Mobile taxation in Brazil

Supporting digital transformation

2020

GSMA
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Contents

Executive summary

Mobile telephone services are playing an increasingly important role globally in supporting economic growth and social inclusion. Growth in mobile penetration can enhance digital connectivity by expanding internet and broadband access, which in turn facilitates the reduction of barriers to trade, commerce, communication, service delivery, and human development. These benefits can be delivered by, for example, expansion in financial inclusion via the use of mobile money, digitally enabled local entrepreneurship, innovative digital health and education delivery systems, and growing numbers of e-government initiatives.

A conducive regulatory environment provides the support the mobile industry needs to thrive and maximise the opportunities available to consumers, business and governments. The regulatory fee and tax frameworks are an important element of this, and there is a need to achieve the right balance between revenue maximisation, and incentivising investment and economic growth.

In this context, the GSMA[1] has commissioned EY to undertake a study of the economic impact of potential regulatory fee and tax reforms on the Brazilian mobile sector. This report analyses developments in the mobile sector and its regulatory fee and tax treatment in Brazil, and analyses scenarios to estimate the impacts of these policy options on the mobile sector, the wider economy, and the Government's fiscal position.

The mobile sector contributes significant economic value to the Brazilian economy

Mobile operators in Brazil make a significant contribution both to the economy and wider society. Total mobile sector revenues were $18 billion in 2018,[2,3] generating $10 billion of direct economic value, representing over 0.5% of Brazil's gross domestic product (GDP).

Mobile technology can play an important role in Brazil's Digital Transformation Strategy

Brazil's digital strategy is set out in its Digital Transformation Strategy 2018-2021 (DTS), and the mobile sector will be a key enabler to deliver on this strategy. For example, increased update of mobile money services (via increased usage and penetration) will improve financial and technological inclusion and allow Brazil to build on its position as a regional leader in innovative financial services technology.[4]

1 https://www.gsma.com/latinamerica/
2 GSMA Intelligence database
3 References to dollars throughout the report are to USD; references to R$ are to Brazilian Reals.
4 Brazil sprints ahead in mobile payments innovation (2019), Visa; ZDNet https://www.zdnet.com/article/brazil-sprints-ahead-in-mobile-payments-innovation/

Despite being a driver of economic growth, Brazil's mobile sector is heavily taxed relative to other countries in Latin America (LatAm)

In 2018, the total tax and regulatory fee contribution of the mobile sector in Brazil was estimated at $6,882 million. This represents 38% of total market revenue, above the LatAm average (18%). The largest source of tax revenue from the mobile sector is state VAT (64% of total tax payments made by the sector), followed by COFINS (11%) and FISTEL fees (7%).

Notwithstanding the fact that the mobile sector generates positive externalities, increasing productivity across the whole economy, when compared to other sectors, the mobile industry is subject to higher tax rates. For example, mobile services are taxed more heavily under the state VAT regime (ICMS) than other sectors, at rates varying between 25% and 35%, whereas the basic ICMS rate is between 17% and 20%. This creates distortions that undermine the positive externalities that the mobile sector delivers.

Stagnant customer growth may put pressure on mobile operators' ability to both make mobile ownership more affordable and invest in network infrastructure

The affordability of mobile services is an inhibitor of adoption, particularly for those with low incomes. The total cost of mobile ownership (TCMO) as a proportion of monthly income for the two lowest income quintiles in Brazil is 10%; well in excess of the UN target benchmark of 2%.[5] Closing this gap by increasing the affordability of mobile ownership would realise benefits across the economy but, if achieved through operator price reductions alone, would contribute to lower average revenue per user which may inhibit the level of network investment.

Enacting policies to reduce the regulatory fee and tax burden on operators — financial and/or administrative — could allow for the reduction of consumer prices to increase affordability and stimulate both subscriber growth and increased usage. Additionally, such a reduction could encourage operators to increase investment in infrastructure. This would improve the quality of the network and continue to reduce the coverage gap,[6] which declined from 13% to 5% during 2014-2018.[7] Regulatory fee and tax reform will also be crucial in allow for investment in 5G coverage as the rollout takes place in 2021.

5 UN's benchmark "1 for 2" affordability target (1 GB of data costing less than 2% of monthly income)
6 The coverage gap is defined as the percentage of the population that live in areas not covered by the mobile broadband network.
7 The State of Mobile Internet Connectivity 2019, GSMA https://www.gsma.com/mobilefordevelopment/wp-content/uploads/2019/07/GSMA-State-of-Mobile-Internet-Connectivity-Report-2019.pdf

Through policy reform, the Brazilian government can simplify and rebalance mobile sector regulatory fees and taxation, supporting investment and a better business climate

The Brazilian regulatory fee and taxation systems are complex; the administrative burden diverts financial and human resources from investment to compliance, thereby potentially distorting companies' investment decisions. Inefficient regulatory fee and tax practices raise compliance costs for businesses, constraining innovation and investment[8] and thereby limiting economic growth.[9] Despite the government's focus on the need to simplify the regulatory fee and tax systems, an extensive body of tax regulation continues to apply.[10]

Mobile sector regulatory fee and tax simplification could encourage investment from operators into the quality of mobile networks and result in lower consumer prices, increasing connectivity and mobile usage in Brazil.

Regulatory fee and tax reform would support sector and economic growth and deliver government revenues

Currently, the Brazilian federal government is analysing various options to simplify the VAT system in line with International Monetary Fund (IMF) recommendations. In addition, Brazil's National Telecommunications Agency (ANATEL) is considering options to simplify and consolidate the various regulatory fees levied on telecommunications operators.[11] The reform remains provisional and subject to change.

An alternative reform scenario (Scenario 1) – a simplified version of ANATEL's provisional proposal — has been developed collaboratively by EY and the GSMA. The potential economic impacts of ANATEL's provisional proposal and Scenario 1 have been assessed:

- **ANATEL's provisional proposal: Mobile regulatory fee consolidation:** This comprises the elimination of five mobile regulatory fees,[12] and replacement with a single fee — the Cide-Telecom. This would be levied at different rates across bands of annual gross revenues, with an additional temporary and declining charge on the number of active SIM connections (which would be abolished entirely after four years).

- **Scenario 1: Mobile regulatory fee consolidation and reduction:** Scenario 1 models the same elimination as ANATEL's provisional proposal, but the Cide-Telecom would be levied at a flat rate on gross revenues, and the SIM connection charge would be removed immediately. This scenario builds on ANATEL's provisional proposal above, but seeks to realise the positive impacts of expanding mobile connectivity more quickly through a reduction in the effective rate.

8 Taxes on revenues can discourage competition and investment, as they inhibit market participants' capacity to invest and self-finance.
9 Digital inclusion and mobile sector taxation in Brazil (April 2016), GSMA; https://www.gsma.com/mobilefordevelopment/wp-content/uploads/2016/06/Report_Digital-Inclusion-and-Mobile-Sector-Taxation-in-Brazil.pdf
10 Doing Business in Brazil (2018), Trench Rossi Watanabe https://www.bakermckenzie.com/-/media/files/expertise/ma-resources/Doing_Business_In_Brazil.pdf
11 Refers to ANATEL's provisional proposal (Análise n. 301/2019/AD) and Draft Bill (SEI nº 4787480). Process n. 53500.058462/2018-89/
12 The five fees to be replaced are under the proposal are: FUST (universal service fund); FUNTTEL (telecommunications development fund); CONDECINE-Teles (telecoms contribution to the development of the film industry); CFRP (contribution to the promotion of public broadcasting); and inspection fees, comprised of TFI (installation inspection fee) and TFF (functioning inspection fee).

The key mobile sector and wider economic benefits that would be expected to arise are summarised in Table 1.

Table 1

Summary of socio-economic benefits of the proposed reforms (by 2025 unless otherwise stated)

Source: GSMA Intelligence, EY analysis

Indicator	ANATEL's provisional proposal: Mobile regulatory fee consolidation	Scenario 1: Annual impact of regulatory fee consolidation and reduction
Annual gain in tax revenue	+$109m*	+$1.6bn
Wider Investment	+$157m*	+$1.7bn
New unique subscribers	316,000	3,623,000
Sector revenue	+$2m	+$197m
GDP	+$479m*	+$5.4bn

*Long-run effects

The modelling suggests that Scenario 1 would deliver significantly greater socio-economic and fiscal benefits than ANATEL's provisional proposal. It would also be more equitable than ANATEL's provisional proposal, as the Cide-Telecom would be levied on a flat-rate basis rather than using a tiered system.

This report also qualitatively considers an additional reform scenario — Scenario 2, in which there is a consolidation of five indirect taxes into a single VAT rate, the IBS;[13] this comprises the current proposed reform within a draft bill within Brazil's House of Representatives.

Assuming that the rate of IBS would not increase the overall tax contribution of the mobile sector, then the key benefits of this would be (i) a productivity increase; (ii) cost savings for mobile operators; (iii) release of funds for investment; (iv) ease of successful indirect tax compliance; and (v) the redeployment of skilled labour to more value-adding functions.

13 An acronym for Imposto sobre Operações com Bens e Serviços.

The mobile sector plays a key role in Brazil's economic and social development

$4.1bn
direct economic contribution of the mobile sector in 2018

$6.9bn
tax contribution of the mobile sector in 2018

The Mobile Tax contribution is 38% of market revenue; 18% is the average in Latin America

147m
unique subscribers in 2019; Largest market in Latin America

70%
unique subscriber penetration in 2019

1,501
hours per annum spent paying taxes; 317 regional average

7th
most difficult country in which to pay tax in, in 2019

$1.6bn
annual gains in tax revenue under Scenario 1, by 2025

$1.7bn
annual increase in investment under Scenario 1, by 2025

3.6m
new unique subscribers under Scenario 1, by 2025

$5.4bn
annual increase in GDP under Scenario 1, by 2025

1. The impact of the mobile sector on the economy and social progress in Brazil

1.1 Socio-economic contribution of the mobile sector to the economy

1.1.1 Mobile contribution to economic growth

- **Mobile operators directly contributed $4.1 billion to the economy in 2018**

Mobile operators in Brazil make a significant and valuable contribution to the economy. Total mobile sector revenues were $18 billion in 2018,[14,15] generating $10 billion of direct economic value; over 0.5% of Brazil's GDP.[16]

However, the benefits to the economy go beyond this direct impact: the mobile operators support a much wider mobile ecosystem, including mobile applications and mobile content developers, mobile distribution and retail companies and mobile device manufacturers. For example, mobile phones and social media are one of the primary channels for the $12.7bn e-commerce market in Brazil.[17]

These companies create further economic activity in Brazil by buying products and services from the firms in their supply chain (indirect effects) and by paying employees which leads to increased consumer spending, generating demand in consumer goods markets (induced effects).

Estimates using data from the GSMA Intelligence database suggest that the direct economic contribution of the wider mobile ecosystem[18] in Brazil in 2019 was $20 billion. This increases to $105 billion when indirect and induced impacts are included.[19]

14 GSMA Intelligence database
15 References to dollars throughout the report are to USD.
16 This figure is sourced directly from the GSMA Intelligence database and is based on a calculation of industry profitability using data for Cost of Goods Sold, rather than the usual approach of using operating expenses, due to difficulty in attaining consistent operating expenses data across countries. Therefore, direct economic value in this context cannot be equated to Gross Value Added (GVA), although it would broadly be expected to vary in proportion with it.
17 The thriving Brazilian e-commerce market (27 September 2019), Contxto https://www.contxto.com/en/technology/the-thriving-brazilian-e-commerce-market/
18 Including infrastructure providers; device manufacturers; distributors and retailers; and content, apps and service providers.
19 GSMA Intelligence database

- **Mobile connectivity promotes productivity improvements in the economy**

  The effects of mobile connectivity on an economy are largely delivered through its impact on productivity. Studies have shown a strong relationship between mobile penetration and productivity; indicating that a 10% increase in mobile penetration increases productivity by between 1.0% and 1.3% on average.[20]

  The impending implementation of 5G communications infrastructure — which will follow the auction of 5G spectrum frequencies[21] — will further enhance the capacity for mobile connectivity to drive productivity in Brazil.

- **The complexity of the tax system restricts the sector's economic contribution**

  Inefficient tax practices raise compliance costs for businesses, constraining innovation and competition[22] and thereby limiting economic growth.[23] Brazil was ranked the seventh-most difficult country in which to pay taxes in 2019 according to the World Bank's Doing Business rankings.[24] Despite the Government's focus on the need to simplify the tax system, an extensive body of tax regulation continues to apply.[25]

  GSMA's study of digital inclusion and mobile sector taxation in Brazil noted that the administrative burden arising from the current tax system diverts financial and human resources from investment to compliance, thereby potentially distorting companies' investment decisions.

  The complexity of the Brazilian tax system adds to mobile operators' compliance costs relative to other sectors, limiting its profitability and efficiency. The number of tax payments made by the mobile sector exceeded the country average by 67% in 2014, indicating that the compliance burden is even larger for mobile operators.[26]

- **Mobile tax reform can play a leading role in Brazil's fiscal management and continued economic development**

  The Brazilian Government is currently considering a variety of potential tax reforms. Mobile sector regulatory fee and tax reform can play a key part in stimulating the economy. In particular, simplification of the regulatory fee and tax systems would support sectoral efficiency, reducing the financial and administrative burden placed on mobile operators. This could encourage investment into infrastructure, improving the quality of the network, reducing the coverage gap, lowering consumer prices, increasing connectivity and mobile usage in Brazil. The potential impacts of the proposal are analysed in detail in Section 3 of this report.

20 ITU, 2012, The Impact of Broadband on the Economy: Research to Date and Policy Issues, https://www.itu.int/ITU-D/treg/broadband/ITU-BB-Reports_Impact-of-Broadband-on-the-Economy.pdf.
21 Brazil 5G auction delay dents country's tech ambitions (20 Jan. 2020), Financial Times. https://www.ft.com/content/b54a11aa-2001-11ea-b8a1-584213ee7b2b
22 Taxes on revenues can discourage competition and investment, as they inhibit market participants' capacity to invest and self-finance.
23 Digital inclusion and mobile sector taxation in Brazil (April 2016), GSMA
24 Ease of Doing Business rankings (2019), World Bank https://www.doingbusiness.org/en/rankings
25 Doing Business in Brazil (2018), Trench Rossi Watanabe
26 Digital inclusion and mobile sector taxation in Brazil (April 2016), GSMA

1.1.2 Role of mobile in Brazil's digital strategy and contribution to Sustainable Development Goals

Brazil's digital strategy is set out in its Digital Transformation Strategy 2018-2021 (DTS). This sets out strategic actions to enable the digital transformation of the economy, to boost competitiveness and productivity, underpin empowerment and inclusion in society, and support economic and social development to improve quality of life.[27]

Reforming taxation of the mobile sector could support Brazil's government in delivering on the strategic actions in the DTS. For example, some state governments have developed effective programmes to encourage infrastructure investment in regions with sparse populations and less coverage. States such as Minas Gerais and Ceará have implemented tax incentivisation policies for the deployment of base transceiver stations with 3G connectivity in municipal districts without coverage, achieving positive results.[28] Similar initiatives could be encouraged in other states to expand coverage and the use of newer mobile technologies (i.e. 4G and 5G). This would represent a major vehicle for digital inclusion, given the increasing prominence of mobile internet access; in 2016, 94% of the population used mobile phones to access the internet, compared to just 49% through a computer.[29]

Increasing mobile phone usage and penetration will also allow Brazil to build on its position as a regional leader as an innovator in the financial services technology industry.[30] The mobile payment industry in Brazil is expected to record a compound annual growth rate (CAGR) of 16.2% to reach $151.9 billion by 2025.[31] Greater access to mobile devices and mobile money can enable financial and technological inclusion in Brazil.

The mobile sector can support global sustainable development by adopting practices that contribute to the delivery of the Sustainable Development Goals (SDGs) of the 2030 Agenda of the United Nations (UN).[32] For example, the GSMA measures the impact on the SDGs of the mobile sector and has found that countries with high levels of mobile connectivity have made the most progress in meeting their SDG commitments.[33,34]

An important focus of Brazil's DTS is alignment to the SDGs. Six of the SDGs are targeted through leveraging mobile and/or IoT plans in the DTS:

- **Goal 1 — No Poverty:** mobile technology can assist with financial inclusion by combining mobile devices with internet access, mobile payments and new financial instruments in the digital environment;
- **Goal 2 — Zero Hunger:** agricultural productivity can be increased through IoT, reducing production loss in the field and during transport and distribution;
- **Goal 3 — Good Health and Wellbeing:** mobile terminals can be used to access medical databases and electronic records, and IoT technology for monitoring and remote diagnosis;
- **Goal 4 — Quality Education:** computers with access to digital content can enable distance learning, teacher training and professional qualification;
- **Goal 9 — Industry, Innovation and Infrastructure:** expansion of the internet and communication infrastructure for industry can drive R&D; and
- **Goal 13 — Climate Action:** implementation of combined sensor networks with access to the internet can enable swift action to prevent and mitigate natural disasters.

27 Brazilian Digital Transformation Strategy – E-Digital (2018)
28 Brazilian Digital Transformation Strategy – E-Digital (2018)
29 Brazilian Digital Transformation Strategy – E-Digital (2018)
30 Brazil sprints ahead in mobile payments innovation (2019), Visa; ZDNet
31 Brazil Mobile Wallet and Payment Market Opportunities Databook 2019, Business Wire https://www.businesswire.com/news/home/20190206005268/en/Brazil-Mobile-Wallet-Payment-Market-Opportunities-Databook
32 UN Sustainable Development Goals https://pardee.du.edu/sites/default/files/BRAZILReportPardeeCenter%20%281%29.pdf
33 2018 Mobile Industry Impact Report: Sustainable Development Goals, https://www.gsmaintelligence.com/research/?file=ecf0a523bfb1c9841147a335cac9f6a7&download
34 This holds if income is controlled for; the relationship between SDG progress and mobile connectivity is not just explained by a country's level of income. This is consistent with academic and empirical evidence which shows that the adoption of mobile technology drives higher economic growth, poverty reduction, improved social outcomes (for example, in health and education) and environmental sustainability.

The following case studies exemplify the mobile sector's contribution to SDGs in Brazil.

Box 1 — Case study: Active school search strategy app — TIM[35] Institute; UNICEF[36,37]

SDG targeted: 4 — Quality education

The active school search strategy, developed by UNICEF Brazil and the TIM Institute, is part of the out-of-school children initiative launched in June 2017. The strategy is built around a mobile application (app) that facilitates identification of out-of-school children and adolescents, management of each case until re-enrolment, and follow-up on their attendance for one year.

Over 470 towns have joined the initiative, using this innovative approach to identify out-of-school children using mobile technology.

Brazil is currently on track to attain an upper secondary education completion rate of 75% by 2030, compared to the UN's 97% target (current rate: 67%).[38] The app directly contributes to achieving the target.

The app additionally fosters financial and technological inclusion. It thereby contributes to combating poverty, and contributing to Brazil attaining 2030 UN targets of less than 7.6% of the population living on $3.10 or less; and of less than 3.9% living on $1.90 or less, both of which it is currently not on track to achieve.

Box 2 — Case study: Pollution prediction using Big Data — Telefonica[39]

SDGs targeted: 3 — Good Health and Wellbeing; 9 — Industry, Innovation and Infrastructure; 13 — Climate Action

In São Paulo, Telefônica Brazil has used mobile network big data to track human mobility, assess air quality, and gauge the health and wellbeing of the city's inhabitants. Using mobility data, it has been able to predict pollution problems up to two days in advance, which has allowed the city to take precautionary measures to protect public health, for example by guiding traffic via alternative routes and advising vulnerable populations, such as those with respiratory conditions, in areas of high pollution. This has enabled Brazil to combat the adverse effects of pollution in cities, which are estimated to cause 20,000 deaths a year across 29 metropolitan regions.

Brazil is currently on track to have cardiovascular and respiratory disease death rates well above UN 2030 targets. Telefonica's initiative can therefore contribute to steering Brazilian healthcare and climate responsibility towards this path.

35 TIM is the brand name of the Brazilian business of Telecom Italia.
36 United Nations International Children's Emergency Fund
37 UNICEF Annual Report 2017, Brazil, https://www.unicef.org/about/annualreport/files/Brazil_2017_COAR.pdf
38 UN Sustainable Development Goals
39 The Mobile Economy – Latin America – 2019, https://www.gsmaintelligence.com/research/?file=1573c453fb84b5b412e139bac53253ae&download

1.2 Market analysis

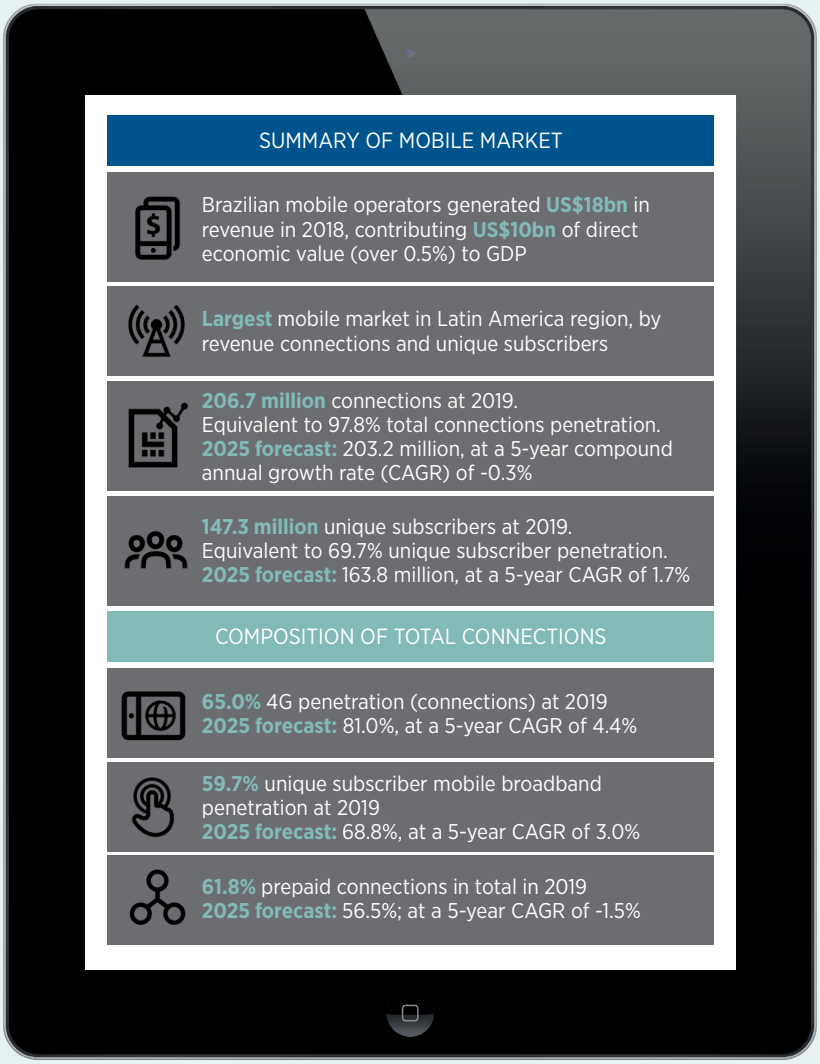
1.2.1 Market overview

The mobile market in Brazil has expanded significantly over the past ten years, with the number of unique subscribers increasing from 102 million to 148 million between 2010 and 2019. As demonstrated in Figure 1, which provides an overview of the Brazilian mobile market, the sector is well-developed; being, for example, the largest mobile market in the LatAm region, with unique subscriber penetration of nearly 70%.[40]

Figure 1

Brazilian mobile market in figures

Source: GSMA Intelligence, EY analysis



40 All figures in this report for years from 2019 onwards relate to Q3, as the latest non-forecast data available is as at Q3 2019.

Unique subscriber mobile broadband (MBB) penetration in Brazil has grown to nearly 60% in 2019, driven by significant investments into network coverage and quality of service by mobile operators.

Nevertheless, key opportunities for mobile development in Brazil include further improvements in reducing the MBB usage gap,[41] further improving the quality of the network to provide better quality of service, and the roll-out of new technologies including 5G and IoT.

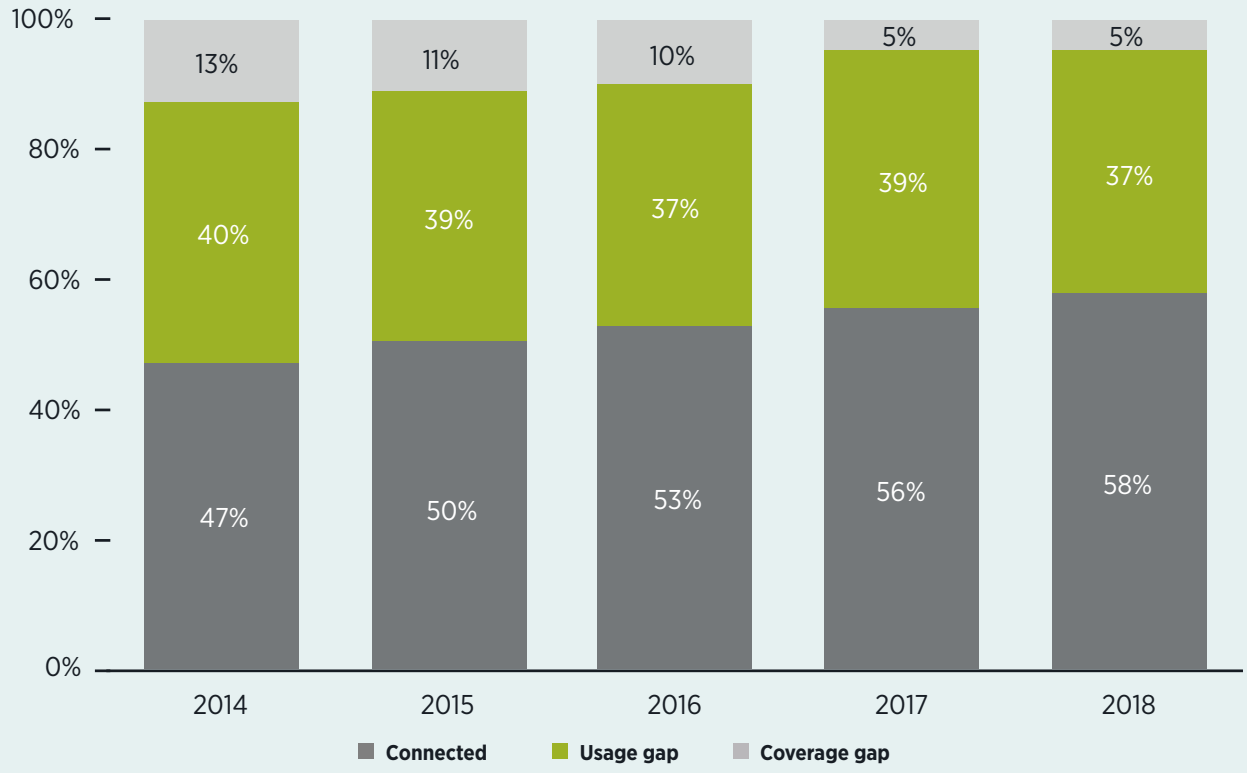
1.2.2 Closing the mobile broadband usage gap and improving connectivity

Figure 2 demonstrates that Brazil's usage gap closed by three percentage points between 2014 and 2018, from 40% to 37%, as the proportion of connected people significantly increased.

Figure 2

Figure 2: Usage gap in Brazil, 2014-2018

Source: GSMA Intelligence database



Brazil's usage gap of 37% is slightly smaller than the regional LatAm average (39%).[42,43] Nevertheless, there remains an opportunity to close the usage gap further, increasing the number of people using mobile technology and fostering connectivity in Brazil.

41 The usage gap is the difference between mobile broadband network coverage and unique mobile broadband penetration.
42 The State of Mobile Internet Connectivity 2019, GSMA https://www.gsma.com/mobilefordevelopment/wp-content/uploads/2019/07/GSMA-State-of-Mobile-Internet-Connectivity-Report-2019.pdf
43 The LatAm region includes Caribbean in the dataset used to calculate the usage gap.

Lack of affordability can represent a significant connectivity barrier. GSMA analysis highlights that countries with a high cost of mobile ownership (including both device and airtime/data) as a share of income per capita[44] typically have lower penetration rates.[45]

A basic measure of affordability of mobile services is the proportion of monthly income which is spent on mobile services and devices. For a range of countries, income groups and consumption baskets, GSMA estimates the total cost of mobile ownership (TCMO), which assists in identifying the elements affecting the affordability of mobile services and devices.[46]

Figure 3 below shows that low affordability is an issue in Brazil, with a medium consumption basket costing 6.0% of average monthly income for those in the lowest 40% of the Brazilian income distribution. This is above the UN's benchmark "1 for 2" affordability target (1 GB of data costing less than 2% of monthly income).[47]

Figure 3

TCMO as a proportion of monthly income in Brazil, 2018

Source: GSMA Intelligence database, Tarifica

44 Defined as Gross National Income (GNI) per capita
45 GSMA (2016) Digital Inclusion and Mobile Sector Taxation
46 TCMO consists of the cost of a handset, activation and usage costs. It is typically calculated as a cost per month, and assumes a life expectancy of a device of 36 months for medium and low-income countries, and 24 months for high and very high-income countries
47 The UN target of 2% is based on gross national income per capita, a measure of the average income of the total population. When considering specific income groups, therefore, it should be taken as a benchmark only. Lower income groups having a TCMO or tariff cost above 2% does not mean that mobile usage is unaffordable by the UN's measure.

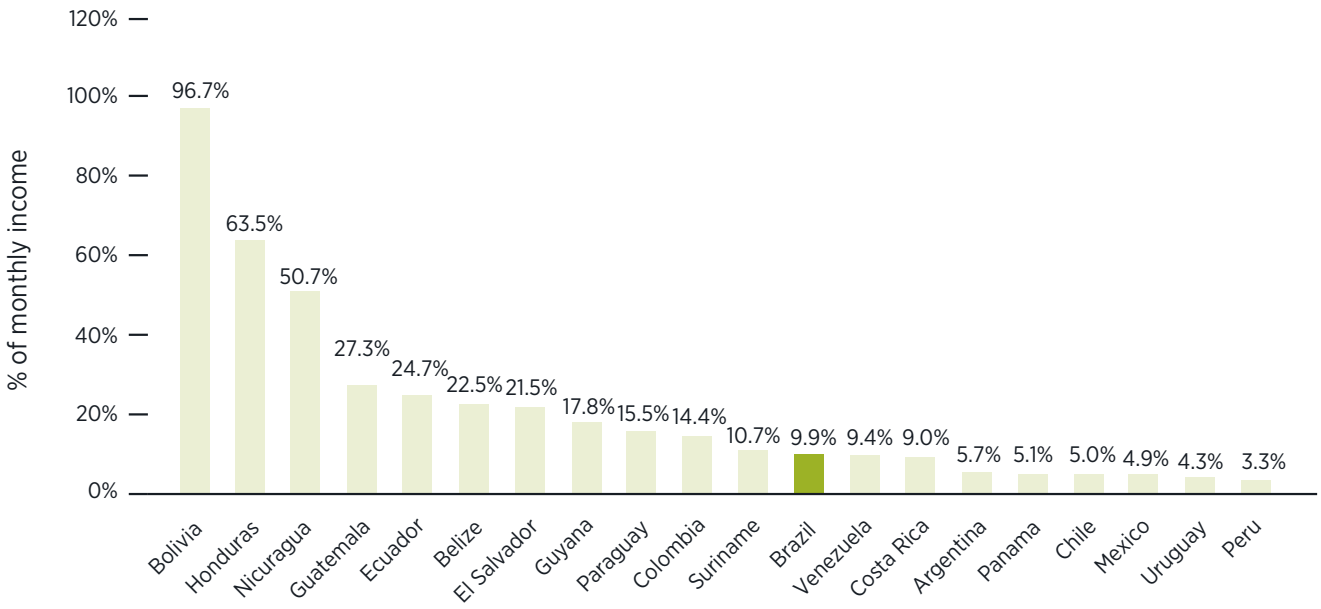
Enacting policy to reduce the financial and administrative regulatory fee and tax burdens on operators could allow for the reduction of consumer prices to increase affordability. Additionally, this could allow operators to increase investment into infrastructure, improving the quality of the network and reducing the coverage gap.[48]

As shown in Figure 4, mobile ownership for those in the lowest 20% of the Brazilian income distribution is less affordable in Brazil than in several other neighbouring countries. The TCMO, as a proportion of income, is 9.9%. Therefore, there is scope for improving the accessibility of mobile for low-income individuals, which can enable greater digital and financial inclusion.

Figure 4

TCMO as a proportion of monthly income for the lowest 20% of the income distribution (1GB data basket), selected countries

Source: GSMA Intelligence database, Tarifica



48 The coverage gap is defined as the percentage of the population that live in areas not covered by the mobile broadband network.

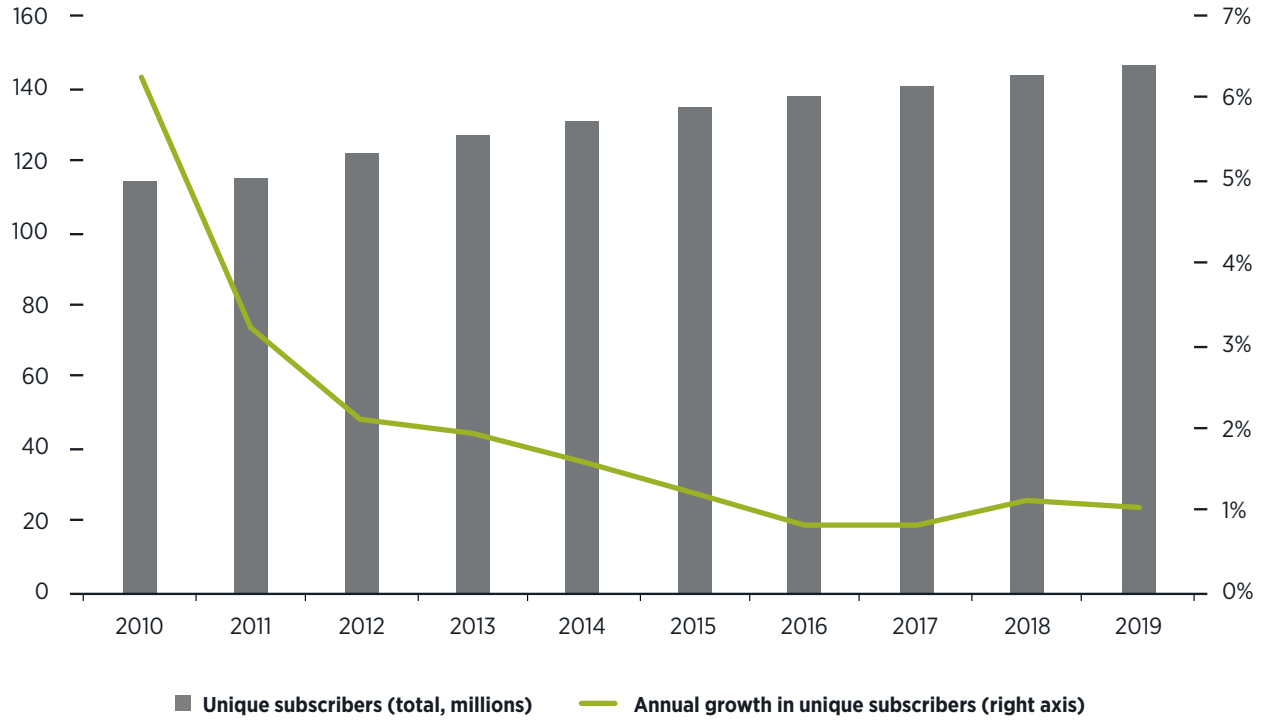
1.2.3 Mobile operator revenue and investment

Unique subscriber penetration has increased significantly since 2010, standing at 70% of the population by 2019 (equivalent to 98% penetration in total connections). Although, as demonstrated in Figure 5, the rate of growth in unique subscriber penetration has slowed in recent periods, and now stands at 1.0% per annum.

Figure 5

Unique mobile subscriber growth in Brazil, 2010-2019[49]

Source: GSMA Intelligence database



However, despite reduced unique subscriber growth, Brazil still ranks below several regional peers and countries at a similar stage of development with regards to unique subscriber penetration; most notably Chile, Colombia, Ecuador, Uruguay and Venezuela.[50] This suggests there is still scope for unique subscriber penetration in Brazil to expand.

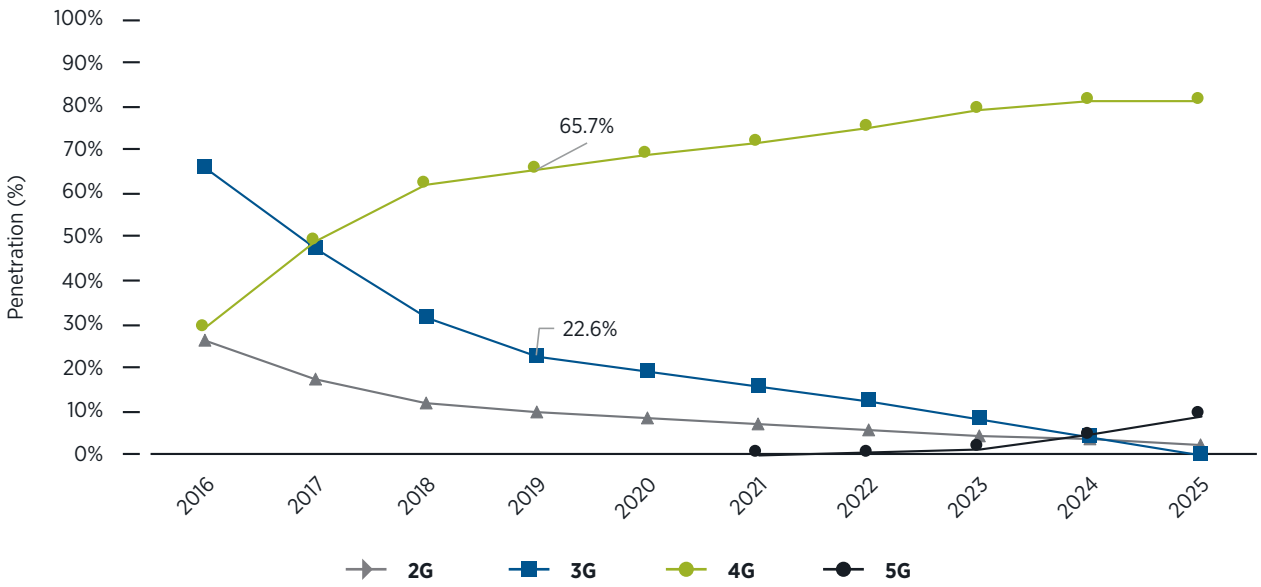
As shown in Figure 6, the combined total connections penetration for 3G and 4G was approximately 88% in 2019. Penetration of 4G services is increasing and has become the dominant mobile technology. This can be expected to begin to subside as 5G is rolled out from 2021, replacing 4G as the fastest available service.

49 All figures as at the end of Q3 of the year
50 GSMA Intelligence database

Figure 6

Market penetration rate (unique connections), by technology

Source: GSMA Intelligence database



As 4G penetration increases, driving up data usage, continued investment will be required to increase the capacity of mobile networks to ensure quality of service. Significant investment is also required to keep pace with innovation, for example, the upcoming move in Brazil to 5G network infrastructure. A lack of investment could inhibit growth of the industry and the socio-economic benefits that can be realised through increased usage of mobile services.

Brazil currently lags behind some LatAm countries in its development of 5G. Uruguay has already implemented 5G, while Mexico has commenced rollout and is 12-24 months ahead of Brazil in its development.[51]

5G rollout will entail installing a dense small cell network in urban areas, which will require considerable amounts of capex by Brazilian operators. In addition, network operating expenditure will increase, adding to funding pressures on meeting investment requirements.[52]

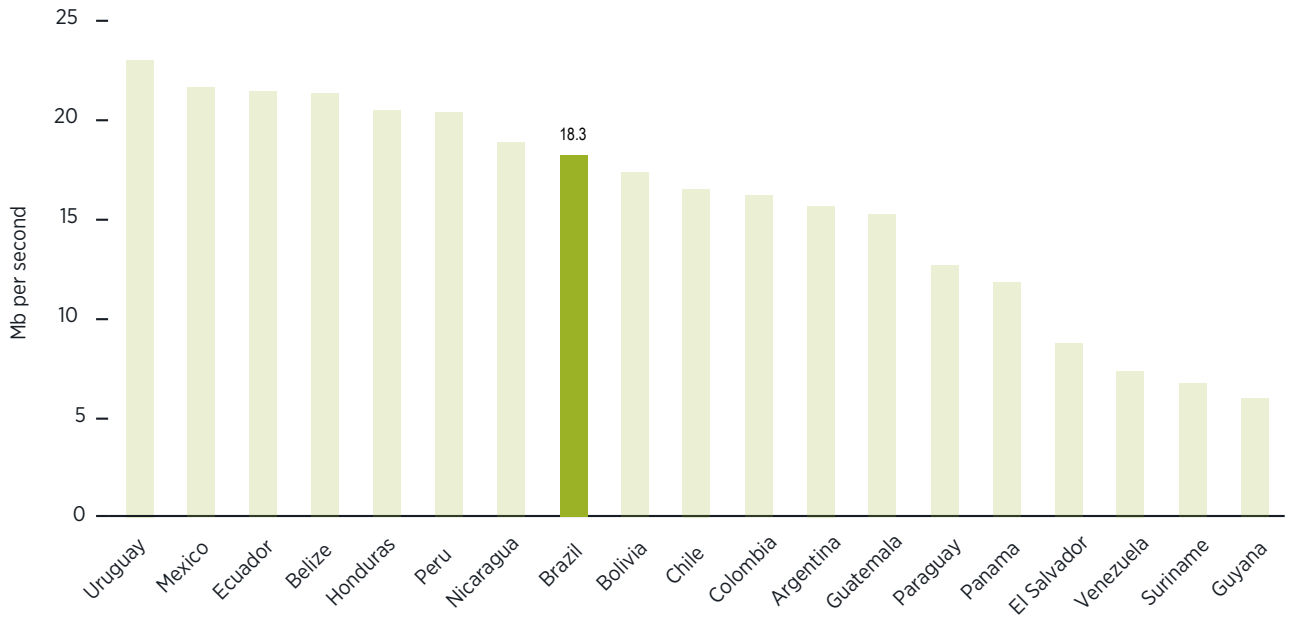
The investment made by mobile operators is an important enabler of improved mobile broadband take-up and quality of mobile services in Brazil. Network coverage for MBB-enabled services in Brazil has expanded rapidly, with 3G and 4G population coverage reaching 95% and 94% respectively in 2019.[53] However, analysis of Speedtest Intelligence® data from Ookla® suggests that there is still potential to improve quality of service. Figure 7 shows that at 18.3Mb per second, the average download speed across all technologies in Brazil is middling by comparison to its regional peers, behind several neighbouring countries.

51 Huawei says Brazil on target with 5G tests, but falling behind neighbours (9 Jul. 2019), Reuters https://in.reuters.com/article/huawei-tech-brazil/huawei-says-brazil-on-target-with-5g-tests-but-falling-behind-neighbours-idINKCN1U42H2
52 The 5G era: Age of boundless connectivity and intelligent automation (2017), GSMA
53 GSMA Intelligence database

Figure 7

Download speed (Mb per second) — LatAm countries, 2018

Source: Speedtest Intelligence® data from Ookla®

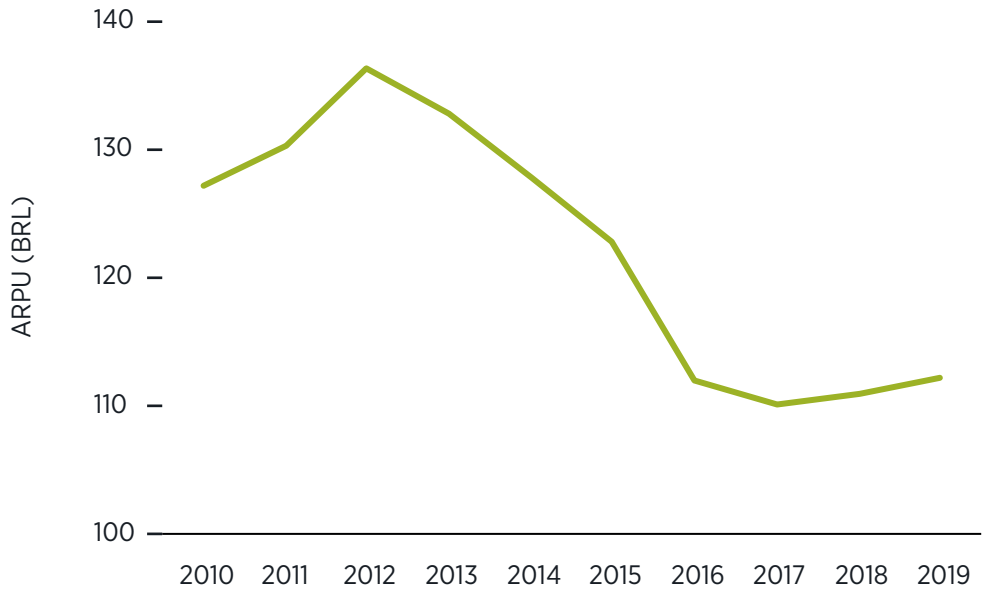


Consistent with the declining unique subscriber growth in Brazil illustrated above, Figure 8 shows that the average revenue per user (ARPU) has fallen from R$127 per month in 2010 to under R$112 in 2019; a 12% decline. Combined, these effects will ultimately put pressure on investment in network coverage, quality of service and 5G infrastructure.

Figure 8

Average revenue per user in Brazil, 2009-2019[54]

Source: GSMA Intelligence database



54 All figures as at the end of Q3 of the year

2. Mobile sector taxation in Brazil: current framework and improvement areas

As set out in Section 1, the mobile sector plays a key role in the Brazilian economy. In addition to its socio-economic impact, the mobile sector makes an important contribution to the public finances of Brazil through tax and regulatory payments.

This section covers the tax regime applicable to the mobile sector and its contribution to the tax revenue of Brazil. Furthermore, this section also assesses the Brazilian tax system against principles of tax policy design which have been consistently developed by international organisations such as the International Monetary Fund (IMF), the Organisation for Economic Cooperation and Development (OECD), the UN and the World Bank.

2.1 Mobile sector taxation in Brazil

Brazil has a complex federal tax system with over 80 different taxes at the federal, state and municipal level, including turnover taxes cascading through the production chain. This distorts firms' input decisions and hampers horizontal equity as different sectors are taxed at both different headline and effective rates. Furthermore, the intricate deduction rules and refund delays create additional administrative costs. This hampers competitiveness and productivity.[55]

Furthermore, the heavy reliance on indirect taxes leading to high effective rates on consumption makes the tax system less progressive. Given that the poorest spend a larger part of their income on consumption, they are especially hit by high indirect tax rates.[56]

Moreover, the Brazilian tax administration is complex due to the coexistence of different tax collection agencies at every government level. Frequent legislative and regulatory changes mean taxpayers must invest more time and resources to navigate through this uncertainty and comply with burdensome tax reporting requirements.[57]

In this challenging tax environment, the Brazilian mobile industry faces a complex taxation system and high tax burden. Below is a summary of the main taxes applying to mobile consumers and operators.

55 A. Brockmeyer, 2018, Brazil: Options for Tax Reform. A Policy Note for Discussion, http://pubdocs.worldbank.org/en/980881536598168344/Policy-Note-Tax.pdf.
56 Ibid.
57 ibid.

2.1.1 Taxes on mobile consumers

Table 2 below outlines the different taxes on mobile whose incidence falls on consumers.

Table 2

Key taxes paid by mobile consumers, 2020

Source: EY 2019 Worldwide VAT, GST and Sales Tax Guide and Brazil's legislation

Value added tax (VAT) and sales taxation	
• State VAT (ICMS)	25% — 35% on the value of mobile services 14% — 20% on the value of mobile handsets and SIM cards
• Federal VAT (IPI)	15% on the value of mobile handsets 5% on the value of SIM cards
• Municipal services tax (ISS)	2% — 5% on the value of technical telecommunication services
Custom duties	
• Handsets[58]	2% on Cost, Insurance and Freight (CIF) value
• SIM cards[59]	6% on CIF value

Brazil has three main taxes on consumption levied by each government level: state VAT (ICMS), federal VAT (IPI) and municipal services tax (ISS).

- ICMS applies to the circulation and importation of goods, as well as the supply of transportation, communication and electricity services. ICMS rates are set by each state, but the current basic rate is 17%, 18% or 20% for internal state transactions. The minimum (7%) and maximum (12%) rates applicable to interstate transactions are set by the federal government.

  Some goods and services are taxed at reduced or increased rates. Mobile telecommunications are generally taxed at higher rates, as outlined in Table 2 above. In particular, it is worth mentioning that the ICMS rates on mobile services are significantly above the headline rates in every state as shown in Table 3 below. Further, despite the positive externalities of the mobile sector, in some cases the ICMS rates on mobile services are similar to or above the rates applicable to goods and services with potential negative externalities.[60]

58 Smartphones exclusively used in potentially explosive industrial areas are tariff-free until 31 December 2021. These handsets must include the following features: 4G/LTE, WiFi/"Bluetooth", NFC and GPS, magnetic USB, "Push-To-Talk" and emergency functions; resistance to a minimum of 55ºC and battery of at least 3.600mAh. Source: CAMEX-Ministerio de Economia, Lista de Exceções de Bens de Informática e Telecomunicações, http://www.mdic.gov.br/index.php/competitividade-industrial/acoes-e-programas-13/o-que-e-o-ex-tarifario-5.

59 SIM cards exclusively used to test mobile handsets in production are exempt until 31 December 2021. Source. ibid.

60 For example, in Rio de Janeiro, mobile services are taxed at 30%, while tobacco and alcohol drinks are taxed at 29%. Source: Fazenda Rio de Janeiro, Tributação em operações e prestações internas, http://www.fazenda.rj.gov.br/sefaz/content/conn/UCMServer/uuid/dDocName%3AWCC188634.

Table 3

ICMS rates on mobile services compared to basic rates in Brazil, 2020

Source: EY 2019 Worldwide VAT, GST and Sales Tax Guide, IBFD, Brazil's legislation and public sources

State	Basic rate	Telecommunication services rates	Percentage point difference
Acre	17%	25%	8
Alagoas	18%	30%	12
Amapá	18%	29%	11
Amazonas	18%	30%	12
Bahia	18%	28%	10
Ceará	18%	30%	12
Distrito Federal	18%	28%	10
Espírito Santo	17%	25%	8
Goiás	17%	29%	12
Maranhão	18%	29%	11
Mato Grosso	17%	27%	10
Mato Grosso do Sul	17%	29%	12
Minas Gerais	18%	27%	9
Pará	17%	30%	13
Paraíba	18%	30%	12
Paraná	18%	29%	11
Pernambuco	18%	30%	12
Piauí	18%	30%	12
Rio de Janeiro	20%	32%	12
Rio Grande do Norte	18%	30%	12
Rio Grande do Sul	18%	30%	12
Rondônia	17.5%	35%	17.5
Roraima	17%	25%	8
Santa Catarina	17%	25%	8
São Paulo	18%	25%	7
Sergipe	18%	30%	12
Tocantins	18%	29%	11

The ICMS broadly follows the credit-invoice method and consequently, input tax can be offset against output tax.

- IPI is levied by the federal government on "finished goods", i.e. goods produced as a result of an industrial process, even if the process is incomplete, partial or intermediary. IPI applies to the shipment of finished goods from an industrial establishment (or similar establishment) in Brazil and the customs clearance of finished imported goods. The IPI rate varies (from 0% to 300%) depending on how essential the product is. Table 2 sets out the rates applicable to mobile products.

  IPI input can be deducted against output tax following similar rules to the ICMS regime.

- ISS is a form of sales tax payable to municipalities. It applies to the supply of any services that are not otherwise taxable by the state authorities (ICMS). A generic list of taxable services is outlined in a federal law, with specific services listed by each municipal law.

  ISS is a single-stage tax without the possibility to recover the input tax paid. Consequently, the recipient of a service bears the tax. In general, ISS is due to the municipality where the service provider is located.

2.1.2 Taxes and regulatory fees on mobile operators

Table 4 below outlines the different taxes paid by mobile operators

Table 4

Key taxes paid by mobile operators, 2020

Source: EY 2019 Worldwide Corporate Tax Guide, EY 2019 - 2020 Personal Tax and Immigration Guide and Brazil's legislation

Corporate income tax	
• Corporate income tax	The basic rate is 15% on taxable income A surtax of 10% applies on annual taxable income exceeding R$240,000 ($62,000)
• Social contribution on net profits (CSLL)	9% on net profits
Employment taxes	
• Social Integration Program (PIS)[61]	0.65% on monthly gross revenues
• Social Security Financing Contribution (COFINS)	3% on monthly gross revenues
• Personal income tax (withheld)	27.5% (top rate) on monthly salary
• Employer's contribution to the unemployment guarantee fund (FGTS)	8% on monthly salary
• Social security contributions (INSS)	
— Employer's contribution	20% on monthly payroll
— Employee's contribution (withheld)	8% - 11% on monthly salary; contribution may not exceed R$621.04 ($160) a month
• Contributions to 'S' system	1% - 2.5% on payroll
Custom duties	
• Base stations	Exempt[62]
• Network equipment	0% - 16% on CIF value[63]
Regulatory fees	
• Contributions to the telecommunications inspection fund (FISTEL)	
— Installation inspection fee (TFI)	R$26.83 per SIM connection R$5.68 per special M2M connection[64] R$1,340.80 per base station or antenna
— Functioning inspection fee (TFF)	R$8.85 per SIM connection R$1.87 per special M2M connection R$442.46 per base station or antenna

61 For the purposes of this study, PIS and COFINS have been classified as employment taxes given their social contribution element. However, other classifications may be preferred in other studies.
62 Source: Tarifa Externa Comum - TEC - Atualizada em 31/01/2020, http://www.camex.gov.br/images/Excel/Listas/TEC_20200131.xlsx.
63 ibid.
64 Decree 9,854 of 25 June 2019 defines M2M connections as those used to transmit data to remote applications in order to monitor, measure and control the device itself, its environment or data systems connected through these networks. A bill (PL 6549/2019) has been submitted to the Congress in order to effectively eliminate the regulatory fees (TFI, TFF, CFRP and CONDECINE-Teles) on M2M connections. Source: Câmara dos Deputados, Projeto de Lei n° 6549, de 2019, https://www25.senado.leg.br/web/atividade/materias/-/materia/140285.
This change would be expected to have wider positive impacts through the enabling of IoT technologies.

Regulatory fees (continued)	
• Contributions to the telecommunications development fund (FUNTTEL)	0.5% on gross revenues
• Universal service fund (FUST)[65]	1% on monthly gross revenues
• Contribution to the promotion of public broadcasting (CFRP)	R$1.34 per SIM connection and per special M2M connection R$67 per base station or antenna
• Telecommunications contribution to the development of the film industry (CONDECINE-Teles)	R$4.14 per SIM connection and per special M2M connection R$205.57 per base station or antenna
Spectrum fees	
• PPDUR[66]	Spectrum pricing varies per auction
Other taxes	
• Royalty tax on technology transfers (CIDE)	10% on the transaction value
• Financial transactions tax (IOF)	Various rates
• Property tax (IPTU)	Various rates

65 The federal government has submitted a bill (PEC 187/2019) to the Congress to eliminate the existing public funds, including FUST. The corresponding fees would continue to exist, but the revenue would not be ring-fenced to separate funds. Source: BNAmericas (7 Nov 2019), Proposed measures potentially impact Brazil's telecom policies, https://www.bnamericas.com/en/news/proposed-measures-potentially-impact-brazils-telecom-policies.

66 In Portuguese, Preço público pelo direito de uso de radiofrequência. Spectrum fees can be covered as a one-off payment or in several instalments across the duration of the licence. Source: ANATEL, Mudanças no preço público pelo direito de uso de radiofrequência – PPDUR, https://www.anatel.gov.br/Portal/verificaDocumentos/documento.asp?numeroPublicacao=349314&pub=original&filtro=1&documentoPath=349314.pdf.

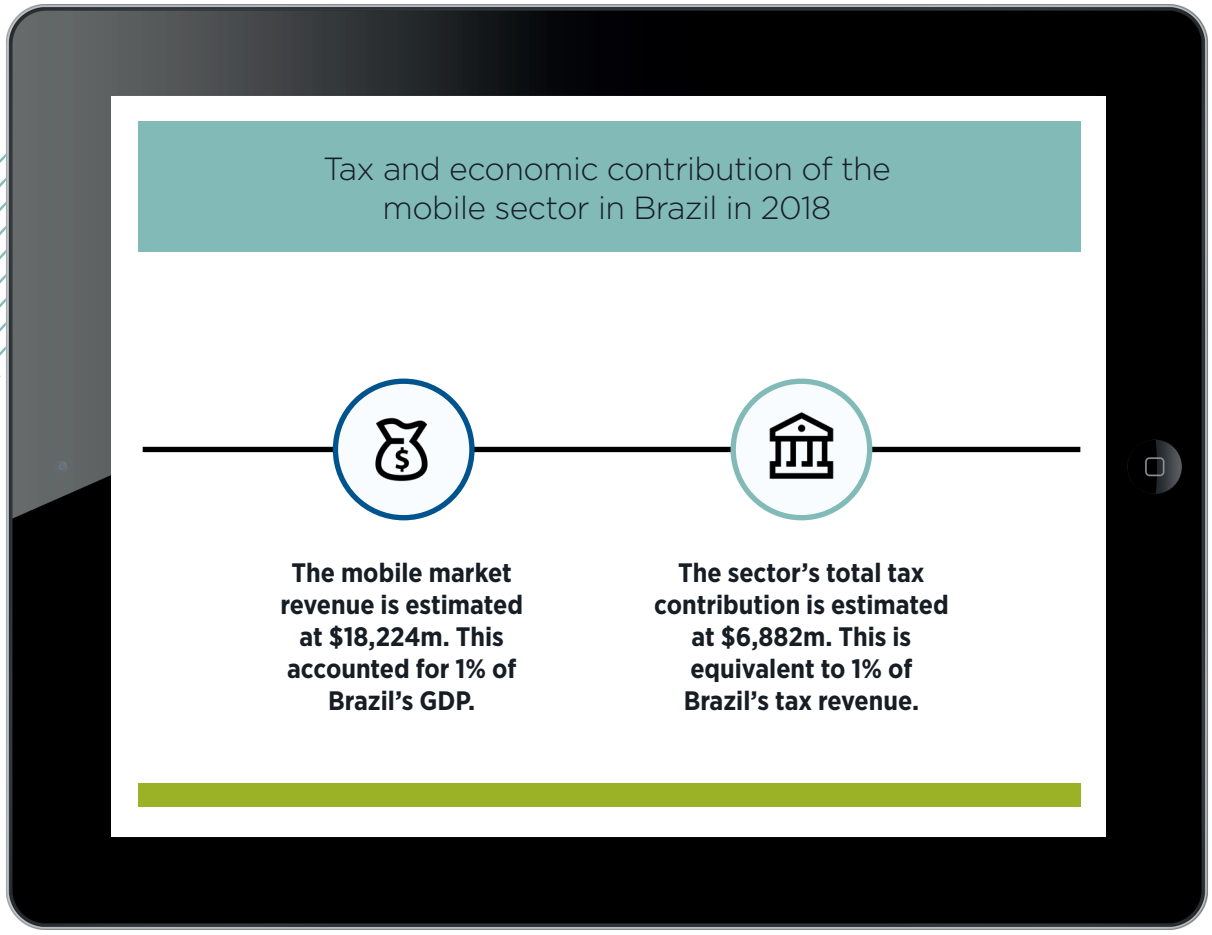
2.2 Tax contribution of the mobile sector

In 2018, the total tax contribution was estimated at $6.9 billion, representing 38% of total market revenue.

Figure 9

Tax and economic contribution of the Brazilian mobile sector in 2018[67]

Source: GSMA Intelligence database, EY analysis and operator's data



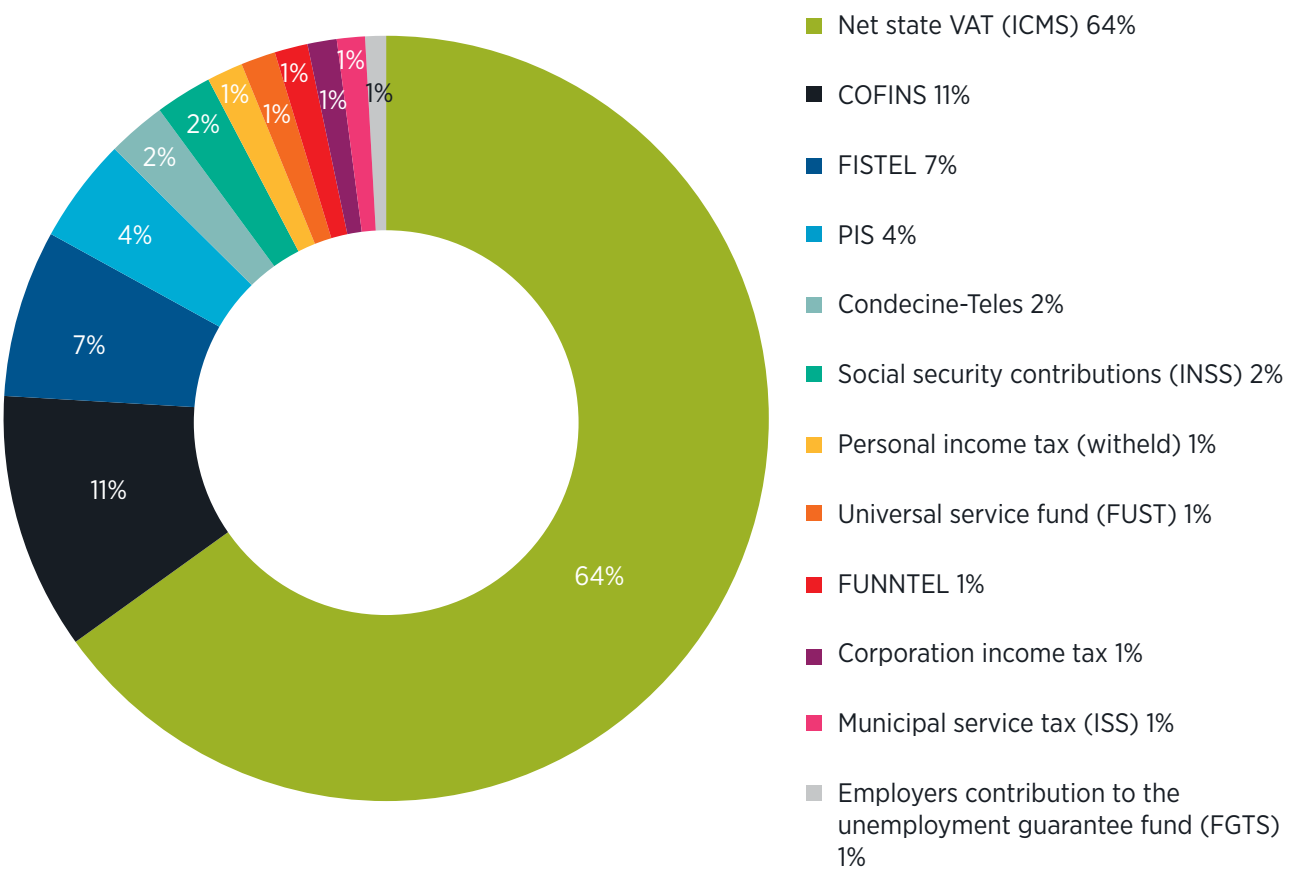
67 Brazil's GDP was of $1.9 trillion in 2018. Source: Oxford Economics. The total tax revenue was estimated at $662,267 million in 2018. Source: Tesouro Nacional, Estatísticas Fiscais Trimestrais Resultados do Governo Geral, Resultados do Ano de 2018, https://www.tesouro.fazenda.gov.br/documents/10180/476865/Boletim_EFP_2018_IV.pdf/b66c3580-4923-4048-967a-58aa2e62e8f3.

As shown in Figure 10, the largest source of tax revenue from the mobile sector comes from ICMS (64% of the total tax payments). This is followed behind by COFINS (11%) and FISTEL fees (7%).

Figure 10

Different taxes as a percentage of overall tax revenues in the mobile sector in Brazil

Source: GSMA Intelligence database, EY analysis and operator data



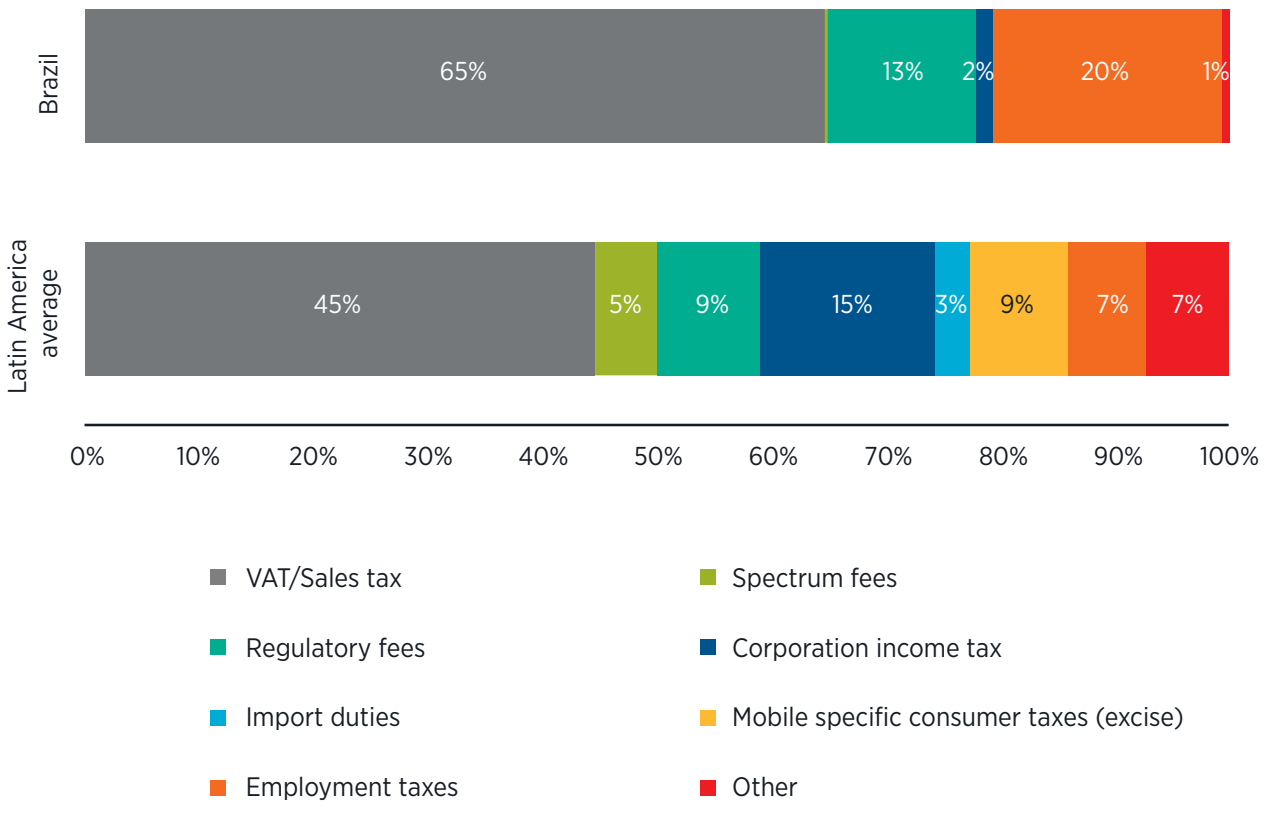
As Figure 11 shows, state VAT (ICMS) and municipal sales tax on services (ISS) represent together almost two thirds of the total tax payments (65%) made by the mobile sector in Brazil. This is significantly above the LatAm average (45%).

Furthermore, the numerous regulatory fees (FISTEL, FUNTTEL, Condecine-Teles, CFRP and FUST) collectively represent 13% of total tax payments made by the mobile sector. This is also above the average level seen in LatAm (9% of total tax payments).

Figure 11

Different taxes as a percentage of overall tax revenues in the mobile sector in Brazil and LatAm[68]

Source: GSMA Intelligence database, EY analysis and operator's data



68 Brazil (2018), LatAm average (2017).

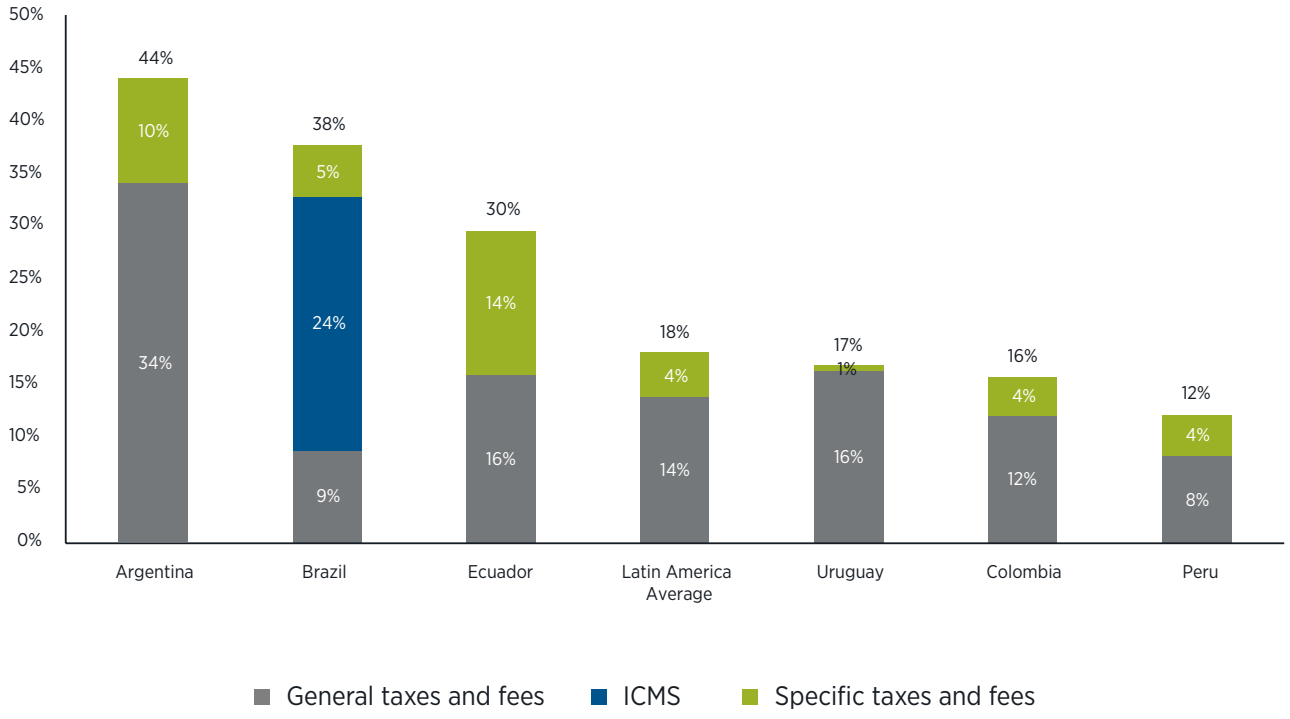
As shown in Figure 12, the tax burden of Brazil (38% of total market revenue) is the second highest in the sample (behind Argentina at 44%), being above the LatAm average (18%). Brazil's mobile-specific taxes, which are equivalent to 5% of total mobile sector revenue, are also slightly above the LatAm average (4%) and other countries in the sample, including Colombia (4%), Peru (4%) and Uruguay (1%). ICMS is treated as a general tax, but as mobile services have higher tax rates than other sectors in the economy, the mobile-specific burden could be actually higher.

General taxes are equivalent to 33% of total mobile sector revenue in Brazil. This is the second-highest in the sample (behind Argentina at 34%) and above the LatAm average (14%).

Figure 12

General taxes and fees vs mobile sector-specific taxes and fees (as percentage of mobile sector revenue)[69]

Source: GSMA Intelligence database, EY analysis and operator's data



69 Argentina (2016), Brazil (2018), Ecuador (2017), Latin America average (2017), Uruguay (2014), Colombia (2015), Peru (2014).

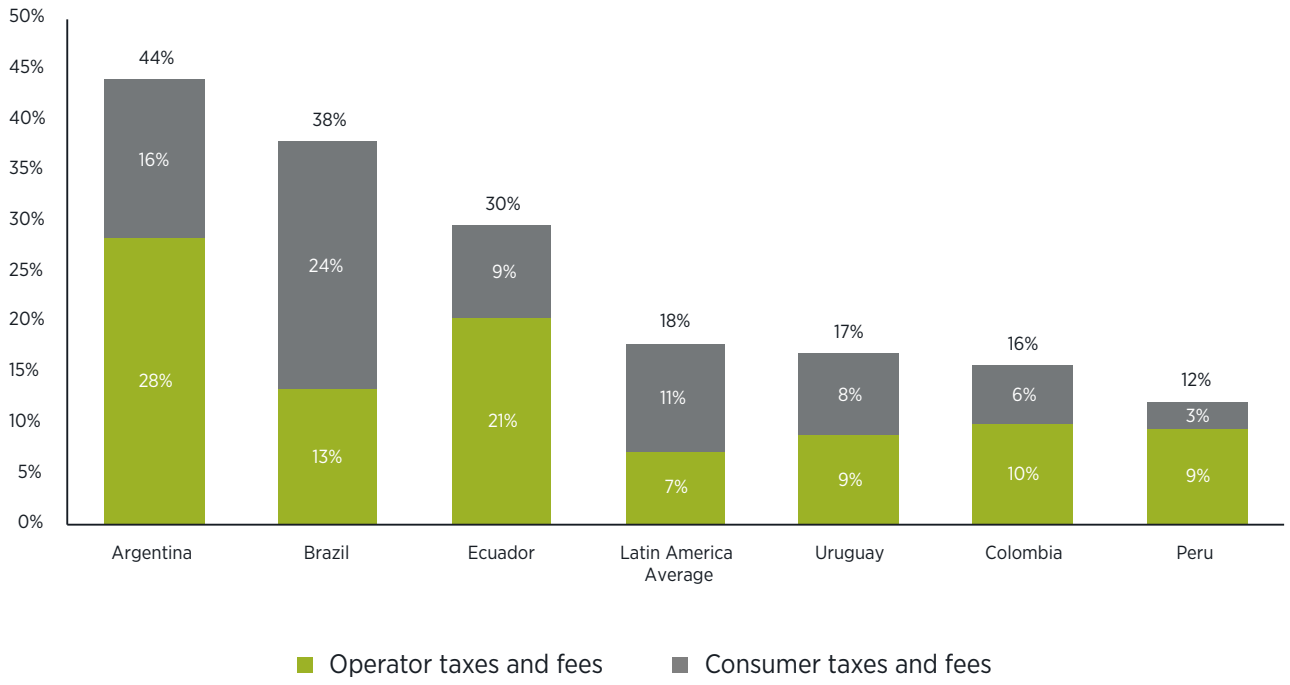
As shown in Figure 13, the tax burden on Brazilian mobile consumers (24% of total market revenue) is the highest in the sample, being above the LatAm average (11%). This tax burden can be explained by the accumulation of consumption taxes. In this regard, it is worth noting that the lowest basic rate of ICMS (17%) is above the average VAT standard rate in LatAm (15%).[70] This basic ICMS rate does not include the IPI and ISS rates, which if added, would make the total headline consumption rate in Brazil even higher.

The tax burden on mobile operators (13% of market revenue) also exceeds the average level seen in LatAm (7%), including countries such as Colombia (10%), Peru (9%) and Uruguay (9%).

Figure 13

Operator taxes and fees vs consumer taxes and fees (as percentage of mobile sector revenue)[71]

Source: GSMA Intelligence database, EY analysis and operator data



70 This average was estimated based on headline rated available on: CIAT, Standard Rates (1968-2017), https://ciatorg.sharepoint.com/:x:/r/sites/cds/_layouts/15/guestaccessaspx?docid=0fdbbb81c0b4c4c07a628d72864b16b8c&authkey=AQHEkvUJSgRkRJ97jr0lWFg&e=b97039aa2a2349838a5170317aff2977.

71 Argentina (2016), Brazil (2018), Ecuador (2017), Latin America average (2017), Uruguay (2014), Colombia (2015), Peru (2014).

2.3 An assessment of the mobile sector taxation in Brazil

Governments raise tax revenues to fund the provision of public goods and services. However, if the tax system is not designed properly, this can lead to unintended consequences for both the government and the taxpayers in terms of the incidence of the tax burden, distributional effects, efficiency and costs of collection.

In order to prevent such unintended consequences, it is important to follow certain principles of tax policy design which have been consistently developed by international organisations such as the IMF, the OECD, the UN and the World Bank.[72]

Principles of taxation applying to the mobile sector

- **Taxes should not discourage investment.** A stable and transparent tax system in line with international standards is a strategy that would deliver sustained investment.[73]
- **Taxation should be as broad-based as possible.** Broad-based taxes with single and low rates should be favoured over specific taxes. This should allow the maximisation of revenue with minimal distortions to the consumption and provision of mobile services.
- **Specific taxes should be limited and be based on a clear rationale of externalities.** Specific taxes should be narrowly targeting a few goods mainly on the grounds that their consumption entails negative externalities on society. Given positive externalities, mobile phones and services would not generally be included in a list of goods and services singled out for exceptionally harsh tax treatment.[74]
- **The tax system should be equitable.** Mobile operators and consumers should be treated equally to others in equal circumstances ("horizontal equity"). In addition, the tax system should also preserve "vertical equity"[75] by avoiding the imposition of regressive taxes which has a larger impact on consumers of mobile services in the lower income groups.[76]
- **Taxes should not undermine the affordability of mobile services,** as excessive taxation can increase the cost of handsets and mobile services.[77] Furthermore, the tax collection should be allocated to improve mobile infrastructure, thereby increasing the coverage and digital inclusion, especially in rural zones.
- **Regulatory and spectrum fees should be set on a cost-recovery basis.** Since these fees could distort production and increase prices, regulatory and spectrum fees should not be excessive.[78]
- **The tax system should be simple.** Tax rules should be clear and no more complex than necessary to achieve the policy aim, facilitating mobile businesses and consumers to make optimal decisions and respond to intended policy incentives.[79]
- **Taxes should be easy to collect.** The collection of taxes should be as efficient as possible, i.e. low tax administration costs and minimisation of evasion and avoidance costs.[80]

72 IMF, OECD, UN and World Bank, 2011, Supporting the Development of More Effective Tax Systems. A Report to the G-20 Development Working Group by the IMF, OECD, UN, and World Bank, https://www.oecd.org/ctp/48993634.pdf.
73 ibid.
74 ITU, 2013, Taxing Telecommunication/ICT services: an overview. https://www.itu.int/en/ITU-D/Regulatory-Market/Documents/Taxation%20Study-final-en.pdf.
75 ibid.
76 R.M. Bird and E.M Zolt, 2003, Introduction to Tax Policy Design and Development, https://www.internationalbudget.org/wp-content/uploads/Introduction-to-Tax-Policy-Design-and-Development.pdf.
77 V. Tanzi and H. Zee, 2001, Tax Policy for Developing Countries, https://www.imf.org/external/pubs/ft/issues/issues27/.
78 International Telecommunications Union (ITU), 2013, Taxing Telecommunication/ ICT Services: An Overview, https://www.itu.int/en/ITU-D/Regulatory Market/Documents/Publications/Taxation2%20E-BAT3.pdf.
World Bank, InfoDev, IFC and ITU, 2011, Telecommunications Regulation Handbook, http://documents.worldbank.org/curated/en/527131468338984285/pdf/NonAsciiFileName0.pdf.
Directive 2002/20/EC Of The European Parliament and of The Council of 7 March 2002 on the authorisation of electronic communications networks and services (Authorisation Directive), https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32002L0020&from=EN.79 ibid.
79 IMF, OECD, UN, and World Bank, 2016, Enhancing the Effectiveness of External Support in Building Tax Capacity in Developing Countries. Prepared for Submission to G20 Finance Ministers, http://www.oecd.org/ctp/enhancing-the-effectiveness-of-external-support-in-building-tax-capacity-in-developing-countries.pdf.
80 IMF, 2011, Revenue Mobilization in Developing Countries, https://www.imf.org/external/np/pp/eng/2011/030811.pdf.

An assessment of the current mobile tax regime in Brazil against the principles identified in section above, identifies the following characteristics:

- **The current tax system has a high incidence on the mobile sector, limiting the positive externalities generated by the industry**

  As shown in section 2.2, the mobile tax burden is high in Brazil at 38% of the total market revenue. Consumers pay 65% of this tax burden, primarily because they are subject to higher ICMS rates than consumers in other sectors. Operators pay the remaining 35% of the total tax burden. The various and intricate regulatory fees are the most significant taxes borne by the operators. This high tax burden can undermine the affordability of mobile services and make the Brazilian tax system less conducive to investment.

- **The current tax system is distortive.**

  Brazil has five indirect taxes: ICMS, IPI, ISS, PIS and COFINS. These cascade taxes create distortions by being levied at every stage of the production chain, leading to higher effective tax rates for downstream firms compared to upstream firms, especially in long production chains. This distorts input decisions, leading to vertical integration and market segmentation. This also undermines horizontal equity as different sectors are taxed at different effective rates.[81]

  Furthermore, the fragmented structure of the ICMS adds a layer of complexity. As internal and interstate transactions are taxed at different rates, this creates further distortions.

  The cascade of regulatory fees is also distortive. These are effectively input taxes that can distort production and increase prices.[82]

- **Affordability remains an issue as the Brazilian tax system places a high tax burden on mobile consumers.**

  Although there is not a mobile-specific tax on consumption, the tax burden on mobile consumers is high (65% of the total tax burden) given the accumulation of VAT and sales taxes. Furthermore, under the ICMS regime, mobile services are taxed more heavily than other sectors, at rates varying between 25% and 35%, whereas the basic ICMS rate is between 17% and 20%. This has a negative impact on the affordability of mobile services, making them less accessible to the poorest.

- **The complexity of the Brazilian tax system leads to excessive compliance costs.**

  Under the category measuring the ease of paying taxes, the World Bank Doing Business 2020 report places Brazil at the bottom, being ranked as the 184th out of 190 countries. In fact, this is the weakest indicator (out of 10 categories) of Brazil in the Doing Business ranking.

  The total tax and contribution rate of Brazil (64.7%) is high compared to the LatAm and Caribbean region (47%), and also compared to OECD high income countries (39.9%). Furthermore, the Brazilian tax system places a significantly higher administrative burden on taxpayers in comparison to other countries. Beyond this, as shown in Table 5 below, the time to prepare, file and pay taxes in Brazil (1,501 hours) is almost five times the average seen in the LatAm and Caribbean region (317.1 hours), and more than nine times the average for OECD high income countries (158.8 hours). 59% of the total hours are spent on paying ICMS alone (885 hours).

  Furthermore, while VAT taxes in Brazil technically follow the common invoice-credit method, deducting inputs costs or claiming refunds (which are often severely delayed) generate additional administrative costs. This undermines competitiveness and productivity.[83]

  This metric is based on medium-size companies and does not include the time spent paying regulatory fees. This suggests the real time spent by mobile operators could be even higher.

81 A. Brockmeyer, 2018, Brazil: Options for Tax Reform. A Policy Note for Discussion, http://pubdocs.worldbank.org/en/980881536598168344/Policy-Note-Tax.pdf.

82 International Telecommunications Union (ITU), 2013, Taxing Telecommunication/ ICT Services: An Overview, https://www.itu.int/en/ITU-D/Regulatory-Market/Documents/Publications/Taxation2%20E-BAT3.pdf. World Bank, InfoDev, IFC and ITU, 2011, Telecommunications Regulation Handbook, http://documents.worldbank.org/curated/en/527131468338984285/pdf/NonAsciiFileName0.pdf. Directive 2002/20/EC Of The European Parliament and of The Council of 7 March 2002 on the authorisation of electronic communications networks and services (Authorisation Directive), https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32002L0020&from=EN.

83 ibid.

Table 5

Brazil's tax index, 2020

Source: World Bank, Doing Business 2020[84]

Indicator	Brazil	LatAm & Caribbean	OECD high income	Overall best performer
Tax payments (number per year)	10	28.2	10.3	3 (2 economies)
Time (hours per year)	1501	317.1	158.8	49 (3 economies)
Total tax and contribution (% of profit)	64.7	47.0	39.9	26.1 (33 economies)
Total tax and contribution (% of profit)	7.8	47.5	86.7	None in 2018/19

The compliance costs of Brazilian taxpayers are also increased due to VAT refund delays, as well as a high level of uncertainty given the numerous changes in legislation and interpretation.[85] All this makes difficult for mobile operators to plan properly in the short and medium term.[86]

The above assessment indicates that there is a significant opportunity for improvements to the Brazilian tax system. The IMF has recommended Brazil to eliminate multiple indirect taxes by moving towards a single broad-based VAT (with full refund for VAT on intermediate goods) and harmonise the fragmented federal and state tax regimes. Given the relatively high tax burden in Brazil, the IMF recommends focusing efforts on simplifying the system while raising the same amount of revenues. The IMF estimates that the fiscal savings from reducing tax exemptions could amount to 2% of GDP and be used to either reduce public debt or lower the high level of payroll and corporate taxes. Furthermore, tax simplification would make compliance less costly.[87]

Currently, the Brazilian federal government is analysing various options to simplify the VAT system in line with the IMF recommendations. In addition, ANATEL[88] is also considering options to simplify and consolidate the various regulatory fees on telecommunications operators. The next section will analyse the potential impacts of these reforms.

84 Doing Business presents quantitative indicators on business regulations and their enforcement that can be compared across 190 economies and over time. Source: World Bank, Doing Business 2020, https://www.doingbusiness.org/en/doingbusiness.
85 ibid.
86 For example, the application of CONDECINE-Telecom lead to some uncertainty in terms of its constitutionality. Telesintese, Teles terão que pagar CONDEDINE, decide STF, (9 March, 2016), http://www.telesintese.com.br/teles-terao-que-depositar-condecine-decide-stf/.
87 IMF, 2019, Brazil. 2019 Article IV Consultation - Press Release; Staff Report; and Statement by the Executive Director for Brazil. IMF Country Report No. 19/242., July 2019, https://www.imf.org/-/media/Files/Publications/CR/2019/1BRAEA2019001.ashx.
88 Brazil's National Telecommunications Agency.

3. Economic impact of tax and regulatory reform on the mobile sector in Brazil

In this section, ANATEL's provisional regulatory fee reform proposal[89] and two additional scenarios for regulatory fee and tax reform are assessed on the basis of their impacts on the mobile sector and the wider economy. ANATEL's provisional proposal and Scenario 1 comprise regulatory fee consolidation, while Scenario 2 comprises indirect tax consolidation.

3.1 Regulatory fee consolidation: ANATEL's provisional proposal and Scenario 1

ANATEL's provisional proposal

There are currently five key regulatory fees levied on telecoms companies in Brazil; these are listed in Table 6.

Table 6

Regulatory telecoms fees in Brazil

Source: EY review of applicable legislation

Fee	Applicable rate levied on mobile operators
FUST (universal service fund)	1% on gross revenues
FUNTTEL (telecommunications development fund)	0.5% on gross revenues
CONDECINE-Teles (telecoms contribution to the development of the film industry)	• R$4.14 per SIM connection and per special M2M connection • R$205.57 per base station or antenna
CFRP (contribution to the promotion of public broadcasting)	• R$1.34 per SIM connection and per special M2M connection • R$67 per base station or antenna
Inspection fees; comprised of: • TFI (installation inspection fee) • TFF (functioning inspection fee)	TFI: • R$26.83 per SIM connection • R$5.68 per M2M connection • R$1,340.80 per base station or antenna TFF: • R$8.85 per SIM connection • R$1.87 per M2M connection • R$442.46 per base station or antenna

Under the provisional proposal, the five regulatory fees are replaced with a new fee; the Cide-Telecom.[90]

The Cide-Telecom would be levied as a percentage of mobile operators' annual gross revenues,[91] with a temporary fee derived from the number of active SIM connections also in effect for the first four years of the reform.

89 Refers to ANATEL's provisional proposal (Análise n. 301/2019/AD) and Draft Bill (SEI nº 4787480). Process n. 53500.058462/2018-89
90 ANATEL's provisional proposal also includes the elimination of TFF and TFI fees on machine-to-machine (M2M) connections. This does not form part of the modelled regulatory reform scenarios but would be expected to have wider positive impacts through the enabling of IoT technologies.
91 Gross revenues will include all revenues from telecom services less discounts, refunds, exports, ICMS, PIS, COFINS, and payments between operators.

The revenue-dependent element of the fee would vary according to bands of revenue, and there would be a phased transition towards the terminal rates over the first four years of the reform. Consequently, the fees would apply as outlined in Table 7.

Table 7

Applicable Cide-Telecom revenue-element rates

Source: ANATEL Cide-Telecom proposal[92]

Annual gross revenues	2021	2022	2023	2024	From 2025
Above R$ 5 million and below R$ 500 million	1.8%	1.8%	1.8%	1.8%	1.8%
Above R$ 500 million and below R$ 5 billion	1.8%	2.3%	2.8%	3.3%	3.8%
Above R$ 5 billion	1.8%	2.6%	3.4%	4.2%	5.0%

The applicable SIM-dependent element of the Cide-Telecom fee would be R$13.42 per active connection in 2021, declining steadily to nil from 2025.

Implementation of ANATEL's provisional proposal would be expected to result in an effective rate above the current effective rate of the five mobile-specific regulatory fees in the first two years of the reform, for the mobile sector as a whole. From 2023 onwards, the effective rate is forecast to fall below that in the "baseline" scenario of no change to regulatory fees.[93] This is illustrated in Table 8.

Table 8

Scenario 1: Cide-Telecom effective rate by comparison to baseline

Source: EY analysis

Regulatory fees as a percentage of gross revenues	2021	2022	2023	2024	2025
Baseline	5.4 %	5.3 %	5.2 %	5.1 %	5.1 %
Scenario 1	5.8 %	5.6 %	5.1 %	4.9 %	4.6 %

92 ANATEL, Anteprojeto de Lei que Estabelece a Contribuição de Intervenção no Domínio Econômico incidente sobre os serviços de telecomunicações (Cidetelecom) e altera as Leis nºs 5.070, de 7 de julho de 1966; 8.313, de 23 de dezembro de 1991; 9.472, de 16 de julho de 1997; 9.998, de 17 de agosto de 2000; 10.052, de 28 de novembro de 2000; 11.652, de 7 de abril de 2008; 12.715, de 17 de setembro de 2012; e a Medida Provisória nº 2.228-1, de 6 de setembro de 2001

93 The baseline scenario reflects the current regulatory fees on the mobile sector, and therefore includes the prevailing regulatory fee rates. Please see Appendix A for more detail on the modelling assumptions used in this study and see Appendix B for detailed estimated impacts.

Scenario 1: regulatory fee consolidation and reduction

Scenario 1 builds on ANATEL's provisional proposal, but with the Cide-Telecom set at a rate of 1.8% of annual gross revenues for all operators following the reform in 2021. There would be no SIM element of the Cide-Telecom.

Scenario 1 illustrates the economic and social benefits that could be delivered by pursuing a lower regulatory fee rate, while retaining the benefits of simplification in ANATEL's provisonal proposal. A reduction in regulatory fees would make the regulatory system more conducive to investment. In general, reform of regulatory fees should ensure that applicable rates are linked to the budgets of the agencies involved and linked to documented cost information.

However, operators have expressed concerns about how money raised is spent. It is understood that some mobile operators would continue to contribute payments that are used to fund activity that do not relate to the telecommunications industry. For example, a portion of the proceeds of the Cide-Telecom may still be used to fund the development of the film industry (currently funded through the CONDECINE-Teles).

3.2 Modelling approach

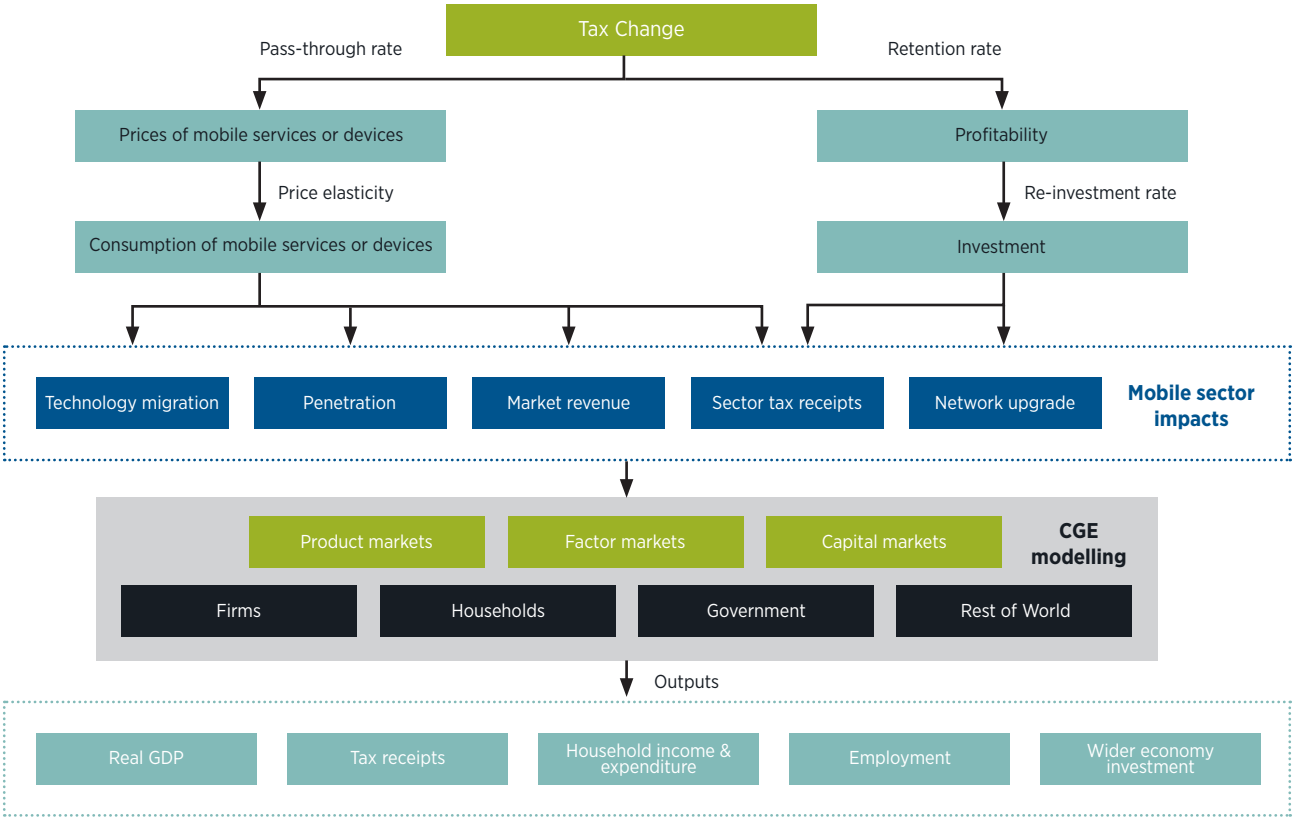
The potential quantitative impacts of ANATEL's provisional proposal and Scenario 1 have been analysed using a robust, two-stage modelling process to analyse both the Brazilian mobile sector and the wider Brazilian economy (through Computable General Equilibrium (CGE) modelling,[94] namely the standard version of the Global Trade Analysis Project (GTAP) model and its associated dataset).[95]

A schematic of the modelling approach used in this study is shown in Figure 14 below.[96] This illustrates how the approach captures the mechanism by which the regulatory fee change would be expected to impact the mobile sector and the wider economy. The reduction in regulatory fees would lead to lower effective prices for consumers and greater profitability for operators, increasing consumption of mobile services and investment respectively. This would have several impacts on the mobile market, including increased market revenue and faster penetration growth, as well as wider economy effects including increased employment growth and increased GDP growth.

Figure 14

Overview of the modelling approach

Source: EY analysis



94 CGE models reproduce the structure of the whole economy by mapping all existing economic transactions. They are based on the economic theory of general equilibrium; i.e. that supply and demand for goods, services and factors of production in the economy must be balanced. Economic relationships in CGE models are based on theory and empirical evidence from academic literature.

95 Aguiar, A., Chepeliev, M., Corong, E., McDougall, R., and D. van der Mensbrugghe, 2019. The GTAP Data Base: Version 10. Journal of Global Economic Analysis, 4(1), 1-27, https://www.jgea.org/resources/jgea/ojs/index.php/jgea/article/view/77

96 Please see Appendix A for more detail on the methodology approach used. A full description of the quantitative methodology can be found in the accompanying standalone methodology.

3.3 Summary of modelling results

Table 9 outlines the annual impacts that ANATEL'S provisional proposal and Scenario 1 are forecast to have compared to the baseline scenario (by 2025 unless otherwise stated).

Table 9

Summary of modelled impacts

Source: EY analysis

	ANATEL's provisional proposal: Mobile regulatory fee consolidation)	Scenario 1: Regulatory fee consolidation and reduction	Description of impact
Tax revenue impact	$109m*	$1,575m	Tax revenue would increase due to the expansion of the mobile sector and growth in the wider economy.
Mobile market revenue	$2m	$197m	Mobile sector revenue would increase due to the increased number of connections, and higher overall usage.
Additional investment by operators	$3m	$28m	Increased revenue would be partially invested, enabling enhanced network capacity and faster, more reliable mobile broadband speeds.
New connections	316,000 unique subscribers (0.14 percentage points (pp)); 394,000 connections (0.18pp)	3.6m unique subscribers (1.65pp); 4.5m connections (2.06pp)	Of the new connections, 58% would be prepay and 67% would be classified as low-income.
Usage	Data: 0.42% Voice: 0.38% Messages: 0.37%	Data: 4.79% Voice: 4.39% Messages: 4.22%	The reductions in price of would lead to an increase in data, voice and message services usage.

	ANATEL's provisional proposal: Mobile regulatory fee consolidation)	Scenario 1: Regulatory fee consolidation and reduction	Description of impact
Productivity gain	0.02%*	0.20%*	The increase in unique subscriber penetration would lead a gain in productivity across the economy, increasing output, incomes and expenditure.
GDP increase	$479m* (0.03%)	$5.4bn (0.29%)	GDP would increase as a result of the price and productivity effects.
Employment increase	4,855 jobs* (0.01%)	78,172 jobs (0.09%)	Increased economic activity would lead to an employment increase.
Wider investment in the economy	$157m* (0.05%)	$1.7bn (0.58%)	Decreased intermediate costs for businesses using mobile would make additional resources available for investment.
Benefits to other sectors	Communications: 0.06%* Trade: 0.05%* Electronics: 0.03%*	Trade: 0.55% Communications: 0.48% Other: 0.32%	All sectors within the economy would expand; the top three sector expansions are listed.[97]

*Annual macro-economic impacts under ANATEL's provisional proposal are expected to occur in the long-run.

The modelling suggests that Scenario 1 would deliver significantly greater socio-economic and fiscal benefits than ANATEL's provisional proposal, in a shorter timeframe. It would also be more equitable than the provisional proposal, as the Cide would be levied on a flat-rate basis rather than using a tiered system.

97 Sectors as defined within the macroeconomic CGE modelling software.

3.4 Indirect tax consolidation: Scenario 2

Background to proposed reform

This scenario is a proposed tax change of a draft bill (PEC 45) within Brazil's House of Representatives, to consolidate five indirect taxes into a single VAT rate.[98] The new VAT would be named IBS (an acronym for Imposto sobre Operações com Bens e Serviços), and the final IBS single rate would be the accumulation of the federal IBS rate; the state IBS rate; and the municipal IBS rate. IBS would not differ across different goods and services; its purpose is to introduce a single rate across all of them. This would create a level-playing field for all sectors; currently, mobile services are taxed more heavily than other sectors in all states. The proposed reform aligns with IMF recommendations for Brazil.[99]

There would be a transition period of ten years for the reform to take full effect. During the first two years, an IBS of 1% would be introduced, as well as by an offsetting reduction in COFINS. During the next eight years, there would be a gradual reduction in the five existing taxes and a gradual increase in the IBS rate.

Approach to analysis

A qualitative approach has been taken to analysing the proposed indirect tax consolidation, as the reform would be economy-wide rather than mobile-specific, and the extended transition of 10 years implies considerable uncertainty for modelling economic benefits.

Benefits of tax simplification

Scenario 2 will contribute to significant simplification of the current tax regime, which can be expected to deliver a number of benefits:

- **Increased economic efficiency and productivity:** Complex indirect taxes generate detrimental economic impacts in two ways: i) allocative efficiency losses,[100] through distortionary effects on relative prices, and ii) technical efficiency losses,[101] through complexity adding to compliance and enforcement burdens. A study modelling a tax-neutral simplification of the complex VAT system in Vietnam found that such a policy had the potential to increase real GDP by 1%.[102] Consolidation of Brazil's indirect tax system could therefore increase the levels of compliance for the government which should increase revenues, and reduce the costs faced by the industry, releasing resources that could be channelled into higher investment.

- **Redeployment of employment to more value-adding activities:** Reduced tax compliance burdens would allow for the redeployment of skilled labour. This could be in the form of performing more value-adding internal finance activities or taking up new roles in different sectors across the wider economy. The aforementioned Vietnam indirect tax simplification study found that while the reform led to an initial decrease in employment in Vietnam, the resulting productivity gains led to increased employment over time.

- **Financial benefits to operators:** Simplifying the indirect tax system would reduce the administrative and financial burden on operators. While they would still face complexity as different geographical and hierarchical levels of government would still set their own rates, there would be a single rate applying to goods and services in each case. This could dramatically reduce the number of applicable rates of tax.

  In addition, the reduction in the number of applicable indirect taxes (from five to one) would make it easier for operators to perform tax calculations, administration of payment and applicable ancillary activities. The reduced administrative burden would release funds, which could be used for investment purposes.

98 The taxes to be consolidated are State VAT (ICMS), the municipal sales tax (ISS), Federal VAT (IPI), the contribution to the financing of social security (COFINS) and the contribution to PIS (PIS/Pasep).
99 IMF, Brazil. 2019 Article IV Consultation - Press Release; Staff Report; and Statement by the Executive Director for Brazil. IMF Country Report No. 19/242., July 2019
100 Allocative efficiency refers to a state in which there is an economically optimal distribution of goods and services. Allocative efficiency losses are reductions in overall economic welfare driven by a movement away from the optimal distribution.
101 Technical efficiency refers to the effectiveness with which a given set of inputs is used to produce an output. Technical efficiency losses are reductions in overall economic welfare driven by a reduction in the production of goods and services for a given set of inputs, ceteris paribus.
102 Modelling VAT in the presence of multiproduction and differentiated exemptions (February 2009), Giesecke, J. A. and Tran, H. N.

Benefit maximisation

Certainty around the implementation of the tax reform for operators would enable effective financial and investment planning. Examples of this include open and effective consultations, clear communication of reform timelines, and consistency of approach by successive governments.

Further, for the full benefits of tax simplification to be realised, the rate of IBS set should not increase the tax contribution of the mobile sector. Section 2 highlighted that this contribution is already relatively high; indirect tax reform should not exacerbate this. Indeed, reducing the overall tax contribution could enhance the benefits, as any reduction in the level of taxes is likely to be passed through to consumers. This could either be directly via effective price reductions or from increased investment driving capacity expansion.

Appendix A Methodology

This Appendix sets out the key principles underpinning the methodology applied in this study to calculate the potential economic impacts of tax policy scenarios; and assumptions specific to the modelling approach undertaken for Brazil.

A full modelling methodology can be found in the accompanying standalone methodology report. This includes the technical details of the methodology, as well as the economic theory underpinning it.

- **Two-stage approach**
  A model of the Brazilian mobile sector, the 'telecoms market model' has been created to calculate changes in the mobile sector resulting from each of the tax policy scenarios. This includes the change in subscribers, usage, technology, revenues, profits, reinvestment and expanded capacity in the sector.

  The wider economic impacts of ANATEL's provisional proposal and Scenario 1 are assessed via a CGE model, namely the standard version of the GTAP model and its associated dataset.[103]

- **Price elasticity of demand**
  The impact of price changes on the consumption of mobile services are captured via estimates of the price elasticity of demand (PED), which measures the change in quantity demanded following a change in price.

  To establish relevant price elasticities for Brazil, a set of studies pertaining to high-income countries has been used (Brazil is defined as an upper middle-income economy by the World Bank).[104]

  The following price elasticities of demand have been assumed in this study:

  - Mobile usage elasticities:[105] from -0.6 to -0.8 for voice and from -0.6 to -0.7 for data;
  - Mobile ownership elasticities:[106] from -0.6 to -0.7 for mobile services; and
  - Technology migration elasticities:[107] from -0.2 to -0.3 for data.

- **Total factor productivity**
  It has been assumed that a 1% increase in unique subscriber penetration leads to a 0.13% increase in total factor productivity (TFP).[108]

103 Global Trade Analysis Project (https://www.gtap.agecon.purdue.edu/)
104 World Bank (https://datahelpdesk.worldbank.org/knowledgebase/articles/906519-world-bank-country-and-lending-groups)
105 Mobile usage elasticities relate to the change in usage per connection following a change in price.
106 Mobile ownership elasticities relate to the change in number of connections following a change in the price of services and handsets.
107 Technology migration elasticities which relate to the migration from 2G to 3G / 4G services following a change in the price of data, and a change in price of handsets.
108 TFP is a measure for how efficiently an economy uses inputs during its production process.

- **Effective pass-through rates**
  The effective pass-through rate is the percentage of the tax or fee change which is passed through to subscribers in the form of lower effective prices. Effective prices represent the value for money achieved by subscribers; effective price changes are therefore wider ranging than pure price changes. The effective price subscribers face can be said to decrease if they receive a better quality or quantity of service for the same price. Effective pass-through rates, therefore, do not imply a one-for-one reduction in headline prices from lower taxation.

  The level of effective pass-through has been based on the results of macroeconomic modelling in GTAP.[109] In both scenarios, the mobile operators are assumed to pass approximately 90% of the tax decrease on to subscribers by decreasing the effective prices of mobile services.

  These rates reflect changes in effective prices that take place over the medium- to long-run, as a transition to a new equilibrium state of the economy following a shock such as a change in taxation. Therefore, they would not only capture the immediate price decisions of mobile operators but would also include reallocation of resources (due to changes in relative prices/costs) and effects of improved productivity on average costs. Thus, the effective pass-through rates have been used phased as per Table 10.

Table 10

Evolution of effective pass-through rates in Brazil[110]

Source: EY analysis

Effective pass-through rate	Year 1	Year 2	Year 3	Year 4	Year 5
ANATEL's provisional proposal	76.5 %	83.3 %	90.0 %	90.0 %	90.0 %
Scenario 1	78.2 %	85.1 %	92.0 %	92.0 %	92.0 %

109 The level of effective pass-through in GTAP is driven by the underlying sectoral linkages and behavioural relationships in the Brazilian economy.
110 GTAP, EY analysis

- **Reinvestment by mobile operators**
  In Brazil, 2G and 3G mobile services cover almost all of the population (100% and 95% respectively), while 4G coverage is already extensive (94%). The modelling suggests that additional funds are made available to mobile operators as a result of the modelled tax reforms. It is assumed that reinvestment of these funds is primarily targeted at improving capacity of the existing network, rather than expanding network coverage.

- **Employment**
  In Brazil, it can be observed that there is significant unemployment amongst the lower-skilled workforce.[111] Therefore, the GTAP modelling approach allows for employment to increase amongst lower-skilled labour in Brazil, specifically in the "Technicians and associated professions and clerks" category. This means that an expansion of demand in the economy leads to both an increase in employment and an increase in wages for lower-skilled workers.

- **Labour mobility**
  Brazil's labour market flexibility index score in the World Economic Forum's Global Competitiveness Report indicated that there is much flexibility in the labour market. The assumption of perfect labour mobility in GTAP was adjusted, with mobility set to 50%.

- **Mobile sector as a proportion of the telecommunications sector**
  The proportion of the telecommunications sector comprised of the mobile sector in Brazil has been estimated at 13%.[112]

- **Regional aggregation in GTAP**
  The following regions have been separated in GTAP for the purposes of conducting the CGE macroeconomic analysis: Brazil, China, USA, Argentina, the rest of Latin America and the Caribbean, the European Union, and the Rest of the World.[113]

111 Unemployment by education level, ILOSTAT labour force survey
112 As the GTAP macro model has no mobile sector as a separate industry, the share of the mobile sub-sector has been calculated based on data from GTAP and GSMA. The rest of the communications sector including postal and courier services; publishing activities; motion picture, video and television production, sound recording and music publishing activities; programming and broadcasting activities; computer programming, consultancy and related activities; and, information service activities.
113 Based on analysis of international trade data for Brazil.

Appendix B
Detailed modelling outputs

This Appendix sets out the detailed estimated mobile market and economic impacts of each of the tax scenarios, compared to a baseline case of no tax reform.

ANATEL's provisional proposal: mobile regulatory fee consolidation

The forecast effective rate impact of ANATEL's provisional proposal is as per Table 11.

Table 11

ANATEL's provisional proposal: Cide-Telecom effective rate by comparison to baseline

Source: EY analysis, operator data

Regulatory fees as a percentage of gross revenues	2021	2022	2023	2024	2025
Baseline	5.4 %	5.3 %	5.2 %	5.1 %	5.1 %
ANATEL's provisional proposal	5.8 %	5.6 %	5.1 %	4.9 %	4.6 %

Table 12 outlines the forecast impacts of the proposal compared to the baseline scenario.

Table 12

Annual impact of ANATEL's provisionally proposed mobile regulatory fee consolidation[114]

Source: EY analysis

Mobile sector impacts	2021	2022	2023	2024	2025
Change in effective price of services[115] vs baseline	0.31%	0.24%	0.01%	-0.19%	-0.38%
Incremental connections (total)	-212,000	-378,000	-174,000	124,000	394,000
Incremental unique subscribers (total)	-159,000	-289,000	-135,000	98,000	316,000
Incremental connections (3G and 4G)[116]	-267,000	-485,000	-223,000	169,000	529,000
of which technology migration	-72,000	-130,000	-58,000	49,000	146,000
Incremental connections by low income subscribers	-143,000	-255,000	-117,000	83,000	266,000
ARPU (total) vs baseline	0.2%	0.1%	-0.1%	-0.1%	-0.2%
Change in mobile penetration (connections)	-0.1%	-0.2%	-0.1%	0.1%	0.2%
Change in mobile penetration (unique subscribers)	-0.1%	-0.1%	-0.1%	0.0%	0.1%
Change in mobile penetration (unique MBB subscribers)	-0.1%	-0.2%	-0.1%	0.1%	0.2%
Data usage vs baseline	-0.2%	-0.4%	-0.2%	0.1%	0.4%
Data usage per connection vs baseline	-0.1%	-0.2%	-0.1%	0.1%	0.2%
Change in market revenue (total)	$16m	-$22m	-$28m	-$11m	$2m
Change in market revenue (total) vs baseline	0.1%	-0.1%	-0.2%	-0.1%	0.0%
Change in investment	-$9m	-$13m	$1m	$3m	$3m
Static tax impact[117]	$66m	$47m	-$8m	-$47m	-$83m
Impact on mobile sector taxation	$73m	$38m	-$19m	-$51m	-$82m

Wider economic impacts[118, 119]	2021	2022	2023	2024	2025
Full impact on communications sector taxation	Impact estimated for long-run only[120]				-$61m
Receipts from all other sectors	Impact estimated for long-run only				$170m
Total tax receipts	Impact estimated for long-run only				$109m
Real GDP	Impact estimated for long-run only				$479m (0.03%)
Employment	Impact estimated for long-run only				4,855 (0.01%)
Household income	Impact estimated for long-run only				$437m (0.03%)
Household expenditure	Impact estimated for long-run only				$365m (0.03%)
Investment	Impact estimated for long-run only				$157m (0.05%)

114 Some figures do not sum due to rounding.
115 The reported change in price refers to an effective price as opposed to a headline price.
116 The incremental number of 3G and 4G connections includes both newly joining 3G and 4G subscribers and those migrating from 2G to mobile broadband enabled technologies.
117 This is the initial direct benefit to the Exchequer, before behavioural change in the sector and the economy; overstates the true benefit.
118 For the macroeconomic variables included below, the long-run impact has been calculated.
119 The timing of macroeconomic impacts is based on the lagged manner in which the productivity benefits would occur.
120 Macroeconomic impacts in ANATEL's provisional proposal were calculated for the long-run only. Annual impacts are not calculated as the macroeconomic model does not reflect the varying effective regulatory fee rate over time.

Scenario 1: mobile regulatory fees consolidation and reduction

This scenario models regulatory fee consolidation and reduction from 2021 onwards. The forecast effective rate impact is as per Table 13.

Table 13

Scenario 1: Cide-Telecom effective rate by comparison to baseline

Source: EY analysis, operator data

Regulatory fees as a percentage of gross revenues	2021	2022	2023	2024	2025
Baseline	5.4 %	5.3 %	5.2 %	5.1 %	5.1 %
Scenario 1	1.8 %	1.8 %	1.8 %	1.8 %	1.8 %

Table 14 and Figure 15 outline the forecast impacts of the regulatory fee reduction compared to the baseline scenario.

Table 14

Annual impact of mobile regulatory fees consolidation and reduction[121]

Source: EY analysis

Mobile sector impacts	2021	2022	2023	2024	2025
Change in effective price of services[122] vs baseline	-2.8%	-3.0%	-3.3%	-3.3%	-3.3%
Incremental connections (total)	1,910,000	4,004,000	4,345,000	4,520,000	4,519,000
Incremental unique subscribers (total)	1,433,000	3,059,000	3,375,000	3,566,000	3,623,000
Incremental connections (3G and 4G)[123]	2,404,000	5,121,000	5,628,000	5,929,000	5,929,000
of which technology migration	649,000	1,369,000	1,488,000	1,549,000	1,549,000
Incremental connections by low income subscribers	1,287,000	2,699,000	2,926,000	3,033,000	3,047,000
ARPU (total) vs baseline	-1.9%	-1.1%	-1.2%	-1.1%	-1.1%
Change in mobile penetration (connections)	0.9%	1.9%	2.0%	2.1%	2.1%
Change in mobile penetration (unique subscribers)	0.7%	1.4%	1.6%	1.6%	1.7%
Change in mobile penetration (unique MBB subscribers)	0.8%	1.8%	2.0%	2.1%	2.2%
Data usage vs baseline	2.0%	4.3%	4.6%	4.8%	4.8%
Data usage per connection vs baseline	1.1%	2.2%	2.4%	2.5%	2.5%
Change in market revenue (total)	-$153m	$145m	$162m	$195m	$197m
Change in market revenue (total) vs baseline	-0.9%	0.9%	0.9%	1.1%	1.1%
Change in investment	$76m	$52m	$28m	$28m	$28m
Static tax impact[124]	-$583m	-$580m	-$578m	-$576m	-$574m
Impact on mobile sector taxation	-$639m	-$526m	-$518m	-$504m	-$502m

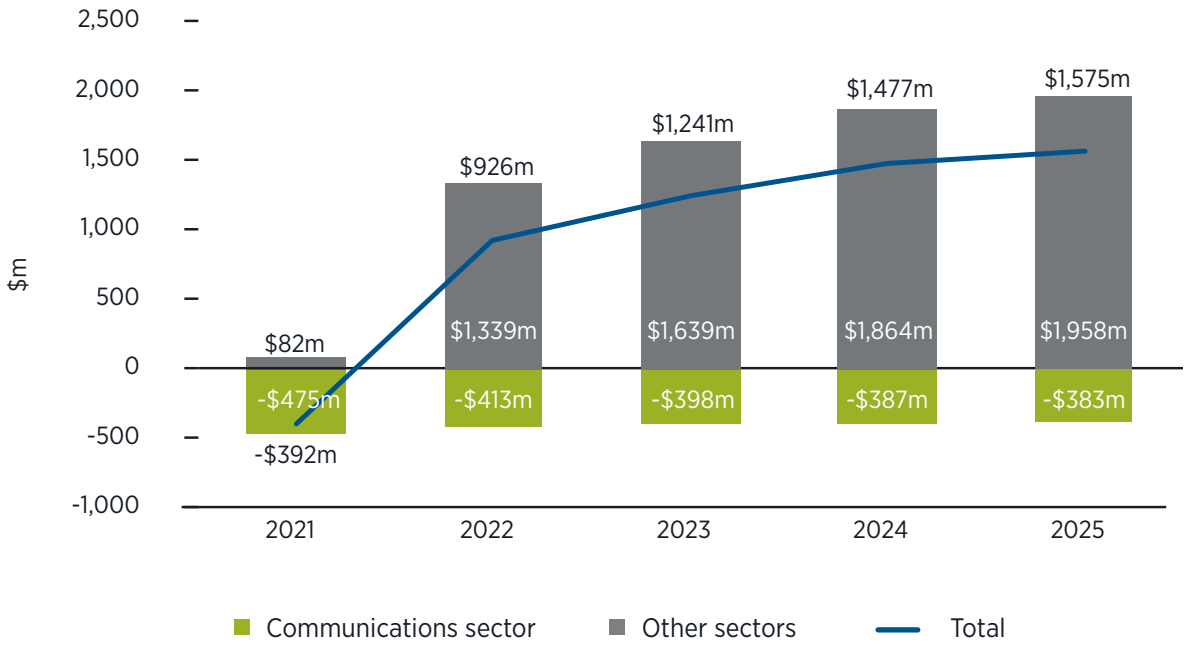
Wider economic impacts[125, 126]	2021	2022	2023	2024	2025
Full impact on communications sector taxation	-$475m	-$413m	-$398m	-$387m	-$383m
Receipts from all other sectors[127]	$82m	$1,339m	$1,639m	$1,864m	$1,958m
Total tax receipts	-$392m	$926m	$1,241m	$1,477m	$1,575m
Cumulative total receipts	-$392m	$533m	$1,774m	$3,250m	$4,825m
Real GDP	$327m	$3,619m	$4,483m	$5,131m	$5,401m (0.29%)
Employment	Impact estimated for 2025 only				78,172 (0.09%)
Household income	Impact estimated for 2025 only				$4,905m (0.33%)
Household expenditure	Impact estimated for 2025 only				$4,067m (0.34%)
Investment	Impact estimated for 2025 only				$1,674m (0.58%)

121 Some figures do not sum due to rounding.
122 The reported change in price refers to an effective price as opposed to a headline price.
123 The incremental number of 3G and 4G connections includes both newly joining 3G and 4G subscribers and those migrating from 2G to mobile broadband enabled technologies.
124 This is the initial direct benefit to the Exchequer, before behavioural change in the economy; it overstates the true benefit.
125 For some of the variables included below, the impact has been calculated as at 2025.
126 The timing of macroeconomic impacts is based on the lagged manner in which the productivity benefits would occur.
127 It is noted that the magnitude of tax receipts from other sectors appears high, the ratio of the total increase in tax receipts to the increase in GDP in the scenario is 28%. This is due to the high tax environment in Brazil, with total tax revenues around 30% of GDP (OECD), which is significantly higher than most other Latin American countries.

Figure 15

Mobile regulatory fees consolidation and reduction — annual impacts on regulatory fee receipts

Source: EY analysis



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