April, 28th, 2016

Dear Mr DelNero,

Thank you for the opportunity to review the White Paper "Empirics of Business Data Services" written by Professor Marc Rysman of Boston University.

Let me first present my academic credentials and relevant experiences. I am currently Professor of Economics at Imperial College London. I am also holder of the Chair in Economics at the University of Rome. I have a M.Sc. and Ph.D. in Economics from the London School of Economics, and a M.Eng. from the University of Turin. My area of specialization is in the field of Industrial Organization, with particular reference to competition and regulation of telecommunications markets. The results of my studies – which embrace both theoretical and empirical approaches – have been published in top academic journals and are cited extensively both in academia and in policy circles (3,400 citations according to Google Scholar). My full list of publications is available at http://www.imperial.ac.uk/people/t.valletti

Over the years I have advised several governmental and inter-governmental agencies on a number of competition and regulation cases, including market definition and remedies in electronic communications for the European Commission (DG Competition and DG Information Society). I was a member of the spectrum advisory board at Ofcom from 2007 to 2012. Since 2013 I have also been a member of the Economic Advisory Group on Competition Policy (EAGCP) of the European Commission DG Competition.

1. The White Paper

This paper has collected and analyzed a very impressive dataset about Business Data Services (BDS). It argues in a convincing way that some considerable parts of this market are concentrated with some providers enjoying a dominant position. This position of dominance can be used to set high prices to users of BDS and therefore some forms of regulation, such as price caps, seem warranted for parts of the market for BDS.

The market of BDS is very complex and I am not familiar with many detailed aspects of it. Given the time available, I have concentrated my response to some economic issues that emerge from reading the current draft of the White Paper. In my discussion, I will follow the same structure of the White Paper that presents empirical evidence in three main sections, related respectively to revenues, locations, and pricing.

2. Revenues

This part of the White Paper presents useful aggregate information, which is particularly valuable to get a sense of who the big players are. In practice, only a few operators - ILECs in particular - have a large market presence. This section is a good starting point for the ensuing analysis, and I only have two minor comments.

First, it would be useful to clarify if there is double counting in the data. To give an example, imagine that the competitive provider Level 3 buys a DS1 service from Verizon for a sum $X, and uses it to provide some service to Citibank for a sum $Y. If I understood it correctly, the data would report revenues, say, of $X for Verizon and $Y for Level 3, a total of $X+Y. This overstates the size of Level 3 in this instance, since total revenues should be $Y, of which $X go to Verizon and $Y-X to Level 3. It would be good to have an idea about the magnitude of this problem. This potential ambiguity seems to be confirmed by results in the locations section, showing that a substantial revenue share flows from CPs to ILEC-affiliated CLECs. In any case, to the extent that smaller firms buy wholesale services from ILECs, the bias introduced by double counting would be to inflate the size of smaller providers who happen to bill the end user. Thus the relative size of the largest ILECs should be even larger in practice, confirming the dominance of such ILECs.

A second and minor comment is related to the Tables that could be made more reader-friendly. I suppose that Table 1 refers to $billions (currently not stated), while figures in Table 3 should be expressed in $000,000 (currently it says $000s). It would be useful to make the initial Tables 1-2-3 homogenous with each other.

3. Locations

The purpose of this section is to understand the presence of several competitors in the relevant market. The relevant market is defined here in terms of the ability of suppliers to reach customers across geographical locations. While most customers will find it hard to change location in case BDS prices change, a supply-side response should be an important force that puts a discipline to prices in case they were too high.

The White Paper presents a very granular view of the presence of competing operators across locations. It manages to give a picture about the presence of the number of competitors per building, as this appears to be often mentioned as the relevant unit for decision-making by suppliers.

According to this analysis, it is first confirmed that ILECs connect most of the buildings (Table 6), while the vast majority of other players are quite small in size. It would be perhaps useful at this stage to have a discussion that compares Table 6 with the previous Tables 1-2-3 based on revenues. It would be reassuring to find comparable shares by provider and by type using two very different approaches. The comparison could also help clarify the issue of double counting mentioned above.

This section also shows that the number of competitors per building is small, with the median building being served by a single operator. I note that the author computes the presence of CPs when they can provide service (with or without UNEs), which seems to be the appropriate way to account for potential supply-side competition.

The situation is instead different for buildings served by fiber, where the playing field seems much more levelled between ILECs and CPs. This is possibly an indication of greater competitive interest in a market with greater demand for bandwidth.

The analysis is also conducted at different level of aggregation, looking at census blocks. While the precise figures change, the picture that emerges is once again one where most census blocks have no competitive provision, and only a few blocks have multiple providers in them.

In some previous work of mine on competition in the UK residential broadband market,[1] the UK regulator adopted a different approach using Local Exchanges as relevant markets, as this is the level where CPs have to sink most of their investments. While BDS are clearly a different market, it would be useful to clarify why this alternative definition, which has been employed elsewhere in the literature, is not particularly relevant in the current context.

I am in agreement with the author's emphasis on the supply side of the market. Nonetheless, it might be useful to comment on some aspects of the demand side. Specifically, it would be good to know how many customers are multi-location (most examples presented presume that to be the case). If these customers can find deals all over the country, this not a particular source of concern. But if instead there is a preference for a single provider, or cross deals are difficult to reach across locations, then it would be possible to argue that the finding that there is little potential competition would be further reinforced.

4. Prices

This is the central part of the White Paper. The author conducts regression analysis where the price paid by a customer is regressed against a set of variables, some of which capture the presence of competition. The main idea being tested is to see if operators in more concentrated markets (that is, markets with few competitors) can exert market power by setting higher prices to their customers. If instead there is a serious entry threat, or if consumers could easily find alternatives, suppliers should not be able to raise prices above competitive levels.

The analysis is primarily done in terms of a building. One might argue that a building is too small to serve as a relevant market, but this choice is based on the narrative descriptions of cases where it was reported exceedingly expensive even to build from one floor of a building to another, in which case the building would possibly be too large to be a relevant market. The author is aware of how crucial the unit of analysis is, and for this reason the author also

[1] M. Nardotto, T. Valletti and F. Verboven "Unbundling the incumbent: Evidence from UK broadband", *Journal of the European Economic Association*, vol. 13, n. 2, 330-362, 2015.

follows alternative approaches. Looking at the results, the coefficients on rivalry in the building are comparable to the coefficients on rivalry in the block, which is reassuring.

I have several observations that might be useful to clarify some outstanding issues.

First, it is important to discuss how prices are calculated. These are obtained from the bills of a customer. As bills report total revenues, that is, prices multiplied by quantities, one has to be careful not to confound the two. I think this is fine in the present study, as prices are calculated by circuit, but it would be good to have some clarifications in this direction. Else one would be subject to the criticism that higher "prices" (= bills) just reflect higher "quantities" (think, for instance, of more inclusive "data bundles" in residential markets). My observation also applies to ancillary services that could come with a circuit. In other words, it was not too clear to me if the currently calculated prices actually follow a "basket" approach where actual prices are calculated for comparable baskets (in previous work, I have followed this basket approach to compare cellular tariffs).[2]

Second, it would be good to understand why competition is expected to play a role on prices at a level as disaggregated as a building. If a service is tariffed, which I understand is true, for instance, of DS1 and DS3 services, then that service must be generally available to all at the same price. I also understand that the carriers can and do under the tariff differentiate services based on geographic locations,[3] and that under the tariff prices can also vary, for instance, with volume, term commitment, and quality of SLAs. But if one could control for all these factors, the prices should *not* change with the number of competitors, as the same conditions must be offered to everyone. So my main point here is to understand why – having controlled for all the "right" factors – competition should have a role for tariffed services. Else the interpretation of the regression results could be substantially different: if, say, regulated prices could *not* react at all to the number of competitors, then the present statistical findings are simply pointing to the spurious correlation that competitors seem to enter in particular

[2] C. Genakos and T. Valletti, "Testing the 'waterbed' effect in mobile telecommunications," *Journal of the European Economic Association*, vol. 9, n. 6, 1114-1142, 2011; C. Genakos and T. Valletti, "Evaluating a decade of mobile termination rate regulation", *Economic Journal*, vol. 125, issue 586, 31-48, 2015.

[3] These are called density zones, with progressively higher prices for a given service as residential density falls; incidentally, I was not too sure if this type of information on density exists in the dataset and is used in the regression analysis.

buildings where particular contractual elements (not observed by the econometrician) are present. Although I understand this is an empirical exercise, it would help to know why regulated prices would be subject to competitive forces, in a setting where the ILEC provider cannot in principle discriminate among its customers – other things equal.

Third, and related to the above, why do CPs not serve buildings where prices seem to be high? Is it because they have to bear some particular kind of entry cost? What are the limits to competition? This would be useful also to inform the regulator as to the effectiveness of possible remedies.

Fourth, the author mentions that his approach relies on some randomness in how the number of CPs is determined in various locations. While he does control for location fixed effects that account for quite a few unobservable factors, the question remains whether it is still possible that unobserved factors that can affect prices (particular demand and supply characteristics) differ within the census tract, and could drive the entry of CPs. While this problem is almost unavoidable in a cross-section like this, I was wondering if any exercise could be done to exploit the time dimension that is still available in the data. One could, for instance, look at the subset of prices for which monthly data exist, and see if over the period some competitive dynamics had the predicted impact on prices. I am not sure if this would be feasible though, as the information about the number of competitors might have been collected only at a single point in time. If that is the case, the FCC might consider collecting additional data on the number of competitors in the near future and conduct an analysis of prices before/after competitive entry in some markets.

Fifth, a similar comment on the possible endogeneity of competitive entry can be made on the interesting results on differences in Price Flexibility Regulation (Table 20). The FCC has allowed greater price flexibility to raise prices above the price cap in some instances. Unless these flexibilities were given randomly, the results would be biased (as it is likely that the regulator allowed price flexibility where it did not expect prices to rise). Again, it would be useful to provide some discussion of what this means in the interpretation of results.

Sixth, the author may want to include an operator-fixed effect in his regression analysis. This would capture, for instance, advertising-related expenses, brand preferences, and so forth. It may also be good to show explicitly in the annex the equation that is being estimated, so it

would be clear for trained economists what fixed effects are being controlled for. Perhaps this type of fixed-effect is already subsumed by the location fixed effects, but it would be useful if the author could clarify this point.

Last, the author acknowledges that it would be interesting to explore the use of cluster standard errors (instead of robust standard errors). I agree with this, which would be doable without having to collect extra data. The correct standard error estimation procedure should be given by the underlying structure of the data and will determine the accuracy of the estimation.

Sincerely,

Tommaso Valletti