

Estimating post-merger price effects in bidding markets: lessons from GE/Alstom

1. General Electric/Alstom (Thermal Power – Renewable Power & Grid Business), case M.7278. RBB Economics advised GE throughout the investigation conducted by the European Commission.

2. HDGTs are typically used by large utilities to generate electricity using natural gas. HDGTs operate on either of two frequencies, 50Hz and 60Hz. In the EEA as well as in many other countries in the world, all HDGTs operate at the 50Hz frequency. Since the Commission concluded that from a supply side perspective a company that has developed a model for a certain frequency would need to invest significant resources to adapt it to the other frequency, it conducted its competitive assessment on the basis of a relevant market comprising all geographic areas operating at 50Hz excluding China. The exclusion of China, which was motivated by the fact that Alstom was not active in that country pre-merger, was the subject of significant debate between the parties and the Commission.

3. The merged entity would account for more than 50% of the EEA HDGT market and enjoy similarly high market shares on the worldwide market for 50Hz frequency HDGTs. Note that Ansaldo is also active in the market, but the Commission largely dismissed its competitive relevance due to perceived technological weaknesses.

4. See Paul Klemperer, "Bidding markets", UK Competition Commission, June 2005.

5. The key parameter of differentiation is the power output, i.e. the amount of electricity the turbine is able to generate. On this basis, a distinction exists between medium, large and the more recent very large HDGTs.

In September 2015, the European Commission ("Commission") cleared, subject to undertakings, General Electric's ("GE") proposed acquisition of Alstom's power generation business after a Phase II investigation.¹ The transaction reduced the number of major suppliers of heavy duty gas turbines ("HDGTs"),² which comprises Siemens and Mitsubishi Hitachi Power Systems ("MHPS") in addition to the parties, from four to three.³

As part of its assessment, an estimate of the likely price impact of the proposed transaction was undertaken by the Commission, taking into account the bidding nature of competition and the way in which the proposed merger may give the new entity the ability to raise prices. This Brief examines the intuition behind the techniques used in this analysis, which we expect the Commission to employ when evaluating future transactions involving bidding markets. It also explains that, whilst less simplistic, these techniques suffer from similar drawbacks to the price pressure tests UPP and GUPPI that the Commission and other authorities around the world are increasingly employing.

Assessing closeness in bidding markets

In a well-known paper, Professor Paul Klemperer criticises the misuse and overuse of the term "bidding market" to argue the absence of any adverse effects arising from a merger.⁴ As Professor Klemperer correctly notes, in those industries where, in any given year, hundreds or even thousands of transactions are awarded on the basis of more or less informal bidding processes, claims that high shares are less likely to confer market power than in conventional industries and that a very small number of bidders would necessarily be sufficient to guarantee competitive outcomes are flawed.

The HDGT industry, however, is a true bidding market where firms supply differentiated products and compete each year through a handful of extremely high value tenders placed by large and sophisticated customers.⁵ In industries with these characteristics, the share of past sales accounted for by a bidder may fail to provide a reliable indicator of its credibility in future bidding contests. The assessment should focus, rather than on market shares, on the closeness of competition between the parties, on the credibility of rivals as bidders for future tenders, and on the strategies that sophisticated customers can implement to sponsor or induce more credible bids from suppliers that have previously been less active bidders.

In a bidding market, closeness of competition can be assessed through a win/loss analysis. Specifically, if information on the winning and losing bidders is available on a tender by tender basis, then the observed data can provide a direct indication of the constraints faced by each supplier and, therefore, on the scope for a merger to eliminate important competitive constraints.

Although there was some disagreement regarding the way the bidding analysis should be specified and interpreted, the Commission recognised that there were virtually no projects for which GE and Alstom were the only bidders. This coupled with the fact that Siemens was found to participate in (and win) a significant proportion of projects for which both GE and Alstom bid led the Commission to conclude that the merger could not be considered to remove each party's closest competitor.

At the same time, however, a concern was raised that since Alstom had participated in and won more European tenders than MHPS during the previous five years (often in competition with GE), its elimination as a bidder would likely give rise to price increases post-merger in Europe.⁶

6. This point was disputed by the parties on the grounds that quite a different picture emerged from a more dynamic analysis of the data. In particular, the data indicated that the competitive constraint exerted by MHPS and Alstom on GE was broadly similar if attention was focussed on the more recent 2013-2014 period.

7. As explained further below, the parties disagreed that the assumption that firms can submit only one bid reflected the reality of competition in the HDGT industry.

8. Intuitively, the higher the degree of closeness of competition between the parties, the greater the increase in the new entity's perceived probability of winning, and, consequently, the higher the incentive to raise prices post-transaction.

9. In this context, price concentration analyses seek to use observed differences in suppliers' tender participation to identify the relationship between prices and concentration. If such a relationship exists, estimates of that relationship may provide useful information regarding the potential impact on prices of the change in concentration that would result from a merger.

Calculating the price impact

To assess the price impact of the merger, the Commission considered that the tender process used in the HDGT industry was best approximated by a so-called first price auction framework. In this setting, each firm can submit only one sealed bid without observing the bids of its rivals and the winner is paid its bid.⁷ Under these circumstances, each firm faces a trade-off: a higher bid will increase its profit in case of victory but it will reduce the probability of winning. As a result, the profit maximising bid is defined at the point where the benefit that a slightly higher price would deliver to profit margins in case of victory is fully offset by the reduction in the probability of winning that the higher price would entail.

A merger between two close competitors in this setting can give rise to unilateral effects since the reduction in the number of bidders will change the trade-off described above by increasing the perceived probability of winning, thereby giving the merged entity an incentive to bid higher than before.⁸

To illustrate this, consider a firm bidding for a project for which the cost of participating in the tender is €2 while the cost of producing the product is €80. Suppose that the firm contemplates three possible bids: €90, €100 and €110. On the basis of prior experience when bidding for similar projects, it perceives that its probability of winning at these prices is, respectively, 35%, 25% and 15%. The lightly shaded area in the table below shows the firm's expected profits pre-merger.

Bid	Cost of production	Margin (M)	Cost of bidding (C)	Pre-merger		Post-merger	
				Prob of winning (Prob)	Expected profit (Prob * M - C)	Prob of winning (Prob')	Expected profit (Prob' * M - C)
€90	€80	€10	€2	35%	€1.5	45%	€2.5
€100	€80	€20	€2	25%	€3	35%	€5
€110	€80	€30	€2	15%	€2.5	25%	€5.5

Although the firm would obtain the highest margin (€30) if it ended up winning with a bid of €110, due to the low perceived probability of winning at this price, it will prefer to settle for a lower bid of €100. Its overall expected profit at this price, once the cost of bidding (€2) is taken into account, is equal to €3, with the other two possible bids of €90 and €110 delivering lower expected profits.

Post-merger, however, if the probability of winning increases by 10 percentage points as a result of the reduction in the number of bidders, the merged firm's optimal bid will increase from €100 (which would deliver an expected profit of €5) to €110 (delivering an expected profit of €5.5).

The Commission adopted this line of reasoning to conclude that price effects would be likely to arise as a result of the disappearance of Alstom as a bidder. In particular, the Commission considered that prices would increase in all tenders where GE and Alstom faced each other pre-merger. To substantiate this point empirically, it relied on two pieces of econometric analysis, the specification of which was subject to considerable debate.

First, the Commission conducted a so-called **probit analysis**, which was aimed at assessing the impact of Alstom's and other rivals' participation on GE's probability of winning a tender. On the basis of this analysis, it concluded that GE's probability of winning a tender was – taking other possible explanatory factors into account – significantly lower when Alstom participated in the tender than when Alstom was not present. As a result, the Commission considered that the elimination of Alstom as a bidder would lead to a significant increase in GE's perceived probability of winning tenders post-transaction.

Second, the Commission relied on a **margin-concentration analysis** to estimate the impact of Alstom and other rivals' participation on GE's bidding behaviour.⁹ On this basis, it concluded that GE charged significantly lower prices when Alstom participated in the tender

10. This means that a merger between two firms that are often runner-up to each other is more likely to affect market outcomes than a merger between two firms that typically face other rivals at the last stage of the negotiations. For example, if firm A won 10 tenders and the runner-up was firm B in 8 cases and firm C in 2 cases, then a merger between firm A and firm B will be significantly more likely to result in higher prices than a merger between firm A and firm C even if both firms B and C participated in all tenders.

11. It is worth noting that, as a sensitivity analysis, the Commission attempted to estimate price effects also on the basis of a different auction format – a so-called second-price auction – which assumes that firms have full information on their rivals' bids. The parties' response was that this alternative theoretical framework was also not reflective of the way competition worked in the HDGT industry and that the Commission's approach in any event overstated the likely price effect of the merger.

than when Alstom was not present. By comparing the average price bid by GE in the two sets of tenders (i.e. with and without Alstom), the Commission estimated the price rise that could occur as a result of the merger. That price increase was then applied to the average number of tenders in which both GE and Alstom had participated during the previous five years to estimate the consumer harm per year associated with the merger.

The approach followed by the Commission to estimate the price effect of the merger is less simplistic than simple price pressure tests, which rely purely on diversion ratios and margins. Nevertheless, like UPP and GUPPI tests, it is based on a theoretical model of competitive interaction – a sealed first price auction – and, as such, it suffers from similar potential drawbacks. First, it relies on strict assumptions on suppliers' competitive interaction which, if not reflective of the observed nature of competition in the industry, will seriously undermine the reliability of any estimated price effects. Second, the model in question is entirely static and, as such, it is unable to capture possible dynamic reactions and supply-side responses, which may ultimately prevent the merged entity from successfully raising prices. Below we discuss each of these drawbacks.

Does the first price auction model reflect the reality of the HDGT industry?

In a first price auction, all suppliers have a single opportunity to bid and they cannot update their beliefs regarding the sources of competitive constraints they face and their probability of winning the tender throughout the process. In GE/Alstom, however, the parties noted that the vast majority of tenders are characterised by a multi-stage bidding process, in which some firms are eliminated at some point and only two bidders typically reach a final stage of negotiations. Under these circumstances, the winning bid will ultimately be determined by the competitive interaction between the winner and the runner-up.¹⁰

Importantly, the data submitted by GE and Alstom indicated that they did not often rank second behind each other and, on this basis, they argued that the Commission had significantly overstated the price impact of the merger. The Commission, however, dismissed this conclusion largely on the grounds that the parties' identification of the runner-up was not considered to be sufficiently accurate when compared with the responses obtained during the market investigation.

Crucially, even if the information bidders had on their rivals' progress was imperfect, this would not justify the application of the first price auction framework when assessing the impact of the merger. Indeed, that would only be the case in the extreme situation that the parties' information could legitimately be considered to be "pure noise". It was clear, however, that each bidder repeatedly adapted its bid throughout the process on the basis of updated information regarding customers' preferences. This fact alone undermines the Commission's reliance on a framework that explicitly depends on the assumption that bidding rounds were of no competitive significance and that they should be ignored entirely.¹¹

What about dynamic competitive reactions?

A commonly cited drawback associated with price pressure tests is that no room is allowed for rivals to react to post-merger price increases. Exactly the same criticism applies also to the framework used by the Commission in GE/Alstom, which relies on the implicit assumption that firms, such as MHPS, that did not participate in some tenders in the past would not have the incentive or the ability to do so post-merger.

Regarding MHPS's incentive to bid post-merger, the parties highlighted that MHPS's participation in EU tenders had already increased in recent times following important investments aimed at improving its ability to service its turbines in Europe and, therefore, that its average participation rate throughout the previous five years as calculated by the Commission understated its willingness to bid post-merger. Furthermore, the parties argued that the disappearance of Alstom as a bidder would increase its perceived probability of winning and therefore the payoff of participating in tenders. Importantly, and as illustrated

12. Crucially, should MHPS decide to bid in a tender where it did not pre-merger, this would result in a reduction in the perceived probability that GE would have of winning such a tender, which would tend to offset any incentives the merged entity may have had profitably to raise prices. This is completely ignored in the methodology followed by the Commission.

in the table below, the logic here is identical to the unilateral effects mechanism identified by the Commission, which was based on an increase in the merged entity's perceived probability of winning giving it an incentive to raise prices.

In particular, the table shows how an increase in the perceived probability of winning can change a firm's decision on whether to bid. Pre-merger, due to the relatively low probabilities of winning at each of the three possible bids of €90, €100 and €110, the supplier would choose not to bid as the expected profit from doing so is either equal to zero or negative. Following a merger between two of its rivals, however, the supplier's perceived probability of winning increases, making its expected profit positive and giving it an incentive to participate by placing a bid equal to €100.¹²

Bid	Cost of production	Margin (M)	Cost of bidding (C)	Pre-merger		Post-merger	
				Prob of winning (Prob)	Expected profit (Prob * M - C)	Prob of winning (Prob')	Expected profit (Prob' * M - C)
€90	€80	€10	€2	20%	€0	25%	€0.5
€100	€80	€20	€2	10%	€0	15%	€1
€110	€80	€30	€2	5%	-€0.5	8%	€0.4

Regarding MHPS's ability to bid post-merger, the fact that it did not bid for some projects historically does not in and of itself demonstrate that it would be incapable of doing so, as there are many reasons why firms may not participate in a tender. For example, given the complexity of gas turbines, it may be costly for customers to evaluate bids; this means that, even if all suppliers could submit effective offers, a customer might choose to invite only three of them to bid. In the absence of a bid from Alstom post-merger, that customer may choose to invite MHPS instead. The parties pointed out that the Commission could only legitimately dismiss this dynamic constraint if it could demonstrate that MHPS's HDGTs were not effective alternatives for certain categories of customer. Although the Commission did argue that the output of MHPS's HDGTs could not be adjusted as flexibly as those of GE, Alstom and Siemens, refined bidding analyses submitted by the parties indicated that MHPS was not a less effective competitor when it bid for tenders where flexibility requirements were specified by the customers. In the end, however, this debate was never definitively resolved since the Commission accepted the divestment of parts of Alstom's gas turbine business to Ansaldo as a remedy to allay its concerns.

Conclusions

The GE/Alstom Decision indicates that the Commission is increasingly interested, like other competition authorities around the world, in measuring the price impact of mergers. However, no estimated price increase can be relied upon if the underlying model used does not reflect reality. In GE/Alstom, the Commission's framework was based on the incorrect assumption that firms do not learn anything meaningful during the tendering process, which led the Commission to conclude that price increases would occur in all tenders where GE and Alstom participated, regardless of whether either of them progressed beyond the initial stage of negotiations.

Furthermore, the model used by the Commission shares one fundamental drawback with price pressure tests: it completely disregards the possibility that rivals' reactions could offset any attempted price increase. Importantly, the very same mechanism that led the Commission's model to predict a post-merger price increase – the increased perceived probability of winning – would also have given MHPS an incentive to increase its participation in European tenders post-merger. If similar techniques are used to estimate price effects in bidding markets in future cases, more attention needs to be given to the ways in which clearly identified real world violations of such models' assumptions can crucially affect their predictions, and hence the overall assessment.