DOES EXCLUSIVE DEALING MATTER? EVIDENCE FROM DISTRIBUTION CONTRACT CHANGES IN THE U.S. BEER INDUSTRY*

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We examine whether restricting a beer distributor's external trading opportunities increases the market shares of brands carried by the distributor. We use distribution status changes from the Anheuser-Busch-InBev distribution agreement, along with a panel scanner data set from a grocery chain in California, to implement a 'difference-in-differences' empirical strategy. We find that InBev's market share increased by 6% once InBev was carried by Anheuser-Busch's exclusive distributors, while InBev's retail price had no significant change. The effect on InBev's market share is stronger for smaller stores that carry more brands. These results are consistent with the efficiency-based theory of exclusive dealing.

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I INTRODUCTION

Exclusive dealing is a vertical contract between a manufacturer and its distributor that prohibits the distributor from carrying other manufacturers' products. The nature and the effect of such an exclusionary contract have stimulated a long debate in both academic and policy making arenas. On the one hand, an exclusive dealing contract between a monopoly and its distributors, if implemented successfully, leads to market foreclosure and is anticompetitive (e.g., Rasmusen, Ramseyer and Wiley [1991] and Bernheim and Whinston [1998]). On the other hand, efficiency theories (e.g., Bork [1978], Marvel [1982], Areeda and Kaplow [1988], Klein and Murphy [1988], Masten and Snyder [1993], and Segal and Whinston [2000]) suggest that exclusive dealing can protect non-contractible investments in a vertical relationship and thus may be efficiency enhancing. Hence, understanding the nature and effect of such contracts is important not only for studies on organization forms, but also for implementing competition policies.[1]

When a distributor makes investment decisions about a manufacturer's product, it also takes into account the effect the additional investment will have on other products that it carries that are not necessarily produced by that manufacturer. If the additional investment creates a business-stealing effect on products produced by other manufacturers, a distributor would choose to invest less than that undertaken by a vertically integrated firm. According to the efficiency argument, by restricting a distributor's external trading opportunities, exclusive dealing aligns the distributor's and manufacturer's interests, increases the distributor's investments, and increases their surplus from such a vertical relationship.

In this paper, we empirically test, using a new source of data variation, whether limiting a distributor's external trading opportunities has any effect on the market

shares of brands carried by the distributor. In addition, we explore the potential channels of such an effect. The setting is the United States beer industry. Anheuser-Busch (AB), the dominant beer manufacturer, employs both exclusive and nonexclusive distributors in the United States, so the above efficiency argument implies that having products promoted by exclusive distributors would have a favorable effect on these products' market outcomes. Testing this hypothesis is challenging, however, because a simple cross-sectional comparison may suffer from omitted variable bias and because it is rare to find variation in distributors' exclusivity status across time. To ease the omitted variable bias problem, we tested the hypothesis by exploiting a distribution agreement that allowed the European InBev brands to enter AB's exclusive-distribution network simultaneously across all geographic areas.

According to the AB and InBev (AB-InBev) agreement, AB was to begin importing InBev brands to the United States as the sole importer after February 2007 (called 'the event' in the rest of the paper). Although the deal applied to all AB distributors simultaneously across the United States, the effects in local markets are not identical. The distribution agreement had no impact at the local distribution level if InBev was already using AB's distribution network. In contrast, the distribution agreement affected InBev's distribution status most dramatically when a local AB's distributor was exclusive to AB. In such an area, brands other than AB (such as InBev) had fewer distribution options and were often accommodated into a shared and crowded distribution network. It is in such an area that the promotional efforts for InBev products are expected to increase the most compared to other areas. To further explore the idea that restricting and relaxing a distributor's brand portfolio may affect its promotional decisions, we also studied changes in the market shares of non-InBev brands whose distributors were forced to carry or drop InBev brands due to the event.

We combined data from 2006-2007 California brewer-distributor arrangements with a two-year panel scanner data set from a large retail grocery chain in Northern California. Having data before and after the AB-InBev deal and across different types of InBev and AB distribution arrangements enabled us to apply a 'difference-in-differences' approach to control for local market fixed effects and unobserved brand-level fixed effects. We also used a matching estimator to show that the main results are robust to heterogeneity between stores.

The results suggest that having a more dedicated distributor matters in the beer industry: InBev's market share increased by 6% once its products were carried by AB's exclusive distributors, while InBev's retail price had no significant change. The effect is strongest for stores with a small sales area and that carry the largest number of brands, where product retail competition is fierce and a local distributor's promotional effort is more likely to make an impact. A less crowded distribution channel also increased non-InBev brands' market shares. In addition, the increase in InBev's market share was not due to lower costs or the market power of AB's exclusive distributors. These results are consistent with the efficiency argument of exclusive dealing.

Interest has been growing in the empirical effect of vertical restraints, yet empirical evidence on exclusive dealing is still limited.[2] Studies that estimate industry models in the beer industry pointed out that exclusive dealing is hardly foreclosure-based (Asker [2005]; Chen [2014]). Studies that estimate reduced-form models mostly use variation in exclusivity across geographic areas, and find that exclusive dealing is not associated with lower aggregate market output (Sass [2005]; Rojas [2010]), while Ater [2014] finds that total revenues are negatively related to exclusive contracts. Relative to the existing literature, this paper adds to the existing evidence of efficiency effects by employing a new kind of data variation and a clear identification strategy.

The rest of the paper proceeds as follows. Section II discusses the theoretical literature and the testable hypotheses. Section III provides an overview of the beer industry. Section IV explains the paper's research design and empirical strategy. Section V describes the data. Section VI provides the main results. Section VII provides additional robustness checks. Section VIII concludes.

II THEORETICAL MOTIVATION AND EMPIRICAL PROPOSITIONS

Efficiency theories (e.g., Segal and Whinston [2000]) suggest that exclusive dealing can result in higher investment levels in vertical relationships. To see this, suppose that a distributor can make non-contractible investments to increase the value of a manufacturer's products, such as making sure that the displays look good, that the retailers are not stocked out, or if the marketing plans are tailored to the preferences of local consumers. Because the investments are non-contractible (and so their costs are entirely borne by the distributor while the benefits accrue partially to the manufacturer), there will be an inefficient level of investment. Moreover, if the distributor is making these investments for several different brands, and if the investments in one brand result in business stealing from the other brands (i.e., the distributor's promotional efforts are substitutable), the distributor would make fewer investments than a vertically integrated firm. An exclusive contract in such an incomplete contract setting provides incentives for non-contractible investments and increases the distributor's investments by eliminating the business-stealing effect.[3] As such, the exclusive arrangement could be seen as efficiency enhancing for the parties involved in the vertical relationship.[4]

In this paper we study whether eliminating a distributor's external trading op-

portunities enhances the distributor's promotional efforts toward the manufacturer's brands and increases its sales as suggested by Segal and Whinston [2000]. Hypothesis 1 is the first testable hypothesis:

Hypothesis 1. All else being equal, a brand's market share will be higher when the brand's distributor has fewer external trading opportunities.[5] In the empirical setting, this takes place when:

1. The brand is reallocated from a shared distribution network to an exclusive distribution network.
2. The brand's distributor loses its representation of InBev.

If the change in InBev's market share was driven by increased distribution-level investments, the effect will be stronger in stores where additional investments by local distributors are more crucial to a brand's success. This leads to the second testable hypothesis.

Hypothesis 2. The above effect on market share is stronger in stores in which product retail competition is more fierce, so additional investments by distributors have a larger effect. In the empirical setting, this takes place when:

1. A store has a smaller sales area.
2. A store carries more brands.

III INDUSTRY BACKGROUND

The United States brewing industry is highly concentrated: AB, Miller, and Coors collectively claimed nearly 80% of the United States market in 2007.[6] There are

three main brewing-level market segments: domestic macro brands, domestic specialty brands, and imported brands. AB, Miller, and Coors—the dominant players—enjoy economies of scale in producing macro products that are priced lower, have large package-size options, and are supported by national advertising campaigns. Specialty beer producers are mostly microbreweries, and emphasize flavor and taste in their products. Imported brands are usually well-established products from foreign countries.

Beer is sold throughout the United States through a 'three-tier' (brewer-distributor-retailer) system. The top-tier brewers supply their products to state-licensed middlemen (distributors). The distributors then store and transport the products to the bottom-tier retailers. Distributors are also responsible for point-of-sale promotions and are expected to have sales staff visit or call accounts regularly to make sure products are available and fresh. Distributors also help brewers to execute their marketing plans locally.[7] After Prohibition, vertical integration between brewers and distributors became heavily regulated by state laws. As a result, brewers often turned to vertical restraints, such as exclusive dealing and exclusive territory, to control their distributors.[8]

Intrabrand competition at the distribution level is not common: brewers tend to adopt exclusive territory systems to prevent competition between their distributors.[9] In contrast, most distribution networks are shared houses full of competing brands that intensify interbrand competition at the distribution level. In order to gain more control over its distributors, AB began its '100 share of mind program' in 1997. Distributors that chose to carry only AB products were given extended credits, extra money on beer cases and truck painting, and priority when other AB distributors were for sale (Butler [1999]). Not every AB distributor decided to go exclusive, though. AB distributors that were carrying strong brands, such as Heineken or Guinness, were

less likely to give up these brands to their rival distributors in order to enroll in the incentive program compared to ones that were carrying only weak brands.[10] In fact, as Sass [2005] points out, the likelihood for a distributor to become exclusive to a brewer depends on the market characteristics of its assigned territory.

Terminating existing distribution contracts can be costly for brewers. Some states have franchise laws that prevent brewers from terminating these contracts without a good cause.[11] Due to the difficulties in switching distributors at will, the distribution agreement between AB and InBev, which was on a national scale, provides a great opportunity to look into how distribution status affects market outcomes.

IV EMPIRICAL STRATEGY

IV(i) The Event: AB-InBev Distribution Agreement

InBev was created in 2004 when two major beer manufacturers—Belgium's Interbrew and Brazil's AmBev—were combined. InBev had many well-known beer brands around the world such as Beck's, Stella Artois, Skol, and Brahma. Prior to 2007, InBev maintained distribution contracts with various distributors throughout the United States.

In November 2006, AB announced a distribution agreement with InBev that allowed it to solely distribute InBev's European beer products, such as Beck's and Stella Artois, in the United States market after 2007.[12] It was widely believed by many industry analysts that AB intended to use this distribution deal to expand its product portfolio and to have more control over its distributors (Kesmodel [2008]). On the other hand, InBev aimed at taking advantage of AB's distribution system to boost sales.[13] The AB-InBev agreement shuffled brand portfolios for many local beer distributors in the United States. Following the agreement, AB distributors that

were not carrying InBev brands began to carry them, while other types of distributors (non-AB) had to drop InBev brands.

We assign changes in InBev's distribution status to a control group or a treatment group in each local market, based on the local AB distributor's distribution status *prior to the event*. To illustrate, Table I lists three possible scenarios. In the first row, the local (nonexclusive) AB distributor already carried InBev, along with other brands, in 2006 (prior to the event). In this case, nothing would change for InBev at the local distribution level, so this is the control group. In contrast, the second and third rows list brand portfolios of other types of AB distributors. Note that neither type of distributor carried InBev prior to the event. Therefore, these AB distributors received InBev brands after the event and belong to the treatment groups.

[Place Table I about here.]

Even though InBev is reallocated to AB distribution networks in both treatment groups, the treatment that InBev receives within those two groups is quite different. In the second scenario, InBev moves to a nonexclusive AB distribution system. Because AB was the only beer manufacturer to have exclusive distributors in the data set, InBev merely moved between two shared distribution networks in this scenario. Therefore, the second scenario's treatment effect (treatment group 1) is a 'reallocation' (from a non-AB to an AB distribution network) effect. In the third scenario, InBev's distribution status changes more dramatically, because the local AB distributor was exclusive. In this case, InBev leaves a relatively crowded shared-distribution network and enjoys a more exclusive network after the event. Therefore, the third scenario's treatment effect (treatment group 2) is both a 'reallocation' and an 'exclusive' effect. If investments, such as distribution-level promotional efforts, are substitutable, then we would expect the promotional efforts of InBev to increase most in the final

scenario.

IV(ii) Econometric Models

Given the panel structure of the data, it is straightforward to carry out the estimation by a 'difference-in-differences' approach. The advantage is that it not only controls for national shocks in each period, but also eliminates unobserved permanent fixed effects in each local market. This is particularly important, because a distributor's choice to become exclusive depends on the market characteristics of its assigned territory. In addition, the fact that the AB-InBev distribution agreement applied to the entire United States at the same time—and was not tailored to meet the needs of California AB distributors—also helped to reduce the potential omitted variable bias problem due to the interactions of local demand- and cost unobservables and time variables.[14]

We first fit InBev's market share using the following specification for store i in week t:

$$\begin{aligned}(1) \qquad \text{Share}_{it} =& \alpha_i + \beta_0\, 1[\text{Post}]_t + \beta_1\, 1[\text{InBev moved to AB exclusive}]_{it} \\ &+ \beta_2\, 1[\text{InBev moved to AB}]_{it} + \epsilon_{it},\end{aligned}$$

where i indexes individual store and t indexes time, α_i represents store fixed effects ($i = 1$ to 206), and $1[\text{Post}]_t$ is an indicator variable equal to 1 for time periods after the AB-InBev distribution agreement. The main variables of interest are $1[\text{InBev moved to AB exclusive}]_{it}$ and $1[\text{InBev moved to AB}]_{it}$, which are indicator variables that equal 1 in areas where InBev moved to an AB-exclusive distribution network, and in areas where InBev moved to an AB distribution network, respectively. If brands receive more promotional efforts from a more exclusive (less crowded) distribution network, then β_1 is expected to be positive (the first prediction in Hypothesis

1). Similarly, if brands gain more promotional efforts simply from reallocating to an AB distribution network, then β_2 is expected to be positive. Besides the above specification, we also provide results from an alternative specification that includes weekly fixed effects, α_t.

To study further the effect on rival brands when their distributors carry or drop InBev (the second prediction in Hypothesis 1), we regress the market shares of non-InBev brands on indicator variables that describe the change in their distribution status due to the event:

$$\text{Share}_{ijt} = \alpha_i + \alpha_j + \alpha_t + \gamma_1 \, 1[\text{InBev in}]_{ijt} + \gamma_2 \, 1[\text{InBev out}]_{ijt} + \epsilon_{ijt}. \tag{2}$$

Here, i indexes individual stores, j indexes brand, and t indexes time; $1[\text{InBev in}]_{ijt}$ is an indicator variable for a brand's distributor to carry InBev after the event; $1[\text{InBev out}]_{ijt}$ is an indicator variable for a brand's distributor to drop InBev after the event. If a substitutable effect exists and dampens a distributor's investment levels, we would expect γ_1 to have a negative sign and γ_2 to have a positive sign.

Standard errors are clustered at the county level unless otherwise stated. We also provide results from a restricted sample in which the identity of each store's AB distributor can be identified, so standard errors are allowed to be clustered at the distributor level.

V DATA

The California Beer and Beverage Distributors (CBBD) trade association publishes an annual directory of its member distributors in California, which contains information about each distributor's brand portfolio and its operating counties.[15] Almost all distributors that carried InBev also carried AB or Miller products.[16] Due to the

distribution agreement, nearly all AB distributors were listed in the 2007 CBBD directory as having acquired InBev products.[17]

Beer sales and pricing data are provided by The Nielsen Company. The scanner data set contains weekly, Universal Product Code (UPC)-level price and sales data in the malt beverage category for a major grocery chain in Northern California and Nevada, and includes 258 stores in 150 cities. The two-year data period—April 15, 2006–April 5, 2008—totals 104 weeks. Within each brand there are many package sizes, different volumes, and bottling methods. Quantity discounts are prevalent in the industry.[18]

[Place Table II about here.]

Table II lists the top 20 beer brands' market shares, average prices, and their basic characteristics—alcohol by volume (ABV) and calories per 12 oz.[19] On average, domestic macro brands were the lightest in both ABV and calories and were usually priced lower than other products.[20] There were five InBev brands in the data set: Bass, Beck's, Boddingtons, Beck's Premier Light, and Stella Artois.[21] Their market shares, average prices, and product characteristics are also given in Table II.

In the empirical section, InBev's market share is an aggregate market share for all its products.[22] For InBev's price, we rely on pricing data at the UPC level instead of averaging prices across all its products. This is because, with the prevalence of quantity discounts in the industry, InBev's average price would be lower in markets where its sales are driven more by large package-size options.

V(i) Summary Statistics

We match the brewer-distributor relationship data to the scanner data set. The distribution territory data from the CBBD directory are only available at the county

level, yet the exact AB distribution territory is not necessarily delineated at the same level. Still, most counties in the data can only be mapped to one AB distributor because macro brewers typically use exclusive territories with their distributors. To gain more information on AB distributors' exact sales territory, we contacted each exclusive AB distributor and each AB distributor of stores in the control group. We removed stores from the sample that were not in California, that did not operate during the entire period, or if there wasn't enough information to identify the AB distributor. The final sample size is 207 stores, having started with 256 stores.[23]

[Place Figure 1 about here.]

Figure 1 illustrates changes in distribution status of InBev brands due to the AB-InBev distribution agreement in the final sample. As shown in Figure 1, AB had exclusive distributors in Butte, Lake, Marin, Mendocino, Shasta, Sonoma and San Joaquin counties, and prior to the event, nonexclusive AB distributors also carried InBev in Lassen, San Francisco, San Mateo and Stanislaus counties.[24]

[Place Table III about here.]

Table III gives summary statistics of store and distributor attributes for the three assigned groups during the entire two-year period. Store characteristics differ across the three groups.[25] In general, stores with AB-exclusive distributors had the highest weekly store sales, the lowest average price, and carried the most brands. Due to data limitation, we were unable to verify all the brewer-distributor relationships for each store. However, for all the brewer-distributor-store combinations that we are able to verify using the CBBD data, we list distributor characteristics in Table III. In areas where AB distributors were exclusive, these AB distributors carried on average 22 brands, while other non-AB distributors carried on average 51 brands. Note that

the mean total market shares for AB-nonexclusive distributors in the control group and in treatment group 1 are similar (41.89% versus 42.09%), suggesting that the prior ownership of InBev brands may not be correlated with the overall abilities of AB distributors.

[Place Table IV about here.]

We also construct a data set that includes distribution status for major brewers in order to study the event's impact on non-InBev brands' market shares under a shared distribution house.[26] This restricted sample includes eight product families in 170 stores.[27] Table IV shows the variations we use to identify the effect with non-InBev brands. In Table IV, 'In' represents a brand's local distributor having added ('Out' represents dropped) InBev to its portfolio in a given geographic area.[28] Table IV shows no specific pattern regarding a firm's tendency to seek or evade InBev brands at the distribution level (except for Crown Imports, which tended to be in different distribution houses from InBev prior to the event). This observation provides more confidence in the research design.

V(ii) Graphical Analysis and Raw Data Mean Differences

Before turning to the parametric models, we plot mean weekly InBev market shares for different groups of stores to show data variation. The results are shown in Figures 2 and 3, with horizontal lines representing the mean market shares of different groups before and after the event. As shown in both figures, most of the variation in InBev's market shares came from weekly shocks, and the market shares followed similar trends in all groups. From Figure 2, we find that the vertical gap between the lines of treatment group 1 and treatment group 2 was closed by half after the event. In

contrast, from Figure 3, we see no clear evidence that the vertical gap between the lines of control group and treatment groups had changed after the event.

[Place Figure 2 about here.]

[Place Figure 3 about here.]

We also provide a 'before and after' comparison of InBev's mean market shares for the three assigned groups. The results are shown in Table V. Mean market shares from each group are presented in columns (1) to (3), while columns (4) and (5) give the differences between groups, and thus preview the 'exclusive' and 'reallocation' effects in a difference-in-differences setting. As suggested in Table V, the exclusive effect is 0.16 percentage points and is significant, while the reallocation effect is negative and is not significant.

[Place Table V about here.]

VI EMPIRICAL RESULTS

Table VI shows the estimated changes in InBev's market share due to changes in its distribution status. The estimated results in column (1) suggest that InBev's market share increased by 0.16 percentage points after joining AB-exclusive networks. Given that the overall average of InBev's market share prior to the event was 2.69 percentage points, moving into an exclusive distribution network was associated with a 6% increase in InBev's market share. There was no significant impact on InBev's market share when it moved to AB-distribution networks. Column (2) provides similar results when weekly fixed effects are included.

[Place Table VI about here.]

Columns (4) and (5) provide estimation results using observations from a restricted sample, in which each store's AB distributor can be identified. For this sample, the standard errors can be clustered at the distributor level to address correlations within each distributor. Clustering the standard errors at the distributor level decreases the estimate precision; however, the results are qualitatively similar to those in columns (1) and (2).

VI(i) The Effect Is Strongest When a Store Is Smaller or Carries More Brands

The above results show that moving into AB-exclusive distribution networks increased InBev's market share significantly. To understand the channels of the effect, we stratify the results by different store attributes. Table VII provides the results. Each cell in Table VII reports the coefficient 'InBev moved to AB exclusive' using the same specification as in column (2) of Table VI. Panel A splits the sample by the store sales area (s). For example, column (1) shows that the estimated coefficient of the exclusive effect when the sample is restricted to store sizes below the 25 percentiles of all stores ($0 \leq p^s < 25$). Panel B splits the samples by the average number of beer brands (n) of a store, and panel C further splits the sample by the store size and the number of a store's beer brands.

[Place Table VII about here.]

The pattern that emerges in Table VII is consistent with Hypothesis 2. The estimated coefficients are larger when the sample is restricted to smaller stores as well as to stores that carry more brands. The estimated coefficient is largest in column (9), which is estimated using the smallest stores *and* with the largest number of brands. In contrast, the coefficient is insignificant and the smallest in column (12), which is estimated using the largest stores *and* with fewest brands, providing

evidence that the exclusive effect is mainly driven by stores in which product retail competition is more fierce, so additional promotions by local distributors are more likely to make an impact.

VI(ii) Additional Evidence on Non-InBev Brands' Market Share

Table VIII presents results from estimating equation (2). The estimates in column (1) show that when a distribution channel was less crowded ('InBev out'), brands within the distribution channel increased market share by 0.12 percentage points. The estimated coefficient 'InBev in' also has the expected sign (negative), but is not precisely estimated. These findings again support Hypothesis 1. Columns (2) and (3) provide the regression results using observations from stores with a smaller sales area and from stores that carry more brands, respectively. The point estimates of 'InBev out,' however, are not larger than that in column (1), and so do not provide further support for Hypothesis 2.

[Place Table VIII about here.]

VI(iii) Alternative Explanations for the Increase in InBev's Market Share

The main findings suggest that using an AB-exclusive distributor increases InBev's market share. The interpretation is that distributors with limited external trading opportunities increase their promotional efforts. However, if AB-exclusive distributors have lower costs, the increase in InBev's market share may be due to lower prices, so the interpretation of the main empirical results would be problematic. In this subsection, we use UPC-level retail prices to show that the main empirical results are not consistent with a cost-efficiency story. First, using data before the event, we show that AB's prices were not lower in areas where AB employed exclusive distributors. In

addition, we show that there were no significant price decreases in InBev's products after they joined AB's distribution network.

[Place Table IX about here.]

Table IX provides regression results of product prices on an indicator variable that equals 1 for AB products in areas where AB employed an exclusive distributor (AB products $\times$ AB exclusive area), along with several demographic control variables. Column (1) gives the results using only AB products. Column (2) reports the results that include other macro products in the sample and are estimated with a store fixed-effect specification. The results do not support the cost-efficiency hypothesis of AB-exclusive distributors: AB's retail prices before the event were similar across the distribution status.

[Place Table X about here.]

Table X provides UPC-level results for InBev's market share and price. Nine UPC products belonged to the InBev product family. All columns provide regression results using a similar specification as in column (2) of Table VI. The main independent variables become 'InBev products $\times$ InBev moved to AB exclusive' and 'InBev products $\times$ InBev moved to AB,' because other foreign products are also included as further control for prices. Besides store fixed effects, the specification includes UPC-level product fixed effects and weekly fixed effects.

Column (1) of Table X provides the UPC-level market share results using only InBev products. The estimated coefficient 'InBev products$\times$InBev moved to AB exclusive' is nearly 0.02 percentage points and is consistent with the market share results from the product family level shown in Table VI. Column (2) gives the UPC-level price results. Column (3) includes prices from other foreign products to serve as further

controls. The effect of moving into an AB-exclusive distribution network on the price of an InBev's product is not statistically significant in both specifications. The above results (in Tables IX and X) thus do not support preexisting cost efficiency from an AB-exclusive distributor nor a decrease in InBev's retail price as channels to raise InBev's market share when it moved into AB-exclusive distribution network.

VII ROBUSTNESS CHECKS

We investigate the robustness of the main results by including further control variables and by using an alternative matching estimator.

VII(i) Further Controls

Because of AB's industry dominance, we might be concerned that a positive 'InBev moved to AB exclusive' coefficient was driven by the brewer's market share. We explore this issue by fitting InBev's market share using the following specification to allow for interactions between changes in distribution status and AB's market share:

$$
\begin{aligned}
(3) \qquad \text{Share}_{it} =& \alpha_i + \alpha_t + \beta_1 \, 1[\text{InBev moved to AB exclusive}]_{it} \\
&+ \beta_2 \, 1[\text{InBev moved to AB}]_{it} \\
&+ \beta_3 \, 1[\text{InBev moved to AB exclusive}]_{it} \times \text{AB market share}_i \\
&+ \beta_4 \, 1[\text{InBev moved to AB}]_{it} \times \text{AB market share}_i + \epsilon_{it}.
\end{aligned}
$$

For each store, we calculate the average AB market share prior to the event, AB market share$_i$, and interact it with the variables of interest.

Column (3) of Table VI uses additional interaction terms. The point estimate of 'InBev moved to AB exclusive × AB market share' is negative and significant (-0.017), reassuring us that the positive 'exclusive' effect is not driven by AB's market share.

In contrast, the point estimate of 'InBev moved to AB × AB market share' is positive and significant (0.021), while the point estimate on 'InBev moved to AB' is negative (-0.617) and significant. This suggests that reallocation into another distribution network lowered InBev's market share, while moving into an AB distribution network where AB had higher market share offset some of the negative impact. Column (6) provides qualitatively similar results for the restricted sample where standard errors are clustered at the distributor level.

VII(ii) Difference-in-Differences Matching Estimators

One concern in using a simple difference-in-differences regression strategy is that the outcome variable may be a function of store attributes, and such heterogeneity between stores can lead to bias (Heckman, Ichimura and Todd [1997]).[29] A matching estimator reduces the above bias by pairing stores with similar observed attributes so that comparisons are based on stores with observed attributes over a common support.[30] For robustness checks, we estimate a difference-in-differences matching model as proposed by Heckman, Ichimura and Todd [1998] for the effect of InBev joining AB's exclusive-distribution network on InBev's market share. Following the language from the program participation literature, the 'treatment group' in this case refers to stores with AB-exclusive distributors (our treatment group 2), and the 'control group' in this case refers to stores where InBev products were also subject to reallocation at the distribution level, but the local AB distributors were not exclusive (our treatment group 1). By removing store fixed effects, we then estimate a difference-in-differences matching model using various weighting schemes, including radius matching, nearest neighbor matching, and kernel matching.[31]

[Place Table XI about here.]

Table XI provides results from the difference-in-differences matching estimators. The estimated impact from joining an AB-exclusive network by radius matching and nearest-neighbor matching is both positive (0.18 and 0.13, respectively) and statistically significant. The matching estimate by kernel matching is also positive (0.13), but cannot be precisely estimated.[32] Compared to the previous difference-in-differences regression estimate (0.16) from the baseline model, the magnitude of matching estimates is similar to that from the regression framework and provides further support for the main findings.

VIII CONCLUSION

Using variation from distribution contract changes, this paper shows that when InBev's products were carried by a distributor with fewer external trading opportunities, InBev market share increased by 6%, with no significant change in InBev's retail price. The effect on InBev's market share was more prominent in stores with smaller sales areas and that carried more brands, where local distributors' promotions were more crucial. The interpretation is that products carried by exclusive distributors received more promotional efforts through non-price channels. Further evidence shows that the effect was not driven by lower costs or by market power of AB-exclusive distributors. For non-InBev brands, a less crowded distribution channel also increased their market shares. The findings are consistent with the presence of a substitutable effect for distributors' efforts, which makes manufacturers prefer exclusive distributors, and support an efficiency argument for exclusive dealing.

There are limitations to this paper's findings. First, the results do not imply that exclusive dealing increases social welfare. If exclusive dealing squeezed efficient firms out of the market, social welfare might be ambiguous. Nevertheless, previous empirical studies either do not support a foreclosure hypothesis in the United States

beer industry (Asker [2005]) or find that the change in consumer surplus due to the foreclosure effect of exclusive dealing is extremely small (Chen [2014]). Second, all results are obtained using data from one of California's grocery chains, and the identification is based on a single event. InBev's products were not close substitutes to AB's domestic macro products and were carried in every store in the final sample, but may not have such a strong presence in other retail formats. It is important to note these limitations when generalizing this paper's findings to other settings. In spite of these limitations, our analysis highlights that, while exclusive dealing is sometimes condemned as a foreclosure device, it is an important instrument in the beer industry to impel a distributor's promotional efforts.

FOOTNOTES

[1]Exclusive dealing practices are subject to antitrust scrutiny in many countries. In Europe, an exclusive dealing practice by Intel, which provided rebates and cash benefits to manufacturers and retailers in exchange for purchasing most of their products from Intel, was found to be anticompetitive by the European Commission and resulted in a €1.06 billion fine in 2009. Other examples include the exclusionary contracts between Visa and MasterCard and their member banks that prohibited access to American Express and Discover, and Microsoft's exclusive dealing practices with computer manufacturers to market its Internet Explorer. See United States v. VISA U.S.A., Inc., 163 F. Supp. 2d 322 (S.D.N.Y. 2001) and United States v. Microsoft Corp., 253 F.3d 34 (D.C. Cir 2001).

[2]For a review of studies on vertical restraints , see Lafontaine and Slade [2008] and Lafontaine and Slade [2014].

[3]Segal and Whinston [2000] formalize the above argument by deriving conditions for an exclusive contract to affect investment incentives in a multiparty contracting environment. They show that exclusivity increases the level of investments when a buyer's (i.e., distributor's) investments are substitutable.

[4]This, however, does not imply that exclusive contracts definitely increase social welfare. Segal and Whinston [2000] carefully describe the conditions under which exclusive contracts are socially beneficial in their model. In particular, an exclusive contract is likely to be socially optimal if the market is competitive, while the aggregate welfare is in general ambiguous when the market is imperfectly competitive. We are grateful to the editor and an anonymous referee for suggesting the above heuristic explanation for theory and drawing our attention to the clarification for social welfare. We will have a further discussion regarding social welfare in conclusion.

[5]The underlying assumption is that retail prices are held constant and are not directly affected by changes in distribution assignments. If not, the effect on market share is ambiguous. We are grateful to an anonymous referee for drawing our attention to this clarification. In addition, in the empirical section, we show that there was no significant change in InBev's retail prices.

[6]Source: Beer Institute. AB was the dominant firm in the industry with 50% market share in 2007. Mergers and acquisitions are quite common in the industry. Miller and Coors formed a joint venture in 2008, and AB merged with InBev in 2009. All the sample data used in this paper predate

these mergers. For a general introduction to the United States brewing industry, see Tremblay and Tremblay [2005].

[7]For example, a manager of a Manhattan distribution company once described how he helped Coors to modify its Latino 360 marketing program: 'Sometimes they'll draw up a program in Colorado that is more of a Mexican theme, and that's not the Hispanic consumer here. So we work collectively and closely with them to make sure they stay focused on the Puerto Rican and Dominican consumers – those that are drinking our products.' See Theodore [2008].

[8]In the paper, an 'AB distributor' means that a distributor had a distribution contract with AB, not that a distributor was owned by AB. Nevertheless, AB, along with other domestic macro brewers, did have great influence on their distributors' daily operations through their contract terms. For example, Khermouch [1997] describes some features of AB's distribution contract: 'to minimize absentee management, the new (AB) contract requires the top on-site manager to hold a 25% stake (of the distribution company)' and 'the contract also mandates weekly calls on all retail accounts, requires mandatory drug testing and prohibits sales incentives on non-A-B brands not matched for A-B brands.'

[9]In some states, it is even required by law to use an exclusive territory system for beer distributors. For empirical studies of the effect of exclusive territory in the United States beer industry, see Culbertson and Bradford [1991], Sass and Saurman [1993], Sass and Saurman [1996], and Rojas [2010].

[10]Furthermore, in areas where AB had lower market share, distributors were less enthusiastic about the program. For example, one AB distributor said: 'There's no way we could be totally exclusive. We fly the A-B eagle on our trucks, but if we didn't do our other things, we couldn't stay in business.' See Butler [1999].

[11]Such practices ensure that a distributor's promotional contribution to a brand isn't easily 'ripped off' by another distributor. However, these practices may make a brewer vulnerable to termination of a bad distributorship; for example, see Day [2006].

[12]The distribution agreement did not include InBev's Canadian brands, such as Labatt Blue and Labatt Blue light. The press release is available at http://anheuser-busch.com/index.php/inbev-and-anheuser-busch-reach-agreement-for-european-import-brands-in-united-states/.

[13]In the press release, August A. Busch IV, the Chief Executive Officer (CEO) of AB, said: 'These well-known import brands complement our company's leading portfolio of American premium beers

and enable our company to better compete.' Carlos Brito, InBev's CEO, announced that 'By securing access to Anheuser-Busch's world-class sales and distribution system, this agreement will enhance opportunities for U.S. consumers to experience the unique values of our premium European import brands, and further accelerate their growth.'

[14]We would be more worried about the research design if the distribution agreements were tailored to certain AB distributors in Northern California. For example, if InBev's product-distribution rights were given to specific AB-exclusive distributors, because they outperformed other AB distributors in 2006, then we may incorrectly attribute the increase in InBev's market share to the increase in the distributors' promotional efforts.

[15]The 2006 and 2007 trade directories were provided by local distributors.

[16]According to the 2006 CBBD directory, prior to the event, there were 39 AB distributors in California. Out of these 39 distributors, 11 were exclusive distributors, and of the 28 AB nonexclusive distributors, 11 were already carrying InBev products.

[17]All AB distributors in the data should start carrying InBev brands after the event, because California does not have strict beer franchise laws that forbid brewers from switching between distributors. In addition, AB distributors would not refuse to carry InBev products, because InBev products were very popular at that time. In the final sample, only one AB distributor did not include InBev in its brand portfolio in the 2007 CBBD directory. Given that this distributor had exactly the same brand portfolio in both the 2006 and 2007 CBBD directories, it is very likely that the distributor failed to update its information.

[18]To illustrate, Budweiser has 7 package sizes (1, 4, 6, 12, 18, 20, and 30), sold in bottles or cans; and the average price of its 24 oz. can is $2.01, while the average price of a 30-pack of 12 oz. Budweiser cans is $18.35.

[19]For each brand, we added up sales for all its package sizes and containers to calculate aggregate sales. We adjusted volume and package sizes to find out how many units were sold for each brand in terms of a regular 12 oz. six-pack. Market shares in sales are defined as total brand sales (in quantity) divided by total beer sales. The average beer prices at the brand level are for the average six-pack of 12 oz. containers across all packages. Product characteristics were obtained from each manufacturer's website.

[20]Domestic macro brands are: Budweiser family brands, Bud Light family brands, Busch, Michelob family brands, Miller family brands, Coors family brands, Keystone family brands, Natural family

brands, and Pabst Blue Ribbon.

[21]Beck's Oktoberfest is another InBev product in the data set. However, it was a seasonal product that had only 11 observations with positive sales (carried by just 4 stores). Therefore, we excluded Beck's Oktoberfest when we calculated InBev's market share.

[22]We also provide market share regression results using all of InBev's products at the UPC level as a robustness check in Section VI.

[23]Stores excluded in the final sample due to a lack of information about distribution status were bigger (in terms of physical sales area) compared to the other stores in California in the original sample. Nevertheless, the average price of beer, the average price of InBev products, and the quantity sold of InBev products between stores in the final sample and the original sample were quite similar.

[24]The counties that belonged to neither a control group nor a treatment group are counties in which the grocery chain studied in this paper did not operate, or counties in which changes in InBev's distribution status could not be determined.

[25]Demographics data are drawn from Census 2000 at the ZIP code area level.

[26]We are only able to map the distribution status to brands for a small number of brands due to the limitation of the CBBD data. For example, distributors 1 and 2, both serving counties A and B, may both appear to have a Heineken distributorship in the CBBD directory. Heineken may have two distributors that compete with each other in both counties. However, major brewers tend to adopt exclusive territories. Therefore, it is more likely that distributor 1 has Heineken in county A and distributor 2 has Heineken in county B, or vice versa. Nevertheless, without collecting more detailed information, we cannot assign distribution status for Heineken in this case. Unfortunately, not every distributor answered our phone calls, so we could only trace the distributorship of major brands in certain areas. Given that this is a restricted sample, we only use the data for the analysis of the effect for non-InBev brands.

[27]Stores in the restricted sample tend to be smaller than those in the final sample. This can be a concern, because a distributor's effort to locate better shelf space may play a more important role in a product's sales when shelf space is limited. Therefore, if the substitutable effect was more likely to be present in stores with a smaller display area, then the results in the restricted sample would overestimate the results for average-size stores.

[28]For example, AB, Miller, and Coors all had their own distributors in Sacramento County, and none of them was exclusive. Prior to the event, InBev was carried by the Miller distributor, which

also carried Heineken along with other brands. The Coors distributor also carried Crown Imports, and the AB distributor also carried Guinness and Sierra Nevada. Therefore, after the event, Heineken received an 'InBev out' treatment; Guinness and Sierra Nevada received an 'InBev in' treatment, while Crown Imports received no treatment at the distribution level in Sacramento County.

[29]The changes in InBev's market share may be a function of the average income of the neighborhood area.

[30]Rosenbaum and Rubin [1983] show that when matching on the observables is valid, matching on the probability of program participation (propensity score) is also valid, which greatly reduces the dimensionality of the matching procedure. One disadvantage of the above matching estimator, however, is that it requires program participation based solely on observed attributes, which may be too strong an assumption for many empirical settings. In contrast, a difference-in-differences matching estimator, as proposed by Heckman, Ichimura and Todd [1998], allows for time-invariant unobservables and is not subject to the above 'selection-on-observables' restriction.

[31]We first estimate a Logit model for a distributor's choice of joining AB's exclusive dealing program based on observed store attributes. The observed store attributes include: store size, population, median household income, the percentage of population that is male, and the percentage of population that is white. Second, we obtain the predicted program-participation probability based on the Logit model. To satisfy the common support assumption, we exclude stores from the treatment group that have propensity scores higher than the 99th percentile of the propensity scores from the control group. Similarly, we exclude stores from the control group with their propensity scores lower than the 1 percentile of the propensity scores from the treatment group.

[32]Standard errors for the difference-in-differences kernel matching estimator are obtained by bootstrapping.

REFERENCES

Areeda, P. E. and Kaplow, L., 1988, *Antitrust Analysis: Problems, Texts, Cases* (Little, Brown, Boston, Massachusetts, U.S.A.).

Asker, J., 2005, 'Diagnosing Foreclosure Due to Exclusive Dealing,' Working paper (Stern School of Business, New York University, New York, New York, U.S.A.).

Ater, I., 2014, 'Vertical Foreclosure Using Exclusivity Clauses: Evidence from Shopping Malls,' Working paper (School of Management, Tel Aviv University, Tel Aviv, Israel).

Bernheim, B. D. and Whinston, M. D., 1998, 'Exclusive Dealing,' *The Journal of Political Economy*, 106, pp. 64–103.

Bork, R. H., 1978, *The Antitrust Paradox: A Policy at War with Itself* (Basic Books, New York, New York, U.S.A.).

Butler, R., 1999, 'Harness the Power,' *Beverage World*, 118, pp. 40–44.

Chen, C.-W., 2014, 'Estimating the Foreclosure Effect of Exclusive Dealing: Evidence from the Entry of Specialty Beer Producers,' *International Journal of Industrial Organization*, 37, pp. 47–64.

Culbertson, W. P. and Bradford, D., 1991, 'The Price of Beer: Some Evidence from Interstate Comparisons,' *International Journal of Industrial Organization*, 9, pp. 275–289.

Day, N., 2006, 'Bye-Bye Bell's: How Illinois Beer Distribution Laws, Fiercely Protected by a Powerful Industry, Drove Away One of Chicago's Favorite Small Brewers,' *The Chicago Reader*, December 14. Available at: *http://www.chicagoreader.com/chicago/bye-bye-bells/Content?oid=923858*.

Heckman, J. J.; Ichimura, H. and Todd, P. E., 1997, 'Matching as an Econometric Evaluation Estimator: Evidence from Evaluating a Job Training Programme,' *The Review of Economic Studies*, 64, pp. 605–654.

Heckman, J. J.; Ichimura, H. and Todd, P. E., 1998, 'Matching as an Econometric Evaluation Estimator,' *The Review of Economic Studies*, 65, pp. 261–294.

Kesmodel, D., 2008, 'Beer Distributors Want More Than One Best Bud,' *The Wall Street Journal*, February 6. Available at: *http://www.wsj.com/articles/SB120226269926846331*.

Khermouch, G., 1997, 'A-B Back to Mindshare Games,' *Brandweek*, 38, p. 4.

Klein, B. and Murphy, K. M., 1988, 'Vertical Restraints as Contract Enforcement Mechanisms,' *The Journal of Law and Economics*, 31, pp. 265–297.

Lafontaine, F. and Slade, M. E., 2008, 'Exclusive Contracts and Vertical Restraints: Empirical Evidence and Public Policy,' in Buccirossi, P. (ed.), *Handbook of Antitrust Economics*, pp. 391–414 (The MIT Press, Cambridge, Massachusetts, U.S.A.).

Lafontaine, F. and Slade, M. E., 2014, 'Franchising and Exclusive Distribution: Adaptation and Antitrust,' in Blair, R. D. and Sokol, D. D. (eds.), *Oxford Handbook of International Antitrust Economics* (Oxford University Press, Oxford, England).

Marvel, H. P., 1982, 'Exclusive Dealing,' *The Journal of Law and Economics*, 25, pp. 1–25.

Masten, S. E. and Snyder, E. A., 1993, 'United States versus United Shoe Machinery Corporation: On the Merits,' *The Journal of Law and Economics*, 36, pp. 33–70.

Rasmusen, E. B.; Ramseyer, J. M. and Wiley, J. S., 1991, 'Naked Exclusion,' *The American Economic Review*, 81, pp. 1137–1145.

Rojas, C., 2010, 'The Competitive and Welfare Effects of Exclusive Agreements: Evidence from US Brewing,' Working paper (Department of Resource Economics, University of Massachusetts at Amherst, Amherst, Massachusetts, U.S.A.).

Rosenbaum, P. R. and Rubin, D. B., 1983, 'The Central Role of the Propensity Score in Observational Studies for Causal Effects,' *Biometrika*, 70, pp. 41–55.

Sass, T. R., 2005, 'The Competitive Effects of Exclusive Dealing: Evidence from the U.S. Beer Industry,' *International Journal of Industrial Organization*, 23, pp. 203–225.

Sass, T. R. and Saurman, D. S., 1993, 'Mandated Exclusive Territories and Economic

Efficiency: An Empirical Analysis of the Malt-Beverage Industry,' *The Journal of Law and Economics*, 36, pp. 153–177.

Sass, T. R. and Saurman, D. S., 1996, 'Efficiency Effects of Exclusive Territories: Evidence from the Indiana Beer Market,' *Economic Inquiry*, 34, pp. 597–615.

Segal, I. R. and Whinston, M. D., 2000, 'Exclusive Contracts and Protection of Investments,' *The RAND Journal of Economics*, 31, pp. 603–633.

Theodore, S., 2008, 'Manhattan Beer Distributors: Big City Wholesaler Keeps Its Focus Small,' *Beverage Industry*, 99, pp. 32–36.

Tremblay, V. J. and Tremblay, C. H., 2005, *The U.S. Brewing Industry: Data and Economic Analysis* (The MIT Press, Cambridge, Massachusetts, U.S.A.).

TABLE I
IDENTIFYING CHANGES IN DISTRIBUTION STATUS OF ANHEUSER-BUSCH (AB) DISTRIBUTORS

Store Types	AB Distributor's 2006 Brand Portfolio	Assignment
Stores with AB non-exclusive distributors	Anheuser-Busch, Boston Beer, Gordon Biersch, Heineken USA, InBev USA, Sierra Nevada	Control group
Stores with AB non-exclusive distributors	Anheuser-Busch, Barton Beers, Boston Beer, Sierra Nevada	Treatment group 1
Store with AB exclusive distributors	Anheuser-Busch	Treatment group 2

TABLE II
PRODUCT ATTRIBUTES BY CATEGORY

Rank	Brand	Market Share (%)	ABV (%)	Calories (per 12 oz)	Average Price (per six-pack)
Domestic Macro					
1	Coors Light	13.12	4.2	102	4.15
2	Bud Light	9.71	4.2	110	3.94
3	Budweiser	9.40	5.0	145	3.98
5	Miller Genuine Draft	4.42	4.7	143	4.30
8	Miller Lite	3.25	4.2	96	4.12
9	Coors Banquet	2.63	5.0	142	3.99
12	Pabst Blue Ribbon	1.45	5.0	153	3.25
15	Keystone Light	1.33	4.1	104	2.91
17	Miller High Life	1.18	4.7	143	3.68
Domestic Specialty					
7	Sierra Nevada Pale Ale	3.26	5.6	190	7.07
19	Fat Tire Amber Ale	0.96	5.2	164	7.66
Imports					
4	Corona Extra	6.21	4.6	148	7.02
6	Heineken	4.15	5.0	150	7.01
10	Tecate	2.38	4.5	142	4.83
11	Corona Light	1.65	3.7	109	7.17
13	Pacifico	1.45	4.8	146	6.47
14	Smirnoff Ice	1.39	5.0	228	7.90
16	Newcastle Brown Ale	1.22	4.7	140	7.45
18	Guinness Draught Ale	1.01	4.2	125	7.91
20	Stella Artois (InBev)	0.88	5.2	145	7.85
26	Beck's (InBev)	0.81	5.0	143	6.93
40	Bass Pale Ale (InBev)	0.45	5.1	150	6.81
70	Boddingtons (InBev)	0.19	4.6	155	7.51
105	Beck's Premier Light (InBev)	0.08	2.3	64	7.00

Notes: This table reports product attributes of the top 20 brands along with 5 InBev Brands in the data. ABV (alcohol by volume) measures the percentage of alcohol as a fraction of the total volume.

TABLE III
SUMMARY STATISTICS

	Control Group	Treatment Group 1	Treatment Group 2
Store Characteristics			
Number of stores	35	135	37
Weekly store sales (six-pack)	2048	1837	2351
	(711.15)	(634.66)	(634.18)
Average store price ($ per six-pack)	5.59	5.44	5.33
	(0.28)	(0.26)	(0.35)
Size (100,000 square footage)	0.27	0.30	0.32
	(0.14)	(0.10)	(0.08)
Number of brands	121.66	127.51	134.76
	(19.56)	(14.69)	(9.88)
Population (100,000)	0.36	0.34	0.28
	(0.17)	(0.17)	(0.12)
Median household income ($10,000)	6.63	6.70	4.99
	(1.74)	(2.42)	(1.80)
Male population ratio	0.50	0.50	0.49
	(0.04)	(0.02)	(0.02)
White population ratio	0.62	0.67	0.83
	(0.15)	(0.17)	(0.08)
Distributor Characteristics (AB)			
Number of distributors	5	9	3
Market shares	41.89	42.09	24.58
	(3.13)	(9.47)	(5.03)
Number of brands carried	37.17	37.48	22.01
	(5.31)	(8.66)	(2.31)
Distributor Characteristics (Non-AB)			
Number of distributors	6	10	7
Market shares	36.94	24.50	43.89
	(15.07)	(18.97)	(19.28)
Number of brands	36.98	27.33	51.39
	(14.47)	(19.40)	(21.27)

Notes: All entries reported are means with standard deviations shown in parentheses.

TABLE IV
DISTRIBUTION STATUS AFFECTED BY THE AB-INBEV DISTRIBUTION AGREEMENT

County/Product Families	AB	Anchor	Crown Imports	Guinness	Heineken	Newcastle	Pyramid	Sierra Nevada
Del Norte, Humboldt	In	*	*	*	*	*	In	*
San Jose (city)	In	Out	In	In	In	Out	Out	In
Alameda	In	*	In	Out	Out	–	Out	In
Monterey, San Benito, Santa Cruz	In	In	In	In	In	In	*	Out
Sacramento	In	Out	–	In	Out	Out	Out	In
Yolo	In	Out	–	In	Out	Out	Out	In
Solano	In	*	In	Out	Out	Out	Out	In
Lassen	–	–	–	–	–	*	–	–
San Francisco	–	–	–	–	–	–	–	–
Stanislaus	–	–	–	–	–	–	–	–

Notes: This table reports changes in distribution status for several product families across different geographic areas. Product families included here are brands carried by at least one AB distributor. The symbol '–' indicates that the brand's distribution status was not affected by the AB-InBev distribution agreement. 'In' indicates that the brand's distributor started carrying InBev after the event. 'Out' indicates that the brand's distributor stopped carrying InBev after the event. The symbol '*' indicates that the brand's distributor in the area cannot be identified.

TABLE V
MEAN DIFFERENCES IN INBEV'S MARKET SHARE

	Mean Market Share			Difference	
	Control	Treatment 1	Treatment 2	(3)-(2)	(2)-(1)
	(1)	(2)	(3)	(4)	(5)
Before	3.96	2.50	2.15	-0.35	-1.45
	(1.92)	(1.29)	(1.42)	(0.04)	(0.04)
After	3.64	2.12	1.93	-0.19	-1.52
	(1.81)	(1.22)	(1.37)	(0.03)	(0.03)
Difference	-0.32	-0.39	-0.23	0.16	-0.07
	(0.06)	(0.02)	(0.05)	(0.05)	(0.05)

Notes: This table reports the means and the standard deviations (in parentheses) of InBev's market shares for the control group and the treatment groups before and after the event.

Table VI
Effect of AB-InBev Distribution Agreement on InBev's Market Share

	Full Sample			Using Observations from the Restricted Sample		
	(1)	(2)	(3)	(4)	(5)	(6)
InBev moved to AB exclusive	0.159**	0.159**	0.593**	0.136*	0.136*	0.439*
	(0.041)	(0.041)	(0.168)	(0.059)	(0.060)	(0.192)
InBev moved to AB	-0.071	-0.071	-0.617**	0.074	0.074	-0.630**
	(0.103)	(0.103)	(0.128)	(0.041)	(0.042)	(0.083)
Post	-0.315**			-0.459**		
	(0.097)			(0.019)		
InBev moved to AB exclusive			-0.017*			-0.013+
× AB market share			(0.006)			(0.006)
InBev moved to AB			0.021**			0.027**
× AB market share			(0.003)			(0.002)
Constant	2.687**	2.567**	2.567**	2.676**	2.597**	2.597**
	(0.017)	(0.044)	(0.043)	(0.018)	(0.051)	(0.043)
Weekly fixed effects	No	Yes	Yes	No	Yes	Yes
Observations	21528	21528	21528	11232	11232	11232
Adjusted R^2	0.043	0.252	0.254	0.047	0.245	0.250

Notes: The dependent variable is InBev's market share. 'AB market share' is the average market share of all AB products prior to the event. All regressions control for store fixed effects. Columns (1)-(3) report the results using the full sample. Columns (4)-(6) report the results using observations from counties where the exact identity of InBev's distributor can be identified. Standard errors, shown in parentheses, are clustered at the county level for columns (1)-(3) and are clustered at the distributor level for columns (4)-(6). + significant at 10%, * significant at 5%, ** significant at 1%.

TABLE VII
STORE SIZE, NUMBER OF BRANDS AND INBEV SHARES

	Panel A: Store Size (s)			
	$0 \leq p^s < 25$	$25 \leq p^s < 50$	$50 \leq p^s < 75$	$75 \leq p^s \leq 100$
	(1)	(2)	(3)	(4)
InBev moved to AB exclusive	0.305**	0.147+	0.081	0.142
	(0.075)	(0.073)	(0.070)	(0.102)
Observations	5304	5408	5408	5408
	Panel B: Number of Brands (n)			
	$0 \leq p^n < 25$	$25 \leq p^n < 50$	$50 \leq p^n < 75$	$75 \leq p^n \leq 100$
	(5)	(6)	(7)	(8)
InBev moved to AB exclusive	0.131*	0.111	0.197**	0.139+
	(0.062)	(0.108)	(0.062)	(0.072)
Observations	5408	5304	5512	5304
	Panel C: Store Size and Number of Brands			
	$0 \leq p^s < 25$	$0 \leq p^s < 50$	$50 \leq p^s < 100$	$75 \leq p^s \leq 100$
	$75 \leq p^n \leq 100$	$50 \leq p^n \leq 100$	$0 \leq p^n < 50$	$0 \leq p^n < 25$
	(9)	(10)	(11)	(12)
InBev moved to AB exclusive	0.494	0.241+	0.020	-0.070
	(0.278)	(0.114)	(0.060)	(0.112)
Observations	728	3536	3536	624

Notes: The dependent variable is InBev's market share. Each cell reports the regression coefficient based on equation (1) (with weekly fixed effect) for a subgroup of stores that have store attributes (store size and/or the number of brands) within the attribute's given percentiles, which are indicated in the column headings. Standard errors, clustered at the county level, are shown in parentheses. + significant at 10%, * significant at 5%, ** significant at 1%.

TABLE VIII
NON-INBEV BRANDS' MARKET SHARE

	All Stores (1)	$0 \leq p^s < 50$ (2)	$50 \leq p^n \leq 100$ (3)
InBev in	-0.023	-0.033	-0.052
	(0.057)	(0.060)	(0.053)
InBev out	0.119*	0.101	0.088
	(0.056)	(0.060)	(0.055)
Constant	1.625**	1.701**	1.456**
	(0.021)	(0.024)	(0.020)
Observations	399419	214741	231124
Adjusted R^2	0.006	0.006	0.006

Notes: The dependent variable is brand-level market share. 'InBev out' indicates brands whose distributor stopped carrying InBev after the event. 'InBev in' indicates brands whose distributor started carrying InBev after the event. All regressions control for store, brand and weekly fixed effects. Standard errors, clustered at the distributor level, are shown in parentheses. * significant at 5%, ** significant at 1%.

TABLE IX
EXCLUSIVITY AND THE PRICE OF ANHEUSER-BUSCH (AB) PRODUCTS

	AB Products (1)	All Macro Products (2)
AB products × AB exclusive	0.002	0.005
	(0.015)	(0.021)
Population	-0.002	
	(0.018)	
Median household income	0.005*	
	(0.002)	
Male population ratio	0.363**	
	(0.099)	
White population ratio	0.012	
	(0.025)	
Store size	-0.028	
	(0.031)	
Constant	5.909**	6.024**
	(0.049)	(0.034)
Store fixed effects	No	Yes
Observations	268568	423875
Adjusted R^2	0.848	0.867

Notes: The dependent variable is the UPC-level, volume-adjusted, 12-oz. six-pack price. All regressions use data before the event, and control for UPC and weekly fixed effects. Standard errors, clustered at the county level, are shown in parentheses. * significant at 5%, ** significant at 1%.

TABLE X
EXCLUSIVITY, MARKET SHARE, AND PRICE: UPC-LEVEL EVIDENCE

	Market Share	Price	
	InBev products	InBev products	All foreign products
	(1)	(2)	(3)
InBev products × InBev moved to AB exclusive	0.016**	-0.014	-0.028
	(0.005)	(0.022)	(0.027)
InBev products × InBev moved to AB	-0.034**	-0.037**	0.291**
	(0.003)	(0.009)	(0.038)
InBev moved to AB exclusive			0.014
			(0.009)
InBev moved to AB			-0.055**
			(0.008)
Constant	0.194**	7.009**	8.852**
	(0.035)	(0.050)	(0.024)
Observations	133724	133724	1284605
Adjusted R^2	0.363	0.512	0.750

Notes: Dependent variables are indicated in the column headings. All regressions control for store, UPC and weekly fixed effects. Standard errors, clustered at the county level, are shown in parentheses. ** significant at 1%.

TABLE XI
DIFFERENCE-IN-DIFFERENCES MATCHING ESTIMATES

	Radius Matching	Nearest Neighbor Matching	Kernel Matching
	(1)	(2)	(3)
InBev moved to AB exclusive	0.181**	0.130**	0.130
	(0.020)	(0.030)	(0.093)
Observations	6324	2914	6324

Notes: The dependent variable is InBev's market share. Standard errors are shown in parentheses. Standard errors for the kernel matching estimate are bootstrapped standard errors using 1,000 replications. ** significant at 1%.

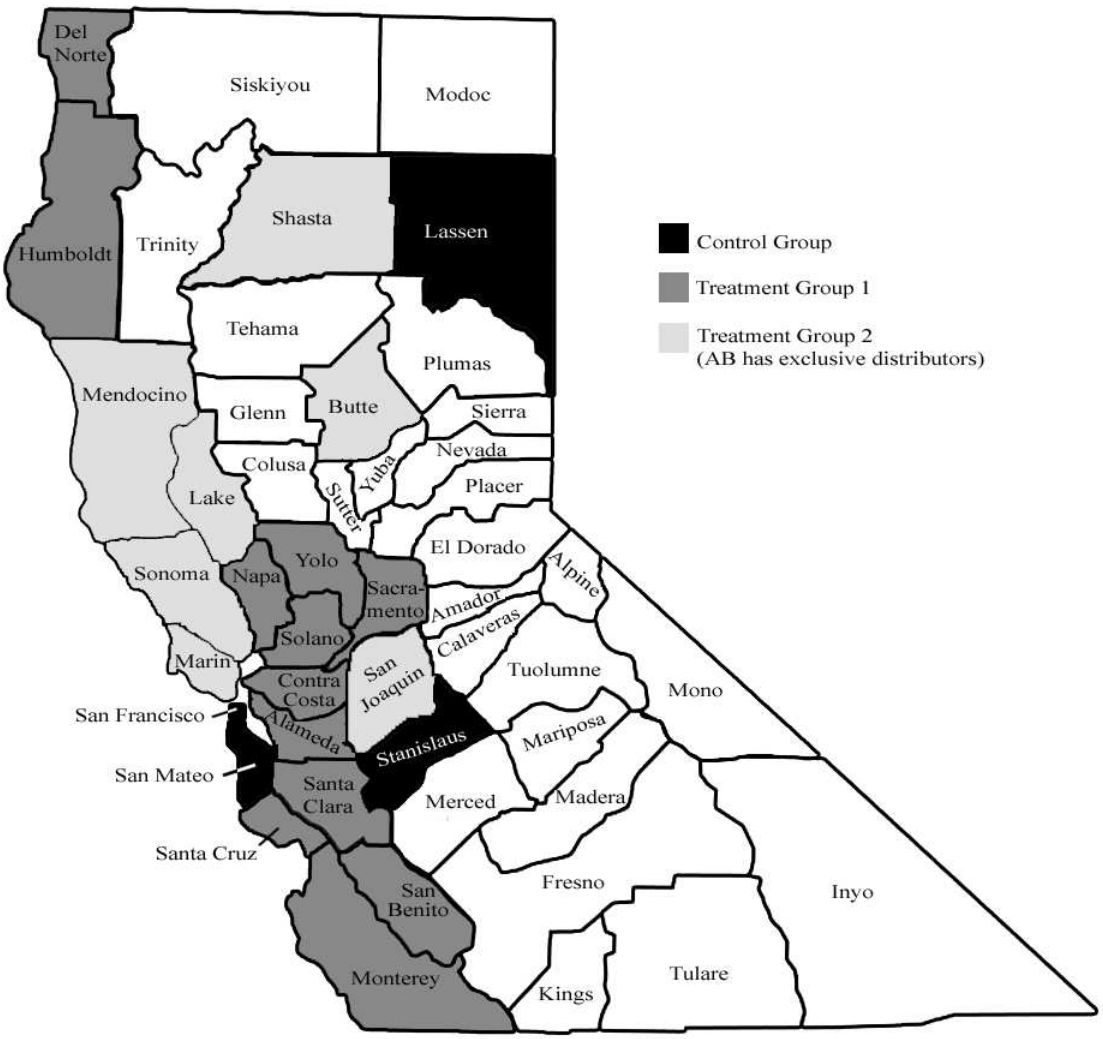

Figure 1
Changes in InBev's Distribution Status Due to the AB-InBev Distribution Agreement

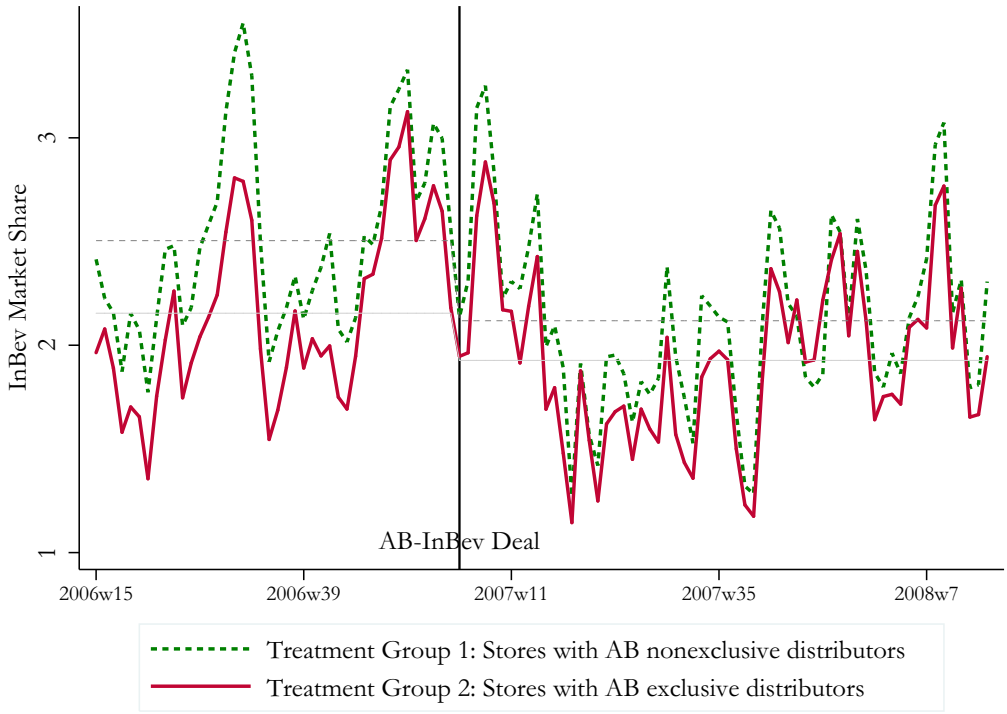

Figure 2
The Effect of Reallocation to the Anheuser-Busch (AB) Exclusive Distribution Network on InBev's Market Share

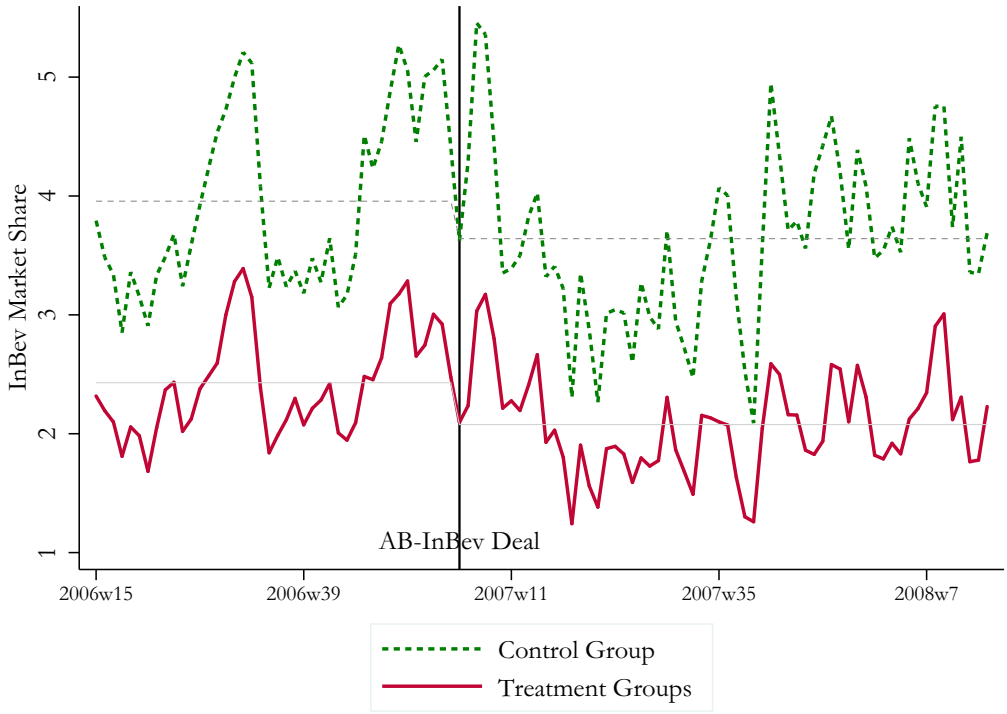

Figure 3
The Effect of Reallocation to the Anheuser-Busch (AB) Distribution Network on InBev's Market Share