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The mobile tax bill: how mobile is impacted by sector-specific taxes

Castells, Pau¹; Pedrós, Xavier²; Sivakumaran, Mayuran³

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Abstract

Many developing countries have introduced sector-specific taxes on the consumption of mobile services, which apply on top of general taxes, and therefore discourage the positive externalities that have been estimated to be associated with the use of mobile technology on workers' productivity and consumer welfare.

This paper investigates the first order impact of these taxes on consumer prices. Firstly, we develop a measure of prices of mobile services and devices, and create a framework to calculate prices before and after tax, taking into account both general and sector-specific taxes, for more than 100 markets worldwide. We use this to provide country and regional benchmarks and to run preliminary bivariate analyses on how taxes impact prices; and how both of these relate to mobile connectivity outcomes. This provides updated analysis, as of 2017 - making a contribution to previous studies (e.g., ITU 2013). Secondly, we provide the results of a tracker of sector-specific tax changes, from 2011 to 2018, for over 100 markets - providing insights on how fiscal policies have changed in their treatment of mobile services and devices in latest years.

JEL Classification

L96 - Telecommunications, H20 – Taxation General

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1. Introduction

The consumption of mobile services generates substantial, well-acknowledged positive externalities, as shown by the literature on its impacts on economic growth (see Bertschek et al. 2017 for a recent review). In developing countries, mobile technology is the main access to the internet, with this improving the functioning of product and factor marketplaces (through lower transaction costs), as well as inducing economy-wide productivity gains. In spite of this, many developing countries have introduced sector-specific taxes on the consumption of mobile services, which apply on top of general taxes, hence discouraging such externalities. This has been partly in the context of governments facing challenges to raise revenue from large informal economies and/or in fiscal deficits.

Sector-specific taxes on the consumption of mobile services are not aligned with principles of efficiency, equity and simplicity (see, for instance, IMF 2014) - due to a number of considerations. Sector-specific taxes raise prices for consumers and costs for firms, reducing use of mobile services and constraining externalities; they also distort relative prices and investment decisions across markets; they might be regressive, particularly where consumption of mobile services is relatively inelastic; as well as add complexity to tax regimes. Due to these mechanisms, one would expect mobile connectivity overall to be negatively impacted - with governments' lower cost of collection of taxes being the counterpart.

In this paper we first review the theory and discussions on mobile sector taxation. We then set out our methodology for estimating the total cost of mobile ownership (TCMO) and our data sources for these estimations. We then present the results: trends in mobile tax rates applicable to consumers between 2011 and 2017, trends in the TCMO and the impact of taxes on the TCMO. We then assess the impacts of tax within the TCMO on affordability and mobile market penetration.

2. Theoretical review

Governments worldwide tax most goods and services at standard rates that apply across their respective economies. They tend to raise the level of taxes on a particular good or service beyond the standard rate in order to reduce its personal consumption, such as with tobacco or alcohol, or to curb other negative externalities on society – to reduce, for example, pollution and environmental damage.

However, some governments apply a number of different and often special taxes to the mobile industry over and above the general taxation applied to other sectors of the economy, despite the positive externalities of mobile goods and services – i.e. the larger societal and economic benefits arising from mobile usage, such as higher levels of growth and productivity. Moreover, in some countries, governments consider mobile use a luxury and implement sector-specific taxation on that basis.

Table 1 summarises taxes and fees on the mobile industry.

Table 1: Overview of taxes and fees

Consumers		Operators		
Tax base	Tax type	Tax base		Tax type
Handsets	VAT	General taxes	Profits	Corporation tax
				*Additional corporate tax
	Custom duty		Revenue	Turnover tax
				Other revenue taxes
	*Additional VAT *Excise taxes		Network equipment	Customs duty
Activation	VAT	Regulatory fees and other payments	Revenue or fixed amounts (one-off or recurring)	*Universal service contributions
	*Activation fees *Connection fees			*Licence and regulatory fees
Usage	VAT			*Spectrum fees
	*Additional VAT *Excise taxes *Withholding taxes			

* Sector-specific taxes

Source: GSMA Intelligence

Users of mobile services are taxed when buying a mobile device, when activating a service and when using their mobile phones.

- **Devices** are subject to general taxes such as value-added tax (VAT) and customs duties. Some markets have also introduced additional sector-specific taxes such as excise taxes on the handset value or higher VAT rates for more expensive handsets considered luxury goods.
- In some countries, on **activation** of their mobile services, consumers also pay general taxes such as VAT on the sale of a SIM card and sector-specific taxes such as activation fees on SIM cards or connection charges.
- Finally, the **usage** of mobile services is subject to general taxes, such as VAT and a General Service Tax (GST), and in some countries sector-specific taxes, withholding taxes, or higher VAT rates when governments classify certain mobile services as a luxury.

Mobile operators also face various taxes on the provision of mobile services. Aside from general taxes, such as corporate tax, operators contribute to public funding through a number of sector-specific taxes and fees. They typically pay one-off and recurring licence and spectrum fees, as well as additional taxes on revenue or profits in some countries. One-off spectrum fees, in particular, can be a significant payment in any given financial year. Mobile operators also contribute to universal service funds from their gross revenues via annual taxes or fees.

An effective tax policy balances a number of competing factors, including the government's need for revenue, support for key economic sectors, the practicalities of enforcement and collection, and the desire to minimise any distorting impact on the wider economy. International organisations such as the

World Bank⁴, the International Monetary Fund (IMF)⁵, the International Telecommunications Union (ITU)⁶ and the Organisation for Economic Cooperation and Development (OECD)⁷ acknowledge a number of established and accepted principles for an effective tax system. Such principles seek to minimise distortions from taxation and account for informal activity or limited institutional capabilities.

Table 2 combines principles on tax policy from these organisations, drawing on economic principles of efficiency, equity (or fairness), simplicity, predictability and transparency. The six principles outline specific steps for implementing effective taxation.

Table 2: General tax principles in sector-specific taxes

Economic factor	Description	
Efficiency	Taxes raise prices for consumers and costs for firms – hence they may reduce levels of consumption and production as well as divert investments.	An efficient tax system should rely on low rates and wide bases to minimise the impact on consumption and production, while raising the required revenue.
	Different taxes across sectors are distorting in that they change the relative prices of goods and services.	Taxation should be broad-based across sectors . Adopting the same tax rates across firms and sectors and minimising the use of tax exemptions could reduce distortions in the economy.
	Taxes encourage positive externalities and discourage negative ones.	Taxes should account for product and sector externalities , by encouraging, via lower specific tax rates, the consumption and production of goods and services that generate positive, broader economic impacts. Higher rates of taxation should apply to products or services that cause negative externalities.
Equity (or fairness)	Vertical equity – taxpayers' ability to pay should be taken into account.	Taxes should be progressive , in line with a taxpayer's income or wealth. Taxes at the same level for all, and especially taxes on necessity goods, are regressive.
	Horizontal equity – taxpayers with the same characteristics should face comparable taxes.	Similar taxpayers should have similar tax treatment , particularly across firms in similar or competing sectors.
Simplicity, predictability, and transparency	Complex and unpredictable tax policy increases compliance costs and discourages investment.	A simple and transparent tax system reduces the number of taxes with which firms must comply, promotes fair treatment and reduces the risk of evasion. A stable, predictable tax design also generates less cost for businesses and creates more certainty for investment.

Source: GSMA Intelligence

⁴ Introduction to Tax Policy Design & Development, Bird and Zolt, 2003

⁵ Taxing Principles, IMF, 2014

⁶ Taxing Telecommunication/ICT services: an overview, ITU, 2013

⁷ Fundamental principles of taxation in addressing the tax challenges of the digital economy, OECD, 2014

Imposing mobile sector-specific taxes can raise the selling price of mobile services and devices, which can reduce their consumption and production across the economy. In the long-run, decreased production and consumption would result in lower tax revenue.

Against the principles set out in Table 2 above, we can assess the suitability of sector-specific taxation:

1. When special tax rates apply only to the mobile sector, they can distort the functioning of the mobile market compared to the rest of the economy. For instance, by increasing prices for consumers and raising costs for firms, these taxes may lead to lower profitability in the mobile market compared to other industries and mobile markets in lower-tax countries. This mismatch can make investing relatively less attractive in a high-tax sector and high-tax country, leading to underinvestment by domestic and foreign investors in the country's mobile industry and an inefficient allocation of capital across the economy.
2. Sector-specific taxes are not aligned with best-practice taxation in terms of accounting for the positive externalities of mobile connectivity. Studies have estimated mobile technologies' positive impacts on productivity and economic growth. Sector-specific taxes, by potentially inducing lower consumption and production of mobile services, can limit these positive, broader impacts. The OECD, in particular, has highlighted the problems of introducing taxes in sectors with positive externalities such as the telecoms sector.
3. Consumer taxes and fees in the mobile market could have a disproportionate impact on the poorest households and exacerbate existing income inequality. Applying sector-specific taxes on mobile services means a large section of the population is subject to additional taxes, with the poorest paying the highest percentage share of their income or savings. Unlike a typical graduated and progressive income tax, where high earners pay a higher rate of tax compared to those earning less, mobile taxes are often the same for all people, regardless of their income levels.
4. Since governments do not levy additional taxes on most other sectors, mobile sector consumers could suffer disproportionately compared to the wider economy. The range of sector-specific taxes paid does not typically align with the best-practice principles of encouraging simplicity, predictability and transparency in tax design. This misalignment can raise mobile operators' compliance costs, create barriers for new firms in the market, or lead to slower investment and innovation.

This paper focuses on the impact of taxes imposed directly on mobile consumers. This primary analysis will create a methodology for assessing normalised costs of accessing mobile, as well as considering the impact of tax on those costs. In addition, we undertake preliminary bivariate analysis on some of the outcomes of taxing outside of best principles, such as on income and demand.

3. Methodology

Our methodology to assess the consumer cost of using mobile is based on the total cost of mobile ownership (TCMO) construction used by Deloitte, GSMA from 2005 onwards⁸.

3.1 TCMO as a proportion of income

The total cost to a consumer of owning and using a mobile phone can be defined by using the concept of TCMO. TCMO is calculated in monthly terms, on the basis of three building blocks:

- The handset price, i.e. cost of the mobile device required for the use of mobile services. This represents a one-off cost that can be spread over the lifecycle of the device (after which it is assumed to be replaced). Handset prices were converted to a monthly price based on a handset lifecycle assumption of three years for developing markets and two years for developed markets, to take into account differences in usage patterns, disposable income and willingness to pay.⁹
- The activation and connection price or any other charges incurred to connect to the operator's network. For prepaid customers this usually consists of an initial charge for activating the SIM card. For postpaid customers there may be additional upfront costs, such as an initial charge for activating the number. Activation and connection prices were converted into monthly prices assuming they follow the lifetime of the device.
- The price related to use, comprising voice, SMS and data charges, which can be prepaid or postpaid. This price is already expressed in monthly terms.

To account for the fact that the handset, activation and connection and usage prices are different across consumption profiles, the TCMO was calculated for various baskets, which we set out in Table 4 below. Since these baskets have different usage characteristics (in usage allowance, type of contract and technology), they can have different prices in the usage block of the TCMO as well as in the activation and connection component. As far as the device component is concerned, the same device was used for all baskets, since it was assumed these two profiles use it with similar purposes and services¹⁰ and hence require a similar technology.

The calculation of the TCMO for basket b of country i is as follows.

$$TCMO_{bi} = \frac{\text{Handset price}_i}{\text{Handset lifecycle}_i} + \frac{\text{Activation and connection price}_{bi}}{\text{Handset lifecycle}_i} + \text{Usage price}_{bi}$$

In order to account for income differences across countries, TCMO was expressed as a proportion of income per capita across different income quintiles¹¹, using the most recent information on income

⁸ See [Global Mobile Tax Review, 2006-07](#), GSMA and Deloitte

⁹ This assumption is based on [Global Mobile Tax Review](#), GSMA and Deloitte, 2011.

¹⁰ This assumption is based on the fact that the data allowance is not substantially different, which should to a certain extent drive similar usage patterns.

¹¹ This results from estimating the share of nominal GDP across different income deciles, to then distribute this between the number of individuals in each decile.

distribution available from the World Bank.¹² The primary TCMO measure presented in this study was estimated for 2017 – i.e. using pricing and income data as of 2017. Since data collection of prices was carried out throughout the first quarter of 2018, for countries experiencing substantial inflation, adjustments have been made to allow for better estimates of 2017 mobile service prices. Prices were captured in local currencies and converted to US dollars using exchange rates from Oanda in 2018.

3.2 Taxes as a proportion of TCMO

The price of the three building blocks presented above can be further broken down into the price before tax (which covers costs and profits) and taxes. The latter can vary between general consumer taxes and sector-specific taxes. Table 3 presents the tax rates that have been considered for this analysis.¹³ Note that this study only covers consumer taxes. Any potential pass-through of taxes levied on the operator to consumers was not considered due to the complexities involved in modelling the latter.¹⁴ There is therefore likely to be an underestimation of tax as a proportion of TCMO presented here.

Table 3: Calculation of the proportion of tax in TCMO

TCMO	Handset price	Handset price before tax		
		Taxes	General taxes	VAT*
				Customs duties*
			Sector-specific taxes	Luxury taxes**
	Activation and connection price	Activation and connection price before tax		
		Taxes	General taxes	VAT*
			Sector-specific taxes	Activation and connection fees**
	Usage price	Usage price before tax		
		Taxes	General taxes	VAT*
			Sector-specific taxes	Excise duties on usage**

Tax as a proportion of TCMO

*Ad valorem tax rates

**Tax rates can be either ad valorem or fixed fees

Source: GSMA Intelligence

Taxes in the TCMO were calculated by applying tax rates to the appropriate tax base.

- In the case of ad valorem taxes (VAT and excise duties), the relevant tax base is the retail price of the relevant TCMO building block that was used.

¹² The most recent year being 2013 or from previous years up to 2003 for some countries where 2013 data was not available.

¹³ Due to lack of data, the analysis of tax rates excludes rates on international traffic (hence, we assume no international calls) and additional tax rates related to importing devices such as processing fees.

¹⁴ Estimating the percentage of an operator tax or fee that is reflected in the retail price of mobile services depends on type of tax, prevailing market conditions of competition and price elasticity of demand across different groups of consumers, among other factors.

- In the case of customs duties, the selected tax base was the retail price of the device building block in the TCMO. A more accurate calculation of customs duties would have involved using the price of goods at the import level as the tax base since retail prices incorporate a number of additional factors (such as transport costs or retailer costs and margins). No data is, however, available on import prices, hence our approach to use retail prices as a close proxy.¹⁵
- In the case of fixed amount taxes, a number of assumptions were made. For activation and connection fees applied on the value of the SIM card, it was assumed that the average retail price of the SIM is \$1.2.¹⁶ For general fixed fees, the tax payments were converted to a monthly level.¹⁷ In rare cases where fixed are applied per day of usage, it was assumed that the average consumer uses mobile services for 20 days in a month.¹⁸

4 Data

We sourced three groups of data to undertake our analysis: pricing data including prices for handsets and usage plans; tax rates applicable to handsets and usage; and macroeconomic data for statistics on income.

4.1 Pricing data

Pricing data for devices and tariffs were provided by Tarifica. Retail prices were captured as of the first quarter of 2017, including all relevant taxes. Based on GSMA Intelligence analysis, four baskets were defined with different levels of usage allowance, type of contract and technology. The following aspects were taken into account:

- Historic average trends in data consumption across countries, sourced from GSMA Intelligence, Ofcom¹⁹, Tefficient²⁰ and Opera²¹. Data requirements going forward (which are likely to increase) were also taken into account. The analysis of average values was carried out taking into account the skewness introduced by intensive users of mobile services.
- A selection of allowances currently offered by operators in developed and emerging markets, provided by Tarifica.

¹⁵ Note that the difference between retail and import prices is likely to be country-specific (i.e. due to differences in transport and logistic costs and/or different market structures at the retail level, for instance).

¹⁶ This is an illustrative assumption, based on \$1 wholesale price plus illustrative costs and margins that add to retail. Wholesale prices retrieved from www.budgetelectronics.cat

¹⁷ Yearly fees were brought to monthly level by dividing by 12. One-off fees were brought to monthly level by dividing by the lifecycle of the device (consistent with the approach taken with regards to fixed fees when measuring the TCMO as such).

¹⁸ This is an illustrative assumption.

¹⁹ [The Communications Market Report](#), Ofcom, 2016

²⁰ [Unlimited pushes data usage to new heights](#), Tefficient, 2016

²¹ [State of the Mobile Web Africa 2016](#), Opera, 2016

- Baskets used in existing benchmarking studies from OECD²², Ofcom²³, EC²⁴ and Tarifica. These represent basket designs often used in the economics literature analysing pricing in the mobile industry.²⁵

The baskets resulting from this analysis are shown in Table 4.

Table 4: Usage basket profiles

Source: GSMA Intelligence and Tarifica

	Basic	Low	Medium	High
Allowance	100 MB data	500 MB data	250 voice minutes 100 SMS 1000 MB data	5000 MB data
Tariff	Prepaid	Prepaid or postpaid	Prepaid or postpaid	Prepaid or postpaid
Technology	2G, 3G or 4G	3G or 4G	3G or 4G	3G or 4G

To capture all costs consumers face when consuming mobile services (handset price, activation and connection fees and usage price), Tarifica collected two variables for each country: the retail price of a device and the tariff price, which included activation and connection fees as well as the price of the service.

Device prices were obtained from mobile operators' websites for the cheapest handset available in the market with internet-browsing capability – a smartphone²⁶ or feature phone²⁷. Given that the performance for basic internet mobile applications (such as basic video or social networking) is only functional with 3G and 4G, this analysis excluded devices with 2G and WAP connectivity. Device prices from retailers other than mobile operators were analysed for the countries where mobile operators did not offer handsets, which means that in some markets there may be cheaper devices available.

Mobile tariffs for each country were measured by the cheapest available plan for each basket across all mobile operators in the market. The plans and prices available for each market were obtained from the websites of mobile operators. Tariffs from mobile virtual network operators were not taken into account.²⁸ A number of restrictions were applied to ensure prices are representative of regular usage and consumption patterns:

- Postpaid plans that required a commitment of more than 24 months were excluded.

²² [Digital Economy Outlook 2015](#), OECD, 2015

²³ [The Communications Market Report](#), Ofcom, 2016

²⁴ [Mobile Broadband Prices in Europe 2016](#), European Commission, 2016

²⁵ For instance, OECD and Tarifica's benchmarking has been extensively used in studies such as: *Evaluating market consolidation in mobile communications*, CERRE, 2015; *Ex-post analysis of two mergers: T-Mobile/tele.ring in Austria and T-Mobile/Orange in the Netherlands*, DG Comp 2015; *The impact of competition on the price of wireless communications services*, Hounghonon, G.V, 2015; *Supersonic: European telecoms mergers will boost capex, driving prices lower and speeds higher*, HSBC Global Research, 2015

²⁶ A smartphone is a device that has an open operating platform (where new applications can be developed and installed by the user).

²⁷ A feature phone is a device with a closed platform, where non-native applications can be installed.

²⁸ This could mean that in some markets cheaper alternatives could be available.

- Prepaid plans lasting less than one month were included; where this applied, usage allowance and prices were scaled up to one month.
- When there are promotional offers, only those that appear to be permanent were taken into account.
- Plans targeted or restricted to certain profiles (e.g. youth, student, senior) were not included.

4.2 Consumer tax rates

Tax rates were sourced from mobile operators and the following public sources:

- VAT rates were obtained from PwC Tax Summaries²⁹, KPMG³⁰ and OECD's Tax Database³¹
- Sector-specific consumer tax rates and fees were sourced from PwC Tax Summaries, IBFD³² and from desktop research (e.g. government budget laws, mainstream media).
- Customs duties on handsets were collected from the World Trade Organisation (WTO) website. These refer to the Harmonised System HS code 851712: 'Telephones for cellular networks mobile telephones or for other wireless networks'.
- Previous Deloitte and GSMA global³³ and country reports³⁴.

4.3 Macroeconomic data

We sourced macroeconomic data from the IMF, World Bank and Oanda.

Table 5: Source of macroeconomic data

Variable	Time	Source
Nominal GDP	2017	IMF World Economic Outlook ³⁵
Population	2017	World Bank
Income distribution	2003–2013	World Bank ³⁶
Exchange rates	2014–2017	Oanda ³⁷

²⁹ [PwC Tax Summaries](#), 2016

³⁰ [Indirect tax rates studies](#), KPMG, 2017

³¹ [OECD Tax Database](#)

³² [IBFD Database](#)

³³ *Digital inclusion and mobile sector taxation 2016*, GSMA and Deloitte, 2016; *Digital inclusion and mobile sector taxation 2015*, GSMA and Deloitte, 2015; *Global Mobile Tax Review 2011*, GSMA and Deloitte, 2011.

³⁴ E.g. *Digital Inclusion and Mobile Sector Taxation in Brazil*, GSMA and Deloitte, 2016; *Digital Inclusion and Mobile Sector Taxation in Colombia*, GSMA and Deloitte, 2016

³⁵ See <https://www.imf.org/external/pubs/ft/weo/2017/01/weodata/index.aspx>

³⁶ See <http://data.worldbank.org/indicator/SI.DST.FRST.20>

³⁷ See <https://www.oanda.com>

5. Trends in consumer tax rates

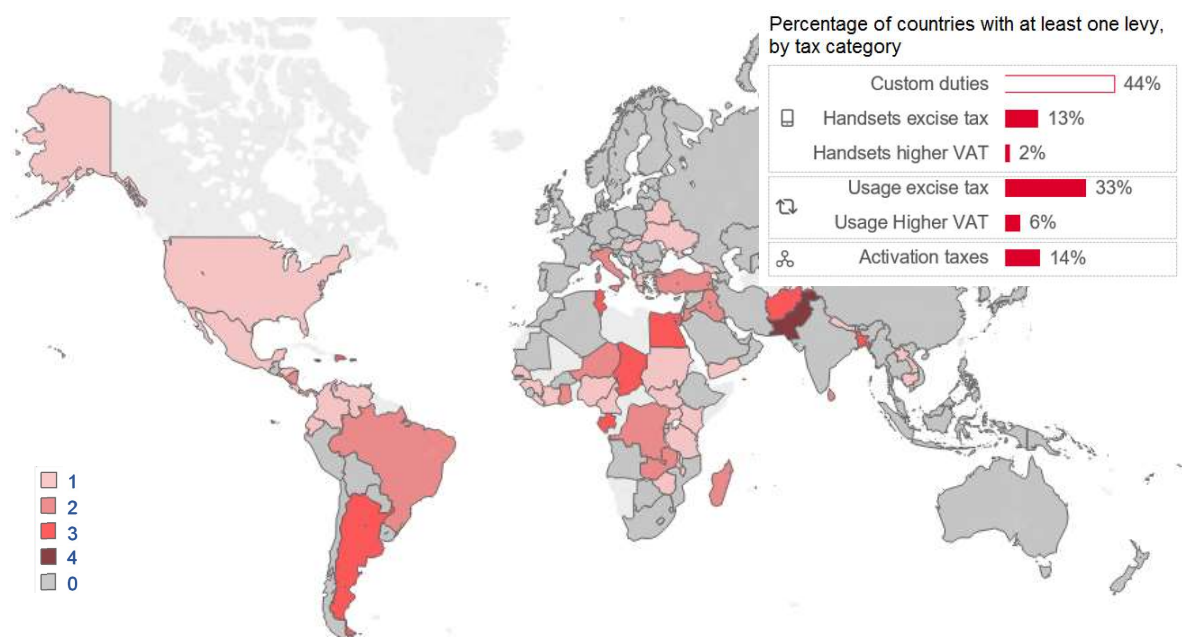
We reviewed tax regimes in 143 markets (representing 98% of the global population), analysing the sector-specific taxes that consumers pay when using mobile services and purchasing mobile devices in 2017. The review covered five categories of sector-specific tax, grouped under activation, usage and handset taxes (see Table 5). VAT and customs duties on devices were also reviewed, although not considered as a sector-specific tax. To analyse trends, a consistent sample of 110 countries was studied from 2011 to 2017.

In 60 countries consumers pay sector-specific taxes when using mobile services or purchasing devices; these apply on top of general tax rates. This represents almost 1.5 billion unique mobile subscribers.

- Sub-Saharan Africa and MENA account for most of these countries (31), followed by Latin America (13). In these three regions, more than half the markets have at least one sector-specific levy on mobile services or handsets.
- Usage excise taxes, applied on top of VAT, are the most frequently used type of consumer tax (present in approximately 30% of the markets studied). This is followed by handset excise taxes and activation taxes (in 15% of markets). Customs duties on handsets still apply to almost half the markets reviewed.
- Among the countries where consumers pay sector-specific taxes, half have two or more levies on mobile usage or mobile devices. In some markets, consumers pay sector-specific taxes in three or four of the categories analysed. These include Afghanistan, Argentina, Bangladesh, Chad, Dominican Republic, Egypt, Gabon, Jamaica, Pakistan, Turkey and Tunisia.

Figure 1: Sector-specific levies on the consumption of mobile services and mobile devices (2017)

Source: GSMA Intelligence



Note: Shows number of sector-specific tax categories where there is at least one levy

An increasing number of governments have introduced levies specific to mobile consumption and devices in recent years. Globally, there have been 120 introductions or increases of sector-specific levies, over the 2011–2017 period.

- Most of these increases or introductions have taken place in Sub-Saharan Africa. Asia-Pacific was the only region where consumers saw more tax reductions than increases, but this did not lead to a reduction in the number of countries where consumers pay sector-specific taxes.
- Excise taxes on usage were the most increased duty over the period, while customs duties were the only tax analysed to have experienced a substantial net decrease. This suggests that, while governments move towards improving the affordability of devices by reducing barriers to trade, consumers are facing increased domestic tax pressure on their use of mobile services.

As a result, between 2011 and 2017 the percentage of countries globally that have at least one sector-specific levy increased from 26% to 41%.³⁸

Table 6: Percentage of countries with sector-specific taxes

Source: GSMA Intelligence

	Global	Sub-Saharan Africa	MENA	Latin America	Asia-Pacific	Europe
2011	26%	43%	33%	36%	24%	9%
2017	41%	63%	56%	57%	33%	17%

Note: Based on a consistent sample of 110 countries, between 2011 and 2017.

The penetration of sector-specific taxation is particularly high in Sub-Saharan Africa, MENA and Latin America (see Table 6). Consumers in the majority of these markets now have sector-specific levies after new levies were introduced during 2011–2017. In Europe, the percentage of countries with these taxes has doubled following the introduction of levies in Albania, Hungary, Ukraine and Malta.

Sub-Saharan Africa drove a substantial part of the global net increase in tax on consumers (Figure 2). Consumers saw the introduction of new sector-specific levies on usage in countries including Cameroon, the Democratic Republic of Congo, Guinea, Malawi and Zimbabwe (ranging from 2% to 10%). Consumers in other countries were subject to increases in existing levies – for example, Madagascar, Rwanda, Tanzania, Uganda and Zambia.

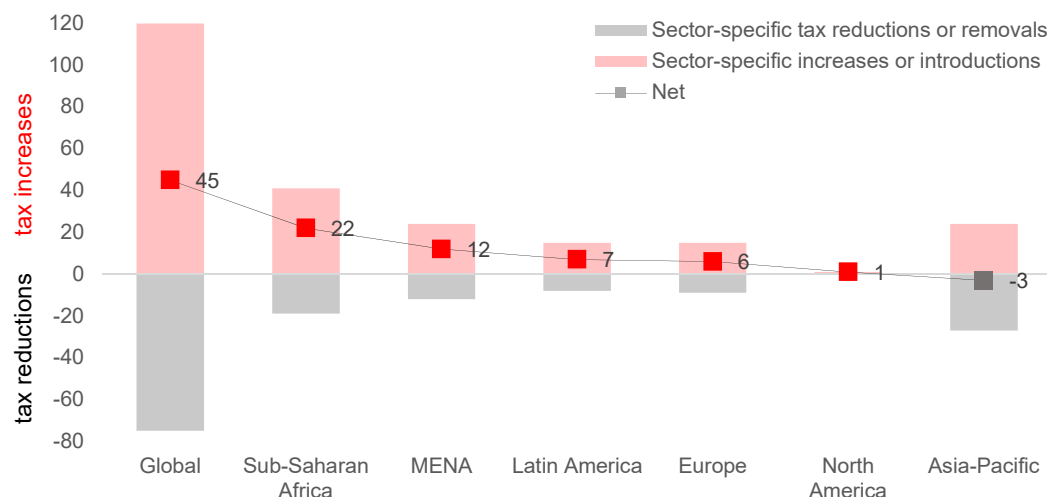
Asia Pacific was the only region to experience more decreases than increases. Some countries reduced existing levies, including Pakistan (14% to 12.5% additional tax on usage) and Afghanistan (10% to 5% additional tax on usage); while others completely removed sector-specific levies on usage, including India (10% additional tax on usage) and Malaysia (6% additional tax on prepaid usage). However,

³⁸ This is based on tracking a consistent sample of 110 countries, between 2011 and 2017. Note the sample of countries included in this analysis is a subset of the 143 countries for which 2017 consumer tax rates are reported.

overall, this did not lead to a decrease in the percentage of countries with sector-specific levies in the region; consumers are still subject to an additional (but decreasing) tax burden.

Figure 2: Number of unique sector-specific tax changes, increases or decreases (2011–2017)

Source: GSMA Intelligence



Note: Based on a consistent sample of 110 countries, between 2011 and 2017

Turning to the type of tax imposed: the use of voice, SMS and data services is typically subject to general taxes (e.g. VAT or sales tax), on top of which consumers in some countries also pay sector-specific levies such as excise duties or higher VAT rates.

- Consumers are subject to additional taxes on usage in 50 markets. Mobile-specific taxation on usage consists of excise duties in most countries; only eight countries have higher VAT rates.
- Sector-specific tax rates on usage are on average 9% in these markets. This does not take into account additional sector-specific tax rates on usage, which are not applied as a proportion of usage (ad valorem) but as fixed fees.
- Almost half the markets where consumers pay mobile-specific taxes on usage are in Sub-Saharan Africa (21). However, the four countries with the highest rates are in MENA and Asia Pacific: Jordan, Turkey, Sri Lanka and Iraq. In these countries, consumers face sector-specific levies of 20% or above (see Figure 9) – although in 2018 Turkey reduced its 25% levy to 7.5%.³⁹

Due to the magnitude of sector-specific levies, consumers in these countries bear a higher overall tax burden. After accounting for general taxes (such as VAT and sales taxes), consumers in the sample of countries with sector-specific levies bear an average tax burden of 25%, which is well above the global overall average of 18%. In most of these markets, removal of sector-specific levies would bring overall tax pressure below the current global average, and could improve the affordability of mobile services.

Some governments have introduced fiscal policies aimed, in the opposite direction, at reducing the tax burden on consumers of mobile services, and with a view to encourage the positive effects of mobile

³⁹ Until 2017, consumers in Turkey paid an excise tax of 25% on voice and SMS, and 5% on data. In 2018 the government introduced reform consolidating these taxes to 7.5%.

technology on the economy and society. For instance, mobile services are subject to reduced rates of VAT or VAT exemptions in Angola, China, Fiji, Hungary, Lesotho, Mauritania, Senegal and Vietnam.

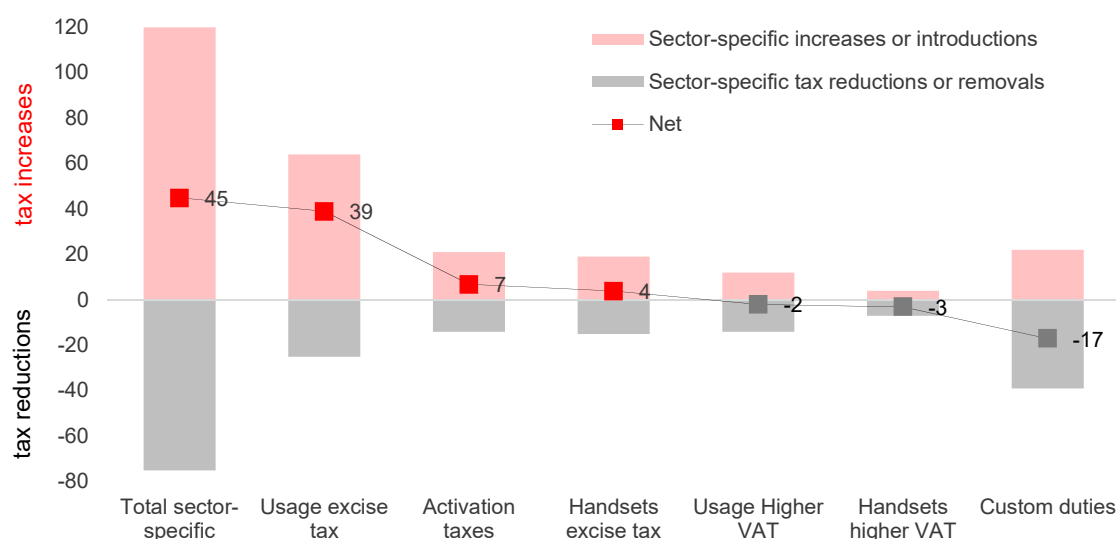
Most tax rate increases in recent years have concerned mobile usage, where consumers have seen a substantial net increase in tax burden (Figure 3).

- Some countries have introduced new sector-specific tax rates on usage, with the highest new rates being in Sri Lanka and Turkey (25%)⁴⁰; Pakistan (14%); DRC (10%); and Albania, El Salvador, Guinea and Tunisia (5%).
- Other countries have increased existing tax rates on mobile usage. Some of the more substantial changes have occurred in Jordan, Nepal and Tunisia, where excise duties have tripled (8% to 26%, 5% to 15% and 5% to 15%, respectively). Sector-specific rates have approximately doubled in Zimbabwe, Tanzania, Bangladesh and Senegal (5% to 10% and 10% to 17%, 3% to 6% and 2% to 5%, respectively).

Contrary to this net increase in tax pressure on mobile usage, consumers globally have seen improvements with regards to taxation on mobile devices and handsets. Analysis of customs duties between 2011 and 2017 shows a substantial net reduction in the rates applied to imports of mobile devices. This is consistent with broader policies to reduce tariff and non-tariff barriers to trade designed to encourage international flows of goods and services. Consumers in many Latin American and Asia-Pacific countries have particularly benefited from reductions in customs duties.⁴¹

Figure 3: Number of unique sector-specific tax changes, increases or decreases (2011–2017)

Source: GSMA Intelligence



Note: Based on a consistent sample of 110 countries, between 2011 and 2017.

⁴⁰ The tax rate in Turkey decreased to 7.5% as of January 2018.

⁴¹ For instance, 10 countries in Asia-Pacific reduced or removed customs duties (including Bangladesh, Cambodia, Indonesia, Malaysia and Pakistan), with eight in Latin America (Brazil, Ecuador and Guatemala, among others).

6 Trends in the TCMO

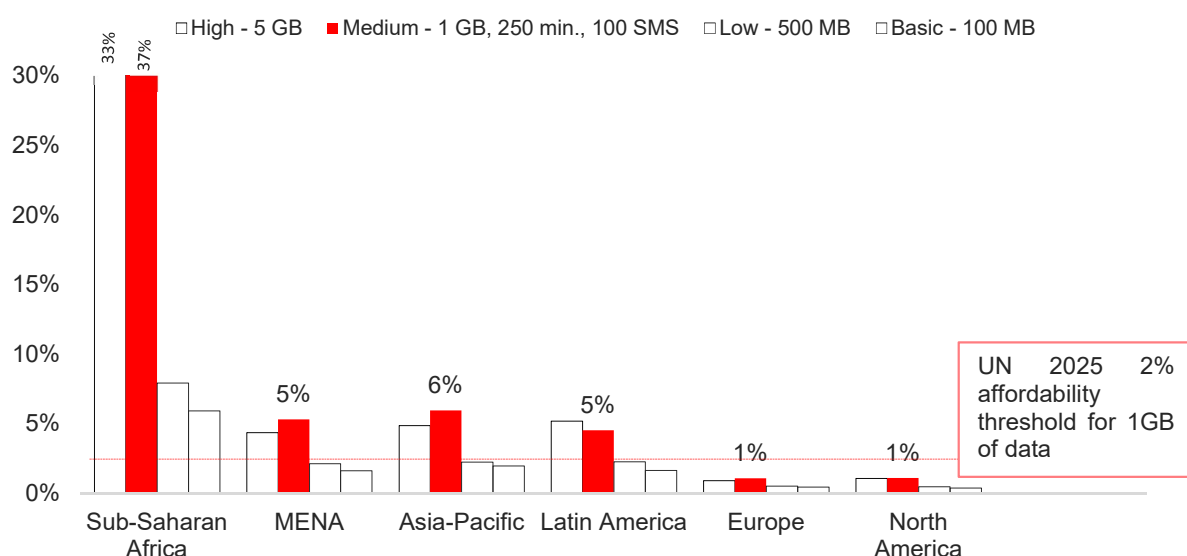
In this section of the paper, we turn our attention to the post-tax total cost of mobile ownership.

In this exercise, we use a benchmark to assess the affordability of mobile services (based on TCMO). The UN's Broadband Commission recently adopted a target for affordable internet of 2% of income per capita for 1 GB of data, to be reached by 2025.⁴² This replaced the previous target, of 5% of income per capita for 500 MB of data, to be reached by 2015. Note that the Medium basket used in this analysis includes 1 GB of data, 250 minutes of voice and 100 SMS – and the UN's affordability threshold is for a package of 1 GB of data only.

Our analysis (Figure 4) shows that both the Medium and High baskets are, based on the UN's target, unaffordable for the average consumer in Sub-Saharan Africa, MENA, Asia-Pacific and Latin America. In these regions the cost of the baskets is at least double the UN's 2025 affordability threshold of 2% of income per capita. Countries in these regions are still behind the UN's former affordability target of 5% by 2015.

Sub-Saharan Africa particularly stands out, since it is the only region with affordability levels well above the 2% threshold across all the baskets studied. No single basket is affordable for the average consumer.

Figure 4: TCMO as a proportion of income, for all earners (2017)

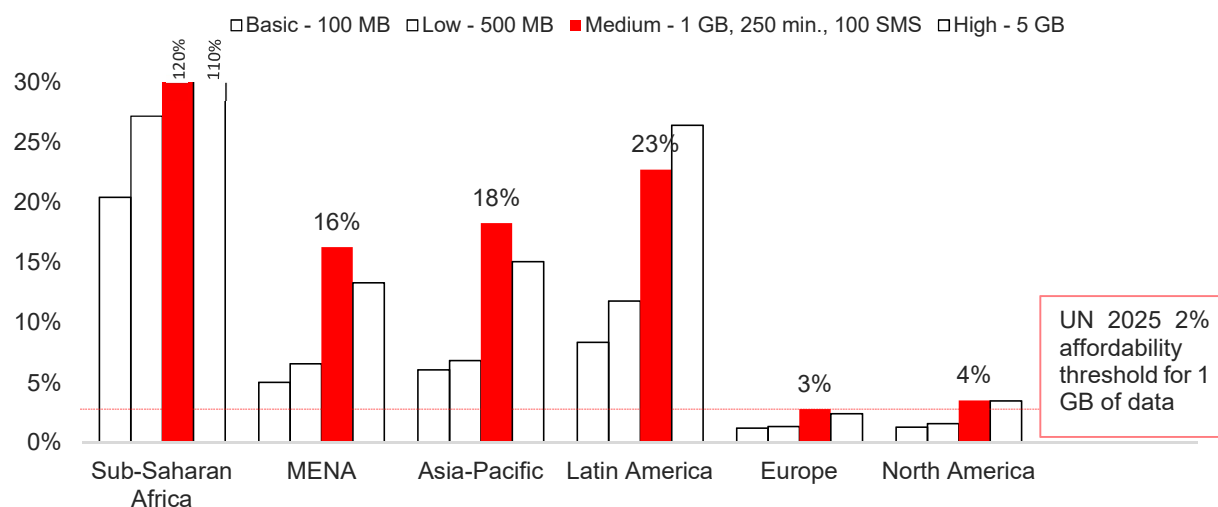


Focusing on the bottom 20% of the income pyramid (Figure 5), no region meets the UN's 2025 2% target for the Medium basket. For the poorest 20%, the Medium basket represents 15–25% of income for the bottom 20% of earners in MENA, Asia-Pacific and Latin America. Meanwhile, this is above 100%

⁴² See "[UN Broadband Commission Adopts A4AI '1 for 2' Affordability Target](#)", A4AI, January 2018

for Sub-Saharan Africa. Europe and North America, while recording a much more affordable TCMO, still have Medium and High baskets slightly above the UN's 2025 2% affordability target.

Figure 5: TCMO as a proportion of income, for bottom 20% of earners (2017)



Taking into account both general and sector-specific levies on consumption, taxes represent 19% of TCMO. This excludes taxes and fees imposed on operators, which may in part be passed on to consumers, depending on a number of factors, meaning the tax burden that consumers bear is likely to be higher.⁴³

When the TCMO is viewed as a trend over time, we see that it has been decreasing as a proportion of income. Improvements in affordability have been primarily driven by price cuts in mobile tariffs and devices (Panel B in Figure 6), and to a lesser degree by improvements in income.

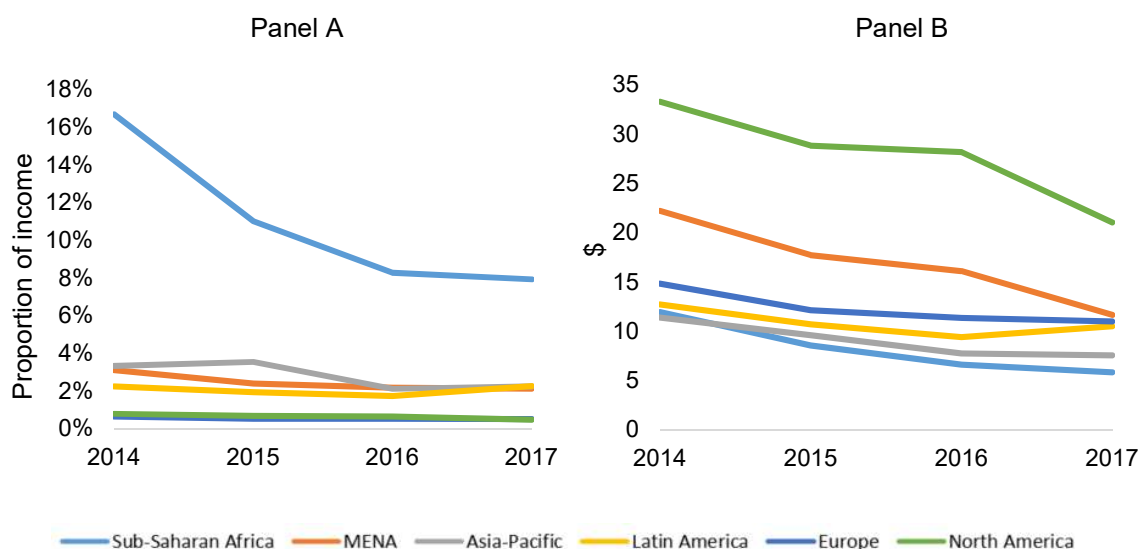
- Sub-Saharan Africa has seen the greatest improvement in affordability, with the TCMO of the Low basket halving both in US dollar terms (Panel B) and as a proportion of income per capita (Panel A).
- The remaining regions have all seen decreases in prices of mobile tariffs and devices too (Panel B), which have translated into improvements in affordability – prices as a proportion of income have decreased between 20% and 40% (Panel A). This is true with the exception of Latin America, whose TCMO as a proportion of income remained stagnant (income remained stagnant or decreased in a number of markets).⁴⁴

⁴³ Factors that are likely to impact the extent to which operator taxes and fees are passed on to consumers include type of tax, type of competition in the market and price elasticity of demand.

⁴⁴ In Latin America, prices decreased in US dollar terms over the period, but income per capita did not improve substantially (and in some countries remained stagnant or decreased slightly).

Figure 6: TCMO for the Low basket (500 MB), as a proportion of income, in US dollars (2017)

Source: GSMA Intelligence



These downward trends in TCMO goes against the trends in taxes on the sector's consumers. Since 2011, taxes as a proportion of TCMO have increased by almost 10% globally. This has been driven by both a net increase in consumer sector-specific tax rates, as well by increases in general taxation (particularly VAT). Sub-Saharan Africa has seen the sharpest increase in tax as a percentage of TCMO.

Consumer taxes represent the highest proportion of TCMO in Europe and Sub-Saharan Africa (Figure 7). However, Europe's taxes are predominantly general taxation – applying to most goods and services in the economy. These do not have such a distortive impact on the economy. Sector-specific taxation has the strongest incidence in Sub-Saharan Africa, MENA and North America. However, taking income differences into account, this has a greater impact in Sub-Saharan Africa, MENA and Asia-Pacific.

Figure 7: Taxes as a proportion of TCMO for the Medium basket (1 GB, 2017)

Source: GSMA Intelligence (North America only includes the US)

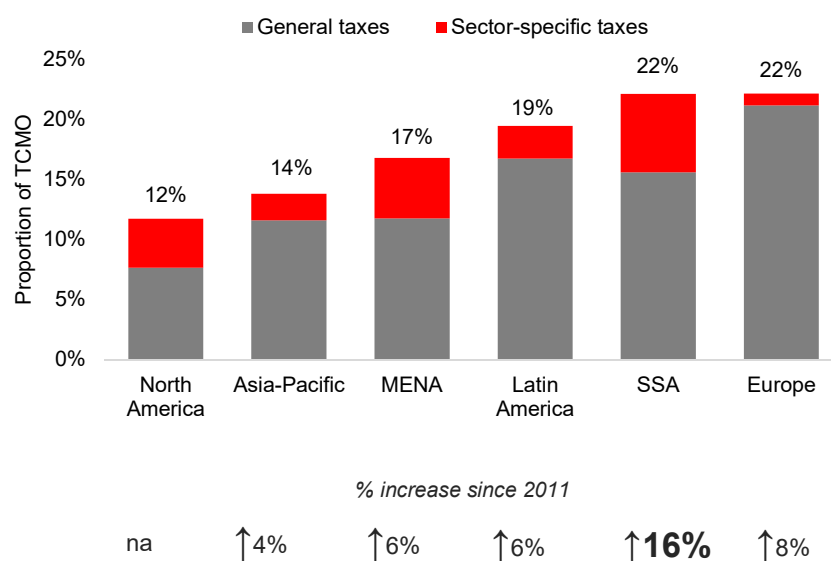
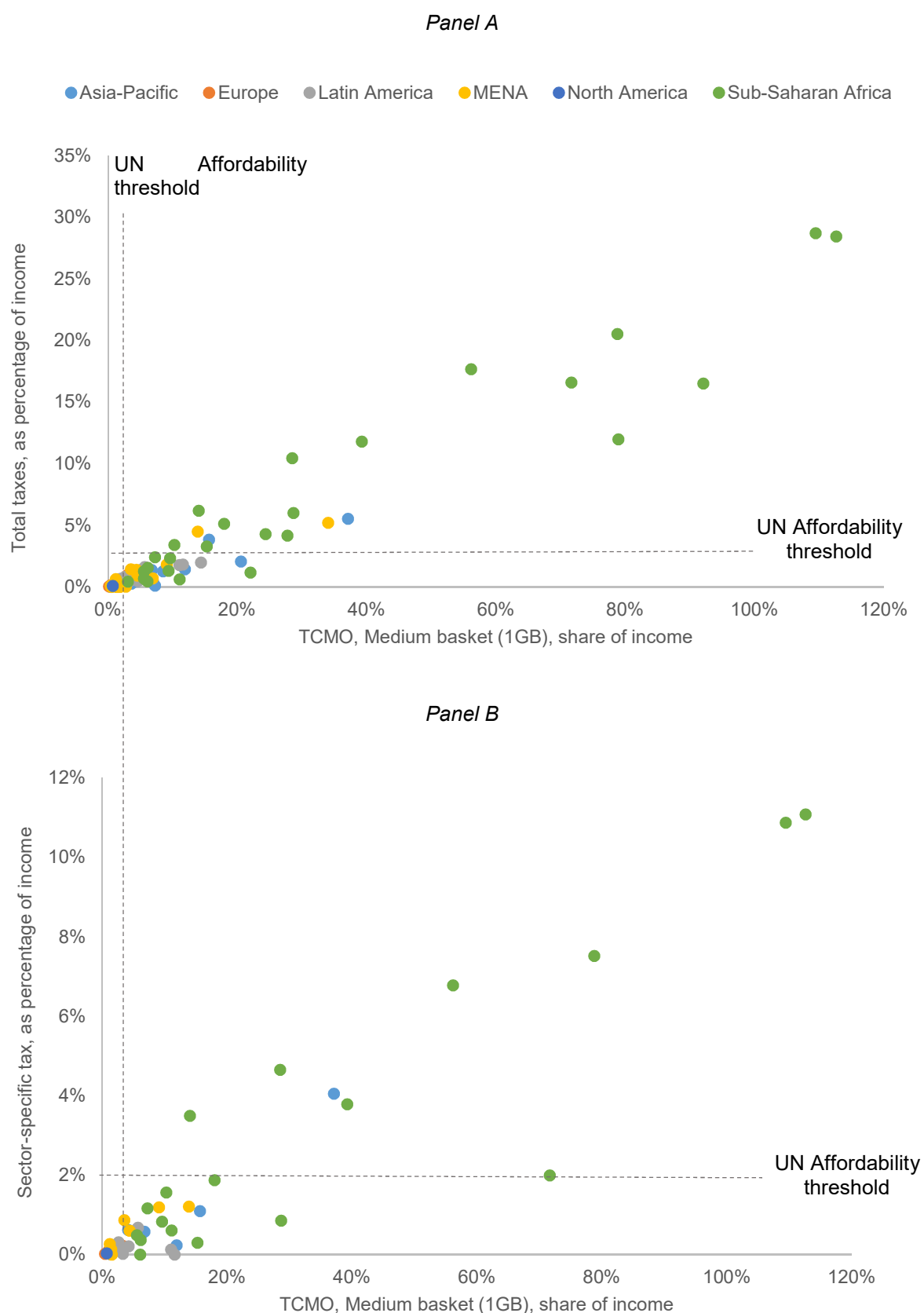


Figure 8: Taxes and the TCMO (Panel A), and Sector-specific taxes and the TCMO (Panel B)

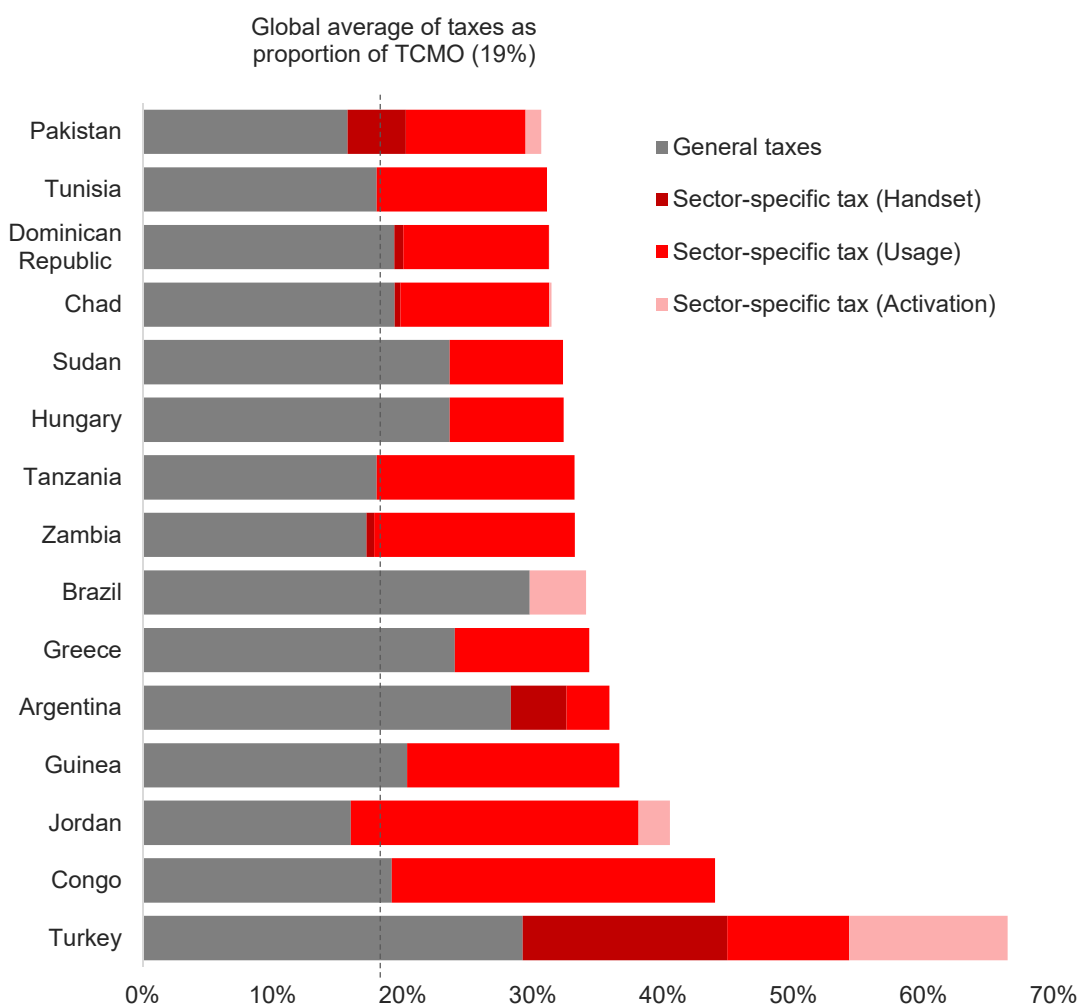


There is also a strong positive relationship between both overall and sector-specific taxation and the TCMO (Panels A and B in Figure 8). Notably, there are a number of Sub-Saharan African countries where sector-specific taxes alone are above UN's 2% affordability threshold (Panel B).

There are 15 countries where the sum of general and sector-specific taxes accounts for more than a third of TCMO (Figure 9). Other than Greece, countries with the highest taxation are all emerging or developing markets. Notably, these all have sector-specific taxes in place (with Turkey standing out as having the highest combined sector-specific levies). Note that in Turkey, Congo, Jordan and Guinea, of all the taxes paid by consumers, more than a third are mobile sector-specific. Had there been no mobile-specific taxation on these top 15 countries, the tax burden for consumers would be halved on average. This would bring total taxes more in line with the global average.

Figure 9: Taxes as a proportion of TCMO for the Medium basket (1 GB) – top 15 countries (2017)

Source: GSMA Intelligence



7. Preliminary analysis of mobile taxes against income and mobile penetration

This section of the paper sets out our initial analysis on assessing the impact of mobile taxation on affordability and mobile penetration. Considerations on further analysis are discussed in section 8.

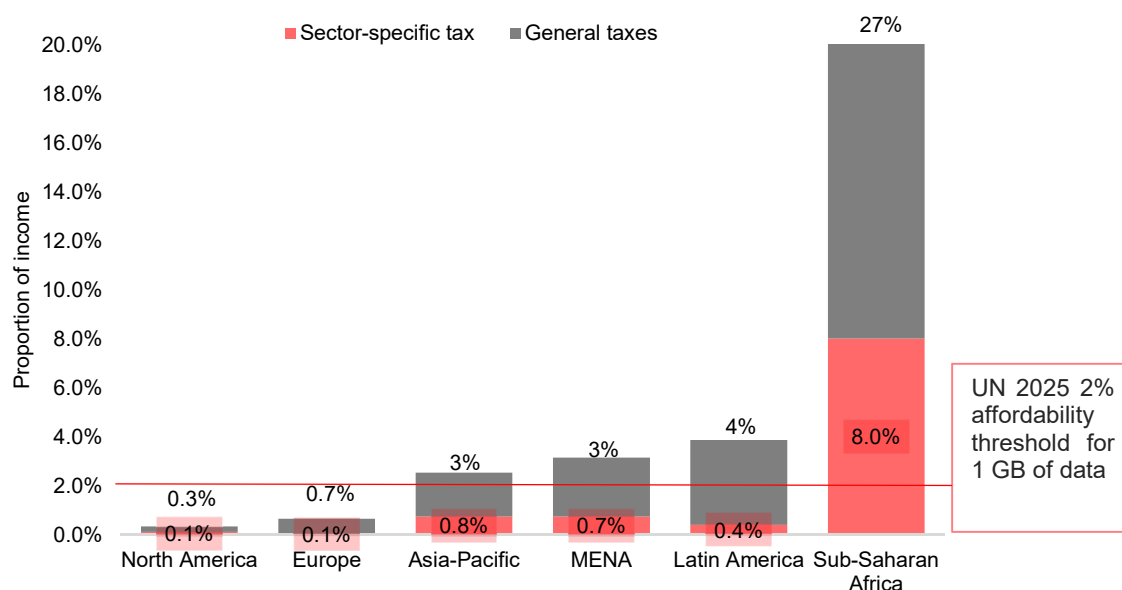
7.1 Assessing taxes against income

Taxes represent 27% of income for the bottom 20% of earners in Sub-Saharan Africa (Figure 10). Sector-specific taxation is particularly stringent in this region, where consumers in the bottom 20% pay 8% of their income in mobile-specific taxes. This is four times the UN's 2% threshold for 2025. Had there been no sector-specific taxes, the total tax rate imposed on these consumers would be reduced by almost a third.

In Asia-Pacific, MENA and Latin America, the sum of taxes represents 3–4% of income for the bottom 20% of earners. For these regions, the removal of sector-specific taxes would reduce the total tax supported by consumers, bringing it more in line with that seen in Europe and North America.

Figure 10: Taxes as a proportion of income, based on TCMO for Medium basket (1 GB), bottom 20% of earners (2017)

Source: GSMA Intelligence

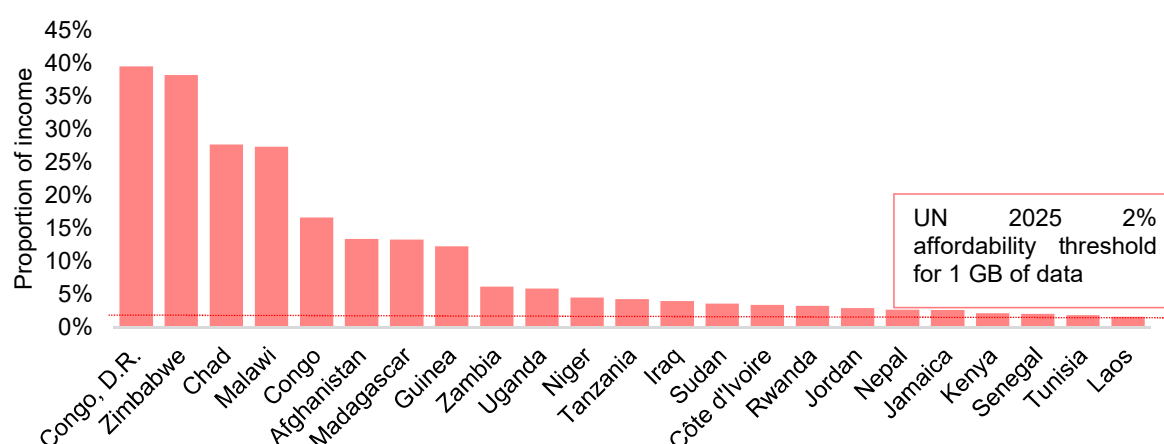


Note: North America only includes the US

In 23 markets sector-specific taxes alone represent more than 2% of income for the bottom 20% of earners (see Figure 11). These are predominantly located in Sub-Saharan Africa and MENA. Given the strong incidence of sector-specific taxes in these markets, their removal could benefit consumers.

Figure 11: Sector-specific taxes as a proportion of income, based on TCMO for Medium basket (1 GB), bottom 20% of earners (2017)

Source: GSMA Intelligence



7.2 Assessing the knock-on impact on mobile penetration

Affordability of mobile services and devices is a key determinant of mobile service adoption. Globally, there is a negative relationship between the total cost of mobile ownership (TCMO) and mobile connectivity, as measured by mobile internet penetration.⁴⁵ Lower prices can particularly increase adoption among those with lower incomes, or lower willingness to pay, while also allowing existing users to increase their usage.

Figure 12 sets out the relationship between mobile taxation on the TCMO and mobile internet penetration by region. Sub-Saharan African countries exhibit low mobile internet penetration with varying but all high levels of TCMO as a percentage of income. Europe has the opposite trend, with low levels of TCMO as a percentage of income with varying but all high levels of mobile internet penetration.

In other regions, we see more variation creating the bridge in the relationship between European countries and Sub-Saharan African countries.

⁴⁵ Total mobile internet subscribers in 2017, expressed as a percentage of total market population.

Figure 12: TCMO for the Medium basket (1 GB) and mobile internet penetration (2017)

Source: GSMA Intelligence

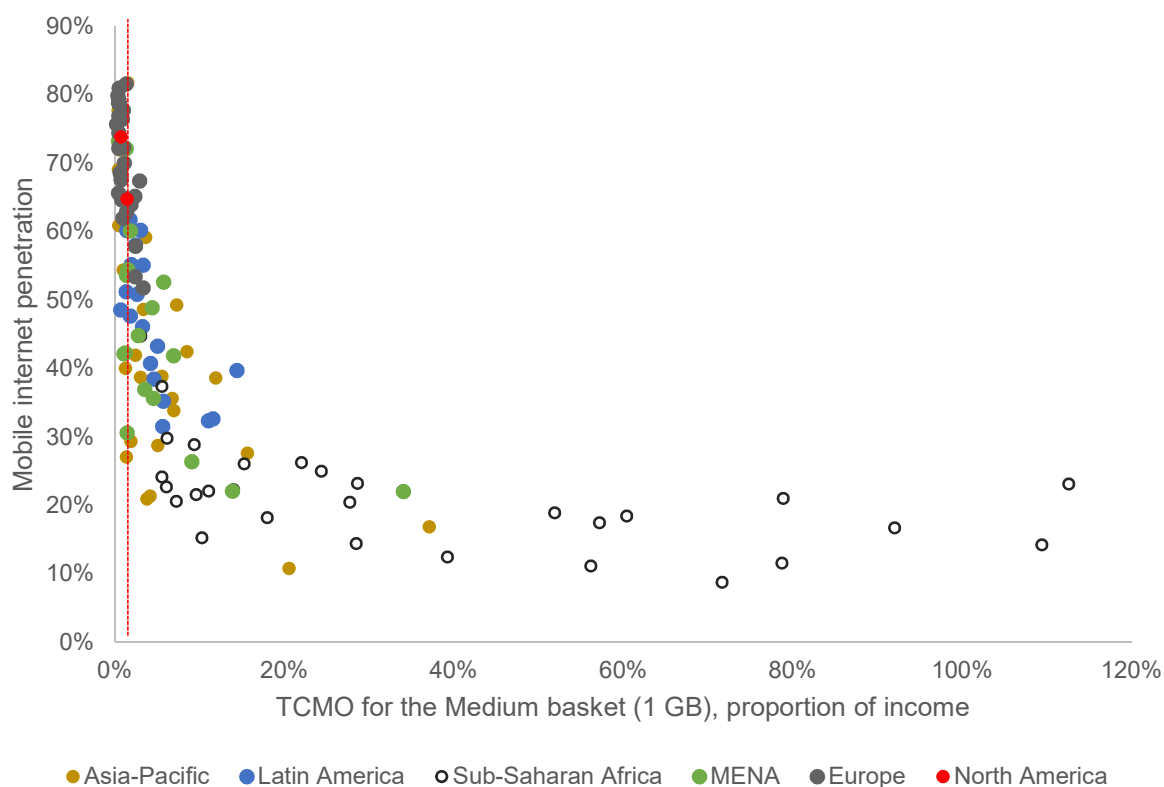
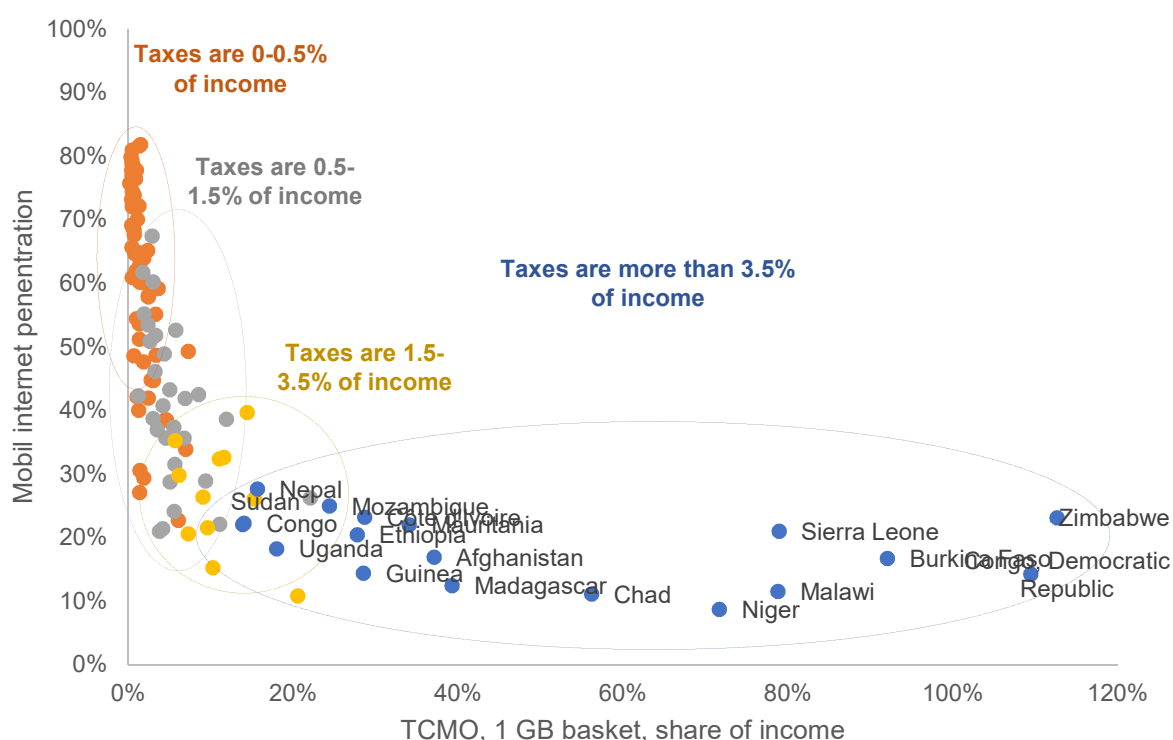


Figure 13 shows the same relationship, that there is a strong association between higher cost of mobile ownership, and lower connectivity levels, as measured by mobile internet penetration. But in addition, it shows that the relationship is also determined by the level of tax within the TCMO (as a percentage of income). Most advanced digital countries are found in the upper-left corner of Figure 13 where the taxes are low, as well as prices, as measured by TCMO. Towards the bottom right area of the chart, countries where overall tax incidence is high show lower connectivity levels.

Figure 13: TCMO for the Medium basket (1 GB) and mobile internet penetration (2017)⁴⁶



8. Conclusions and further analysis

Our TCMO framework provides a set of results for more than 100 countries. We have shown results which include TCMO as a proportion of income per capita, across different income quintiles; general and sector-specific taxes as a proportion of TCMO; or general and sector-specific taxes as a proportion of income. Our initial results in our bivariate analysis shows that there is a relationship between tax, the TCMO and mobile penetration to be investigated further.

Yet additionally, we have seen a trend of TCMO decreasing across regions, but a counter-intuitive trend of sector-specific tax rates increasing on average.

To date, there has been no study that has assessed, ex-post, the impact of tax rate changes on the TCMO and mobile market outcomes such as mobile internet penetration. Our initial results provide motivation for such further analysis, but there will be challenges in isolating the impact of sector-specific tax rate changes in the broader climate of a study country's or study region's fiscal policies. Additionally, identifying appropriate counterfactual scenarios for such analysis will be difficult when so many countries have undertaken some change in mobile sector-specific tax policy in recent years.

⁴⁶ Total mobile internet subscribers in 2017, expressed as a percentage share of the total market population.

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