Learning to coordinate: A study in retail gasoline
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Summary

Analyzes retail gasoline prices in Perth, Australia, 2001 to date

Finds substantial evidence of market-wide pricing coordination

Regular amplitude and wavelength of pricing cycles

Led explicitly by leading firm(s) a day ahead

As well as implicitly with the threat of price wars

Very stable pricing patterns over the last five years

Margins grew by up to 75%

Learning to coordinate

Much is known about how tacitly collusive agreements are implemented, little is known about how they are initiated

Authors offer evidence for how gasoline retailers tacitly learned to coordinate their pricing cycles over the last five years

Thursday price jumps and fixed daily decreases of 2 cpl

Price leadership, price wars and experimentation led the market to learn to coordinate on specific pricing cycles
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Learning and Communication

Significant coordination until 2010, suddenly extreme amount of coordination after 2010, suggesting some communication.

Figure 6: Evolution of the Timing of Price Jumps and Cycle Length

(i) Timing of Market-level Price Jumps by Day of Week

(ii) Monthly Average Cycle Length by Firm

Inter-temporal dispersion in price cuts and jumps:

Further inspection of inter-temporal dispersion of price cuts and price jumps confirms the emergence of -2 cpl price cuts and Thursday price jumps as focal points starting in 2010. Figure 5 highlights the former focal point. It plots the daily average price cut across all stations for each day of the undercutting phase. In computing these daily average price cuts, we focus on days 2-7 of station-level price cycles. Or in other words, the first 6 days of the undercutting phase. The dashed black line in Figure 5 marks the start of 2010, when retail profit margins begin to grow rapidly.

The figure reveals a sharp decline in inter-temporal dispersion of price cuts at the start of 2010. Prior to this decline, we find relatively large dispersion in price cuts within each cycle day for ten years between 2001 and 2010. In addition, we see the magnitude of price cuts differ across days 2-7 of the cycle. However, within a matter of weeks at the start of 2010, we find inter-temporal dispersion in price cuts collapses. At this point, price cuts across days 2-7 of the cycle converge to -2 cpl focal point, and remain stable for the next five years.

Figure 6 presents inter-temporal dispersion in the timing of price jumps. Panel (i) plots, for each day of the week, a dummy variable that equals one if a market-wide price jump occurs that day of the week. As with price cuts, we again find a rapid decline in inter-temporal dispersion in the timing of price jumps at the start of 2010. Prior to 2010, market-wide price jumps are dispersed across all the days of the week. Between 2010 and 2015, however, we see that virtually all price jumps occur on Thursdays. We further find that mid-way through 2015 a rapid shift in Thursday price jumps to Tuesday price jumps. This corresponds to another price war, which we discuss in detail below.

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However, BP shows gradual adoption of Thursday price jumps on Thursday price jumps at the start of 2010, despite the fact that BP was leading jumps week-to-week on Wednesdays. The week following Gap 1, however, Caltex, Woolworths and Coles dramatically shift their behavior and immediately start coordinating on Thursday price jumps. At the same time, BP reverts back to engaging in price jump leadership on Wednesdays with a subset of its stations the following week.16

It is in this sense that Gap 1 is a form of price leadership by BP: through it, BP is able to communicate its intentions to coordinate on Thursday price jumps with its rivals. In doing so, it dramatically tips the equilibrium to coordinating on Thursday price jumps, thereby creating

16The restriction to simultaneous price setting once each day is important for interpreting the shift. When BP engaged in Thursday price jumps with nearly its entire station network in Gap 1, its rivals would not have been able to respond in that week. Observing Gap 1, the rivals would first have a chance to coordinate on Thursday jumps the following week. They do so nearly perfectly with their first opportunity the week following Gap 1.
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(i) BP

Suggests looking at the location of pricing decisions
Defection and Punishment

Price wars are often interpreted as punishment for defection from a collusive agreement due to imperfect monitoring. Price wars are just one extreme way of enforcing collusion, but there are other ways, with lower-powered incentives. But behavioral fluctuations/experimentation can arise for all sorts of reasons. Monitoring not necessarily behavior (given perfectly observable prices) but the state of rivals' characteristics (types). Impatience may lead firms to steal from a collusive agreement without retribution (Bernheim and Madsen, forthcoming).

Specifically in the 2009 price war, profit margins did not seem significantly different from neighboring time periods. Moreover, it did not seem that average retail prices changed significantly upon Caltex's ostensible defection. Perhaps the location of realized retail prices did fluctuate with a significant effect on firm revenue.
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Conclusion

Fascinating account of highly sophisticated pricing coordination practices in Perth’s retail gasoline market.

Difficult to deny presence of collusion from the evidence: increased coordination (2010-2015) yielded higher margins.

Location-based pricing patterns suggest themselves.

More detailed view of collusive agreement.

May provide more evidence of tacit learning to coordinate.

May facilitate estimation of actual profit and extent of competition versus market sharing, especially interesting during periods in which price wars ostensibly occurred.

Conciliatory reaction to apparent defections from collusive practices may be reasonably founded as part of the agreement.
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