



# **NERA response to Ofcom comments on our paper: Review of country benchmarks used for setting lump sum values for UK 900 MHz and 1800 MHz**

Prepared by NERA Economic Consulting for  
Telefónica UK

9 April 2014

## **Project Team**

Jonathan Falk  
Richard Marsden  
Jonathan Pike

## **NERA Economic Consulting**

Marble Arch House  
66 Seymour Street  
London W1H 5BT  
UK  
Tel: 44 20 7659 8500  
Fax: 44 20 7659 8501

[www.nera.com](http://www.nera.com)

1166 Avenue of the Americas  
New York  
NY 10036  
USA  
Tel: 1 212 345 2981  
Fax: 1 212 345 4650

## **Contents**

<b>1.</b>	<b>Introduction</b>	<b>1</b>
<b>1.</b>	<b>Ofcom misunderstand the methodology</b>	<b>2</b>
<b>2.</b>	<b>Specific econometric concerns</b>	<b>3</b>
<b>2.1.</b>	<b>Relative values vs. absolute values</b>	<b>3</b>
<b>2.2.</b>	<b>Pooling</b>	<b>3</b>
<b>2.3.</b>	<b>Sample size</b>	<b>4</b>
<b>2.4.</b>	<b>Treatment of differences by the use of a constant</b>	<b>4</b>
<b>2.5.</b>	<b>Weighting</b>	<b>5</b>
<b>3.</b>	<b>Conclusion</b>	<b>5</b>

## 1. Introduction

In August/September 2014, NERA Economic Consulting (NERA) undertook a statistical analysis of the country benchmark data that is being used by Ofcom to derive lump sum values of UK 900 MHz and 1800 MHz spectrum. The report was produced for Telefónica and was included as part of their submission to Ofcom's August 2014 Consultation on annual licence fees (ALFs) for mobile spectrum.

In that paper, we proposed that Ofcom undertake a “top down” econometric evaluation to screen for potential outliers amongst its country benchmarks, as a complement to its “bottom up” qualitative analysis of individual observations. Our approach provided a potential framework for allocating observations to Ofcom's three tiers of evidence which could then be refined through qualitative reasoning. In particular, in cases where lack of evidence may make qualitative reasoning difficult, it provides an objective basis for tier designation. Using this approach, we put forward a number of recommendations, including downgrading the Austria 900 MHz and 1800 MHz benchmarks from Tier 1 to Tier 3.

Ofcom's views on our submission are set out at in Annex 7, paragraphs A7.185-A7.191. In short, Ofcom rejects our proposal to carry out any quantitative analysis of the benchmarks, arguing that an exclusively qualitative approach is more appropriate. We have examined Ofcom's response to our econometric analysis of the observed auction prices. Ofcom's conclusions are unpersuasive for two main reasons, which we set out in more detail in the following sections:

1. Ofcom misunderstand the methodology itself. Ofcom seems to assume that the analysis we employed provides something akin to proof that certain auction results have been misclassified. This was never our intention – the analysis is offered as a complement to rather than a replacement for the qualitative analysis
2. Ofcom's critique of the specifics of the econometrics we use are simply wrong, particularly with regards to complaints about functional form, weighting, and the superiority of relative measures to absolute measures.

For the avoidance of doubt, we agree with Ofcom that the data are too sparse to permit firm conclusions about how to classify particular results on a purely mathematical basis. For example, we do not claim that the econometric analysis *proves* that Austria's results are unreliable. What they do, however, is provide strong, objectively based reasons to *suspect* that Austria's results are unreliable. They provide a context for the specific objections that multiple stakeholders have made to Ofcom's interpretation of the Austrian process.

Accordingly, any of the comments from Ofcom that suggest that our econometric analysis is unreliable because the data sample is small miss the point. Our work was not intended (nor would we suggest it be used) as a mechanistic way to separate tiers. What we provided is in its essence a *cross-check* on a qualitative process which otherwise proceeds with no objective standards at all.

## 1. Ofcom misunderstand the methodology

Ofcom summarise their analysis of our econometric study as follows:

A7.191: *“Overall, we do not consider that NERA’s approach offers a reliable basis for determining that specific data points are outliers. Instead, our view remains that our qualitative approach to assessing the quality of evidence (tiers) and the risks of understatement or overstatement is more appropriate.”*

We agree that a qualitative approach is appropriate and we agree that our approach, by itself, would not offer a reliable basis for determining outliers. Since we agree with these general points, where is the disagreement? Simply put, it is that the NERA approach ought to be an important *check* on the qualitative methodology. The Ofcom process creates a complicated mapping in which auction results are fed through various mathematical formulae and then classified into various tiers. Errors are certainly possible at any stage of that process, and Telefónica, amongst others, have strenuously argued that mistakes have been made. How are we to judge whether it is likely that mistakes *were* made? One way is to simply judge the wisdom of each particular decision, taking into account the specific criticisms made. But such a process is inherently qualitative and potentially flawed as well.

The use of the econometric analysis as a *cross-check* ought to be welcome to Ofcom. They themselves use various alternative measures as cross-checks on their own methodology. An advantage of this particular cross-check is that it allows direct comparison across countries, something that is difficult to do under Ofcom’s qualitative country-by-country analysis.

NERA’s analysis is based on the premise (which Ofcom does not dispute) that the country benchmarks developed by Ofcom purport to measure *the same thing*: what the market price (absolute or relative) would be for a particular spectrum band in the UK. Everyone grants that this measure is a noisy one, so the point of averaging results together is to squeeze some of the noise from the process. Ofcom’s qualitative tier-weighted process is simply one form of averaging, and its estimate is only as good as the data it relies on.

If some of the data points do not form a measure of what the market price in the UK would be, then including them in the average is just a mistake. There would be no reason to think that including them in the averaging process would make the resulting measure any better. Downweighting results which do not reflect hypothetical UK auction prices helps of course, which is why the tiering process is so crucial.

The NERA methodology is simply a method to get at a simple question: do the final data reflect noisy underlying estimates of the same thing? If not, which particular data points seem unlikely to represent a noisy estimate of the UK price?

Once we understand this, we can see how inapposite Ofcom’s summary paragraph is; NERA’s evidence is that it is likely that Ofcom’s qualitative assessment is flawed. Despite the fact that there are relatively few observations, there is objective evidence that:

- (a) one of the countries that Ofcom places in the first tier, i.e. Austria, seems to be measuring something different than what the others have measured;

- (b) these results apply even when controlling (as best as is possible) for country-specific features; and
- (c) these findings apply regardless of the metric used – both relative and absolute prices have this feature.

Is this evidence definitive? Of course not. It is meant to be *combined* with evidence already presented by Telefónica and other interveners with regards to the quality of the evidence. To put it another way, however unreliable this econometric evidence is, it ought to make Ofcom *less* certain in its conclusions. Had Ofcom replied that it did in fact make them less certain, but not sufficiently so to reverse their conclusions, its position would at least be logical (albeit flawed in our opinion). But evidence which cuts against one's position, unless it is simply wrong (which Ofcom nowhere contends) cannot be dismissed because it is different than the preferred conclusion; a scientific outlook requires *incorporation* of contrary evidence, not dismissal.

## **2. Specific econometric concerns**

### **2.1. Relative values vs. absolute values**

Ofcom considers relative values more important than absolute values on the grounds that country-specific factors should wash out in relative analyses.<sup>1</sup> Whether or not that is true depends of the source of error. If, for example, the 900 MHz auction result (as modified for UK comparison) properly measured the UK value, but the 800 MHz auction result was inappropriate for some reason, basing the 900 MHz UK value on the ratio would increase error vis-à-vis basing the 900 MHz UK value on the absolute value. NERA looked at both approaches to see what, if anything could be inferred from the data. As both the ratio and the absolute values for Austria suggest that something different than a UK-normalized estimate of price is being estimated; it further suggests that there is not simply some Austrian market factor which raises or lowers the value of spectrum which would wash out in the ratio.

### **2.2. Pooling**

Ofcom suggest that pooling the data is an inadequate means of controlling for country-specific factors.<sup>2</sup> To the extent that there are country-specific factors which have a common effect on all bands, the pooling by country is literally the best that can be done to estimate that effect. That said, we agree that the presence of few observations to precisely measure this country-specific effect would be troubling. Fortunately, however, we do not need to precisely measure this effect. We are simply quantitatively estimating, in an objective manner, the result which emerges after having given country-specific effects their full possible sway. We conclude, even then, that Austria is an outlier. If we wanted a precise estimate of Austria's true value net of its country specific effects, this criticism might have some force. But we do not seek such an estimate. We merely want to know whether the

---

<sup>1</sup> Ofcom, February 2015 Consultation, A7-185.

<sup>2</sup> Ofcom, February 2015 Consultation, A7-186 and 187.

benchmarks for Austria, Spain, Ireland (etc.) measure the same thing. We conclude they do not. One does not need a precise estimate of either effect to draw that conclusion.

An analogy might make this more clear. Suppose we wanted to know the average weight of a UK football player. In the absence of data, we might apply two methods, getting the weight of average football players in other countries or a relative method which calculated the ratio between the weight of football players to rugby players and applied it to the weight of English rugby players. We meticulously carry out this exercise, but no one appears to have noticed that American football is a different sport (with very different average weights). Note that this inclusion of American data corrupts both the relative and absolute methods. But the econometric technique certainly doesn't need precise means to calculate the country-specific effects on the ratio to demonstrate that something is wrong with the results and that the American results are anomalous.

### 2.3. Sample size

Ofcom suggests that “Robust statistical inference typically requires a minimum of 30 observations.”<sup>3</sup> We have no idea where this idea developed and the Ofcom statement has no reference. But it is misguided in two respects.

First, the standard errors of the analysis speak for themselves regardless of sample size. Analyses with few observations will, as a consequence, all other things equal, have larger standard errors and their conclusions will be more tentative. In the presentation of our results, we give the standard errors as given us by the data, so that the relative paucity of data points is fully accounted for.

Second, we ask: “Compared with what?” Ofcom had the same 15 or 16 observations we had. If robust objective *quantitative* conclusions are impossible with 15 observations, so are robust *qualitative* conclusions, unless Ofcom is prepared to substantiate, with some evidence beyond their say-so, that qualitative balancing in a non-transparent way is superior.

Rather than classify country results into tiers based on a purely qualitative showing, we attempt to bring some rigor to the process, as opposed to none. That our methodology is more rigorous than Ofcom's cannot be seriously disputed, nor can the fact that our methodology is more robust than Ofcom's in the sense that independent observers can at least vary its assumptions and determine for themselves its sensibility. By contrast, the *ipse dixit* methodology of Ofcom (especially in relation to Austria) allows no meaningful inquiry at all.

### 2.4. Treatment of differences by the use of a constant

Ofcom criticizes NERA for the use of a constant factor separating band prices within a country.<sup>4</sup> We are surprised by this criticism, as the underlying rationale for this adjustment is not ours, but Ofcom's. If the logarithm of the absolute values differ by a constant then the relative ratios will be constant across countries. This is Ofcom's assumption. If it is not true,

---

<sup>3</sup> Ofcom, February 2015 Consultation, A7-188.

<sup>4</sup> Ofcom, February 2015 Consultation, A7-189.

then relative ratios are not reliable. It is true that we could have attempted more complicated interactive effects. We transparently explained our reason not to do so, namely that the risk of spurious fitting in small data sets mandates a simple structure. As we agree that our econometric analysis does not stand on its own to mandate tiering classification, and is simply a cross-check on Telefónica's qualitative analysis, we stand by the results.

## 2.5. Weighting

Finally, Ofcom criticizes our regression for giving all country data equal weight, when some are manifestly more reliable than others.<sup>5</sup> As an initial matter, this begs the question, in what tier should any particular result be placed? Unlike the Ofcom technique, which is based purely on country-by-country qualitative analysis and lacks a comparative framework, the NERA methodology derives initial tier designations from the data themselves.

We assume that the benchmark data give the answer to a simple question: on the assumption that the relative (or absolute) values translated to UK values ought to yield the same thing (namely, the "true" UK value), do they? We find, unsurprisingly, that certain countries do not appear to be good benchmarks. We find this unsurprising just as Ofcom does. Ofcom's solution is to downweight the results in various tiers which they derived in an ad hoc fashion. When we begin to add rigor to the process of assigning countries to tiers, however, we discover that the classification methodology is suspect. Were we to fix this by adding more weight to the more reliable observations (as revealed in the NERA analysis, not through ad hoc classification) we would be more certain that Austria should be downweighted, as giving more weight to the more central observations would perforce make the outlying observations look even more outlying.

## 3. Conclusion

We request that Ofcom revisit their analysis of our econometric study, as Ofcom's initial critique is flawed and misguided. The quantitative exercise we propose would provide a valuable *cross-check* on a qualitative process which otherwise proceeds without objective standards. In the absence of such a cross-check, it appears that Ofcom is unable to identify outlying data points, such as the Austrian benchmarks, and subject them to the critical scrutiny they deserve.

---

<sup>5</sup> Ofcom, February 2015 Consultation, A7-190.



# NERA

ECONOMIC CONSULTING

Marble Arch House  
66 Seymour Street  
London W1H 5BT  
UK  
Tel: 44 20 7659 8500  
Fax: 44 20 7659 8501

1166 Avenue of the Americas  
New York  
NY 10036  
USA  
Tel: 1 212 345 2981  
Fax: 1 212 345 4650

[www.nera.com](http://www.nera.com)