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**Spectrum licensing, policy instruments and market entry. A comment**

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## Spectrum Licensing, Policy Instruments and Market Entry: A Comment<sup>1</sup>

In May 2014, Madden, Bohlin, Tran and Morey (Madden et al., 2014) published a study concerned with the mobile communications industry which concluded, as stated in the abstract, that ‘the probability of entry is enhanced by using auction assignments and excess licences’. They obtained the national 3G (third-generation)<sup>2</sup> spectrum data which underpinned their study by recourse to the DotEcon Spectrum Awards Database supplemented by further data searches to establish the number of 2G licences<sup>3</sup> held prior to the award of 3G (UMTS) licences.

On the face of it, this follows established scholarly practice. However, it happens that several alternative databases exist on UMTS, of which one has been compiled by ourselves and has been used in a number of publications commencing with a book on the theme of 3G published in 2002 (Curwen, 2002a and 2002b; Curwen and Whalley, 2014b). This is compatible with Wikipedia<sup>4</sup> (Wikipedia, 2016) and various publications of the Global mobile Suppliers Association. The problem is that even a cursory inspection of these databases reveals significant discrepancies compared to the data used in Madden et al., which suggests that the conclusions drawn by the Madden et al. article need to be treated with great caution.

There are several issues to address, of which the most important relate to Table 2 in Madden et al. which lists the number of excess licences – number of UMTS licences less number of 2G licences – and the number of new entrants resultant upon the issue of UMTS licences. Even if Denmark and Liechtenstein are set aside for the time being – the particular issues in those countries are discussed at a later point – there are numerous problems. In the case of Europe, for example, (and the list is merely illustrative):

- Belgium: There were 3 incumbents and 4 licences. So Table 2 should read ‘Excess licences 1; New entrants 0’, rather than ‘0’ and ‘0’.
- Finland: There were 3 incumbents and 4 licences, all of which were won. So Table 2 should read ‘Excess licences 1; New entrants 1’, rather than ‘0’ and ‘0’.
- Greece: There were 3 incumbents and 4 licences. So Table 2 should read ‘Excess licences 1; New entrants 0’, rather than ‘0’ and ‘0’.
- Ireland: There were 3 incumbents and 4 licences. So Table 2 should read ‘Excess licences 1; New entrants 0’, rather than ‘0’ and ‘1’.
- Italy: There were 4 incumbents and 5 licences. One incumbent withdrew during the bidding and two new entrants won licences. So Table 2 should read ‘Excess licences 1; New entrants 2’, rather than ‘0’ and ‘0’.

Some more detailed information about these cases can be seen in Table I.

Table I: UMTS licensing

Country	2G licences <sup>1</sup>	UMTS licences available	UMTS licences awarded	Method <sup>2</sup> (BC = beauty contest)	Date	UMTS licence winners <sup>3</sup>
Belgium	3	4	3	Auction	Feb 2001	KPN Mobile 3G, Mobistar, Proximus
Finland	3	4	4	BC	Mar 1999	Radiolinja, Sonera, Suomen 3G, Telia Finland
Greece	3	4	3	Auction– assigned <sup>4</sup>	Jul 2001	CosmOTE, Panafon, Stet Hellas
Ireland	3	4	3	BC – assigned	Jun 2002 <sup>5</sup>	Hutchison 3G Ireland, mmO <sub>2</sub> , Vodafone
Italy	4	5	5	BC + auction	Nov 2000	H3G, IPSE 2000, TIM, Wind, Omnitel

*Notes:*

1. The number of 2G licences using GSM technology is that ruling at the time of UMTS licensing. 2. The determination of method is complicated in a number of cases. Some of these are commented on in the text but space does not allow for a full exposition. Other sources may accordingly give a different version. 3. Licensees are cited under the names used when the licence was first issued. 4. The initial intended licensing method was abandoned in favour of an assignment given the shortage of applicants. 5. The three licences were not awarded at the same time. Hutchison 3G Ireland received its licence in June 2002, mmO<sub>2</sub> in August 2002 and Vodafone Ireland in September 2002.

*Source:* Curwen (2002a)

The problem also arises in Asian countries covered in Madden et al. (2014). For example:

- Singapore: There were 3 incumbents and 4 licences. As only the three incumbents applied to bid the auction was cancelled. So Table 2 should read ‘Excess licences 1; New entrants 0’, rather than ‘0’ and ‘0’.

Table 2 in Madden et al. is notable for not indicating whether all of the incumbents either bid for, or won, licences. Furthermore it is not strictly accurate to state that there were two excess licences in Austria and Germany. In both cases twelve spectrum blocks were offered with applications restricted to either two or three blocks – in other words, an outcome involving either four, five or six licences was anticipated. This is by no means the same thing as two excess licences as claimed by Madden et al. and, in the face of sustained bidding by potential entrants, the inevitable outcome was that incumbents chose not to drive prices above unsustainable levels and opted for a six-licence solution.

There are also comparability issues in Asia. For example, South Korea is cited as ‘Excess licences 0; New entrants 0’. What actually happened is that the three incumbents all formed bidding consortia because the cost of the licences was set at a very substantial \$1.09 billion. The two (not three) W-CDMA – the equivalent of UMTS – licences were awarded in December 2000. However, the third licence requiring the use of an alternative cdma-2000 technology was ignored by the third incumbent LG Telecom when offered in March 2001 and only awarded in August after LG Telecom agreed to become a minority partner in yet another consortium.

There are two other significant matters to discuss. In the first place, Madden et al. state on p.279 that “only ‘contested’ (by incumbents and potential entrants) assignments are modelled”. By this they mean that any licences reserved exclusively for new entrants are not counted. As 52 assignments are listed in Table 2 but only 49 are modelled, there are evidently three exceptions. While this may appear to be a reasonable attempt to ensure data compatibility, it creates some ambiguities of its own.

Take the case of the UK in 2000. According to Table 2 in Madden et al., there were no excess licences and no new entrants. However, the ‘A’ licence, reserved for new entrants, was itself heavily contested and sold for the extraordinary sum of £4.38 billion to TIW. Shortly

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3 thereafter, TIW was sold to a subsidiary of Hutchison Whampoa which rapidly discovered  
4 that the only way to build market share was to act as a disruptive force by undercutting the  
5 four incumbents – a tactic also employed in other markets where Hutchison became a new  
6 entrant as discussed in Curwen and Whalley (2014a: chapter 4) and Whalley and Curwen  
7 (2012). In other words, new entry was a significant factor in the post-auction structure of the  
8 UK market.  
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11 Secondly, Madden et al. state in Table 3 that the 49 assignments in their sample can be  
12 readily divided into 20 auctions and 29 beauty contests. However, this is misleading. For  
13 example, in the case of Liechtenstein the regulator used neither system of assignment but  
14 rather offered the licences to incumbents without a fee. It was over a year later before the first  
15 acceptance was formally registered and one incumbent refused outright. In the case of  
16 France, the so-called beauty contest was in name only because a minimum licence fee was set  
17 at roughly €5 billion – rather more in practice than could have been expected via an auction –  
18 with the result that only two of the three incumbents and no potential new entrants applied.  
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21 In the case of Denmark, a single round sealed-bid tender was used rather than a multi-round  
22 auction which again was significant because one of the incumbents chose not to bid, one part-  
23 owner of another incumbent also chose not to bid leaving the other owner to bid on alone  
24 (thereby raising the issue as to whether it was technically an incumbent or a new entrant), and  
25 one incumbent was outbid by a new entrant (Hutchison Whampoa). Furthermore, a number  
26 of auctions were preceded by stringent beauty contests – these are known as ‘hybrid’ auctions  
27 – with a view to eliminating parties with no real interest in winning a licence<sup>5</sup>, while in  
28 Slovenia in March 2001, the price bid was not the only factor specified in determining who  
29 would be awarded an auctioned licence.  
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32 In summary, it is evident that there two issues to address. Firstly, it is necessary to consider  
33 whether the Madden et al. article is factually accurate. According to the sources cited that  
34 they failed to consult, there do appear to be a significant number of factual inaccuracies.  
35 Secondly, and just as importantly, it is necessary to consider whether the entries as stated  
36 without any qualification are acceptable as they stand. As indicated above, many of the  
37 UMTS licence sales were far from straightforward but Madden et al. appear to have chosen to  
38 brush under the carpet the problem of comparing like with like.  
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41 All of this matters because, having established their database, Madden et al. subject the data  
42 to complex and extensive econometric analysis which occupies 14 of the 20 pages of text in  
43 their article. But if the database is inaccurate, no amount of econometrics can make it more  
44 accurate. It just means that the conclusions drawn will themselves be inaccurate, in which  
45 case there seems to be little point in conducting the analysis in the first place.  
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#### 48 Notes

- 49 1. The editor of the Review of Industrial Organization has refused to publish this on more than one occasion, in  
50 effect claiming that we have not ‘proved’ that Madden et al. have made any errors.
- 51 2. This is most commonly known as the Universal Mobile Telecommunications System (UMTS).
- 52 3. This is most commonly known as the Global System for Mobile (GSM). In Europe it operates in the 900  
53 MHz and 1800 MHz bands, whereas UMTS operates in the 2.1 GHz band.
- 54 4. Although Wikipedia is often treated with disdain by academics, its telecoms databases can be surprisingly  
55 detailed and accurate.
- 56 5. A concern, for example, was that certain bidders would attempt to drive up prices before pulling out.  
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