

IFAMD Market Commentary 04/2012

- How to Achieve a Competitive Gasoline Price -

Gasoline prices are currently back at the forefront of public discussions. The Austrian and Australian legislators have introduced rules on price adjustment to boost competition among gas stations. In Germany, the introduction of similar rules is being discussed, as is, however, also the maximisation of price transparency. IFAMD explains why, from the perspective of game theory, additional market transparency is counterproductive and how the Austrian and Australian price adjustment rule should be extended to become more effective.

The gasoline market is a “collusive market”, i.e., suppliers coordinate their pricing with a view to higher margins. In many markets, such coordination among competitors works very well even without explicit communication. Game theory discusses the properties of a market that determine whether or not the market supports collusive tendencies of the market participants. To that purpose, we simply need to analyse whether the profits that are to be gained from collusive behaviour are greater or smaller than those that are available in case of a deviation from collusion. As long as deviation from collusion (i.e. a price reduction – which is what consumers and politicians would like to see on the gas market) is less attractive than the collusive profits, no gasoline supplier will voluntarily pass up collusion.

Diving one level deeper into the game theoretic discussion, interestingly we find that exactly three properties drive the relative attractiveness of collusion and deviation:

- the number of market participants
- the level of price transparency
- the frequency of pricing and purchase decisions

More specifically, collusive tendencies in a market will be higher, the

- smaller the number of market participants
- greater the level of price transparency
- greater the frequency of pricing and purchase decisions.

Thus, tacit coordination for higher margins is more easily established the smaller the number of suppliers in the market – an almost trivial observation. We might also put it this way: More competitors means more competition. With respect to the gasoline market, this merely means what is clear anyway: Small gas stations must be supported, they are that extra something in the competitive setting among the large chains. So far, so clear, but we will return to this issue later on.

Price transparency is a more difficult matter though. The prevailing opinion in the public discussion actually appears to be that transparency automatically promotes competition. However, in collusive markets, exactly the opposite is true: Transparency makes it all the easier for suppliers to tacitly coordinate their actions! After all if one gas station reduces its price (“deviates from collusion”, in the

language of game theory), its competitors will take immediate notice and can thus react instantaneously. Yet the resulting effect is not, as many seem to believe, that the other stations will also reduce their prices, competition resumes and a price war begins. Rather, to the contrary, the effect is that the said gas station never reduces its price in the first place, knowing that if it did, the other stations would follow suit, restoring the original market shares of the stations, but at lower prices. The reason for the first station not to cut its price is that it cannot do so *without being observed by the competition*. This is the issue with transparency, for which still no workable solution is being discussed with respect to the gasoline market. In any event, to increase the level of transparency is exactly the wrong measure.

For the gasoline market, solely the aspect of the frequency of purchase and pricing decisions is of interest. As far as the purchase decision is concerned, it probably takes place several times per second at the pumps across the country – it is hard to imagine a market with a higher decision frequency. Together with the obvious level of transparency in the gas market (price boards on every street – how could a market be much more transparent?), it becomes clear that the market must be maximally collusive. Game theorists are not surprised about high gas prices – a more extreme market is difficult to imagine. The continuously repeated game simply means that deviation from collusion yields very little advantage. A defector will enjoy only few purchase decisions in his favour before the competition follows suit and the balance of market shares is restored to what it was before. It is therefore more attractive to continue with the collusion and to maintain high prices. This fatal mechanism even works in reverse, as we can observe at the start of every holiday season: If a gas station increases its prices, it will initially lose some of its market share. The other stations, however, will gladly interpret this increase as an invitation to demand higher prices and will quickly raise theirs in turn – because the old market share at higher prices is even more attractive than a higher market share at the old price. How can we make this statement without worrying about price elasticities or price-sales-curves in this market? It is simply the game theoretic argument that the inviting gas station would otherwise reduce its prices even further very quickly – within an hour or two in practice – if the other station did not follow suit. The dire insight from this observation is that, literally due to an intrinsic mechanism of its market, the gas price must always be at the upper limit of the barely acceptable level – otherwise the market participants would not be acting rationally.

You may perhaps be familiar with the email chain letters that spread around the world every once in a while, demanding that a specific mineral oil company be punished for its pricing behaviour on the gasoline market (or for its environmental sins), which would be achieved by drivers' collective avoidance of this company's gas stations. Such a boycott could indeed be an effective measure because it specifically addresses the frequency of purchase decisions on the gas market. This is essentially the only leverage at our disposal. A chain email from Canada which I came across a few years ago, however, missed an important detail: All its readers were requested to avoid the gas stations of a certain mineral oil company until the company would eventually reduce its prices. What the message failed to specify, though, was a criterion by which the participants in such coordinated purchase decision behaviour would be able to see whether the aim of the initiative had been achieved. After all, the drivers will eventually want to frequent their familiar gas stations again – at reduced prices – to enjoy the benefits of their action. But when exactly should that happen? Most participants of the initiative likely lacked the

patience to wait for a really good result but instead returned in an uncoordinated manner to the chain of gas stations in question as soon as prices had dropped minimally, thus diluting the campaign and reducing it to absurdity.

The only really promising measure against collusion among gas stations has in fact been adopted by the regulatory authorities of Western Australia: The trick is to regulate the frequency of price adjustment by the gas stations, for example by limiting it to one change a day, say, at noon. In Austria, a similar rule states that the price may be revised upwards once a day. However, there is no limit to the frequency at which prices can be reduced – since lower prices are the very aim of the regulation. *Yet this is exactly the problem!* The argument outlined above, according to which no gas station will voluntarily reduce its price, continues to apply also in Austria: Very soon after one station reduces its price, all other stations in the area would follow suit, so that in the end everyone is left with the same market share but at lower prices for all – a process which no-one will want to set off in the first place. What is more, even the mechanism described above regarding coordinated price increases up to the barely acceptable level will still work: The inviting gas station merely needs to signal its invitation to higher prices to the competition for several consecutive days. In case the competition should fail to follow in each instance, the inviting gas station can withdraw its higher price at any time; for example it can reduce the price again already in the early afternoon without incurring major losses on that day. If the station repeats this game on several days in a row, the other stations in the area will eventually join in. Thus, the mechanism works just as well as without regulation, albeit not quite as fast.

A much more effective market regulation rule must therefore be: The gas stations may *change* their prices (be it up or down) only once a day, e.g. at noon! Only then will it become really expensive for a gas station to have set too high a price, given that it cannot correct the price downwards in the next 24 hours. It must forego part of its market share for at least one day. At this point, a mechanism balanced in more detail can and should also make a distinction between small gas stations and large chains of stations, for example in the sense that small stations may change their prices once a day while stations belonging to large chains can adjust their prices only once a week.

Gladly would we test our hypothesis on the pricing behaviour of gas stations using empirical data from Austria. Alas, such a study could hardly hope to receive financial support from any of the large chains of gas stations!

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