



Consultative Document

**Report on the
Interconnection Benchmarking Study
for the
Telecommunications Sector of
Trinidad and Tobago
2024–2029**

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List of Abbreviations

BEREC	Body of European Regulators of Electronic Communications
CPP	calling party pays
XCD	East Caribbean Dollar
ECTEL	Eastern Caribbean Telecommunications Authority
EU	European Union
EUR	Euro
FWI	French West Indies
FDC	fully distributed costs
FICC	fixed international carriage charge
FTR	fixed termination rate
FY	financial year
GDP	gross domestic product
IBS	interconnection benchmarking study
ICA	international conveyance assumption
ICC	international carriage charge
IFTR	international fixed termination rate
IMTR	international mobile termination rate
ITU	International Telecommunication Union
JM\$	Jamaica dollar
LCU	local currency unit
LRAIC	long-run average incremental cost
LRIC	long-run incremental cost
LRIC+	LRIC with a markup
MICC	mobile international carriage charge
MS	Member States
MTR	mobile termination rate
NRA	national regulatory authority
OTT	over-the-top
PLMN	public land mobile network
PSTN	public switched telephone network
RIO	reference interconnection offer
RPP	receiving party pays
SCI	Sepulveda Consulting Inc.
TATT	Telecommunications Authority of Trinidad and Tobago
TT\$	Trinidad and Tobago dollar
TCI	Turks and Caicos Islands
US\$	United States dollar

Executive Summary

Interconnection in telecommunications is the process of linking the networks of different telecommunications operators, to enable consumers across these networks to communicate seamlessly. Interconnection is an important consumer issue as telecommunications users cannot communicate with each other unless the necessary interconnection arrangements among telecommunications operators are in place (World Bank, 2000). According to International Telecommunication Union (ITU) surveys, interconnection-related issues are ranked by many countries as the single most important problem in the development of a competitive marketplace for telecommunications services (World Bank, 2000). Therefore, effective interconnection arrangements among operators are essential for reducing any systemic costs, technical issues and other inconveniences incurred by operators and consumers when providing and/or using telecommunications services. As a result, the interconnection rates negotiated by operators play a pivotal role in ensuring fair interconnection practices which, in turn, support a competitive telecommunications market.

According to the Organisation for Economic Co-operation and Development (OECD), cost-oriented interconnection rates are necessary for fostering competition, since high rates can deter new entrants, while rates set below actual costs can impede investment in network infrastructure (OECD, 2001). Notably, interconnection costs are a key determinant of interconnection rates. Therefore, having a reasonable estimate of interconnection costs is an important aspect in ensuring sustainable interconnection rates between operators.

However, in the absence of costing data and cost models, determining interconnection rates becomes a complex task. One key approach to determining interconnection rates is that of interconnection costing benchmarks, which has been used extensively by the European Commission and other international jurisdictions (World Bank, 2004).

Interconnection costing benchmarks provide a reasonable indication of the level of interconnection costs within a specific region, geographic market or predetermined comparable group. Interconnection costs are a key determinant of interconnection rates. Interconnection costing benchmarks are used predominantly in the absence of cost models, or where there is no or limited cost data available¹. Moreover, interconnection costing benchmarks can be used in association with cost models to provide supporting evidence for model inputs and to cross-check model outputs, and thus may be used as an interim or ongoing measure for assessing interconnection costs.

¹ See, for example, *A Practical Guide on Benchmarking Telecommunication Prices*, issued by ITU in August 2014.

The Telecommunications Authority of Trinidad and Tobago (the Authority) has conducted several interconnection benchmarking studies and has published the findings in three reports to date. The aim of these publications was to improve data and information symmetry² amongst parties in the domestic wholesale fixed and mobile telephony markets, for the adoption of the recommended interconnection rates by domestic telecommunications operators. These publications also provide the basis for the rates to be implemented in the event of a breakdown in commercial negotiations; if a legal dispute arises between existing or new service providers (for example, virtual network operators); or where specific market distortions have been determined or detected by the Authority, (e.g., dominance, cross subsidisation, or acts of unfair competition, including anti-competitive pricing).

This *Report on the Interconnection Benchmarking Study for the Telecommunications Sector of Trinidad and Tobago 2024–2029* (the 2024 IBS Report) is the fourth IBS report issued by the Authority. The 2024 IBS Report includes costing benchmarked rates for the following six interconnection services in the telecommunications sector of Trinidad and Tobago (i.e., the six benchmarked interconnection services) for the period 2024 to 2029:

- 1) Domestic mobile termination rate (MTR)
- 2) Domestic fixed termination rate (FTR)
- 3) Mobile international carriage charge (MICC)
- 4) Fixed international carriage charge (FICC)
- 5) International mobile termination rate (IMTR)
- 6) International fixed termination rate (IFTR)

These cost-oriented benchmarks, which pertain to the abovementioned six interconnection services, are based on eight sufficiently comparable jurisdictions that have implemented long-run incremental cost (LRIC) models to determine interconnection rates; host similar operators (in terms of ownership, financial capacity and corporate structure, culture and administration) using like technology; and have macroeconomic indicators (e.g., GDP per capita and inflation) and demographic metrics similar to Trinidad and Tobago's.

The sample jurisdictions were determined through the application of diverse selection criteria, including regional geography, customer pricing regimes, number of operators, availability and confidentiality of interconnection rates, and the age of the regulatory decision. The interconnection rate observations were adjusted to attain uniform rates from which two weighted sample benchmarks were computed. These results then underwent normalisation analysis to assess the sensitivity of the benchmarked rates to eight potential variables within the sample jurisdictions, namely, population density, maximum elevation, gross domestic product (GDP) per capita, fixed

² Information symmetry refers to a scenario(s) where the information or data deemed to be of relevance is completely known by all the parties involved.

subscriber density, mobile subscriber density, the number of fixed operators, the number of mobile operators, and inflation. The selection of these variables allows for meaningful comparison of the interconnection rates across the benchmarked countries. The 2024 IBS Report therefore presents the findings of the Authority’s updated benchmarking exercise derived from the application of this methodology.

The first IBS report was issued in March 2017 (the 2017 IBS Report) and included recommended costing benchmarked rates for three financial years, covering the period April 2017 to March 2020. Pursuant to stakeholder comments on the 2017 IBS Report, the Authority issued a first decisions on recommendations (DORs) document and the second IBS report in June 2019 (the 2019 IBS Report), confirming the 2017 IBS Report benchmarks.

Subsequently, to respond to stakeholder comments on the 2019 IBS Report and to update the benchmarking data, the Authority issued a second DORs document and the third IBS report in March 2021 (the 2021 IBS Report). The 2021 IBS Report included recommended costing benchmarked rates for three financial years, covering the period April 2021 to March 2024.

Based on the update of the underlying benchmarking data, this 2024 IBS Report, 1) extends the recommended costing benchmarked rates included in the 2021 IBS Report for another 12 months, to March 2025; and 2) includes new recommended costing benchmarked rates for April 2025 to March 2029³.

These four IBS reports have been undertaken by the Authority pursuant to regulation 15(2) of the *Telecommunications (Interconnection) Regulations (2006)* (Regulation 15(2), the Interconnection Regulations), which allows for the establishment of “costing benchmarks, as determined by the Authority, that comport with internationally accepted standards for such benchmarks”. The Authority has, for each IBS Report, contracted international consulting firm, Sepulveda Consulting Inc (SCI), to conduct the interconnection benchmarking study. The methodology used, which was developed over time, is consistent with internationally accepted standards and reflects stakeholder feedback. It was based on the 2017 and 2019 IBS Reports, informed by stakeholder consultations, finalised and implemented in the 2021 IBS Report⁴. Thus, the 2024 IBS Report presents the findings of the Authority’s updated benchmarking exercise derived from the application of this approved methodology.

³ As discussed in section 4.1 of the document, the Authority considers that the FY 2028/2029 end-point benchmarked rates are likely to remain reasonably appropriate beyond March 2029.

⁴ *Practical Guide on Benchmarking Telecommunication Prices*, issued by ITU in August 2014

The Authority considers that adopting benchmarked costing rates could offer significant benefits to consumers. Lower domestic interconnection rates might lead to reduced average retail call prices, especially for operators with net outpayment positions⁵, such as those with minority market shares, new market entrants, and virtual network operators. If lower interconnection rates do result in reduced retail call prices, we can expect increased usage of mobile and fixed services in price-sensitive markets. This could enhance competition both within the same mode (intra-modal) and between different modes (inter-modal), particularly due to the substitutability of fixed-to-mobile services⁶ and the impact of over-the-top (OTT) services⁷ on mobile telephony competition. Furthermore, as lower interconnection rates lead to reduced retail prices, operators with net outpayment positions are likely to see increased demand for their services, which would benefit both service providers and consumers in the broader domestic telephony market.

The Authority may also establish these benchmarked rates in accordance with sections 29 (2) and 82 of the Act. This can occur when the formal dispute resolution process is initiated or when market distortions such as dominance, cross-subsidization, or unfair competition, including anti-competitive pricing, are determined. In these situations, the Authority is empowered to “establish price regulation regimes, which may include setting, reviewing, and approving prices”.

Table 1 lists the rates for the six benchmarked interconnection services and, for reference, also includes the April 2023 to March 2024 recommendations from the 2021 IBS Report.

⁵ “Operators with net outpayment positions” refers to concessionaires holding negative balances following the difference of total interconnection revenues less interconnection outpayments.

⁶ In the *Determination: Domestic Retail Fixed Telephony and Fixed Broadband Market Definitions* (October 2024), mobile voice service was noted to form part of the relevant domestic retail fixed voice market definition. That determination was made considering the significant partial substitution (i.e., the reduction in consumption of fixed voice services and the related increase in the consumption of mobile voice service on a call basis).

⁷ In the *Determination: Retail Domestic Mobile Telephony Market Definition* (May 2024), OTT services were noted to be a relevant part of the retail domestic mobile telephony market. Specifically, OTT services were observed to be demand-side substitutes for mobile voice services on a call or usage basis.

Table 1 The Authority’s costing benchmarked rates

Interconnection Rates	Currency*	2021 IBS Report: Costing Benchmark Rates	2024 IBS Report: Costing Benchmark Rates	
		April 2023 to March 2024	April 2024 to March 2025	April 2025 to March 2029 ⁸
Domestic mobile termination rate (MTR)	TT\$	0.0641	0.0641	0.0472
	US\$	0.0095	0.0095	0.0070
Domestic fixed termination rate (FTR)	TT\$	0.0182	0.0182	0.0142
	US\$	0.0027	0.0027	0.0021
Mobile international carriage charge (MICC)	TT\$	0.0439	0.0439	0.0337
	US\$	0.0065	0.0065	0.0050
Fixed international carriage charge (FICC)	TT\$	0.0439	0.0439	0.0337
	US\$	0.0065	0.0065	0.0050
International mobile termination rate (IMTR)	TT\$	0.1080	0.1080	0.0810
	US\$	0.0160	0.0160	0.0120
International fixed termination rate (IFTR)	TT\$	0.0621	0.0621	0.0479
	US\$	0.0092	0.0092	0.0071

Note: *The costing benchmarked rates were calculated and determined in US dollars. The TT dollar equivalent values in this table are provided for “illustrative purposes” only and are based on the historical weighted average US dollar to TT dollar exchange rate used for benchmarking analysis (0.1482), as described in section 3.4. The US to TT exchange rate may be different at the date of publication of this report and over the course of the applicability of the benchmarks. If so, at the start of each financial year, interconnection rates could be restated in TT dollars, based on the TT dollar to US dollar exchange rate at that time.

⁸ In accordance with the duration of the interconnection agreements held by fixed and mobile network operators, i.e., five years, the costing benchmarked rates have been estimated for the five-year period 2024–2029.

1. Introduction

1.1. Background

Interconnection in telecommunications is the process of linking the networks of different telecommunications operators, to enable consumers of one network to communicate with consumers of another network, thereby resulting in seamless connectivity across networks (World Bank, InfoDev, and ITU, 2011). Accordingly, interconnection is an important consumer issue, as telecommunications users cannot communicate with each other or connect with services they demand unless necessary interconnection arrangements among telecommunications operators are in place (World Bank, 2000).

Therefore, inadequate interconnection arrangements impose unnecessary costs and technical problems to operators along with delays, inconvenience and additional costs for businesses and consumers (World Bank, 2000). As a result, the interconnection rates (that is the rate charged by a network operator to another network operator for the purposes of interconnecting) negotiated among operators play a critical role in ensuring that interconnection arrangements among operators are fair, leading to a competitive market environment. According to the Organisation for Economic Co-operation and Development (OECD), the level of interconnection rates can determine the structure of the telecommunications market. High charges deter market entry while low charges that are below actual costs prevent incumbents from recouping network investments and discourage future infrastructure spending. Thus, cost-oriented interconnection rates are essential for effective competition (OECD, 2001).

Interconnection costs are a key determinant of interconnection rates. Having a reasonable estimate of interconnection costs is an important aspect in ensuring sustainable interconnection between operators which would lead to competitive markets for telecommunications services and effectively support facilities and service-based competition. However, determining interconnection rates is a complex task with some telecommunications regulators addressing interconnection disputes by relying on available benchmarking rates (World Bank, 2004). Therefore, in the absence of cost models, one key approach to determining interconnection rates is that of interconnection costing benchmarking which has been used extensively by the European Commission and other international jurisdictions (World Bank, 2000).

Interconnection costing benchmarks can support evidence-based regulation by reducing information asymmetry amongst parties in the domestic wholesale fixed and mobile telephony markets. Furthermore, when the benchmarking sample is drawn from suitably comparable jurisdictions in which cost-based rates are enforced, interconnection costing benchmarked rates can reflect real-world operations, both in the technical design of the network and in operating conditions.

The Telecommunications Authority of Trinidad and Tobago (the Authority) has conducted several interconnection benchmarking studies, with the objective of providing costing benchmarked rates for adoption by domestic telecommunications operators during the interconnection negotiation process.

The Authority's first IBS report was issued in March 2017 (the 2017 IBS Report), recommending costing benchmarked rates for three financial years, covering the period April 2017 to March 2020. Pursuant to stakeholders' comments on the 2017 IBS Report, the Authority issued the first decisions on recommendations (DORs) document and a second IBS report in June 2019 (the 2019 IBS Report), confirming the 2017 IBS Report benchmarks. Subsequently, to respond to stakeholder comments on the 2019 IBS Report and to update the underlying benchmarking data, the Authority issued a second DORs document and a third IBS report in March 2021 (the 2021 IBS Report), which included recommended costing benchmarked rates for three financial years, covering the period April 2021 to March 2024.

Following the expiration of the previous recommended costing benchmarks in March 2024, the Authority commissioned this *Report on the Interconnection Benchmarking Study for the Telecommunications Sector of Trinidad and Tobago 2024–2029* (the 2024 IBS Report). This report presents and evaluates the costing benchmarked rates pertaining to the following six interconnection services for the telecommunications sector of Trinidad and Tobago:

- 1) Domestic mobile termination rate (MTR)
- 2) Domestic fixed termination rate (FTR)
- 3) Mobile international carriage charge (MICC)
- 4) Fixed international carriage charge (FICC)
- 5) International mobile termination rate (IMTR)
- 6) International fixed termination rate (IFTR)

Ensuring that prices for interconnection services are cost based is a standard policy objective of national regulatory authorities (NRAs) around the world⁹. It is commonly accepted that moving interconnection rates closer to costs promotes both static and dynamic (that is, longer term) economic efficiency¹⁰ and, as a result, competition. In addition, moving interconnection rates closer to costs may have the effect of lowering consumer prices which may, in turn, stimulate consumer demand for the operators' services. The Authority's IBS reports are premised on these principles and, as such, comport with international best practice.

⁹ *Practical Guide on Benchmarking Telecommunication Prices*, issued by ITU in August 2014

¹⁰ Static efficiency aims to maximise output and minimise costs by utilising current resources and technology effectively. On the other hand, dynamic efficiency emphasises the importance of adapting and innovating to stay efficient amidst evolving market conditions, shifting consumer preferences, and advancements in technology.

1.2. Purpose

The purpose of this 2024 IBS Report is to present the updated costing benchmarked rates for the six interconnection services in the telecommunications sector of Trinidad and Tobago, computed using a combination of qualitative and quantitative assessments, for the five-year period April 2024 to March 2029.

1.3. Objectives

The objectives of this Report are to:

1. review the benchmarking methodology used for selecting sample jurisdictions comparable to Trinidad and Tobago for the 2024–2029 period.
2. review the rates for interconnection services in the sample jurisdictions for the period January 2016 to October 2024, to establish historical levels and trends for the six benchmarked interconnection services.
3. review the historical costing benchmarked rates from the 2021 IBS Report for the six interconnection services during the last financial year of recommendations (April 2023 to March 2024).
4. compute costing benchmarked rates for the six interconnection services for the period April 2024 to March 2029.
5. develop benchmarked rates for the interconnection period April 2024 to March 2029, to be implemented in the event of a dispute where a concessionaire has a dominant position in the relevant market, or the Authority detects cross-subsidisation or acts of unfair competition, including anti-competitive pricing.

1.4. Scope

The 2024 IBS Report provides costing benchmarked rates for the six interconnection services in the telecommunications sector of Trinidad and Tobago for the five-year period 2024–2029. These rates are based on a study of interconnection rates in comparable regional jurisdictions that use LRIC models. The interconnection benchmarking study is premised on the principles of cost-oriented interconnection rates, in keeping with international standards and domestic telecommunications legislation. However, the 2024 IBS Report does not propose a specific a price

regulation regime, including rate minima, nor a range within which interconnection rates should be set.

1.5. Legal and Regulatory Framework

The Authority's objective in undertaking this consultative process is to develop costing benchmarked rates for the six interconnection services.

Section 25(2)(m) of the Telecommunications Act, Chap. 47:31 (the Act), which addresses network interconnection, requires that prices for interconnection services be "cost oriented", and states that:

... the Authority shall require a concessionaire to ... disaggregate the network and, on a cost-oriented basis such as the Authority may prescribe, establish prices for its individual elements and offer the elements at the established prices to other concessionaires of public telecommunications networks and public telecommunications services.

Furthermore, regulation 5(1) of the Interconnection Regulations requires that interconnection between parties be provided under non-discriminatory terms, as specified hereunder:

5(1) A concessionaire shall provide interconnection under the same terms and conditions and of the same quality as it provides for its own networks and services, the networks and services of its subsidiaries and partners, or the networks and services of any other concessionaire to which it provides interconnection.

In addition, regulation 15(2) of the Interconnection Regulations provides guidelines for setting interconnection rates as follows:

15(2) Where the relevant data for the establishment of the costing methodologies, models or formulae are unavailable within a reasonable time, the concessionaire may set interconnection rates with reference to such costing benchmarks, as determined by the Authority, that comport with internationally accepted standards for such benchmarks.

Moreover, in the Report and Decision of the Arbitration Panel established pursuant to section 82 of the Act, (the 2019 Panel Report) recommended that the Authority intervene in the adoption of cost-based interconnection rates. In said decision, one recommendation is that:

the Panel further holds that these rates for fixed and mobile international termination access services shall remain in effect until....

(2) The Authority determines the cost of fixed and mobile international termination access services by benchmarks as per the interim regime;

The Panel also considered the “Pricing Rules and Principles for the Termination of International Incoming Traffic on Domestic Networks in Trinidad and Tobago” (the Pricing Rules and Principles), issued by the Authority on 18th February 2013, which were pursuant to section 29 (4) of the Act, establish the framework for setting the IMTR and IFTR, including that:

1. The rate charged by a concessionaire for the termination of incoming international telecommunications traffic on a domestic telecommunications network shall not be less than the sum of:
 - a. the cost of termination of the international traffic on the relevant domestic network (herein referred to as the domestic termination rate); and
 - b. any relevant cost incurred in terminating the international traffic.

The four IBS reports have been prepared in compliance with regulation 15(2), in that the costing benchmarked rates developed in the reports comport with internationally accepted standards for such benchmarks.

Having now computed costing benchmarked rates, the Authority strongly encourages operators to use them in current and future interconnection rate-setting processes. Without prejudice to such processes, the Authority suggests that these calculated costing benchmarked rates serve as rate “maxima”, so that, if implemented pursuant to Regulation 15(2), operators would be free to set interconnection rates at or below the rate maxima.

Finally, in addition to Regulation 15(2), the costing benchmarked rates developed could also be implemented pursuant to section 29(2) of the Act that allows the Authority to establish “price regulation regimes, which may include setting, reviewing and approving prices”, in any case where a “concessionaire has a dominant position in the relevant market”, “cross-subsidises another telecommunications service provided by such concessionaire” or “the Authority detects anti-competitive pricing or acts of unfair competition”.

1.6. Consultation Process

The Authority seeks the views and opinions of stakeholders regarding the proposals made in this document, in accordance with its *Procedures for Consultation in the Telecommunications and Broadcasting Sectors of Trinidad and Tobago*.

This Report shall be issued for two rounds of consultation. Each round of consultation shall be for a period of four weeks, at minimum.

1.7. Other Relevant Documents

Other relevant documents to be read along with the *Report on the Interconnection Benchmarking Study for the Telecommunications Sector of Trinidad and Tobago 2024–2029* include:

1. *Results of an Interconnection Benchmarking Study for the Telecommunications Sector of Trinidad and Tobago* (ver. 0.1, 2017)
2. *Results of an Interconnection Benchmarking Study for the Telecommunications Sector of Trinidad and Tobago 2019* (ver. 0.2, 2019)
3. *Results of an Interconnection Benchmarking Study for the Telecommunications Sector of Trinidad and Tobago 2021* (ver. 1.0, 2021)
4. Telecommunications (*Interconnection*) Regulations (2006)

2. Benchmarking Sample Methodology

This section discusses the benchmarking methodology used to select the appropriate jurisdictions, determine the sample, the data compilation process, and the related results, including the historical levels and trends of the MTRs and FTRs in the benchmarking sample.

2.1. Benchmarking Sample Selection Criteria

The selection of the jurisdictions to be included in the benchmarking sample is the first step in the process of a benchmarking analysis¹¹. Consistent with the methodology applied in the previous IBS reports, and with the objective that the selected jurisdictions be appropriately comparable to Trinidad and Tobago, the following benchmarking sample selection criteria were applied¹²:

1. **Regional geography:** Only jurisdictions in the Caribbean region are included in the sample. This criterion ensures a reasonable degree of comparability because operators are providing service in relatively similar geographic and environmental conditions.
2. **Physical geography:** Only island nations and jurisdictions are included in the sample, to ensure that operators face comparable cost conditions specifically related to island states, which may be different from those that apply in continental states.
3. **Calling party pays (CPP) versus receiving party pays (RPP) regimes:** CPP and hybrid RPP-CPP regime jurisdictions are included in the benchmark sample, whereas “pure” RPP regimes are excluded. RPP and CPP regimes are conceptually different and, as a result, interconnection rates under these two regimes may not be comparable. Therefore, this criterion excludes jurisdictions in which pure RPP regimes are in effect but includes those jurisdictions that have hybrid RPP-CPP regimes, and where some or all interconnection rates in such cases are deemed to be reasonably comparable for benchmarking purposes.

¹¹ The *Practical Guide on Benchmarking Telecommunication Prices*, issued by ITU in August 2014, has noted that the main weakness in benchmarking is the complex differences in the circumstances in various countries.

¹² The sample selection criteria draw on selection criteria established in previous SCI studies in the Caribbean, including three consultations conducted by the Turks and Caicos Islands (TCI) Telecommunications Commission, which led to the following decisions: Telecommunications Decision 2011-2, *Decision on the Mobile Termination Rate Review*, issued 24th January 2011; Telecommunications Decision 2014-4, *Decision on the Review of Interconnection Rates*, issued 20th June 2014; and Telecommunications Decision 2020-2, *Decision on the Third Review of Interconnection Rates*, issued 13th October 2020. The methodology is also consistent with the *Practical Guide on Benchmarking Telecommunication Prices*, issued by ITU in August 2014.

4. **Number of operators:** Only jurisdictions with two or more mobile and fixed operators are included in the benchmarking sample. Therefore, this criterion excludes jurisdictions that have a single mobile or fixed operator.
5. **Availability of interconnection rates:** Only jurisdictions where interconnection rates are publicly available and can be independently verified are included in the benchmarking sample.
6. **Confidentiality of interconnection rates:** This criterion excludes jurisdictions where interconnection rates are claimed by all operators to be confidential. However, in jurisdictions where some but not all operators claimed confidentiality, the interconnection rates of those who did not claim confidentiality or who disclosed their rates are used.
7. **Vintage of regulatory decision:** Only jurisdictions where the relevant NRA has revised or approved interconnection rates since January 2016 are included in the benchmarking sample¹³. This criterion ensures that the information underlying the rates used for benchmarking purposes is reasonably up to date.

It should be noted that, for jurisdictions meeting these sample selection criteria, no restrictions were applied with respect to the methodology used to set interconnection rates, i.e., whether or not those rates were set on a cost or an alternative basis, or established by an NRA, court or through commercial negotiation. The objective was to include all interconnection rates in regulatory effect in each of the selected benchmark sample jurisdictions.

These selection criteria allowed for the establishment of a benchmarking sample of reasonable size¹⁴, thereby limiting the influence of any one jurisdiction on the results, while at the same time maintaining an appropriate degree of comparability to Trinidad and Tobago.

¹³ This selection criterion was first implemented in the 2017 IBS Report to ensure that the regulatory decision on which the rate is based is relatively recent. In this regard “vintage” refers to the date of the decision that determined current interconnection rates. Within a possible set of jurisdictions, some interconnection rate decisions may be recent, while others may be very dated. In the latter case, the corresponding rates may not be appropriate for benchmarking purposes. The 2017 and 2019 IBS Reports used a vintage cut-off date of January 2012, so only rates based on decisions after that date would be included. The 2021 IBS Report updated the vintage cut-off date by two years, to January 2014. In the same manner, the 2024 IBS Report updates its vintage cut-off date to January 2016.

¹⁴ *Practical Guide on Benchmarking Telecommunication Prices*, issued by ITU in August 2014

2.2. Benchmarking Sample Jurisdictions

The application of the above-noted benchmarking selection criteria results in a benchmarking sample of 10 Caribbean jurisdictions for each of the MTR and FTR benchmarking samples. The benchmarking sample jurisdictions are listed in Table 2, which also indicates whether the interconnection rates in each case are set on a cost basis, i.e., using a pure long-run incremental cost (pure LRIC); LRIC with a markup for fixed and common costs (LRIC+); fully distributed cost (FDC) approach, or another methodology, including benchmarking or commercial negotiation. As can be seen from Table 2, the majority of jurisdictions in the sample are cost based.

For comparison purposes, Table 2 also includes the respective jurisdictions that were included in the 2021 IBS Report relative to the current 2024 IBS Report. As discussed below, differences in the jurisdictions included in the benchmarking samples between reports relate to the vintage sample selection criterion.

In keeping with the criteria used in the previous IBS reports, the four French West Indies (FWI) jurisdictions are once again combined into two groups: 1) Guadeloupe and Martinique and 2) St. Barthelemy and St. Martin. The rationale for doing this is provided in the 2017 and 2019 IBS Reports¹⁵ and also addressed in detail in the 2021 IBS Report¹⁶.

Two sets of sample jurisdictions are considered for benchmarking purposes: 1) the full post-2016 benchmarking sample or “all sample” and 2) the post-2016 cost-based benchmarking sample or “cost-based sample”, with the latter being a subset of the former. The “all sample” benchmarking sample comprised 10 jurisdictions which used cost models predominantly (i.e., 80% of cases) and benchmarks in the minority (i.e., 20% of cases), to determine interconnection rates. These are presented in Table 2.

¹⁵ For example, the NRA in FWI had established the same interconnection rate for all operators in Guadeloupe and Martinique and separate interconnection rates for each operator in St. Barts and St. Martin, although these rates have now converged.

¹⁶ The Authority considers that FWI should be treated as two rather than four observations for benchmarking purposes. The Authority notes that, traditionally, the NRA in FWI had established the same interconnection rate for all operators in Guadeloupe/Martinique and separate interconnection rates for each operator in St. Barts/St. Martin. (They have tended to converge through the latter half of the sample.) Including each of these four jurisdictions separately in the sample would potentially place a disproportionate weight on the FWI jurisdictions within the two benchmarking sub-samples relied on for the Authority’s MTR and FTR recommendations.

Table 2 MTR and FTR benchmarking sample jurisdictions

No.	Jurisdictions	2021 IBS Report (post-January 2014 sample)		2024 IBS Report (post-January 2016 sample)	
		MTR	FTR	MTR	FTR
1	Anguilla	--	--	--	--
2	The Bahamas	Benchmarking	Benchmarking	Benchmarking	Benchmarking
3	Barbados	Cost (LRIC+)	Other	--	--
4	British Virgin Islands	--	--	--	--
5	Cayman Islands	--	--	--	--
6	Dominica	Cost (LRIC+)	Cost (LRIC+)	Cost (LRIC+)	Cost (LRIC+)
7	Dominican Republic	Other	Other	--	--
8	Grenada	Cost (LRIC+)	Cost (LRIC+)	Cost (LRIC+)	Cost (LRIC+)
9	Guadeloupe & Martinique	Cost (Pure LRIC)	Cost (Pure LRIC)	Cost (Pure LRIC)	Cost (Pure LRIC)
10	Jamaica	--	Cost (Pure LRIC)	Cost (Pure LRIC)	Cost (Pure LRIC)
11	St. Barthelemy & St. Martin	Cost (Pure LRIC)	Cost (Pure LRIC)	Cost (Pure LRIC)	Cost (Pure LRIC)
12	St. Kitts & Nevis	Cost (LRIC+)	Cost (LRIC+)	Cost (LRIC+)	Cost (LRIC+)
13	St. Lucia	Cost (LRIC+)	Cost (LRIC+)	Cost (LRIC+)	Cost (LRIC+)
14	St. Vincent & the Grenadines	Cost (LRIC+)	Cost (LRIC+)	Cost (LRIC+)	Cost (LRIC+)
15	Turks and Caicos Islands (TCI)	Benchmarking	Benchmarking	Benchmarking	Benchmarking
	Total all sample	11	12	10	10
	Total cost based	8	9	8	8

Note: -- indicates jurisdictions that met criteria 1 through 6 but were excluded from the sample because the vintage of the applicable regulatory decision pre-dated the vintage cut-off date under criterion 7 in the report(s) in question.

2.3. Benchmarking Database Update

The primary sources for interconnection rate data and information for the 2024 IBS Report are identical to previous IBS reports. They include NRA decisions and orders and/or operator-specific reference interconnection and access offers. NRA decisions typically focus on MTRs and FTRs and, to a lesser extent, MICCs and FICCs, and IMTRs and IFTRs. For this update, the data compilation process involved the collection and assessment of publicly available data from NRAs and operator websites¹⁷.

The data compilation for this 2024 IBS Report was carried out in the period June to November 2024. While the collected interconnection rate information up to October 2024 is “actual” in nature, many NRA interconnection rate decisions include transitional or glide-path interconnection rate reductions into the future. Where specified, such mandated glide-path reductions were taken into account to project interconnection rates and are discussed in section 4.

¹⁷ See the References section for full bibliographic details and related web links.

2.4. Benchmarking Sample Data Adjustments

There are two technical matters that must be addressed to allow comparison of interconnection rates across benchmarking sample jurisdictions. These involve, where necessary, adjustments for differences in interconnection traffic rating units and differences in currencies across jurisdictions.

In the first case, and as discussed in the previous IBS reports, one form of adjustment that previously may have had an impact on ongoing benchmarking comparability related to expressing all interconnection rates on a uniform per minute basis. All the benchmark sample jurisdictions state their domestic MTRs in this manner. However, as explained in the previous IBS reports, for domestic FTRs, a minority of jurisdictions historically included a combination of per-call set-up and differential time-of-day, per minute charges. In these instances, the 2017 IBS Report converted these into average per minute rates, as is commonly done in benchmarking studies, to allow rate comparability across jurisdictions. While the 2021 IBS Report involved such conversions for historical benchmarking purposes, such adjustments are no longer relevant, since all benchmarking jurisdictions included in the study use uniform, per minute domestic FTRs and MTRs¹⁸.

In the second case, interconnection rates are typically expressed in local currency units (LCUs). All such LCU rates must therefore be converted to a common currency, which in this study is US dollars, for comparison purposes. Of the jurisdictions in the current benchmarking sample, two are denominated in US dollars (i.e., The Bahamas and TCI). During the period under investigation, the five Member States (MS) of the Eastern Caribbean Telecommunications Authority (ECTEL) had fixed official US dollar exchange rates linked to the Eastern Caribbean dollar (XCD). In such cases, the official fixed US dollar exchange rates are used.

FWI and Jamaica have floating exchange rates, i.e., the euro (EUR) and Jamaican dollar (JM\$). Trinidad and Tobago have a managed floating exchange rate (TT\$). With the objective of being able to separate changes in exchange rates from changes in LCU interconnection rates, a single, long-term weighted¹⁹ average exchange is used for each of these three jurisdictions (i.e., FWI, Jamaica and Trinidad and Tobago)²⁰, for the historical period January 2016 to October 2024 and the projection study period November 2024 to March 2029.

¹⁸ The last remaining benchmarking jurisdiction requiring a rate conversion exercise, namely, Jamaica, adopted a uniform per minute FTR in December 2017. See the first round DORs (pages 58–61).

¹⁹ As in the previous IBS reports, the exchange rates are calculated based on average annual exchange rates, with a weighting of 1 for the initial years of the historical study period, in this case for 2016 to 2021 inclusive, and a weighting of 3 for each of the last two years, in this case 2022 and 2023.

²⁰ The LCU-US\$ weighted average exchange rates (all historical data sourced from the World Bank) for this 2024 IBS Report are: 1.1054 for EUR, 0.00698 for JM\$ and 0.1482 for TT\$. For reference, the weighted average exchange rates used for the 2021 IBS Report were 1.1457 for EUR, 0.00770 for JM\$ and 0.1497 for the TT dollar. The exchange rates for the other six jurisdictions in the benchmarking samples, i.e., the five ECTEL MS and The Bahamas, did not change.

As previous IBS Reports also showed, the benchmarking results are not sensitive to reasonable changes in exchange rates. To update this past sensitivity analysis, section 6.2 of this 2024 IBS Report also includes a current sensitivity analysis with respect to exchange rates and reconfirms the earlier findings that the benchmarking results are not sensitive to reasonable changes in exchange rates.

2.5. Supplementary Benchmarking Data

In addition to Caribbean jurisdictions meeting the above-noted benchmarking selection criteria, interconnection rate levels and information on trends in European Union (EU) Member States are considered for trend analysis and cross-check purposes, and not for benchmarking purposes.

As in previous IBS reports, the 2024 IBS Report data is based on the EU Member States' MTRs and FTRs compiled by Body of European Regulators of Electronic Communications (BEREC). The update to EU averages for MTRs and FTRs are included in the figures in the following sections. In addition, the European Commission (EC), via Delegated Regulation (EU) 2021/654, established uniform rate maxima for the MTRs and FTRs charged by all operators providing call termination services in the EU, which came into effect in July 2021 and January 2022, respectively. These uniform rate maxima are also reflected in the EU average MTR and FTR trend lines in Figures 1 and 2.

2.6. Historical MTR and FTR Levels and Trends

Figures 1 and 2 illustrate monthly historical domestic MTR and FTR levels and trends for the jurisdictions included in the MTR and FTR benchmarking samples for the historical period January

2016 to October 2024. In addition, they include the levels and trends of the all sample and cost-based benchmarking sample averages^{21, 22}, the EU averages, and Trinidad and Tobago²³.

Consistent with the previous IBS reports, Figure 1 shows that MTRs have continued to decrease²⁴. The all sample benchmark average (shown in red) has declined from US\$0.0619 in January 2016 to US\$0.0062 as of October 2024 – a reduction of 90%. The cost-based MTR benchmark average (shown in blue) averaged US\$0.0053 in October 2024. For the same date, the EU average (shown in grey) is lower still, at US\$0.0022.

Figure 1 shows a reduction over time of the all sample average as more of the NRAs in the jurisdictions apply cost-based regulation so that, by 2019, the all sample average started to converge with the cost-based average and the EU average. From that date to October 2024, all averages continued to decline but at slower rates, and appear to have stabilised over the most recent 12 to 18 months.

The current levels of the all sample and cost-based sample MTR costing benchmark averages suggest that the MTR in Trinidad and Tobago is currently well above cost. This suggests that operators have not implemented the recommended costing benchmarked rates set out in 2017, 2019 and 2021 IBS Reports. This is consistent with international experience, where operators have neither the incentive nor obligation to commercially negotiate cost-based rates.

²¹ The all sample average is calculated based on an unweighted average of the relevant interconnection rates in effect in the month in question. There are 10 observations for each of the MTR and FTR all sample averages for January 2016 to October 2024, so the cost-sample average in Figures 1 and 2 include 10 observations. In contrast, the cost-based average only includes those observations which, during that month, had a cost-based rate. The number of cost-based observations for the MTR and FTR varies from 2 in the early part of the January 2016 to October 2024 period to the full 8 in the later part of that period. To maintain reasonable within sample comparability over time, the cost-based average is presented from January 2019, when the sample included 7 observations.

²² In the past, the Authority has undertaken sensitivity analyses related to the exclusion of outlier observations (see 2019 IBS Report (section 6.2 and Appendix II, Sensitivity #3) and concluded that the benchmarking results are not sensitive to such exclusions. To update this past sensitivity analysis, but also taking into account the somewhat reduced number of observations, section 6.2 of this report also includes a current sensitivity analysis that presents the median (instead of the mean) of the all sample and cost-based samples. This analysis confirms the previous findings that the benchmarking results are not sensitive to these different calculations.

²³ Given that the operators in Trinidad and Tobago have expressly deemed existing local interconnection rates to be confidential, Figures 1 and 2 exclude Trinidad and Tobago in the public version of this 2024 IBS Report. A confidential version of the report is available to local operators only, upon request. The Authority may consider the use of interconnection cost models for subsequent interconnection periods where operator data is complete and accessible, and it may publish domestic interconnections rates derived from this process.

²⁴ For example, the 2017 IBS Report showed that, in April 2012, the all sample average (based on the post-2012 jurisdictions and exchange rates included at the time) was US\$0.0842 and the EU average was US\$0.0475. The rates included in the 2024 IBS Report, starting in January 2016, are somewhat reduced from those levels for the all sample average, at US\$0.0619. However, the EU average was very significantly reduced to US\$0.0117 in January 2016 due to a multi-year programme by the European Commission to lower interconnection rates in the EU (see Annex A of 2017 IBS Report), which continues to date.

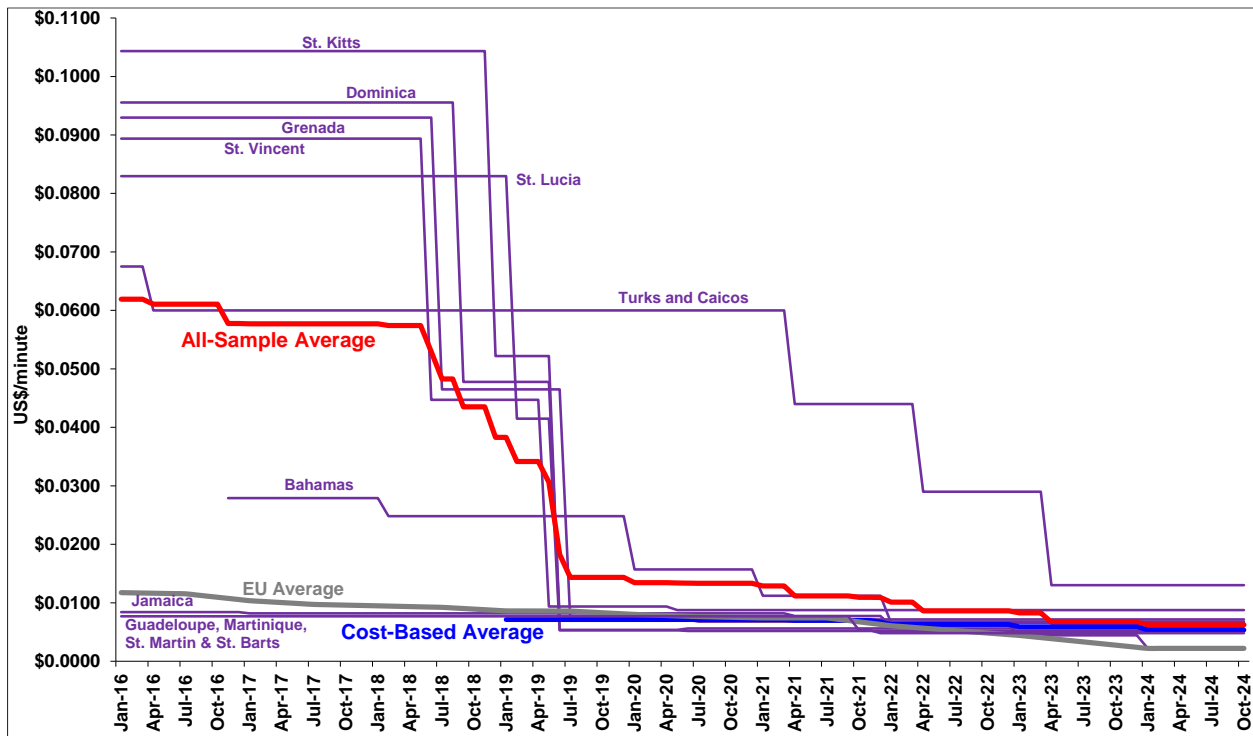


Figure 1 MTR benchmarking sample (January 2016 to October 2024)

Figure 2 shows the FTR benchmarking sample for the January 2016 to October 2024 period. Here again, consistent with the previous IBS reports, the FTRs continued to decrease²⁵, with the all sample benchmark average (shown in red) declining from US\$0.0114 in January 2016 to US\$0.0020 as of October 2024 – a reduction of 83%. The cost-based MTR benchmark average (shown in blue) averaged US\$0.0020 in October 2024. For the same date, the EU average (shown in grey) is lower still, at US\$0.0008.

Figure 2 shows a reduction over time of the all sample average, as more of the NRAs in the jurisdictions apply cost-based regulation so that, by 2019, the all sample average started to converge with the cost-based average and the EU average. From that date to October 2024, all averages continued to decline but at slower rates and appear to have stabilised over the most recent 12 to 18 months.

²⁵ For example, the 2017 IBS Report showed that, in April 2012, the all sample average (based on the post-2012 jurisdictions and exchange rates included at the time) was US\$0.0122 and the EU average was US\$0.0066. The rates included in the 2024 IBS Report, starting in January 2016, are somewhat reduced from those levels for the all sample average, at US\$0.0114. However, the EU average was very significantly reduced, to US\$0.0029 in January 2016, due to a multi-year programme by the European Commission to lower interconnection rates in the EU (see Annex A of 2017 IBS Report), which continues to date.

The current levels of the all sample and cost-based sample FTR costing benchmark averages suggest that the FTR in Trinidad and Tobago is currently well above cost. As in the MTR, operators in Trinidad and Tobago have not implemented the recommended costing benchmarks set out in previous IBS reports.

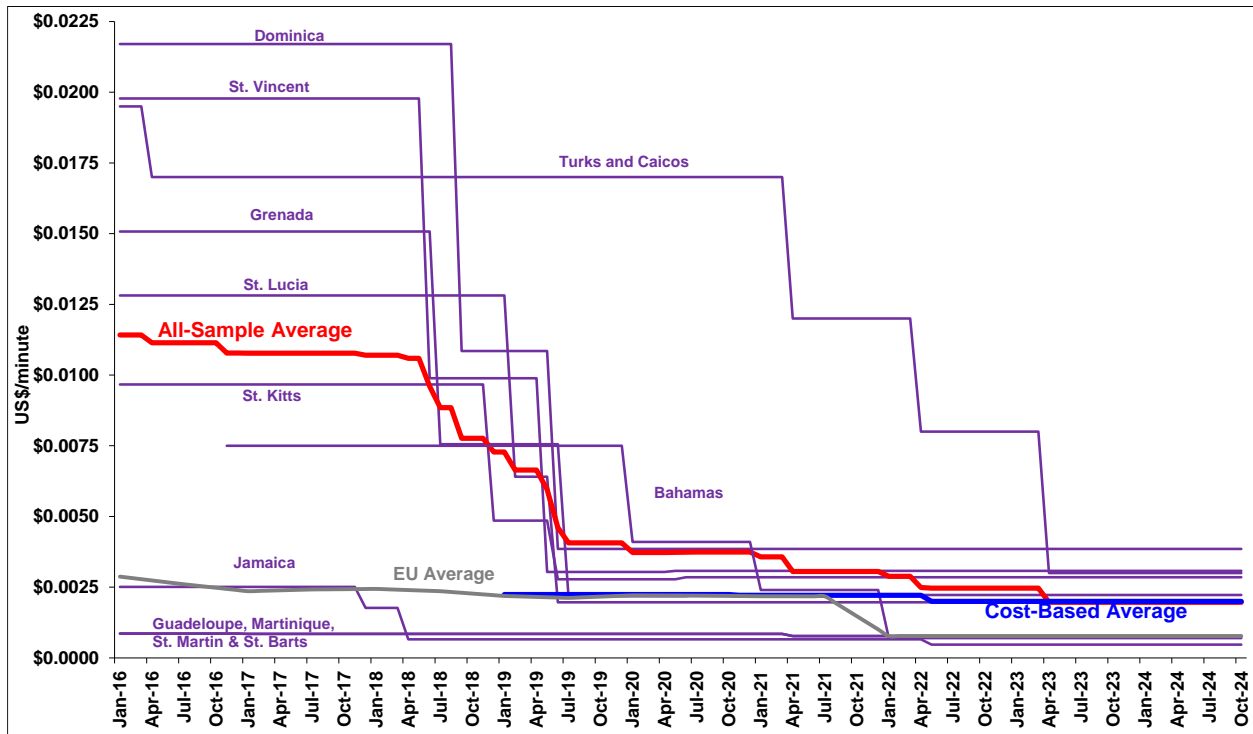


Figure 2 FTR benchmarking sample (January 2016 to October 2024)

3. Domestic MTR and FTR Benchmarks

This section discusses the methodology used to develop the MTR and FTR costing benchmarked rates.

3.1. MTR and FTR Costing Benchmark Methodology

The previous IBS reports followed a multi-step benchmarking methodology to determine the recommended MTR and FTR costing benchmarked rates. This same methodology is followed once again for the 2024 IBS Report, which consists of the following steps:

1. **Establishment of benchmarking sample:** This first step is described in section 2.1.
2. **Determination of benchmark averages:** This consists of determining the all sample and the cost-based sample averages described in sections 2.2 and 2.6.
3. **Benchmark average rate projections:** Based on an assessment of pricing trends, the previous IBS reports had estimated further reductions in the all sample and cost-based averages beyond the respective historical period, based on glide-path related, rate reductions stretching beyond the historical period and statistical trend analyses²⁶. However, as noted above, an assessment of Figures 1 and 2 suggests that both the all sample and cost-based sample averages have stabilised over the most recent 12 to 18 months. Hence, further significant reductions in the immediate term are not likely. Taking a conservative approach, the Authority considers that the October 2024 all sample and cost-based sample averages for the MTR and FTR should be projected forward, and that the projection period should be four additional years, ending in FY 2028/2029 at the close of the five-year interconnection period.
4. **Determination of “end-point” benchmark rates:** To determine “end-point” FY 2028/2029 benchmark rates, the projected levels of all sample and cost-based sample average rates are taken into account. The cost-based sample average is treated as a “lower bound” and the all sample average as an “upper bound” for the end-point MTR and FTR benchmarked rates. This ensures the resulting benchmarked rates are reasonably cost oriented, i.e., close to, but still above, cost-based sample average benchmark rate levels, while also closely tracking the all sample average benchmark rate levels. Importantly, as the results show (see Figures 3 and 4), the all sample and cost-based sample averages have converged over time. Given the relative stability of the all sample and cost-based sample averages, and with a view to regulatory certainty and stability, the Authority considers that the FY 2028/2029 end-point

²⁶ For example, see section 4.1. iii) of the 2021 IBS Report.

benchmark rates are likely to remain reasonably appropriate beyond March 2029 as well. For this reason, the calculated costing benchmarked rates can be open ended, beginning in April 2025 and applicable until further notice from the Authority.

5. **Normalisation adjustment considerations:** The 2017 and 2019 IBS Reports included normalisation analyses to determine whether demographic, socio-economic and other environmental differences between the benchmarking sample jurisdictions and Trinidad and Tobago warrant any adjustments to the end-point benchmark recommendations (either upwards or downwards). The results of those analyses show that, if anything, a downward adjustment could be justified. However, to be conservative, the Authority decided not to apply such an adjustment. The normalisation analysis has been updated for this 2024 IBS Report and is presented in section 5. The updated normalisation analysis results again show that a downward adjustment could be justified for the FTR and MTR costing benchmarked rates. However, to be conservative, the Authority decided, once again, not to apply a normalisation adjustment.
6. **Starting point for current benchmarks:** Given the relative stability of the benchmark averages, the Authority proposes that the end point of the 2021 IBS Report costing benchmark recommendations for FY 2023/2024 should be used as the starting point of the current 2024 IBS Report recommendations. As such, the costing benchmarks for FY 2024/2025 should equate to those calculated for FY 2023/2024 in the 2021 IBS Report.
7. **No glide path necessary to the end-point benchmark rates:** Given that the end-point FY 2028/2029 benchmark rates are very similar to the corresponding FY 2023/2024 costing benchmarked rates included in the 2021 IBS Report, the Authority does not consider glide-path reductions to be necessary over the intervening period FY 2025/2026 to FY 2028/2029.

The Authority considers that this dual – all sample and cost-based sample averages – benchmarking approach provides a robust, fair and reasonable basis for calculating MTR and FTR costing benchmarks. It also effectively reduces the probability of error of establishing either a rate recommendation that is “too high” (substantially above actual costs) or “too low” (below costs).

3.2. MTR Costing Benchmarked Rates

Figure 3 depicts the historical and projected all sample and cost-based sample MTR benchmark averages from January 2016 to March 2029. As the figure shows, the MTR benchmark averages have been converging since January 2019, so that by October 2024, the all sample average of US\$0.0064 is relatively close to the cost-based sample average of US\$0.0053. For reference

purposes, the EU average for October 2024 is US\$0.0022. The October 2024 averages are projected to March 2029 at the same values.

The benchmarking methodology set out above results in a MTR costing benchmark of US\$0.0070 from the beginning of the next financial year, namely, April 2025. This benchmark is above both the all sample and cost-based sample averages that hold as of October 2024. For FY 2024/2025, the Authority extends the FY 2023/2024 recommendations included in the 2021 IBS Report. These benchmarks are above both the all sample and the cost-based sample averages that have held and will continue to hold during this two-year period. They constitute a form of bridge between the recommended costings benchmarks in the 2021 IBS Report and the 2024 IBS Report.

Figure 3 also compares the current MTR costing benchmarked rates with its previous MTR benchmark recommendations. It is notable that the Authority’s MTR end-point recommendations from the 2017 and 2019 IBS Reports for FY 2019/2020 closely tracked the current MTR all sample average for that period. The Authority considers that this result supports the reasonableness and appropriateness of its benchmarking methodology.

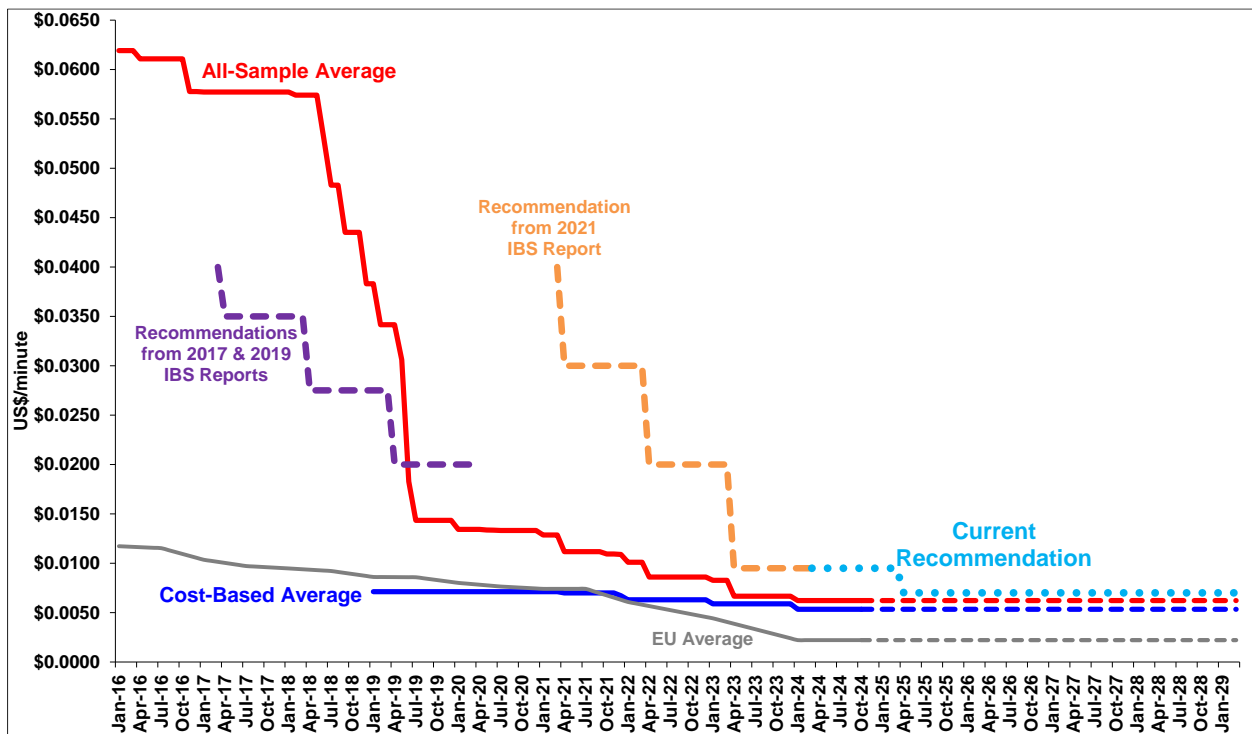


Figure 3 MTR costing benchmarked rates

3.3. FTR Costing Benchmarked Rates

Figure 4 depicts the historical and projected all sample and cost-based sample FTR benchmark averages from January 2016 to March 2029. As the figure shows, the FTR benchmark averages have been converging since January 2019, so that by October 2024 the all sample and cost-based sample averages are both US\$0.0020. For reference purposes, the EU average for October 2024 is US\$0.0008. The October 2024 averages are projected to March 2029 at the same values.

The benchmarking methodology set out in section 3 results in the FTR costing benchmark of US\$0.0021 from the beginning of the next financial year, i.e., April 2025. This benchmark is above both the all sample and cost-based sample averages that hold as of October 2024. For FY 2024/2025, the Authority extends the FY 2023/2024 benchmarked rates included in the 2021 IBS Report. These benchmarks are above both the all sample and the cost-based sample averages that have held and will continue to hold during this two-year period. Here as well, they constitute a form of bridge between the costings benchmarks in the 2021 IBS Report and the 2024 IBS Report.

Figure 4 also compares the current FTR costing benchmark with its previous FTR. It is notable that the Authority’s end-point FTR recommendations from the 2017 and 2019 IBS Reports for FY 2019/2020 tracked quite closely the FTR all sample average for that period. The Authority considers that this result, once again, supports the reasonableness and appropriateness of its benchmarking methodology.

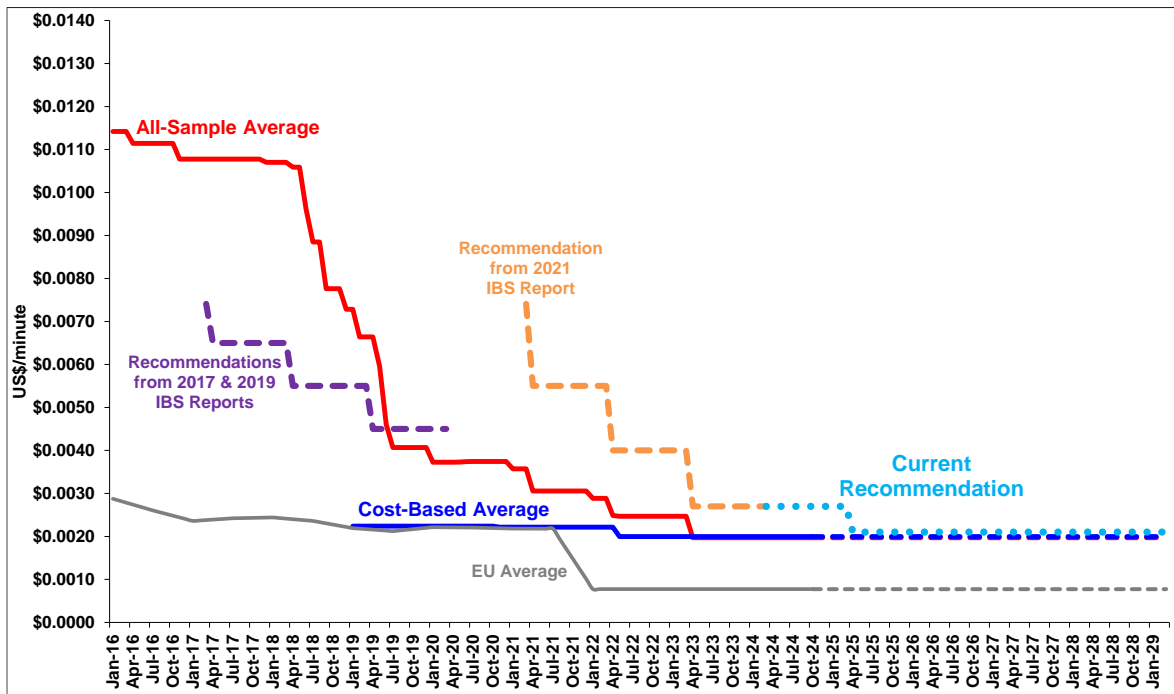


Figure 4 FTR costing benchmarked rates

3.4. Summary of MTR and FTR Costing Benchmarked Rates

Table 3 shows the Authority’s current MTR and FTR costing benchmarks.

Table 3 MTR and FTR computed costing benchmarked rate

Interconnection Rates	Currency*	2021 IBS Report: Costing Benchmarks	2024 IBS Report: Costing Benchmarked Rates	
		April 2023 to March 2024	April 2024 to March 2025	April 2025 to March 2029
Domestic mobile termination rate (MTR)	TT\$	0.0641	0.0641	0.0472
	US\$	0.0095	0.0095	0.0070
Domestic fixed termination rate (FTR)	TT\$	0.0182	0.0182	0.0142
	US\$	0.0027	0.0027	0.0021

Note: *The costing benchmarks were calculated and determined in US dollars. The TT dollar equivalent values in this table are provided for “illustrative purposes” only and are based on the weighted average historical US dollar to TT dollar exchange rate used for benchmarking analysis (0.1482), as described in section 3.4. The US to TT exchange rate may be different at the date of publication of this report and over the course of the applicability of the benchmarks. If so, at the start of each financial year, interconnection rates could be restated in TT dollars, based on the TT dollar to US dollar exchange rate at that time.

Figure 5 provides a summary of the Authority’s current MTR and FTR in comparison with its previous recommendations.

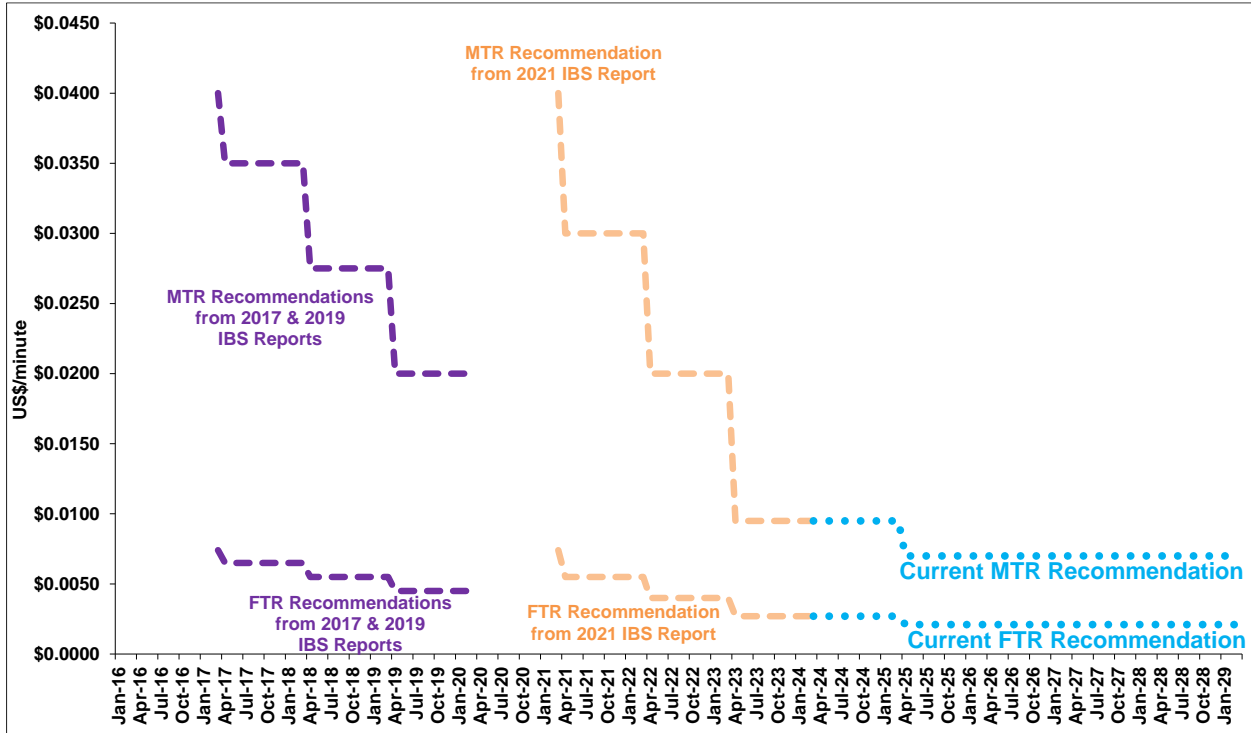


Figure 5 MTR and FTR costing benchmarked rates

4. International IMTR and IFTR Benchmarked Rates

This section sets out the costing benchmarked rates for the MICC, FICC, IMTR and IFTR. In Trinidad and Tobago, the IMTR and the IFTR are effectively each made up of two elements, namely, an international carriage charge (ICC) and a domestic termination charge²⁷; in essence, $IMTR = MTR + MICC$ and $IFTR = FTR + FICC$. In the past, the MICC and FICC have been set at different rate levels. The 2021 IBS Report developed a benchmarking methodology to determine the Authority's recommended MICC and FICC costing benchmarks based on a uniform rate, pursuant to the 2019 Panel Report. This 2024 IBS Report applies the same methodology.

4.1. Methodology for MICC and FICC

The calculated costing benchmarks for the MICC, FICC, IMTR and IFTR are based on the following considerations:

1. **Adoption of a uniform end-point ICC target rate (i.e., MICC = FICC).** This principle was adopted and implemented in the 2021 IBS Report and is continued in the 2024 IBS Report.
2. **Reliance on direct ICC benchmarks.** This 2024 IBS Report relies on the same “direct” benchmarking approach developed in the previous IBS reports, which consists of jurisdictions where an explicit ICC or an ICC-like tariff exists; otherwise, implicit ICCs were calculated as the difference between the IMTR and MTR, and the IFTR and FTR, as applicable.
3. **Relationship of MICC/FICC to IMTR/IFTR.** Consistent with the 2021 IBS Report, the 2024 IBS Report separately benchmarks the two components of the IMTR and IFTR. The first is the “domestic termination rate”, which includes the MTR and FTR costing benchmarked rates. The second is “any relevant cost incurred in terminating the international traffic”, which includes the MICC and FICC costing benchmarked rates developed (see section 4.2).
4. **Starting point for current benchmarked rates.** Given the relative stability of the benchmark averages, and following the approach used above for the recommended MTR and FTR benchmarks, the Authority considers that the end point ICC and IMTR/IFTR recommendations for FY 2023/2024 from the 2021 IBS Report should be used as the starting

²⁷ In tariffing terms, the IMTR is typically referred to as “incoming international call termination to PLMN service” and the IFTR as “incoming international call termination to PSTN service”.

point of the 2024 IBS Report. As such, the Authority considers that the costing benchmarks for FY 2024/2025 should equate to those recommended for FY 2023/2024 in the 2021 IBS Report.

5. **No glide path necessary to the end-point benchmark rates:** Given that the end-point FY 2028/2029 benchmark rates are very similar to the corresponding FY 2023/2024 recommendations included in the 2021 IBS Report, the Authority once again does not consider glide path reductions to be necessary over the projection period FY 2025/2026 to FY 2028/2029.

4.2. Benchmarking Results of IMTR and IFTR

Table 4 presents the explicit and implicit ICCs associated with the IMTR and IFTR in the nine jurisdictions that meet the selection criteria described in section 3²⁸. Therefore, there are 18 benchmarking observations in total. Given that the objective is to establish a uniform benchmark ICC, the MICCs and FICCs are considered as part of the same sample of observations for ICC benchmarking purposes.

As shown in Table 4, most benchmark sample jurisdictions have an effective implicit ICC of zero. This trend towards zero-rated implicit ICCs has been driven largely by a regulatory response to sector liberalisation. In the initial phases of liberalisation, former legal telecommunications monopolies in the Caribbean region, for instance, subsidiaries of Cable and Wireless, proposed or introduced an ICC-like tariff item in their respective reference interconnection offers (RIOs) called the “international conveyance assumption” (ICA)²⁹. However, as sector liberalisation became more widely established throughout the Caribbean region, and the costs of international connectivity declined drastically as a result of the rollout of new digital technologies and the emergence of new international network operators, many NRAs mandated the removal of ICAs from RIOs in their respective jurisdictions. In effect, the costs of international connectivity have declined to “de minimis” levels and ICCs of zero is largely the norm today³⁰.

²⁸ Note that TCI’s IMTR and IFTR are excluded since they do not meet the vintage sample selection criterion.

²⁹ The Authority has been able to confirm that the ICA was part of the respective RIOs in Barbados, Dominica, Grenada, Jamaica, St. Kitts, St. Lucia and St. Vincent within the benchmark sample, as well as in other jurisdictions, including the Cayman Islands. The ICA was typically defined as a “notional figure negotiated by the Parties for use in the determination of the Incoming International to Mobile Termination Charge”.

³⁰ For example, in its 2018 Interconnection Rate Recommendation, ECTEL determined the LRIC+-based cost estimates for the MTR, IMTR, FTR and IFTR for each of the five ECTEL Member States. It found that there was no difference between the cost of the MTR and IMTR, i.e., the MICC = 0, and there was a very small difference in cost between the FTR and IFTR. The average difference was US\$0.0005. Relative to the average FTR across the ECTEL Member States, this amount was negligible and, consequently, ECTEL set the same value of both the IFTR and FTR at the higher of the two cost amounts by country, or effectively at the higher average rate of US\$0.0028.

Consequently, as shown in Table 4, 16 of the 18 observations have “zero-rated” implicit ICCs in place (i.e., the IMTR = MTR and/or the IFTR = FTR): the one non-zero implicit ICCs, is the case of the IMTR in The Bahamas and the one explicit ICC-like observation is associated with the IFTR in Jamaica.

Table 4 presents the results of the dual averaging benchmarking process used in the 2021 IBS Report. Average “A” reflects the “all sample” average of the 18 explicit and implicit ICCs, which is US\$0.0005. Average “B” reflects the average of the jurisdictions with “non-zero-rated” ICCs, which is US\$0.0048. Taking these two benchmark averages into account, the Authority considers that an end-point ICC costing benchmarked rate of US\$0.0050 is reasonable and appropriate for Trinidad and Tobago.

Table 4 MICC, FICC, IMTR and IFTR benchmarking sample

	Sample Jurisdictions	MTR	IMTR	Explicit ICC	Implicit ICC	FTR	IFTR	Explicit ICC	Implicit ICC
1	Bahamas	\$0.0066	\$0.0123		\$0.0057	\$0.0007	\$0.0007		\$0
2	Dominica	\$0.0071	\$0.0071		\$0	\$0.0039	\$0.0039		\$0
3	Grenada	\$0.0068	\$0.0068		\$0	\$0.0022	\$0.0022		\$0
4	Guadeloupe & Martinique	\$0.0022	\$0.0022		\$0	\$0.0008	\$0.0008		\$0
5	Jamaica	\$0.0048	\$0.0048			\$0.0005	\$0.0005	\$0.0039	
6	St. Barts & St. Martin	\$0.0022	\$0.0022		\$0	\$0.0008	\$0.0008		\$0
7	St. Kitts & Nevis	\$0.0056	\$0.0056		\$0	\$0.0029	\$0.0029		\$0
8	St. Lucia	\$0.0052	\$0.0052		\$0	\$0.0020	\$0.0020		\$0
9	St. Vincent & the Grenadines	\$0.0087	\$0.0087		\$0	\$0.0031	\$0.0031		\$0
	Total			0	9			1	8
	Averages							Obs.	Value
A	All (explicit and implicit) ICCs							18	\$0.0005
B	Non zero-rated, implicit and explicit ICCs							2	\$0.0048
	ICC costing benchmark								\$0.0050

4.3. Summary of Costing Benchmarked Rates

Table 5 provides a summary of the Authority’s MICC and FICC and, by extension, IMTR and IFTR costing benchmarked rates from April 2024 to March 2025 based on the benchmarking methodology applied.

Table 5 MICC, FICC, IMTR and IFTR costing benchmarked rates

Interconnection Rates	Currency*	2021 IBS Report: Costing Benchmarked Rates	2024 IBS Report: Costing Benchmarked Rates	
		April 2023 to March 2024	April 2024 to March 2025	April 2025 to until further TATT notice
MICC	TT\$	0.0439	0.0439	0.0337
	US\$	0.0065	0.0065	0.0050
FICC	TT\$	0.0439	0.0439	0.0337
	US\$	0.0065	0.0065	0.0050
IMTR = MTR + MICC	TT\$	0.1080	0.1080	0.0810
	US\$	0.0160	0.0160	0.0120
IFTR = FTR + FICC	TT\$	0.0621	0.0621	0.0479
	US\$	0.0092	0.0092	0.0071

Note: *The costing benchmarks were calculated and determined in US dollars. The TT dollar equivalent values in this table are provided for “illustrative purposes” only and are based on the historical weighted average US dollar to TT dollar exchange rate used for benchmarking analysis (0.1482), as described in section 3.4. The US to TT exchange rate may be different at the date of publication of this report and over the course of the applicability of the benchmarks. If so, at the start of each financial year, interconnection rates could be restated in TT dollars, based on the TT to US exchange rate at that time.

Figures 6 and 7 provide a summary of the Authority’s MICC and FICC, and IMTR and IFTR costing benchmarked rates in comparison with the benchmarked rates from the previous IBS reports.

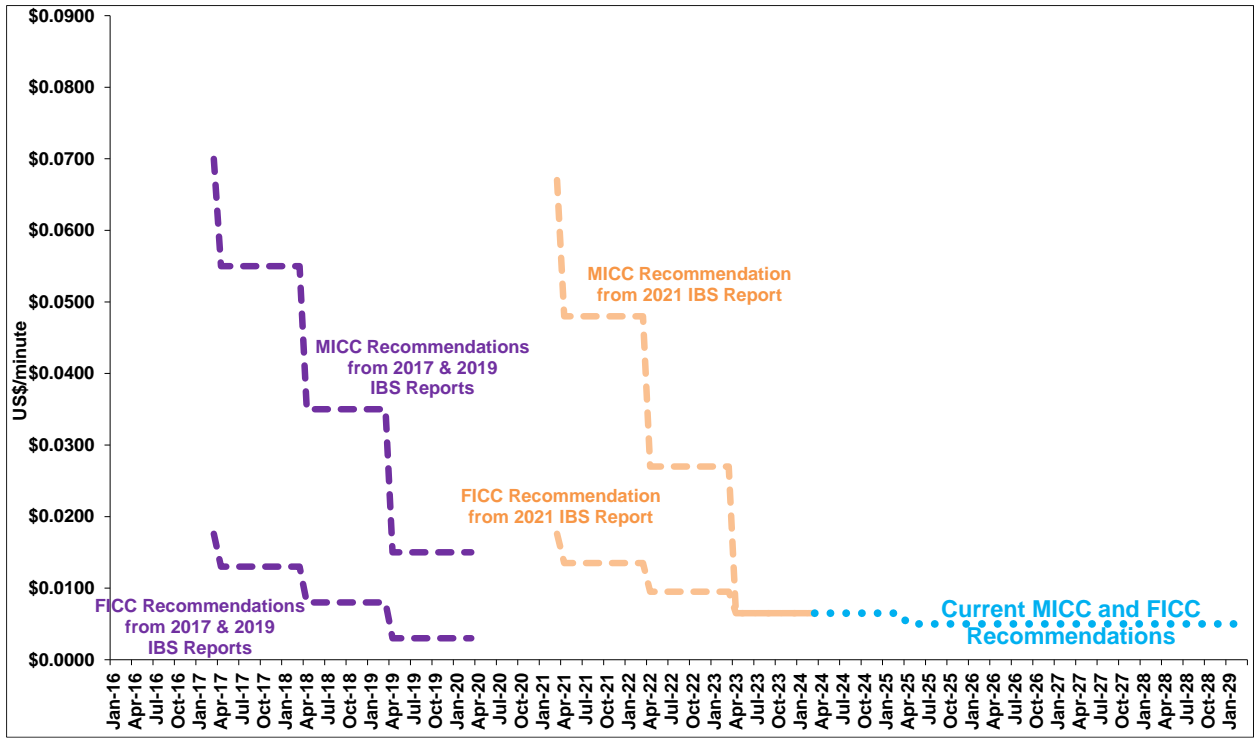


Figure 6 MICC and FICC costing benchmarked rates

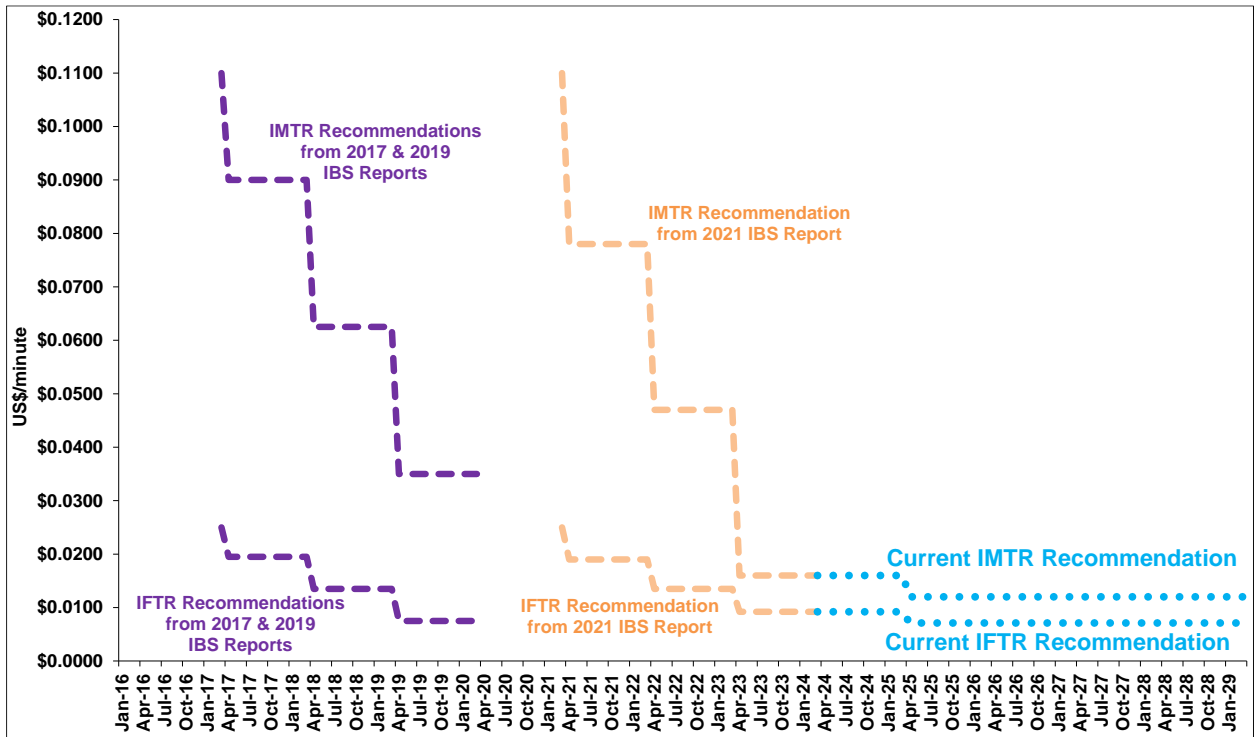


Figure 7 IMTR and IFTR costing benchmarked rates

5. Supporting Analyses and Assessments

The Authority's previous IBS reports included normalisation and sensitivity analyses in support of the verification process used to derive the Authority's costing benchmarks, as well as assessments of the potential impacts on operators and consumers, and the potential cost-benefits of rates moving towards the computed costing benchmarked rates³¹.

On this basis, the Authority is assured that the results of the previous analyses and assessments support its current costing benchmarked rates. Nonetheless, this section updates and expands the earlier analyses and assessments, the results of which provide further support for the current benchmarked rates computed.

5.1. Normalisation Analysis

The benchmarking sample selection criteria set out in section 2 are designed to select jurisdictions for benchmarking purposes that are suitably comparable to Trinidad and Tobago. The previous IBS reports included a normalisation analysis to assess whether any demographic, topographic, socio-economic or environmental differences between the selected benchmarking sample jurisdictions and Trinidad and Tobago may be significant enough to affect the costing benchmarking results and, if so, potentially justify a normalisation adjustment (either positive or negative) to the calculated costing benchmarked rates³².

For the 2024 IBS Report, the normalisation analysis has been updated to include more recent data (i.e., including for 2022 and 2023, as available). As well, in addition to the ten demographic, topographic, socio-economic and environmental variables included in the 2021 IBS Report, two new variables have been added, namely the number of fixed service providers and inflation. The full set of eight variables used for normalisation analysis purposes include the following:

1. Population density, which is a potential measure of the economies of scale for the provision of telecommunications services as well as a proxy for relative traffic volumes.

³¹ See, for example, sections 6.2 and 6.3, and Appendix II of the 2019 IBS Report, which provide the most comprehensive set of normalisation and sensitivity analyses. See also sections 6.2 and 6.3, and Annex B of the 2017 IBS Report.

³² As noted in *Practical Guide on Benchmarking Telecommunication Prices*, issued by ITU in August 2014, depending on national market conditions relative to comparable benchmarking jurisdictions, some explicit adjustment to the benchmark results could be considered to reflect differences in national operating environments.

2. Maximum elevation, which is a topographic factor that could also potentially affect the relative costs of the provision of telecommunications services³³.
3. Gross domestic product (GDP) per capita (measured in US dollars), which measures the average income per person, and can serve as a proxy for the relative cost differences between countries (especially in the case of labour costs).
4. Fixed subscriber density, which measures the number of fixed subscribers per 100 inhabitants and reflects the scale of fixed voice service and the development of the fixed market, and can also serve as a proxy for relative fixed voice service usage levels.
5. Mobile subscriber density, which measures the number of mobile subscribers per 100 inhabitants and reflects the scale of mobile service and the development of the mobile market and can also serve as a proxy for relative mobile service usage levels.
6. The number of fixed operators, which is a measure of the market structure and may provide an indication of the level of competition in the fixed services market.
7. The number of mobile operators, which is a measure of the market structure and may provide an indication of the level of competition in the mobile services market.
8. Inflation, which is a measure of the rate of change of the cost of consumer goods and services, as measured by the consumer price index (CPI), and which can serve as a proxy for differences in the relative costs between countries³⁴.

Table 6 gives a summary of the normalisation variable data for each of the jurisdictions in the benchmarking sample, along with sample averages split out on an all sample and cost-based sample basis. It also shows the calculated correlation coefficients between each of the normalisation variables and the domestic FTRs and MTRs, as applicable³⁵. Trinidad and Tobago,

³³ This measure was proposed by one of the stakeholders in the consultation process related to the 2021 IBS Report.

³⁴ For background purposes, note that, between 2016 and 2023, inflation in Trinidad and Tobago fluctuated substantially, from lows of 0.6% in 2020, to peaks of 5.8% in 2022. Specifically, over the period 2016 to 2023, inflation averaged 2.5% annually. The Central Bank of Trinidad and Tobago has noted that, in the second half of 2023, inflationary conditions began to ease, with headline inflation in December 2023 (end of period) at 0.7% – considerably lower than the 4.7% reported in July 2023. Notably, the communications industry’s inflation was reported at 1.7% in 2023, down from 2.4% in 2022.

³⁵ The correlation coefficients in Table 6 were calculated using the Excel CORREL function, which calculates how strongly two variables are correlated with one another. A correlation coefficient ranges from -1.0 (perfect negative correlation) to +1.0 (perfect positive correlation), and a correlation coefficient of 0 represents no correlation whatsoever.

which is not included in any of the calculations, is listed at the bottom of the table for comparison purposes.

The analysis findings for each of the eight normalisation variables are as follows:

1. Population density: Trinidad and Tobago's population density of 261/km² is very close to the all sample and the cost-based benchmarking sample averages of 236/km² and 283/km², respectively. As shown in Table 6, there is a negative correlation between population density and the FTRs and MTRs in the case of both the all sample and the cost-based benchmarking samples. This implies that the higher the population density, the lower the FTR and MTR. The degree of correlation is moderate, ranging between -0.36 and -0.62. This finding could potentially justify a normalisation adjustment. However, since Trinidad and Tobago's population density is roughly equal to the benchmarking sample average, none is necessary. Consequently, no normalisation adjustment is considered warranted for population density.
2. Maximum elevation: Trinidad and Tobago's peak elevation of 940 metres is very similar to the all sample average of 988 metres, and slightly below the cost-based sample average of 1,233 metres. There is therefore very little correlation (i.e., ranging from -0.33 to +0.22) between maximum elevation and the FTRs and MTRs in the case of both the all sample and cost-based samples. Consequently, no normalisation adjustment is considered warranted for maximum elevation.
3. GDP per capita: Trinidad and Tobago's GDP per capita about US\$18,300 is slightly lower than the all sample and cost-based sample averages of approximately US\$21,100 and US\$19,900, respectively. For this variable, the correlation coefficients between GDP per capita and the FTRs and MTRs in the benchmark sample jurisdictions are negative. This implies that the higher the GDP per capita, the lower the FTR and MTR, on average. This negative correlation is more pronounced in the case of the FTR compared to the MTR³⁶. Consequently, this finding could potentially justify an upward adjustment to the FTR costing benchmark, but not in the case of the MTR. However, as noted, Trinidad and Tobago's GDP per capita is relatively close to the all sample and cost-based sample GDP per capita averages, which tends to negate the need for any such potential normalisation adjustment in the case of the computed FTR costing benchmark. Consequently, no normalisation adjustment is considered warranted for GDP per capita.

³⁶ The pronounced relationship may be indicative of efficiency effects caused by economies of scale of fixed network cost which, based on operator feedback, is synonymous with higher fixed or capital costs. The inverse relationship is also reported in high income states, where service prices are relatively more affordable, and uptake of telecommunications services is widespread, contributing to lower service unit costs and increased customer demand. This relationship, as seen in Table 6 causes significant disparities in the price and affordability of telecommunications services, which persists between countries with high GDP per capita versus countries with low GDP per capita and has been noted by ITU in its Policy Brief: *The affordability of ICT services*, Policy Brief 2021 (LDCs) (ITU, 2021 https://www.itu.int/en/ITU-D/Statistics/Documents/publications/prices2021/ITU_A4AI_Price_Brief_2021.pdf)

4. Fixed subscriber density: Trinidad and Tobago's fixed subscriber density of 23% is slightly below the all sample and cost-based benchmark averages of 29% and 32%, respectively. In this case, the correlation coefficients between fixed density and the FTRs in the benchmark sample jurisdictions are negative, meaning the higher the fixed density, the lower the FTR, on average. However, the degree of correlation is weak (i.e., ranging from -0.33 to -0.27). Additionally, fixed density in Trinidad and Tobago is very similar to the benchmark sample averages. Consequently, no normalisation adjustment is considered warranted for fixed density.
5. Mobile subscriber density: Trinidad and Tobago's mobile subscriber density of 148% is considerably higher than the benchmark averages of about 105% for both samples. Here as well, the correlation coefficients between mobile density and the MTRs in the benchmark sample jurisdictions are strongly negative (i.e., ranging from -0.46 to -0.80). Consequently, given that Trinidad and Tobago's mobile density is well above the benchmarking sample averages, this finding could potentially justify a downward adjustment to the MTR costing benchmark.
6. Number of fixed operators: There are 6 fixed operators in Trinidad and Tobago, which ranks well above the average of 2 to 3 fixed operators in the benchmark sample jurisdictions. In this case, the correlation coefficients between the number of fixed operators and the FTRs are strongly negative (ranging from -0.57 to -0.71). This means that the greater the number of fixed operators, the lower the FTR. Consequently, given Trinidad and Tobago's high number of fixed operators relative to the benchmarking sample averages, this finding could potentially justify a downward adjustment to the FTR costing benchmark.
7. Number of mobile operators: There are 2 mobile operators in Trinidad and Tobago, which ranks slightly below the all sample and cost-based benchmark sample averages of 2.6 and 2.8, respectively. Here as well, the correlation coefficients between the number of mobile operators and the MTRs are strongly negative (i.e., -0.69 to -0.78). This implies that the higher the number of mobile operators, the lower the MTR or, in other words, the greater the degree of competition, the lower the MTR. A high degree of competition amongst operators will lead to a reduction in MTR rates. This inverse relationship between the number of operators and the market price is applicable to both wholesale (interconnection) and retail telecommunications services. This finding may explain, in some measure, the higher MTR in Trinidad and Tobago relative to the benchmark sample jurisdictions. That said, it also suggests that a downward adjustment to the calculated MTR costing benchmark could potentially be warranted to correct for the effective lower degree of mobile competition in Trinidad and Tobago relative to the benchmark sample jurisdictions. A reduction in interconnection services (via a downward adjustment to the MTR) may reduce operational

costs of smaller players and/or new entrants with net interconnection outpayments and thereby increase their competitiveness.

8. Inflation: The average rate of CPI inflation over the benchmark sample period of 2016 to 2023 in Trinidad and Tobago was 2.5%, which is above the all sample and cost-based benchmark sample averages of 2.1% and 1.9%, respectively. The correlation between inflation and both the FTRs and MTRs is weak, and ranges between low negative and low positive. Consequently, no normalisation adjustment is considered warranted for inflation.

Therefore, the results of the updated and expanded normalisation analysis suggest that a potential downward adjustment to the FTR and MTR costing benchmarks could be justified due to differences in the number of fixed and mobile operators in Trinidad and Tobago compared to the benchmark sample jurisdictions. Further, an additional potential downward adjustment to the MTR costing benchmarks could be justified due to differences in mobile density in Trinidad and Tobago compared to the benchmark sample jurisdictions.

However, as in the previous IBS reports, the Authority is of the view that no normalisation adjustments should be applied and, in light of this, the Authority considers the MTR and FTR costing benchmarks in this 2024 IBS Report to be reasonable and conservative in nature.

Table 6 Normalisation analysis

Benchmark Jurisdiction Demographic, Topographic, Socio-Economic and Other Variables											
Jurisdictions	Population	Max Elevation	GDP/cap	Fixed	Mobile	Fixed	Mobile	Inflation	Costs	FTR (USD)	MTR (USD)
	Density	(m)	(USD)	Density	Density	Operators	Operators	(Avg 2016-23)		JUN-24	JUN-24
Bahamas	41	63	34,750	21%	99%	2	2	2.3%	No	0.0007	0.0066
ECTEL - Dominica	97	1,447	8,954	19%	86%	2	2	1.9%	Yes	0.0039	0.0071
ECTEL - Grenada	371	840	10,464	24%	81%	2	3	1.2%	Yes	0.0022	0.0068
ECTEL - St. Kitts & Nevis	184	1,156	22,553	42%	119%	3	3	0.6%	Yes	0.0029	0.0056
ECTEL - St. Lucia	295	950	13,980	21%	96%	2	2	1.3%	Yes	0.0020	0.0052
ECTEL - St. Vincent	266	1,324	10,280	28%	100%	2	2	2.1%	Yes	0.0031	0.0087
FWI - Guadeloupe & Martinique	263	1,467	27,928	52%	133%	3	4	1.8%	Yes	0.0008	0.0023
FWI - St. Barthelemy & St. Martin	528	424	23,649	51%	132%	4	4	0.8%	Yes	0.0008	0.0023
Jamaica	261	2,256	6,874	15%	106%	3	2	5.3%	Yes	0.0005	0.0053
Turks & Caicos Islands	48	49	30,438	18%	110%	2	2	3.3%	No	0.0030	0.0130
All Sample Average	236	998	18,987	29%	106%	2.5	2.6	2.1%		0.0020	0.0063
<i>Correlation Coefficient (FTR)</i>	-0.36	-0.03	-0.31	-0.27	na	-0.57	na	-0.25			
<i>Correlation Coefficient (MTR)</i>	-0.62	-0.33	0.03	na	-0.46	na	-0.69	0.33			
Cost-Based Sample	283	1,233	15,585	32%	107%	2.7	2.8	1.9%		0.0020	0.0054
<i>Correlation Coefficient (FTR)</i>	-0.61	-0.10	-0.36	-0.33	na	-0.71	na	-0.37			
<i>Correlation Coefficient (MTR)</i>	-0.49	0.22	-0.78	na	-0.80	na	-0.78	0.12			
Trinidad & Tobago	261	940	18,333	23%	148%	6	2	2.5%	No		

Sources : World Bank; FWI - Ministry of Overseas Territories and ARCEP; TATT Market Reports; government websites, and Wikipedia (elevations).
 "na" - implies that the correlation coefficient is not relevant (e.g., the correlation between fixed density and MTRs & mobile density and FTRs).

5.2. Sensitivity Analyses

The previous IBS reports included many sensitivity analyses. Section 6.3 and Annex B of the 2017 IBS Report included a first set of sensitivity analyses to assess the robustness of the MTR and FTR benchmarking results. In response to the comments from the first round of consultation, a number of additional sensitivity analyses were conducted and included in section 6.2, Appendix II and Appendix IV of the 2019 IBS Report³⁷. In total, the 2019 IBS Report included six sets of sensitivity analyses for the domestic MTR and FTR benchmarking results.

As indicated in the 2019 IBS Report, the Authority concluded that the results of the sensitivity analyses supported the appropriateness and robustness of the calculated costing benchmarks. The Authority maintains this view with respect to the current MTR and FTR costing benchmarks set out in the 2024 IBS Report. To further confirm those earlier conclusions and, as indicated above, this section presents two sensitivity analyses on the updated data.

Sensitivity Analysis #1 – Update of Exchange Rates from 2021 IBS Report

Section 3.4 describes the multi-year methodology to convert all interconnection rates to US dollars for comparison purposes. As set out therein, the LCU-US dollar weighted average exchange rates for this 2024 IBS Report were as follows: 1.1054 for EUR, 0.00698 for JM\$ and 0.1482 for TT\$. For the 2021 IBS Report, the weighted average exchange rates used were as follows: 1.1457 for EUR, 0.00770 for JM\$ and 0.1497 for the TT dollar. The exchange rates for the other six jurisdictions in the benchmarking samples, i.e., the five ECTEL MS and The Bahamas, did not change from the 2021 IBS Report to the 2024 IBS Report.

Figures 8 and 9, which are comparable to Figures 3 and 4, respectively, present the results of using the 2021 IBS Report exchange rates described above (sensitivity #1). In the case of both the MTR and the FTR, the changes in the exchange rates from the 2021 IBS Report to the 2024 IBS Report are, on the whole, relatively very modest and do not materially impact the benchmarking results. Hence, the Authority concludes that given the methodology used to calculate the exchange rates used for comparison purposes, the MTR and FTR costing benchmarks computed are robust to changes from the 2021 IBS Report.

³⁷ The additional sensitivities are also discussed in detail in the 2019 DORs from the first round of consultation.

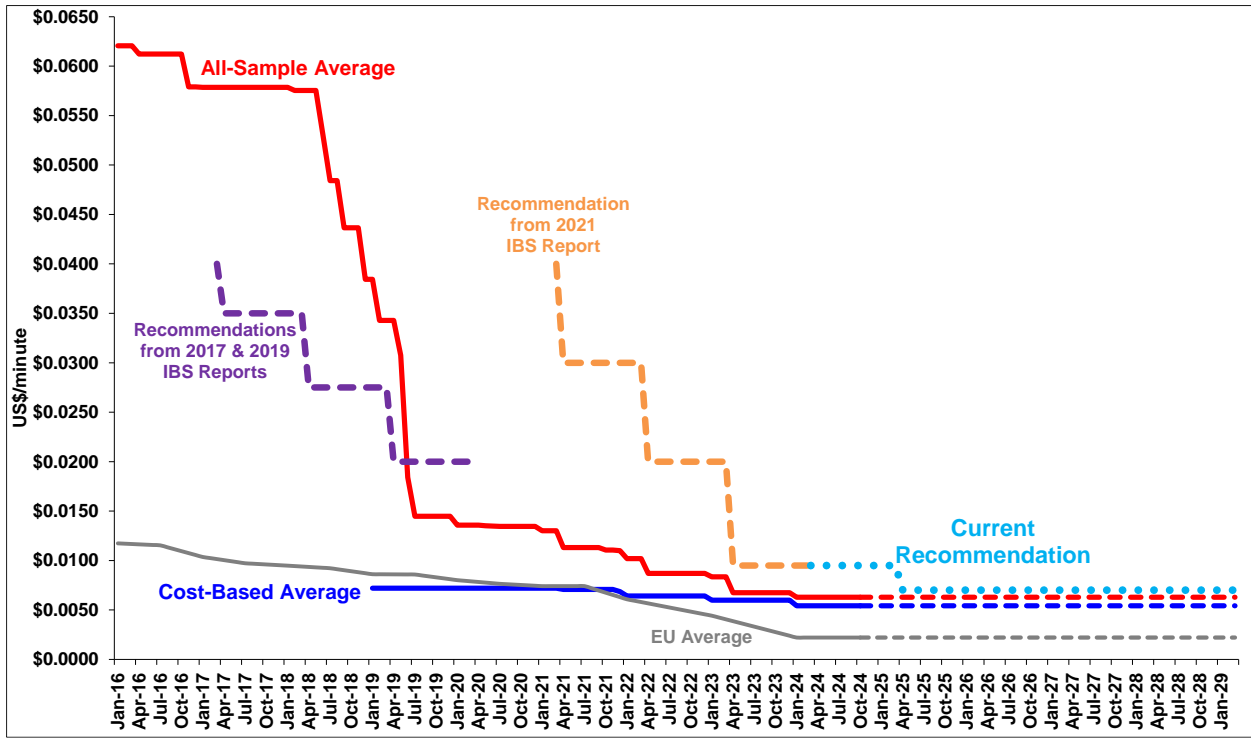


Figure 8 MTR costing benchmarked rates and sensitivity #1

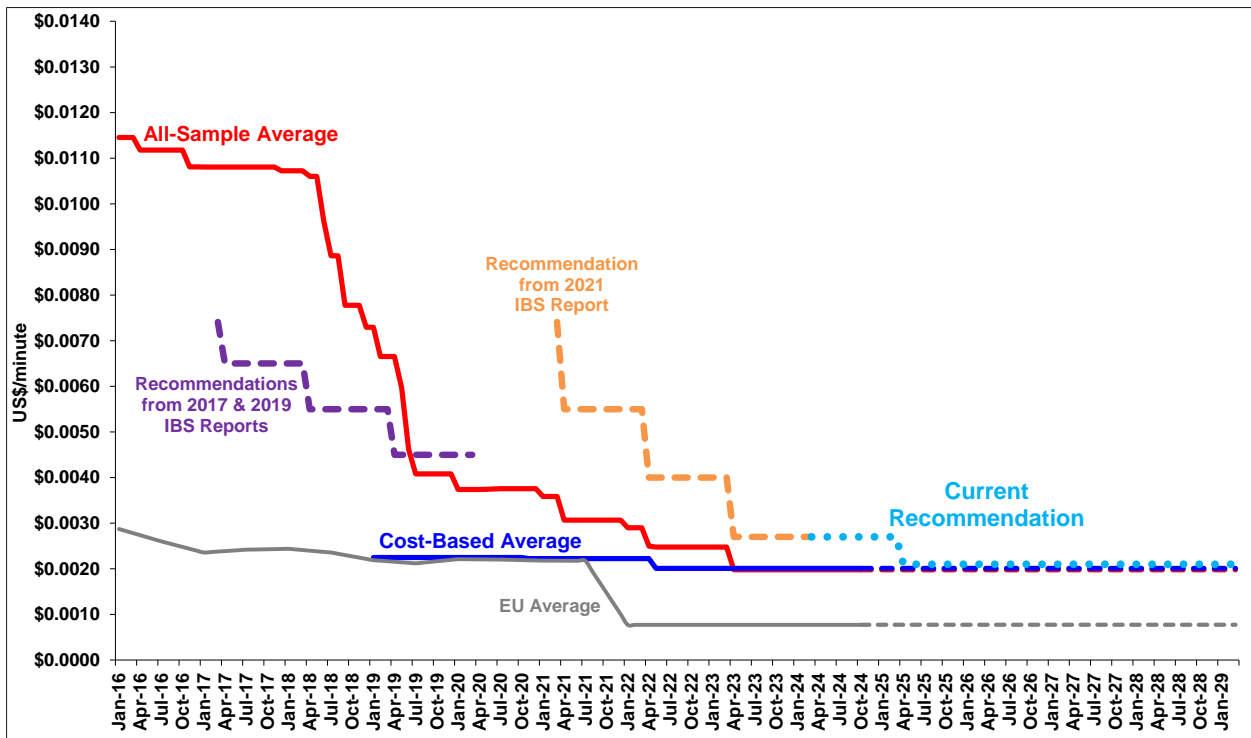


Figure 9 FTR costing benchmarked rates and sensitivity #1

Sensitivity Analysis #2 – Use of Median for Calculating Trends

Figures 1 and 2, which provide sample jurisdiction-specific MTRs and FTRs for the January 2016 to October 2024 period, show that there was variation around the calculated average. In response to stakeholder comments, in the past, the Authority has undertaken sensitivity analyses related to this dispersion. Specifically, as set out in 2019 IBS Report (section 6.2 and Appendix II, Sensitivity #3), the Authority concluded that the benchmarking results are not sensitive to the exclusion of outlier observations.

To update this past sensitivity analysis, but also taking into account the somewhat reduced number of observations, sensitivity #2 uses the median instead of the mean of the all sample and cost-based samples. The results are presented in Figures 10 and 11 (which are comparable to Figures 3 and 4, respectively).

As may be expected, for both the MTR and FTR, the shape of the sample median trend lines are somewhat different from the shape of the sample mean trend lines (i.e., compared to Figures 1 and 2), especially for the all sample observations. It is the sharper decrease in the trend line during the year 2019 that is markedly different in the case of both the MTR and FTR. However, from 2020 onwards, the all sample median trend line closely tracks the all sample mean trend line due to the convergence of individual sample MTR and FTR observations. Given the methodology that is used to calculate the cost-based sample (as described in section 2.1), the same convergence occurs with the cost-based sample median and mean trend lines. Hence, the Authority concludes that the MTR and FTR costing benchmarked rates are robust to changes vis-à-vis the manner of calculating the trends, regardless of which sample means or medians are used.

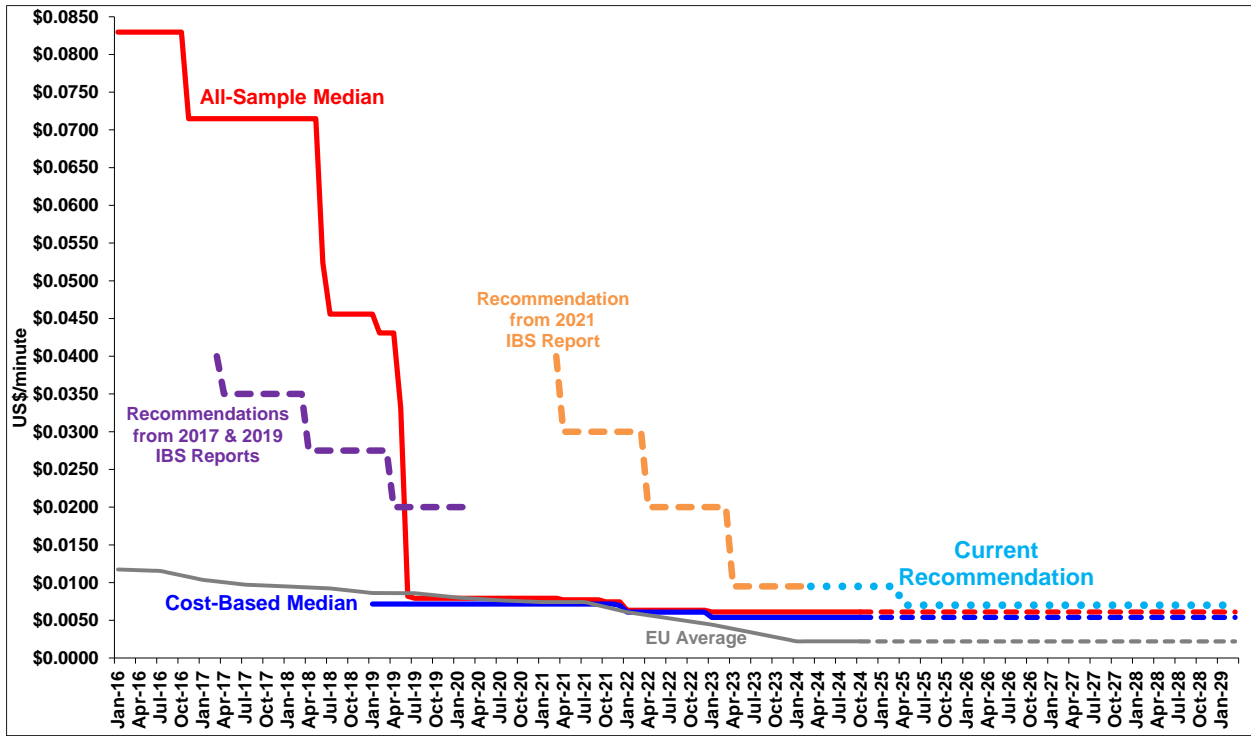


Figure 10 MTR costing benchmarked rates and sensitivity #2

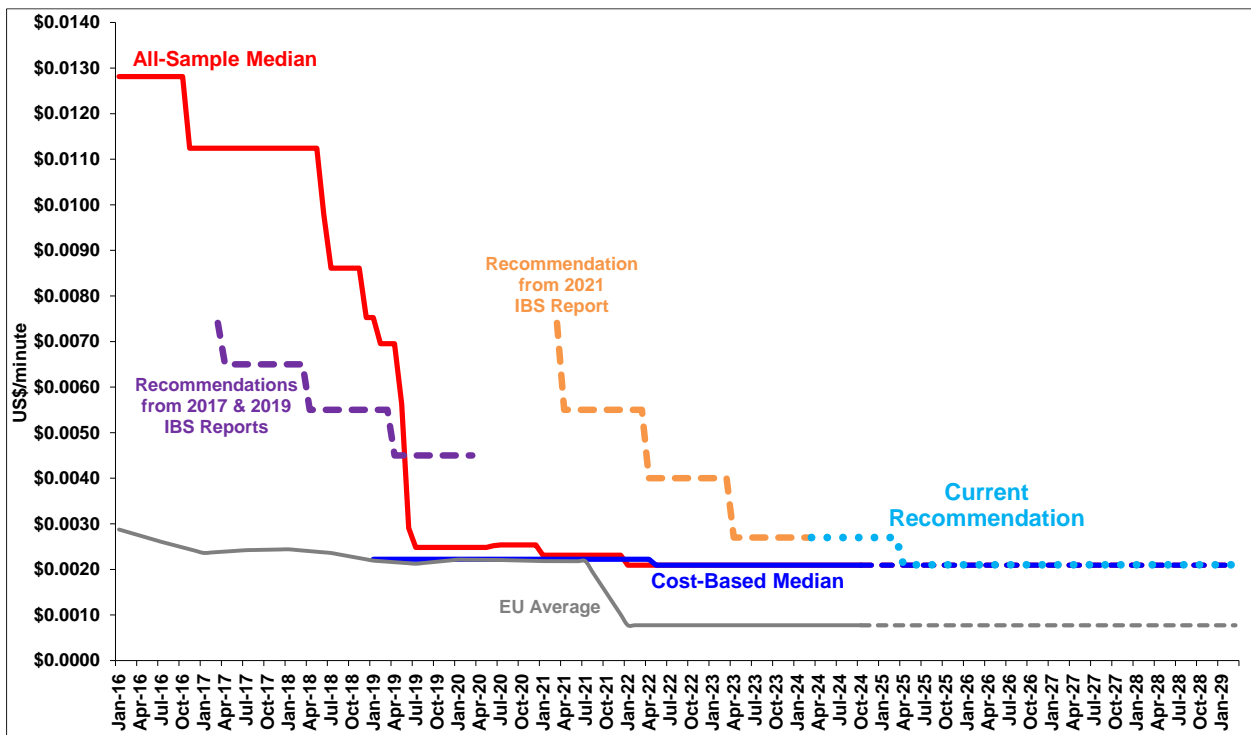


Figure 11 FTR costing benchmarked rates and sensitivity #2

5.3. Impact on Operators and Consumers

The previous IBS reports included assessments of the potential impacts on operators and consumers of reductions in the domestic and international interconnection rates. This impact analysis was revisited and updated for the 2024 IBS Report.

To assess potential impacts on operators, the Authority considered current call traffic data for the totality of domestic and international segments of the voice market in Trinidad and Tobago³⁸. This data was used to estimate total interconnection revenues/outpayments, bearing in mind that, at the aggregate level, interconnection revenues and outpayments cancel each other out. However, at the individual operator level, traffic imbalances may exist, which could leave one or more operators in a net interconnection revenue position, while others may be in a net interconnection outpayment position. These imbalances may differ by market segment, namely, domestic fixed, domestic mobile and international. Generally, since traffic imbalances tend to be limited, so too are net interconnection revenues/outpayments for individual operators overall.

To gauge the size of individual operator's net interconnection revenue/outpayment positions, the Authority issued requests for information (RFIs) to operators. Only a subset of operators responded to the RFIs. In some cases, the data provided included gaps and inconsistencies³⁹. Despite these shortcomings, the Authority was able to approximate the impacts of reducing interconnection rates to the costing benchmarks developed⁴⁰. As expected, in the event of an interconnection rate reduction, any operator in an overall net interconnection revenue position, under current rates, would incur a reduction of net interconnection revenues, though the reduction would be relatively minor, if not negligible, in comparison to the overall retail voice revenues. The Authority also found that other operators could be better off, since their net interconnection outpayments would decline leading to reduced costs. Here as well, the quantum of any such savings was found to be very minor in comparison to total retail voice revenues. Overall, the Authority found that net interconnection revenue/outpayments would be small relative to the total retail voice service market revenues.

It should also be recognised that wholesale interconnection rates are an important cost factor influencing the pricing of downstream retail voice service prices, including those for domestic and international calling services. Therefore, a reduction in interconnection rates could lead to a reduction in retail voice service prices which, in turn, could hypothetically stimulate call traffic volumes. To the extent that this occurs, the effect of domestic and international call demand

³⁸ This data is the same as what is reported in TATT's 2023 Annual Market Report.

³⁹ Due to the confidential nature of this data, it is not included in the 2024 IBS Report.

⁴⁰ Note that the impact analysis was static in nature, assuming that all else other than the interconnection rate reductions remained equal.

stimulation could offset, in whole or part, net interconnection revenue losses brought about by a reduction in interconnection rates. In other words, the static effects of interconnection rate reductions could be offset by the dynamic effects of increased traffic volumes brought about by lower retail voice service pricing.

For this reason, the Authority considers that reducing interconnection rates to the costing benchmarks should, in principle, bring about a number of positive benefits to consumers, including:

1. lower retail fixed and mobile service prices to competitive levels.
2. increased demand and competition for fixed and mobile voice services for fixed voice users.
3. increased penetration of fixed and mobile voice services among prospective voice users.

The Authority also notes that conventional voice traffic over the PSTN has been declining for years, globally as well as in Trinidad and Tobago. The decline has been particularly severe in the international market segment (which has declined by 60% in the last four years alone, in terms of call traffic minutes)⁴¹. There are many reasons for the decline, although the emergence of numerous OTT voice and video calling and messaging services is likely the primary cause. It appears that excessive IFTR and IMTR rate levels have resulted in high retail international call prices which, in turn, contributed to the collapse of the conventional international voice services market. Lowering international interconnection rates could lead to lower retail prices, benefiting consumers, and even operators, given the greater demand for the service.

The Authority remains of the view that moving from the current interconnection rates to the computed costing benchmarked rates would improve economic efficiency, promote greater competition between operators and bring benefits to voice consumers.

5.4. Cost-Benefit Assessment

The previous IBS reports also included an assessment of the risks, in terms of the costs and benefits, associated with not implementing the costing benchmarked rates established.

Several negative impacts could be expected if the calculated costing benchmarked rates are not implemented. Leaving interconnection rates at prevailing levels would allow operators with significant market power (or dominant position) to continue charging above-cost rates for

⁴¹ See TATT's 2023 Annual Market Report, page 83.

interconnection services. This implies that operators with net interconnection revenues would be allowed to continue profiting from excessive rates, while those with net interconnection outpayments would continue incurring excessive interconnection costs.

Excessive wholesale interconnection rates have likely created long-entrenched inefficiencies that have likely also resulted in under-investment in the voice services market. Excessive wholesale interconnection rates lead to inflated downstream retail voice service prices which, in turn, lead to reduced demand for voice services and, as a result, a potential reduction in investment in voice services over time. This is precisely why the Act and Interconnection Regulations call for cost-based pricing of wholesale services, including interconnection services.

Moreover, the notion that reducing international interconnection rates could harm operators by limiting access to foreign exchange revenue is misguided or unsubstantiated. International call traffic may have been a significant source of surplus foreign exchange revenues (i.e., excess profits) decades ago, when there was a virtual monopoly in place. That no longer exists today. If anything, inflated wholesale international interconnection pricing – and, by extension, retail international call prices – has likely caused the near total collapse of the conventional international voice services market today. Reducing international interconnection rates would greatly increase the chances of reviving the market by enabling lower retail voice prices, where customers' demand for international voice service is price elastic.

In this respect, maintaining above-cost interconnection service pricing harms consumers. Retail voice service prices are higher than otherwise, which suppresses consumer demand in terms of usage as well as subscription levels. Further, maintaining above-cost interconnection service pricing also distorts and limits competition in the retail market, by promoting higher-than-otherwise retail voice service prices.

In sum, the Authority is of the view that there is a very high risk that not reducing the relevant interconnection rates to the level of the costing benchmarked rates would serve to sustain existing interconnection pricing inefficiencies, harm consumers through higher-than-necessary retail prices, and distort market competition. The Authority, therefore, considers that these risks would be significantly mitigated, if not eliminated, by the implementation of the current costing benchmarked rates set out in this 2024 IBS Report.

6. Conclusion

This 2024 IBS Report updates the benchmarking data and analysis included in the 2021 IBS Report and, accordingly, sets out the rationale for, and results of, the Authority's current costing benchmarked rates for the MTR and FTR, MICC and FICC, and IMTR and IFTR, in fulfilment of regulation 15(2) of the Interconnection Regulations.

The results of the 2024 benchmarking study indicate that the current interconnection rates in Trinidad and Tobago are above the cost of interconnection derived or modelled in jurisdictions with comparable demographic and economic conditions in the Caribbean region. The implementation of the computed costing benchmarked rates would bring about a reduction in those charges to more reasonable and appropriate cost-based levels. The Authority is of the view that implementing the calculated costing benchmarked rates would likely result in lower retail call prices and yield significant consumer benefits for prospective and existing fixed and mobile voice service users in Trinidad and Tobago. The Authority therefore strongly encourages operators to take into account these benchmarks in current and future interconnection rate-setting processes. Without prejudice to such processes, the Authority may also implement these benchmarks, pursuant to regulation 15 (2) or to section 29 (2) of the Act.

It is also important to recognise that lowering interconnection rates over time, to ensure they reflect costs as closely as possible, is an interconnection policy objective pursued by virtually all NRAs, including the Authority. Evidence from the Caribbean region and elsewhere (e.g., Europe) testifies to this fact. Consequently, the Authority is in step with international regulatory practice with respect to the derivation of its costing benchmarked rates.

References

- Arbitration Panel. 2019 “Report and Decision In the Matter of an Arbitration: Telecommunications Authority of Trinidad and Tobago Section 82 of the Telecommunications Act 2001 between Columbus Communications Trinidad Limited (Complainant) and Telecommunications Services of Trinidad and Tobago Limited (Respondent)”, Reference No: TATT 04/07/06/06, December 20, 2019. Accessed January 11, 2021: <https://tatt.org.tt/wp-content/uploads/2023/02/In-the-Matter-of-an-Arbitration-TATT-Section-82-of-the-Telecommunications-Act-2001-CCTL-vs-TSTT1.pdf>
- Autorité de Régulation des Communications électroniques et des Postes (ARCEP). 2024. “Les terminaisons d’appels”. Accessed August 8, 2024: <http://www.arcep.fr/?id=8080#16875>
- Body of European Regulators of Electronic Communications (BEREC). 2020. “Termination rates at the European level”, BoR (20) 97, dated 11 June 2020. Accessed November 12, 2020: https://berec.europa.eu/eng/document_register/subject_matter/berec/reports/9285-termination-rates-at-the-european-level-january-2020
- , 2021. “Termination rates at European level June 2021” BEREC BoR (21) 159, dated 9 December 2021. Accessed August 8, 2024: https://www.berec.europa.eu/sites/default/files/files/document_register_store/2021/12/BoR_%2821%29_159_Termination_Rates_Report_-_30_June_2021_P4_2021_clean.pdf
- Eastern Caribbean Telecommunications Authority (ECTEL). 2009. “Decision on Interconnection Rates from the 19th Council of Ministers’ Meeting”. March 31, 2009. Accessed March 1, 2017: http://www.ftc.gov.bb/library/rio/responses/2009-06-24_caritel_rio_submission_ectel_info_consolidated_rio.pdf
- Eastern Caribbean Telecommunications Authority (ECTEL). 2018. “Recommendation to National Telecommunications Regulatory Commissions on Cost Oriented Interconnection Rates in the ECTEL Member States”. Dated April 2018. Accessed January 5, 2021: https://www.ectel.int/wp-content/uploads/2018/09/PUBLIC_Determinaton_Interconnection_rates_2018-1.pdf
- European Commission. 2020. “Commission Delegated Regulation supplementing Directive (EU) 2018/1972 of the European Parliament and of the Council by setting a single maximum Union-wide mobile voice termination rate and a single maximum Union-wide fixed voice termination rate” C(2020) 8703 final. Dated 18 December 2020. Accessed January 11, 2021: <https://op.europa.eu/en/publication-detail/-/publication/54e4cc97-414d-11eb-b27b-01aa75ed71a1/language-en/format-PDF/source-search>

- International Telecommunication Union. 2014. “Practical Guide on Benchmarking Telecommunication Prices”. Dated August 2014. Accessed August 8, 2024: https://www.itu.int/dms_pub/itu-d/opb/pref/D-PREF-EF.PG.BENCH-2014-PDF-E.pdf
- Office of Utilities Regulation (OUR) (Jamaica). 2012. “Mobile Termination Rate - Determination Notice. June 4, 2012”. Accessed March 1, 2017: <http://www.our.org.jm/ourweb/sectors/telecommunications/determination-notices/mobile-termination-rate-determination-notice-june>
- , 2013. “Cost Model for Mobile Termination Rates - Determination Notice May 2013. May 30, 2013”. Accessed March 1, 2017: <http://www.our.org.jm/ourweb/sectors/telecommunications/determination-notices/cost-model-mobile-termination-rates-determination>
- , 2013. “LIME RIO 6 - Tariff Schedule. October 1, 2013”. Accessed March 1, 2017: http://www.our.org.jm/ourweb/sites/default/files/documents/sector_documents/lime_rio_6_tariff_schedule.pdf
- , 2016. “Consultation Document - Draft Cost Model for Fixed Termination Rates. June 22, 2016”. Accessed March 1, 2017: http://www.our.org.jm/ourweb/sites/default/files/documents/sector_documents/consultation_document_-_draft_cost_model_for_fixed_termination_rates_-_public_version.pdf
- , 2021. “Update of the Mobile Cost Model - The Decision on Rates. Determination Notice” 2021/TEL/011/DET.003. Dated 01 September 2021. Accessed August 8, 2024: https://our.org.jm/wp-content/uploads/2021/09/Update-of-the-Mobile-Cost-Model-The-Decision-on-Rates-Determination-Notice20210901_11203750-2.pdf
- , 2022. “Update of the Cost Model for Fixed Interconnection Rates - The Decision on Rates. Determination Notice” 2022/TEL/002/DET.001. Dated 31 March 2021. Accessed August 8, 2024: https://our.org.jm/wp-content/uploads/2020/12/Determination-Notice-Update-of-the-Cost-Model-for-Fixed-Interconnection-Rates-The-Decsion-on-Rates20220331_14550139-1.pdf
- Telecommunications Authority of Trinidad and Tobago, 2010. “Assessment of the Minimum Rates for Termination of Incoming International Traffic”, made under Determination 2010/01, dated February 3, 2010. Accessed January 12, 2021: <https://tatt.org.tt/Portals/0/Minimum%20Rates.pdf>
- , 2017. “Results of an Interconnection Benchmarking Study for the Telecommunications Sector of Trinidad and Tobago”. Dated March 27, 2017. Accessed August 8, 2024: https://tatt.org.tt/wp-content/uploads/2023/03/DownloadableDocuments.aspxcommandcore_downloadentryid_906
- , 2019. “Results of an Interconnection Benchmarking Study for the Telecommunications Sector of Trinidad and Tobago”. Dated March 27, 2017. Accessed August 8, 2024:]

- , 2021. “Results of an Interconnection Benchmarking Study for the Telecommunications Sector of Trinidad and Tobago”. Dated March 27, 2017. Accessed August 8, 2024: <https://tatt.org.tt/wp-content/uploads/2023/03/Updated-IBS-Report-16th-March-2021-redacted.pdf>
- , 2024. “Telecommunications and Broadcasting Sectors Annual Market Report 2023”. Dated August, 2024. Accessed October 22, 2024: <https://tatt.org.tt/wp-content/uploads/2024/08/Annual-Market-Report-AMR-2023.pdf>
- Turks and Caicos Islands Telecommunications Commission, Telecommunications. 2010. “Review of Mobile Termination Rate Consultation Document, issued 19 July 2010”. Accessed March 1, 2017: <http://www.telecommission.tc/content/root/files/20100719112927-TCI-MTR-Consultation-Document- July-19-2010.pdf>
- , 2011. “Telecommunications Decision 2011-2, Decision on the Mobile Termination Rate Review, January 24, 2011”. Accessed March 1, 2017: <http://www.telecommission.tc/content/root/files/20110124152043-TCI-MTR-Review-Decision- 2011-01-24 -final.pdf>.
- , 2014. “Telecommunications Decision 2014-4, Decision on the Review of Interconnection Rates, Turks and Caicos Islands Telecommunications Commission, June 20, 2014”. Accessed March 1, 2017: <http://www.telecommission.tc/content/root/files/20140620101740-TCI-ICR-Review-Decision-final-June-18-2014.pdf>
- , 2020. “Telecommunications Decision 2020-2, Decision on the Third Review of Interconnection rates, October 13, 2020”. Accessed November 9, 2020: <http://www.telecommission.tc/content/root/files/20201013202350-TCI-3rd-ICR-Review-Decision-DN-2020-2-Final.pdf>
- Utilities Regulation and Competition Authority (The Bahamas). 2012. “Setting Regulated Interconnection Charges of Bahamas Telecommunications Company Limited (BTC) Going Forward, Statement of Results to Public Consultation and Final Decision, ECS 25/2012, 21 December 2012”. Accessed March 1, 2017: <http://www.urcabahamas.bs/consultations.php?cmd=view&article=127>
- , 2016. “Consultation on Proposed Changes to the Reference Access and Interconnection Offer Published by The Bahamas Telecommunications Company Ltd., Response to Public Consultation and Final Determination, ECS 19/2016, 8 August 2016”. Accessed March 1, 2017: <http://www.urcabahamas.bs/consultations.php?cmd=view&article=415>.
- , 2019. “Wholesale Fixed and Mobile Termination Rates for SMP Licensees”, Response to Public Consultation and Final Determination, ECS 74/2019, issued December 23, 2019. Accessed January 5, 2021: <https://www.urcabahamas.bs/wp-content/uploads/2020/01/URCA-Final-Determination-Termination-rates-3.pdf>