

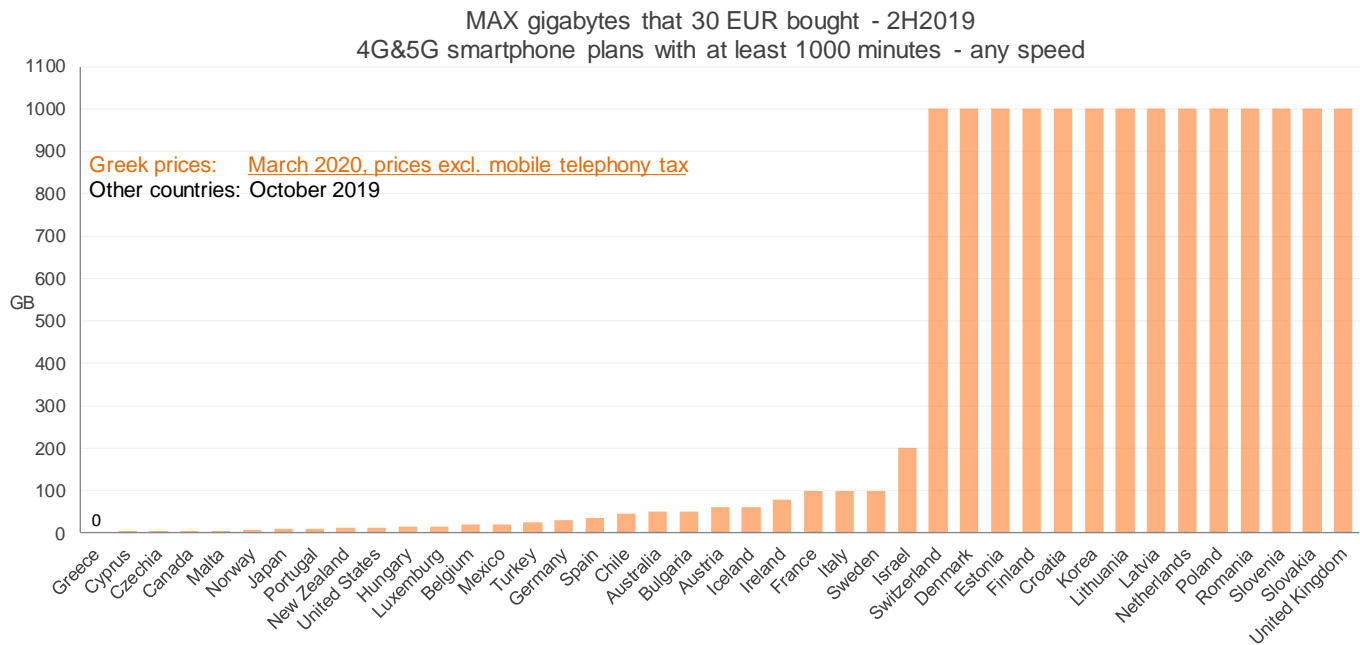
Review of mobile data connectivity competitiveness in Greece within the wider context of digital economy competitiveness

The European Commission ranked Greece as the least competitive EU member state in fixed and mobile broadband connectivity the last 5 years

Rewheel research study commissioned by the Hellenic Competition Commission (Ελληνική Επιτροπή Ανταγωνισμού), March 2020

Greece has also consistently ranked the last 5 years as one of the most expensive EU28 & OECD countries in the European Commission's annual mobile broadband price comparison studies, and as well in Rewheel's bi-annual Digital Fuel Monitor international mobile data connectivity price comparison studies.

- Are the latest (March 2020) mobile data connectivity prices in Greece still very expensive?
- Are Greek mobile connectivity prices expensive due to the mobile telephony tax?
- Why have the Greek mobile data connectivity prices been and still are very expensive?
- Is the Greek mobile market a 3-MNO tight oligopoly market?
- Can the three Greek operators deploy 5G independently without any significant increase in CAPEX spending?
- Does the active mobile network sharing agreement between Vodafone and Wind restrict competition?
- What measures are necessary to lower the barriers of entry and encourage a 4th mobile network operator (MNO) entry?
- What ex-ante and ex-post measures could potentially remedy the competition restrictions in the absence of a 4th MNO entry?



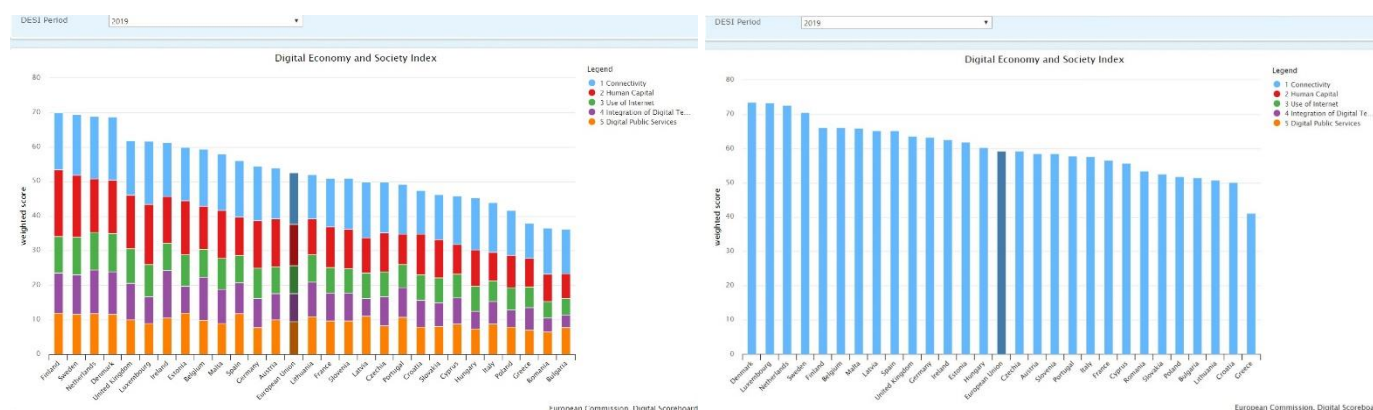
Unlimited plans were plans with truly unlimited volume (no FUP) or at least 1000 gigabytes.
Countries with the same gigabyte volume are listed alphabetically using abbreviation codes (e.g. Switzerland: CH).

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Study context

The newly appointed Hellenic Competition Commission (Ελληνική Επιτροπή Ανταγωνισμού), under its current research & development program activities, has initiated a broad review of the structure and state of the Greek digital economy. Internet connectivity and in particular mobile data (smartphone and mobile broadband) connectivity is a key enabler of the digital economy. Connectivity prominently features in the European Commission’s Digital Economy and Society Index (DESI), a composite index that summarizes relevant indicators on Europe’s digital performance and tracks the evolution of EU member states in digital competitiveness.

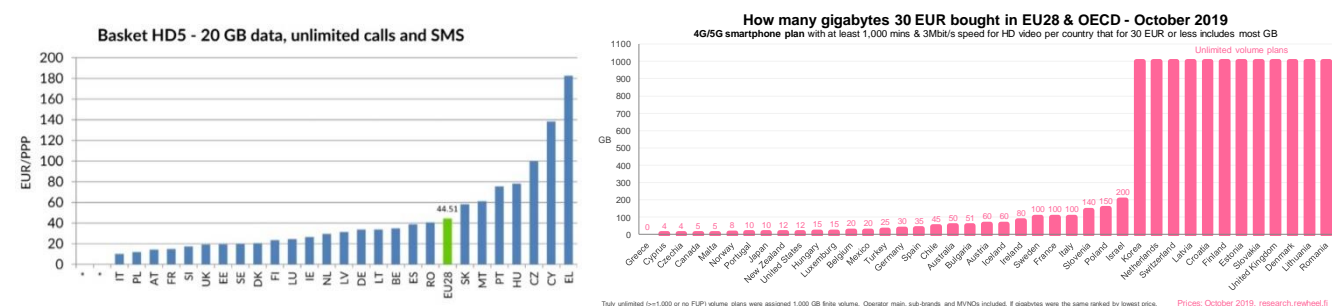
According to the European Commission’s 2019 digital competitiveness rankings¹ Greece ranked third from the bottom in the overall digital competitiveness as seen in the chart below on the left. In connectivity² – the *fuel* of the digital economy – Greece ranked as the least competitive EU member state, seen below in the chart on the right.



Moreover, Greece has consistently ranked in the European Commission’s annual mobile broadband price comparison studies, and as well in Rewheel’s bi-annual Digital Fuel Monitor international mobile data connectivity price comparison studies, as one of the most expensive EU28 & OECD countries.

The chart below on the left, taken from the European Commission’s latest (February 2019) mobile broadband price comparison study³ depicts Greece being the country among the EU28 member states with the highest monthly price (EUR/PPP) for a plan that includes 20 gigabytes and unlimited calls and SMS.

The chart below on the right, taken from Rewheel’s latest (October 2019) mobile data connectivity price comparison study⁴ depicts Greece being the country among the 41 EU28 & OECD countries with the lowest gigabyte allowance (i.e. zero gigabytes) that 30 EUR per month bought in 4G/5G smartphone plans that included at least 1000 minutes and 3 Mbit/s speed for HD video support.



In light of the above, the Hellenic Competition Commission approached Rewheel – an independent Finnish consulting, research and advisory firm that specializes in international mobile data connectivity comparisons, competition and network economic analysis – with a request for an independent study on the competitiveness of the Greek mobile data connectivity market within the wider context of digital economy competitiveness.

¹<https://ec.europa.eu/digital-single-market/en/desi>
²<https://ec.europa.eu/digital-single-market/en/connectivity>
³<https://ec.europa.eu/digital-single-market/en/news/mobile-broadband-prices-europe-2019>
⁴http://research.rewheel.fi/insights/2019_oct_pro_2h2019_release/

Brief description of the study structure

This independent study commissioned by the Hellenic Competition Commission (Ελληνική Επιτροπή Ανταγωνισμού) examines the competitiveness of the latest (March 2020) Greek mobile data connectivity prices using various international benchmark techniques and a number of factors (e.g. market structure, number and types of operators present) that may give rise to non-coordinated effects and could restrict or significantly impede effective competition in mobile markets.

The study is structured in 6 sections:

- In Section 1 we present a review of Greece's digital competitiveness as measured by the European Commission
- In Section 2 we examine the structure of the Greek mobile connectivity market
- In Section 3 we examine the latest mobile data connectivity prices in Greece and present a comparison with the latest mobile data connectivity prices from seven other European markets where the general consumer price level is higher than in Greece
- In Section 4 we present a review and comparison of the historic (2014-2019) development of mobile data connectivity prices in Greece and in EU28 & OECD markets
- In Section 5 we present and discuss the factors that, according to our view, restrict competition in the Greek mobile market and underpin the prevailing high mobile data connectivity prices
- In Section 6 we discuss 5G investment strategies, 5G network sharing, network-based consolidation and the potential effects of such strategies on effective competition. We conclude Section 6 by reviewing the draft terms of the upcoming 5G auction in Greece with particular emphasis on ex-post competition concerns and by discussing the effectiveness of ex-ante (revised 5G auction terms) and ex-post regulatory remedies.

There are two versions of the report available. A public version (29 pages) that contains the summary of findings and conclusions and a full version (162 pages) with the recommendations that has been made available to the Hellenic Competition Commission and to the members of the Lawmaking Commission convened by the Greek Ministry of Development and Investments with the task to transpose recent EU Directives and make recommendations on the modernization of competition law.

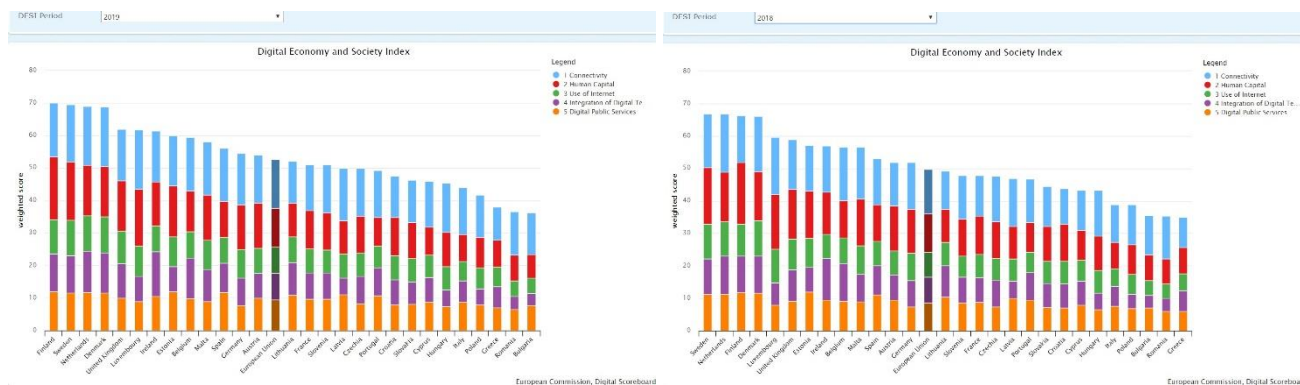
Table of Contents

1	Greece's digital competitiveness as measured by the European Commission	30
1.1	Overall digital competitiveness – Digital Economy and Society Index (DESI) EU member state rankings	30
1.2	Rankings of EU member states in connectivity – Greece ranks last among all EU Member States	32
1.2.1	Mobile broadband rankings – Greece ranked in the bottom of mobile broadband competitiveness.....	34
1.2.2	Mobile broadband prices – Greece has consistently ranked among the most expensive EU markets.....	38
2	The Greek mobile connectivity market	43
2.1	Telekom operator groups, mobile network operators and MVNOs	43
2.2	Market size and segment sizes	44
2.3	Operator market shares.....	47
3	March 2020 mobile data connectivity prices – Greece vs. samples from selected European markets	50
3.1	Smartphone plans with voice and data connectivity	51
3.1.1	Plans that are affordable for most – monthly fee of 20 EUR or less	52
3.1.1.1	Greece (3 MNOs: Deutsche Telekom no.1, Vodafone no.2 and Wind no.3)	52
3.1.1.2	Germany (3 MNOs: Deutsche Telekom no.1, Vodafone no.2 and Telefonica no.3)	54
3.1.1.3	Netherlands (3 MNOs: KPN no.1, Vodafone no.2 and Deutsche Telekom no.3).....	55
3.1.1.4	Austria (3 MNOs: Telekom Austria no.1, Deutsche Telekom no.2, Hutchison maverick no.3).....	56
3.1.1.5	Ireland (3 MNOs: Vodafone no.1, Eir owned by maverick Iliad maverick no.2, Hutchison maverick no.3).....	56
3.1.1.6	Finland (3 MNOs: Elisa locally owned no.1, Telia no.2, DNA used to be locally owned acquired by Telenor no.3).....	57
3.1.1.7	Italy (4 MNOs: TIM no.1, Vodafone no.2, WindTre and Iliad owned by maverick groups no.3 and no.4 respectively)	57
3.1.1.8	UK (4 MNOs: EE owned by BT no.1, Telefonica no.2, Vodafone no.3 and Hutchison maverick no.4).....	59
3.1.2	Plans that are affordable for some – monthly fee of 40 EUR or less	60
3.1.3	Plans that are affordable for few – monthly fee higher than 40 EUR.....	65
3.1.4	Maximum gigabytes that 20 or 40 EUR buys and lowest price for unlimited data volume with HD video speeds	68
3.2	Mobile broadband plans (data connectivity only).....	72
3.3	Fixed-mobile bundled plans.....	80
3.4	Mobile data connectivity plans for small & medium enterprises (SMEs).....	83
4	Historic (2014-2019) mobile data connectivity prices – Greece vs. EU28 & OECD markets	87
4.1	Did the latest (March 2020) price changes improve Greece's mobile data connectivity competitiveness?	89
4.1.1	Smartphone plans with voice and data connectivity.....	89
4.1.2	Mobile broadband plans (data connectivity only)	104
4.2	Historic (2014-2019) mobile data connectivity prices – Greece vs. EU28 & OECD markets	111
4.2.1	Smartphone plans with voice and data connectivity.....	112
4.2.2	Mobile broadband plans (data connectivity only)	118
5	Why Greek mobile data connectivity prices have been and still are very expensive	121
5.1	Are Greek mobile connectivity prices very expensive due to the mobile telephony tax?	121
5.2	Factors that may give rise to non-coordinated effects and could impede effective competition in mobile markets.....	129
5.2.1	Number of mobile network operators present (3 vs. 4)	129
5.2.2	Type of mobile network operators present (fixed-line broadband interest and big telco group ownership)	133
5.2.2.1	The big telco group ownership non-coordinated effect.....	134
5.2.2.2	The fixed-line broadband interest non-coordinated effect	135
5.3	Is the Greek mobile market a 3-MNO tight oligopoly market?	136
6	5G investments, network sharing, auction design and ex-post competition concerns	140
6.1	Typical 5G rollout strategies and investment levels required.....	140
6.2	Network layer consolidation – Active network sharing and number of independent network operators.....	145
6.3	5G spectrum auction design in Greece and ex-post competition concerns	149
6.3.1	Regulatory measures that will lower the barriers of entry: Czech 5G auction terms – 4 th entrant acquires 5G spectrum	151
6.3.2	Ex-ante and ex-post regulatory remedies – No 4 th bidder acquires 5G spectrum.....	156

Summary of findings and conclusions

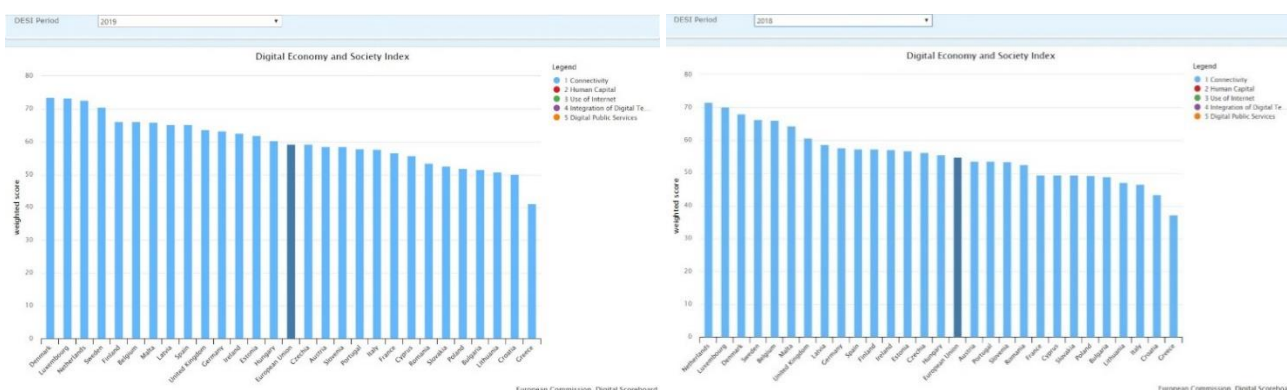
Greece is ranked third from the bottom in the overall digital competitiveness among the EU28 member states

According to the European Commission’s 2019 digital competitiveness rankings⁵ Greece ranked third from the bottom in the overall digital competitiveness as seen in the chart below on the left. Greece improved its relative digital competitiveness in 2019 as seen in the chart below on the right that depicts the 2018 rankings. In 2018 Greece ranked as the EU member state with the lowest Digital Economy and Society Index (DESI) weighted score behind Romania and Bulgaria.



In connectivity Greece ranked as the least competitive EU member state every year the last 5 years

In connectivity, the *fuel* of the digital economy, Greece ranked as the least competitive EU member state both in 2019 and 2018 as seen in the charts below. In fact, Greece ranked as the least competitive EU member state in connectivity as far back as 2015. The European Commission’s Connectivity⁶ dimension measures the member state competitiveness in fixed and mobile broadband coverage and take-up and as well in fixed broadband retail price levels.



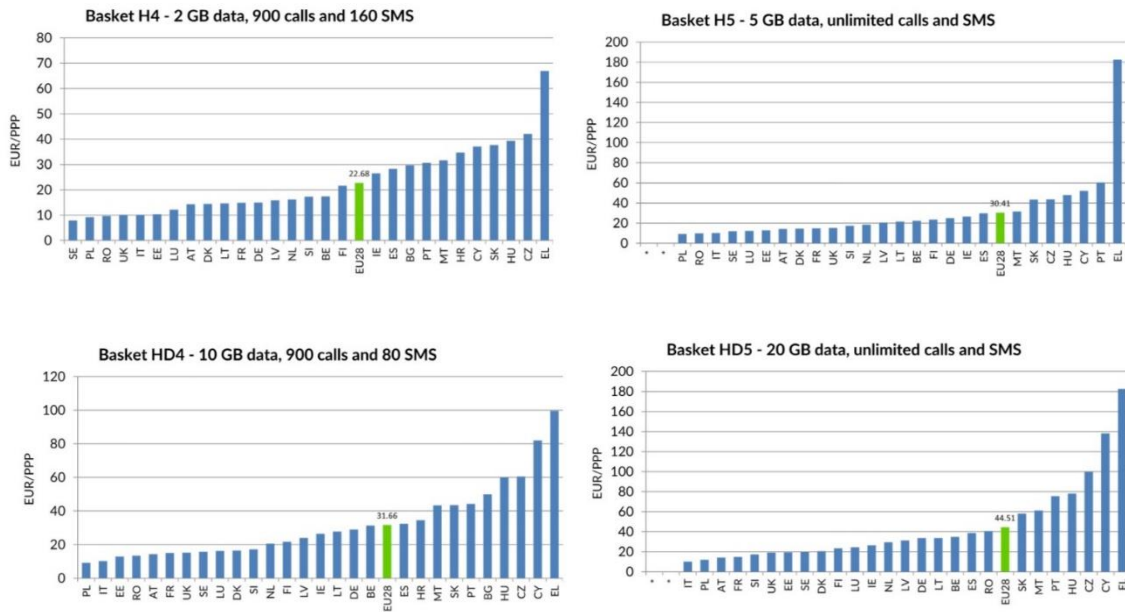
Evidently, connectivity is Greece’s digital *Achilles heel*.

⁵<https://ec.europa.eu/digital-single-market/en/desi>
⁶<https://ec.europa.eu/digital-single-market/en/connectivity>

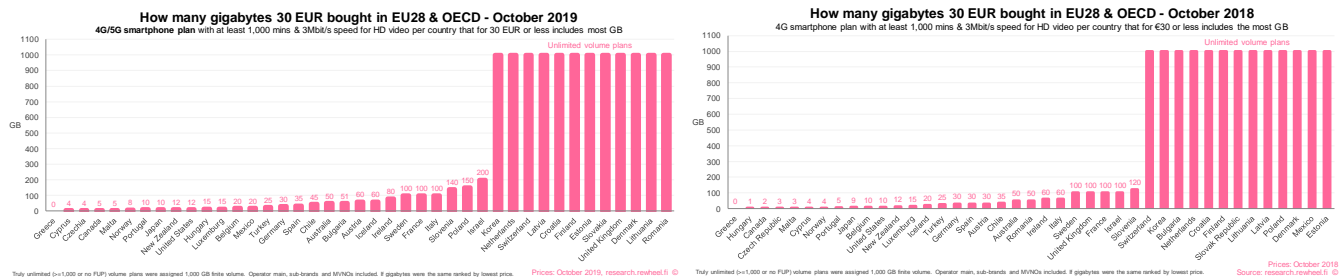
Greece has consistently ranked as one of the most expensive EU markets in mobile data connectivity prices

The European Commission the last five years has carried out annual survey studies of the retail mobile broadband prices in all EU28 member states and in selected non-EU countries.

In all five mobile broadband price comparison studies carried out by the European Commission Greece was found to be one of the most expensive EU markets. According to European Commission’s latest (February 2019) mobile broadband price comparison study⁷ Greece ranked as – by far – the most expensive member state in the 2, 5, 10 and 20 gigabyte smartphone plan baskets as seen in the charts below.



In Rewheel’s bi-annual Digital Fuel Monitor international mobile data connectivity price comparison studies, similarly to the European Commission studies, Greece ranked as one of the most expensive EU28 & OECD countries as far back as 2014. Greece was the only country among the 41 EU28 & OECD countries whereby a budget of 30 EUR per month did not buy consumers any gigabyte volume in smartphone plans that included at least 1000 minutes the last six years (the charts below depict the EU28 & OECD rankings according to the maximum gigabytes that 30 EUR bought during October 2019 and October 2018).



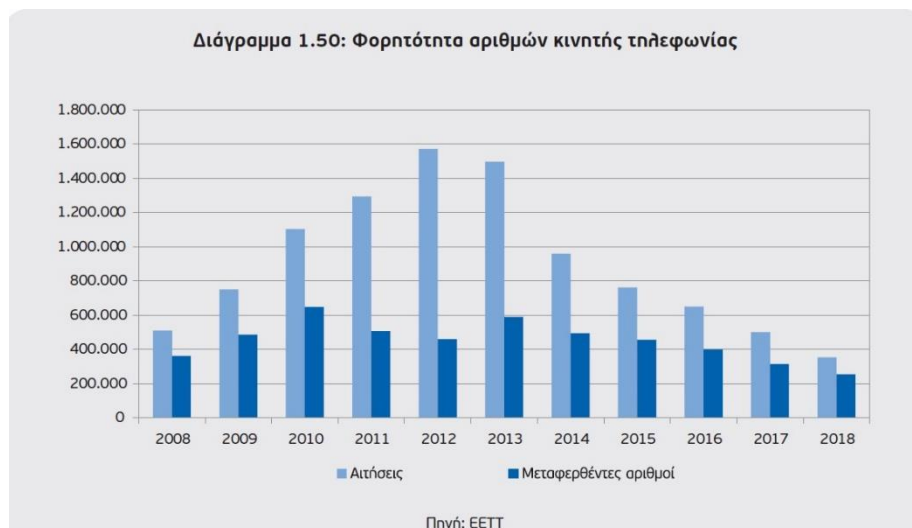
⁷<https://ec.europa.eu/digital-single-market/en/news/mobile-broadband-prices-europe-2019>

Greek mobile market: 3 mobile network operators with fairly stable market shares, 2 of which are involved in active network sharing over a significant percent of the population. Subscriber switching in decline since 2013.

The Greek mobile market has been controlled by the same 3 mobile network operators (MNOs) the last 20 years: Cosmote owned by the Deutsche Telekom group, Vodafone owned by the Vodafone group and Wind Greece owned by institutional fund investors. The market shares of the three mobile operators according to EETT⁸, the national telecom regulatory authority in Greece, have been fairly stable since 2009. Cosmote controls roughly 50% of the market, Vodafone around 30% and Wind around 20%.

Vodafone and Wind, since 2013, are involved in active 2G/3G network sharing. According to published reports the operators aimed to share an estimated 70% of their provincial networks plus 40% of nationwide areas classified as urban. Furthermore, the European Commission reported⁹ that EETT received in 2018 from Vodafone and Wind a request for the approval of the expansion of their existing network sharing agreement to include 4G technology. According the Commission the application is currently under consideration by EETT's competent departments. As of March 2020, it was not clear if EETT has approved the latest network sharing request from Vodafone and Wind.

According to EETT, the mobile number portability (MNP) requests and admissions have steadily declined since 2013 as seen in the chart below. The mobile number portability requests and admissions indicate the level of customer switching in the market. The fact that fewer and fewer customers are switching mobile operators raises various competition concerns.



⁸<https://www.eett.gr/opencms/export/sites/default/EETT/Journalists/MarketAnalysis/MarketReview/PDFs/2018.pdf>

⁹https://ec.europa.eu/newsroom/dae/document.cfm?doc_id=59864

During March 2020 mobile data connectivity prices in Greece were several times higher than German, Dutch, Austrian, Irish, Finnish, Italian and UK prices even though all these seven countries have higher comparative price levels (i.e. overall consumer prices are more expensive in these countries).

We compared the March 2020 Greek consumer mobile data connectivity prices – of smartphone plans with voice and data connectivity and as well of mobile broadband (data-only) plans – with prices from seven other selected European markets. The markets we selected are EU member states that have a Comparative Price Level – reported by Eurostat¹⁰ – that is higher than Greece's. In these selected EU member states the overall consumer prices are more expensive than Greek consumer prices. Five of these markets are, like Greece, 3-MNO markets (i.e. 3 mobile network operators are present) while Italy and the UK are 4-MNO markets.

We have included in the sample many markets where either Deutsche Telekom, Vodafone or both operators are present to illustrate that big telco group prices vary greatly across national markets. Big telco groups offer much lower prices in ultra-competitive 4-MNO markets¹¹ and as well in competitive 3-MNO markets where at least one challenger/maverick^{12,13} operator is present compared to typical 3-MNO oligopoly markets like Greece.

Even though Greece's comparative price level is significantly lower (i.e. 84 versus 100 to 129 for all other selected markets) Greek smartphone mobile data connectivity prices (i.e. maximum data/minute/SMS volumes that 20 or 40 EUR buys or monthly price for a plan with unlimited data/minute/SMS volumes) are several times higher than German, Dutch, Austrian, Irish, Finnish, Italian and UK prices as seen in the table below.

Comparison of smartphone mobile data connectivity price level in Greece and selected 3-MNO and 4-MNO EU markets, March 2020

Country	Comparative price level	Affordable for most			Affordable for some			Lowest price for unlimited data volume	
		Max GB for 20 EUR or less	National mins	National SMS	Max GB for 40 EUR or less	National mins	National SMS	Monthly price €	Comments
Greece, 3 MNOs	84	2.6	300	500	11	500	500	149.9	Full network available speed, includes a new smartphone every year
Germany, 3 MNOs	104	20	Unlimited	Unlimited	Unlimited	Unlimited	Unlimited	39.9	10 Mbps maximum speed
Netherlands, 3 MNOs	112	20	Unlimited	Unlimited	Unlimited	Unlimited	Unlimited	25.0	Full network available speed
Austria, 3 MNOs	109	20	2,000	2,000	30	Unlimited	Unlimited	45.0	Full network available speed
Ireland, 3 MNOs	129	80	Unlimited	Unlimited	80	Unlimited	Unlimited	-	Unlimited data in smartphone plans not available
Finland, 3 MNOs	122	Unlimited	Unlimited ¹	Unlimited ¹	Unlimited	Unlimited	Unlimited	22.0	100 Mbit/s speed
Italy, 4 MNOs	100	50	Unlimited	Unlimited	Unlimited	Unlimited	Unlimited	30.0	Full network available speed
UK ² , 4 MNOs	117	Unlimited	Unlimited	Unlimited	Unlimited	Unlimited	Unlimited	17.0	Full network available speed

¹ Unlimited data volume at 100 Mbit/s speed costs 18 EUR per month. If subscribers use minutes/SMS they pay at most 4 EUR extra to bring the total to 22 EUR per month.

² GB.

A budget of 20 EUR per month bought Greek consumers a 4G smartphone plan with at most 2.6 gigabytes, 300 minutes and 500 SMS. In all other markets with 20 EUR per month consumers could buy at least ~7x more gigabytes and on top of that unlimited minutes/SMS (in Austria they could buy 2,000 minutes/SMS with 20 EUR per month). In Finland and the UK consumers could buy unlimited data volume in their smartphones for less than 20 EUR per month.

With a budget of 40 EUR per month Greek consumers could buy a 4G smartphone plan with at most 11 gigabytes, 500 minutes and 500 SMS. In all other markets with 40 EUR per month consumers could buy at least ~3x more gigabytes and on top of that unlimited minutes/SMS. In Germany, Netherlands, Finland, Italy and the UK consumers could buy unlimited data volume with HD video capable speeds and unlimited minutes/SMS for less than 40 EUR per month.

Smartphone plans with unlimited data volume and a minimum speed of 3 Mbit/s for HD video streaming were available, during March 2020, in 7 out of the 8 countries included in this comparison. Greek consumers were asked to pay 149.90 EUR per month

¹⁰ https://ec.europa.eu/eurostat/statistics-explained/index.php/Comparative_price_levels_of_consumer_goods_and_services

¹¹ http://research.rewheel.fi/downloads/4G_prices_vs_number_MNOs_position_share_concentration_PUBLIC.pdf

¹² http://research.rewheel.fi/downloads/Rewheel_EU27_smartphone_tariff_competitiveness_report_December_2012_HIGHLIGHTS.pdf

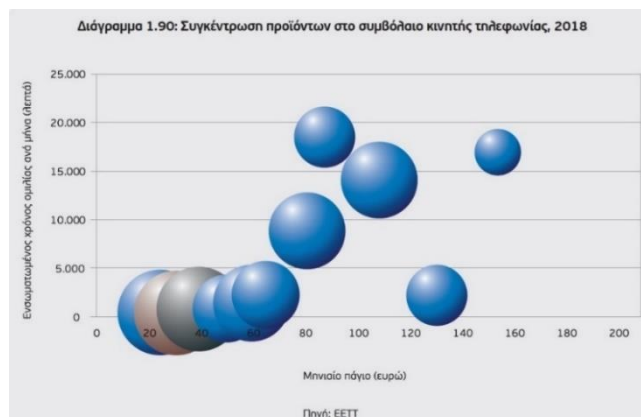
¹³ https://www.ofcom.org.uk/_data/assets/pdf_file/0019/74107/research_document.pdf

during March 2020 to buy a smartphone plan with unlimited data volume that supports HD video streaming at all times. That is 6x times more per month than what Dutch consumers were asked to pay in the Netherlands.

In Ireland the maximum data volume consumers could buy in their smartphone plans was 80 gigabytes (advertised as unlimited data but subject to a 80 gigabyte fair usage policy whereby the operator reserved the right to throttle the speed). However, it is worth highlighting that consumers in Ireland could buy the 80 gigabyte 4G smartphone plan that also included unlimited minutes/SMS for only 12.99 EUR per month.

Responding to the publication of the European Commission's February 2019 mobile broadband price comparison study where Greece ranked as one of the most expensive EU28 member states the three Greek mobile operators stated in Kathimerini¹⁴ that such studies do not reflect the reality because they are based on listed prices and not on the actual prices that consumers pay. Mobile operators in Greece appear to suggest that consumers in Greece pay much lower prices than those listed on their websites.

However, the EETT published data¹⁵ (Παρατηρητήριο Τιμών-Pricescope) does not appear to support this claim. As it can be seen in the EETT chart below, in 2018 55% of contract connection plans had a monthly fee up to 60 EUR i.e. 45% of contract connection plans had a monthly fee of more than 60 EUR. Contract connection plans with a monthly fee of over 100 EUR per month represented, as seen in the chart below, roughly 20% of all contract connection plans. The median monthly price of all contract connection plans during 2018, was according to EETT 34 EUR per month.



9. Το 55% των προγραμμάτων συμβολαίου κινητής τηλεφωνίας αφορούσε πάγια έως και 60 ευρώ το μήνα, με μέσο όρο τιμής τα 35 ευρώ (41 ευρώ το 2017), διάμεσο τιμή τα 34 ευρώ (44 ευρώ το 2017) και ενσωματωμένο χρόνο ομιλίας περί των 460 λεπτών το μήνα έναντι 550 λεπτών το μήνα το 2017 (Διάγραμμα 1.90).

Moreover, operators across many markets frequently discount the prices that they advertise on their web sites in special deals that apply only to certain consumers. So Greek operators are not unique in that sense. These discounts range typically from 10% to 30%.

Consider for example Vodafone Italy's¹⁶ listed 12.99 EUR price, seen in the screenshot below, for a 4G smartphone plan that includes 50 gigabytes (+ unlimited minutes/SMS) which is applicable to all consumers. A ~31% discount that applies only to consumers that will establish a new connection number or consumers that will switch from certain named operators brings the price for 50 gigabytes down to 8.99 EUR per month.



¹⁴<https://www.kathimerini.gr/1054303/article/oikonomia/ellhnikh-oikonomia/sta-yyh-oi-xrewseis-kinhths-thlefwnias>

¹⁵<https://www.eett.gr/opencms/export/sites/default/EETT/Journalists/MarketAnalysis/MarketReview/PDFs/2018.pdf>

¹⁶<https://www.mobileworld.it/tag/ho-mobile/>

When Vodafone Greece discounts its RED Start tariff by 35% from 43 EUR to 27,95 EUR per month, similarly to Vodafone Italy's Vodafone Greece's discount is available only to new connections and customers that will switch their number from Cosmote or Wind, the monthly price that these Greek consumers must pay to buy a plan that packs only 3 gigabytes (+ 1000 minutes/SMS) is still 3x higher than the price that some Italian consumers pay to buy 50 gigabytes (+ unlimited minutes/SMS).

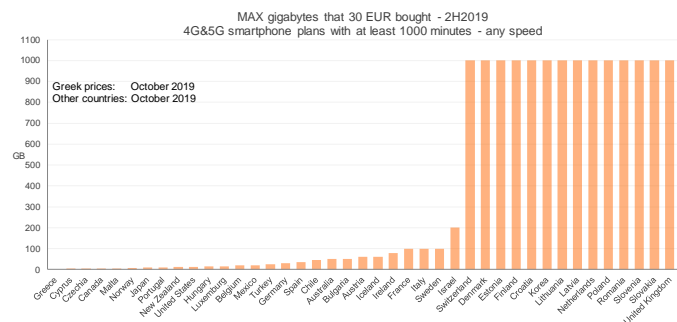
Vodafone RED Start	Vodafone RED Plus	Vodafone RED Max
<ul style="list-style-type: none"> 3GB 1000 λεπτά προς όλα τα εθνικά δίκτυα 1000 SMS προς όλα τα εθνικά δίκτυα 	<ul style="list-style-type: none"> 6GB 3000 λεπτά προς όλα τα εθνικά δίκτυα 3000 SMS προς όλα τα εθνικά δίκτυα 	<ul style="list-style-type: none"> 20GB Απεριόριστα λεπτά ομιλίας προς όλα τα εθνικά δίκτυα 6000 SMS προς όλα τα εθνικά δίκτυα
<p>Θέλω και Vodafone σταθερή με μόνο +14,23€/μήνα και ΔΙΠΛΑΣΙΑΖΟ ΤΑ GIGA ΜΟΥ! Μάθε εδώ</p>	<p>Θέλω και Vodafone σταθερή με μόνο +13,53€/μήνα και ΔΙΠΛΑΣΙΑΖΟ ΤΑ GIGA ΜΟΥ! Μάθε εδώ</p>	<p>Θέλω και Vodafone σταθερή με μόνο +14,20€/μήνα και ΔΙΠΛΑΣΙΑΖΟ ΤΑ GIGA ΜΟΥ! Μάθε εδώ</p>
Οφέλη	Οφέλη	Οφέλη
<p>27,95€ / μήνα από 43€ <small>με έκπτωση παγίου ή 35,42€ / μήνα με συσκευή</small></p>	<p>35,75€ / μήνα από 55€ <small>με έκπτωση παγίου ή 45,29€ / μήνα με συσκευή</small></p>	<p>47,48€ / μήνα από 75€ <small>με έκπτωση παγίου ή 60,16€ / μήνα με συσκευή</small></p>

Mobile broadband plan prices in Greece during March 2020 were similarly much higher than prices across the seven EU markets.

Did the latest (March 2020) price changes improve Greece’s mobile data connectivity competitiveness? No, Greece still ranks as the least competitive EU28 & OECD country in the most important comparative price metrics tracked by Rewheel’s Digital Fuel Monitor bi-annual releases.

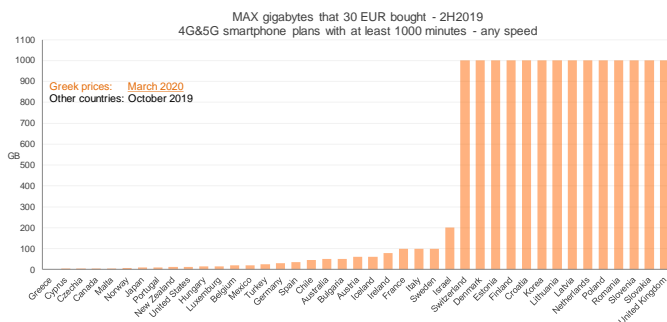
In almost every single of our twelve Digital Fuel Monitor bi-annual releases, including the latest 12th release 2H2019¹⁷, Greece ranked as the least competitive market among the 41 EU28 & OECD markets across most of our comparative price metrics. In our key comparative metric – the maximum gigabytes that consumers could buy in smartphone plans that have at least 1000 minutes when they spend up to 30 EUR per month – Greece has consistently ranked since 2014 as the least competitive EU28 & OECD market.

The latest (March 2020) plans and discounts introduced by the three Greek operators – after their CEOs met the Greek Prime Minister in December 2019¹⁸ to discuss among other things the high mobile prices – have not changed this fact. Greece still ranks as the least competitive country in the maximum gigabytes that 30 EUR bought metric when we compare the Greek operator March 2020 prices – that are applicable to all consumers (i.e. excluding prices offered only to certain special consumer segments such as youth, student, seniors, new connections, consumers that switch from other operators, etc) – with the October 2019 prices from all other EU28 & OECD countries. Greece continues to rank as the only EU28 & OECD country where consumers could not buy any gigabytes in 4G smartphone plans that included at least 1000 national minutes when they spend up to 30 EUR per month as seen in the charts below.



Unlimited plans were plans with truly unlimited volume (no FUP) or at least 1000 gigabytes. Countries with the same gigabyte volume are listed alphabetically using abbreviation codes (e.g. Switzerland: CH).

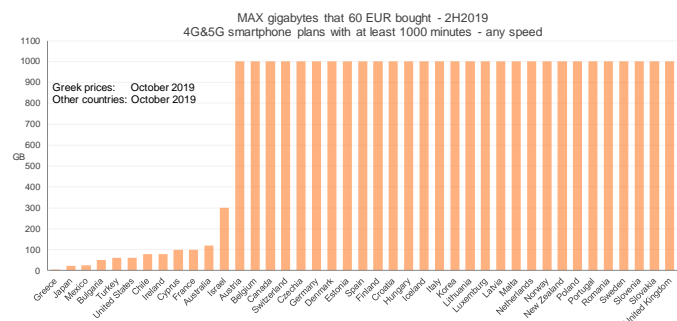
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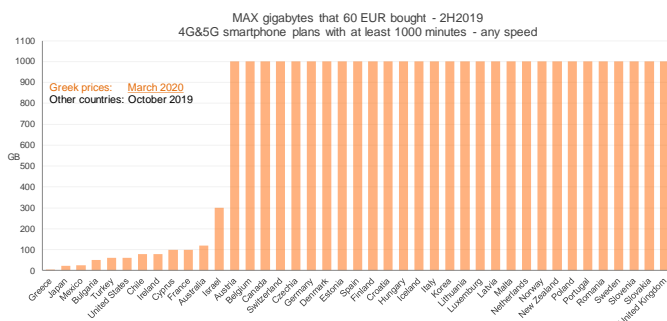
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With a monthly budget of 60 EUR per month – a monthly amount that very few consumers in Greece can afford – Greek consumers could buy during October 2019 a smartphone plan with at most 5 gigabytes and 1000 national minutes. Greece ranked as the country with the lowest amount of gigabytes 60 EUR bought during October 2019. And while in March 2020 60 EUR bought in Greece one more gigabyte than in October 2019 (6 vs. 5 gigabytes) Greece still ranks as the least competitive market in the 60 EUR metric.



Unlimited plans were plans with truly unlimited volume (no FUP) or at least 1000 gigabytes. Countries with the same gigabyte volume are listed alphabetically using abbreviation codes (e.g. Switzerland: CH).

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¹⁷http://research.rewheel.fi/downloads/The_state_of_4G_pricing_DFMonitor_12th_release_2H2019_PUBLIC.pdf

¹⁸<https://www.kathimerini.gr/1055020/article/epikairothta/politikh/epi-taphtos-oi-akrives-xrewseis-sth-synanthsh-kyr-mhtsotakh-me-paroxoys-kinhts-thlefwnias>

Greece is an outlier (by far the most expensive market) in another important mobile data connectivity metric: the median monthly price of smartphone plans that included at least 1000 national minutes. According to the Digital Fuel Monitor methodology¹⁹ the median monthly price per country or group of countries is the median price (tariff retail monthly price incl. VAT and taxes where applicable) among all eligible plans logged in the database for a given country or group of countries. The October 2019 Greek median monthly price of 4G smartphone plans that included 1000 national minutes was over 70 EUR per month. The median monthly price for the second most expensive country, Malta, was ~45 EUR per month.

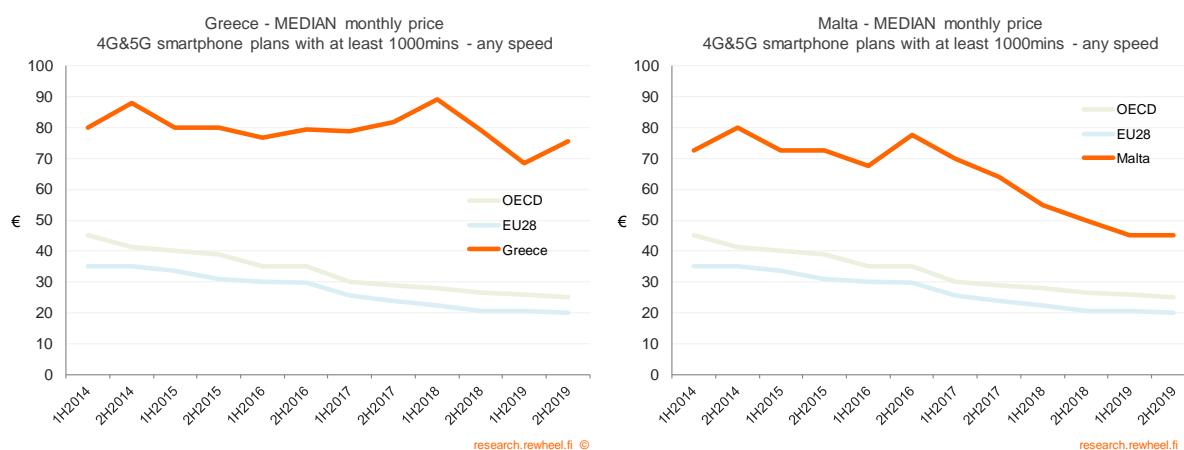
The latest plans introduced by the three Greek operators did not change Greece's ranking in this important metric. With the March 2020 prices Greece still ranks as the country that has by the far the highest median monthly price of 4G smartphone plans that included 1000 national minutes.

Greece was by far the most expensive market in another important mobile data connectivity metric: the median gigabyte price of smartphone plans that included at least 1000 national minutes. The median gigabyte price per country or group of countries is the median gigabyte price (tariff retail monthly price incl. VAT and taxes where applicable divided by the included gigabyte allowance) among all eligible plans logged in the database for a given country or group of countries.

The latest plans introduced by the three Greek operators did marginally change Greece's ranking in this important metric. With the March 2020 prices Greece ranks as the second most expensive country ahead of the de-facto Canadian network duopoly²⁰ in the median gigabyte price of 4G smartphone plans that included 1000 national minutes.

However, it is important to highlight, when comparing the Greek March 2020 prices against the October 2019 prices of all other EU28 & OECD countries that any improvements in the rankings of Greece should be interpreted as the *best-case* scenario given that prices have been falling across the board the last 5 years. Hence, one cannot exclude the possibility that the *like-for-like* rankings of Greece during March 2020 might actually be worse than what was shown herein. During April or May 2020, we will publish the 13th release of DFMonitor where we will report the April 2020 prices across all EU28 & OECD markets. Therein, we will re-examine the conclusions we have made herein regarding Greece's latest mobile data connectivity rankings.

Besides comparing the latest March 2020 Greek prices with the October 2019 prices from all other EU28 & OECD countries we also looked at the historic (2014-2019) development of prices in Greece versus EU28 & OECD prices and as well versus historic prices from other selected markets. We selected markets that had many things in common with the Greek mobile market but most importantly markets where the median monthly price level of 4G smartphone plans that included at least 1000 national minutes was pretty similar (very high) during the early days of 4G i.e. back in 2014. By examining the historic development of the median monthly and median gigabyte price development in these markets, the last 5 years, we put into context the historic development of Greek median monthly and median gigabyte prices. As seen in the chart below while the median monthly price of 4G smartphone plans with at least 1000 minutes was very high in both the Greek and Maltese 3-MNO markets during the 1H2014, by the 2H2019 Maltese monthly prices have fallen significantly but Greek prices stayed mostly flat.



¹⁹http://research.rewheel.fi/downloads/Methodology_DFMonitor_12th_release_2H2019.pdf

²⁰http://research.rewheel.fi/downloads/Root_cause_weak_competition_Canada_wireless_market_PUBLIC.pdf

Are Greek mobile connectivity prices very expensive due to the mobile telephony tax?

No. Prices in Greece are very expensive even after excluding the mobile telephony tax.









Greek operators argued that the European Commission’s and other international price comparison studies (e.g. Rewheel’s Digital Fuel Monitor releases) that show that Greek mobile data prices are among the highest in EU & OECD are not representative because as they claim Greeks pay much lower prices than those listed on their websites. Further to that, according to Kathimerini²¹, Greek operators claimed that any difference that makes Greek prices higher is the result of the high applicable mobile telephony tax. According to Ovum²² taxes applicable to mobile telephony are highest in Greece with an average value of 39% (mobile telephony tax that varies between 12%, 15%, 18% or 20% and the 24% VAT tax that comes on top bringing the total to a minimum 36%).

Is this claim correct? No, it is not.

To put it to the test, in the comparison shown below we used the actual bill of a consumer that subscribes to Cosmote’s Mobile 1500 plan with a listed retail price of 29.90 EUR/month. As seen below this typical Greek consumer pays a monthly price of 14.3 EUR before the 12% mobile telephone tax and the 24% VAT for a contract plan that includes only 200 national minutes and 200 megabytes. If this consumer did not subscribe to Cosmote’s fixed broadband service and was not granted a 20% discount on its monthly bill then the monthly price before the 12% mobile telephony tax and the 24% VAT would have been even higher i.e. 17.5 EUR rather than 14.3 EUR.

But while this Greek consumer pays 14.3 EUR (excl. taxes) per month to buy 200 national minutes and a tiny 0.2 gigabyte data allowance, in Germany, the Netherlands, Austria, Ireland, Italy, France and the UK consumers buy, for 13.2 EUR or less (excl. taxes), 4G smartphone plans with 5-100 gigabytes and unlimited minutes/SMS as seen below.

Are Greek mobile data connectivity prices expensive due to the mobile telephony tax?

← 3 mobile network operators					4 mobile network operators →		
Greece	Germany	Netherlands	Austria	Ireland	Italy	France	UK
February 2020 bill ¹ of Cosmote sub Mobile 1500 plan with 200 mins & 0.2 gigabytes	Vodafone Germany March 2020 plan with unlimited min/SMS & 5 gigabytes	Deutsche Telekom Netherlands March 2020 plan with unlimited min/SMS & 7 gigabytes	Deutsche Telekom Austria March 2020 plan with unlimited min/SMS & 12 gigabytes	Eir owned by the French Iliad group March 2020 plan with unlimited min/SMS & 80 gigabytes	Vodafone Italy March 2020 plan with unlimited min/SMS & 50 gigabytes	Bouygues Telecom France March 2020 plan with unlimited min/SMS & 60 gigabytes	Three UK March 2020 plan with unlimited min/SMS & 100 gigabytes
Price 14.3 EUR Tax 1.7 EUR VAT 3.9 EUR Total 19.9 EUR	Price 12.6 EUR Tax -- VAT 2.4 EUR Total 15.0 EUR	Price 13.2 EUR Tax -- VAT 2.8 EUR Total 16.0 EUR	Price 12.5 EUR Tax -- VAT 2.5 EUR Total 15.0 EUR	Price 10.6 EUR Tax -- VAT 2.4 EUR Total 13.0 EUR	Price 10.7 EUR Tax -- VAT 2.3 EUR Total 13.0 EUR	Price 11.7 EUR Tax -- VAT 2.3 EUR Total 14.0 EUR	Price 11.7 GBP Tax -- VAT 2.3 GBP Total 13.0 GBP
							

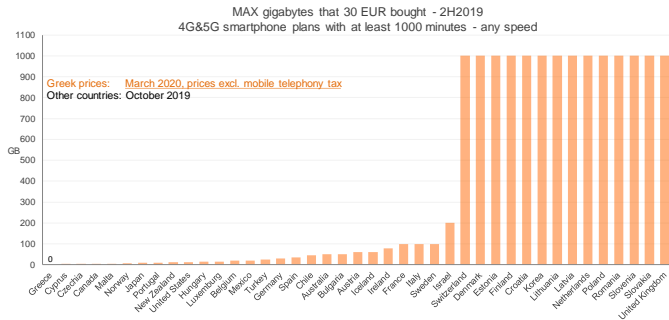
No. Prices in Greece are very expensive even when the mobile & VAT taxes are excluded
Most Greeks pay 10-20 EUR per month to buy plans with tiny data volumes (e.g. 200 megabytes) while in many other EU countries, where the general consumer price level is much higher consumers buy 5-100 gigabytes with ~15 EUR/month

¹Greek operators argue that the European Commission’s, Rewheel’s, etc. studies that show Greek mobile data prices as the highest in EU are not representative because as they claim Greeks pay much lower prices than those listed in their websites. Hence, in this comparison we used the actual bill of a consumer that subscribes to Cosmote’s Mobile 1500 plan with a listed retail price of 29.90 EUR/month. The consumer also subscribes to Cosmote fixed-line services and gets a 20% (~3.2 EUR) discount on its mobile bill. Without this discount the consumer would have pay 17.5 EUR/month (excl. the 12% mobile tax & 24% VAT).
research.rewheel.fi ©

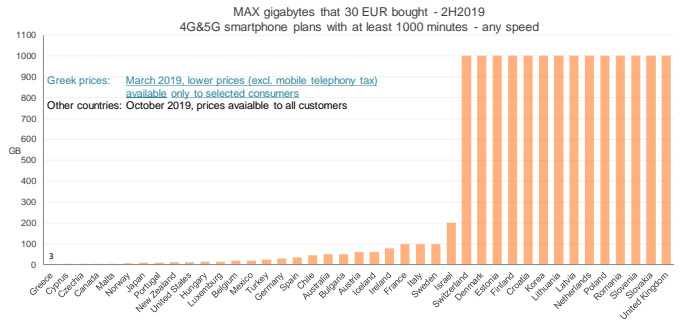
Most Greeks pay 10-20 EUR per month to buy plans with tiny data volumes (e.g. 200 megabytes) while in many other EU countries, where the general consumer price level is much higher consumers buy 5-100 gigabytes with ~15 EUR/month.

The fact is that even after we exclude the mobile telephony tax from Cosmote’s, Vodafone’s and Wind’s March 2020 prices that are applicable to all consumers Greece still ranks as the EU28 & OECD country with the lowest amount of gigabytes (i.e. zero gigabytes) that 30 EUR buys in 4G smartphone plans with at least 1000 national minutes, seen below in the chart on the left.

And that is true even when we unfairly compare the Greek operator March 2020 prices that are available only to certain consumers with the prices in the rest 40 EU28 & OECD countries that are available to all consumers, as seen below in the chart on the right.



Unlimited plans were plans with truly unlimited volume (no FUP) or at least 1000 gigabytes. Countries with the same gigabyte volume are listed alphabetically using abbreviation codes (e.g. Switzerland: CH). research.rewheel.fi ©



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Why have Greek mobile data connectivity prices been and still are very expensive: factors that may give rise to non-coordinated effects and could restrict or significantly impede effective competition in mobile markets

What are the factors that drive mobile data connectivity in mobile markets? Most economists will argue that the price level in a given market is determined by both endogenous factors such as costs, concentration, number of effective competitors, the presence of a maverick firm and as well exogenous factors such as taxes, GDP per capita, country general consumer price level, population density, land area, terrain, etc.

However, we have shown – in our first comparative analysis of EU27 smartphone plan prices ‘*EU27 smartphone tariff competitiveness 2012 report*’²³ that drew the attention of the European Commission’s Directorate General for Competition and as well in our tight mobile oligopolies 2016²⁴ and 2015²⁵ studies – that the price level in EU28 mobile markets is predominantly driven by the degree of effective competition rather than the country general price level or other exogenous factors. Mobile prices in EU28 mobile markets are driven both by the number (3 vs. 4) of network operators present but as well by the type of operators present. Active network and spectrum pooling could as well, depending on the scope and geographic reach of the agreement, restrict or even significantly impede effective competition²⁶ in mobile markets.

In January 2019 in a study²⁷ titled ‘*4G prices as a function market concentration, number of MNOs, operator subscriber share, position, group affiliation and country general price level*’ we showed that the number of MNOs present in a mobile market has a measurable significant effect on mobile data connectivity prices (i.e. 4G smartphone plans with at least 20 gigabytes and 1000 national minutes). Operators in 3-MNOs markets charge a median monthly price that is 2x higher than the median monthly price charged by operators in 4-MNO markets (€44 versus €22).

The presence of a 4th mobile network operator leads to significantly lower prices among all operators in the market. So, the presence of a 4th MNO does not only result in a decrease in the lowest available price in the market, as most would assume, but as well to a significant decrease in the country median monthly price (median among all prices offered by all operators, MVNOs, etc.).

The dependency of mobile operator prices as a function of the number of MNOs present in the market is evident even after excluding the no.4 MNOs from the operators in 4-MNO markets. The median price of the no.1, no.2 and no.3 operators in 4-MNO markets (€25) is still much lower than the median price of no.1, no.2 and no.3 operators in 3-MNO markets (€44).

Ofcom, the UK telecom sector regulator, reached similar conclusions in its 2016 study²⁸ titled ‘*A cross-country econometric analysis of the effect of disruptive firms on mobile pricing*’. Ofcom concluded that “*mobile prices are between 17.2% and 20.5% lower on average in countries where there is one additional mobile operator AND a disruptive firm (i.e. challenger/maverick operator) is in the market*”.

The economic theory of market concentration and the non-coordinated effect of upward pricing pressure that it gives rise to predict that prices are generally higher in mobile markets with higher concentration measured by the number of effective competitors or by the Herfindahl-Hirschman Index (HHI).

The higher the number of mobile network operators the lower the market concentration will generally be and the higher the probability that the smallest no.4 challenger mobile network operator will be at the edge of profitability and therefore will have an economic incentive to grow its market share – and profit given that mobile network operators run a fixed-cost business case as shown in our ‘*Unlimited mobile data and near zero marginal cost, a paradigm shift in telco business models*’ study²⁹ – by pushing network efficiencies to the limit and supplying the market with abundant capacity (i.e. affordably priced mobile data connectivity with unlimited data volume).

²³http://research.rewheel.fi/downloads/Rewheel_EU27_smartphone_tariff_competitiveness_report_December_2012_HIGHLIGHTS.pdf

²⁴http://research.rewheel.fi/downloads/Tight_oligopoly_mobile_markets_EU28_2016_PUBLIC.pdf

²⁵http://research.rewheel.fi/downloads/Tight_oligopoly_mobile_markets_EU28_04012016_PUBLIC.pdf

²⁶https://bereg.europa.eu/eng/document_register/subject_matter/bereg/download/0/8605-bereg-common-position-on-infrastructure_0.pdf

²⁷http://research.rewheel.fi/downloads/4G_prices_vs_number_MNOs_position_share_concentration_PUBLIC.pdf

²⁸https://www.ofcom.org.uk/__data/assets/pdf_file/0019/74107/research_document.pdf

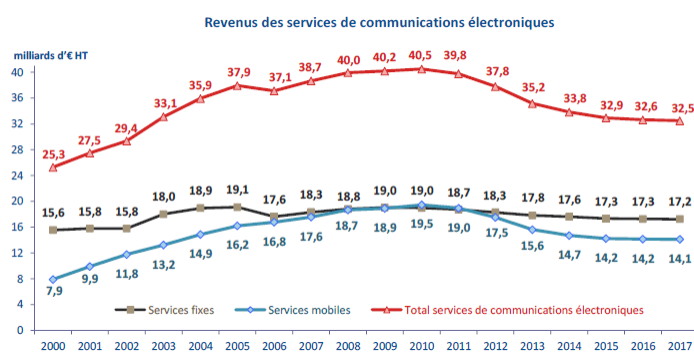
²⁹http://research.rewheel.fi/downloads/Near_zero_marginal_mobile_data_cost_25092017_PUBLIC.pdf

While the standard economic theory of concentration and number of effective competitors explains why mobile data connectivity prices are significantly higher in 3-MNO versus 4-MNO markets, it provides little insights into why we still observe significant price differences between 3-MNO markets that have similar concentration levels (e.g. Greece, Austria, Ireland, Finland).

In our January 2019 study we showed that mobile operators from big telco groups charge a median price of €43, mobile operators from regional fixed-line incumbents, cableco groups or from groups that execute fixed-mobile convergence (FMC) strategies charge a median price of €36 while mobile operators from challenger/maverick groups that typically execute mobile-centric convergence (MCC) strategies charge a median price of €20. Groups that are present in many EU28 mobile markets and have different market share positions across their markets have an economic incentive – non-coordinated effect – not to allow their subsidiaries with small market shares to compete too much on price and erode the revenue in those markets in fear of retaliation of similar action by their big telco peers in the markets where they command the no.1 and no.2 market share positions and where lower prices would have a significant impact on group revenues (profits).

Mobile network operators that are owned by a group which derives its entire profit from one or few mobile markets exert significantly higher competition intensity to their market/s compared to mobile network operators that are owned by a group which is present across many European member states and which derives a fraction of its profits from that particular mobile market. Challenger/maverick mobile network operators that derive most of their profits from a single or few mobile markets have a compelling economic incentive to undercut the price offered by their competitors and grow their market share and revenues in order to recover their fixed costs (cost of rolling out and upgrading the network) and increase their profit.

Challenger/maverick mobile network operators that derive most of their profits from a single or few mobile markets (e.g. Iliad in France) can increase their revenue and profit even though the total market revenues erode. See for example Iliad's strategy in France and Italy. Following Iliad's entry market mobile service revenues have fallen in France, as seen in the chart below compiled by the French telecom regulator ARCEP, from a peak of 19.5 billion EUR in 2009 to 14.1 billion EUR in 2017 i.e. the market lost 28% of revenues³⁰. However, Iliad mobile services revenues in France grew from zero in 2010 to over 1.6 billion in 2019³¹.



Mobile network operators that execute fixed-mobile converged strategies (i.e. fixed-line incumbents, mobile operators that sell fixed-line broadband using the infrastructure of their competitors or mobile operators that belong to groups that have a fixed-line broadband interest in their core markets) share an economic incentive – non-coordinated effect – to curtail effective competition in mobile data connectivity and in particular in mobile and wireless home broadband by limiting the supply through restrictive gigabyte caps (artificial capacity constraint) in order to prevent partial or complete substitution of their fixed-line broadband products by affordable mobile or wireless home broadband plans that include very large or unlimited data volumes.

4G or 5G mobile or wireless home broadband plans with very large or unlimited data volume (and to a less extent smartphone plans that include unlimited data volume using the WiFi hotspot functionality) have become a credible substitution alternative for certain fixed-line broadband customer segments (students, singles, single parent families, etc.) and thus pose an increasing direct threat to operator groups that derive a substantial part of the group revenues from fixed-line broadband (DSL or cable) connectivity.

³⁰<https://www.arcep.fr/cartes-et-donnees/nos-publications-chiffrees/observatoire-des-marches-des-communications-electroniques-en-france/obs-marches-an2017-def.html>

³¹https://www.iliad.fr/finances/2020/CP_170320_Eng.pdf

Is the Greek mobile market a 3-MNO tight oligopoly market?

The Greek mobile market was ranked as the market with the third highest tight mobile oligopoly index score among the EU28 member state markets in our 2015³² study and the second highest score in our 2016³³ study, seen in the tables below. Greece's high tight mobile oligopoly ranking was attributable to the following three factors that were shown in our studies to restrict or significantly impede competition in mobile markets.

2016					2015				
Index rank	Country	Index	Competition outcome	Oligopoly classification	Index rank	Country	Index	Competition outcome	Oligopoly classification
		100% (max)					100% (max)		
28	Germany	90%	Non-competitive	Tight oligopoly	28	Germany	90%	Non-competitive	Tight oligopoly
27	Greece	83%	Non-competitive	Tight oligopoly	27	Bulgaria	81%	Non-competitive	Tight oligopoly
26	Portugal	80%	Non-competitive	Tight oligopoly	26	Greece	80%	Non-competitive	Tight oligopoly
25	Hungary	80%	Non-competitive	Tight oligopoly	25	Hungary	80%	Non-competitive	Tight oligopoly
24	Slovak Republic	76%	Non-competitive	Tight oligopoly	24	Malta	77%	Non-competitive	Tight oligopoly
23	Czech Republic	73%	Non-competitive	Tight oligopoly	23	Portugal	73%	Non-competitive	Tight oligopoly
22	Romania	71%	Non-competitive	Tight oligopoly	22	Czech Republic	73%	Non-competitive	Tight oligopoly
21	Malta	68%	Non-competitive	Tight oligopoly	21	Netherlands	73%	Non-competitive	Tight oligopoly
20	Belgium	63%	Non-competitive	Tight oligopoly	20	Slovakia	73%	Non-competitive	Tight oligopoly
19	Luxemburg	63%	Non-competitive	Tight oligopoly	19	Romania	69%	Non-competitive	Tight oligopoly
18	Spain	63%	Non-competitive	Tight oligopoly	18	Cyprus	68%	Non-competitive	Tight oligopoly
17	Cyprus	60%	Non-competitive	Tight oligopoly	17	Spain	66%	Non-competitive	Tight oligopoly
		59%		Threshold	16	Croatia	64%	Non-competitive	Tight oligopoly
16	Bulgaria	57%	Sub-competitive	Sub-competitive oligopoly	15	Belgium	63%	Non-competitive	Tight oligopoly
15	Croatia	56%	Sub-competitive	Sub-competitive oligopoly			59%		Threshold
14	Italy	56%	Sub-competitive	Sub-competitive oligopoly	14	France	58%	Sub-competitive	Sub-competitive oligopoly
13	Austria	53%	Sub-competitive	Sub-competitive oligopoly	13	Austria	56%	Sub-competitive	Sub-competitive oligopoly
12	Slovenia	50%	Sub-competitive	Sub-competitive oligopoly	12	Italy	56%	Sub-competitive	Sub-competitive oligopoly
11	Ireland	50%	Sub-competitive	Sub-competitive oligopoly	11	Luxemburg	51%	Sub-competitive	Sub-competitive oligopoly
10	Netherlands	49%	Sub-competitive	Sub-competitive oligopoly	10	Slovenia	50%	Sub-competitive	Sub-competitive oligopoly
9	United Kingdom	47%	Sub-competitive	Sub-competitive oligopoly	9	Ireland	50%	Sub-competitive	Sub-competitive oligopoly
8	France	45%	Sub-competitive	Sub-competitive oligopoly	8	UK	47%	Sub-competitive	Sub-competitive oligopoly
		43%		Threshold			43%		Threshold
7	Denmark	34%	Effective competition	Competitive oligopoly	7	Denmark	41%	Effective competition	Competitive oligopoly
6	Poland	34%	Effective competition	Competitive oligopoly	6	Poland	41%	Effective competition	Competitive oligopoly
5	Sweden	28%	Effective competition	Competitive oligopoly	5	Sweden	28%	Effective competition	Competitive oligopoly
4	Estonia	17%	Effective competition	Competitive oligopoly	4	Finland	20%	Effective competition	Competitive oligopoly
3	Lithuania	17%	Effective competition	Competitive oligopoly	3	Estonia	17%	Effective competition	Competitive oligopoly
2	Latvia	13%	Effective competition	Competitive oligopoly	2	Latvia	13%	Effective competition	Competitive oligopoly
1	Finland	13%	Effective competition	Competitive oligopoly	1	Lithuania	13%	Effective competition	Competitive oligopoly
		0% (min)					0% (min)		

Firstly, all three Greek mobile network operators have a fixed-line broadband interest and hence share an economic incentive – non-coordinated effect – to curtail effective competition in mobile data connectivity. Cosmote is the fixed-line incumbent and naturally executes a fixed-mobile convergence strategy. Vodafone and as well Wind, having no national fixed-line broadband infrastructure of their own, execute ‘*me too*’ fixed-mobile convergence strategies^{34,35} by fully relying on Cosmote’s fixed-line infrastructure. This increases the symmetry in the market and aligns the economic incentives of all three operators and particularly those of Vodafone and Wind.

Secondly, 2 out of 3 mobile network operators in Greece i.e. Cosmote and Vodafone are owned by big European telcos (i.e. Deutsche Telekom and Vodafone) and hence share an economic incentive – non-coordinated effect – not to allow their subsidiaries with small market shares to compete on price and erode the revenue in those markets in fear of retaliation of similar action by their big telco peers in the markets where they command the no.1 and no.2 market share positions and where lower prices would have a significant impact on group revenues (profits).

Thirdly, Cosmote and Vodafone were among the first European operators³⁶ to introduce discriminatory mobile internet access pricing such as zero-rating. Zero-rating and other discriminatory mobile internet access pricing incentivizes mobile operators to artificially restrict open internet access with restrictive mobile data connectivity caps³⁷. As of March 2020, Cosmote and Vodafone still zero-rated many applications over the mobile networks.

Last but not least, Vodafone and Wind have been cooperating very closely in a number of business-critical areas. The degree of cooperation between Vodafone and Wind is not typical for mobile network operators that are supposedly fierce competitors. Even though our tight oligopoly index did not account for such factors, one cannot ignore the potential adverse impact of these factors in effective competition both in giving rise to non-coordinated effects but as well in increasing the likelihood of coordinated effects.

Vodafone’s and Wind’s extensive cooperation in several business-critical areas raises the following question: Is it possible to act as independent competitive forces in the mobile market given their close cooperation in several business-critical areas?

³²http://research.rewheel.fi/downloads/Tight_oligopoly_mobile_markets_EU28_2016_PUBLIC.pdf

³³http://research.rewheel.fi/downloads/Tight_oligopoly_mobile_markets_EU28_04012016_PUBLIC.pdf

³⁴http://research.rewheel.fi/downloads/O2_ready_to_disrupt_German_tight_oligopoly_market%2017042017_PUBLIC.pdf

³⁵http://research.rewheel.fi/downloads/Telenor_Denmark_turnaround%20strategy_04042016_PUBLIC.pdf

³⁶http://research.rewheel.fi/downloads/Zero_rating_list_EU28_Q4_2014_public.pdf

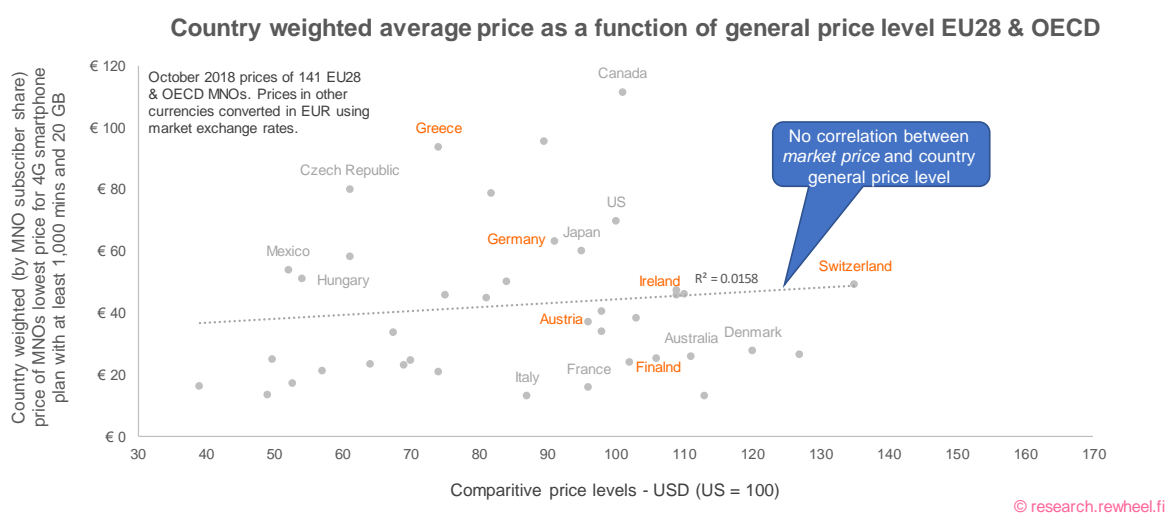
³⁷<https://webfoundation.org/2015/02/guest-blog-the-real-threat-to-the-open-internet-is-zero-rated-content/>

Do exogenous factors such the country general consumer price level, population density, land area, terrain, etc. determine mobile data connectivity prices?

Operators in markets where mobile data prices are very expensive often blame – among other things – taxes, the country's higher general consumer price level, the country's low population density, the country's higher share of rural population and the country's challenging terrain (e.g. to many mountains, too many islands, etc.).

Do such claims stand-up to rigorous inspection? No, they don't.

As seen in the scatter plot below presented in our '4G prices as a function market concentration, number of MNOs, operator subscriber share, position, group affiliation and country general price level' study³⁸ mobile data connectivity prices in EU28 markets are neither driven nor dictated by the country general consumer price level. Greek mobile connectivity prices are much higher than prices in the 3-MNO German, Irish, Austrian, Finnish and Swiss markets even though the general consumer price level in Greece is much lower.



The claim that mobile data connectivity prices are higher in countries with low population density or challenging terrain (e.g. Canadian operators have made such claims³⁹) falls flat on its face when it is closely examined. See for example the conclusion of the Canadian Competition Bureau "Further, factors such as network quality and population density did not explain the price differences."⁴⁰

As shown herein, Greece, Canada and Malta are among the EU28 & OECD countries with the most expensive mobile data connectivity prices. Can anybody credibly argue that mobile data connectivity prices in Malta have been and still are very expensive because of the low population density or the challenging terrain?

Malta is a tiny island that is no longer than 27 kilometres and no wider than 15 kilometres and has among the highest population density in the world. Half a million people live in the tiny island of Malta. Despite the relatively inexpensive overall consumer price level⁴¹ (almost identical to Greece's), the very high population density⁴², the tiny land area⁴³ and the pretty flat terrain (highest point in Malta is 253 meters⁴⁴) mobile connectivity prices in Malta have been very and still are expensive.

³⁸http://research.rewheel.fi/downloads/4G_prices_vs_number_MNOs_position_share_concentration_PUBLIC.pdf

³⁹<https://www.cwta.ca/blog/2018/06/05/state-of-the-canadian-wireless-industry-2018/>

⁴⁰<https://www.competitionbureau.gc.ca/eic/site/cb-bc.nsf/eng/04431.html>

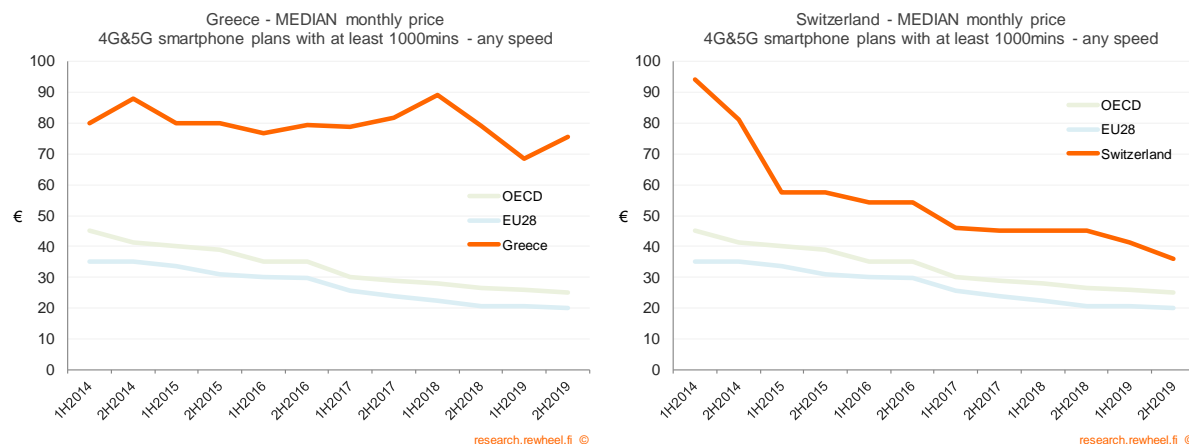
⁴¹https://ec.europa.eu/eurostat/statistics-explained/index.php/Comparative_price_levels_of_consumer_goods_and_services

⁴²https://en.wikipedia.org/wiki/List_of_countries_and_dependencies_by_population_density

⁴³https://en.wikipedia.org/wiki/List_of_countries_and_dependencies_by_area

⁴⁴https://en.wikipedia.org/wiki/Ta%27_Dmejrek

And then there is Switzerland, the country with the second highest overall consumer price level according to Eurostat. During the 1H2014 (i.e. before the entry of Salt the maverick operator owned by Iliad's majority shareholder Xavier Niel) the Swiss median monthly price for smartphone plans with at least 1000 minutes was higher than Greece's (over 90 EUR per month as seen in the charts below).



Salt, the maverick no.3 MNO, introduced in the market a new price level of ~30 CHF (less than 30 EUR) for an unlimited everything 4G smartphone plan. As seen in the screenshot below, Salt sold such plan, for 29.95 CHF during the 2nd of October 2019. Sunrise, the no.2 MNO followed suit with its Yallo sub-brand with a discounted price of 39 CHF for an unlimited everything 4G smartphone plan while the stated owned market incumbent, Swisscom, goes even further with its discount brand Wingo by selling unlimited everything for 25 CHF per month (~23 EUR per month).

Salt. Exclusive online offer.

- Unlimited calls in Switzerland
- Unlimited SMS/MMS in Switzerland
- Unlimited high-speed Internet (4G+) in Switzerland

29.95 month instead of 59.95*

Order online

yallo fat plus
39.- / month

yallo superfat XXL
64.- / month

wingo® mobile
PROMO FULL FLAT
Get the Wingo Mobile Promo subscription now and enjoy 12 months unlimited internet / telephony in Switzerland and up to 2 GB in the EU.
CHF 55.- / month
CHF 25.- / month

Switzerland is a country with 8.5 million population and relatively high population density. Like Greece, it has a mountainous terrain and – surprisingly – it has a higher share of rural population than Greece (26% versus Greece 21%⁴⁵). Switzerland has an overall consumer price level that is nearly 2x more expensive than Greece. Despite all that, mobile data connectivity is significantly cheaper in Switzerland than in Greece. With as little as 23 EUR per month Swiss consumers could buy 4G smartphone plans with unlimited data volume (+ unlimited minutes/SMS) while many Greek consumers pay around 20 EUR for 200 megabytes and 200 national minutes.

⁴⁵<https://www.connect-testlab.com/switzerland-2018-results-in-a-nutshell>

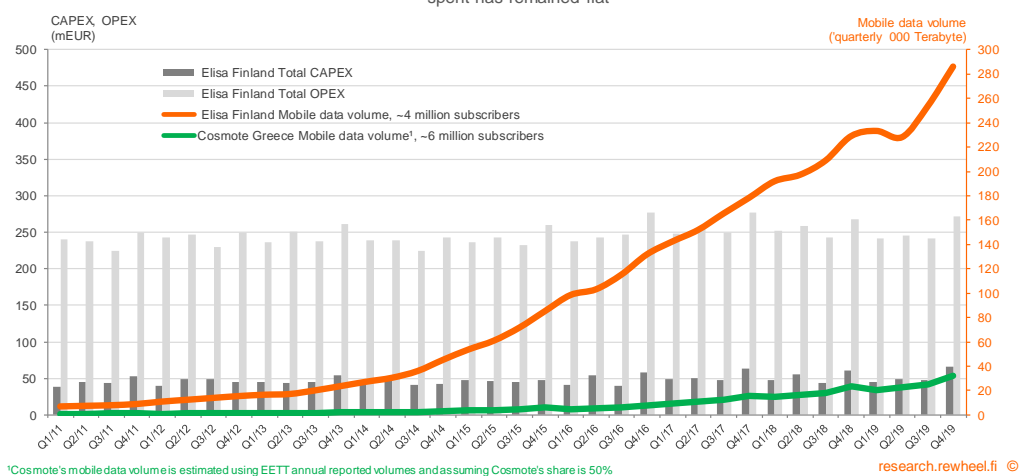
Could the three Greek operators deploy 5G independently without any significant increase in CAPEX spending?

European operators have so far adopted *Capex-light* 5G rollout strategies. For example, Deutsche Telekom⁴⁶ and Vodafone⁴⁷ groups, have communicated to their investors that they are not planning to increase their typical investment intensities but instead gradually shift the investment focus from 4G to 5G, like they did during the earlier technology generation changes.

In recent years Rewheel has been often citing the example of the Finnish leading mobile operator Elisa, that carries the highest volume of mobile data traffic normalised for population in the whole world⁴⁸. Despite the massive data traffic growth during the last decade – mobile data traffic in Elisa's network has grown by more than 32x the last eight years but CAPEX & OPEX spent has remained flat – and the fact that Elisa has been a global pioneer in launching commercial 5G services as early as the summer of 2018, Elisa managed to keep its annual Capex spending stable during 2018 and 2019⁴⁹ and they intend to keep their CAPEX intensity flat going forward too. Cosmote has also given⁵⁰ a lower CAPEX guidance for 2020.

4G/5G network economics – near zero marginal mobile data cost

The data traffic in Elisa's network has grown by more than 32x the last eight years but CAPEX & OPEX spent has remained flat



By taking into account the most recent CAPEX envelopes (i.e. annual capital expenditure) of the three Greek mobile operators – reported by Cosmote and estimated for Vodafone and Wind using EETT reported investments in the market – we conclude that Cosmote could easily accommodate the next 5 years both a *CAPEX-light* independent 5G deployment strategy and as well an *5G-everywhere* independent deployment strategy with its current annual CAPEX envelope.

We further conclude that Vodafone and Wind could easily accommodate the next 5 years *CAPEX-light* independent 5G deployment strategies with their current annual CAPEX envelopes. Vodafone and Wind could probably, although with less legroom (their annual CAPEX might increase slightly), also be able to accommodate independent *5G-everywhere* deployment strategies.

⁴⁶<https://www.telekom.com/resource/blob/518850/ec280e4b5f3742fb8d215cc4c1a73481/dl-transcript-data.pdf>

⁴⁷<https://investors.vodafone.com/static-files/a2b473ec-e5d6-4377-9a98-861d3fe5c94d>

⁴⁸http://research.rewheel.fi/insights/2019_oct_pro_capacity/

⁴⁹<https://corporate.elisa.com/attachment/content/Q4-2019-English.pdf>

⁵⁰https://www.cosmote.gr/cs/otegroup/en/investor_relations.html

Network layer consolidation – Active network sharing and number of independent network operators

The Body of European Regulators for Electronic Communications (BEREC) – EETT is a member of BEREC – and the Radio Spectrum Policy Group (RSPG) which advises the European Commission published⁵¹ in 2011 a report⁵² on infrastructure and spectrum sharing in mobile/wireless networks. In June 2018, BEREC published⁵³ a report⁵⁴ which described features of mobile infrastructure sharing in European markets and provided an outline of some of the potential benefits and drawbacks of such arrangements. In June 2019, BEREC, published⁵⁵ a report⁵⁶ comprising of a ‘*Common position on infrastructure sharing*’.

BEREC’s common position is intended to provide NRAs, stakeholders and interested parties with information relating to the treatment of mobile network infrastructure agreements in Europe including the criteria which can be taken into account by NRAs in assessing such agreements.

Regarding active network sharing, BEREC’s common position stressed that it is likely to have a great impact. BEREC stated that the respective competent authority might limit active sharing for MNOs above a certain size. These areas will be very likely in the most densely populated ones. For spectrum pooling BEREC stressed that such sharing may reduce the differentiation capacity of the sharing parties.

Rewheel’s view is that active infrastructure sharing agreements that may include spectrum sharing, a large part of the population, many technologies (in particular 4G/5G) and access to a shared network capacity inherently have higher impact on the competitive situation and could materially constrain the independence of the operators (coordinated effects) and their ability to differentiate their prices, quality and variety of services (non-coordinated effects). Therefore, such network sharing agreements are more likely to raise anti-competitive effects and may require, in the absence of countervailing efficiencies, the need for remedies.

As mentioned earlier, Vodafone and Wind are involved in active 2G/3G network sharing in Greece since 2013. According to published reports the operators aimed to share an estimated 70% of their provincial networks plus 40% of nationwide areas classed as urban. Furthermore, the European Commission reported⁵⁷ that EETT received in 2018 from Vodafone and Wind a request for the approval of the expansion of their existing network sharing agreement to include 4G technology. According the Commission the application is currently under consideration by EETT’s competent departments. As of March 2020, it was not clear if EETT has approved the latest network sharing request from Vodafone and Wind.

The inclusion of 4G and/or 5G in Vodafone’s and Wind’s active network sharing agreement will most likely raise many competition concerns if as originally communicated the operators do share 70% of their provincial networks plus 40% of nationwide areas classed as urban. Irrespective of EETT’s pending approval, that might be given under the Electronic Communication Code⁵⁸, such an extensive horizontal co-operation agreement between 2 out of 3 mobile infrastructure competitors in the Greek tight oligopoly market will certainly warrant a detailed investigation under the European and national competition law framework⁵⁹.

⁵¹http://berec.europa.eu/eng/document_register/subject_matter/berec/reports/224-berec-rspg-report-on-infrastructure-and-spectrum-sharing-in-mobilewireless-networks

⁵²https://berec.europa.eu/eng/document_register/subject_matter/berec/download/0/224-berec-rspg-report-on-infrastructure-and-_0.pdf

⁵³https://berec.europa.eu/eng/document_register/subject_matter/berec/regulatory_best_practices/common_approaches_positions/8605-berec-common-position-on-infrastructure-sharing

⁵⁴https://berec.europa.eu/eng/document_register/subject_matter/berec/download/0/8605-berec-common-position-on-infrastructure-_0.pdf

⁵⁵https://berec.europa.eu/eng/document_register/subject_matter/berec/regulatory_best_practices/common_approaches_positions/8605-berec-common-position-on-infrastructure-sharing

⁵⁶https://berec.europa.eu/eng/document_register/subject_matter/berec/download/0/8605-berec-common-position-on-infrastructure-_0.pdf

⁵⁷https://ec.europa.eu/newsroom/dae/document.cfm?doc_id=59864

⁵⁸http://eur-lex.europa.eu/resource.html?uri=cellar:c5ee8d55-7a56-11e6-b076-01aa75ed71a1.0001.02/DOC_3&format=PDF

⁵⁹[https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:52011XC0114\(04\)&from=EN](https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:52011XC0114(04)&from=EN)

5G spectrum auction design in Greece

On the 6th of February 2020, EETT, published⁶⁰ public consultation documents⁶¹ on the granting of rights of use for radio frequencies in the 700 MHz, 2100 MHz, 3400-3800 MHz and 26 GHz frequency bands. The original deadline for submitting responses was set as 10th of March 2020 but was later postponed⁶² to the 31st of March 2020.

According to the EETT's English summary⁶³, the currently allocated spectrum for mobile telecommunications in Greece is divided between three mobile network operators. Cosmote currently holds 225 MHz across the 800 - 2600 MHz bands, Vodafone holds 205 MHz across the same bands, and Wind holds 135 MHz across the same bands.

According to EETT the following frequency bands are included in the upcoming spectrum auction: 60 MHz paired spectrum (2x30 MHz) in the 700 MHz frequency band, 120 MHz paired spectrum (2x60 MHz) in the 2100 MHz frequency band and 280 MHz of spectrum that is readily available in the 3400-3800 MHz frequency band.

Furthermore, there are 2x30 MHz of spectrum granted to Cosmote (3440-3470 & 3540-3570) and as well as another 2x30 MHz of spectrum (3670-3700 MHz & 3770-3800 MHz), bound by the Greek State exclusively for the provision of electronic communications services to rural areas. EETT proposed that Cosmote's spectrum rights, expiring in 2029, to be included in the forthcoming tender, for the period after 2029 and until the expiration date of the new spectrum rights in the band and at the same time make possible the reallocation of them within the same band to enhance effective planning and optimize spectrum use.

In order to ensure optimum use of spectrum and deter excessive spectrum concentration by one or more bidders, EETT is considering imposing a restriction on the maximum spectrum granted in the 700 MHz band, in the 2100 MHz band and in the 3400-3800 MHz band per provider (spectrum cap). Specifically, EETT is considering the following segmentation and spectrum caps per frequency band: 2x10 MHz in the 700 band (i.e. the spectrum will be split in 3 equal parts among the three existing MNOs), 2x20 MHz in the 2100 band (i.e. the spectrum will be split in 3 equal parts among the three existing MNOs) and 100 MHz in the 5G-essential 3400-3800 MHz band if there are 4 participants (presumably the 3 existing MNOs and a potential 4th new entrant aspirant) or 150MHz or 140 MHz in case there are only 3 participants (presumably the 3 existing MNOs).

If there are only 3 participants then a 150 MHz cap in the 3400-3800 MHz band will most likely yield an outcome whereby Cosmote and Vodafone ends up with 150 or 140 MHz each and Wind acquires the remaining 100 or 120 MHz of spectrum.

EETT appeared to invite 5G active network sharing by stating that *"Given the expected high capital expenditure for the 5G network deployment, the possibility of joint development and use of New Generation Access network infrastructures is considered. EETT, similar to European practice, suggests that sharing of network equipment may be allowed and all sharing agreements should be considered and evaluated on a case-by-case basis"*.

While EETT proposed different spectrum caps in the 5G 3400-3800 MHz band in the event there are 4 rather than just 3 participants (i.e. the existing three Greek MNOs) it neither explicitly stated that the objective of the auction is encouraging new network operator entries nor EETT proposed other necessary measures (low frequency spectrum set-asides, national roaming obligations, etc.) for lowering the barriers of entry and encouraging a potential 4th MNO entrant to participate in the auction.

⁶⁰https://www.eett.gr/opencms/opencms/admin/News_new/news_1130.html

⁶¹https://www.eett.gr/opencms/export/sites/default/admin/downloads/Consultations/RadioCommunications/PC_5G/PC_5G.zip

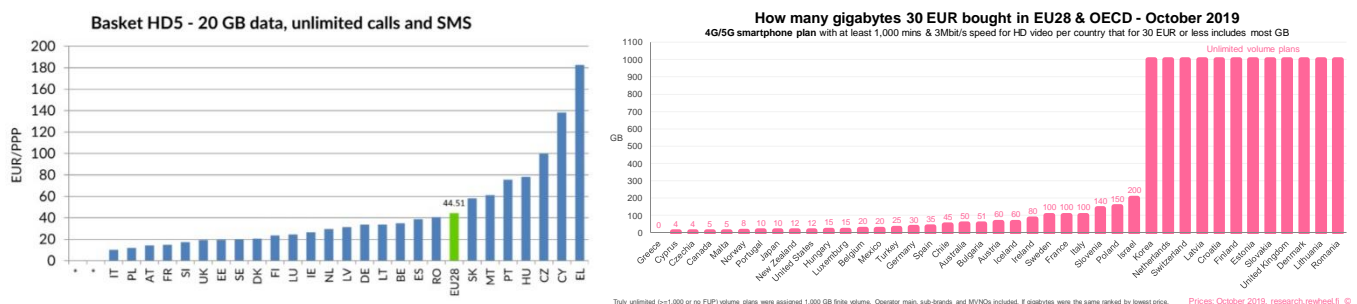
⁶²https://www.eett.gr/opencms/opencms/admin_EN/News/news_0525.html

⁶³https://www.eett.gr/opencms/export/sites/default/admin/downloads/Consultations/RadioCommunications/PC_5G/PublicConsultation5GBriefENGfinal.pdf

Regulatory measures that will lower the barriers of entry: Czech 5G auction terms – 4th entrant acquires 5G spectrum

Czechia is an EU member state with a ~10.6 million population size, almost identical to Greece's ~10.7 million population and a land area of ~77 thousand square kilometres compared to Greece's ~130 thousand square kilometres⁶⁴. Czechia's general consumer price level is lower (71) than Greece's (84) as reported by Eurostat⁶⁵.

Czechia and Greece have another thing in common. Both rank among the most expensive countries in mobile data connectivity in the European Commission's and Rewheel's international comparison studies. As seen in the charts below, Greece ranked as the most expensive country in the European Commission's February 2019 20GB-unlimited-call-and-SMS basket comparison with Czechia being the third most expensive market among EU28 member states and similarly Greece ranked as the most expensive country in Rewheel's October 2019 maximum-gigabytes-that-30-EUR-bought metric comparison with Czechia being the third most expensive market among EU28 & OECD countries.



The number and type of operators present in the Czech mobile market is very similar to Greece's. The Deutsche Telekom group is the no.1 MNO, O2 owned by the PPF group (a Czech based privately held international financial and investment group) is the no.2 and Vodafone is the no.3.

So, like in Greece, 2 out of 3 MNOs are owned by big telco groups (Deutsche Telekom and Vodafone) and the third MNO is owned by financial investors. Moreover, like in Greece, all three MNOs executed fixed-mobile converged strategies. O2 is the fixed-line incumbent in Czechia and until most recently both T-Mobile and Vodafone relied on O2's DSL national infrastructure for executing their 'me too' fixed-mobile converged strategies. In July 2019 Vodafone acquired Liberty's Global cable operations (UPC) in the Czechia⁶⁶.

And last but not least, like in Greece 2 out of the 3 Czech MNOs (T-Mobile and O2) are involved in active network sharing. However, in August 2019, the European Commission sent⁶⁷ a Statement of Objections to T-Mobile and O2 informing them its preliminary view that their extensive active network sharing agreement restricts competition. T-Mobile's and O2's network sharing agreement that covers all mobile technologies and the entire territory of Czechia with the exception of Prague and Brno means that a very significant share of the Czech population (~85%) is covered by only two independent radio access networks. In 2014 Vodafone, the no.3 MNO in Czechia, had filed a formal complaint⁶⁸ with the country's anti-monopoly watchdog and threatened to escalate the complaint to the European Commission level if no action was taken. In October 2016 the European Commission opened a formal investigation into the network sharing agreement between T-Mobile and O2 in Czechia and three years later issued a Statement of Objections as we mentioned above.

⁶⁴https://en.wikipedia.org/wiki/List_of_countries_and_dependencies_by_area

⁶⁵https://ec.europa.eu/eurostat/statistics-explained/index.php/Comparative_price_levels_of_consumer_goods_and_services

⁶⁶https://ec.europa.eu/commission/presscorner/detail/en/IP_19_4349

⁶⁷https://ec.europa.eu/commission/presscorner/detail/en/ip_19_5110

⁶⁸<https://www.commsupdate.com/articles/2014/06/10/vodafone-cr-files-complaint-over-rivals-4g-network-sharing-plan/>

In light of the upcoming 5G auction in Czechia, the recent significant structural market developments (i.e. network sharing under investigation) and as well in light of the summer 2019 launch by the three Czech mobile operators of new smartphone plans – some of which included unlimited mobile data – the Czech Ministry of Industry and Trade commissioned⁶⁹ Rewheel during September 2019 to carry out an independent EU28 & OECD mobile data price comparison study for the purpose of supporting the Ministry in the final auction design and other measures that may be deemed necessary. In our September 2019 study⁷⁰, we concluded that the recently launched 4G smartphone plans did not significantly improve the overall competitiveness of the Czech mobile market. Czechia still ranked as one of the most expensive EU28 & OECD countries in mobile data connectivity.

Following the latest developments concerning the weak competition that characterizes the Czech mobile data connectivity market and the fact that mobile data prices are still very expensive the Czech Ministry of Industry and Trade instructed the Czech telecom regulator (CTU) to revise the terms for the upcoming 5G auction. On the 16th of March 2020 CTU published a set of revised tender terms⁷¹.

Therein the Czech regulator stated that "*The Government of the Czech Republic in its Policy Statement pledged support for competition on the mobile telecommunication market as one of fundamental steps towards fulfilment of the objectives of Digital Czech Republic...The Czech government approved Resolution No. 84/2020 on 27 January 2020 recommending the CTU, when setting the Tender conditions, in order to make the electronic communications services accessible...leading to decrease of the mobile data price for end-users comparable to European level, especially through setting attractive conditions for larger number of operators with various range of their own infrastructure and radio spectrum, also reflecting the current, as well as future...".*

For supporting its argumentation regarding the positive effects from the entry of new network operators CTU cited a study⁷² titled '*Market Entry and Fighting Brands: The Case of the French Mobile Telecommunications Market.*' and as well Rewheel's research findings⁷³ that documents these benefits in other European markets.

The main objective of the revised tender terms was to create the conditions that might allow the acquisition of radio frequencies in the auction by new network operators (e.g. a 4th entrant MNO), who are not incumbent operators (existing 3 MNOs) and as well create conditions to enable subsequent competitiveness of these new network operator/s.

So, in addition to setting-aside (reserving) 2x10 MHz of 700 MHz spectrum for a new network operator, a term already included in earlier version, in the revised tender terms CTU mandated;

- a temporary national roaming obligation for the benefit of new network operators subject to the fulfilment by the new network operators of 10% population coverage with their own networks for gaining access to national roaming and 20% for retaining the right to national roaming
- higher spectrum cap in the 3440–3800 MHz frequency band for new operators
- a prevention of multiple participation (ensuring economic independence of the bidders)
- prolongation of the term to fulfil selected development criteria in the 700 MHz frequency band for new network operators

As we showed in our tight mobile oligopoly studies^{74,75} the most potent regulatory remedy for restoring effective competition in tight mobile oligopolies is the entry of new mobile network operators that ideally are not controlled by big telco groups or groups that have vested fixed-line broadband interests (e.g. fixed-line incumbents from other European markets). National regulatory authorities, should on a continuous basis try to lower the barriers of entry and actively encourage the entry of new mobile network operators by setting aside adequate and substantial low (e.g. 700 MHz) and high frequency (e.g. 3400-3800 MHz essential for 5G) spectrum at attractive reserve fees and by mandating passive site sharing and cost-oriented temporary (5-7 years) national roaming.

⁶⁹<https://www.mpo.cz/cz/rozcestnik/pro-media/tiskove-zpravy/v-neomezenych-tarifech-ceska-republika-dohnala-evropu--250064/>

⁷⁰http://research.rewheel.fi/insights/2019_oct_czech/

⁷¹<https://www.ctu.eu/call-comments-draft-invitation-tender-granting-rights-use-radio-frequencies-provide-electronic>

⁷²https://www.cresse.info/uploadfiles/2017_pa15_pa3.pdf

⁷³http://research.rewheel.fi/downloads/The_state_of_4G_pricing_DFMonitor_9th_release_1H2018_PUBLIC.pdf

⁷⁴http://research.rewheel.fi/downloads/Tight_oligopoly_mobile_markets_EU28_2016_PUBLIC.pdf

⁷⁵http://research.rewheel.fi/downloads/Tight_oligopoly_mobile_markets_EU28_04012016_PUBLIC.pdf

Passive site sharing and cost-oriented temporary (5-7 years) national roaming on the incumbent operators' existing mobile networks is essential for a new 4th entrant. Without it, the new 4th entrant MNO will most likely not become an effective competitor in the short term. Building a mobile network from scratch to cover 60% to 80% of population is minimum a 5-year undertaking. It is very capital intensive and few companies can sustain the financial burden for this prolonged period without the positive contribution of incoming cash flow from customer revenues. But in the absence of national mobile coverage few customers will be willing to switch to the 4th entrant's network.

Considering all the above, we find it very unlikely that a credible bidder would come forward and bid to acquire 3400-3800 MHz 5G spectrum with the aim of becoming the 4th MNO in the Greek market without having the possibility to acquire at the same time low frequency spectrum (i.e. reserved spectrum in the 700 MHz band at reasonable fees) and without securing access to a cost-oriented temporary (5-7 years) 4G national roaming agreement.

On the 10th of February 2020 Kathimerini, reported⁷⁶, that given there has been neither market moves nor discussions of potential new bidders with the Greek Government, it is very likely that there will be only three bidders in the upcoming 5G auction: the three incumbent network operators. Indeed, in light of the EETT's published auction terms we find it very unlikely that a credible 4th MNO bidder would show up.

How would the Greek mobile data connectivity market and Greece's digital future look like in few years from now if the Greek Government were to intervene and create the necessary conditions in the upcoming 5G spectrum auction that may lead to the entry of a credible 4th mobile network operator?

Judging from the developments that followed the most recent 4th MNO entries in the French, Dutch, Slovakian and Italian markets, effective competition would intensify, the total investment level in the market would increase⁷⁷, 5G investments would be brought forward by the three incumbent operators, innovation would increase⁷⁸ and consumer prices would fall faster and further.

If a credible 4th MNO were to enter the Greek mobile connectivity market by acquiring 700, 2100 and 3400-3800 MHz spectrum in the upcoming 5G auction it is very likely that the three incumbent mobile operators in Greece would bring forward and widen the scope of their 5G rollout and will most certainly lower prices ahead of the new entrant's imminent market launch as French, Dutch, Slovakian and Italian operators did.

The entry of a new 4th MNO is very likely to lead to a substantial decrease in mobile data connectivity prices in Greece. Consumers in Greece, as early as 2021, would most likely be able to buy affordably priced (15 to 30 EUR per month) smartphone, mobile broadband and wireless home broadband plans, with very large or unlimited gigabytes. If it materializes, such a development will massively improve Greece's fixed and mobile broadband connectivity rankings (currently Greece ranks as the least competitive market among the EU28 member states) and could fuel Greece's digital economy awakening.

⁷⁶<https://www.kathimerini.gr/1064093/article/oikonomia/ellhnikh-oikonomia/o-diagnwsmos-gia-tis-adeies-5g-kai-o-ponokefalos-ths-huawei>

⁷⁷https://www.cerre.eu/sites/cerre/files/150915_CERRE_Mobile_Consolidation_Report_Final.pdf

⁷⁸https://ec.europa.eu/competition/speeches/text/sp2017_08_en.pdf

Ex-ante and ex-post regulatory remedies – No 4th bidder acquires 5G spectrum

What happens in tight mobile oligopoly markets if the prospect of a 4th MNO entry is very unlikely, like in Greece? How can effective competition be restored in the Greek tight mobile oligopoly market absent of a new 4th MNO entry?

European national regulatory authorities (i.e. telecom sector regulators like the EETT) have a mandate under the European Electronic Communications Code⁷⁹, that came into force in December 2018, to initiate market analysis/reviews and impose ex-ante regulations/remedies (wholesale access obligations and access price controls and as well in special circumstances unbundling, retail price caps, measures to control individual tariffs, etc.) in mobile markets where it is shown – whether by means of a significant market power of one undertaking or joint dominant position by two or more undertakings – that effective competition is restricted. Moreover, when assigning spectrum usage rights⁸⁰, national regulatory authorities have a broad power to take a number of measures aiming at increasing (e.g. reserved spectrum for new entrants, etc.) or preserving effective competition (e.g. spectrum caps, etc.).

For example, ahead of the 4G 800/2600 MHz auction Ofcom carried out a market analysis and concluded⁸¹ that effective competition in the UK mobile market requires the presence of at least 4 national wholesale mobile competitors (i.e. 4 MNOs) each with a minimum spectrum portfolio. Many other European national regulatory authorities have attached coverage obligations, base station deployment obligations for specific technologies e.g. 5G, minimum-service levels obligations (e.g. minimum 100 Mbit/s download speed), national roaming obligations, MVNO wholesale access obligations, etc. when they assigned spectrum usage rights with the aim to increase or preserve effective competition.

The use of retail price caps or other measures aimed to control individual tariffs is quite interesting especially if one considers the fact that often in 4 to 3 mergers mobile network operators offer voluntary price control commitments in order to sway national or supranational (i.e. European Commission) competition authorities in approving the mergers. T-Mobile in the Netherlands (part of the Deutsche Telekom group) pledged⁸² to continue to offer Tele2's 4G smartphone plan that includes unlimited data volume (+ unlimited minutes/SMS) for maximum €25 for at least 3 years, as seen in the screenshot below.



In the recently approved US 4 to 3 merger between T-Mobile (majority owned by Deutsch Telekom) and Sprint, T-Mobile's CEO, also pledged in a regulatory filing⁸³ to maintain or cut prices for three years if the deal is approved. Furthermore, T-Mobile committed that if the merger was to be approved it will launch⁸⁴ two new prepaid plans packing 2 gigabytes for 15 USD per month and 5 gigabytes for 25 USD per month (+ unlimited minutes/SMS) – the 15 USD plan is half the price of the lowest T-Mobile plan today – that will be available to everyone. Similar pledge not to increase prices was made by Hutchison Three⁸⁵ in the UK, when its 4 to 3 merger with O2 was under review by the European Commission.

On the other hand, the European Commission and EU member state national competition authorities have a broad mandate to police and regulate anti-competitive conduct across all industry sectors in the following three main policy areas.

- Cartels, or control of collusion and other anti-competitive practices such horizontal agreements⁸⁶ (e.g. mobile network sharing), under article 101 TFEU⁸⁷
- Market dominance, or preventing the abuse of firms' dominant market positions under article 102 TFEU
- Mergers, control of proposed mergers, acquisitions and joint ventures according to the European Union merger law⁸⁸

⁷⁹<https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32018L1972&from=EN>

⁸⁰<https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32002L0020&from=en>

⁸¹<https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32002L0020&from=en>

⁸²<https://www.t-mobile.nl/Consumer/media/pdf/campagne/beloftes/t-mobile-promises-en.pdf>

⁸³<https://ecfsapi.fcc.gov/file/10204163125179/Legere%20Pricing%20Commitment%20Letter%202002.01.2019.pdf>

⁸⁴<https://investor.t-mobile.com/news-and-events/t-mobile-us-press-releases/press-release-details/2019/T-Mobile-Announces-Plans-for-THREE-Supercharged-New-T-Mobile-Un-carrier-Moves-That-Will-Use-Transformational-5G-Network-for-GOOD/default.aspx>

⁸⁵<https://www.ft.com/content/6cef9528-cd90-11e5-831d-09f7778e7377>

⁸⁶<https://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=CELEX:12008E101:EN:HTML>

⁸⁷[https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:52011XC0114\(04\)&from=EN](https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:52011XC0114(04)&from=EN)

⁸⁸<https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32004R0139&from=EN>

In January 2020 the Greek Ministry of Development and Investments convened a Lawmaking Commission with the task to transpose recent EU Directives and make recommendations on the modernization of competition law in Greece.

If the Lawmaking Commission were to propose that application of competition law in the telecom sector in Greece – that is currently under the exclusive jurisdiction of EETT – must be divided between the Hellenic Competition Commission (ex-post competition law enforcement and merger control) and EETT (ex-ante regulation and supporting advisory role in merger control) and such proposal were adopted by the Greek government and enshrined in law then the Hellenic Competition Commission will be given the mandate to carry out formal sector inquiries and impose ex-post remedies if it were to find competition restrictions in the Greek mobile data connectivity market.

Such remedies may include but are not limited to wholesale access obligations and access price controls, unbundling and retail price controls. Generally, Rewheel does not advocate the adoption of retail price controls in mobile markets where at least 3 mobile network operators are present with independent radio access networks and not before all other regulatory tools have proven ineffective.

According to our knowledge, the only EU28 or OECD market where the Government has recently intervened to curb the persistent high mobile data connectivity prices with a retail price control is Canada. On the 5th of March 2020 the Canadian government announced⁸⁹ a retail price control measure applied to the three incumbent MNOs in Canada. The Government of Canada “... has taken action to foster competition in the mobile services market and to improve choice and affordability for consumers. However, Canadians continue to express concerns that the prices for mobile services are too high. To help Canadians get more affordable telecommunications services, Bell, TELUS and Rogers (across their brands) will be expected to lower their prices. For cellphone plans that offer 2 to 6 GB of data, the three national carriers are expected to lower their prices by 25 percent in the next two years.”

In January 2019, the Canadian Competition Bureau (i.e. Canadian competition authority), acquired access to Rewheel's research service and to our EU28 & OECD mobile data connectivity prices database for carrying out its own econometric analysis of the Canadian wireless industry. In May 2019, the Canadian Competition Bureau submitted⁹⁰ its comments to CRTC's (Canadian sector regulator) mobile wireless services review. Therein⁹¹, the Bureau noted “*International comparisons generally suggest that Canadian prices for wireless plans are high relative to other countries*” and cited a number of international price comparison studies that have consistently ranked Canada among the most expensive countries including studies made by the OECD, the ISED (Canadian Ministry of Innovation, Science and Economic Development), the FCC (US Federal Communication Commission) and Rewheel.

Now it is important to note that the Canadian wireless market is ruled by provincial mobile network duopolies and monopolies as we showed in our September 2019 study⁹² titled ‘*Root cause of weak competition in the Canadian wireless market*’. While in some provinces regional operators increasingly challenge the incumbents, at the national level, Canada is a de-facto network duopoly. The possibility to create a third and fourth independent national mobile networks in Canada, considering the idiosyncrasies of the Canadian spectrum licensing regime (Canada has many semi-autonomous provinces) is remote to the say the least. Therefore, a retail price control might be the only option left for the Canadian government.

In section 6.3.2, the last section of the report, we present and discuss a set of bold ex-ante measures (for the upcoming 5G auction) and ex-post non-structural measures (wholesale access obligations and access price controls, unbundling and retail price controls) that could in the absence of a 4th MNO entry potentially remedy some of the competition restrictions, which according to our view, are present in the Greek mobile data connectivity market.

⁸⁹<https://www.canada.ca/en/innovation-science-economic-development/news/2020/03/offering-canadian-consumers-more-affordable-options-for-their-wireless-services.html>

⁹⁰<https://services.crtc.gc.ca/pub/ListeInterventionList/Documents.aspx?ID=278712&en=2019-57&dt=i&S=C&PA=t&PT=nc&PST=a&lang=e>

⁹¹<https://services.crtc.gc.ca/pub/ListeInterventionList/Documents.aspx?ID=278712&en=2019-57&dt=i&S=C&PA=t&PT=nc&PST=a&lang=e>

⁹²http://research.rewheel.fi/downloads/Root_cause_weak_competition_Canada_wireless_market_PUBLIC.pdf

About Rewheel

*New radio spectrum bands, 4.5G and 5G technology, unlimited mobile data plans and the Internet of Things radically change mobile network operators' cost, revenue and profitability dynamics. **Rewheel's mission is to help operators prepare for the paradigm shift in network and spectrum strategy, spectrum valuation, network sharing, M&A, MVNO economics and mobile data pricing.***

Founded in 2009, Rewheel is a Finland based boutique management consultancy. Our clients are mainly European mobile network operators, telco groups, MVNO groups, sector regulators, competition authorities, governments, global internet firms, mobile data-centric start-ups, PE and VC investors.

We delivered management consultancy work for clients in the United Kingdom, United States, Ireland, Switzerland, Finland, Sweden, Belgium, Greece, Poland, Slovenia, Hungary, Russia, Romania.

The following independent authorities and ministries have commissioned, acquired access, used and/or cited Rewheel's mobile market price comparison and competition analysis studies. The ex Commissioner of the European Commission responsible for Competition Joaquín Almunia, the United States Department of Justice, the New York, California and many other US State Attorney General Offices, the National Competition Authorities of Canada, Australia, Germany, Austria and the Netherlands, the Monopoly Commission of Germany, the Ministry of Economic Affairs of the Netherlands, the Ministry of Industry and Trade of Czechia, the Korean Electronics and Telecommunication Research Institute, the National Regulatory Authorities of the United Kingdom, Germany, the Netherlands, Finland, Belgium and Ireland.

Rewheel's mobile data technology, network-economics, spectrum, profitability and competitiveness focused reports have been cited by OECD Economic Surveys, The Economist, The Financial Times, The New York Times, Reuters, Bloomberg, WSJ and publicly referenced by the UK telecoms regulator Ofcom, BIPT, Vodafone, Telefonica, Tele2, Elisa, DNA, GSMA, VPs of the EU Commission responsible for Competition, MEPs, IEEE, ITU.

Antonios Drossos and Pal Zarandy (Rewheel partners) have authored telecom expert opinions and/or quoted by the Financial Times, The Economist, The New York Times, The Wall Street Journal, The Washington Post, Reuters, Bloomberg, Business Insider, TIME, Politico, Handelsblatt, Der Spiegel, BILT, Die Welt, WDR, Focus, Kathimerini, etc.

Since 2010 we have been supporting a number of European challenger mobile operators in multiband (700, 700 SDL, 800, 900, 1400 SDL, 1800, 2600, 3.5 GHz) auctions with spectrum valuation and strategic advisory services.

Network economics metrics

For comprehensive data usage, spectrum usage and capacity utilisation metrics in EU28 and OECD markets visit

⇒ <http://research.rewheel.fi/networkeconomics/>

Recent Rewheel research PRO-reports

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⇒ http://research.rewheel.fi/downloads/Unlimited_mobile_data_Finland_different_PUBLIC.pdf

3.6 GHz 5G spectrum valuation in Poland

⇒ http://research.rewheel.fi/downloads/3.6GHz_5G_spectrum_valuation_Poland_PUBLIC.pdf

The state of 4G & 5G pricing, 2H2019: more-for-less

⇒ http://research.rewheel.fi/downloads/The_state_of_4G_pricing_DFMonitor_12th_release_2H2019_PUBLIC.pdf

2018 capacity utilization and 5G capacity potential of mobile operator existing macro cell site grids

⇒ http://research.rewheel.fi/downloads/2018_capacity_utilization_potential_macro_site_grids_PUBLIC.pdf

Root cause of weak competition in the Canadian wireless market

⇒ http://research.rewheel.fi/downloads/Root_cause_weak_competition_Canada_wireless_market_PUBLIC.pdf

4G era – Who got the most out of it?

⇒ http://research.rewheel.fi/insights/2019_may_pro_4G_who_got_most_of_it_revenue_growth/

The state of 4G pricing – 1H2019 – Digital Fuel Monitor 11th release

⇒ http://research.rewheel.fi/insights/2019_apr_pro_1h2019_release/

4G prices as a function market concentration, no. of MNOs, subscriber share, position, group affiliation and country general price level

⇒ http://research.rewheel.fi/insights/2019_jan_pro_4G_prices_as_a_function_of/

Iliad's 4th MNO venture into Italy – Will it pay off?

⇒ http://research.rewheel.fi/insights/2019_jan_pro_iliad_italy/

T-Mobile and Tele2 4 to 3 mobile merger in the Netherlands – Competition concerns, efficiencies and effective remedies

⇒ http://research.rewheel.fi/insights/2018_nov_pro_tele2_t-mobile_nl/

The state of 4G pricing – 2H2018 – Digital Fuel Monitor 10th release

⇒ http://research.rewheel.fi/insights/2018_oct_pro_2h2018_release/

Capacity utilization and fixed-to-mobile broadband substitution potential with existing macro site grids – 2017

⇒ http://research.rewheel.fi/insights/2018_sep_pro_capacity/

The 4 to 3 consolidation effect – Ahead of the Commission's merger ruling Tele2 increased prices in the Netherlands

⇒ http://research.rewheel.fi/insights/2018_july_pro_T-mobile-Tele2_Netherlands/

The state of 4G pricing – 1H2018 – Digital Fuel Monitor 9th release

⇒ http://research.rewheel.fi/insights/2018_may_pro_1h2018_release/

Gigabyte price development in 4 to 3 consolidated versus 4-MNO European markets – September 2013 to March 2018

⇒ http://research.rewheel.fi/insights/2018_apr_pro_4to3_consolidation_vs_4MNO/

The state of 4G pricing – 2H2017 – Digital Fuel Monitor 8th release

⇒ http://research.rewheel.fi/insights/2017_nov_pro_2h2017_release/

Unlimited mobile data and near zero marginal cost – a paradigm shift in telco business models

⇒ http://research.rewheel.fi/insights/2017_sep_pro_near_zero_marginal_cost/

O2 – Ready to disrupt the German tight oligopoly market

⇒ http://research.rewheel.fi/insights/2017_apr_pro_o2_germany_turnaround/

Capacity utilization and fixed-to-mobile broadband substitution potential – A study of 64 European operators

⇒ http://research.rewheel.fi/insights/2017_mar_pro_network_utilisation_mimo/

Effective structural remedies for Hutchison-WIND 4 to 3 Italian mobile merger

⇒ http://research.rewheel.fi/insights/2016_sept_premium_italy_hutch_wind_merger/

Telenor Denmark – Turnaround strategy

⇒ http://research.rewheel.fi/insights/2016_apr_premium_telenor_denmark_turnaround/

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