Coordinate to obfuscate? The role of prior announcements of recommended prices

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DISCUSSION PAPER

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Coordinate to obfuscate?
The role of prior announcements of recommended prices*

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Abstract

Firms may want to coordinate industry-wide price jumps that are predictable for rivals, however, unpredictable for consumers. We show how such coordination is carried out in Norwegian gasoline retailing. Overnight, the market leader initiated an equilibrium transition from regular to non-regular price jumps. Prior announcements of a non-transaction price variable, recommended prices, are used to coordinate the timing and the level of industry-wide price jumps.

Keywords: Price coordination, consumer obfuscation, prior announcements
JEL Codes: D22, D43, L11, L13

1 Introduction

To achieve common industry-wide price jumps, focal points are typically established on the timing and magnitude of such jumps. With regular price jumps, low-price periods are predictable for consumers, hence price-aware consumers may shift purchases to these periods. From 2004 to November 2017, Norwegian gasoline companies increased retail prices to the level of the recommended price every Monday and Thursday (Foros and Steen, 2013; the Norwegian Competition Authority, 2020). Between price jumps, price undercutting depends on local competition.

With regular price jumps, too many might shift demand to low-price periods from the sellers' point of view. Firms' incentives to make price setting confusing to consumers are addressed within the consumer obfuscation literature.[1] We show how the Norwegian market leader, Circle K, on 29 November 2017 initiated an equilibrium transition to a pattern with price jumps occurring on days where the company adjusts its recommended price. Rivals are informed about price jumps because Circle K announces recommended prices on its website. Since the adjustments take place on irregular days of the week, price jumps are unpredictable for consumers after the transition.

Systematic use of retail prices to facilitate coordination is empirically examined by, among others, Wang (2009) and Byrne and de Roos (2019). In contrast, we explore how prior announcements of recommended price adjustments, a non-consumer price variable, are used as an industry-wide focal point for the timing of price jumps.

In 2019, the Norwegian Competition Authority initiated an investigation of companies' (Circle K and YX) public announcements of recommended prices. The case was settled one year later. The companies offered binding remedies to end public announcements of recommended prices. The Norwegian Competition Authority (2020) emphasized that the transition in November 2017 made price jumps more unpredictable to consumers.

2 Empirical analysis

2.1 Market structure and data

The major companies are Circle K (market share 32 % in 2017), Shell (23%), Esso (22%) and YX (19%). In the following, a *retail price jump* is defined as the case in which the retail price of a station increases to the recommended price. The commodity of interest is 95-octane gasoline per liter.[2] We use three datasets, each with different attributes. The *station panel* consists of station-specific prices from four Circle K stations located in four different cities (first to fourth largest), from 1 June 2017 to 31 May 2018. Prices are reported each hour and allows us to study the equilibrium transition in detail. The *user-reported data* contains station-specific retail prices across the country for all brands, from 1 January

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[1] See Carlin (2009) and de Roos and Smirnov (2020), among others.
[2] 1 USD≈8 NOK in 2018-figures.

2017 to 28 February 2018.[3] Prices are reported by users through a smartphone application. Lastly, the daily *time series data* consists of Circle K's recommended price from 1 January 2013 to 31 May 2018.

2.2 Equilibrium transition

Figure 1 shows that Circle K implemented price jumps only on Mondays and Thursdays (vertical lines) up until the week of the equilibrium transition. However, on Monday 27 November 2017, Circle K did not impose a price jump. Instead, it increased prices on Wednesday 29 November. On the same day, Circle K advertised a price policy change through a press release, where it stated that (too many) consumers had shifted demand to the predictable low-price windows: "*A large number of customers makes an effort to refuel when it is cheapest, primarily Sunday night and Monday morning. Then queues and congestion await at gasoline stations across the country*".
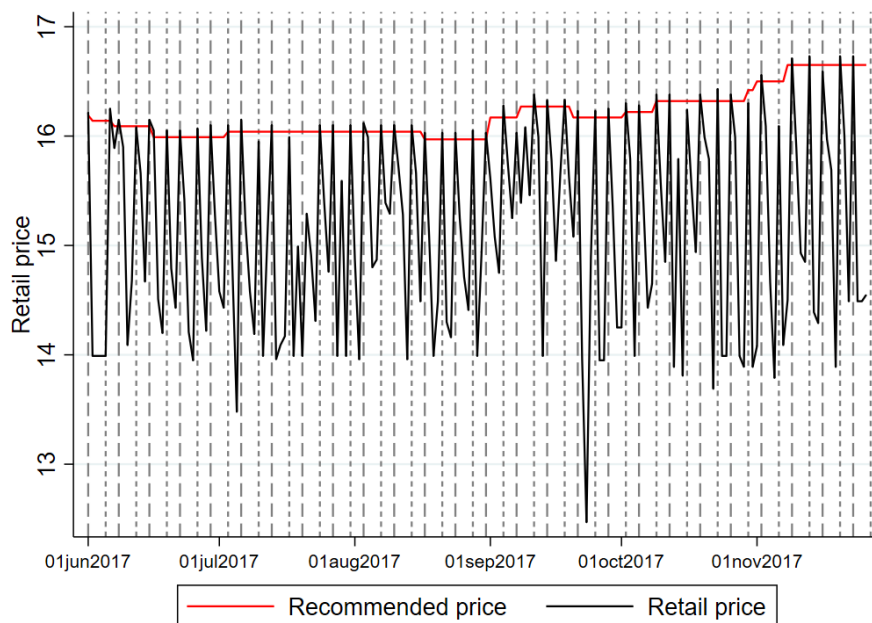

Figure 1: Mean retail price across stations at 3 p.m. over time prior to the transition, from 1 June 2017 to 27 November 2017. Dashed lines mark Mondays, short dashed lines mark Thursdays. Data used: station panel.

From this date, as illustrated in Figure 2, price jump days coincide close to *perfectly* with days where Circle K makes recommended price adjustments (vertical lines). Consequently, Circle K controls the *timing* of price jumps through recommended price adjustments. As before, the retail price increases to the recommended price.

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[3] The station panel consists of 35 029 observations. The user-reported data consists of 106 361 observations and include stations located in all parts of Norway.
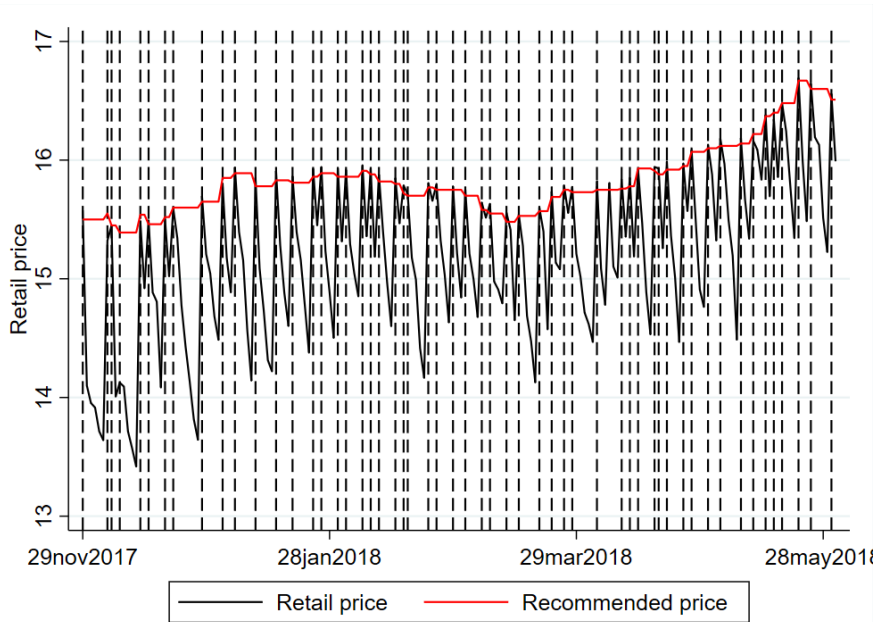
Figure 2: Mean retail price across stations at 3 p.m. over time following 29 November 2017. Dashed lines mark dates with recommended price adjustments. Sample period is 1 June 2017 to 27 November 2017. Data used: station panel.

When it comes to the timing of price jumps, in the station panel, 54 % of the price jumps occur at 10 a.m. and 45 % at 11 a.m.[4] This is illustrated in **Feil! Fant ikke referansekilden.**.
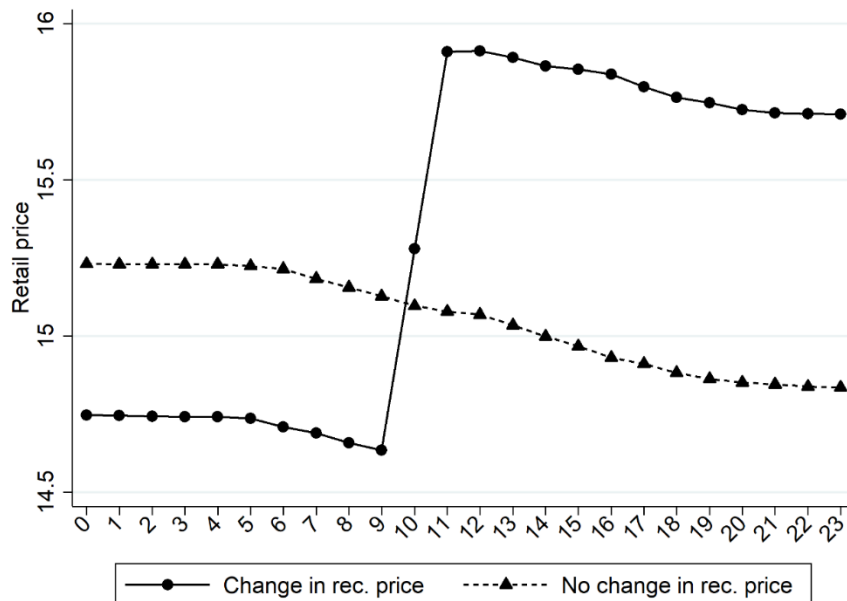

Figure 3: Mean retail price for each hour across stations separately for days with $\Delta rp_t \neq 0$ and $\Delta rp_t = 0$, from 29 November 2017 to 31 May 2018. Data used: station panel.

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[4] The Norwegian Competition Authority (2020) confirms that Circle K increases prices at 10 a.m. sharp.
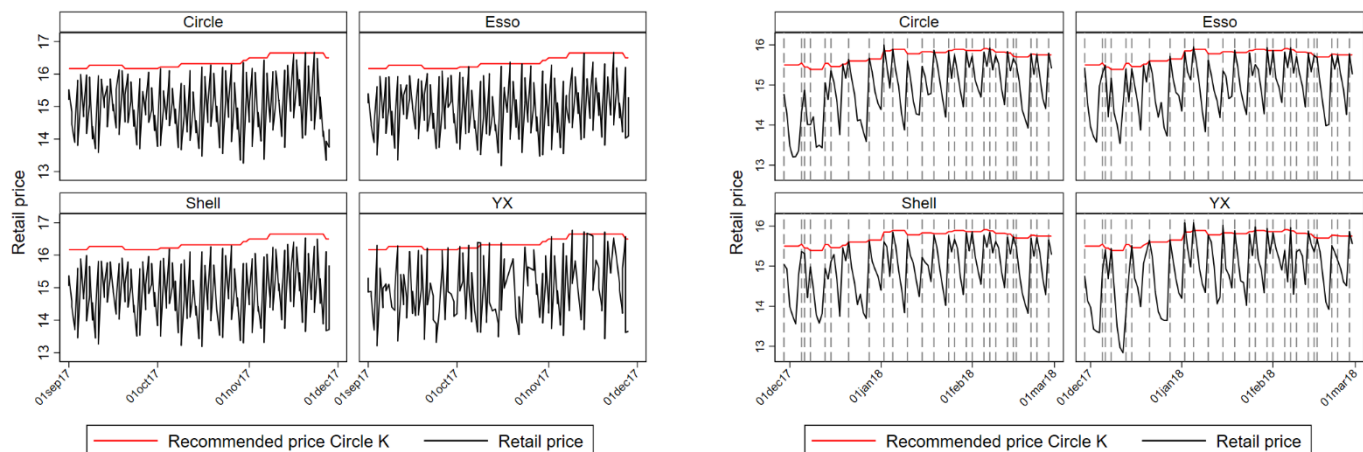
Figure 4: Brand-specific mean p.m. retail prices before (left) and after the equilibrium transition (right). Dashed lines in the right panel mark dates with recommended price adjustments by Circle K. Red lines are Circle K's recommended price. Data used: user-reported data and time series data.
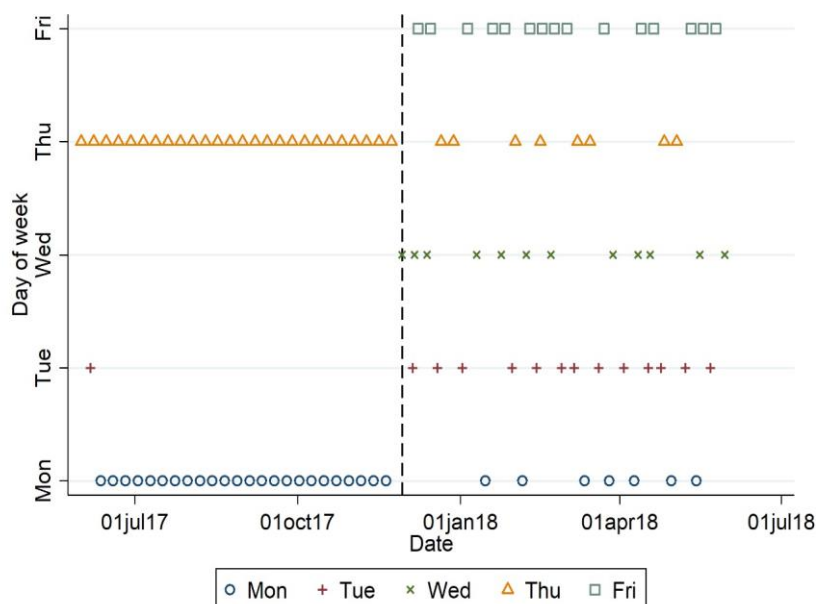

Figure 5: Occurrence of price jump days by day of the week for one station in the Circle K panel, from 1 June 2017 to 31 May 2018. Vertical line marks 29 November 2017. Data used: station panel.

Other companies follow Circle K's days of price jumps, as shown in Figure 4, which plots brand-specific mean p.m. retail prices from the user-reported data.[5] Hence, the equilibrium transition is industry-wide. This is confirmed by the Norwegian Competition Authority (2020).

Figure 5, illustrating the occurrence of price jumps by day of the week for one station in the station panel (identical pattern for the other stations), shows that Circle K's adjustments are made on irregular days of the week, varying from week to week: To the left of the vertical line, price jumps occur on Mondays and Thursdays. However, to the right, price jumps occur on all weekdays.

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[5] Since the dataset is unbalanced, we calculated brand-specific mean prices for the a.m. and p.m. hours per day, treating each day as consisting of two prices.
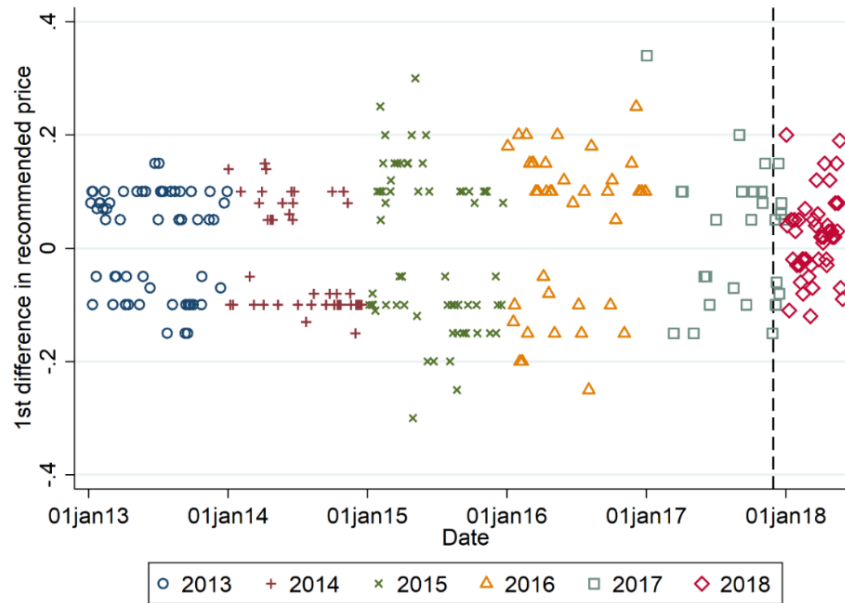
Figure 6: Adjustment in the recommended price, Δrp_t, by Circle K, where $\Delta rp_t = rp_t - rp_{t-1}$ (t indexes day). Δrp_t=0 is omitted. Vertical line marks 29 November 2017. Sample period is 1 January 2013 to 31 May 2018. Data used: time series data.

Two changes in Circle K's use of the recommended price coincide with the equilibrium transition. Figure 6 plots the first difference in the recommended price over time. The frequency of adjustments after the transition resembles the number of price jumps prior to the transition (around twice a week). In comparison, recommended prices were only adjusted around once a week before the transition. Adjustments occurred on all days of the week prior to 29 November 2017. Hence, the relation between adjustments in the recommended price and price jumps is unique for the post-policy change period. Turning to the magnitude, while the mode of the size of adjustments is 0.1 NOK or -0.1 NOK for all years prior to 2018, the mode is -0.02 NOK in 2018.

3 Discussion

Circle K's public prior announcements of recommended prices are used as a focal point for industry-wide irregular price jumps. On price jump days, Circle K updates the recommended price online at 8 a.m. Observations from March to July 2018 of YX's recommended price, also posted online, show that *all* of Circle K's adjustments were followed up by adjustments in YX's recommended price within 90 minutes. At 10 a.m., all Circle K stations implement price jumps. Shortly after, other companies implement price jumps (see also The Norwegian Competition Authority, 2020). In other words, rivals follow Circle K's signal of a future price jump.

Why post recommended prices online? In several gasoline markets, these prices are used to impose resale price maintenance on vertically separated stations (Wang, 2009; Foros and Steen, 2013). For this purpose, ways of *privately* communicating recommended prices to stations are sufficient. Furthermore, information about recommended price adjustments has little value to consumers, as there is no direct

link to retail prices, which consumers care for. To illustrate, we observe cases with recommended price adjustment only for diesel. Nonetheless, prices on gasoline also increase. The main reason to publicly announce recommended price adjustments seems to be to inform rivals of the timing of irregular price jumps.

In an infinitely repeated game with price leadership, Harrington (2017) shows that with partial mutual understanding of the collusive price, the leader faces the risk of lower demand because rivals might not follow immediately. However, this cost may be eliminated if the leader makes prior announcements of future prices. A channel that ensures rivals receive the announcements is crucial. In the Norwegian market, this channel is arguably Circle K's website.
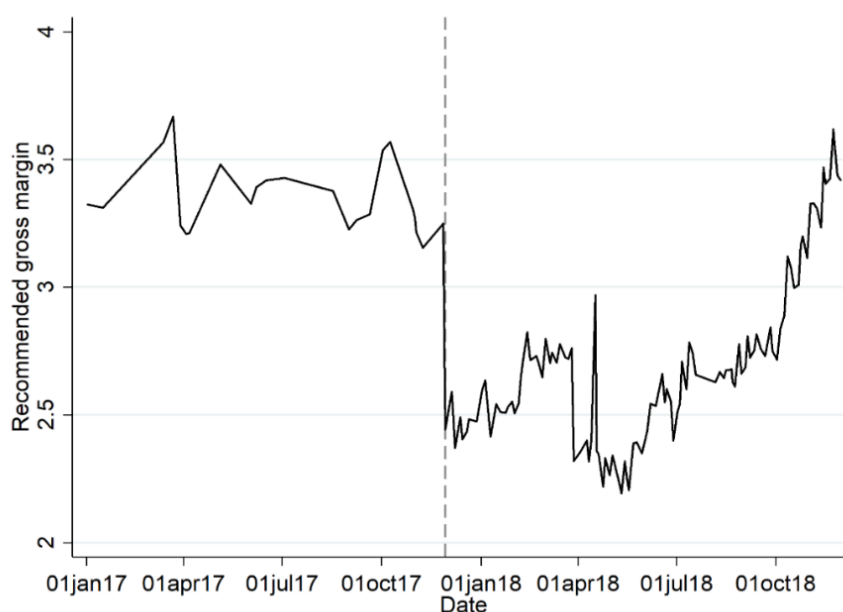

Figure 7: Recommended gross margin from 2 January 2017 to 30 November 2018. Vertical dashed line is 29 November 2017.

According to Circle K's press release in November 2017, its objective was to induce a transition to (more) uniform retail pricing. Circle K reduced the level of the recommended price by NOK 1. However, as documented above, price undercutting between price jumps continued following the transition. One explanation for why Circle K failed its objective is that price jumps were imposed on average twice a week, as before. Rivals know that prices will not stay low too long. In fact, due to Circle K's flexible way of implementing price jumps, a rival may encourage Circle K to initiate jumps by aggressively undercut prices.

Figure 7, which plots recommended price margins from 2 January 2017 to 30 November 2018[6], shows that after one year, this margin is back to the same level as prior to the transition. Hence, even if more uniform retail prices was the main goal of Circle K, the new pattern may nonetheless be more

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[6] The recommended gross margin is found by subtracting the gasoline tax, CO2 tax, value-added tax and the wholesale price from the recommended price.

profitable (for a given quantity) for firms than the previous regular Monday-Thursday pattern due to consumer obfuscation, Shifting demand to low-price-windows have become more difficult because of the irregular price jumps. This is also the main concern emphasized by the Norwegian Competition Authority (2020).

4 Concluding remarks

We have shown how prior announcements of recommended price adjustments are used as a focal point for the timing of irregular price jumps. This points to consumer obfuscation as the motivation for the equilibrium transition.

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