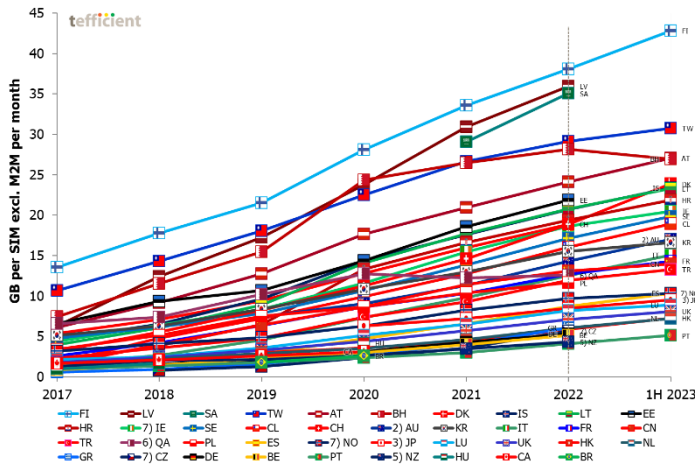# tefficient

Industry analysis #4 2023

Mobile data – first half 2023 – excluding M2M/IoT

Data-only drives traffic. The same can't be said for 5G.

Tefficient's 39th public analysis of mobile data development and drivers compares 39 countries worldwide, where M2M/IoT can be excluded from the total bases. Mobile data usage grew in 38 of them – with Bahrain as the only exception.

When usage grows, the growth rates are slowing. Portugal leads with a growth rate of 47%, contrasting with Taiwan's modest 8% growth. Bahrain experienced a decline of 6% in data usage.

Data-only subscriptions continue to dominate average mobile data usage, although their market share remains limited. Latvia's average data-only subscription consumed 138 GB per month in 2022 while Austria recorded 115 GB per month in the first half of 2023. In the FWA-only category, Australia had a remarkable 334 GB per month in 1H 2023.

While data-only drives traffic, the same can't be said for 5G in general. Reporting is imperfect, but there are only three countries with disproportionately high 5G traffic in relation to their 5G bases: South Korea, Austria and Saudi Arabia. We explain what these countries do and what other countries are missing.

Overall, mobile data revenue once again reached its lowest level, although the erosion in revenue per gigabyte slowed compared to our previous analyses. Portugal experienced the fastest erosion rate at 30%. As the sole country, Turkey witnessed a much-needed increase.

Adding to the positive outcomes, 73% of markets experienced an increase in ARPU following onto data usage growth. However, when accounting for overall inflation, the ARPU growth is still almost always slower than inflation. Things improved, though.

The M2M/IoT reporting dilemma

This page is mainly about methodology issues and can be skipped.

Regulators' reporting of M2M/IoT[1] SIMs continues to create a challenge for the comparability between countries. To make this *excluding-M2M* analysis, we had to exclude countries where M2M SIMs aren't broken out in the reporting of the respective regulator[2]: USA, Singapore, Romania, India, Mexico, Malaysia, Peru, Pakistan, Slovenia and Cyprus. You will find these countries solely in our [including-M2M analysis](#).

Qatar and Taiwan – for which the regulators state that M2M is excluded – are, on the other hand, only shown in this analysis.

To allow full comparability between countries in this excluding-M2M context, regulators must break out all these three data points in their reporting:

1. M2M subscriber (SIM) base
2. M2M data traffic
3. M2M revenue

This is done in four countries: **Sweden**, **Norway**, **Greece** and **Bahrain**. We appreciate that the regulators PTS, Nkom, EETT and TRA have done this since it allows us to calculate the error that would be made if only the M2M subscriber base (but not the M2M data traffic nor M2M revenue) was reported.

Taiwan excludes M2M from all three data points and is therefore also fully correct and comparable. **Qatar** also excludes M2M from all three data points, but only reports its base of data-enabled mobile subscriptions, excluding voice-only subscriptions.

For **Australia**, M2M base and M2M traffic are reported and as Telstra breaks out M2M revenue in its reporting, it has been excluded (but not the M2M revenue of the other two MNOs, Optus and TPG Telecom, as these aren't reported).

The regulators in the remaining countries most often only break out M2M subscriptions – not M2M data traffic and seldomly M2M revenue. For these markets, the consequence of this is:

- The **mobile data usage is slightly overstated** as the M2M data traffic is included, but not the M2M base.
- Since the M2M data traffic and the M2M revenue is included, the **revenue per GB is affected, likely overstated**.
- Since the M2M revenue is included, but not the M2M base, the **ARPU is slightly overstated**.

The error is estimated to be less than 1% on the usage side and 1–3% on the revenue side.

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[1] Hereafter called M2M.
[2] In the case of USA, the industry association CTIA.

When excluding M2M, data usage is still growing in all but one country

Figure 1 shows the development of mobile data usage for 39 countries where regulators report mobile data traffic and where – at least – M2M subscribers can be excluded from the total mobile base. The usage is shown per SIM per month.
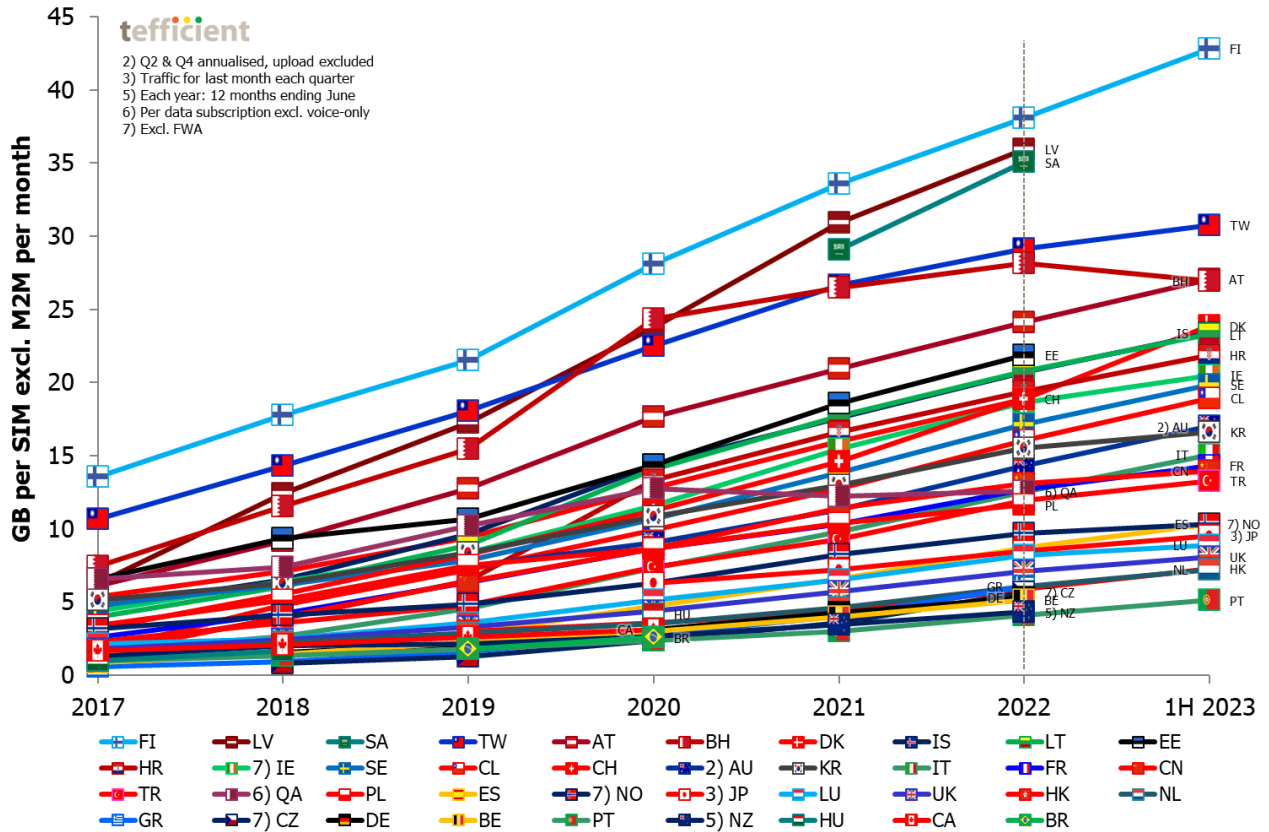

Figure 1. Development of mobile data usage per SIM (excl. M2M) per month – the legend shows the ranking[3]

Starting from the top of the chart, **Finland** is the world number one in the world when it comes to mobile data usage. **Latvia** is the runner-up and is approaching Finland. **Saudi Arabia** is third-ranked while **Taiwan** now is a quite distant number four. **Austria** is now fifth-ranked[4], having overtaken Bahrain.

The average Finnish non-M2M SIM carried **42.8 GB** of data per month in 1H 2023[5] (+5.9 GB vs. 1H 2022). There is an obvious explanation: **85%** of the Finnish non-M2M SIMs had **unlimited data volume** in June 2023. If we exclude voice-only SIMs, that share grows to 88%. No other country is as unlimited as Finland.

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[3] Some countries will report 1H 2023 but haven't yet: Greece and Qatar. Some countries have not reported sufficient data in a long time (Hungary, Canada, Brazil).

[4] As shown in our including-M2M analysis, Malaysia could possibly play in the global top five too, but since the Malaysian regulator does not break out M2M SIMs, Malaysia can't join this analysis.

[5] The Finnish regulator does not report the M2M data traffic. Hence this figure is – as for most of our markets – slightly overstated.

The average Latvian non-M2M SIM carried 36.0 GB per month in 2022[6] (+5.1 GB vs. 2021). Unlimited is offered as a premium option in regular mobile in **Latvia** but, as we will show later in this analysis, the high usage is largely explained by data-only subscriptions. **Saudi Arabia** – a new country in our analysis[7] – follows closely with 35.1 GB per month in 2022 (+6.0 GB vs. 2021).

In fourth-ranked **Taiwan**, the average SIM carried 30.7 GB per month in 1H 2023 (+2.3 GB vs. 1H 2022). Unlimited was behind Taiwan's development as well, but usage growth slowed in the past years following attempts by the Taiwanese operators to bring rationality back into the market. The relatively late (mid-2020) introduction of 5G provided the Taiwanese operators with the tool they needed to turn the ARPU erosion around when the two challenger MNOs[8] couldn't follow pace in 5G. Unlimited is still very much a standard, but with 5G it comes with a tiered premium.

Austria (27.1 GB in 1H 2023, +3.9 GB vs. 1H 2022) overtook **Bahrain** (26.9 GB, -1.8 GB vs. 1H 2022) in the first half of 2023 and is now fifth-ranked.

Although the legend below Figure 1 shows the ranking of the 39 countries, it's difficult to spot them all. Figure 2 offers an easier visualisation.
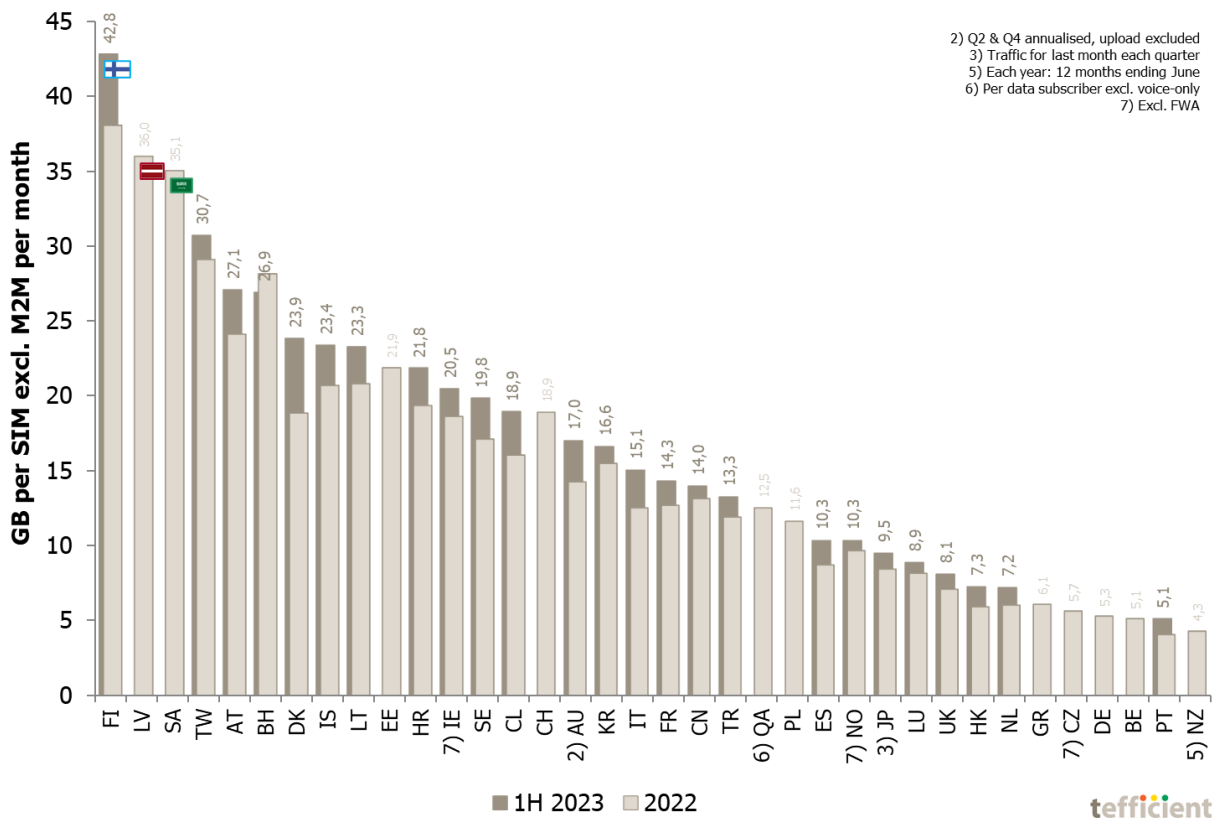

2) Q2 & Q4 annualised, upload excluded
3) Traffic for last month each quarter
5) Each year: 12 months ending June
6) Per data subscriber excl. voice-only
7) Excl. FWA

■ 1H 2023 ▢ 2022

Figure 2. Mobile data usage per SIM (excl. M2M) per month, 1H 2023 and full year 2022

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[6] The Latvian regulator SPRK reports annually.

[7] The data traffic is only reported annually by the Communications, Space and Technology Commission.

[8] There are five MNOs in Taiwan. Taiwan Mobile is however in process to acquire Taiwan Star (TStar) and FarEasTone in process to acquire APT (Gt). The mergers have now been conditionally approved by the regulator, NCC, and by the Fair Trade Commission.

In comparison to our historical reports there's not much dark grey on top of the 2022 light grey bars which shows that for most markets, there was little usage growth in the first half of 2023.

The markets with the lowest data usage in Figure 2 are **New Zealand**, **Portugal**, **Belgium**, **Germany**, **Czechia**[9], **Greece**, the **Netherlands** and **Hong Kong**.

Figure 3 is a zoom-in on the lower end of Figure 1.
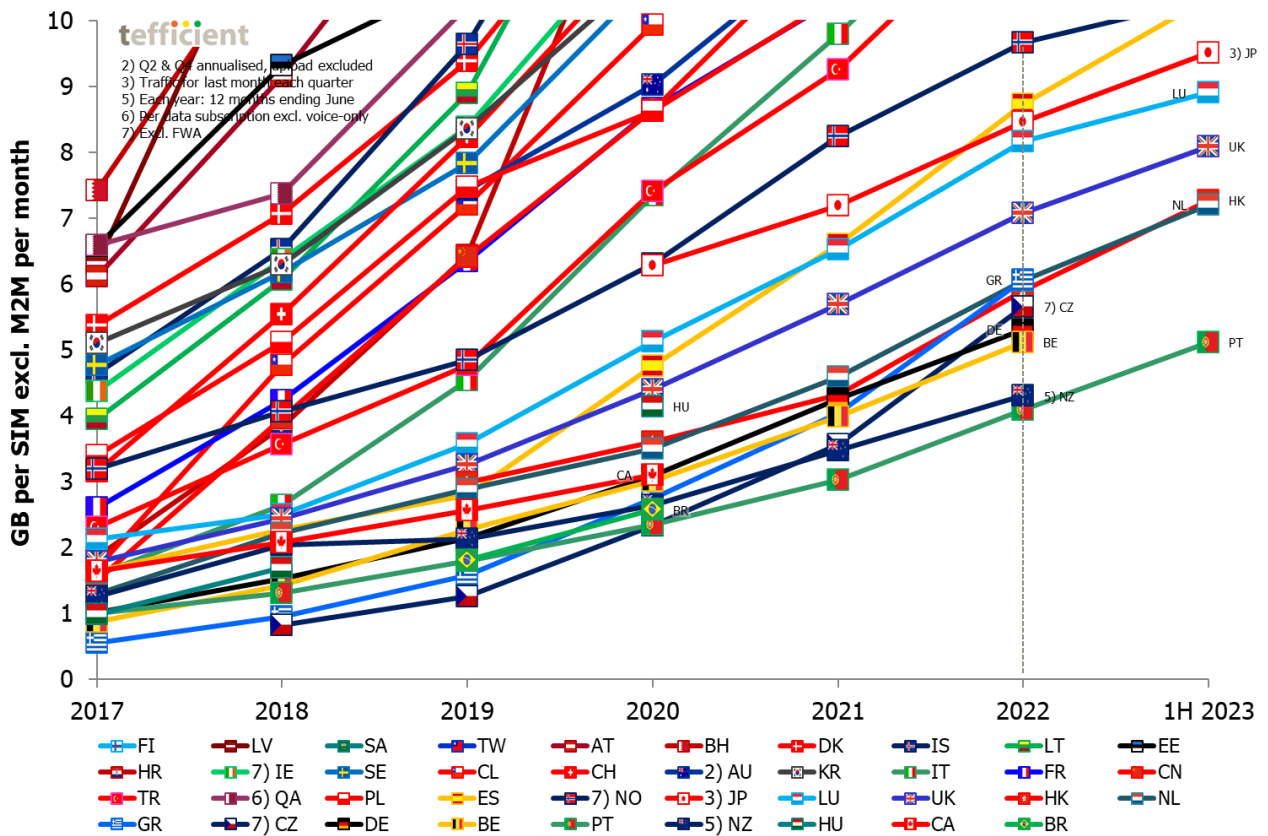
Figure 3. Development of mobile data usage per SIM (excl. M2M) per month [zoom-in on low end]

Albeit in the lower usage range, **Luxembourg** and **Japan** had quite modest usage growth in 1H 2023. Faster growth then in Portugal, Hong Kong, the Netherlands and the UK.

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[9] Note that FWA (fixed wireless access) traffic is excluded from the reported mobile data traffic of the regulator CTU. To make it comparable with other markets, we would have added it, if only CTU reported it.

Data usage growth fastest in Portugal

Figure 4 shows the growth in average usage per SIM between 1H 2022 and 1H 2023.

2) Q2 & Q4 annualised, upload excluded
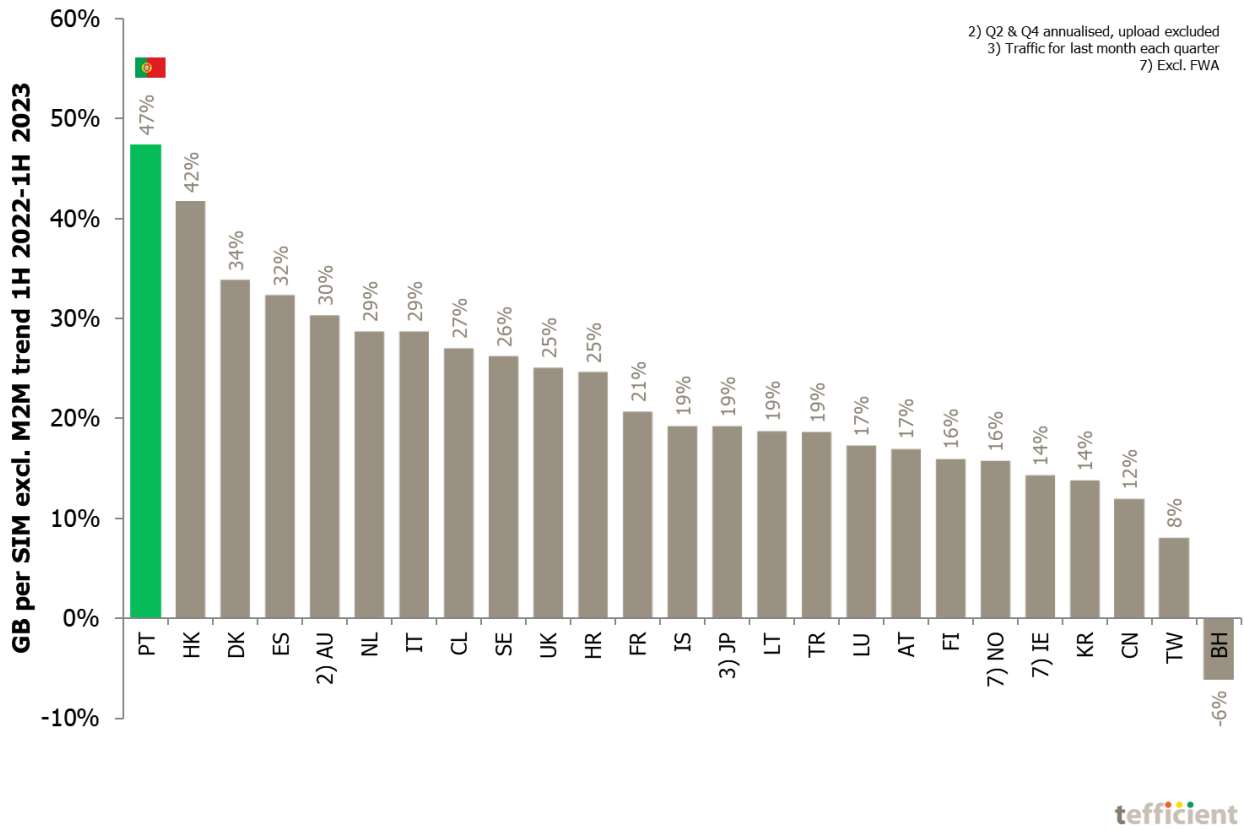3) Traffic for last month each quarter
7) Excl. FWA

Figure 4. Development of mobile data usage per SIM 1H 2022-1H 2023

Portugal had the fastest growth in mobile data usage, **47%**. **Hong Kong** is the number two in growth with 42%. **Denmark** is number three with 34% – followed by **Spain** with 32%.

At the right end of the scale, we find **Bahrain** with a **decline of 6%**. **Taiwan** had some growth, but just 8%.

Taiwan had the slowest usage growth – but Bahrain witnessed a decline in usage.

Data-only rarely more than 20% of base, but defines usage

Although **fixed wireless access** (FWA) experiences a renaissance with 5G in the US with the US MNOs collectively having recruited over 7 million FWA customers in the past three years (read on), using mobile networks to substitute fixed broadband isn't something new. In some markets, like Finland and Austria, this was around for long. The take-up can be significant if the FWA/data-only offers are reasonably charged and without usage caps. It also helps if the fixed broadband offering is weak with much DSL in the mix.

In the second half of 2021, the Finnish regulator, Traficom, started to report also fixed data traffic, allowing a comparison with the mobile data traffic it had reported for long, see Figure 5.
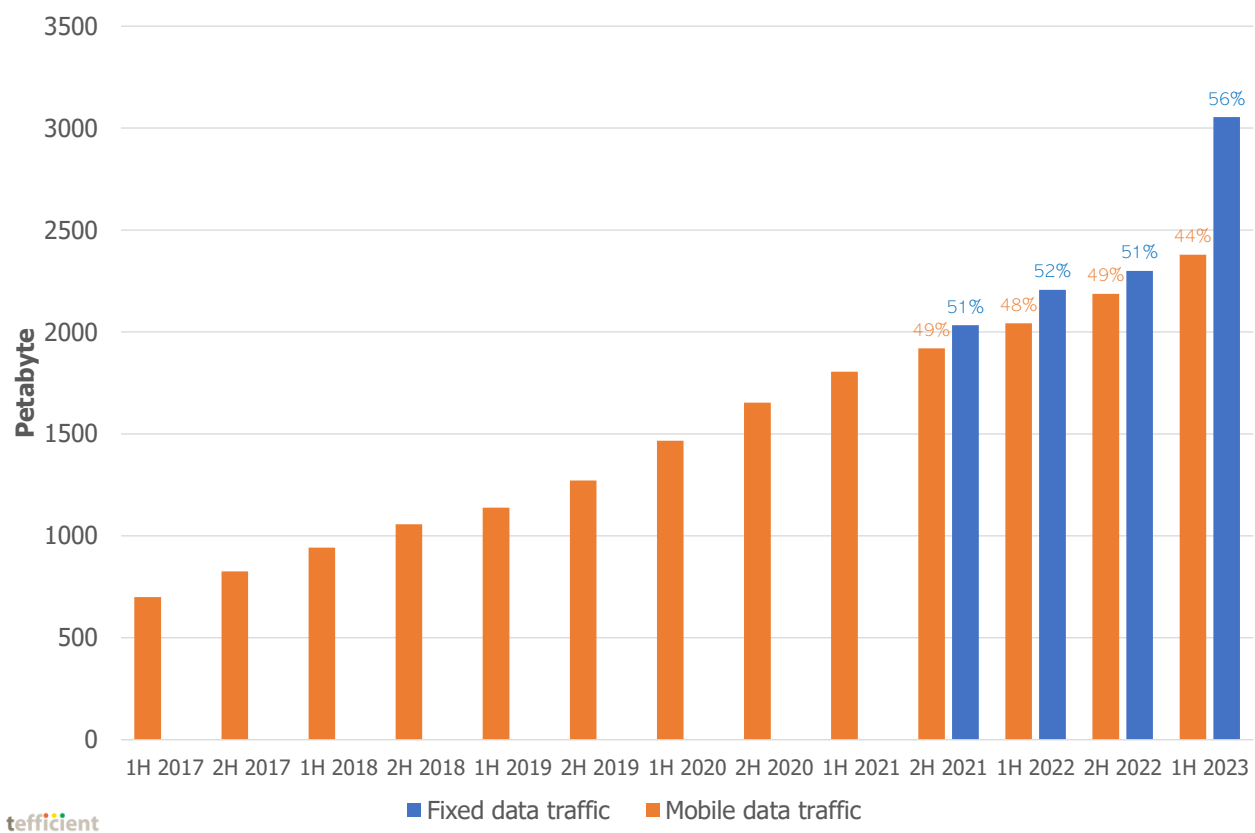
Figure 5. Development in reported mobile and fixed data traffic in Finland, 1H 2017-1H 2023

In the first half of 2023, the fixed data traffic seems to have leaped in Finland, making mobile data traffic represent **44%** of the total data traffic – down from 49% in 2H 2022. The fixed data traffic in 2021 and 2022 might however have been reported incorrectly low by one or several of the fixed providers, but the historical numbers have not been updated by the regulator.

A 44/56% split between mobile and fixed data traffic is still quite evenly distributed. But there's another market with a similar split: **Austria**.
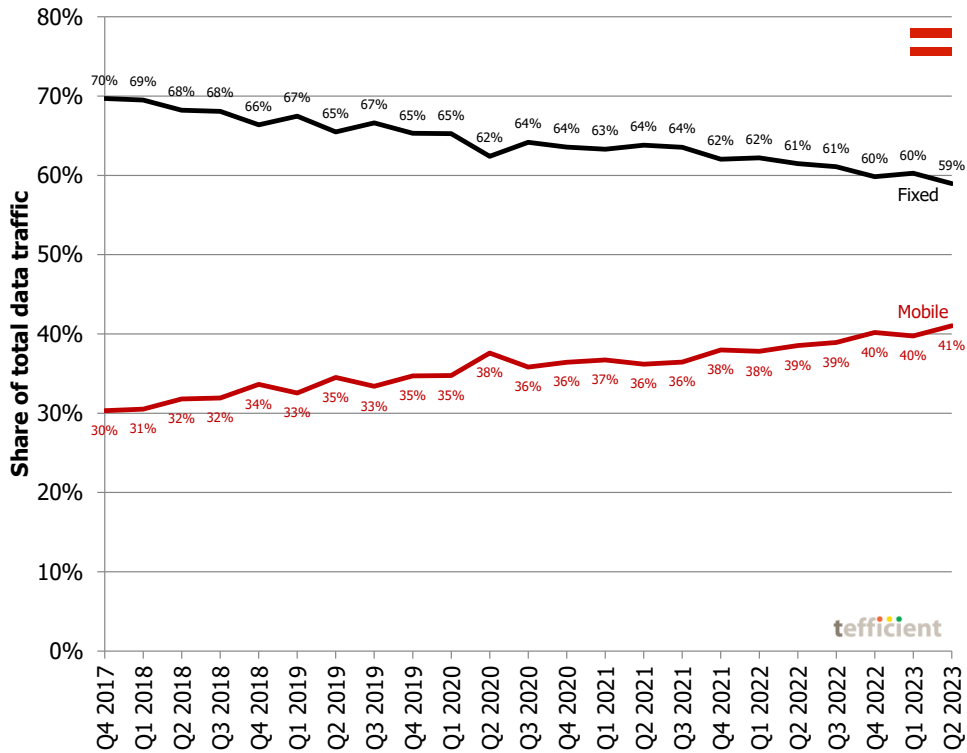
Figure 6. Development in reported mobile and fixed data traffic in Austria, Q4 2017-Q2 2023

In the latest reported quarter by RTR, Q2 2023, the Austrian split was 41/59%. Unlike Finland, where the mobile data share of traffic could be in decline, it continues to grow in Austria.

In most other countries, the fixed data traffic totally dominates over the mobile data traffic.

Let's now put Finland and Austria into a chart comparing the data-only share of the country's SIM base with all the other countries.
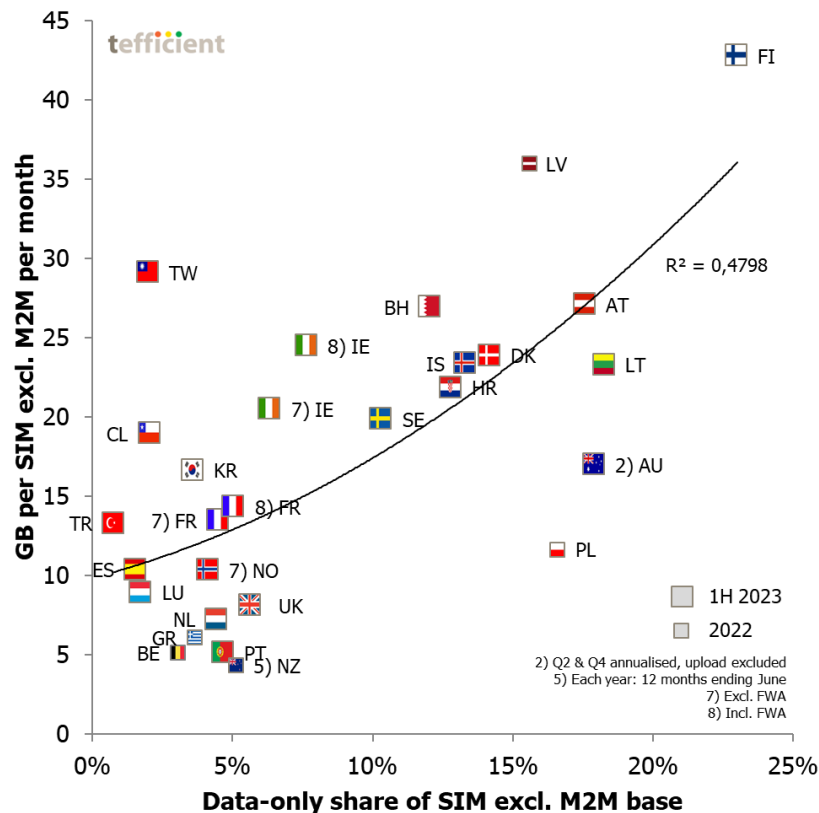
Figure 7. Mobile data usage vs. data-only share

In June 2023, **23%** of the SIM base in Finland was data-only. That makes **Finland** the leader in data-only share of base – and the average mobile data usage is also the highest. In **Lithuania**, **Australia** and **Austria**, data-only represented 18% of the bases and the usage was lower than in Finland. **Poland** was at 17% in December 2022, but with much lower overall usage than Austria and Lithuania. **Latvia** was at 16% in December 2022 and with the second highest overall usage.

Taiwan is an exception to the overall trend: Its mobile data usage is high although the data-only share of base was just 2%. Albeit at a bit lower usage level, also Chile and Turkey have low data-only share of base.

Despite these exceptions, the adherence to the regression line is relatively strong. As in all previous reports we therefore conclude that **data-only penetration is a significant driver of the average mobile data usage**.

The easiest way for low-usage countries to grow data usage and expand the mobile market would be to **start addressing and monetising the data-only segment**. This seems to be effective particularly in markets where fast fixed broadband networks (FTTH, FTTB or HFC) aren't already available to a substantial share of the households.

The US wireless market leader **Verizon** launched its first **5G** branded service in December 2018 to support a fixed wireless access (FWA) use case. **T-Mobile**, **U.S. Cellular** and finally **AT&T** have since followed. It

seems to work very well sales-wise as FWA since the beginning of 2022 totally dominates the overall broadband subscriber growth, see Figure 8. In Q3 2023, **93%** of the broadband net adds were FWA.
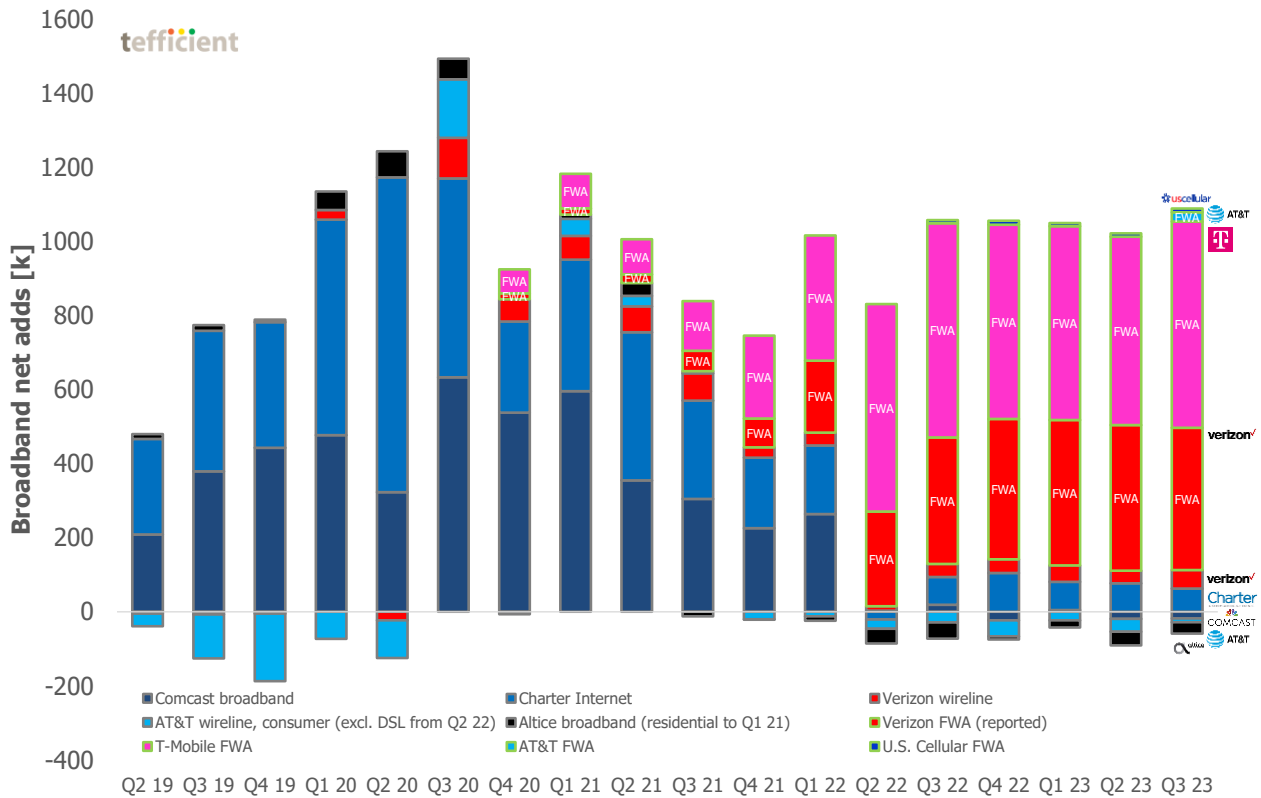

Figure 8. Broadband – fixed (grey outline) and FWA (green outline) – net adds per quarter per provider, USA

In September 2023, T-Mobile had accumulated more than **4.2 million FWA subscribers** (4G and 5G) across the US. Since Verizon offers fibre broadband in parts of the country, it doesn't sell FWA everywhere. Verizon still had close to 2.7 million FWA subscribers (again across 4G and 5G) in September 2023, representing **26%** of Verizon's total broadband (fixed+FWA) base.

Figure 7 shows that even a relatively low share of such data-only subscriptions could lift the average data consumption significantly.

Some of the countries in Figure 7 are also reporting the data-only traffic. For these countries, we can compare the data-only penetration of the SIM base to its share of the total mobile data traffic, see Figure 9.
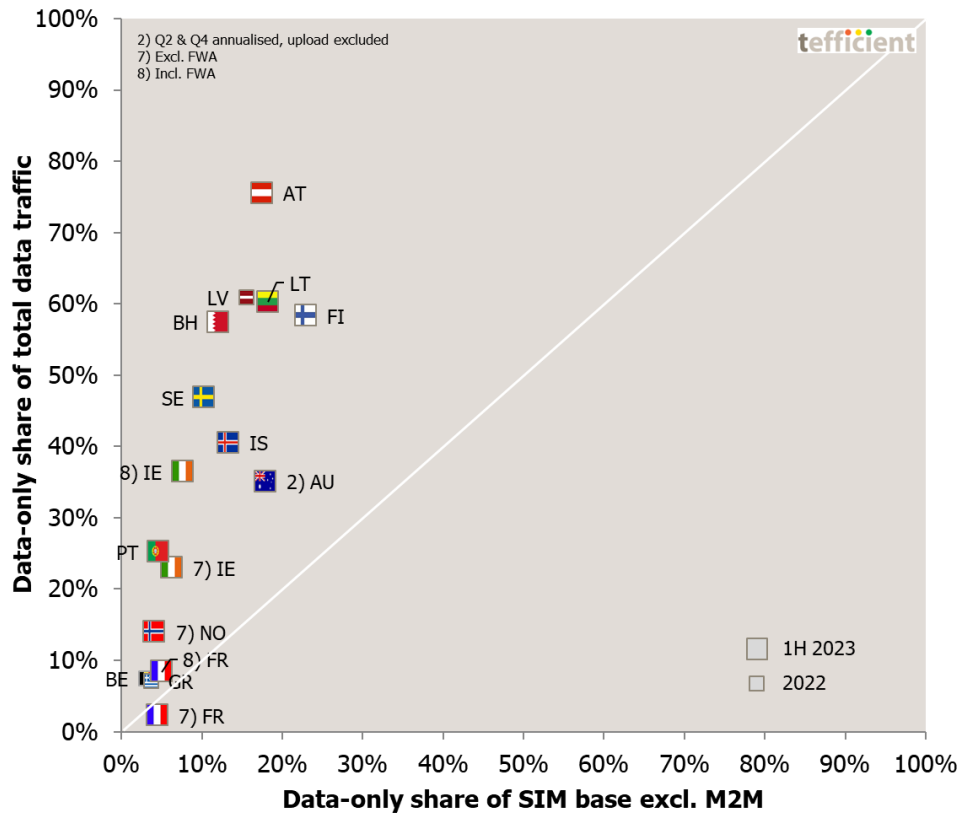
Figure 9. Data-only share of total traffic vs. data-only share of SIM base

Data-only SIMs carry a disproportionally high share of the data traffic:

- Portugal **5.4x** higher traffic per data-only SIM vs. any SIM
- Bahrain **4.8x**
- Ireland (incl. FWA) **4.8x**
- Sweden **4.5x**
- Austria **4.3x**
- Latvia **3.9x**
- Norway (excl. FWA) **3.4x**
- Lithuania **3.3x**
- Iceland **3.0x**
- Finland **2.5x**
- Belgium **2.4x**
- Australia **2.0x**
- Greece **1.9x**
- France (incl. FWA) **1.7x**

For the countries that are reporting both data-only traffic and the number of data-only subscriptions, we can compare the average usage per *data-only* subscription, see Figure 10.
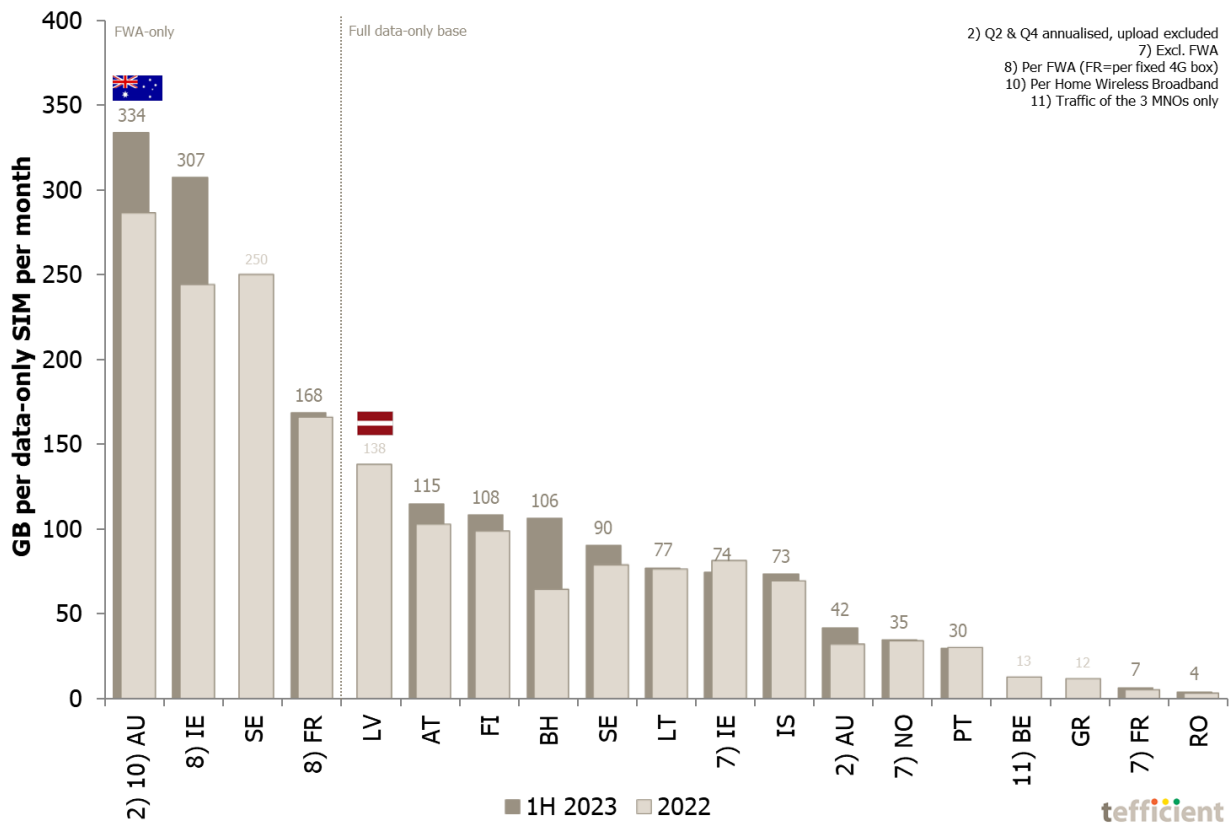
Figure 10. Mobile data usage per data-only SIM per month, 1H 2023 and full year 2022

Starting from the left, the average Home Wireless Broadband subscription in **Australia** carried **334 GB** of mobile data per month in the first half of 2023. In **Ireland**, the average FWA subscription carried **307 GB** of mobile data per month. **Sweden** follows with 250 GB per month in 2022 (no number reported for 1H 2023). At the end the short FWA-only top list, we have **France** where the average '4G box' carried **168 GB** of mobile data per month in 1H 2023.

If instead looking at the whole data-only base (not just the FWA segment), **Latvia** leads with an average mobile data consumption per data-only SIM of **138 GB** per month in 2022. **Austria** follows with 115 GB per month in 1H 2023. **Finland** had 108 GB and **Bahrain** 106 GB.

In comparison to our previous reports, there's not much dark grey on top of the full year 2022 light grey bars which shows that for most markets, there was little usage growth in the first half of 2023. In two cases – Ireland (excl. FWA) and Portugal – the average data-only usage was even decreasing.

The average Latvian data-only subscription consumed 138 GB per month in 2022.

If **5G FWA** should become the fibre-over-radio solution that T-Mobile and Verizon suggest, the data-only FWA usage figures of Australia and Ireland give a taste of the usage that the solution must at least manage. Fixed broadband usage is yet higher – often reaching 400 GB per month.

Unlike data-only, 5G adoption isn't an obvious driver of data traffic

Little by little, regulators are starting to report 5G subscriber bases. In a similar way as we correlated the data-only share of total mobile data with the data-only share of the subscription base, Figure 11 tries to do the same for 5G.

There are a few issues:

- In many countries, regulators reporting 5G subscribers aren't reporting 5G traffic (Chile, Croatia, France, Iceland, Taiwan, Japan and China).
- In Spain, CNMC reports 5G traffic, but not 5G subscribers.
- The definition of what a 5G subscriber is differs.
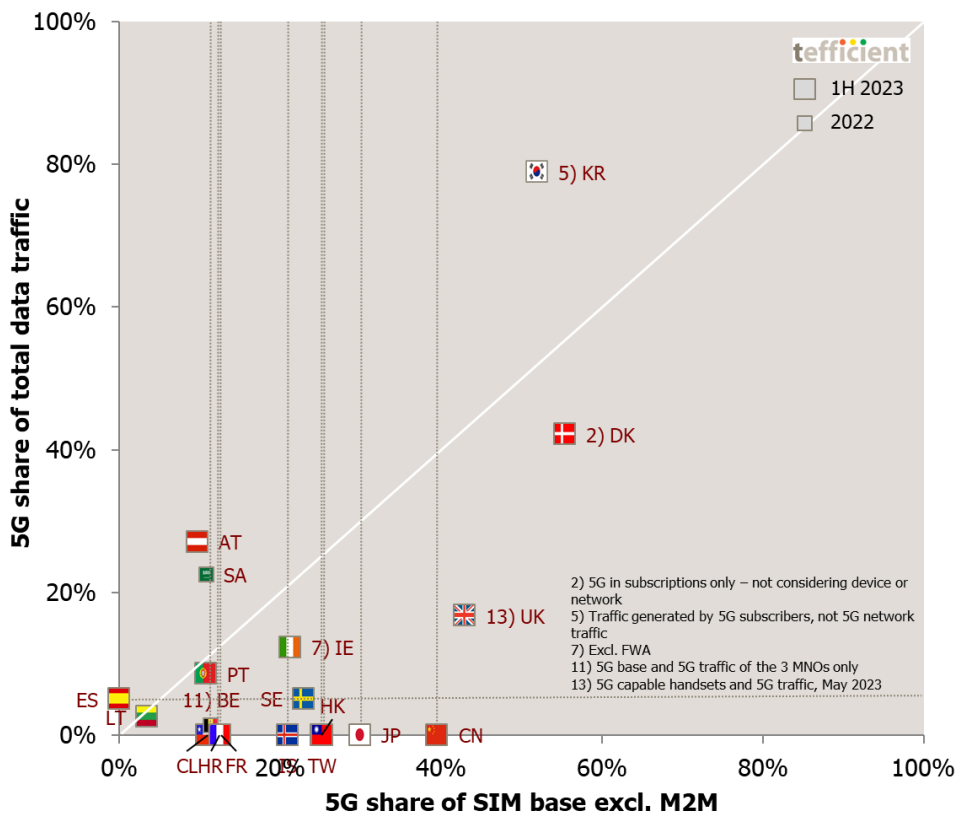
Figure 11. 5G share of total traffic vs. 5G share of SIM base

With these difficulties, it's hard to be firm on the conclusion on 5G, but Figure 11 isn't necessarily showing that 5G drives data traffic. There are a few countries above the white equilibrium line for which it is true – **Saudi Arabia, Austria and South Korea** – but there are more countries below the line: Lithuania, Portugal, Belgium, Ireland, Sweden, the UK and Denmark. If we compare to Figure 9 – the data-only graph – the difference is clear. Whereas data-only drives data traffic, 5G doesn't seem to.

Why not? One obvious explanation is **coverage** (or rather lack thereof). 5G subscribers with 5G devices need 5G coverage to generate 5G traffic and while 5G coverage is being rolled out, the 5G share of traffic should increase. The quantum leap in speed and quality that 5G could offer comes through new, higher, spectrum bands (typically the C-band), though. Regretfully it doesn't propagate well into buildings from outdoor sites and since most of the mobile data traffic is consumed indoors, the lack of 5G C-band indoor coverage is a hinder for 5G's traffic dominance. Operators might have to level up on dedicated indoor solutions to get a disproportionately high share of traffic on 5G.

South Korea, Austria and Saudi Arabia have disproportionally high 5G traffic.

While that sounds both costly and slow, another option is to **target the FWA market using 5G**. The positions of **Austria** and **Saudi Arabia** in Figure 11 – where 5G's share of traffic is higher than 5G's share of subscriptions – is a result of that. Since each FWA subscriber consumes so much more traffic than the average mobile data user, even a small amount of 5G FWA customers will move the needle. Through stand-alone and slicing, 5G also offers the possibility to set monetisable thresholds for the speeds and quality of FWA. An early example of that is **3 in Austria**, see Figure 12.

Figure 12. The premium broadband offering of 3 Austria – 5G+ (=5G stand-alone) and fibre

If selecting the bandwidth guarantee (Bandbreiten-Garantie) option, 3 Austria states that the **guaranteed download speed** of the connection is 50% of the stated maximum speed. For the FIX Data 500 option with a maximum download speed of 500 Mbit/s, the guaranteed download speed is then 250 Mbit/s.

The other country in Figure 11 that successfully has been able to drive 5G share of traffic faster than 5G share of base is **South Korea**. The explanation here isn't FWA (not offered) but rather a massive rollout of 5G base stations coupled with an initially intense sales activity from the MNOs promoting data-rich or unlimited 5G plans.

The new South Korean government has since it came to power in 2022 however focussed on bringing down living costs and has pushed South Korea's MNOs to introduce cheaper 5G plans – with less data. In 2023, it also agreed with the MNOs to allow users of 5G handsets to subscribe to LTE plans (and vice versa) which could provide users with new saving possibilities. The government also revoked the mmWave 5G frequencies rewarded to SK Telecom, KT and LG U+ as none of the MNOs had fulfilled the rollout requirement. In November 2023, it opened a tender for this spectrum, making it technically possible for a 4th MNO to establish itself in South Korea.

All this seems to have had a negative effect on the progress of 5G in South Korea. As shown in Figure 13, neither the 5G subscription base nor the 5G share of traffic develops as quickly as in the past. But make no mistake, South Korea is still the global 5G leader.
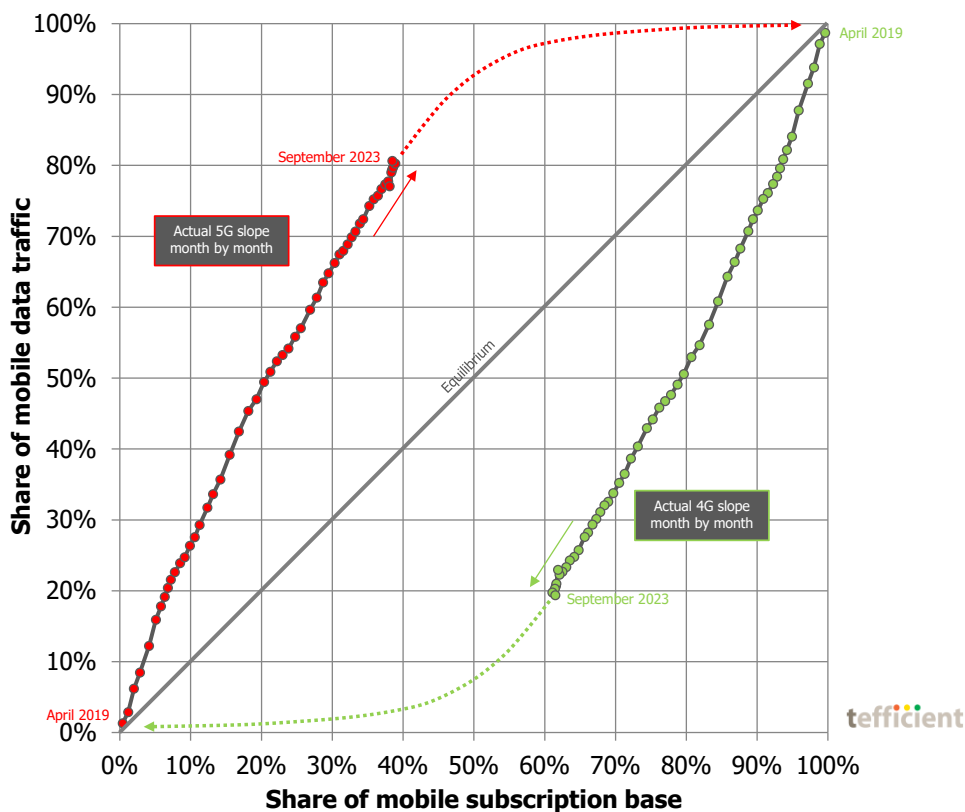

Figure 13. 5G share of total traffic vs. 5G share of SIM base and 4G share of total traffic vs. 4G share of SIM base – Korea per month since 5G launch

In September 2023, **81%** of the mobile data traffic in South Korea was consumed by 5G subscribers. 5G represented 38% of the total SIM base, indicating that the average mobile data usage per 5G subscriber is far higher than for non-5G subscribers in South Korea.

The usage figures for September 2023 are:

- 5G: **28.5** GB per month
- 4G: **7.5** GB per month

Although 4G still represents 59% of the mobile subscriber base in South Korea, these 4G subscriptions only consume 18% of the mobile data traffic – as shown by the latest green dot in Figure 13.

It's important to point out that it's not 5G as such that alone explains the higher mobile data usage in 5G: Korea's operators are offering **unlimited** data plans more widely in 5G compared to what they did in 4G. But even if comparing apples to apples – unlimited to unlimited – 5G still seems to drive usage in South Korea: In September 2023, the average unlimited 5G subscription consumed **49.9 GB** whereas the average unlimited 4G subscription used much less – **25.9 GB**.

A gigabyte has never been cheaper

Most mobile operators in mature markets aren't attempting to monetise voice and SMS based on usage any longer; they have instead made these allowances unlimited and included them in a flat fee. This means that the last price-defining parameter for most mobile users is **data volume**. Even though more and more operators introduce unlimited propositions, these are often the last step in a tiered data plan[10] – which means that price still, essentially, is about data volume.

Figure 14 plots the *total* mobile service revenue per consumed gigabyte[11] against the average mobile data usage per SIM and month.
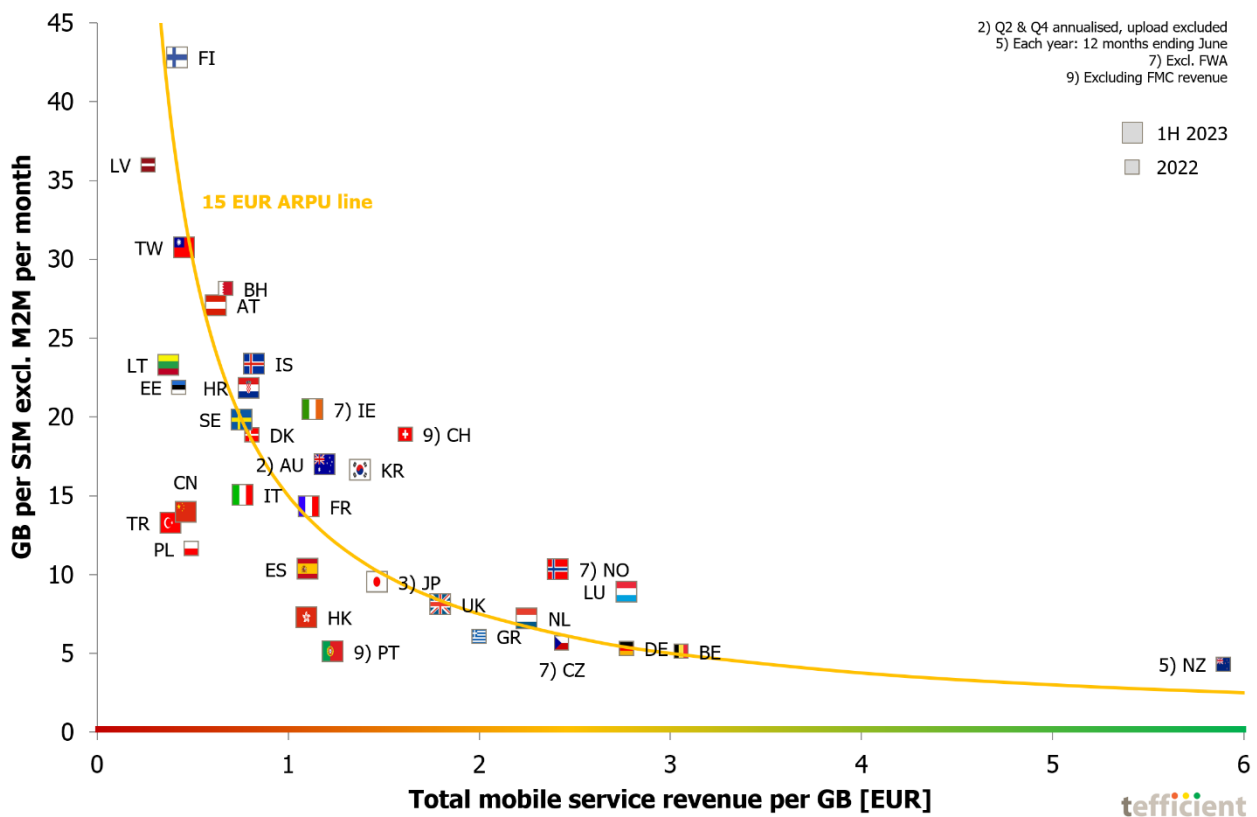
Figure 14. Mobile data usage vs. total mobile service revenue per consumed GB

The amber line shows where **15 EUR of ARPU** is earned. Countries below it had an ARPU lower than 15 EUR, countries above an ARPU higher than 15 EUR.

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[10] There are exceptions to this – where the price-defining parameter instead is data throughput – e.g. Finnish operators, Swisscom, O2 Germany, Norwegian operators and Vodafone in Spain, the UK and most other European Vodafone markets (except Germany). There are also operators mixing several parameters such as volume, throughput, policy, zero-rating, video resolution, service bundling etc.
[11] Attributing zero value to voice and messaging.

With Canada not being in this excluding-M2M analysis (due to lack of M2M reporting), **New Zealand**[12] holds the position where operators collectively earn the highest total service revenue per consumed mobile GB.

There is a cluster of countries with high revenue per GB without being as extreme as New Zealand: **Belgium**, **Germany**, **Luxembourg**, **Czechia**[13], **Norway**[14] and the **Netherlands**.

It's important to point out that our analysis looks at what the mobile operator industry de facto makes on end-users, not what the best offer on the market currently is. Most users are on old price plans because they are still locked in by a contract – or because they have not bothered to find the best deal.

At the other end of the scale, we find the markets where operators get the lowest revenue per consumed gigabyte: **Latvia**, **Lithuania**, **Turkey**, **Finland**, **Estonia**, **Taiwan**, **China** and **Poland**.

> Latvia's operators have the lowest total revenue per GB – New Zealand's operators the highest.

Looking at Figure 14 we can conclude – as in all our previous analyses on this topic – the key explanation to high mobile data usage is low effective revenue per gigabyte: **Bigger data buckets lead to lower revenue per GB – which, on the other hand, increases usage**. At least when customers can use those big buckets also within the data-only segment, see Figure 7.

But we also said that a gigabyte has never been cheaper. More correctly put is that operators never had lower total service revenue per gigabyte than what they currently have – which is true for all markets except Turkey. Figure 15 shows the revenue development from 1H 2022 to 1H 2023.

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[12] Note that the latest reported data on New Zealand is for the year up to June 2022.
[13] FWA not included in the data traffic due to the reporting of the regulator, CTU. It's not clear if FWA revenue is included or excluded.
[14] FWA not included in the revenue nor the data traffic due to the reporting of the regulator, Nkom.
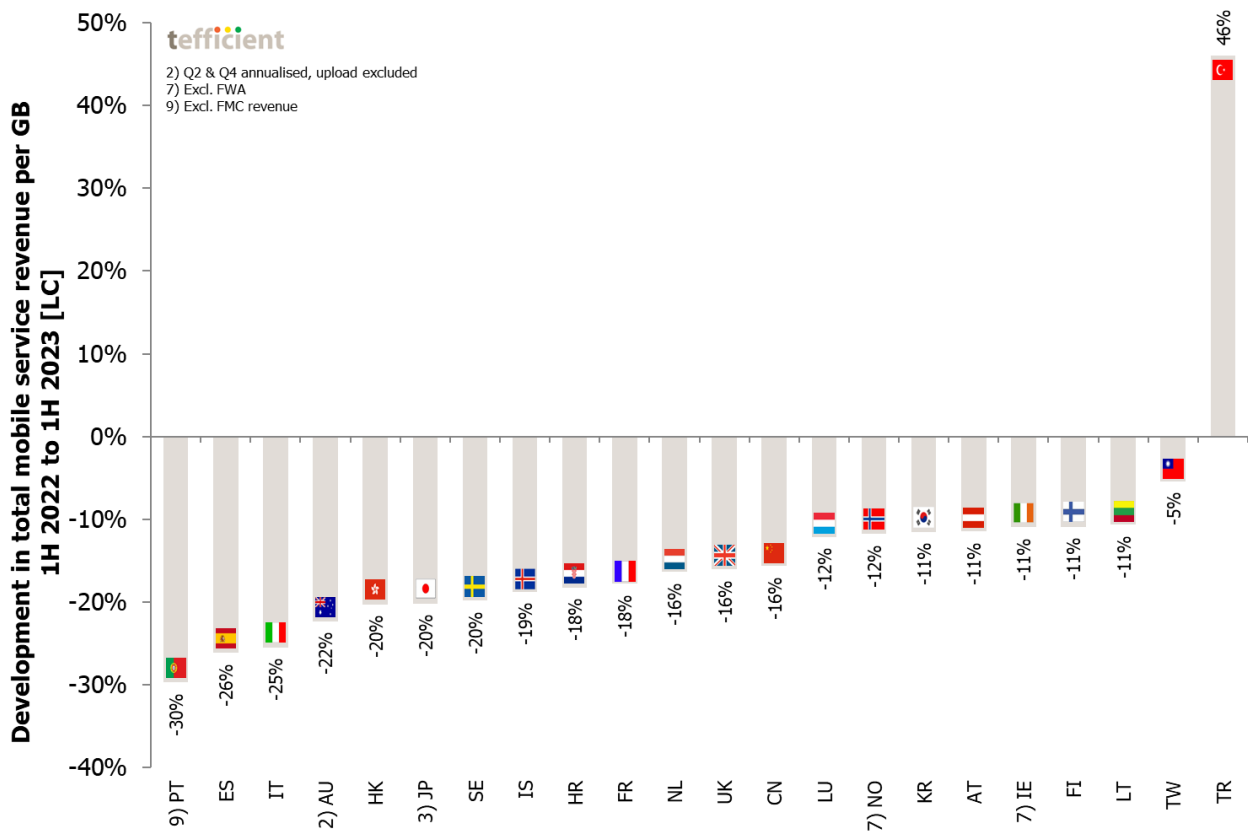
Figure 15. Development in total mobile service revenue per consumed GB – 1H 2022 to 1H 2023

The prerequisite to appear in Figure 15 is of course that the statistics have been reported both for 1H 2022 and 1H 2023. Of these markets, **Portugal** had the fastest revenue erosion, 30%. **Spain** had 26% while **Italy** had 25%.

In **Turkey**, the revenue per GB **increased with 46%** – in local currency – between 1H 2022 and 1H 2023. But where inflation increased in the world in 2022, Turkey had *hyperinflation*: It was 72% in 2022, making Turkey an outlier among our markets. The Turkish inflation lowered in 2023 – in Q2 2023 it was 40% – but the Turkish MNOs have some catching up to do.

The market with the slowest erosion in the revenue per GB is **Taiwan**.

No correlation between data usage and ARPU

Figure 16 is a variant of the revenue per GB chart – it plots the usage against the average revenue per SIM, i.e. the ARPU.
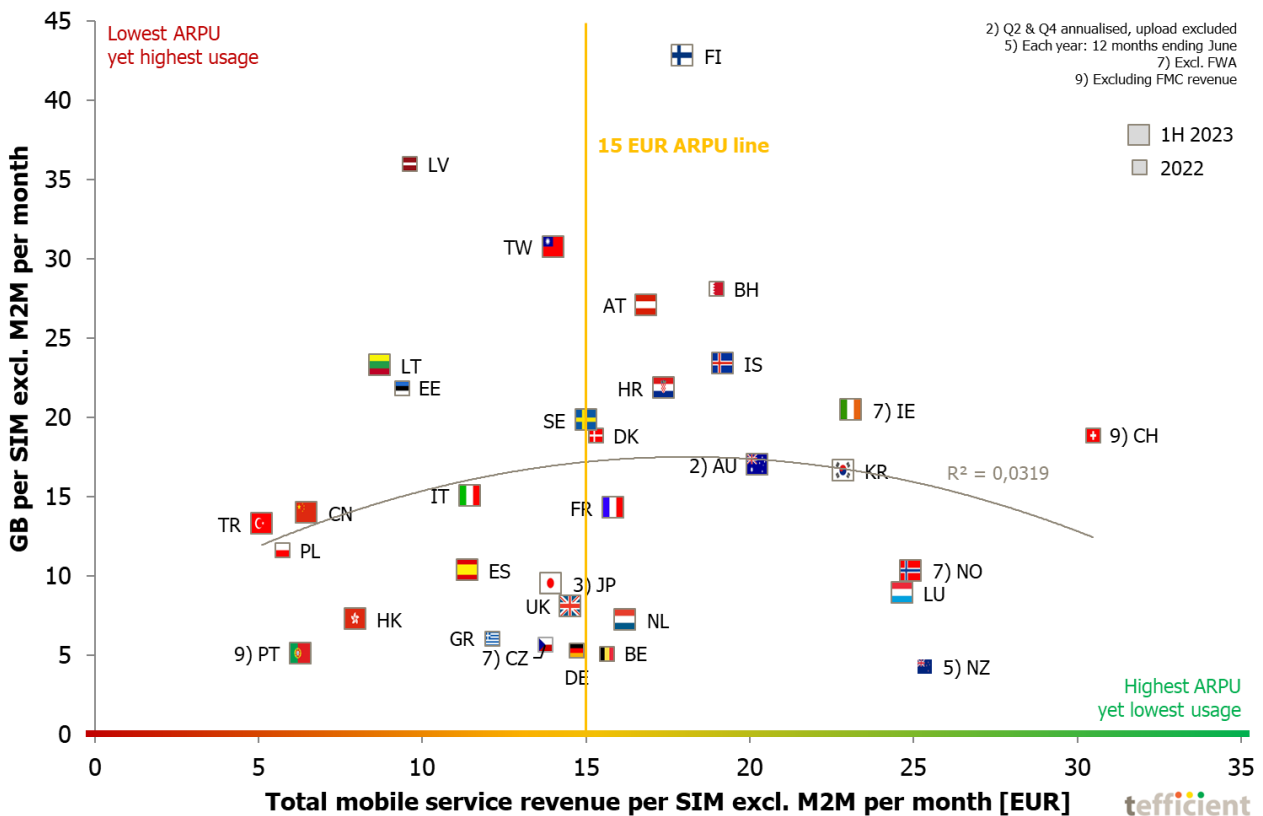

Figure 16. Mobile data usage vs. total mobile service revenue per SIM

Switzerland had the highest ARPU among our markets, but the average mobile data usage was quite high. Three countries, **Norway**[15], **Luxembourg** and **New Zealand**, have high ARPUs without high mobile data usage.

South Korea and **Ireland** have high ARPUs too – but with a quite high mobile data usage.

Operators to the upper left – **Finland**, **Taiwan**, **Latvia**, **Lithuania**, **Estonia**, **China**, **Poland** and **Turkey** – are the most generous with mobile data considering their ARPU. These countries form a nice imaginative trend line suggesting that operators could expect to get rewarded with higher ARPU as usage grows.

But that's regretfully not to overall trend: The adherence to the grey regression line is weak but it's not pointing in the north-easterly direction one would like to see – with more usage leading to higher ARPU.

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[15] FWA traffic, FWA subscriptions and FWA revenues excluded as FWA traffic isn't reported.

Dressing the Christmas tree based on ARPU development

Now to our Christmas tree graph which we continue to be so proud of. It's the graph were we like to see the branches stretch to the right – since that means that the ARPU grew in the past year. That would demonstrate that the operators of a country have been able to monetise the growth in data usage.
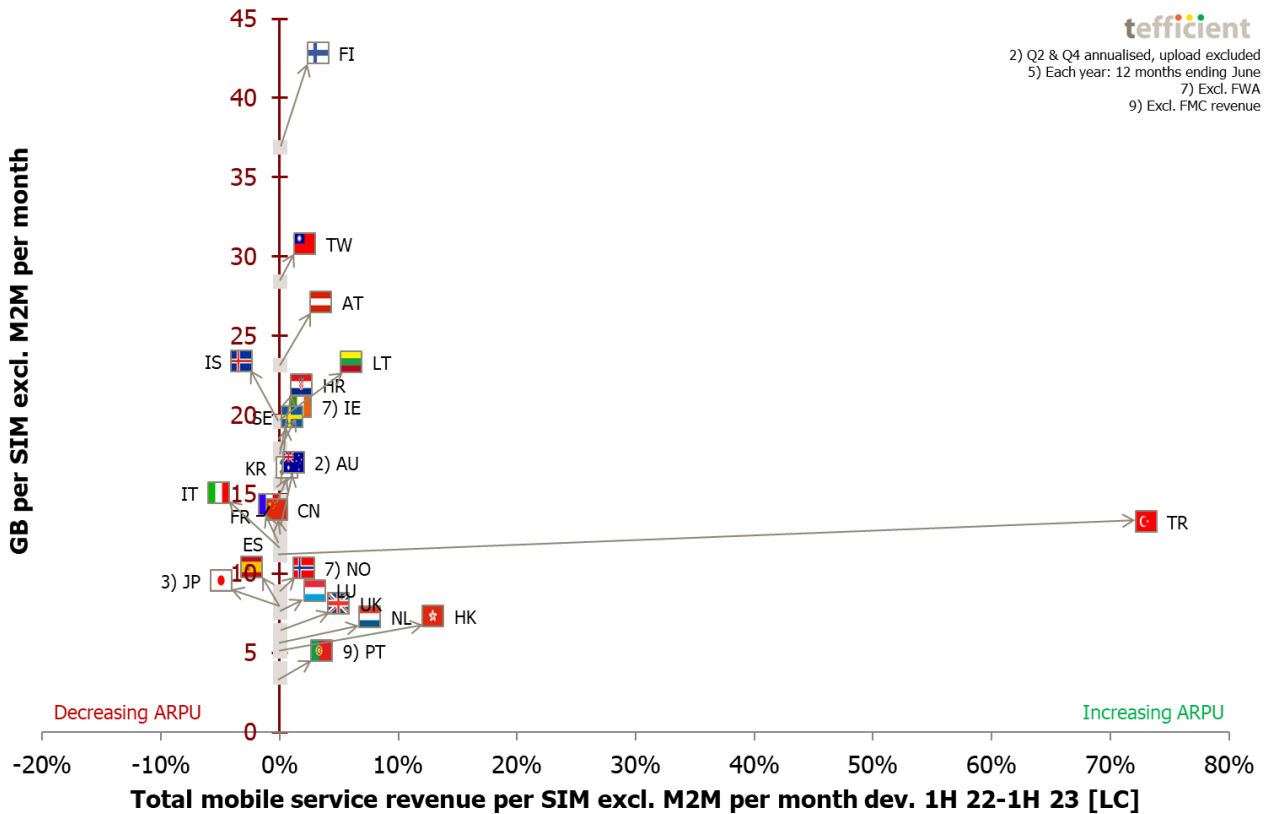
Figure 17. Development in mobile data usage vs. the development in ARPU – 1H 2022 to 1H 2023

The branches stretch right in **16 of 22 markets**[16] (73%). These are – from the top – **Finland**, **Taiwan**, **Austria**, **Lithuania**, **Croatia**, **Ireland**, **Sweden**, **Australia**, **Turkey**, **Norway**, **Luxembourg**, the **UK**, **Hong Kong**, the **Netherlands** and **Portugal**. In 6 markets (27%), the branches stretch left meaning that even though data usage generally grew, ARPU fell. The ARPU erosion in **Italy** and **Japan** is the fastest; 5%.

Compared to the Christmas tree graph in our including-M2M analysis, a higher share of countries is to the right. This shows that M2M has a quite negative influence on the overall monetisation of mobile data – it dilutes the ARPU but as the M2M base continues to grow, it worsens the ARPU development too. If excluding M2M – like we have done in this analysis – the situation looks better and no longer alarming. Most mobile operators seem capable of turning the growth in *human* mobile data usage into ARPU growth.

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[16] The 22 markets for which regulators/operators have reported the necessary underlying stats to date.

But what about **inflation**? We just said that Turkey's inflation was very high. What if we subtracted the annual inflation of Q2 2023[17] from the ARPU development shown in Figure 17? Then we get Figure 18.
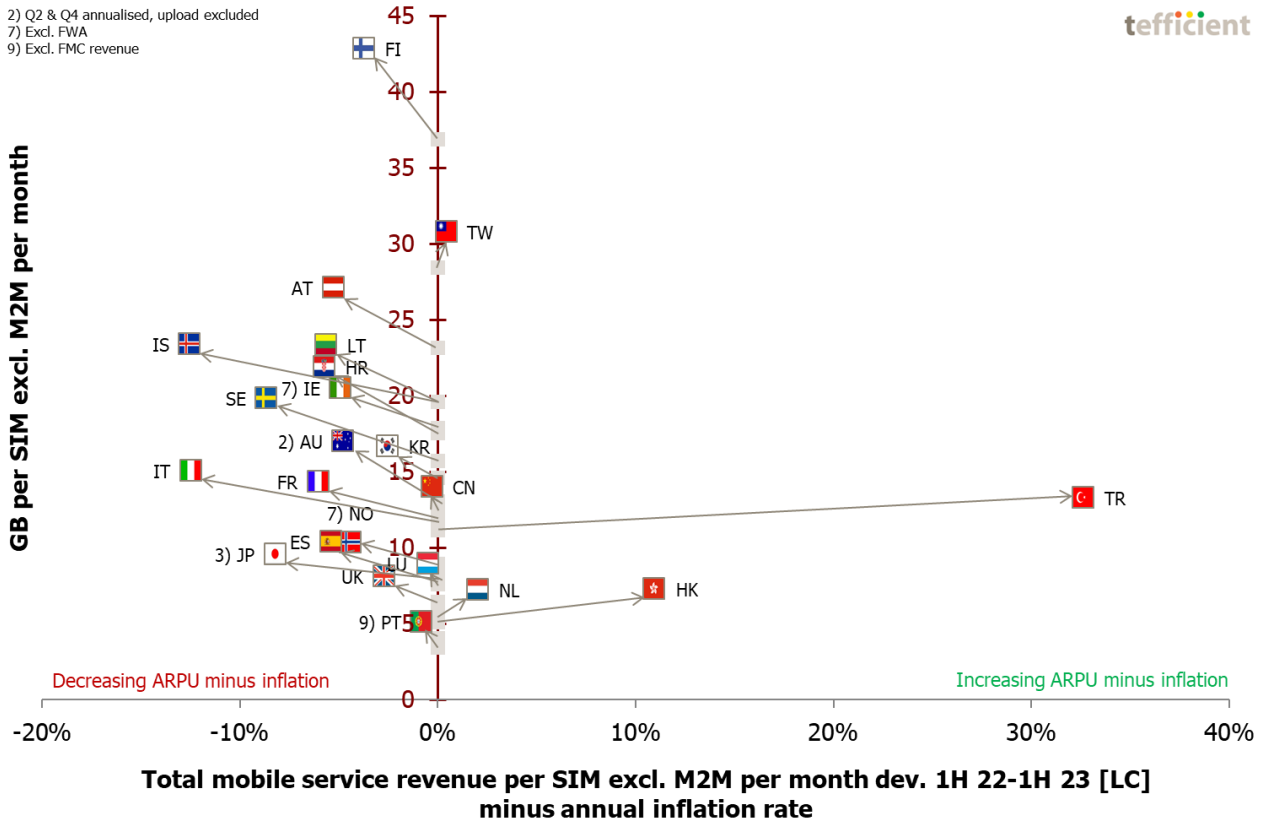

Figure 18. Development in mobile data usage vs. the development in ARPU minus inflation – 1H 2022 to 1H 2023

The Christmas tree now became quite ugly. There are only four markets where operators collectively could compensate inflation with ARPU growth: **Taiwan**, **Turkey**, **Hong Kong** and the **Netherlands**.

In all other remaining markets (18 of 22), **ARPU growth was slower than the inflation**. It's though looking better than in our [previous analysis](). Mobile providers have been increasing prices and the inflation rates are now lower than six months ago.

There's of course no rule saying that mobile ARPU should follow overall inflation. The inflation in 2022 was e.g. largely driven by increasing energy and food prices. Although some operators seem to suggest it, energy doesn't represent a major share of mobile operator cost – in mature markets energy is often just 2-4% of total OPEX.

> ARPU growth was slower than the inflation in 18 of 22 markets.

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[17] We have used the Q2 2023 CPI as defined by the OECD [https://www.oecd-ilibrary.org/economics/data/prices/consumer-prices-complete-database_0f2e8000-en]() to the degree possible. Japan, Hong Kong, Taiwan and Croatia are not on this OECD list and other sources have therefore been used.

But why are we then comparing ARPU growth and overall inflation rate? In the past years, many operators have implemented **CPI[18]-driven price increases** which, after some time, should make the two more linked. Based on how adverse Figure 18 looked in our [previous analysis](#) – and the improvement observed this time – it seems to have had an effect but not yet neutralised inflation. Unless all mobile providers in a market do CPI-based price increases, customers might compensate by simply switching to a provider not doing it.

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[18] Consumer price index

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Conclusion

In our second analysis solely focused solely on mobile data usage and revenues excluding M2M, **usage growth prevailed in 38 of the 39 markets**, with **Bahrain** being the sole exception.

Finland leads the charts with 42.8 GB per average SIM per month in 1H 2023. Despite **85%** of SIMs being **unlimited**, the data usage growth rate was rather slow in Finland: 16%. Usage in **Portugal** grew 47%. But in absolute terms, the data usage grew 5.9 GB in Finland and just 1.6 GB in Portugal.

Our analysis shows strong correlation between the **data-only share** of a country's SIM base and the average data usage. **Finland**, **Lithuania**, **Australia**, **Austria**, **Poland** and **Latvia** are the data-only powerhouses of the world. Finnish statistics show that mobile networks carried 44% of the total data traffic in the first half of 2023 – fixed networks 56%. Austria is approaching with a 41%/59% split in Q2 2023.

While attempting to correlate **5G** share of base with 5G share of traffic faced challenges due to data limitations and varied definitions, only **South Korea, Austria and Saudi Arabia** have disproportionately high 5G traffic. Lack of 5G coverage emerged as a plausible explanation for the limited impact of 5G elsewhere.

Across technologies, increased data-only penetration, particularly through fixed-line substitution, has the potential to elevate data usage. However, a prerequisite for this, and for high data usage in general, is maintaining a low total revenue per gigabyte. Countries such as **Latvia, Lithuania, Turkey, Finland, Estonia, Taiwan, China and Poland** exhibit this characteristic, while **New Zealand** represents the opposite end of the spectrum.

Despite variations in data usage, market ARPU does not consistently correlate with usage levels. **Switzerland, Norway, Luxembourg and New Zealand** boast higher ARPU without particularly high usage.

16 of 22 markets could grow ARPU on the back the data usage growth, an improvement compared to our inclusive-M2M analysis. However, when accounting for overall inflation, the festive outlook dims: ARPU growth lagged inflation in 18 of the 22 markets assessed.

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