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Merger Remedies and Bargaining Power in the Coffee Market*

Yann Delaprez [†] Morgane Guignard [‡]

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Abstract

This paper analyzes a merger of large manufacturers with divestiture in the French coffee market. In contrast to previous approaches used to study the effects of upstream divestitures on prices and welfare, we model the vertical market structure. First, our results show that the standard policy recommendation to require divestiture to small recipient firms may not hold when asymmetric bargaining power between firms is considered. Second, we show that previous models significantly overestimate costs. We estimate costs that are 41 percent lower, and find that divestiture can lead to marginal cost savings for the buyer of the divested brand.

Keywords: merger, remedies, divestiture, vertical markets, bargaining power.
JEL classification: D12, L11, L51, L40.

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1 Introduction

Numerous articles document a rise in market concentration and markups (Grullon et al. (2019), De Loecker et al. (2020), Döpper et al. (2021)). This led to debates over the mechanisms that might explain these findings (Conlon et al. (2023), Eeckhout (2021)). One potential explanation is related to lax merger policy that either did not block directly anti-competitive mergers or implemented ineffective merger remedies (Nocke and Whinston (2022), Kwoka Jr and Waller (2021)).

Divestiture is often considered as the most effective merger remedy and is widely used by competition authorities.[1] Many mergers that are cleared subject to divestitures are horizontal mergers between upstream firms in vertically related industries. In most of these cases, competition authorities assess the potential price effects of these mergers and divestitures based on models assuming that the upstream firms are located downstream.[2] Despite the prevalence of such deals, the effectiveness of divestitures in vertically related markets remains largely unexplored.[3]

The asymmetric bargaining power between upstream and downstream firms is a key feature of vertical markets. Upstream firms bilaterally bargain with downstream firms over wholesale prices to have access to final consumers.

[1] In Europe, between 2004 and 2018, out of the 109 mergers second phase decisions, 9 were prohibited, 62 were cleared conditional on remedies, and 38 cleared without remedies. See www.ec.europa.eu/competition/mergers/statistics.pdf. Over 80% of conditional approvals in either 'phase I' or 'phase II' rely on structural remedies that is the divestiture of assets or brands to competitors (Gerard and Komninos (2020)). In the U.S., between 2003 and 2012 more than 60% of mergers raising competitive concerns were cleared by the competition authorities conditional on the implementation of remedies such as divestiture (Kwoka (2014)).

[2] DEMB/MONDELEZ (Case M.7292) in the coffee market; Sara Lee/Unilever (Case COMP/M.5658) in the deodorants market and INEOS/Solvay (Case M.6905) in the chemicals market are examples of upstream mergers where merger simulation models based on Bertrand competition have been used either by the parties or by the competition authority.

[3] This is confirmed by Asker and Nocke (2021): "*In light of their prevalence, it is surprising how little is known – theoretically and empirically – about merger remedies*".

This poses a challenge for antitrust enforcement which finds support in conventional economic theories that advocate divestiture as a remedy for mergers. First, competition authorities relying on traditional models may overestimate the need to impose a divestiture. Indeed, downstream firms with large bargaining power may limit the ability of the merger to raise negotiated input prices.[4] Second, antitrust enforcers may mistakenly assess a buyer of a divested brand with a small market share as the most suitable because traditional models, which do not account for bargaining power, predict a positive correlation between firm size and prices. However, bargaining power may not be positively correlated with firm size. Thus, a buyer with small market shares but high bargaining power may harm consumers more than a buyer with relatively large market shares but low bargaining power.

The omission of asymmetric bargaining power in the analysis of mergers and divestitures in vertically related markets also raises empirical concerns about the measurement of costs. In a Nash-Bertrand model where upstream firms (e.g., manufacturers) are assumed to set final prices, marginal costs are obtained as the difference between final prices and manufacturers' markups (e.g., Döpper et al. (2021) and Grieco et al. (2023)). Thus, in the context of a merger between manufacturers, the computed marginal costs include retail margins. This makes it difficult to identify potential cost efficiencies for both the merged entity and for the purchaser of the divested brands.

In this article, we study the effectiveness of divestiture imposed to clear a merger between manufacturers taking into account the vertical market structure. To do so, we quantify the impact of upstream divestiture on markups and costs in a Nash-bargaining model. This allows to address two questions remaining unanswered, even though they pose major issues for designing merger policy. First, how do upstream

[4]This type of argument is encountered in merger case M.5658 Unilever/Sara Lee, where the parties argue that "*the Commission's analysis is likely to overstate the likely price increase from the merger*" precisely because the standard model used by the European Commission ignores the vertical market structure and the fact that retailers may be powerful.

divestitures affect markups versus efficiency in vertically related markets? Second, how should antitrust authorities assess the choice of buyer of divested brands?

To answer these questions, we use data from Kantar Worldpanel on consumer coffee purchases in France from 2013 to 2017 and implement a retrospective analysis of the DEMB/Mondelez merger case in the French coffee market.[5] The DEMB/Mondelez case is particularly relevant to analyze the effectiveness of an upstream merger with divestiture in a vertically related market. First, bargaining power is a key feature of the coffee market. Prices of raw coffee are volatile, therefore negotiating more fiercely when the price of coffee is high allows manufacturers to limit these fluctuations (Blouin and Macchiavello (2019)). Second, the competition authority and the parties used models ignoring the vertical market structure to assess the price effects of the merger and divestiture. Thus, the DEMB/Mondelez merger case is an ideal laboratory to examine the extent to which merger and divestiture policy could be improved by quantifying and accounting for bargaining power.

Our analysis starts with event study evidences studying the impact of the merger and the divestiture on retail prices. We show that, relative to the prices of products not directly involved in any of the mergers and divestitures, the merged entity raised prices by about 3.3 percent. These estimates can be compared to previous estimates found in the literature as the price effects of mergers without divestiture are studied extensively. For instance, Ashenfelter and Hosken (2010) studies five mergers among which four led to price increases. They find estimates ranging from 3 to 7 percent. Our estimates are close to the lowest effects they found, which is consistent with the fact that retailers have, on average, more bargaining power than the manufacturers in the French coffee market. We also estimate that the prices of the divested brand decreased by about 2.5 percent. The buyer of the divested brand decreased the prices of its other products by about 3.4 percent. The prices effect of a divestiture on the

[5]See, Case M.7292 - DEMB/Mondelez/Charger OPCO - https://ec.europa.eu/competition/mergers/cases/decisions/m7292_3753_2.pdf; in this article, we use the terms 'merger' and 'joint venture' interchangeably and will primarily refer to this as a 'merger'.

price of the products sold by the buyer of the divested brands is studied by Friberg and Romahn (2015) for a divestiture imposed to clear a merger in the Swedish beer market. They find that the price of the divested product falls by about 3.2 percent and prices of products initially owned by the buyer of the divested brand raise by about 2.6 percent. Contrary to Friberg and Romahn (2015), we find a fall in prices for product initially owned by the buyer of the divested brand supporting the presence of cost efficiencies.

As a result, some consumers pay higher prices while others pay lower prices, and the observed price changes do not allow for drawing conclusions about the net effect of the merger and divestiture on welfare that may be driven by opposite mechanisms. To assess the net effect on consumer welfare, we estimate a structural model of bargaining building on the framework developed by Gowrisankaran et al. (2015) or Crawford et al. (2018) in including asymmetric bargaining power and cost efficiencies. We also leverage this additional structure imposed on the data to explain the mechanisms through which pro- and anti-competitive effects of merger with divestiture affect consumers in a vertically related market.

A typical anti-competitive effect caused by mergers is the negative impact on markups (Bjornerstedt and Verboven (2016)). We find that the merger increased upstream markups by around 12 percent. Our approach differs from that of Bjornerstedt and Verboven (2016) by studying and modeling a somewhat less specific market structure where bargaining power is a key feature and studying the divestiture.[6] In complement to the similar economic mechanisms in Bjornerstedt and Verboven (2016), our model quantifies two additional pro-competitive effects. First, our results suggest that retailers have relatively higher bargaining power than manufacturers. Secondly, the buyer of the divested brand may have achieved marginal cost savings on the products already in its portfolio. Despite these two pro-competitive effects and the implemented divestiture, we find that the merger had a negative im-

[6]The Swedish Analgesics Market is quite peculiar. In their analysis, the distributor Apoteket set a fixed percentage markup on the wholesale prices paid to pharmaceutical companies.

pact on consumer surplus. This mainly explained by the fact that markups associated with the divested brand increased by about 84 percent.

Our estimation of costs in vertical markets also contributes to the recent literature quantifying markups estimating models of Nash-Bertrand pricing by manufacturers (Grieco et al. (2023) or Döpper et al. (2021)). These papers point out that changes in costs are a key channel for understanding the extent to which markups affect prices. However, these models do not take vertical market structure into account. In this paper, we show that this may overestimate costs by about 41 percent. Another example directly related to divestiture is Alviarez et al. (2020). They study the effect of divestitures on a price index in the beer market across 76 countries. They estimate an oligopoly model assuming that final prices result from competition between manufacturers directly selling their products to consumers. They find that divestitures decrease a beer price index by 1 percent to 6 percent relative to a situation in which the merger is approved without divestiture. They found that this effect is not driven by marginal cost savings. By contrast, we do identify cost efficiencies for the buyer of a divested brand. Despite the key role of cost efficiencies in merger review, to the best of our knowledge, there are no estimates of cost efficiencies for a buyer of a divested brand available in the literature. Thus, these estimates add to the empirical literature estimating merger-induced cost efficiencies, such as Miller and Weinberg (2017).

Finally, with the estimated model we derive new policy recommendation on the choice of the buyer of the divested brand in markets where bargaining power is an important feature. In this paper, we show that a buyer that has small market shares but high bargaining power can deteriorate consumer surplus more than a larger buyer with relatively lower bargaining power. This contrasts strongly with the policy recommendation corresponding to aim for small buyers in horizontal markets derived in Nash-Bertrand models (Friberg and Romahn (2015)).

The article is organized as follows. Section 2 presents the DEMB/Mondelez merger case, the data, and descriptive statistical facts. Section 3 documents the

event study evidences studying the impact of the merger and the divestiture on retail prices. Section 4 develops the demand model and discusses estimation results. Section 5 introduces the supply model of vertically related market. Section 6 calculates the change in consumer surplus resulting from the merger and offers policy recommendations regarding the selection of the buyer for the divested brand. Section 7 concludes.

2 Industry Background and Data Pattern Relevant for Identification

2.1 The DEMB/Mondelez Merger

In May 2015, DEMB and Mondelez merged to combine their coffee businesses. The resulting firm, called Jacobs Douwe Egberts (JDE), said in a press release that it expects to become the world's leading coffee company with annual sales of more than €5 billion.[7] JDE owns world-leading brands such as L'OR, Senseo and Tassimo. The company has market-leading positions in several countries, including France. At the time of the merger, the specialist business press expected JDE to be the leader in terms of volume produced and Nestlé to be the leader in terms of value.[8] The French coffee market is dominated by JDE and Nestlé. In France, the European Commission cleared the merger subject to a divestiture, arguing that L'Or, owned by DEMB, and Carte Noire, owned by Mondelez, were close substitutes.[9] Thus, this raised concerns about the potential anti-competitive effects of the merger. Consequently, Mondelez

[7] http://www.jacobsdouweegberts.com/company-news/mondelez-international-and-d.e-master-blenders-1753-complete-coffee-transactions/

[8] https://www.lsa-conso.fr/les-nouveaux-maitres-du-cafe,175177

[9] See. p.74, point (369) in the Commission decision of May 5, 2015 (Case M.7292-DEMB/Mondelez/ChargerOpco).

offered to sell its Carte Noire brand to Lavazza.[10] The European Commission evaluated the proposal positively, and Carte Noire was indeed sold to Lavazza in February 2016 for approximately 750 million euros.[11] The divestiture package also comprised Mondelez's manufacturing facility located in France, where Lavazza consolidated all the production lines. This enabled Lavazza to acquire a production plant in France, which gave it access to the French coffee market. Before the merger, Lavazza distributed its brand in France but did not have any production facilities in the country. This feature of the institutional setting strongly suggests cost efficiencies for the buyer of the divested brand. We incorporate this feature in our structural model.

2.2 Data

We use scanner data from Kantar Worldpanel on coffee purchases in France from 2013 to 2017. The data are collected from a panel of voluntary households scanning their purchases. Before cleaning the data, our dataset contains 1,296,395 observations. In our dataset, a row corresponds to a purchase of coffee by an individual, including information related to the product, such as the price or the name of the manufacturer. In addition, information about the store where the product was purchased is available.

We focus our analysis on the biggest retailers and manufacturers following standard practice in the empirical Industrial Organization literature.[12] We keep purchases in the 7 main retailers: Carrefour, Leclerc, ITM, Auchan, Système U, Casino and an aggregate of discounters. We also focus the analysis on the brands produced by

[10] The divestiture also included Mondelez' Lavérune (south of France) manufacturing facility in which Lavazza pooled all the production line of Carte Noire previously located across different factories. See. p.125, in the Commission decision of May 5, 2015 (Case M.7292-DEMB/Mondelez/ChargerOpco).

[11] https://www.lesechos.fr/2016/02/lavazza-finalise-le-rachat-de-carte-noire-196305

[12] For example, in Bonnet and Dubois (2010), they focus on purchases from the top seven retailers, which represent 70.7% of total purchases in the sample.

the 8 largest manufacturers: DEMB, Lavazza, Legal, Malongo, Mondelez, Nestlé, Segafredo and an aggregate of private labels.[13] Thus, we include all manufacturers mentioned in the merger case. There are 15 national brands and some private labels, which are brands sold under the retailer's name. We study three segments: Roasts and Grounds, Beans, and Pads. We define a market as a month-year combination in France. We end up with a data set consisting of 966076 purchases, representing 74.52 percent of the total purchases in the sample. In the analysis, a product is defined as a brand-segment-retailer combination. The aggregation of the data results in a final dataset that is an unbalanced panel of 218 different products. The final dataset consists of 11682 observations.

2.3 Economic Importance and Data Pattern Relevant for Identification

In this subsection, we present some data patterns that demonstrate the economic importance the divestiture studied, as well as key variations that we use to identify our structural model.

Given the limited evidence in the literature on the price and welfare effects of a divestiture, a natural question to address is to what extent divestiture has important economic consequences. To show that it generated a significant change in market shares in the French coffee market, we display the average market shares by brand before and after the merger in Table 1.[14] The period before the merger comprises of 28 months (465581 observations).[15] The period after the divestiture is made of 22 months (334200 observations). The period between the approval of the merger

[13] We have a total of 28 private labels, thus representing one private label per segment for each retailer and representing in total over the sample period 1575 observations.

[14] In the following analysis, manufacturers 1 and 2 merge their coffee businesses in the new joint venture. Manufacturer 5 is the buyer of the divested brand. Average prices by brand before the merger and after the divestiture are displayed in Appendix A.

[15] We refer to observations before aggregating the data by product/market.

and divestiture comprises of 10 months. We show that the divestiture we observe is (i) quantitatively and (ii) economically important. (i) The change in average market share for the buyer of the divested brand is large, going from 1.83 percent to 13.41 percent. (ii) Before the merger, Manufacturer 5 is at the bottom of the hierarchy in terms of average market shares. After the merger, Manufacturer 5 ranks third in terms of average market shares. The market share for Manufacturer 1 (resp. Manufacturer 2) is equal to 20.08 percent (resp. 29.64 percent). After the merger, the market share of the new entity is about 35.47 percent. Thus, the data shows that the divestiture had first-order economic effects in the French coffee market. The model in this article allows for identifying and assessing these effects. Note also that the change in product portfolio caused by the merger and divestiture is associated with large changes in market shares, leading to variation in markups. This variation at the portfolio level is a key source of identifying variation needed for the model we estimate in this article.

Table 1. Market Shares Pre-Merger and Post-Divestiture Period By Brand (%)

		Pre		Post	
Firm	Brand	mean	s.d	mean	s.d
	Private Labels	34.10	1.36	34.24	1.53
Manuf. 1	**Brand 1**	7.17	0.97	7.32	1.00
	Brand 2	11.47	1.18	10.94	1.07
	Brand 3	1.44	0.28	0.75	0.20
Manuf. 2	**Brand 4** (divested brand)	12.42	1.08		
	Brand 5	0.76	0.12	1.02	0.21
	Brand 6	4.21	0.57	3.06	0.40
	Brand 7	10.53	1.06	11.07	0.65
	Brand 8	1.72	0.27	1.31	0.13
Manuf. 3	**Brand 9**	6.06	0.89	7.27	0.33
	Brand 10	3.35	0.40	3.71	0.64
Manuf. 4	**Brand 11**	2.03	0.32	2.24	0.39
Manuf. 5	**Brand 12**	1.83	0.25	1.89	0.55
	Brand 4 (divested brand)			11.52	1.55
Manuf. 6	**Brand 13**	2.24	0.41	2.73	0.33
Manuf. 7	**Brand 14**	0.49	0.09	0.68	0.15
	Brand 15	1.12	0.32	1.16	0.26

Note: The table reports the average (across markets) market shares before the merger (28 months) and after the divestiture (22 months).

3 Impact of Merger and Divestiture on Retail Prices

We begin by examining the impact of the merger and divestiture on retail prices using the raw data through a theory-free approach, focusing on descriptive evidence to understand the changes in prices.

3.1 Empirical Specification

We estimate a generalized difference-in-differences specification. Our identification strategy compares product prices of firms involved in the merger and divestiture to those of firms not involved in the merger and divestiture around the time of the merger. The identification strategy is similar to Craig et al. (2021). It is summarized by the following equation:

$$\begin{aligned} log(p_{jt}) = K + \alpha_j + \alpha_t + \delta_1 \mathbb{1}_{M1} \times \mathbb{1}_{\text{Post}} + \delta_2 \mathbb{1}_{M2} \times \mathbb{1}_{\text{Post}} + \\ \delta_3 \mathbb{1}_{\text{Divested Brand}} \times \mathbb{1}_{\text{Post}} + \delta_4 \mathbb{1}_{\text{Buying Manufacturer}} \times \mathbb{1}_{\text{Post}} + \\ \beta_1 \mathbb{1}_{M1} \times \mathbb{1}_{\text{Transitory}} + \beta_2 \mathbb{1}_{M2} \times \mathbb{1}_{\text{Transitory}} + \beta_3 \mathbb{1}_{\text{Divested Brand}} \times \mathbb{1}_{\text{Transitory}} + \\ \beta_4 \mathbb{1}_{\text{Buying Manufacturer}} \times \mathbb{1}_{\text{Transitory}} + X_{jt}\gamma + u_{jt}, \quad (1) \end{aligned}$$

where p_{jt} is the retail price of product j at time t. α_t is a month-year specific term that aims to capture changes in market structure that are product invariant. α_j is a product specific term. $\mathbb{1}_{\text{Post}}$ is an indicator equal to 1 if period t belongs to the post-merger/divestiture period. $\mathbb{1}_{\text{Transitory}}$ is an indicator equal to 1 if t belongs to the period between the approval of the merger and the finalization of the divestiture (all months between May 2015 and February 2016). $\mathbb{1}_{M1}$ is an indicator equal to 1 for products owned by the merging manufacturer M1. $\mathbb{1}_{M2}$ is an indicator equal to 1 for product owned by the merging manufacturer M2. $\mathbb{1}_{\text{Divested Brand}}$ is an indicator equal to 1 if the product is from Brand 4 (divested) after the merger/divestiture. $\mathbb{1}_{\text{Buying Manufacturer}}$ is an indicator equal to 1 for all other products owned by the buyer

of the divested brand. $X_{jt}\gamma$ control for any other time-varying product characteristics or shocks that we observe, such as the percentage of Arabica coffee or the creation of buying alliances at the end of 2014.[16]

Estimating the effect of a merger on retail prices presents challenges that are well documented in the merger literature (Ashenfelter and Hosken (2010)). The first relates to the choice of the control group. Any control group chosen may respond strategically to changes in prices set by the merger and the buyer of the divested brand. For example, if the merged entity raises prices after the merger, any producer in the control group that produces products that are close substitutes might also raise prices. We choose the control group that most reasonably satisfies the parallel trend assumption.

Our preferred control group includes the products sold by Manufacturer 6. We report the results in Table 2. In column (i), we estimate Equation (1) including only product dummies as controls. In column (ii), we also add market dummies as controls. In column (iii), we add time-varying product characteristics: the percentage of Arabica, organic and decaffeinated coffee in product j at time t and three dummies controlling for the formation of buying alliances at the end of 2014. Specifically, we create a dummy equal to 1 for manufacturers' products, i.e. national brands (NB), sold by a retailer belonging to a buying alliance in the post-buying alliance period ($\mathbb{1}_{\text{Buying alliance 1}} \times \mathbb{1}_{\text{NB}} \times \mathbb{1}_{\text{Post alliance 1}}$, $\mathbb{1}_{\text{Buying alliance 2}} \times \mathbb{1}_{\text{NB}} \times \mathbb{1}_{\text{Post alliance 2}}$, $\mathbb{1}_{\text{Buying alliance 3}} \times \mathbb{1}_{\text{NB}} \times \mathbb{1}_{\text{Post alliance 3}}$). In column (iv), we add variables controlling for potential transitory price effects in the period between the merger and the divestiture.

The estimated effects of the merger are given by $\hat{\delta_1}$ and $\hat{\delta_2}$. According to this

[16] In 2014, Auchan and Système U (September). (https://www.lemonde.fr/economie/article/2014/09/11/auchan-et-systeme-u-vont-faire-achats-communs_4486156_3234.html), Casino and Intermarché (November) (https://ec.europa.eu/commission/presscorner/detail/fr/IP_19_6216); Carrefour and Cora (December) (https://www.lemonde.fr/economie/article/2014/12/22/les-distributeurs-carrefour-et-cora-s-associent-pour-acheter-moins-cher_4545088_3234.html) created three separate buying alliances to negotiate prices with manufacturers, excluding private labels.

specification, the merger led to an average price increase of about 3.3 percent for products sold by Manufacturer 2. It suggests that neither buyer power nor cost efficiencies are sufficient to limit the anti-competitive effects of the merger. The price effect for products sold by Manufacturer 1, that is the merging firm not involved in the divestiture, is not statistically significant.

The estimated effects of the divestiture are given by $\hat{\delta_3}$ and $\hat{\delta_4}$. Prices of the divested brand decrease on average by about 2.5 percent in the post-merger period. This is intuitive because the divested brand is part of a relatively smaller product portfolio than before, so its new owner (the buyer of the divested brand) has relatively less leverage to increase prices in negotiations. The prices of the products initially owned by the buyer of the divested brand decrease on average in the post-merger period. This decrease amounts to 3.4 percent. In the absence of cost savings on these products, this decrease is counter-intuitive.

Table 2. Actual Price Effects, Two-Year Window

	$ln(p_{jt})$	$ln(p_{jt})$	$ln(p_{jt})$	$ln(p_{jt})$
	(i)	(ii)	(iii)	(iv)
$\mathbb{1}_{M1} \times \mathbb{1}_{\text{Post}}$	-0.031***	-0.016*	-0.0096	0.0066
	(0.0094)	(0.012)	(0.0090)	(0.010)
$\mathbb{1}_{M2} \times \mathbb{1}_{\text{Post}}$	0.012*	0.027***	0.032***	0.033***
	(0.0070)	(0.010)	(0.0086)	(0.0098)
$\mathbb{1}_{\text{Buying Manufacturer}} \times \mathbb{1}_{\text{Post}}$	-0.065***	-0.050***	-0.044***	-0.034***
	(0.014)	(0.016)	(0.010)	(0.013)
$\mathbb{1}_{\text{Divested Brand}} \times \mathbb{1}_{\text{Post}}$	-0.041***	-0.026***	-0.031***	-0.025**
	(0.0081)	(0.011)	(0.010)	(0.011)
% Arabica coffee			0.088***	0.092***
			(0.015)	(0.014)
% Organic			0.026	0.030
			(0.018)	(0.018)
% Decaffeinated			0.22***	0.23***
			(0.034)	(0.034)
$\mathbb{1}_{\text{Buying alliance 1}} \times \mathbb{1}_{\text{NB}} \times \mathbb{1}_{\text{Post alliance 1}}$			✓	✓
$\mathbb{1}_{\text{Buying alliance 2}} \times \mathbb{1}_{\text{NB}} \times \mathbb{1}_{\text{Post alliance 2}}$			✓	✓
$\mathbb{1}_{\text{Buying alliance 3}} \times \mathbb{1}_{\text{NB}} \times \mathbb{1}_{\text{Post alliance 3}}$			✓	✓
Product dummies	✓	✓	✓	✓
Market dummies		✓	✓	✓
Transitory controls				✓
N	4268	4268	4268	4268
adj. R^2	0.986	0.986	0.987	0.987

Notes: The table reports the estimated parameters from the regression model in Equation (1). Standard errors are clustered at the brand-retailer-year level in parentheses. $+p < 0.1$, $*p < 0.05$, $**p < 0.01$, $***p < 0.001$.

Indeed, the divested brand is an additional margin that is likely to allow the buyer of the divested brand to increase the prices of the products that were already in its portfolio before the divestiture. Thus, this estimate suggests that the buyer of the divested brand may have achieved some cost savings for the products already in its portfolio. It also justifies why, starting in Section 4, we estimate a structural model to disentangle the extent to which the observed price effects arise from a trade-off between the likely pro-competitive and anti-competitive effects of the merger and the divestiture.

Another difficulty associated with our empirical strategy, and raised in Ashenfelter and Hosken (2010), is the choice of sample around, before, and after the merger event. The former is key to obtain estimates that are not contaminated by transitory effects. The latter is important to rule out changes in the market that are not due to the merger. We do not drop the data corresponding to the period around the merger, but control for possible transitory effects. In our cases, the merger is officially approved in May 2015, but the divestiture is officially finalized in February 2016. This period might contains transitory selection effects. Our specification, through the terms $\beta_1 \mathbb{1}_{M1} \times \mathbb{1}_{\text{Transitory}}$, $\beta_2 \mathbb{1}_{M2} \times \mathbb{1}_{\text{Transitory}}$, $\beta_3 \mathbb{1}_{\text{Divested Brand}} \times \mathbb{1}_{\text{Transitory}}$ and $\beta_4 \mathbb{1}_{\text{Buying Manufacturer}} \times \mathbb{1}_{\text{Transitory}}$, capture these effects.[17] In column (iv), we show that the inclusion of these variables leaves the price effect for the product sold by Manufacturer 2 almost unchanged. In contrast, the estimates associated with the divestiture are slightly less negative. This suggests that most of the effects do not take place in the transitory period.

Our preferred comparison window is the largest sample for which we have complete pre- and post-merger year around the transitory period. Note that it is in line with the literature such as Bjornerstedt and Verboven (2016) or Craig et al. (2021) in which one year before and after the merger is used.

[17] In Friberg and Romahn (2015) or Ashenfelter and Hosken (2010) they drop the data corresponding to the period around the merger. Here, we think it is more transparent to keep this data in our sample.

3.2 Event Studies of Merger and Divestiture

We then examine two potential sources of bias in our estimates using an event study: (i) the estimates could be driven by different trends in log prices in the pre-treatment period, (ii) the estimates could be biased by merger effects that develop slowly over time due to price rigidity or anticipatory effects (the treatment was likely known before the actual approval).

Figure 1 shows the event studies plot for the estimated difference-in-differences specification, controlling for product-specific effects, market-specific effects, and time-varying control variables. The horizontal red line shows the difference-in-differences estimates. The 95% confidence intervals are shown, with standard errors clustered at the brand-retailer-year level. The first vertical black line corresponds to the time of merger approval and the second vertical black line corresponds to the finalization of the merger with the divestiture actually implemented.

In panel 1.1 of Figure 1, we plot the estimates for the divested brand. Panel 1.2 plots the event study estimates for the products initially owned by the buyer of the divested brand (i.e., excluding the divested brand).

Our preferred specification shows no evidence of pre-trends for the products of the buyer of the divested brand (excluding the divested brand), except for the first month. For the divested brand, we find evidence of a small statistically significant differential trend in log prices 16 months prior to the divestiture. For both the divested brand and the products owned by the buyer of the divested brand, we observe a decrease in prices starting in October 2016. The decrease is larger than the difference-in-differences estimates. The fact that the price decrease is statistically significant only after a few months is consistent with cost efficiencies that are known to take time to arise (Miller and Weinberg (2017)). To further study this possibility our structural model will incorporate cost efficiencies for the buyer of the divested brand.

Panel 1.3 shows the event study for Manufacturer 2. The results show no evi-

dence of a pre-trend. The price increase provided by our difference-in-differences specification is driven by effects starting 6 months after the divestiture is finalized. The price increase is larger than the effects estimated on the basis of the difference-in-differences. In sum, the parallel trend assumption based on our preferred control group is reasonable. However, we do not claim to recover causal effects. Next, we analyze these results in more detail with an estimated structural model of supply and demand. It allows for exploiting the structure imposed on the data to explain the mechanisms through which pro- and anti-competitive effects of mergers with divestitures affect consumers in vertically related markets. The model also allows us to examine the welfare implications of the merger and to derive policy recommendations.

4 Demand

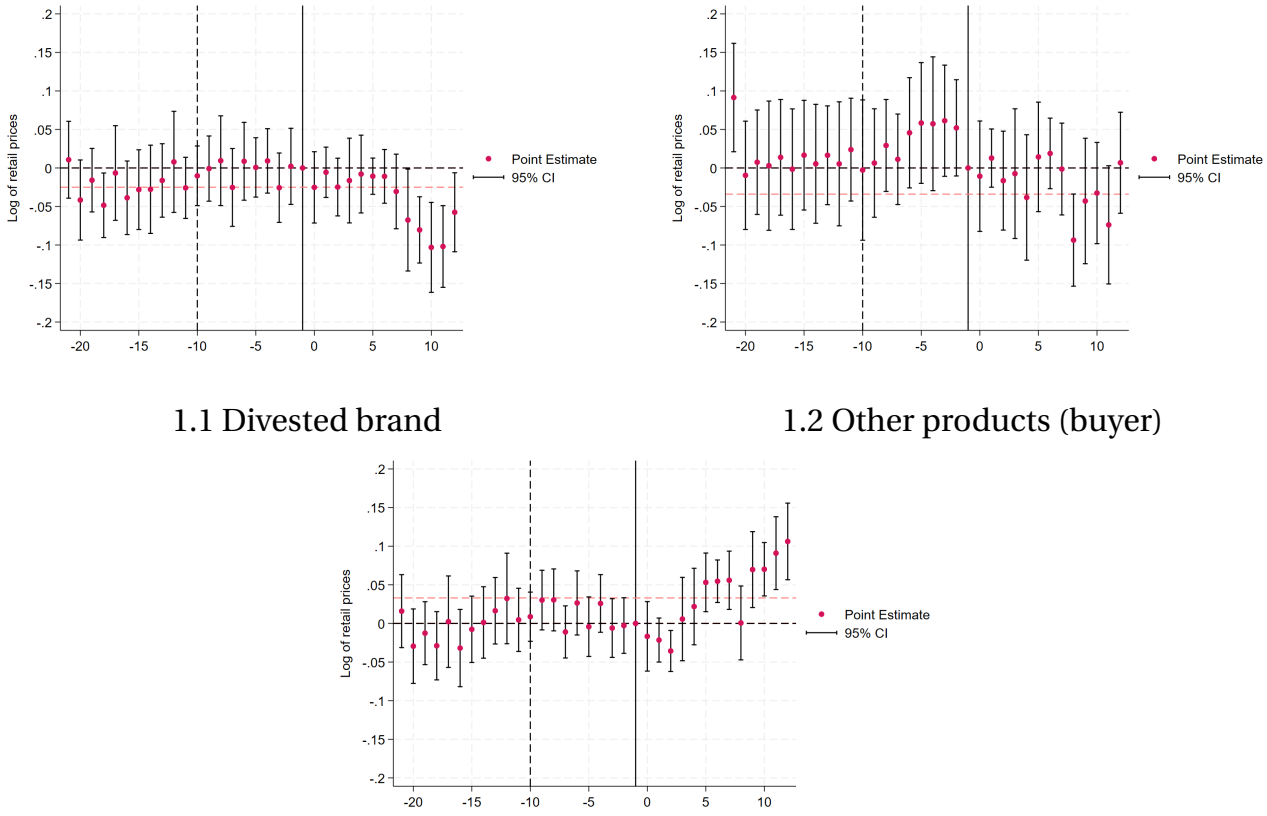
4.1 Random coefficient logit model

To model the consumer substitution patterns, we use a random coefficient logit (RCL) model. Each consumer chooses a product $j \in \mathcal{J}_t = \{1, ..., J\}$ or the outside good $j = 0$. Product j is a brand-segment-retailer combination. Consumers are assumed to purchase one unit of the good that gives the highest utility among $\mathcal{J}_t$ products. The indirect utility function $\mathcal{U}_{ijt}$ for consumer *i* buying product *j* $\in \mathcal{J}_t$ in period *t* is specified as follows:

$$\mathcal{U}_{ijt} = -\alpha_i p_{jt} + \beta_{bs} + \beta_r + \mu_t + \xi_{jt} + \epsilon_{ijt}, \tag{2}$$

where μ_t are time fixed effects, β_r denote retailer dummies, β_{bs} are brand-segment dummies and ξ_{jt} is an unobserved (by the researcher) characteristic of product j in period t. We account for unobserved heterogeneity to model consumer price disutilities such as:

$$\alpha_i = exp(\alpha + \sigma v_i), \quad \text{with} \quad v_i \sim N(0, 1). \tag{3}$$



1.1 Divested brand

1.2 Other products (buyer)

1.3. Merger (M2)

Figure 1. Treatment Effect Estimates

Notes: Event studies plot for the estimated difference-in-differences specification, controlling for product-specific effects, time-specific effects, and time-varying control variables. The horizontal red line shows the difference-in-differences estimates. The 95% confidence intervals are shown, with standard errors clustered at the brand-retailer-year level. The first vertical line corresponds to the time of merger approval and the second vertical line corresponds to the finalization of the merger with the divestiture actually implemented.

Where α represents the mean valuation of p_{jt} and σ is a parameter interpreted as the standard deviation across consumers of the mean valuation of p_{jt}.

The outside option allows consumers to substitute away from the set of products considered. The outside good includes all brands outside the selected sample. These brands have small market shares and represents around 25.36% of the full sample. Placing these products in the outside good group implies that their prices are set exogenously.[18] The indirect mean utility for the products in the outside good is normalized to zero such that:

$$\mathcal{U}_{i0t} = \varepsilon_{i0t}. \tag{4}$$

Assuming that ε_{ijt} is independently and identically distributed across consumers, products and time as a Type 1 Extreme Value, predicted market shares are then given by the logit choice probability integrated over the individual-specific valuation for the price:

$$\begin{aligned} s_{jt}(\delta_{jt}, \alpha, \sigma) &= \int \frac{exp(-\alpha_i p_{jt} + \beta_{bs} + \beta_r + \mu_t + \xi_{jt})}{1 + \sum_{k=1}^{Jt} exp(-\alpha_i p_{kt} + \beta_{bs} + \beta_r + \mu_t + \xi_{jt})} f(\alpha_i) d\alpha_i \\ &= \int \frac{exp(\delta_{jt} - \alpha_i p_{jt})}{1 + \sum_{k=1}^{Jt} exp(\delta_{kt} - \alpha_i p_{kt})} f(\alpha_i) d\alpha_i, \end{aligned}$$

where f(.) is the density of the lognormal distribution. Next, we define q_{jt} the quantity of product j that is sold at t and q_{0t} the quantity of the outside good at t. Thus, the observed market share of product j at t is given by $s_{jt} = \frac{q_{jt}}{\sum_j q_{jt} + q_{0t}}$. The market shares system is defined by:

$$s_{jt}(\delta_{jt}, \alpha, \sigma) = s_{jt}. \tag{5}$$

4.2 Estimation and Instruments

Demand estimation. The estimated parameters are α, σ, 6 parameters corresponding to the retailer dummies (we take Retailer 1 as reference), 44 parameters corre-

[18] The outside good share is in line with comparable studies in the literature. For instance, Dubois et al. (2019) estimates demand for pharmaceuticals products with an outside good market share equal to 29% in Canada and 24% in U.S.

sponding to the brand-segment dummies and 59 parameters corresponding to the time fixed effects (we take month 1, January 2013, as reference). We stack these parameters to be estimated in the vector θ^d. Next, we define the structural error term $g_{jt}(\theta^d) \equiv \xi_{jt}$ as the variation in market shares not explained by the model. The demand unobservables ξ_{jt} are obtained after inverting the system of market shares defined in (5) 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:

$$\underset{\theta^d}{argmin} \quad g(\theta^d)' Z W Z' g(\theta^d). \tag{6}$$

Z is a matrix of instruments and W is a weighting matrix. The vector $g(\theta^d)$ stack the ξ_{jt} over each market. The estimation of the RCL is based on Berry et al. (1995). We follow recommendation presented in Conlon and Gortmaker (2020) regarding best practices for differentiated products demand estimation.

Instruments. Equilibrium prices are determined simultaneously by supply and demand. Therefore, to identify the demand function, one needs instruments that shift supply without directly affecting demand. Failing to instrument price generally provides estimates associated with price that are biased toward zero. We use three types of instruments to solve this issue: (i) cost shifters, (ii) markup shifters, and (ii) BLP-type of instruments.

We construct our cost shifters by studying the institutional setting of the coffee market in the observed period. In 2014, Auchan and Système U (September)[19], Casino and Intermarché (November)[20]; Carrefour and Cora (December)[21] formed three separate buying alliances to negotiate prices with manufacturers, excluding private labels. These events allow us to create three instrumental variables equal to 1 for

[19] See https://www.lemonde.fr/economie/article/2014/09/11/auchan-et-systeme-u-vont-faire-achats-communs_4486156_3234.html

[20] See https://ec.europa.eu/commission/presscorner/detail/fr/IP_19_6216

[21] See https://www.lemonde.fr/economie/article/2014/12/22/les-distributeurs-carrefour-et-cora-s-associent-pour-acheter-moins-cher_4545088_3234.html

manufacturer products (NB) sold by a retailer belonging to a buying alliance in the post-buying alliance period. We argue that these instruments are relevant because buying alliances affect wholesale prices, which are retailers' marginal costs. We assume that buying alliances are orthogonal to demand shocks.[22]

We also use the merger as a markup shifter, as in Miller and Weinberg (2017). Specifically, we create a dummy variable equal to 1 in the post-merger period for the products belonging to the merged entity. Suggestive evidence for the relevance of this instrument is presented in the event studies, which show that prices increase significantly after the merger. The instrument is valid if the demand error term is orthogonal to the merger shock.

Finally, we use classical Berry et al. (1995) instrumental variables, that is, the number of rivals' products within a retailer in each market and the number of rivals' products per segment within a retailer in each market. These instruments are correlated with prices because the price set by retailers depends on the number of rivals' products available within a retailer. In the next section, we formally investigate the relevance condition.

4.3 Demand Estimation Results

Table 3 presents the results for the logit and RCL demand. Column (i) reports the results for the logit demand. The estimate associated with the price is equal to -0.159 and is statistically significant at all standard levels. This demand function leads to an average own-price elasticity of -3.101. The RCL model shown in column (ii) provides an average own-price elasticity of demand of -3.439 which is higher than the one associated with the logit. Based on this specification, a 1% increase in the price of a product reduces demand by about 3.4% on average. The coefficient

[22] In the merger case DEMB/Mondelez (2015), page 71, the parties confirm our view and argue that "*retailers in France are able to exercise significant buyer power. That would be maintained after the transaction in particular since retailers are linked by buying alliances*".

associated with price is negative and statistically significant at all conventional levels. The estimate for standard deviation is equal to 0.55 and is statistically significant at all conventional levels. The F-test associated with the first stage logit IV is equal to 46.39, indicating that the instruments are not weak.[23]

Table 3. Demand Parameter Estimates

	Logit IV (i)	RCL Logit (ii)
Price	-0.159***	-1.42***
	(0.016)	(0.17)
Standard deviation (σ)		0.55***
		(0.18)
μ_t	✓	✓
β_{bs}	✓	✓
β_r	✓	✓
N	11682	11682
Own-price elasticity	-3.101	-3.439
F-test first stage	46.39	

Notes: The table reports the estimated demand parameters based on the logit and random coefficient logit demand implied by the utility functions in (2). There are 11682 observations for the period 2013-2017. Specifications include 6 retailer dummies, 44 brand segment dummies, and 59 month-specific parameters. Standard errors in parentheses. + $p < 0.1$, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$. Retailer and brand segment dummies are reported in Table 13 of Appendix B.

[23] First stage regression is presented in Table 12 of Appendix B.

Table 4 presents the own-price elasticities of the RCL model by segment. The average own-price elasticity of the pads segment is higher than the other two segments. The pads segment has the highest average own-price elasticity of -4.255, indicating more elastic demand compared to the other segments. In contrast, the demand for products in the roast & ground (resp. beans) segment is less elastic. On average, the own-price elasticity of demand for products in the roast and ground segment (resp. beans segment) is equal to -2.807 (resp. -2.734). Draganska et al. (2010) estimate a structural model of demand in the German ground coffee market for 2000-2001 and find an average own-price elasticity ranging from -5.7 to -6.9. Our estimates are consistent with Bonnet and Villas-Boas (2016), who find an average own-price elasticity ranging from -5.26 to -3.10 in the French coffee market over the period 1998-2006 for the beans and roast and ground segments.

Table 4. Own Price Elasticity by Segment

Segment	mean	s.d	min	max
Roast and ground	-2.81	0.70	-5.11	-1.34
Pads	-4.26	1.06	-6.13	-2.13
Beans	-2.73	0.53	-3.73	-1.31
Mean	-3.44	1.13	-6.13	-1.31

Notes: The table reports the average own and cross-price elasticities by segment based on the random coefficient logit model. A comparison of the own-price elasticity with the other papers in the literature is available in Table 15 of Appendix B.

Table 5 provides more details on the elasticities obtained with the RCL model. We show the aggregate own and cross-price elasticities of the 16 brands. The aggregate own-price elasticities range from -1.91 to -4.24. In addition, the buyer of the divested brand acquired a brand that is a relatively close substitute for the products that were already in its product portfolio.

Table 5. Own and Cross-Price Elasticities by Brand

		Brand														
	PLs	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
PLs	-1.91	0.20	0.30	0.02	0.29	0.03	0.07	0.36	0.04	0.25	0.14	0.04	0.04	0.06	0.01	0.02
Brand 1	0.61*	-3.94	0.23	0.01	0.27	0.03	0.04	0.44	0.02	0.36	0.15	0.04	0.03	0.06	0.01	0.02
Brand 2	0.71	0.25	-3.24	0.02	0.29	0.04	0.05	0.48	0.03	0.34	0.18	0.04	0.04	0.07	0.01	0.02
Brand 3	0.82	0.17	0.29	-2.31	0.29	0.03	0.07	0.32	0.04	0.21	0.13	0.04	0.04	0.06	0.01	0.02
Brand 4	0.75	0.24	0.31	0.02	-2.96	0.04	0.06	0.42	0.03	0.30	0.16	0.04	0.04	0.06	0.01	0.02
Brand 5	0.64	0.31	0.30	0.01	0.28	-3.99	0.05	0.53	0.03	0.40	0.19	0.04	0.03	0.07	0.01	0.02
Brand 6	0.82	0.16	0.29	0.02	0.29	0.03	-2.17	0.32	0.04	0.21	0.13	0.04	0.04	0.06	0.01	0.02
Brand 7	0.59	0.39	0.28	0.01	0.27	0.04	0.04	-3.90	0.02	0.44	0.19	0.03	0.03	0.07	0.01	0.02
Brand 8	0.80	0.18	0.31	0.02	0.30	0.03	0.07	0.38	-2.76	0.26	0.15	0.04	0.04	0.06	0.01	0.02
Brand 9	0.55	0.44	0.26	0.01	0.26	0.04	0.03	0.57	0.02	-4.24	0.19	0.03	0.03	0.07	0.01	0.02
Brand 10	0.62	0.33	0.29	0.01	0.27	0.04	0.04	0.54	0.02	0.41	-3.98	0.04	0.03	0.07	0.01	0.02
Brand 11	0.80	0.21	0.29	0.02	0.29	0.03	0.07	0.35	0.03	0.24	0.14	-2.67	0.04	0.06	0.01	0.02
Brand 12	0.79	0.19	0.30	0.02	0.29	0.03	0.07	0.38	0.04	0.26	0.15	0.04	-2.75	0.06	0.01	0.02
Brand 13	0.70	0.29	0.29	0.02	0.28	0.04	0.05	0.46	0.03	0.34	0.16	0.04	0.04	-3.52	0.01	0.02
Brand 14	0.84	0.19	0.28	0.02	0.29	0.03	0.07	0.32	0.04	0.21	0.13	0.04	0.04	0.06	-2.40	0.02
Brand 15	0.75	0.23	0.30	0.02	0.29	0.03	0.06	0.40	0.03	0.28	0.15	0.04	0.04	0.06	0.01	-3.09

Notes: The table reports aggregate own and cross-price elasticities by brand based on the RCL model. Brands in bold are the brands owned by the merger. *brand 4* is the divested brand. * For example, the table shows that a 1 percent change in the price of private label products increases sales of Brand 1 products by 0.61 percent.

5 Supply

The supply model assumes a vertical market structure with M upstream manufacturers and R downstream retailers. We denote Θ_t^M the set of products owned by the manufacturer *m* at time t and Θ_t^R the set of products sold by the retailer *r* at time t.

5.1 Vertical Supply Model

We assume that manufacturers' profit are given by:

$$\Pi_t^M(p) = \sum_{j \in \Theta_t^M} (w_{jt} - mc_{jt}^M)\mathcal{M}_t s_{jt}(p), \tag{7}$$

where mc_{jt}^M is the manufacturer's marginal cost of producing the product j at time t. Retailers' profit is given by:

$$\Pi_t^R(p) = \sum_{j \in \Theta_t^R} (p_{jt} - w_{jt} - mc_{jt}^R)\mathcal{M}_t s_{jt}(p), \tag{8}$$

where $\mathcal{M}_t$ is the total market size, p_{jt} the retail price, w_{jt} the wholesale price, mc_{jt}^R the retail marginal cost of distributing the product j at time t.

Our empirical framework is guided by a bilateral bargaining game, in line with Gowrisankaran et al. (2015). In each period t, we consider a game where manufacturers and retailers engage simultaneously and secretly in bilateral bargains to set wholesale prices.[24] At the same time, retailers compete on prices in the downstream market and set final prices for each product. The timing assumption of simultaneous moves, meaning that manufacturer-retailer bargaining and retailer competition occur simultaneously, is common in the Nash-bargaining literature; for example, it is an assumption made in Crawford et al. (2018), Ho and Lee (2017) and Draganska et al. (2010).[25] We start with the downstream market.

[24] Negotiation are product by product.

[25] An alternative assumption would be sequential moves in which vertical contracts are negotiated before the downstream competition as in Crawford and Yurukoglu (2012).

Bertrand-Nash Competition

Retail prices are determined in a pure-strategy Nash equilibrium. The maximization problem of retailer r at time t is given by:

$$\max_{\{p_{jt} \in \Theta_t^R\}} \Pi_{rt}^R(p) = \sum_{j \in \Theta_t^R} (p_{jt} - w_{jt} - mc_{jt}^R) \mathcal{M}_t s_{jt}(p), \tag{9}$$

Following (9), the first-order condition with respect to p_{jt} is given by:

$$s_{jt}(p) + \sum_{k \in \Theta_t^R} (p_{kt} - w_{kt} - mc_{kt}^R) \frac{\partial s_{kt}(p)}{\partial p_{jt}} = 0, \forall j \in \Theta_t^R. \tag{10}$$

Following (10), we obtain J equations per market t with J unknowns $(w_j - mc_j^R)$. Therefore, the system of J first-order conditions in vector notation can be written as follows:

$$s_t(p) + (I_t^R \odot \Omega_t(p))(p_t - w_t - mc_t^R) = 0,$$

where $\Omega_t(p)$ is a $J \times J$ block-diagonal matrix. The (j,k)-element of $\Omega_t(p)$ is defined as $\dfrac{\partial s_{kt}(p)}{\partial p_{jt}}$. The block-diagonal matrix I_t^R is of dimension $J \times J$. The (j,k)-element of I_t^R is defined as:

$$I_{jkt}^R = \begin{cases} 1 & \text{if } j \text{ and } k \text{ are sold by the same retailer} \\ 0 & \text{otherwise.} \end{cases} \tag{11}$$

We can invert the following expression to obtain the retail margins:

$$\mathbf{m}_t^R \equiv -(I_t^R \odot \Omega_t(p))^{-1} s_t(p) = p_t - (w_t + mc_t^R), \tag{12}$$

with $\mathbf{m}_t^R$ the retail margin and $w_t + mc_t^R$ the retail marginal costs. Next, we can recover the vector of retail marginal costs as $w_t + mc_t^R = p_t - \mathbf{m}_t^R$. We now move to the upstream market.

Nash-Bargaining

We consider an asymmetric Nash-in-Nash bargaining framework à la Horn and Wolinsky (1988). The equilibrium wholesale price of the bilateral negotiation is the argu-

ment that maximizes the following equation:

$$\max_{w_{jt}}[\pi^R_{jt}(w_{jt},p) - d^R_{jt}(\backslash j)]^{\lambda_{jt}} \times [\pi^M_{jt}(w_{jt},p) - d^M_{jt}(\backslash j)]^{(1-\lambda_{jt})}, \tag{13}$$

where λ_{jt} (resp. $1-\lambda_{jt}$) is a bargaining weight for the retailer (resp. for the manufacturer).[26] π^R_{jt} and π^M_{jt} denote the profit of retailer r and manufacturer m for the product j such that:

$$\pi^R_{jt} = (p_{jt} - w_{jt} - mc^R_{jt})\mathcal{M}_t s_{jt}(p) \tag{14}$$

$$\pi^M_{jt} = (w_{jt} - mc^M_{jt})\mathcal{M}_t s_{jt}(p) \tag{15}$$

We denote d^R_{jt} and d^M_{jt} the disagreement payoff, i.e the outcome of manufacturer m and retailer r realized if the manufacturer-retailer pair fails to reach an agreement as follows:

$$d^R_{jt}(\backslash j) = \sum_{k\in\Theta^R_t\backslash j}(p_{kt} - w_{kt} - mc^R_{kt})M_t\Delta s_{kt}(\backslash j) \tag{16}$$

$$d^M_{jt}(\backslash j) = \sum_{k\in\Theta^M_t\backslash j}(w_{kt} - mc^M_{kt})M_t\Delta s_{kt}(\backslash j), \tag{17}$$

with $\Delta s_{kt}(\backslash j)$ is the difference in market shares of product k that occurs when the product j is no longer sold by retailer r. For manufacturer m, the disagreement payoff depends on its sale made on its other products. For retailer r, the disagreement payoff depends on sales made on others' product belonging to the manufacturer m and contracts engaged with other manufacturers.

The division of surplus generated by the bilateral contract between manufacturer m and retailer r for product j is given by the first-order condition:[27]

$$\lambda_{jt}(\pi^M_{jt}(w_{jt},p) - d^M_{jt}(\backslash j))\frac{\partial \pi^R_{jt}}{\partial w_{jt}} + (1-\lambda_{jt})(\pi^R_{jt}(w_{jt},p) - d^R_{jt}(\backslash j))\frac{\partial \pi^M_{jt}}{\partial w_{jt}} = 0. \tag{18}$$

[26] We denote λ_{jt} as the Nash bargaining weight per product/market. It can also be similar for all products within a supplier-retailer combination.

[27] See. Appendix C for derivations.

This expression reveals two sources of bargaining forces. The terms $\pi_{jt}^{M}(\omega_{jt}, p^{\star}) - d_{jt}^{M}(\backslash j))$ and $\pi_{jt}^{R}(\omega_{jt}, p^{\star}) - d_{jt}^{R}(\backslash j))$ represent the gain from trade obtained by the manufacturer and the retailer. The bargaining leverage is low if the gain from trade is high because the firm will significantly lose from not reaching an agreement. This channel will be referred to as bargaining leverage and contrast with the bargaining power channel represented by the exogenous Nash bargaining weights λ_{jt}.

Given that retail prices are fixed during the bargaining stage, from (14) and (15) we have:

$$\frac{\partial \pi_{jt}^{R}}{\partial w_{jt}} = -\mathcal{M}_t s_{jt}(p)$$
$$\frac{\partial \pi_{jt}^{M}}{\partial w_{jt}} = \mathcal{M}_t s_{jt}(p)$$

Consequently, the first order condition given by equation (18) can be written as follows:

$$\pi_{jt}^{M}(w_{jt}, p) - d_{jt}^{M}(\backslash j) = \frac{1-\lambda_{jt}}{\lambda_{jt}}(\pi_{jt}^{R}(w_{jt}, p) - d_{jt}^{R}(\backslash j))$$

Using (14) and (15) we have:

$$\underbrace{(w_{jt} - mc_{jt}^{M})}_{\mathbf{m}_{jt}^{M}}\mathcal{M}_t s_{jt}(p) - d_{jt}^{M}(\backslash j) = \frac{1-\lambda_{jt}}{\lambda_{jt}}\left(\underbrace{(p_{jt} - w_{jt} - mc_{jt}^{R})}_{\mathbf{m}_{jt}^{R}}\mathcal{M}_t s_{jt}(p) - d_{jt}^{R}(\backslash j)\right),$$

where $\mathbf{m}_{jt}^{M} \equiv w_{jt} - mc_{jt}^{M}$ is the manufacturer margin and $\mathbf{m}_{jt}^{R} \equiv p_{jt} - w_{jt} - mc_{jt}^{R}$ is the retailer margin for product j at time t. Next, replacing the disagreement payoff given by (16) and (17) we obtain the following equation:

$$\mathbf{m}_{jt}^{M}\mathcal{M}_t s_{jt}(p) - \sum_{k \in \Theta_t^{M} \backslash j} \mathbf{m}_{kt}^{M}\mathcal{M}_t \Delta s_{kt}(\backslash j) = \frac{1-\lambda_{jt}}{\lambda_{jt}}\left(\mathbf{m}_{jt}^{R}\mathcal{M}_t s_{jt}(p) - \sum_{j \in \Theta_t^{R} \backslash j} \mathbf{m}_{kt}^{R}\mathcal{M}_t \Delta s_{kt}(\backslash j)\right) \tag{19}$$

Let's define $\mathcal{S}_t$ as the following $J \times J$ matrix:

$$\mathcal{S}_t = \begin{pmatrix} s_{1t} & -\Delta s_{2t}(\backslash 1) & \dots & -\Delta s_{Jt}(\backslash 1) \\ -\Delta s_{1t}(\backslash 2) & s_{2t} & \dots & -\Delta s_{Jt}(\backslash 2) \\ \vdots & \vdots & \ddots & \vdots \\ -\Delta s_{1t}(\backslash J) & -\Delta s_{2t}(\backslash J) & \dots & s_{Jt} \end{pmatrix},$$

and re-write equation (19) in matrix form:

$$(I_t^M \odot \mathcal{S}_t)\mathbf{m}_t^M = (\frac{1-\lambda_t}{\lambda_t})(I_t^R \odot \mathcal{S}_t)\mathbf{m}_t^R. \tag{20}$$

The block-diagonal matrix I_t^M is of dimension $J \times J$. The (j,k)-element of I_t^M is defined as:

$$I_{jkt}^M = \begin{cases} 1 & \text{if } j \text{ and } k \text{ are sold by the same manufacturer} \\ 0 & \text{otherwise.} \end{cases} \tag{21}$$

We can invert (20) to obtain the manufacturer margins:

$$\mathbf{m}_t^M \equiv (\frac{1-\lambda_t}{\lambda_t})(I_t^M \odot \mathcal{S}_t)^{-1}(I_t^R \odot \mathcal{S}_t)\mathbf{m}_t^R = w_t - mc_t^M, \tag{22}$$

Equation (22) shows that margins of manufacturers depend on the vector of bargaining weight λ_t.

Using the retail marginal cost obtained the downstream market, the marginal cost of retailers for each product can be expressed as a function of costs of production and distribution and manufacturers' margin:

$$\begin{aligned} p_t - \mathbf{m}_t^R = w_t + mc_t^R &= (w_j - mc_t^M) + (mc_t^R + mc_t^M) \\ &= \mathbf{m}_t^M(\lambda_t, \mathbf{m}_t^R) + mc_t^R + mc_t^M. \end{aligned} \tag{23}$$

5.2 Estimation and Instruments

Supply estimation. We use equation (23) to estimate the bargaining weights. We assume that $mc_t^R + mc_t^M$ is a function of observables and unobservables as follows:

$$
\begin{aligned}
w_{jt} + mc^R_{jt} &= \mathbf{m}^M_{jt}(\lambda, \mathbf{m}^R_{jt}) + mc^R_{jt} + mc^M_{jt} \\
&= \mathbf{m}^M_{jt}(\lambda, \mathbf{m}^R_{jt}) + \beta_1 \mathbb{1}_{\text{Buying Manufacturer}} \times \mathbb{1}_{\text{Post}} + \beta_2 \mathbb{1}_{\text{Divested Brand}} \times \mathbb{1}_{\text{Post}} \\
&+ \phi_r + \phi_s + \phi_t + \eta_{jt}, \qquad (24)
\end{aligned}
$$

where ϕ_r are retailer dummies (6 parameters), ϕ_s are segment dummies (4 parameters) and ϕ_t are month-year dummies (59 parameters). η_t is an error term capturing unobserved cost shocks. Motivated by the observed decrease in prices of products sold by the buyer of the divested brand, and considering the specific characteristics of the institutional context, we incorporate into our cost specification two indicator variables. One indicator variable equal to 1 for all other products of the buyer of the divested brand in the post-divestiture period ($\mathbb{1}_{\text{Buying Manufacturer}} \times \mathbb{1}_{\text{Post}}$) and an indicator variable equal to 1 for the products divested to Manufacturer 5 in the post-divestiture period ($\mathbb{1}_{\text{Divested Brand}} \times \mathbb{1}_{\text{Post}}$).[28] Indeed, these two terms allow to capture the potential cost savings resulting from the divestiture. λ denotes here the bargaining weight of retailers, which we assume to be manufacturer-specific.

Instruments and identification. The variable η_{jt} is observed by manufacturers and retailers - but not by the researcher - before prices are determined. It creates an endogeneity issue since η_{jt} depends on prices and market shares that are likely to be correlated with unobserved costs. To address this endogeneity issue, we use instrumental variables that satisfy the orthogonality condition $E[\mathbf{Z}'\eta(\theta^s)] = 0$. Identification requires at least as many instruments as parameters to be estimated. Given

[28] The presence of cost savings is supported by the fact that the divestiture included a Mondelez manufacturing plant, Lavérune, in the south of France, where Lavazza consolidated all the production lines of Carte Noire initially located in different factories. The acquisition facilitated Lavazza's entry into the French market through the acquisition of this local production plant by also producing its brand Lavazza in the French manufacture. Red box in Figure 2 in Appendix A illustrates that the buyer of the divested brand now produces its brand in the French manufacture located in Lavérune.

our final objective, which is to provide recommendations to competition authorities on the choice of the buyer, we estimate 6 bargaining weights, i.e. one bargaining per firm, including one for the merging manufacturers (M1 and M2) together. We also assume that private labels manufacturer are vertically integrated with retailers (i.e., $\lambda = 1$).

We use two types of instruments. First, we use a dummy equals one for products belonging to the merged entity after the merger in the same spirit as Miller and Weinberg (2017). This instrument captures the change in competition due to the merger with divestiture and exploits the variation in product portfolio generated by this change in ownership. The relevance of the instrument is supported by our event study for the prices of products sold by the merger. This instrument is valid if the changes in product portfolio caused by the merger are not systematically correlated with the unobserved costs. The second set of instruments corresponds to BLP-type of instruments. Precisely, we use the count of rival product per segment and firm, thus allowing to create 6 BLP-type of instruments. In total we use 7 instruments and identify 6 bargaining weights.

Next, we can stack the parameters in the vector of parameters $\theta^s = (\lambda, \vartheta, \beta_1, \beta_2)$. θ^s is the vector of parameters minimizing the following GMM objective function:

$$\hat{\theta^s} = \underset{\theta^s}{argmin}\ \eta(\theta^s)'\mathbf{Z}\mathbf{W}^{-1}\mathbf{Z}'\eta(\theta^s), \tag{25}$$

where $\mathbf{W}$ is the optimal GMM weighting matrix. We set $\mathbf{W} = \mathbf{Z}'\mathbf{Z}$ in the first step and then use estimates of the optimal weight matrix in the second step.

5.3 Supply Estimation Results

Table 6 shows the estimated parameters for the vertical supply model. First, we discuss the estimated bargaining weights. We estimate 6 bargaining weights. Our approach allows us to identify a new pro-competitive force relevant to divestiture policy. The results show that, on average, retailers have relatively more bargaining

power than manufacturers, except for Manufacturer 6, which has the highest bargaining weight.[29] This greater relative bargaining power of retailers limits the ability of the merger to raise input prices.

Table 6. Supply parameter estimates

	Estimates	
Bargaining weights (λ)		
Merged entity	0.767***	(0.003)
Manufacturer 3	0.678***	(0.004)
Manufacturer 4	0.717***	(0.008)
Manufacturer 5 (buyer)	0.601***	(0.004)
Manufacturer 6	0.389***	(0.006)
Manufacturer 7	0.729***	(0.003)
Cost Parameters		
$\mathbb{1}_{\text{Buying Manufacturer}} \times \mathbb{1}_{\text{Post}}$	-1.091***	(0.254)
$\mathbb{1}_{\text{Divested brands}} \times \mathbb{1}_{\text{Post}}$	-0.134	(0.249)
ϕ_s	✓	
ϕ_r	✓	
ϕ_t	✓	
GMM objective function	0.152	

Notes: Heteroskedasticity-robust standard errors in parentheses.
+ $p < 0.1$, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

Next, to assess the extent to which markups are affected, we compute the average manufacturer markups in Table 7 before and after the merger with divestiture. We also show the share of total profit obtained by the manufacturers before and after the merger. The results show that the markups of the merged entity increased by about 12 percent on average. The markups associated with the divested brand increased by about 84 percent. This shift is attributed to the relatively higher bargaining power of the buyer compared to the merged entity. It also allows the buyer of the divested brand to obtain a higher share of the total profit generated by the divested brand. In

[29] The bargaining weight of the retailer (or manufacturer) is denoted λ (or $(1-\lambda)$).

contrast, in a Nash-Bertrand competition model, the markups associated with the divested brand would have decreased as the brand is transferred from a large product portfolio to a relatively smaller one.[30] In addition, the buyer of the divested brands increased the markups on its existing brands by 11 percent. This is due to a higher disagreement payoff in negotiating wholesale prices for brands already in its portfolio before the divestiture. Moreover, the buyer also obtains a higher share of the total profit both for the divested brand and for the products already in its portfolio, because the buyer of the divested brands has relatively higher bargaining power compared to the merged entity. Thus, the additional anti-competitive effects from the relatively larger bargaining weights and the increase in its disagreement payoff does not explain why the prices of products already sold by the buyer before the divestiture decreased, as indicated by the event study. One possible explanation that the model allows for is cost efficiency.

Table 7. Manufacturers' markup and profit sharing

Manufacturer	Markups (€/kg)		Profit Sharing (%)	
	Pre	Post	Pre	Post
Merged entity	1.96	2.19	25.19	27.31
	(0.72)	(0.80)	(0.12)	(1.07)
Manufacturer 5 (buyer):				
Divested brand	2.20	4.04	25.98	38.69
	(0.82)	(1.50)	(0.22)	(0.47)
Other products	3.31	3.67	35.59	38.53
	(1.10)	(1.11)	(0.11)	(0.47)
Rivals	2.19	2.19	30.90	31.25
	(1.06)	(0.95)	(0.27)	(0.36)

Notes: Standard deviation in parentheses. The table reports the average (across markets and retailers) manufacturer price-cost margins before the merger (28 months) and after the divestiture (22 months).

[30] Results for the change in markups under Nash-Bertrand competition are available in Appendix E.

The cost efficiency estimates are presented in Table 6. The results indicate that the total costs of the divested brand decreased after the divestiture, but this effect is not statistically significant at any conventional level. In contrast, the costs associated with the other products of the buyer of the divested brand decreased significantly. The estimate is statistically significant at the 0.01 level. Thus, the results show that the buyer achieved cost savings primarily on the products that were already in its portfolio. The estimated cost saving is €1.091 per kilogram, which corresponds to a cost reduction of about 9 percent.

Table 8. Marginal Costs in Horizontal and Vertical Models

	Marginal cost (€/kg)		
	Horizontal	Vertical	Difference (%)
Merged entity	12.59	11.34	27.26
	(11.67)	(11.34)	
Manufacturer 5 (buyer):			
Divested brand	16.29	13.62	34.78
	(15.76)	(14.74)	
Other products	13.73	9.70	86.58
	(11.10)	(9.77)	
Rivals	14.38	10.19	50.87
	(11.65)	(10.43)	
Total			41.09

Notes: Standard deviation in parentheses. The table reports the average (across markets and retailers) total marginal costs, manufacturer and retailer price-cost margins. Difference (%) represents the difference between the costs computed in a horizontal and vertical model in percentage.

We are able to identify cost savings by estimating a model that extends Nash-Bertrand models - assuming that manufacturers sell directly to consumers. This generalization has broader implications for cost measures beyond just merger analysis. Indeed, several papers, such as Döpper et al. (2021), argue that price patterns are mainly explained by changes in costs using models that do not account for vertical structure.

To quantify the potential impact on measured costs, Table 8 presents the average total costs (or markups) implied by a Nash-Bertrand model alongside those obtained from our estimated Nash bargaining model. In addition, we show the average percentage difference in costs computed based on the two models. The results reveal that, on average, Nash-Bertrand models overestimate costs by about 41 percent relative to Nash-bargaining models. This suggests that costs and markups may differ substantially from what they would be under more general models.[31]

The model we estimate identifies pro- and anti-competitive mechanisms through which prices are impacted. The fact that merger prices increased while the prices of the buyer of the divested brand decreased raises the question of whether the merger and divestiture increased or decreased consumer surplus. In the next section, we use counterfactual simulations to evaluate the impact of the merger and divestiture on consumer surplus relative to a benchmark counterfactual in which no merger occurred.

[31]The implications for papers examining the impact of changes in costs on prices depend on the extent to which retail margins, which are included in the costs computed in the Nash-Bertrand model, vary over time.

6 Counterfactual Analysis

6.1 Consumer surplus

Using counterfactual analysis, we assess the change in prices and consumers surplus due to the merger and the divestiture separately. To do so, we recompute the equilibrium vector of prices in three counterfactual scenarios: (1) no merger; (2) merger without divestiture; and (3) merger with divestiture but no cost savings for the buyer of the divested brand. Table 9 shows the percentage change in prices and consumer surplus under the three scenarios. Column (i) shows the change in prices and consumer surplus in the scenario "merger without divestiture" relative to the "no merger and divestiture" scenario. It shows that the merger without divestiture decreased the consumer surplus by about 3 percent, on average. Columns (ii) and (iii) show the change in prices and consumer surplus relative to the "no merger and divestiture" scenario with and without cost savings. With cost savings (i.e., column (iii)), the merger with divestiture reduces the price of the divested brand and the other products of the buyer, which is consistent with the price pattern observed in the data. It also reveals that the merger reduces the consumer surplus, but it decreases less with the divestiture. Indeed, on average, the consumer surplus decreased by about 0.3 percent. Thus, the results support the choice of the European Commission to request the use of divestiture to mitigate the anti-competitive effects of the merger. Yet, the results suggest also that the divestiture was not sufficient to prevent a negative effect on consumers. Provided that the divested brand could have been sold to another buyer, it raises the question of how much it depends on the choice of the buyer.

6.2 Policy recommendations

In this section, we examine the extent to which the choice of the buyer of the divested brand affects the estimated impact on prices and consumer surplus. We also aim to provide some recommendations to competition authorities on how to select

Table 9. Counterfactual results

Δ Retail price (%)	No divestiture	Divestiture	
		no cost savings	cost savings
	(i)	(ii)	(iii)
Merged Entity	3.91	2.16	2.18
Manufacturer 5 (buyer):			
Divested Brand	8.90	-4.49	-4.48
Other products	0.19	4.42	-4.00
Rivals	0.14	0.09	0.11
Δ Consumer surplus (%)	-3.19	-0.50	-0.32

Notes: This table shows the average percentage price change (weighted by quantity). The simulations are based on the estimates presented in Table 3 and Table 6 and are computed using the period after the divestiture as Miller and Weinberg (2017).

the buyer of the divested brand in the presence of bargaining power. We simulate four counterfactuals in which Brand 4 (i.e., the divested brand) is divested to either Manufacturer 3, 4, 6 or 7 instead of the observed divestiture to Manufacturer 5. We show the results in Table 10. We assume in each case that the buyer obtains the same cost savings as those we observe for Manufacturer 5.[32] Column (i) corresponds to the percentage change in prices and consumer welfare caused by the actual merger and divestiture. The remaining columns show the percentage change in prices and consumer surplus caused by the merger with the same divested brand but a counterfactual buyer (i.e., either M3, M4, M6, or M7).

The table shows two interesting sets of results. The first result to note is that the

[32]This assumption does not affect the qualitative results presented in this section. In Appendix D, we show the results of similar counterfactual simulations assuming no cost savings. In contrast, this assumption is likely to overestimate the cost savings attributed to each counterfactual buyer, thus underestimating the associated negative effect on consumer surplus. Indeed, M5 had no production facilities in France prior to the divestiture, but this is not the case for the counterfactual buyers.

actual divestiture does not lead to the lowest change in consumer surplus. In particular, it shows that having Manufacturer 4 or Manufacturer 7 as buyer would have been less harmful to consumers. The result for Manufacturer 4 is interesting because it shows that, although Manufacturer 4 had a higher pre-merger market share than the actual buyer, it has lower average bargaining weight. Therefore, our results show how policy recommendations regarding the choice of the potential buyer differ when bargaining power is taken into account. In Friberg and Romahn (2015), it is argued that the best way to mitigate the anti-competitive effects of a merger, through divestiture, is to choose a small buyer. In contrast, our results suggest that divesting a brand to a small buyer with high bargaining weight is unlikely to mitigate the anti-competitive effects of the merger.

Note also that divesting Brand 4 to Manufacturer 3 would not decrease the price of the divested brand. This is mainly due to its higher market share limiting the potential for a price drop. Moreover, the divestiture of Brand 4 to Manufacturer 6 would increase the price of its other product, despite the presence of cost savings. This is explained by Manufacturer 6's high bargaining weight, which is 0.61. This result highlights the importance of considering bargaining power in vertical markets. Note finally that there are no direct links between market shares and bargaining weights. The literature on bargaining provides several plausible determinants of bargaining weight. For instance, a high bargaining weight can be due to a better brand assortment, the patience of firms to reach an agreement (Draganska et al. (2010)) or better negotiation skills (Grennan (2014)). The antitrust authorities cannot infer values of these weights based on observed market shares and therefore the estimation of these weights is key when making decision on the choice of the buyer of the divested brand.

Table 10. The choice of the buyer

	Actual buyer	*Scenarios*			
Δ Retail price (%)	Manuf. 5	Manuf. 3	Manuf. 4	Manuf. 6	Manuf. 7
	(i)	(ii)	(iii)	(iv)	(v)
Merged Entity	2.18	2.16	2.18	2.19	2.12
Buyer:					
Divested brand	-4.48	0.67	-4.30	-4.32	-4.72
Other products	-4.00	-1.29	-7.16	1.54	-7.21
Rivals	0.12	0.05	0.12	0.10	0.12
Δ Consumer surplus (%)	-0.32	-0.68	-0.20	-0.62	-0.26
Pre-merger market share (%)	1.84	10.24	1.96	2.34	1.65
1-λ	0.40	0.32	0.28	0.61	0.27

Notes: This table shows the average percentage price change (weighted by quantity). The simulations are based on the estimates presented in Table 3 and Table 6 and are computed using the period after the divestiture as Miller and Weinberg (2017). Pre-merger market share is the average pre-merger market share between month 17 and month 28.

7 Conclusion

This paper examines the effectiveness of divestiture as a merger remedy in the French coffee market, where bargaining power between manufacturers and retailers is a key feature of the market. The results challenge the common wisdom that one should divest brands to a small buyer. We show that a buyer that has small market shares but high bargaining power can deteriorate consumer surplus more than a larger buyer with relatively lower bargaining power.

Our approach also allows us to overcome a measurement challenge that economists often face when estimating marginal costs. Models that do not account for the vertical market structure may overestimate costs by about 41 percent. Based on a more accurate measure of costs, we show that divestiture can lead to cost efficiencies for the buyer of the divested brand, thereby positively affecting competition.

This article documents evidences of an additional pro competitive force. Retail-

ers have relatively higher bargaining power than manufacturers, resulting in lower wholesale prices paid by retailers and consequently lower final prices. However, this higher bargaining power was not sufficient to block the anti-competitive effects of the merger as prices of the merged entity raised. This is mainly explained by the fact that after the merger and divestiture markups increased. The markups of the merged entity increased by about 12 percent on average whereas the markups associated with the divested brand increased by about 84 percent. In addition, the buyer of the divested brands increased the markups on brands already in its portfolio by 11 percent. Therefore, this article shows that the anti-competitive effects of the DEMB/Mondelez merger and the associated divestiture dominate the pro-competitive effects thereby leading to a decrease in consumer surplus. Beyond this specific merger and divestiture, and to the extent that cost efficiencies may not always be present, the results cast a doubt on the effectiveness of divestiture as a merger remedy.

To conclude, an interesting research agenda to pursue is to assess to what extent the choice of the divested brands rather than the buyer may impact consumer welfare. Nonetheless, we acknowledge that this exercise falls outside the scope of this article as it requires to develop an approach allowing to estimate brand-level bargaining weights.

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Appendix

A Descriptive Statistics

Table 11. Mean Retail Price Pre-Merger and Post-Divestiture Period By Brand (€/Kg)

		Pre		Post	
Manufacturer	Brand	mean	s.d	mean	s.d
	Private Labels	16.49	14.62	17.06	12.95
Manuf. 1	**Brand 1**	29.88	22.32	27.75	19.75
	Brand 2	17.40	1.20	16.91	1.07
	Brand 3	10.63	7.39	15.42	17.07
Manuf. 2	**Brand 4** (divested brand)	23.05	18.87		
	Brand 5	23.04	1.92	22.60	2.99
	Brand 6	14.57	7.34	9.62	3.04
	Brand 7	27.39	1.45	28.65	2.30
	Brand 8	11.62	0.95	11.11	0.99
Manuf. 3	**Brand 9**	30.85	1.78	30.11	1.69
	Brand 10	24.64	2.32	23.67	2.38
Manuf. 4	**Brand 11**	21.43	18.95	18.13	16.29
Manuf. 5	**Brand 12**	19.41	12.76	18.57	12.74
	Brand 4 (divested brand)			22.83	17.61
Manuf. 6	**Brand 13**	22.17	11.96	21.31	12.71
Manuf. 7	**Brand 14**	7.85	1.48	12.46	13.19
	Brand 15	17.76	13.49	16.93	13.51

Note: The table reports the average (across markets) retail prices before the merger (28 months) and after the divestiture (22 months).

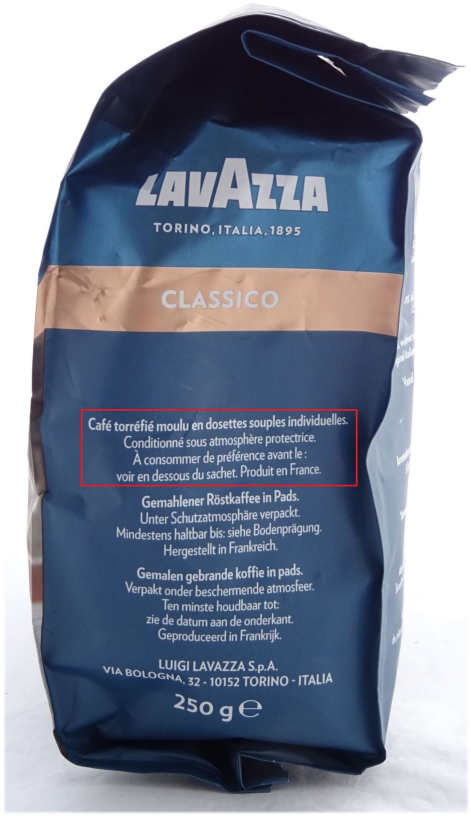

Figure 2. Lavazza Packaging (2019)

Notes: Packaging of Lavazza in 2019, produced in France. Red box illustrates that the buyer of the divested brand now produces its brand in the French manufacture located in Lavérune. Source: GNPD Mintel.

B Demand Results

Table 12. First Stage Regression Logit

	Price
$\mathbb{1}_{\text{Merger}} \times \mathbb{1}_{\text{Post}}$	1.47***
	(0.10)
$\mathbb{1}_{\text{Buying alliance 1}} \times \mathbb{1}_{\text{NB}} \times \mathbb{1}_{\text{Post alliance 1}}$	-0.25*
	(0.10)
$\mathbb{1}_{\text{Buying alliance 2}} \times \mathbb{1}_{\text{NB}} \times \mathbb{1}_{\text{Post alliance 2}}$	-0.53***
	(0.11)
$\mathbb{1}_{\text{Buying alliance 3}} \times \mathbb{1}_{\text{NB}} \times \mathbb{1}_{\text{Post alliance 3}}$	-0.72***
	(0.12)
Nb. of rival's products sold	-0.068***
/segment within a retailer	(0.021)
Nb. of rival's products sold	0.055***
within a retailer	(0.013)
ρ_t	✓
β_{bs}	✓
β_r	✓
N	11682
F-Test	46.39

Notes: Standard errors in parentheses

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

Table 13. Retailer and Brand-segment Dummies

Variable	Mean	
Retailer dummies		
Retailer 1	-	
Retailer 2	-0.439	(0.023)
Retailer 3	-0.479	(0.024)
Retailer 4	0.201	(0.034)
Retailer 5	-0.792	(0.037)
Retailer 6	-0.731	(0.025)
Retailer 7	-0.652	(0.073)
Brand-segment dummies		
PLs R&G	1.516	(1.070)
PLs Pads Soft	1.469	(1.204)
PLs Pads Rigid	5.438	(1.379)
PLs Beans	-2.372	(1.040)
Brand 1 R&G	0.449	(1.210)
Brand 1 Pads Soft	-1.612	(1.373)
Brand 1 Pads Rigid	7.351	(1.307)
Brand 1 Beans	-2.416	(1.266)
Brand 2 Pads Soft	2.716	(1.340)
Brand 3 R&G	-1.915	(1.000)
Brand 3 Pads Soft	-1.737	(1.320)
Brand 3 Pads Rigid	3.666	(1.341)
Brand 3 Beans	-4.421	(0.909)
Brand 4 R&G	1.384	(1.222)
Brand 4 Pads Soft	1.129	(1.290)
Brand 4 Pads Rigid	6.062	(1.303)
Brand 4 Beans	-1.635	(1.247)
Brand 5 R&G	1.514	(1.390)

Notes: Standard error in parentheses.

Variable	Mean	
Brand-segment dummies		
Brand 6 R&G	-1.034	(0.933)
Brand 6 Pads Soft	-1.382	(1.226)
Brand 6 Pads Rigid	1.064	(1.416)
Brand 7 Pads Rigid	4.764	(1.410)
Brand 8 R&G	-0.454	(1.178)
Brand 8 Beans	-3.030	(1.242)
Brand 9 Pads Rigid	4.995	(1.408)
Brand 10 R&G	3.266	(1.403)
Brand 11 R&G	-1.453	(1.005)
Brand 11 Pads Soft	-0.778	(1.253)
Brand 11 Pads Rigid	4.440	(1.328)
Brand 12 R&G	-0.646	(1.129)
Brand 12 Pads Soft	-1.103	(1.315)
Brand 12 Pads Rigid	2.770	(1.366)
Brand 12 Beans	-2.190	(1.295)
Brand 13 R&G	-0.367	(1.209)
Brand 13 Pads Soft	3.000	(1.402)
Brand 13 Pads Rigid	3.937	(1.294)
Brand 13 Beans	-2.336	(1.241)
Brand 14 R&G	-2.579	(1.006)
Brand 14 Pads Rigid	4.140	(1.329)
Brand 14 Beans	-3.918	(0.996)
Brand 15 R&G	-1.140	(1.196)
Brand 15 Pads Soft	-1.682	(1.302)
Brand 15 Pads Rigid	4.796	(1.322)
Brand 15 Beans	-3.476	(1.211)

Outside good as reference for brand-segment dummies

Table 15. Comparison of Own-Price Elasticity with Literature

	Average Own-Price Elasticity
Table 4	[-6.13, -1.31]
Noton and Elberg (2018)	[-6.5, -7.5]
Villas-Boas (2007)	[-6.8, -5.6]
Bonnet and Villas-Boas (2016)	[-5.26, -3.10]
Draganska et al. (2010)	[-5.7, -6.9]*

Notes: This table shows the lower and upper bounds of the average own-price elasticities for all demand specifications presented in several papers estimating demand for coffee. * For Draganska et al. (2010), it shows the minimum and maximum (across products) average own-price elasticities.

C First Order Condition Bargaining Problem

The equilibrium wholesale price is the argument that maximizes the following equation:

$$\max_{w_{jt}} [\pi^R_{jt}(w_{jt}, p) - d^R_{jt}(\backslash j)]^{\lambda_{jt}} \times [\pi^M_{jt}(w_{jt}, p) - d^M_{jt}(\backslash j)]^{(1-\lambda_{jt})}, \tag{26}$$

Taking the log in (26), we obtain:

$$\lambda_{jt}\ log(\pi^R_{jt}(w_j, p) - d^R_{jt}(\backslash j)) + (1 - \lambda_{jt})\ log(\pi^M_{jt}(w_j, p) - d^M_{jt}(\backslash j))$$

Taking the derivative with respect to w_j, we get the following first order condition:

$$\lambda_{jt}(\frac{\partial \pi^R_{jt}(w_j, p)}{\partial w_j})(\pi^R_{jt}(w_j, p) - d^R_{jt}(\backslash j))^{-1} + (1-\lambda_{jt})(\frac{\partial \pi^M_{jt}(w_j, p)}{\partial w_j})(\pi^M_{jt}(w_j, p) - d^M_{jt}(\backslash j))^{-1} = 0.$$

Re-arranging, we obtain:

$$\lambda_{jt}(\pi^M_{jt}(w_j, p) - d^M_{jt}(\backslash j))\frac{\partial \pi^R_{jt}}{\partial w_{jt}} + (1 - \lambda_{jt})(\pi^R_{jt}(w_j, p) - d^R_{jt}(\backslash j))\frac{\partial \pi^M_{jt}}{\partial w_{jt}} = 0.$$

D Counterfactual without cost savings

Table 16. The choice of the buyer (no cost savings)

	Actual buyer	*Scenarios*			
Δ Retail price (%)	Manuf. 5	Manuf. 3	Manuf. 4	Manuf. 6	Manuf. 7
	(i)	(ii)	(iii)	(iv)	(v)
Merged Entity	2.16	2.30	2.17	2.19	2.11
Buyer:					
Divested Brand	-4.29	0.21	-4.40	-4.41	-4.80
Other products	4.42	1.61	2.61	8.50	2.16
Rivals	0.09	0.23	0.11	0.10	0.10
Δ Consumer surplus	-0. 50	-1.36	-0.51	-0.67	-0.45
Pre-merger market share (%)	1.84	10.24	1.96	2.34	1.65
1-λ	0.40	0.32	0.28	0.61	0.27

Notes: This table shows the average percentage price change (weighted by quantity). The simulations are based on the estimates presented in Table 3 and Table 6 and are computed using the period after the divestiture as Miller and Weinberg (2017).

E Changes in Markups - Model of Nash-Bertrand Competition

Table 17. Manufacturers' markup

Manufacturer	Markups (€/kg)	
	Pre	Post
Merged entity	6.29	6.87
	(2.28)	(2.58)
Manufacturer 5 (buyer):		
Divested brand	7.11	6.14
	(2.77)	(2.25)
Other products	5.09	5.59
	(1.66)	(1.67)
Rivals	5.35	5.39
	(1.97)	(1.85)

Notes: Standard deviation in parentheses. The table reports the average (across markets and retailers) manufacturer price-cost margins before the merger (28 months) and after the divestiture (22 months).