

Comments on the CC's working paper
entitled: *“Empirical analysis methodology of
price outcomes in negotiations between
hospital operators and insurers”*

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Peter Davis

Introductory remarks

1. The Competition Commission (“CC”) has issued a short working paper which attempts to provide an “*Empirical analysis methodology of price outcomes in negotiations between hospital operators and insurers*”¹ (“CC’s working paper”). In doing so, it is repeating and to some modest degree expanding upon its earlier remarks on the ‘Prices charged by hospital operators to insurers’ in Appendix D to the Annotated Issues Statement (AIS).²
2. In this document I provide my comments on the CC’s working paper.

No clear economic framework underlying the CC’s empirical analysis

3. The CC’s working paper does not explicitly refer to any economic framework which has motivated its empirical methodology. In contrast, Appendix D to the AIS provided at paragraphs 8 and 9 considered a sketch of a ‘*Bargaining Framework*’, while paragraph 91 of the AIS considers (presumably correctly) that prices charged by private hospital operators to PMIs “*are likely to be affected by various factors, especially costs*”. More generally hospital quality and range of service may also be important determinants of prices charged for their services. It is striking that there is only passing reference in the new working paper of the outside options considered in the Bargaining Framework (it is considered very briefly at paragraph 24(d)). And it is similarly striking that the word ‘cost’ appears in this paper only at paragraph 16 and in footnote 11 within a discussion of the situation for one hospital operator ‘*based in London only*’ (i.e., presumably HCA). There is literally no other mention of the word ‘cost’ in the rest of the CC’s empirical methodology paper. Yet we are seeking to understand variation in prices, so ordinarily cost would be the first port of call for most economists.

¹ The document issued for consultation on the 6th of June 2013, is available here: http://www.competition-commission.org.uk/assets/competitioncommission/docs/2012/private-healthcare-market-investigation/130606_insured_methodology.pdf

² See in particular paragraphs 63-80 of Appendix D to the Annotated Issues Statement issued on 28th February 2013 and available here: http://www.competition-commission.org.uk/assets/competitioncommission/docs/2012/private-healthcare-market-investigation/ais_app_d_toh_3_exec_summary_bargaining_final.pdf

4. In my view this paper is fundamentally disappointing as a methodology paper. The reason is that there is simply no significant attempt made to develop an empirical strategy that would seek to distinguish: (i) problematic variation in prices – driven by market power – from (ii) unproblematic variation in prices (driven by other factors). The latter, could for example arise from variation in costs or hospital quality. Elsewhere the CC wholly accepts and endorses the importance of clearly laying out reasoning around such concerns. In particular, the issue is described in the CC’s “best-practice” guidelines³ for technical work where the CC write at paragraph 15 that such work:

“...should always contain a clear explanation of the rationale for the choice of methodology used to analyse the data. In doing this, any technical concerns should be addressed. By way of example, some particular concerns that might arise, and should be tackled, include:

(a) The economic concept of ‘identification’—that is to explain if and how the model can identify the economic impacts that are being measured, separated from other factors and events.....”

The CC’s conclusions stated in the ‘Introduction and summary’ appear to have little connection with the analysis reported in the CC’s working paper

5. The CC’s conclusions are clear and unambiguous at paragraph 8: “[CC’s] view is that the analyses of the insured price outcomes in (a) and (b) indicate that some hospital operators have some market power in negotiations with insurers”. The reality is that such conclusions appear to be (i) based on four data points; (ii) not justified or even mentioned in any material manner in the main text of the working paper; and (iii) actually contradicted in significant respects by the subsequent text in the working paper. For example at paragraph 26 of the CC’s working paper, the CC note that the particular functional relationship between its metrics or drivers of price differences “*is unclear*” and “*as the analysis is limited to four data points, it is difficult to discern any detailed [sic] pattern between the differences in prices and metrics*”. Instead the CC seeks to infer a relationship between hospital portfolio characteristics and prices using its four data points using only ordinal information. Such a bold conclusion at paragraph 8 of the CC’s working paper cannot possibly be sustained on the basis of the rankings alone.

³

See: http://www.competition-commission.org.uk/assets/competitioncommission/docs/pdf/non-inquiry/rep_pub/corporate_documents/corporate_policies/best_practice

The paper appears to omit material sections

6. I note that there appear to be pieces of the document missing. For example, paragraph 19 states: “*The previous section sets out our results [...]*”. But it does not. That perhaps is because the CC has dropped the results and is seeking to present only its methodology, but paragraph 19 is not the only one where this is the case. For example, paragraph 21 remarks intriguingly: “*As demonstrated by this strategic document, [...]*”, and yet there is no document referred to in the previous paragraphs.
7. While these may be dismissed as drafting errors, it is consistent with my general impression of this paper as perhaps not having been provided with the attention that such a potentially important topic deserves.

Comparisons of insured price outcomes across hospital operators (and their drivers)

8. The paper does not propose to use enough data to be able to distinguish problematic from non-problematic variation in prices. **In fact, the CC’s analysis of comparisons of insured price outcomes across hospital operators relies on a grand total of four data-points!**⁴ This is, to the CC’s credit, recognized explicitly in paragraph 26 of the CC’s working paper where the CC states “*the analysis is limited to four data points*”.
9. Clearly, four data-points cannot possibly be sufficient to meaningfully learn empirically about the potentially very complex relationship between observed average prices and the forces generating those observed average prices. Surprisingly then, the CC attempts to pursue a strategy to do just that - going on to consider a variety of possible metrics listed in Table 1 under four headings – each of which, according to paragraph 24, “*may be relevant in negotiations*” and which the CC uses in an effort to “*characterise hospital operators’ portfolios*” (paragraph 25, Table 1).⁵

⁴ More specifically, in paragraph 11 we learn that the CC’s data set “*covers inpatient and day-patient episodes for patients insured by the different insurers in 2011*”. So the CC is using data only from one year, 2011. In paragraph 23, we learn that the CC notes that “*there are only four hospital operators that own an extensive portfolio of hospitals across the UK [...] and this analysis is limited to them.*”

⁵ More specifically, the CC considers (i) size of hospital portfolio (more precisely, total admissions); (ii) footprint (more precisely, number of hospital sites or number of NUTS2 regions that contain a hospital and number of hospitals in high PMI penetration regions); (iii) flagship sites (number of top quartile by admissions hospitals and number of hospitals providing CCL3); and (iv) local concentration (measured in various ways including via 1 minus average LOCI or by fascia count <=1).

10. The conclusion of the CC's analysis is, intuitively, to say in paragraph 26 of the CC's working paper that "*as the analysis is limited to only four data points, it is difficult to discern any detailed pattern between the differences in prices and metrics*". It seems highly intuitive to conclude that the CC (or any other user of a dataset) cannot credibly seek to use four data points to discern very much by way of patterns across operators. It is less clear to me why the CC seeks to limit this conclusion just to discerning "*detailed pattern[s]*" – if, as appears to be the case, it is indeed making that claim.
11. Intriguingly, but also perhaps worryingly, at paragraph 26 the CC says: "*We have focussed on the ranking between hospital operators [...]*" and "*The ranking [...] is considered to give us a broad picture across these various metrics*". At some level a literal reading of this last conclusion is unobjectionable as the statement only appears to make a very modest claim that is wholly devoid of specificity. However, this conclusion is notably far from the conclusion the CC reports in paragraph 8 of the CC's working paper.
12. If the CC means to say it is actually attempting to use its empirical analysis to infer anything from either the level or ranking of these four prices about the drivers of market or bargaining power of hospital operators, then it is not doing so using an approach to data analysis that is well grounded in statistical or econometric analysis.⁶
13. In short, it is not at all clear from the paper how the CC gets to its conclusion stated in paragraph 8 of the CC's working paper that: "*Overall, our view is that the analyses of the insured price outcomes in (a) and (b) [referring to paragraph 7] indicate that some hospital operators have some market power in negotiations with insurers*".

The detail of the price measures suggested

14. In paragraphs 11 and 12 the CC wishes to examine 'average revenue per admission by insurer' and reports that it uses Healthcode data to do so. The CC notes that such an average revenue (revenue per admission) measure could provide a misleading comparison since "*it does not control for the different mix of treatments that different hospital operators may perform*" (paragraph 12 of the CC's working paper).

⁶ More technically, in paragraph 24, the CC explains that it considers four metrics which "*may be relevant in negotiations*", namely size, footprint, flagship hospitals, local concentration. Thus the CC has four potential explanations for factors which may explain some or all of the variation in observed prices. If I had four data points in a regression analysis with four possible explanations, the econometric theory of identification tells us that there would be no way to econometrically use the available four data points to tell apart those four possible explanations for what is being observed. Here of course there are also a number of other potentially relevant drivers of prices which would also need to be distinguished before the CC came to a view that these price data (four observations) indicate that "*some hospital operators have some market power in negotiations with insurers*".

15. In paragraphs 13 to 16, the CC outlines a methodology for constructing a price index which it believes will allow a comparison of prices across hospitals for a given insurer. I have a number of concerns about this construction.
16. First, I note that instead of calculating the mean episode price, the CC should ensure its results are robust to calculating the median episode price at step (b). This is because the mean price may potentially be subject to considerable influence from outliers caused by atypical patients who experienced material complications and so atypical episode prices.
17. Secondly, at step (c) the CC calculates the *“hypothetical expenditure the insurer would face if it were to purchase all its requirements for this treatment [...] from one hospital operator at the average price charged by that hospital operator to the insurer”*. And at step (d) the CC aggregates across treatments. These hypothetical steps are interpreted at paragraph 15 of the CC’s working paper to have important implications for the interpretation of the CC’s price index results, namely that: *“An index of 0.8 means that had the insurer in 2011 purchased the treatments in the basket only from that hospital operator, it would have spent 20 per cent less on these treatments than it did in fact spend”*. I submit that the CC must be very careful in interpreting its results – as its current interpretation is highly misleading. To show why, I make three specific observations:
 - The first observation is that in reality the price paid by an insurer will depend on the volume directed to a particular hospital operator. In general, more volume will allow lower average prices, all else equal. The CC does not consider the implications of such volume discounts for its analysis or the proper interpretation of its results. In particular, the movement of volumes across hospitals may affect the average price per episode for a given treatment in a manner which is not at all ‘hypothetical’ but which is instead very real.
 - The second observation is that implicit in the CC’s hypothetical movement of volume is a great deal of implausible travel, and inconvenience, suffered by patients. For example, when hypothetically reallocating patients from BMI facilities (mainly outside London) to HCA facilities (mainly inside London) there is an implicit assumption that such movements of patients are (i) feasible and (ii) desirable – or at least perfectly acceptable - for patients. In reality patients will care about the location of their treatment and would need to incur significant transport costs to move wholesale across providers. The CC cannot simply ignore such important factors in its analysis or interpretation and appears to be currently basically comparing ‘apples and oranges’ in its analysis – despite its effort in terms of treatment mix to avoid doing so.

Comparisons of insured price outcomes across insurers and relative to self-pay patients

21. In paragraph 28 of the CC's working paper, the CC reports the construction of a price index constructed for a basket of treatments offered by each hospital to each insurer following the approach outlined in paragraphs 13-15. The CC then notes that using that outlined methodology *"it is not possible to undertake a comparison of the price charged by a specific hospital operator to different insurers"*. And so adapts the methodology in paragraphs 13-15 to provide a basket of treatments which is common across insurers for a given hospital operator. This is undertaken to facilitate comparisons of prices across insurers.
22. The observations made above in respect of the difficulties of interpretation of price differences across hospital operators apply equally to this new exercise comparing price outcomes across insurers. For example, the location of an insurer's customers should be expected to affect the average price paid. Secondly, I note that this methodology would similarly only provide a very small number of data points for a given hospital chain. Namely, a number equal to the number of insurance companies in the dataset reported in footnote 16 of the CC's working paper as six. That means that, like the analysis the CC undertook looking at variation in insured price outcomes across hospital operators, this piece of the CC's analysis would also result in only a very small number of observations for analysis. In particular it would provide the CC with a dataset with far too small a number of observations to statistically or econometrically meaningfully attempt to disentangle the various forces at work generating variation in the observed average prices calculated using the CC's methodology.⁸
23. The CC concludes at paragraph 8 that *"The analysis of the insurers' buyer power in (c) suggests that the ability of these hospital operators to exercise their market power varies depending on the individual insurers, with the larger insurers paying lower prices relative to smaller insurers."* There is no discussion of the link between the exercise reported at paragraph 28 of the CC's working paper and this conclusion, making it effectively unsupported. But in any event, it is clear that without at least considering the various potential causes of price differences across insurers, there can be no legitimate basis for the CC's conclusion in the working paper that such price differences are driven by market power. For example, large volume deals may lead to lower prices irrespective of market power on either side if, say, the unit costs of servicing such higher volumes are lower.

⁸ For the avoidance of doubt, the CC does build its average price data from individual level data. However, the availability of the data at the individual level is ultimately not used in the CC's proposed analysis which seeks to relate price levels to drivers of insured price outcomes such as the size of a hospital chain.

24. In paragraphs 29-32, the CC reports a related method for constructing a price index for treatments that are provided to insured patients and also to self-pay patients. Specifically, the CC looks for a basket of treatments provided by a given hospital operator to all insurers and also at the prices paid by self-pay patients by that hospital operator. The CC calculates a price index separately for insured patients and self-pay patients for a given insurer and then proposes to calculate the ratio of these two metrics. Since there is nothing in this section of the paper about any inferences, implications, concerns or limitations to this part of the CC's empirical methodology, there appears to be little to comment upon directly.
25. However, a connection is drawn at paragraph 5 of the CC's working paper where the CC asserts in respect of the analysis put out at paragraphs 28 and also that laid out in paragraphs 29-32 that *"Both these analyses can provided a useful insight into the degree of any buyer power held by insurers in negotiations"*. And also at paragraph 8 where again the CC asserts that its analysis suggests that hospital operators' market power varies depending on the individual insurers. In each instance the CC's inference simply does not flow from the analysis actually reported in the CC's working paper.
26. Relatedly, there appear to be plenty of reasons to think that price indices calculated using these methodologies could differ for reasons that have little or nothing to do with buyer or seller power. Indeed, the CC itself has mentioned in other contexts that cost differences can cause variation in prices and more generally any demand differences, differences in costs of serving particular insurance companies, the role of common costs at either hospital or operator level and so forth that could all affect the prices charged by individual hospital operators to individual insurance companies.

Summary

27. To summarize, the CC's working paper is in my view profoundly unsatisfying. At a methodological level, no effort is made to even attempt to distinguish problematic from non-problematic variation in prices. In terms of the 'empirical work', the CC's proposed methodology clearly does not provide a route to having enough data to do very much (anything) useful empirically. Indeed the CC's analysis itself (as distinct from its stated conclusions in the introduction of the working paper) makes clear the profound limitations associated with its proposed approach.
28. In terms of taking its analysis forward, the CC may wish to reflect on the academic literature which has recently developed a number of potentially useful tools for examining the question of buyer power empirically. In particular the references listed below which have begun to study such questions in both hospital-insurer and also other contexts:
 - Brand, K., G. Gowrisankaran, A. Nevo, and R. Town (2012) *"Mergers When Prices Are Negotiated: Evidence from the Hospital Industry,"* Discussion paper, University of Arizona working paper.

- Crawford, G., and A. Yurukoglu (2011): "The welfare effects of bundling in multichannel television markets," *American Economic Review*.
- Grennan, M. (2010): "Price discrimination and bargaining: Empirical evidence from medical devices," *American Economic Review*
- Lee, R., and K. Fong (2011): "Markov-Perfect Network Formation An Applied Framework for Bilateral Oligopoly and Bargaining in Buyer-Seller Networks," Discussion paper, mimeo.