

ITS Europe 2014 Conference

AUCTION DESIGN AND RECENT SPECTRUM AUCTIONS IN EUROPE

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Context

- Simultaneous availability of additional frequencies in the 800 MHz band “Digital Dividend” and in the 2,600 MHz band
- Obligation of MS in Article 6, para 4 of the “Decision establishing a multiannual radio spectrum policy programme” (RSPP) to make these frequency bands available to the market by 1 January 2013
- Expiration of the “old” GSM licenses for 900 MHz and 1800 MHz spectrum having started before 2010 adds a further dimension to the complexity of frequency assignments

Assignment Strategies

Assignment procedures, strategies and procedure types

Strategy	Admini- strative	Beauty Contest	SMRA 800	CCA 800	MF SMRA	MF CCA	package clock auction
800 MHZ separately	HR	F, ESt	BE, CZ, FI, LT, LV, SV	DK	-	-	-
MF- assignments	-	HU	-	-	DE, IT, PT, SP	AT, IR, NL, SI, SK, UK	RO

Missing Member States: PO, BG, EE, LX, MA, CY

Country	Year of auction	Type of assignment procedure	Revenue in €	Revenue/ (MHz*PoP)	800 MHz only or MF SMRA Revenue/(MHz*PoP)
Austria	2013	CCA	2'014'461'467	0.846	n.a.
Belgium	2011	SMRA	360'000'000	0.537	0.537
Croatia	2013	ADMIN	386'847	0.002	0.002
Czech Republic	2013	SMRA	113'200'000	0.048	0.140
Denmark	2012	CCA	99'457'000	0.297	0.297
Estonia	2013	Stacked BCs	4'200'000	0.052	0.052
Finland	2013	SMRA	108'010'000	0.333	0.333
France	2011	BC sealed bid	2'639'000'000	0.669	0.669
Germany	2011	SMRA	4'384'000'000	0.145	0.720
Ireland	2012	CCA	656'929'637	0.511	n.a.
Italia	2011	SMRA	3'945'300'000	0.271	0.813
Latvia	2013	SMRA	4'694'168	0.039	0.039
Lithuania	2013	SMRA	2'348'818	0.013	0.013
Nederland's	2012	CCA	3'805'000'000	0.630	n.a.
Portugal	2011	SMRA	372'000'000	0.118	0.430
Romania	2012	package clock auction	682'100'000	0.146	n.a.
Slovakia	2013	CCA	163'900'000	0.104	n.a.
Slovenia	2014	CCA	148'741'000	0.154	n.a.
Spain	2011	SMRA	1'648'000'000	0.166	0.460
Sweden	2011	SMRA	194'284'448	0.343	0.343
UK	2013	CCA	2'785'882'353	0.180	n.a.
Switzerland	2012	CCA	824'554'740	0.179	n.a.

Comparability

1. Stand alone 800 MHz assignments (HR, F, ES, BE, CZ, FI, LT, LV, SWE)
2. Multi-frequency SMRA's (DE, IT, PT, SP, HU planned)
3. Multi-frequency CCA (AT, IR, NL, SI, SK, UK)
4. Package Clock Auction (RO)

Conclusion

- Auction results from auctions under item 1 and 2, are directly comparable
- CCA and Package Clock auction results are **not directly comparable**
 - CCA with CCA
 - CCA with SMRA

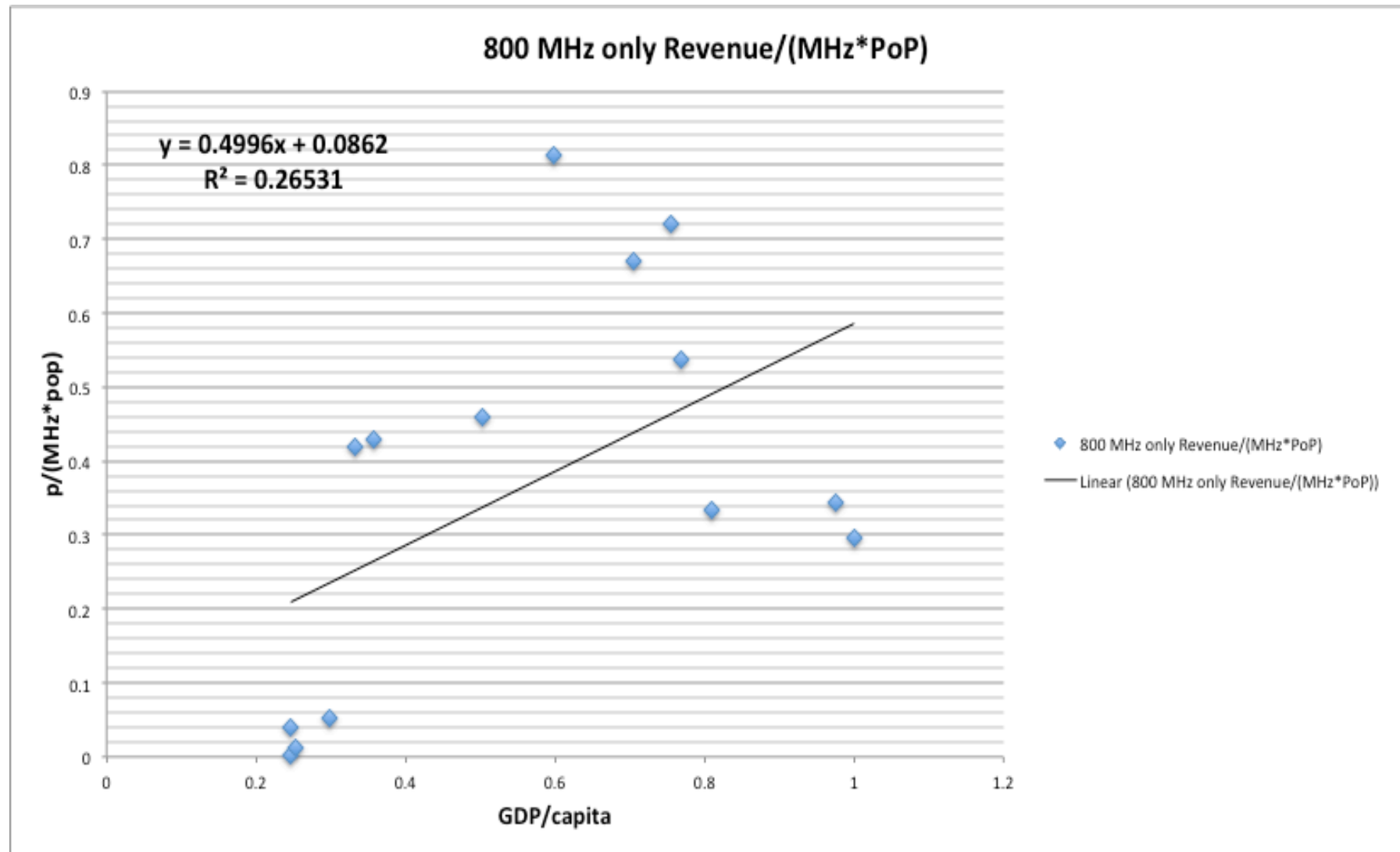
There is hope, that using a variant of “linear representative prices” methods may make CCA results comparable

Results of comparable 800 MHz assignment procedures

Country	Year of auction	Type of assignment procedure	Revenue in €	Revenue/ (MHz*PoP)	800 MHz only or MF SMRA Revenue/(MHz*PoP)	GDP/capita Index
Belgium	2011	SMRA	€ 360'000'000	€ 0.537	€ 0.537	0.77
Croatia	2013	ADMIN	€ 386'847	€ 0.002	€ 0.002	0.25
Czech Republic	2013	SMRA	€ 113'200'000	€ 0.048	€ 0.140	0.33
Denmark	2012	CCA	€ 99'457'000	€ 0.297	€ 0.297	1.00
Estonia	2013	Stacked BCs	€ 4'200'000	€ 0.052	€ 0.052	0.30
Finland	2013	SMRA	€ 108'010'000	€ 0.333	€ 0.333	0.81
France	2011	BC sealed bid	€ 2'639'000'000	€ 0.669	€ 0.669	0.70
Germany	2011	SMRA	€ 4'384'000'000	€ 0.145	€ 0.720	0.76
Italy	2011	SMRA	€ 3'945'300'000	€ 0.271	€ 0.813	0.60
Latvia	2013	SMRA	€ 4'694'168	€ 0.039	€ 0.039	0.25
Lithuania	2013	SMRA	€ 2'348'818	€ 0.013	€ 0.013	0.25
Portugal	2011	SMRA	€ 372'000'000	€ 0.118	€ 0.430	0.36
Spain	2011	SMRA	€ 1'648'000'000	€ 0.166	€ 0.460	0.50
Sweden	2011	SMRA	€ 194'284'448	€ 0.343	€ 0.343	0.98

- Variability of $p/(\text{MHz} \cdot \text{pop})$ extremely high (0.002 to 0.813)
- Possible determinants: Income/capita, population density, roll-out/coverage obligation, competition intensity, auction design ...

800 MHz prices vs. GDP/capita



Regression results in 800 MHz assignments

	Intercept	GDP/capita	Dummy MF SMRA	n of qualified bidders	corr. R ²
Model 1	0,086	0,450**	-	-	0,2653
Model 2	-0,096	0,594***	0,362***	-	0,6560
Model 3	-0,734	0,447***	-	0,270***	0.6586
Model 4	0,561	0,526***	0,233***	0,157***	0.7897

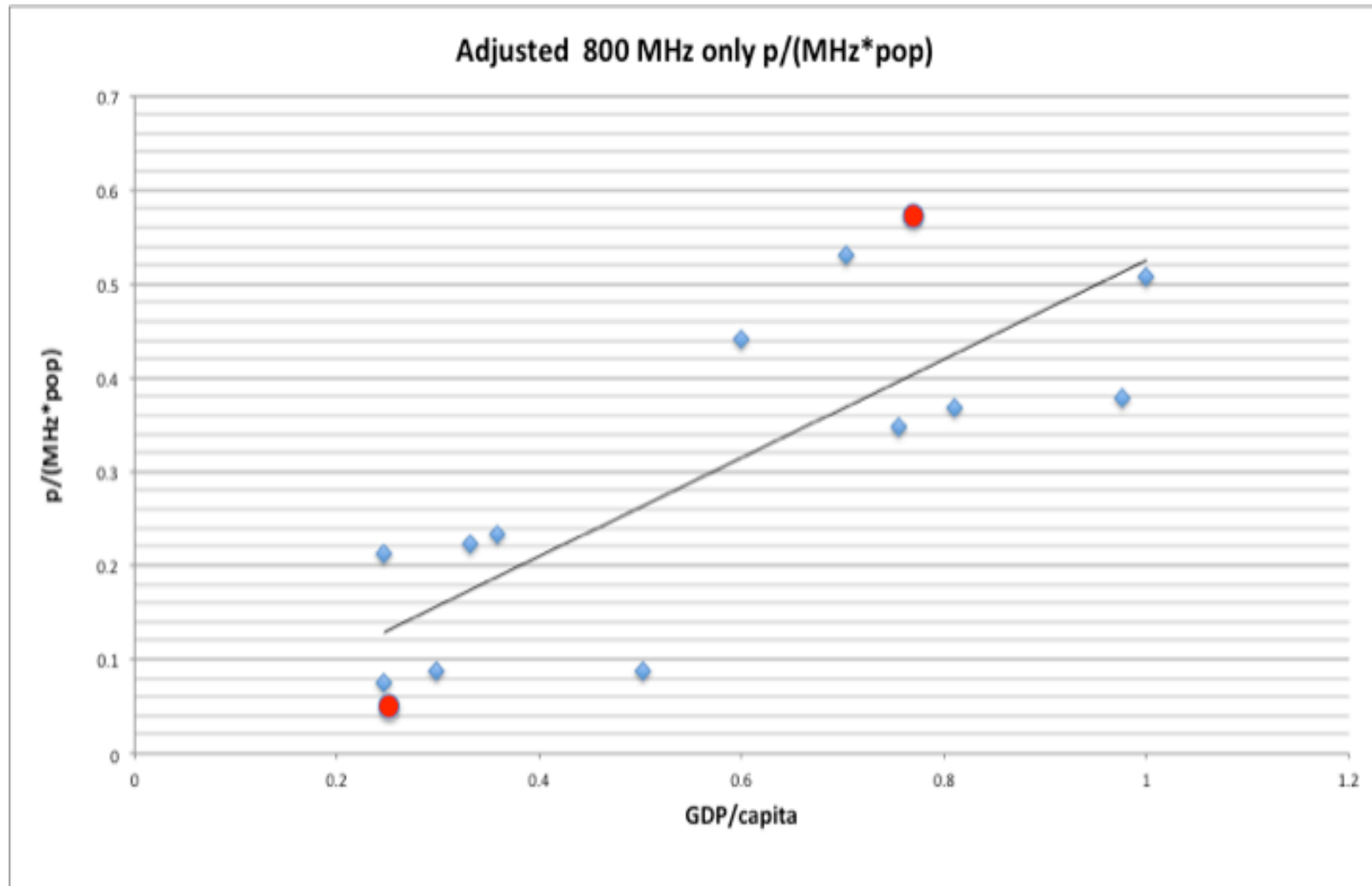
****....significant at the 5% level**

*****...significant at the 1% level**

Results of regression analysis

1. GDP/capita is the most important determinant of the price of 800 MHz in this sample of assignment procedures. The income elasticity evaluated at the sample mean is $\varepsilon = 0,80$, indicating a country with an GDP/capita index which is higher by 10% than the GDP/capita index at the sample mean would expect 8% higher prices for 800 MHz spectrum.
2. "n of qualified bidders" represents the competitive pressure in the market for 800 MHz spectrum. This means, that an increase of the number of qualified bidders will increase prices of 800 MHz spectrum.
3. SMRA-Dummy: if the frequencies are assigned in an MF-SMRA the prices will be higher.
 - Stand-alone assignment procedures carry the so-called "aggregation risk", which in properly structured MF-auctions (package oriented auctions) is not present. Bidders in standalone auctions will incorporate that risk into their bids in standalone auctions.

Adjusted $p/(MHz \cdot pop)$



Interpretation of Results

- Adjusted $p/(MHz \cdot pop)$: $p/(MHz \cdot pop)$ is corrected for “n of qualified bidders” and the MF SMRA-Dummy.
- Results only tentative, very small sample size
- In stand alone 800 MHz assignments, little or no influence of auction design
 - No significant outliers
 - Two rather strange data points (red): Croatia and Belgium
 - Croatia used an administrative procedure
 - Belgium used a stand-alone SMRA with very high reserve prices, which ended with the primary round at reserve prices

CCAs ??

- CCA's not yet analysed due to
 - Small sample size
 - Comparability
 - Extrapolation of lot prices from bidding data not yet fully developed (linear reference prices etc)
- There are only very few CCAs which are comparable with regards to auctioned portfolio. Good candidates: Ireland (2012), Austria (2013) and with some adjustments Netherlands (2012)
- These could only be analysed by means of detailed case studies, including many details of auction design, payment schedules, differences in spectrum caps, spectrum reservations etc.

Contact

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