



OFFICE OF UTILITIES REGULATION

Interconnection in Telecommunications

A Consultative Document



OFFICE OF UTILITIES REGULATION

1999 March

CONTENTS

-----	1
COMMENTS FROM INTERE -----	2
EXECUTI -----	
OF THE OUR IN INTERC -----	10
INTRODUCTION -----	10
Interconnection -----	11
Role of the OUR -----	11
Interconnection Guidelines -----	12
TIMING OF THE PUBLICATION OF THIS DOCUMENT -----	13
STRUCTURE OF THIS DOCUMENT -----	14
CHAPTER 2: TYPES OF INTERCONNECTION -----	15
INTRODUCTION -----	15
Types of Interconnection -OUR -----	15
Customer Premises Equipment -----	
16	
Private Networks -----	18
Value-Added Services Providers -----	19
Interconnection between public network operators -----	20
CONCLUSION -----	23
CHAPTER 3: CONNECTION ISSUES -----	24
INTRODUCTION -----	24
Equipment Approval Process -----	24
Connection of Private to Public Networks -----	25
CONCLUSION -----	28

CHAPTER 4: PRINCIPLES OF INTERCONNECTION	29
INTRODUCTION	29
Basic Interconnection Framework	29
INTERCONNECTION PRINCIPLES	30
DOMINANT VERSUS NON-DOMINANT OPERATORS	31
CHAPTER 5: INTERCONNECTION SERVICES	35
INTRODUCTION	35
Value Added Service Providers (VASPs)	35
Public Network Operators	37
Dominant Fixed Network Operator	40
Dominant Mobile Operator	42
FACILITY SHARING	43
CONCLUSION	45
CHAPTER 6: INTERCONNECTION CHARGES FOR VALUE ADDED	46
INTRODUCTION	46
Retail Minus	46
Cost based charges	48
CONCLUSION	48
CHAPTER 7: INTERCONNECTION CHARGES FOR PUBLIC NETWORK OPERATORS	50
INTRODUCTION	50
Cost Orientation	50
OUR's Definition of Cost Orientation	54
Cost Measurement	57
Conclusion on cost measurement	61
INTERCONNECTION CIRCUITS AND ESTABLISHING INTERCONNECTION	62
FACILITY SHARING	63
CONCLUSION	63
CHAPTER 8: POSSIBLE INTERCONNECTION SURCHARGES	65
INTRODUCTION	65
Difference Between the Costs of Universal Service and Unbalanced Tariffs	65
Universal Service Funding	67
Access Deficit Charges	70
Conclusion on Access Deficit Charge	75
CONCLUSION	76
CHAPTER 9: ENSURING NON-DISCRIMINATION AND FAIR COMPETITION	78
INTRODUCTION	78

Accounting Separation	79
Imputation Tests	82
Confidentiality.....	
CONCLUSION	84
REFERENCE INTERCONNECTION OF R (RIO), NEGOTIATION AND DISPUTE RESOLUTION	
R INTERCONNECTION REFER (RIO)	85
Contents of a typical RIO	85
Negotiation	
Publication Requirement	
Settlement of Disputes	
CHAPTER 11: LIST OF	90
Annexes:	
ANNEX A:	NCE PAPER AND GOJ'S TELECOM
ANNEX B: COST STANDARDS	HODOLOGIES
ANNEX C: MARKET DEFINITION AND DOMINANCE	103
ANNEX D:	INTERNATIONAL COMPARISON OF INTERCONNECTION
ANNEX E:	R ACCESS DEFICIT CHARGES
ANNEX F:	TERMS
	123

Abstract

In November 1998 the Government of Jamaica (GOJ) tabled a new Telecommunications Policy before Parliament. This new framework recognized the Office of Utilities Regulation, OUR, as the independent regulatory agency for the telecommunications sector in Jamaica. It also set out those areas (value-added services, and wireless services) in which the GOJ will be introducing competition. The Policy specifically mandated the OUR to develop interconnection guidelines which will be used in commercial negotiations of the terms and conditions of interconnection contracts between entrants and the incumbent operator. The regulatory approach proposed by the OUR is in keeping with the regulatory commitments to the World Trade Organization (WTO) Basic Agreement on Trade in Telecommunication Services of which Jamaica is a signatory.

This Consultative Document reflects the OUR's initial views on a wide variety of issues pertaining to interconnection. It is a precursor to the interconnection guidelines, which will be produced following careful consideration of the responses received to this document (see the next page for details). Comments from all parties are invited.

Additional copies of this document may be downloaded from the OUR's Web site at <http://www.cwjamaica.com/~office.our>

COMMENTS FROM INTERESTED PARTIES

Persons who wish to express opinions on this Consultative Document are invited to submit their comments in writing to the OUR. Comments are invited on all aspects of the issues raised, but c questions identified. At various points in this document specific questions are set out on which the OUR is seeking the opinion of interested parties. These questions

Chapter 11. To ease the OUR's processing of the responses, respondents are requested as far as may wish to address other aspects of the document for which the OUR has prepared no response.

Responses to this Consultative Document should be sent by post, fax or e mail to:-

P.O.Box 593, 36 Trafalgar Road, Kingston 10

Fax: (876) 929-

E mail: fknbrown.our@cwjamaica.com

Any confidential information should be submitted
sepa
respondents are requested to limit as far as possible the use of confidentiality markings. Respondents are encouraged to supply their responses in electronic form, so posted on the OUR's Website (or a link included where the respondent wishes to post its response on its own website).

Comments on responses

The OUR's intention in issuing this Consultative Document is to stimulate public debate on the i

Document are a vital part of that public debate, and so as far as possible, should also be publicly available. The OUR considers that respondents should have an oppo
out the evidence and views put forward in other responses, with which they may disagree, and to comment on them. The comments may take the form of either correcting a factual error or

ponses are requested by 12 July 1999, ie four (4) weeks after the

Arrangements for viewing responses

To allow responses to be publicly available, the OUR will keep the responses that it receives on viewed by and copied for visitors to the OUR's Offices. Individuals who wish

to view the responses should make an appointment by contacting Granville Newell by one of the following means:-

Telephone: (876) 968 6053 (or 6057)

Fax: (876) 929 3635

E-mail: granewell.our@cwjamaica.com

The appointment will be confirmed by a member of the OUR's staff. At the pre-arranged time the individual should visit the OUR's offices at:

3rd Floor, PCJ Resource Centre, 36 Trafalgar Road, Kingston 10

The individual will be able to request photocopies of selected responses at a price, which just reflects the cost to the OUR.

Timetable

The timetable for the consultation is summarised in the table below which includes an indicative timing for the Guidelines.

Summary of the timetable for the consultation on interconnection

<i>Event</i>		

EXECUTIVE SUMMARY

Chapter 1: The role of the OUR in interconnection

- Interconnection enables the customers of one network to successfully complete calls to consumers or services connected to a separate network. This is known as the *any-to-any* principle of interconnection.
- Entrants will be competing with the incumbent for customers and market share. Simultaneously the incumbent will be supplying critical non-competitive interconnection services to entrants. An incumbent, therefore, has the incentive backed up by its dominance to delay access to its network and to suppress competition.
- For competition to be effective, entrants must not only be able to interconnect with existing networks but should be able to do so under terms and conditions that are fair, non-discriminatory, and transparent.
- In recognition of the above, the GOJ's Telecommunications Policy, which was tabled in Parliament (November of last year) by the Minister of Commerce and Technology, mandated the OUR to develop Guidelines to be used in negotiating interconnection arrangements between new entrants and the incumbent, and to have responsibility for dispute resolution.
- This Consultative Document, as with all of the OUR's Consultative Documents, is aimed at identifying the issues and to encourage public discourse on the matter. After the consultation period and after taking into account the responses received the OUR will issue the Guidelines. The Guidelines will set out the regulatory principles the OUR will adopt if called upon to resolve a dispute.

Chapter 2: Types of interconnection

- For regulatory purposes, the OUR has identified three types of (inter)connection. Type A deals with the connection of Customer Premises Equipment (PBXs, telephone handsets, fax machines, etc), and private networks to the public switched telephone network. Value-added service providers (VASPs) are categorised as type B. Type C covers carrier-to-carrier interconnection (ie public fixed and public mobile networks). Each type raises separate regulatory issues.
- The attachment of CPEs and private networks to the public switched telephone network does not involve the linking of networks to sell services to the general public. Neither does the issue of charging arise. For these reasons the attachment of CPEs and private networks are connection and not interconnection issues.
- VASPs sell a wide array of services such as internet services, data processing, pre-paid calling cards, and electronic mail to the general public. VASPs will also be competing with the incumbent in these markets. As VASPs do not operate their own switching and transmitting facilities, they must purchase these services from public network operators to deliver services to their customers.
- There are four types of interconnection between public network operators: fixed-fixed, mobile-fixed, fixed-mobile, and mobile-mobile. These involve interfaces with additional functionality (eg signaling) and higher bandwidth at the trunk side of operators' switches.

Chapter 3: Connection issues

- This chapter examines various options for dealing with two key regulatory issues pertaining to the connection of CPEs and private networks to the public network.
- The approach favoured by the OUR is to allow customers to connect equipment that has already been approved by the FCC, and the Canadian Department of Communications. Consideration may also be given to equipment approved by the European Union.
- The problem of "leaky PBXs" may arise, ie the use of a private network connected to the public network to bypass the international accounting rate system. The favoured option recognises that some bypass will take place but large bypass volumes should be detectable and appropriate action, such as disconnection, may be taken by network operators.

Chapter 4: Principles of interconnection

- All public network operators, dominant and non-dominant, and not just CWJ should have an obligation to interconnect, either physically or logically.
- Only dominant networks should be obligated to interconnect with VASPs.
- Interconnection should enable the following:-
 - i) consumers should be able to communicate with each other even if they are connected to separate networks (*any-to-any*);
 - ii) to ensure consistency in quality and allow the inter-working of networks, interconnection should be across interfaces of sufficient functionality (*end-to-end interoperability*);
 - iii) network operators with equal responsibility to interconnect should ensure that interconnection is carried out and in a swift and efficient manner (*equal responsibility*);
 - iv) request for interconnection should be satisfied unless the request is unreasonable, in which case there may be a dispute to be resolved by the OUR (*interconnection on request*); and
 - v) interconnection should be prompt and efficient and "invisible" to the consumer (*prompt, efficient and "invisible"*).
- Interconnection agreements involving dominant network operators should satisfy the regulatory principles set out in the WTO commitment and in the GOJ's Telecommunications Policy. The principles are: non-discrimination, fair terms and conditions, inclusion of relevant elements in interconnection charge, and transparency.

Chapter 5: Interconnection services

- The services purchased by VASPs are normal retail services such as calls and line rental, domestic and international leased circuits, or VSAT. VASPs add value to these services and then sell these services to consumers.
- With regard to public network operators, the services offered by a dominant fixed network

should be sufficiently unbundled so that entrants are not required to pay for network components or elements that they do not require. There are two ways of satisfying this unbundling requirement: (i) by offering unbundled network elements, and (ii) a menu of interconnection services such as local interconnect, single tandem, and double tandem. OUR's view is that either of these two approaches would be acceptable.

- The types of interconnection services to be offered by a dominant fixed network should include call termination and origination, transit services, international switching and transmission, and ancillary services such as emergency operator services, directory assistance, customer inquiries, etc.
- Mobile network operators should offer call termination services. Another interconnection service that might be provided is roaming. Roaming enables the customers of one mobile operator to make or receive calls using another mobile network.
- In order to avoid the un-necessary duplication of facilities or for environmental reasons the dominant fixed and dominant mobile network providers may be encouraged to share "bottleneck" facilities with entrants. The facilities that are normally shared include switch buildings and wireless masts.

Chapter 6: Interconnection charges for value-added service providers

- Since VASPs purchase normal retail services, one method for determining the charges for such services is retail minus discount. The level of the discount should reflect the cost saved by the incumbent for providing service to VASPs as opposed to end-users.
- Another approach is to base the charges directly on costs (network costs, a share of common costs, the retail costs incurred to supply VASPs, including a reasonable return on investment).
- OUR is of the view that either of the approaches would be acceptable as long as applied consistently and in a non-discriminatory manner.
- OUR recognises, however, that for the short term robust cost based interconnection charges for VASPs might not be possible in which case retail minus discount would be the natural option.

Chapter 7: Interconnection charges for public network operators

- Interconnection charges for public network operators should be cost oriented. There are various possible definitions including fully distributed cost (FDC), total service long run incremental cost (TSLRIC) and Stand-alone Cost (SAC); and Efficient Component Pricing Rule (ECPR).
- Charges based on FDC are derived from the accounting data of the operator and as such are influenced by the operator's accounting policies, the method of allocating common costs across the various services, and the approach to asset valuation adopted.
- The rationale for TSLRIC is that it is based on the most modern technology currently available and only takes account of those costs that are casually related to the service in question. It gives the minimum charge (price floor) for the service. SAC gives the cost that would be incurred if the operator were to provide a single service by itself. It therefore gives maximum price (price ceiling) for the service.

- Under the Efficient Component Pricing Rule (ECPR) interconnection charges include the TSLRIC plus the net revenue foregone by the incumbent by providing the interconnection service.
- The OUR's definition of cost orientation is based on interconnection charges lying between TSLRIC (floor) and SAC (ceiling). But in order to ensure that interconnection services do not share a disproportionate burden of common cost, OUR is suggesting that interconnection charges should be set no higher than TSLRIC plus an equal proportionate mark-up.
- At present OUR does not have in its possession any robust data on the costs incurred by CWJ to provide interconnection services, but recognises that it may be called upon to resolve disputes relating to interconnection charges.
- As a result of this limitation OUR is proposing that in the short-term benchmarks derived from cross-country comparison be used as the basis for interconnection charges, and in particular the EU Commission recommendations. There is evidence that these recommendations are reasonable for Jamaica.
- In the medium term the OUR proposes that fully distributed cost information be used. In the long term, however, charges should be determined using TSLRIC plus proportionate mark-up.

Chapter 8: Possible interconnection surcharges

- Two types of surcharge, universal service charge and access deficit charge, may be added to the basic interconnection charge.
- CWJ has the universal service obligation, ie it is required to provide basic telephone services to rural communities and low income users. This obligation imposes a cost (loss in profitability) on CWJ.
- OUR is of the view that the customers of all public network operators and VASPs should make a contribution to the funding of USO.
- To avoid exacerbating the already large pressures for tariff rebalancing, Access Deficit Charges might reasonably be added to the charge for termination or origination of international calls purchased by indirect access (long distance) operators.
- Before either surcharge could be implemented the onus would be on CWJ to robustly quantify the universal service cost and/or the access deficit. The size of each surcharge must be transparent and it must be implemented in a non-discriminatory manner.

Chapter 9: Ensuring non-discrimination and fair competition

- New entrants are dependent on the dominant incumbent for the supply of critical non-competitive services (interconnection). At the same time entrants will be competing with the incumbent in downstream markets for business. For these reasons safeguards are needed to ensure that the incumbent does not adopt discriminatory practices or anti-competitive behaviour.
- Distortion can take the form of discrimination, in which the incumbent charges its own competitive businesses a lower rate for network services than it charges competing suppliers.
- Another source of distortion is where the incumbent over-prices its monopoly services

(including interconnection services) while pricing its competitive services below cost. A cross subsidy is deemed to exist if the revenue derived from supplying a service is below the total service long run incremental cost of supplying the service. In this instance it would be more profitable for the firm not to provide the service.

- To provide the information to ensure non-discriminatory behaviour and fair competition the OUR would favour accounting separation.
- To avoid price squeeze by the incumbent imputation tests should be carried out. These tests will ensure that when the incumbent sets the prices for its retail and value-added services the charges for interconnection services it pays to itself are treated as real costs that need to be recovered.
- To facilitate interconnection the entrants may supply commercially sensitive information to the incumbent. There is a fear that the incumbent might be inclined to share this information with its retail business units that are in direct competition with entrants. The OUR is consulting on how best to prevent confidential information supplied by entrants from being used in an anti-competitive manner.

Chapter 10: Reference interconnection offer and negotiating process

- CWJ should produce for general circulation reference interconnection offers for both its fixed and mobile networks.
- Reference Interconnection Offers (RIOs) offer several benefits:-
 - i) they provide entrants with adequate information about the incumbent's networks so as to enable them to make informed business decisions;
 - ii) they assist in ensuring non-discriminatory behavior on the part of the incumbent; and
 - iii) they ensure that those wishing to purchase interconnection services are presented with a standard offer against which they may negotiate and do not have to start from scratch in negotiations.
- A RIO should cover the technical characteristics of the incumbent's fixed and mobile networks, description of the interconnection services to be provided, schedule of charges for interconnection services, arrangements for the establishment of interconnection, etc.
- CWJ is to consult with the OUR prior to the RIOs becoming effective for there to be checks to make sure that the minimum requirements are fulfilled.
- However, this process of consultation with the OUR would be "without prejudice" to subsequent changes being required, if the case for such changes is proven.
- Each RIO should specify the procedure for requesting interconnection services, confirmation of receipt of application for interconnection services, date and time for the commencement of negotiation, and timing for completion of negotiation.
- For the purposes of transparency all interconnection agreements ought to be submitted to the OUR within ten working days upon signing of the interconnection agreement. Any party may seek to keep out of the public domain information it considers to be a trade secret or commercially sensitive information.
- If the parties fail to conclude an agreement or where subsequent to the signing of an

agreement a dispute arises and the parties fail to resolve it, then either party may refer the matter to the OUR for resolution.

CHAPTER 1: THE ROLE OF THE OUR IN INTERCONNECTION

Introduction

- 1.1 During the last ten years the global telecommunications sector has undergone some major changes. Private sector involvement in the provision of telecom services is now at its highest level in the industry's history. Even more dramatic is the fact that markets that were once considered to be the sole purview of natural monopolies have been thrown open to competition. Technological development and the failure of state-owned telecom entities to satisfy the growing telecommunications needs of countries are the frequently cited reasons these changes. The general prognosis is that these trends will intensify during the coming decade and beyond.
- 1.2 In some countries regulators existed to protect consumers from abuse of monopoly position, but the advent of competition has led to an increase in the number of National Regulatory Agencies (NRAs). These organizations are charged with the responsibility of facilitating market entry by new players, to guard against anti-competitive practices of incumbent monopoly operators, and ensuring that the benefits of competition are passed on to consumers.
- 1.3 All over the globe the introduction of competition in telecommunications has brought tremendous benefits to both consumers and operators. Competition provides consumers with greater choice of service operators, wider variety of services, significantly improved service quality, and more cost reflective tariffs. For developing countries, added benefits include the attraction of badly needed investment, faster network deployment, and wider consumer coverage. In addition, incumbents and other operators are given incentives to make improvements in their efficiency and to exploit opportunities for growth and innovation.
- 1.4 Against this background the Government of Jamaica (GOJ) has proposed to make certain changes to the telecommunications sector. These changes are articulated in the GOJ's Telecommunications Policy which was tabled before Parliament in 1998 November.¹ It provided for, among other things:-
 - the introduction of competition in the provision of value added services, and wireless services; and the full liberalization of the market for Customer Premises Equipment (CPEs);
 - the establishment of an independent regulator for the sector;
 - modernization of the legal framework governing the sector; and
 - the fulfillment of binding commitments made by the GOJ to the World Trade Organization (WTO) Basic Agreement on Trade in Telecommunications Services .

¹ Copies of Government of Jamaica's 1998 Telecommunications Policy can be obtained from the Ministry of Commerce and Technology, 4th Floor, PCJ Building, 36 Trafalgar Road, Kingston.

Interconnection

- 1.5 Interconnection is a necessary condition for effective competition since it enables consumers of one network to be able to successfully complete a call to another consumer or service irrespective of whose network the originator of the call is using or to whose network the call recipient or service provider is connected to. This is referred to as the *any-to-any* principle of interconnection (see Chapter 3 for further details). An example of interconnection is the linking of Cable and Wireless Jamaica's (CWJ's) cellular and fixed line networks. The interconnection of these two networks allows a cellular customer to communicate not only with existing cellular subscribers but also with CWJ's fixed line telephone customers and vice-versa. If new entrants are only allowed to offer services to their own end-users they would find it extremely difficult, if not impossible, to attract customers. The necessary condition for effective competition is that entrants must not only have access to the incumbent's networks, but access must be on terms and conditions that are fair, non-discriminatory, and transparent.
- 1.6 New entrants will be dependent upon the incumbent's networks as they require essential non-competitive inputs from the incumbent telephone operator. In many instances charges for these non-competitive inputs constitute a substantial portion of the cost of providing the service. A frequently cited figure is that it is at least 40% of the new entrant's total service costs. At the same time, a new entrant will also be competing directly with the incumbent operator for customers and market share. Therefore, the incumbent usually regards the entrant as a threat to its business, and thus may have little incentive to allow efficient access to its facilities by the new entrant.
- 1.7 Interconnection, however, goes beyond competition issues and bears on questions of consumer interest and economic efficiency. For example, since September 1996 there is a lack of interconnection between Jamaica Digiport International (JDI), a network providing international services to users of the Montego Bay Free Zone, and CWJ's fixed and mobile networks. In spite of the fact that JDI and CWJ's networks are not in direct competition with each other, detriments still result from the absence of connectivity between them (ie the *any-to-any* does not currently exist in Jamaica).² Thus, customers of JDI are forced also to take service from CWJ to make domestic calls; and there is wasteful duplication of facilities since lines to these customers are provided by both JDI and CWJ.

Role of the OUR

- 1.8 The GOJ through its Telecommunications Policy has designated the Office of Utilities Regulation, OUR, as the independent utility watchdog agency to regulate all facets of

² In September 1991 the interconnection arrangement between CWJ and JDI came to an end and a new contract was not negotiated.

the telecommunications sector, including matters relating to pricing and interconnection.³ More specifically the Policy has mandated the OUR to "develop and make available guidelines which should be used in commercial negotiation of the terms and conditions of interconnection contracts between the entrant and the incumbent PTC" (Public Telephone Company). The OUR will also be required to resolve interconnection disputes, where commercial negotiations fail (see Annex A for the relevant extract from the GOJ's Telecommunications Policy). It is envisaged that the implementation of this policy framework will be backed-up by a new Telecommunications Act. Without such legislation the OUR would not have the legal authority to carry out these duties.

- 1.9 The position set out in the GOJ's Telecommunications Policy is that it will be left to operators to negotiate interconnection contracts by their own free will taking account of OUR's guidelines and the principles articulated therein. To set a framework for the commercial negotiation, the OUR considers that CWJ should issue two Reference Interconnection Offers (RIOs) for its fixed and mobile networks respectively. OUR will check these to make sure that they satisfy certain basic requirements (See Chapter 10). Thereafter, it should be publicly available to all interested parties including potential competitors. In case of dispute between the parties the matter should be referred to the OUR for resolution (see Chapter 10 for more detailed discussion).
- 1.10 In addition to the production of guidelines and the resolution of disputes, there are two further roles for the OUR. The regulator has a licence enforcement function, ie to check that operators' licence obligations are being fulfilled. The regulator should also have a reserve power to intervene on its own initiative if there is evidence that the consumer interest is being materially damaged, even if the operators are in agreement. The need for this could arise if a practice was adopted that the operators found mutually beneficial, but was against the public interest. For example, if two operators engaged in explicit or implicit collusive behaviour, such as by charging each other high prices for call termination in order to keep retail prices high when traffic between them was roughly balanced. Such instances are likely to be very much the exception, but a reserve power to intervene on behalf of consumers should be a feature of the long term regulatory arrangements. To carry out these two roles – licence enforcement and reserve power of intervention – all interconnection agreements should be lodged with the OUR, especially those involving a dominant network.

Q1.1 Is there need for the OUR to intervene even when there is agreement between the parties?

Interconnection Guidelines

³ Under the OUR Act, 1995, the OUR is to be the independent regulator for utility undertakings providing Telecommunication services, electricity, water and sewage, and public transportation (by road, rail, and ferry). But at present the OUR does not have statutory authority over the main utilities because of deficiencies in the Act.

- 1.11 This document sets out the OUR's initial thinking about the nature of the regulatory regime for interconnection. This is the initial phase to the publication of Interconnection Guidelines in accordance with GOJ's Telecommunications Policy.
- 1.12 Interconnection arrangements greatly affect all providers of telecoms services, and some of the issues are complex and quite different approaches could be adopted. Therefore, the OUR is actively seeking comments from interested parties to allow its own analysis to be tested and refined. After responses to this document have been received and fully considered by the OUR, the Guidelines will be issued.
- 1.13 The purpose of the Guidelines will be:-
- to explain the interconnection regime and in particular the regulatory framework; and
 - to indicate how the OUR would address various issues if it were required to resolve a dispute.
- 1.14 The Guidelines will set out the following:-
- contents of a typical Reference Interconnection Offer (RIO);
 - procedures for raising an issue with the OUR, such as a dispute to be resolved;
 - principles that the OUR will adopt in resolving disputes; and
 - in some cases proposals that are likely to be adopted unless fresh evidence is brought forward.

Timing of the Publication of this Document

- 1.15 There are two major factors that have influenced the timing of the publication of this document. First, GOJ's forthcoming new Telecommunications Act will define many key aspects of the context within which the regulation of interconnection will occur. For example, the types of competition that are to be introduced, the categories of licences to be issued, rights and obligations regarding interconnection to be contained in such licences, and principles concerning the availability and terms and conditions of interconnection. This would tend to suggest delaying the publication of this document until the new Act was passed. But second, the OUR needs to ensure that its Guidelines are available by the time that operators and service providers start to negotiate interconnection agreements. To allow proper time for consultation, this suggests early publication.
- 1.16 The OUR has decided to publish this Consultative Document in advance of the new Act in an attempt to ensure that new entry is not delayed by an absence of information about the regulator's approach to interconnection issues, whilst allowing adequate time for full consultation on critical and complex interconnection issues. In taking this decision, the OUR has also been influenced by the following considerations:-
- GOJ's Telecommunications Policy gives the OUR a specific duty to develop

- interconnection guidelines, and this document is the initial step in fulfilling that remit.
- Some aspects of the context within which regulation will take place were set out in GOJ's Telecommunications Policy, such as the identification of some high-level interconnection principles.
 - It is not expected that legislation would specifically address the majority of the detailed regulatory issues covered in this document.

1.17 But, since this document is being issued in advance of the new legislation, for the avoidance of doubt it is important to be clear that nothing contained herein should be taken as indicating the possible content of the new Act, which will be determined by GOJ and the Parliament. For example, the discussion of interconnection arrangements for various possible types of operator is without prejudice to the areas to be liberalised under the new Act.

Structure of this Document

- 1.18 The next Chapter discusses the possible types of interconnection, and makes the distinction between connection and interconnection. Connection issues are discussed in Chapter 3.
- 1.19 The remainder of the document deals with the interconnection of value-added service providers and public network operators:-
- framework of principles (Chapter 4);
 - the services involved (Chapter 5)
 - the charges (Chapters 6 & 7);
 - possible interconnection surcharges (Chapter 8);
 - safeguards to ensure non-discrimination and fair competition (Chapter 9);
 - reference interconnection offer (RIO), negotiation and dispute resolution procedure (Chapter 10)
- 1.20 A Summary of consultation questions is in Chapter 11. Annex F contains a glossary of terms used in the document.

CHAPTER 2: TYPES OF INTERCONNECTION

Introduction

2.1 In November 1998 the Ministry of Commerce and Technology tabled before Parliament GOJ's "Telecommunications Policy: A Framework". The new framework identifies three classes of interconnection (See Annex A for the relevant extract from GOJ's Telecommunications Policy). The left column of Table 2.1 summarizes each class, while Table 2.2 provides in greater detail a listing of the kinds of service and public networks associated with each class. This chapter discusses the taxonomy of "interconnection" and makes the distinction between connection and interconnection.

Table 2.1: Classification of Interconnection

<i>GOJ Policy</i>	<i>OUR Classification</i>
<p>Class 1: Customer Premises Equipment (CPEs) such as Private Branch Exchanges (PBXs), Fixed and Mobile Telephone Handsets.</p> <p>Private Networks</p> <p>Value Added or Enhanced Service Providers (VASP)</p>	<p>Type A: CPEs Private networks</p>
	<p>Type B: Value-added or Enhanced Service Providers</p>
<p>Class 2: Public Fixed Networks</p>	<p>Type C: Public Fixed Network Public Mobile Networks</p>
<p>Class 3: Public Mobile/Fixed Wireless & Satellites</p>	

Types of Interconnection - OUR

2.2 The OUR has reclassified the three (3) classes of interconnection set out in the GOJ's

Policy into three types, and this is depicted in the right column of Table 2.1. This reclassification recognizes that each of the three types involves different services and raises different charging issues. A summary of the similarities and differences between the different types is provided in Table 2.3.

- 2.3 Type A of the OUR's classification of interconnection addresses the connection of Customer Premises Equipment (CPEs), and private networks to the public switched telephone network (PSTN). Private network and CPE do not involve the interconnection of networks to sell services to the general public. The WTO's Reference Paper on regulatory principles (see Annex A) defined interconnection as the "linking with suppliers providing public telecommunications transport networks or services in order to allow the users of one supplier to communicate with users of another supplier and to access services provided by another supplier, where specific commitments are undertaken." This WTO definition means that the term "interconnection" is only used when reference is made to the connectivity of public networks and VASPs to the PSTN. In light of this the attachment of CPEs and private networks is more appropriately described as connection rather than interconnection. The connection of CPEs and private networks to the PSTN are discussed separately.

Table 2.2: Examples of Equipment/Service/Network

<i>CPEs</i>	<i>Private Networks</i>	<i>Value-added or Enhanced Services</i>	<i>Public Fixed Networks</i>	<i>Public Mobile Networks</i>
Telephone handsets; Fax Machines; PBXs; Caller ID; Modems; Answering Machines	Satellite Segments (e.g. INTELSAT); Very Small Aperture Terminal (VSAT); Leased Wireless Circuits; Leased Wire Circuits	Internet Service Provision; Prepaid Calling Cards; Voice Mail; Answering Service	Fixed Network in Free Zone(s) eg. JDI; Wireless in the Local Loop (WLL); Long Distance Fibre Networks	Cellular; Personal Communication System (PCS); Global Mobile Personal Communication by Satellite (GMPCS)

Customer Premises Equipment, CPEs - type A

- 2.4 Table 2.2 gives some examples of various CPEs that may be connected to the PSTN. It includes instruments such as telephone handset, fax machines and Private Branch Exchanges (PBXs). The connection of these instruments to the NTP would not require CWJ to provide any new services to its customers, merely the right to connect and so

the issue of charging for connection of CPEs to the network should not arise. To use services across the network customers pay the operator of the PSTN for normal retail services.

- 2.5 GOJ has indicated that it will be opening up the market for CPEs to competition. This is one of the commitments made by GOJ to the WTO. Competition already exists in some types of CPE, such as telephone handsets and fax machines. But, there is currently no competition in the supply of PBXs for connection to the PSTN.

Table 2.3: Summary of Types of Interconnection/Connection

<i>Type</i>		<i>Equipment Connected</i>	<i>Where connected to PSTN</i>	<i>Publicly available service or closed group</i>	<i>Additional Functionality</i>	<i>Bandwidth of connection</i>
A	CPE	CPEs	NTP	Closed Group	None	Normal voice channel
	Private Network	PBXs	Usually NTP	Closed Group	None	Normal voice channel
B	Value-added Service Provider	Leased Lines & VSAT	NTP & possibly elsewhere	Public	None ?	Usually voice channel
C	Public Fixed Networks	Switch	POI to trunk side of switch	Public	Signaling, interconnect billing, etc	Higher bandwidth (more bits per second)
	Public Mobile or Satellite Networks	Switch	POI to trunk side of switch	Public	Signaling, interconnect billing, etc	Higher bandwidth (more bits per second)

- 2.6 CWJ has applied restrictions on its customers' free choice of CPE to be connected at the

NTP. Based on a 1994 agreement between CWJ and the Fair Trading Commission (FTC) fourteen (14) types of CPEs were approved for connection. CWJ's customers could purchase these instruments from whatever source and connect them to the NTP without seeking prior written approval from the company. However, the agreement

stipulates certain preconditions for connection:-

- connection of CPE should be carried out by CWJ's technical officers or by qualified contractors;
- at the point where CPE interfaces with CWJ's network, CWJ may install or require the installation of a network termination testing apparatus at the customer's expense to ascertain the quality of the connection;
- CPEs should satisfy the quality standards and criteria established by the US Federal Communication Commission (FCC) and the Canadian Department of Communication; and
- CWJ's own quality and technical standards prescribed from time to time.

2.7 Absent from the list in the agreement between CWJ and FTC was Private Branch Exchange (PBX). PBXs are switches installed on the customer's premises. They enable calls to be connected to particular telephone extensions within an organization and support other uses such as voice mail. The current practice of CWJ precludes any other supplier of the product and so may have facilitated monopoly pricing of PBXs. In addition, PBXs supplied by CWJ must not simultaneously be used for lines connected to CWJ's network and lines connected to private networks. The rationale advanced for this practice is to prevent the bypass of CWJ's external telecommunications network. Some possible approaches to this issue are addressed in Chapter 3.

2.8 A consequence of CWJ's PBX policy is that the incumbent is dictating to customers beyond the Network Termination Point (NTP). In well developed telecoms markets it is generally accepted that the network ends at the NTP. As long as the CPE does not impose damage on the network, users should be free to connect whatever equipment they wish, obtained from whatever equipment supplier they so wish.

2.9 The liberalization of the market for CPEs will enable consumers to choose between the incumbent and other suppliers. However, such connections must be consistent with the need to protect the integrity of the incumbent's network quality and viability. Given this concern an approval process for CPEs connected to CWJ's networks and other PTOs may be needed as discussed in Chapter 3.

Private Networks -type A

2.10 A private network is a network typically comprising leased circuits which is often used to provide telecom services within an organization that has offices at separate locations, possibly in different countries or in different parts of the same country, but is not used for the supply of services to the public.

2.11 In Jamaica, some private companies, government, and nonprofit organizations use private networks to connect to different locations. This connection of locations is usually done using dedicated leased lines. The local light and power provider, Jamaica Public Service (JPS) and the National Water Commission (NWC) are examples of institutions with private networks. These and other operators of private networks would like to

connect to the PSTN so as to reach, or be reached by, telephones connected to the PSTN. Private networks could be attached to the PSTN via PBXs but as mentioned above CWJ does not permit this.

- 2.12 The two most widely used types of circuit in private networks are leased lines from CWJ, and Very Small Aperture Terminal (VSAT) circuits. VSATs are satellites receiving dishes that are less than two meters in diameter. VSATs are very popular among organizations with branches scattered across geographically dispersed locations. In recent years VSATs have increasingly become the preferred choice over terrestrial alternatives such as Integrated Services Digital Network (ISDN) and frame relay (see Glossary) due to:-
- fast access speeds and high bandwidth;
 - dynamic bandwidth application which enables VSAT bandwidth to be upgraded very quickly without having to make changes to hardware; and
 - small size enables easy deployment, thereby significantly bringing down the cost of installation and expansion.
- 2.13 CWJ considers that VSATs should not be connected to its network unless the VSAT services have been obtained from CWJ. The GOJ and CWJ currently have a court case about the Minister's right to issue VSAT licences.
- 2.14 The inability of private network operators to connect their PBXs to the PSTN has proven to be extremely costly and inefficient. As a case in point both JPS and NWC who operate their own private network, are forced to have two PBXs and two telephone handsets on their employees' desks if they wish to access their respective networks and the PSTN, ie CWJ's networks.
- 2.15 Type A presents two major regulatory issues for the OUR. The first has to do with the possibility of damage to the PSTN if faulty instruments (CPEs) are connected to the PSTN. The second has to do with the subject of "leaky PBX" or bypassing of the international settlement rate system. These issues will be explored in further detail in Chapter 3.

Value-Added Services Providers -type B

- 2.16 For the purpose of this document VASPs are sellers of telecommunication services by which suppliers add value to the customer's information by enhancing its form or content or by providing for its storage and retrieval. For example, electronic mail, internet provision, data processing, or access to data bases. In order to provide services and/or reach a large number of customers, VASPs must normally interconnect with a PTO. They usually connect to the network termination point. But the connection of VASPs is different from the connection of CPE and private networks in the sense that VASPs sell services to the public (see Table 2.3).
- 2.17 VASPs go beyond mere connection to the incumbent's network. Unlike CPEs and

private networks, VASPs interconnect with the PSTN and sell services to the public. However, VASPs do not operate their own telecommunications switching and transmission networks. Instead these services are purchased from providers of public networks. The types of services that are normally purchased by VASPs from public network operators are further discussed in Chapter 5.

- 2.18 Internet Service Providers (ISPs) are very good examples of this class of connection. These providers have private networks, comprising their own equipment (such as servers and modems) and an international leased circuit (rented from CWJ or VSAT connections arranged independent of CWJ), which links into the internet. They are connected to CWJ's network (the PSTN) by way of either dedicated leased lines or normal telephones line.

Interconnection between public network operators -type C

- 2.19 Type C represents carrier-to-carrier interconnection. Regulatory issues relating to this type include the level and structure of interconnection charges as well as the terms and conditions under which new entrants gain access to the incumbent's networks. Consideration must also be given to the most appropriate framework and mechanisms for regulating these matters.
- 2.20 Carrier-to-carrier interconnection is broken down into two distinct categories. The first covers interconnection of public fixed networks such as CWJ's fixed network, JDI's fixed network, and new entrants with long distance fibre optic networks or wireless local loop networks. Wireless technology offering service to a fixed location (fixed wireless), ie Wireless in the Local Loop (WLL), may make it feasible to provide service to locations where traditional copper local loops are not currently available.
- 2.21 The second category covers public mobile or satellite networks such as cellular, Personal Communication System (PCS) and Global Mobile Personal Communication by Satellite (GMPCS).
- 2.22 Analogue cellular is the first generation of wireless communication service in which the transmission of voice and data is done by way of the radio spectrum (frequencies). The entire service area is divided into cells each served by its own transmitter. Each cell is connected to a mobile switching exchange which in turn is connected to the mobile telephone network. Services may be offered to subscribers on a fixed, mobile or a combination of fixed and mobile. PCS is a subset of the second generation of digital wireless mobile services, that also includes digital cellular. These services represent a new family of advanced digital micro-cellular wireless service for mobile telephone handsets, a significantly improved version of the traditional analogue cellular service. It allows a wider variety of voice and data services and improved service quality. On the basis of services offered and prices digital cellular and PCS are close substitutes. Both cellular and PCS systems can generally be implemented more quickly than fixed lines and can also be cheaper to install since there is no need to lay wire underground or to string lines on overhead poles (although usage is apparently more expensive). For these

reasons these technologies are relevant in enhancing access for economically marginal segments of the population.

- 2.23 Global Mobile Personal Communication by Satellite (GMPCS) covers a wide array of non-geostationary satellite systems being developed to facilitate global communications coverage. The basic element of the GMPCS technology is a constellation of comparatively small satellites orbiting close to the earth. GMPCS will allow users to make and receive calls using mobile handsets from anywhere in the world. It was initially designed to serve international travellers including businessmen and consultants. It is also capable of providing other types of service including data, voicemail, voice paging, and fax. Another attraction of GMPCS is that it has the potential to help reach remote and isolated communities. The GMPCS operators are also putting in place agreements so that the same handsets may also be used to place calls on the domestic (terrestrial) wireless networks. Two companies that are at the forefront of the development of GMPCS are GlobalStar and Iridium. The latter has already launched service while the former is slated to commence launching sometime this year. Neither has yet been licensed to offer service in Jamaica.
- 2.24 Type C covers the entry of fixed and mobile network operators in direct competition with the incumbent PTO or offering service to previously unserved customers. It involves the interconnection of both local and long-distance new carrier's networks to the incumbent's network, thereby forming an extended PSTN. Essentially a single network of networks operated by multiple organizations.
- 2.25 Type C therefore represents interconnection as that term is most commonly used worldwide. For example, the European Union Interconnection Directive defines interconnection as "the physical and logical linking of the telecommunications networks used by the same or a different organization in order to allow the users of one organization to communicate with users of the same or another organization, or to access service provided by another organization. Services may be provided by the parties involved or other parties who have access to the network."⁴
- 2.26 The difference between physical and logical interconnection is highlighted using Figure The broken lines represent logical interconnection, while the unbroken ones represent physical interconnection. CWJ's fixed network is physically interconnected with its mobile network. A new entrant that interconnects with CWJ fixed network might not physically interconnect with CWJ's mobile network. If both the new entrant mobile network and CWJ's mobile network were already both interconnected to CWJ's fixed network, there would therefore be a logical interconnection between the two mobile networks. Each would have physical links with the CWJ fixed network, which could be used as a transit network.

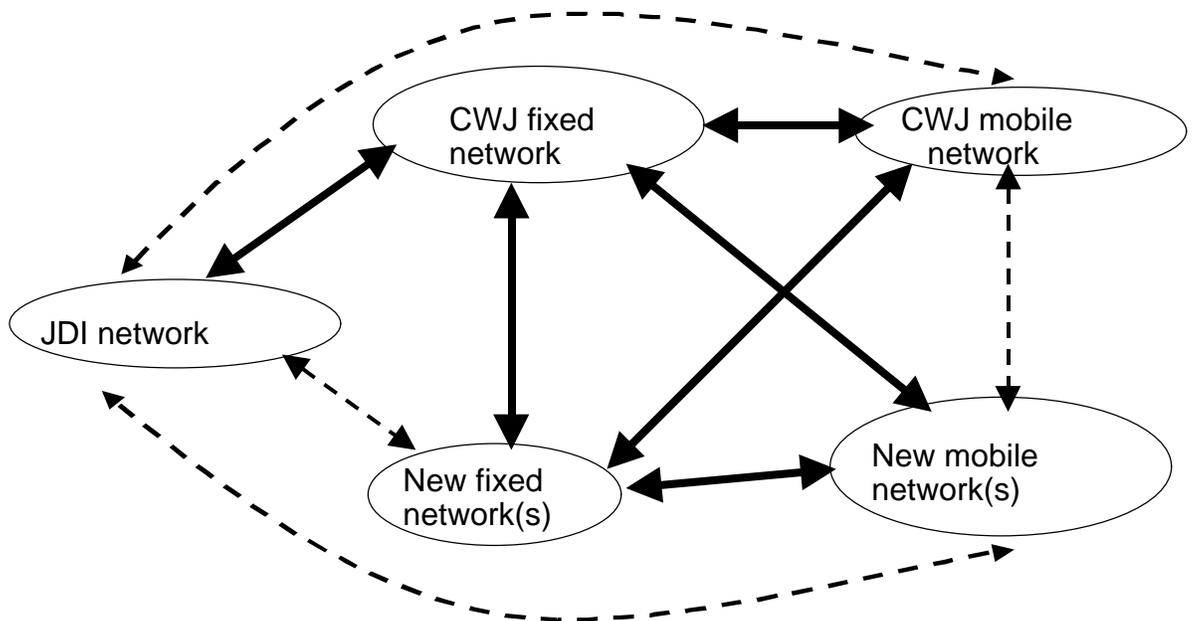
⁴ See Article 2(1)(a) of European Commission on Interconnection in Telecommunications. The document may be downloaded from Web site <http://www.ispo.be/infosoc/telecompolicy/en/main.en.html>.

2.27 Another case in point is the JDI network. If this network was already interconnected with CWJ's fixed network, logical interconnection could occur to all other networks interconnected with CWJ's fixed network without the need for JDI to establish physical interconnection links to all of these networks.

Interconnection of public fixed networks to the incumbent's networks

2.28 This would include interconnection between CWJ fixed and mobile networks and new fixed networks. There should be established Points of Interconnection (POI) at locations other than network termination points, to allow traffic to be exchanged between the networks on the trunk side of switches. Much more functionality than for a normal end-user is required in order to allow end-to-end interoperability of services, such as signaling.

Figure 2.1: Illustration of Physical and Logical interconnection links



2.29 Another example of the interconnection of public networks to the incumbent's network is the connectivity of JDI and CWJ networks. JDI provides international telephone services to businesses located inside of the Montego Bay free zone. As mentioned in Chapter 1, CWJ and JDI networks are no longer interconnected in any way. Thus, to make local inter and intra-parish telephone calls, JDI customers inside the free zone must rent lines and buy calls from CWJ as well as JDI. Added to this is CWJ's refusal to allow PBXs to be connected to any other network in addition to CWJ. This means that the businesses are forced to provide each employee with a second handset to be able to make domestic calls involving CWJ. Interconnection of these networks would remove the need for this wasteful duplication of equipment and facilities.

Interconnection of Public Mobile and Satellite Networks to the Incumbent's Networks

- 2.30 This is another example of carrier-to-carrier interconnection. It involves the interconnection of public mobile networks (cellular, PCS, GMPCS) to the incumbent's fixed and mobile networks. It raises additional regulatory issues in addition to public fixed networks that derive from the demands that they make on the radio frequency spectrum and in the specific case of GMPCS from the trans-national nature of the networks and mobility of their end-users.
- 2.31 CWJ's fixed line and cellular networks are interconnected to each other. New entry by public network operators in the domestic cellular market will only be attractive if interconnection with both CWJ fixed line and cellular networks is permitted. Failure to interconnect with the incumbent provider would constitute an insuperable barrier to entry, since the new entrant would only be able to offer its subscribers the ability to make and receive calls from other subscribers on its own network, but not calls to or from any other telephone subscribers in Jamaica or the rest of the world.

Conclusion

- 2.32 This chapter examines the three classes of interconnection set out in GOJ's Policy and proposes a slight reclassification for regulatory purposes. It concludes that the attachment of CPEs and private networks to the public network is not an interconnection issue but rather connection. Value-added service providers (VASPs) raise additional issues, because they sell services to the public. Public network operators represent true carrier-to-carrier interconnection and so raise further regulatory questions discussed later in this document.

CHAPTER 3: CONNECTION ISSUES

Introduction

- 3.1 This Chapter explores possible solutions to two issues pertaining to type A - the connection of CPEs and private networks to the PSTN. In the first, the concern is that the connection of defective instruments to the PSTN may inflict damage to the network, thereby impacting negatively on service quality and network viability. In the case of private networks the critical issue is how best to deal with the bypass of the international settlement rate system caused by "leaky PBXs".

Equipment Approval Process

- 3.2 OUR recognizes the importance of preventing damage to the PSTN due to the attachment of faulty CPEs. But it is also important to ensure that consumers enjoy the freedom to select their own equipment supplier. At present CWJ sets conditions for CPEs attached to its network but without oversight by an independent unit. In most countries this arrangement is considered unacceptable since it can be used in an anti-competitive fashion. The experience has been that an incumbent vested with the power and responsibility to approve CPEs wields power to restrict and distort competition to the detriment of new entrants and consumers. For this reason OUR is of the view that the responsibility for CPE approval should not reside with CWJ. Instead, OUR is proposing that an alternate approval system that is impartial and transparent be established to oversee the certification of instruments attached to the PSTN.

Q3.1 Do respondents agree with the OUR's position that CWJ should not have responsibility for CPE approval?

- 3.3 Three options are available to regulate the types of equipment to be attached to the incumbent's network:-
- Certification;
 - Joint Industry Committee; and
 - International Standards
- 3.4 *Certification:* In this case an independent agency, for example the Jamaica Bureau of Standards (JBS), would be given the responsibility for equipment certification. This would be done with or without prior consultation with the OUR. JBS has responsibility for monitoring standard of local and imported goods and may well possess the necessary resources and skills for handling this additional workload.
- 3.5 *Joint industry committee:* This committee would comprise the incumbent, other telecom providers and potential suppliers of CPE to come up with a proposed list of CPE that consumers may attach to the PSTN. The list would then be forwarded to the regulator

for review and approval. If the committee was unable to arrive at a consensus, the OUR would intervene.

- 3.6 *International Standards:* This option recognizes that CWJ operates a modern network facility which is on par with countries like the United States, and Canada. Hence, CPEs approved by FCC (USA), and the Canadian Department of Communications (CDC) would be automatically approved for use in Jamaica. As a supplement there could be either an independent agency (eg JBS) or a joint industry committee to consider request for approval of the equipment already been approved by FCC, and CDC. In addition, following investigation of the compatibility of equipment approved for use in the European Union the same approach would apply. All PTOs would be required to make this list available to customers wishing to connect instruments to PSTN. At present CWJ allows a prescribed list of instruments that satisfy the quality standards established by the FCC, and Canadian Department of Communications to be connected to the PSTN without its prior approval. Therefore, this approach would basically be an extension of a system that is already in practice. Another benefit is that it would require less regulatory intervention. All PTOs including the incumbent would have to monitor their own networks for violation of the standards and take appropriate action against the offending party. This is the OUR's preferred approach.
- 3.7 Nevertheless, whatever approval mechanism for CPEs that is finally adopted, the OUR will still have responsibility for the resolution of disputes. If there is a dispute between an operator and one of its customers, the customer can lodge a complaint to the Customer Affairs Department of the OUR and the normal procedures adopted by the OUR for handling complaints will apply.

Q3.2 What approval mechanism should be adopted for CPEs?

Connection of Private to Public Networks

- 3.8 A further issue that would be of relevance to the incumbent and is also of concern to the OUR is the question of bypass. Bypass is the routing of international calls to avoid the international settlement rate system. As an example, consider a company which has an international leased circuit to the USA as part of its private network. It could bring a call into Jamaica from the USA over the leased circuit and present it to the public network as a domestic call via its PBX. In this case no settlement rate payment would be made to CWJ, the terminating international operator.
- 3.9 Settlement rates are a major source of revenue for CWJ. In 1996/97 revenues from incoming international calls accounted for 52% of total revenue. For outgoing international calls the figure was 20%. For every minute of outgoing call CWJ receives in return five (5) minutes of incoming calls. Hence, Jamaica is a large net recipient of settlement minutes. Settlement rates are substantially above cost. This allows CWJ to keep domestic line rental and intra-parish call prices low with the surplus generated by

the settlement rate system.⁵

- 3.10 In Jamaica bypass is not permitted and this is set out in GOJ's commitments to the WTO. Notwithstanding this, however, OUR recognizes that bypass may actually take place when private and public networks are connected to the same PBX. The question is how best to deal with this problem.
- 3.11 One solution is to impose a penalty payment on private network operators who bypass the international settlement rate system. The public network operator could make this a condition of service and monitor the network for breach of terms and conditions of service. The level of the fine need not be conditional on the magnitude of the bypass. However, the OUR is not in favour of the operator imposing penalties on customers.
- 3.12 Another solution is to impose a "leaky PBX" surcharge on all PBXs connected to the PSTN. The intention is to make the level of the surcharge a function of the magnitude of the expected total bypass occurring. The rationale is to offset the negative effect of bypass on the operator's settlement profitability, and it may include an amount for universal service obligations. Administering such a scheme is a very complex exercise due to the large number of private network nodes. For this reason it has not found favour in most countries.
- 3.13 Even if bypass takes place, the real issue is whether the cost of not allowing connection of private networks to public networks justifies the benefits. The response to this is really a function of the magnitude of the bypass. If only a small amount of bypass is occurring then the benefits of allowing connection of PBXs to both private and public networks are likely to outweigh the costs of not allowing connection.
- 3.14 On the other hand, where the bypass is substantial, this might present a heavy loss in settlement revenues to CWJ. Given the need to generate its required return on equity of 17.5-20% the incumbent might be forced to raise domestic tariffs to make up for the loss, thereby, imposing an additional cost on other end-users. This arises because of the dependence of CWJ's profitability on revenues from the termination of incoming international calls. There are other potentially powerful developments that are likely to change this position, in particular substantial reductions in settlement rates arising from pressure applied by the Federal Communications Commission (FCC) and/or the International Telecommunications Union (ITU). In response to these developments, some rebalancing of tariffs is likely to be required to make prices more cost reflective (See *Rebalancing Telephone Prices*, November 1998 for a detailed discussion of these issues). With lower settlement rates and tariffs that are more rebalanced (less unbalanced), the problem of "leaky PBXs" does not go away, but the magnitude of the incentive to engage in bypass and the effect of bypass on CWJ's profit both reduce.

⁵ For a comprehensive discussion see OUR's Consultative Document *Rebalancing Telephone Prices*, November 1998. Copies can be obtained from OUR's library or its Web site at www.cwjamaica.com/~office.our/consult.htm.

3.15 Where bypass is occurring on a large scale it is likely that CWJ will be able to detect it for two reasons. First, large bypass would tend to involve sale to third parties and so typically advertising and marketing (which may occur in Jamaica and/or the countries at the far end of the international routes). Such public activity can be used to identify the existence of bypass and the identity of the bypasser. Second, by monitoring traffic flows, bypass volumes may be detected. For example, a decline in CWJ's incoming international call volume matched by an increase in traffic from a particular customer with an international leased circuit. Furthermore, the incentive to engage in bypass will decline as settlement rates fall.

Q3.3 *What regulatory approach should OUR adopt in dealing with the issue of "leaky PBXs"?*

3.16 Issues arise about the extent of investigatory rights that CWJ should have, the burden of proof required to justify disconnection, and the role of the regulator in such enforcement action. The first two issues are related, in that the greater the rights that CWJ has, eg to inspect equipment attached to its network and other equipment (even if not supplied by CWJ), the easier it would be for CWJ to gather more convincing evidence that bypass of the settlement rate system was occurring. Conversely, if limits are set on CWJ's rights, eg following the principle that the network ends at the NTP, there would be a case for a lower burden of proof before disconnection might be justified.

Q3.4 *What balance should be struck between CWJ's investigation rights and the burden of proof required for enforcement action, such as disconnection, to prevent bypass of settlement rates?*

3.17 As regards the role of the regulator, the OUR proposes a distinction between two types of case. One where the alleged bypasser also operates a legitimate business that is in competition to CWJ in addition to the alleged bypass activity, and where disconnection of the latter would also involve cessation of the former. For example, an allegation that an internet service provider was also bringing in voice calls bypassing the settlement rate system over its private network. In such cases there may be a concern about the incentives of CWJ, because of the possible effect that disconnection would have in removing a competitor. The involvement of the regulator may be appropriate in these circumstances, prior to enforcement action, to ensure that the evidence that bypass is occurring is sufficiently strong.

3.18 The other type of case would be where the alleged bypasser does not have a legitimate competing business and so concern about anti-competitive intent by CWJ would not be present. In such cases the OUR does not consider that it should be involved prior to enforcement action – in the first instance, it should be a matter for the network operator to resolve with its customer. However, customers who believed that they had been unfairly treated and had received no satisfactory response from the operator would be able to make a complaint to this effect to the OUR.

Q3.5 *What role should the OUR play in the process of identifying and taking action against those allegedly engaged in bypass of the settlement rate system via "leaky PBXs"?*

Conclusion

- 3.19 OUR is of the view that the responsibility for CPE approval should rest outside of the control of the incumbent. An alternate approach would be to adopt international standards. In this regard instruments approved by the FCC, CDC, and the European Union for connection to the PSTN would automatically be approved for use in Jamaica. This is the OUR's preferred approach. However, considerations may be given to entrusting that responsibility to a committee consisting of all telecom providers and suppliers of CPEs or a public sector organization such as Jamaica Bureau of Standards or OUR.
- 3.20 Customers should be permitted to connect their PBXs to both public and private networks simultaneously if they wish, but should not engage in bypass of the settlement rate system. Action should be taken to limit the extent of "leaky PBXs".

CHAPTER 4: PRINCIPLES OF INTERCONNECTION

Introduction

4.1 The basic objective of interconnection is to satisfy the *any-to-any* principle of interconnection. *Any-to-any* means that consumers or service providers on any public network should be able to access any consumer or public service provided on any other public network. The implication of this requirement is that it should not matter which network the consumer is on, or which network the service provider is on. This chapter discusses the principles that should govern interconnection arrangements between public network operators.

Objectives of Interconnection

4.2 As a precursor to developing a regulatory framework for interconnection guidelines the OUR has set out below what it considers should be the primary economic and social goals of interconnection:-

- the widest range of telecommunication services should be available to the population at reasonable cost;
- telecommunication services should be provided in the most economically efficient manner;
- the benefits of liberalization are distributed as quickly as possible and to the largest section of the community as possible, with telecom users able to access the full range of services on the market not just offered by the incumbent from which they rent their exchange line connection;
- wasteful and uneconomic duplication of network facilities - should be minimized;
- conditions for attracting investment should be central so as to stimulate infrastructure growth and innovation; and
- conditions for fair competition among the incumbent dominant operator and new entrant should exist.

Q4.1 In developing a regulatory framework for interconnection, what should be the objectives of the OUR?

Basic Interconnection Framework

4.3 Interconnection should occur across interfaces of sufficient functionality to ensure that services can be provided to consumers even where the service provider and the customer are on different networks. Consumers generally do not care which or how many networks are involved in completing a call and should not have to. That is interconnection should occur seamlessly and without loss of quality to the consumer. For this reason, in the OUR's view, the obligation to interconnect should go beyond CWJ and apply to all public networks, including new networks. This requirement is not likely to place an undue burden on new entrants as they would like to interconnect with existing

networks anyway. All public network operators should interconnect with each other either physically or logically.

- 4.4 In the OUR's view, VASPs should have no general right to interconnect with all network operators, but should have a right to interconnect with dominant public network operators (See the discussion of dominance in Annex C). Non-dominant operators should be free to choose whether or not and on what terms they wish to sell services to VASPs, since in the absence of market power they lack the ability to distort competition.

Interconnection Principles

- 4.5 Set out below are what the OUR considers to be the general underlying principles regarding the nature and purpose of interconnection. These principles would be relevant in determining the appropriate regulatory action, if the OUR were required to resolve a dispute.

Any-to-any: Refers to the ability of users of separate networks to communicate with each other. It recognizes that the value attached to a network by end-users is strongly correlated with the number of other customers that a particular network allows its customers to reach. This is the reason for all public network operators to be interconnected to each other. If small networks could only offer services to their own end-users they would find it difficult to attract new users, regardless of their efficiency. At present any-to-any interconnection does not exist in Jamaica.

End-to-end Interoperability: Interconnection should be across interfaces of sufficient functionality to ensure that high quality services can be provided to consumers even where the call recipient or service provider and the calling customer are on different networks.

Equal Responsibility: Where two or more networks are required by their licences to interconnect with each other, then both have equal responsibility to ensure that the two networks are interconnected swiftly and efficiently.

Interconnection on request: Any public network operator has the right to request interconnection from another public network operator at locations and in such manner as considered reasonably necessary by the requesting party. The party of which the request is made is compelled to facilitate the request, unless there is a dispute as to the reasonableness of the request, in which case the matter may be referred to the OUR for deliberation and resolution.

Prompt, efficient and "invisible" interconnection: Interconnection should be performed promptly and efficiently and the interconnection process should, as far as possible, be "invisible" to the end customer.

Fair, efficient and non-discriminatory charges: As discussed later in this Chapter,

charges should promote economic efficiency, be cost oriented and not unduly discriminatory.

Flow of interconnect payments: The direction of flow of payments should follow the retail tariff arrangements. For example, consider a call from network A to network B. Under 'calling party pays' (ie the price of the call is paid by the caller) as for say intra and inter-Parish calls, A collects the retail revenue and pays B an interconnection charge for call termination. Under 'called party pays' (ie the price is paid by the call recipient), as for say toll-free calls, B collects the retail revenue and pays A an interconnection charge for call origination. Where both caller and call recipient pay, as currently for some calls from the fixed network to cellular, both A and B would collect retail revenue and would be expected to recover their costs, so that there would be no interconnection payments from A to B or vice versa.

Dominant versus Non-dominant Operators

- 4.6 In the first instance, interconnection agreements are to be commercially negotiated between the parties. In the case of public network operators, this will be in the context of both having rights and obligations to interconnect with each other. The OUR would generally become involved only if commercial negotiations fail and the parties cannot agree. In such circumstances, there would be a dispute to be resolved by the OUR. In some cases no dispute would arise and so the OUR would not become involved.
- 4.7 However, experience throughout the world has demonstrated that where one party to the interconnection agreement is dominant, failure to agree is very common. It might be that the parties could agree on some aspects, such as for example technical standards, but aspects on which there is a fundamental difference of interest between the parties, such as interconnection charges, are very likely to give rise to disputes. A dominant operator is able to a large degree to enforce pricing and other business decisions independent of the wishes or demands of competitors and customers.
- 4.8 The distinction between dominant and non-dominant operators is therefore an important one, and different regulatory arrangements will be required for interconnection with dominant networks. The public networks currently dominant in Jamaica are: CWJ's public fixed network, and CWJ's public mobile network (market definition and dominance are discussed further in Annex C).
- 4.9 Generally, the terms and conditions of interconnection with non-dominant operators will require little or no regulatory intervention. Since such operators do not possess market power, unreasonable terms and conditions would result in lost of business and so they are unable to distort competition (in the absence of collusion). Therefore, the remainder of this chapter and indeed this document addresses the regulation of interconnection with dominant networks.
- 4.10 OUR's objective is to create a level playing field for all players participating in the sector.

In order to inhibit discriminatory behavior and promote fair competition the OUR sets out below the general pro-competitive principles to be adopted during interconnection negotiations. These pro-competitive principles are consistent with the WTO Reference Paper on regulatory framework for competition in telecommunications, and were further emphasized by GOJ in its Telecommunications Policy.

- (a) Non-discrimination** (see Chapter 9 for more detailed discussions): The ability of a new entrant to interconnect on a non-discriminatory basis with CWJ is essential to the fostering of a truly competitive market in the telecommunication sector. This means, for example, that an entrant in say the cellular segment of the market can interconnect with CWJ's fixed line network at price and quality standards similar to that provided by CWJ for interconnecting its own cellular network to the fixed line network. In the absence of non-discriminatory interconnection policies, an incumbent could stifle competition by charging entrants a higher price for interconnection than it charges itself for the same services. This could render the entrant uncompetitive in terms of prices and would severely undermine its long-term expansion prospects and its development as a viable participant in the marketplace.
- (i) *Same price for same service*: Charges by the incumbent for interconnection should be non-discriminatory. The level of the interconnection charge to be paid by an entrant must be the same as the transfer charges to its own downstream businesses for comparable interconnection services. For example, it would be discriminatory for CWJ to charge its own retail business a lower interconnection charge than that it charges to an entrant. Such discriminatory behavior would likely be considered anti-competitive. A dominant network should also not discriminate between two new entrants, since this could distort competition.
- (ii) *No unfair subsidies*: The incumbent provider by virtue of its vertically integrated structure and dominant networks is capable of engaging in anti-competitive cross-subsidization. It could lower prices in the markets in which it faced competition and try to recover losses by raising the prices in markets where it did not face competitors, including raising interconnection charges. For services provided by the incumbent subject to competition, there will need to be safeguards to protect against anti-competitive behavior.
- (iii) *Volume discounts*: The incumbent should not offer volume discounts as this would unduly favour its retail or value added arms, which are likely to be the largest purchaser of interconnection from the incumbent.
- (b) Fair Terms and Conditions**: Technical specifications for interconnection should be reasonable and available publicly including to potential investors. Interconnection charges should be cost oriented. Services should be available at appropriate points of interconnection and should be unbundled to make sure that the entrant is not required to pay for components or facilities that it does not

require.

- (i) *Reasonableness*: CWJ should not be allowed to stipulate to new entrants excessively stringent and costly technical standards and specifications. Failure to guard against unreasonable specifications by the incumbent may lead to the stipulation of standards that are punitive and thwart market entry.
- (ii) *Cost Oriented* (see Chapters 6 & 7): Charges for interconnection, apart from possible surcharges, should be based upon costs directly caused by those elements of the network used by the entrant (see item c below). More specifically they should only consist of relevant network costs (which require the exclusion of retail costs, and the costs of providing exchange lines to retail customers), a share of common cost and a return on capital employed. For example, Fully Distributed Cost (FDC) and Long Run Incremental Cost (LRIC) could be consistent with the principle of cost orientation on the condition that only relevant costs were included. Cost oriented charges provide appropriate signals to inform build/buy decisions - whether or not the entrant should build out its network further and so reduce the amount of interconnection it needs to buy from the incumbent.
- (iii) *Point of Interconnection (POI)*: The physical link with the incumbent's network should be accommodated at any point of the network which is technically feasible. This means locations where traffic is switched such as local switches, tandem switches, and international switches. The incumbent should make available to all interested parties network information such as types and location of switching equipment, specification of interfaces and so forth. Without adequate information the new entrant would not be able to plan its own network development and operations effectively.
- (iv) *Unbundled*: The definition of the interconnection services (see Chapter 5) should ensure that the new entrant is not required to purchase more services than are required for the purpose of interconnecting with the incumbent provider. A new entrant should also be able to request new interconnection services. But unbundling would not be required either where not technically feasible or excessively costly.
- (c) **Inclusion of Relevant Elements in Interconnection Charge** (see Chapter 8 for further details): Added to the cost of interconnection could be contributions to the funding of the cost of universal service obligations of the incumbent and requirements to provide free access to the emergency services, and constraints on the rebalancing of tariffs.

CWJ has the universal service obligation. Hence, it has responsibility for serving all customers and areas, including those that are unprofitable. The incumbent may incur a cost (reduction in profitability) from so doing - at present this universal

service cost is recovered from CWJ's other profitable customers. It would seem logical that the customers of all operators should contribute towards the costs of universal service.

CWJ's tariffs are unbalanced, that is the price of some services are set below cost (eg line rental), whilst others are above cost (eg international calls). Profits earned by CWJ on certain calls may therefore fund losses on other services. The question arises whether new entrants competing with CWJ in the provision of such calls should make similar contributions.

- (d) Transparency:** A dominant network should develop and publish a Reference Interconnection Offer (RIO), indicating for example a standard contract and a list of standard services with standard charges (this is discussed further in Chapter 10). Hence, a new entrant would not have to start from scratch when it wants to negotiate an interconnection agreement with the incumbent. In addition, all interconnect agreements with the incumbent should be published or at least submitted to the Regulator, but agreements does not require the OUR's approval before coming into effect.

The transparency principle also requires that CWJ justify that its charges are fairly derived by making available the relevant cost information. Best practice is that regulatory accounts be produced with the relevant information and that these accounts should be externally audited to tight audit standards and reconciled to statutory annual accounts to give confidence.

Q4.2 What principles should apply to interconnection agreements between entrant and incumbent?

CHAPTER 5: INTERCONNECTION SERVICES

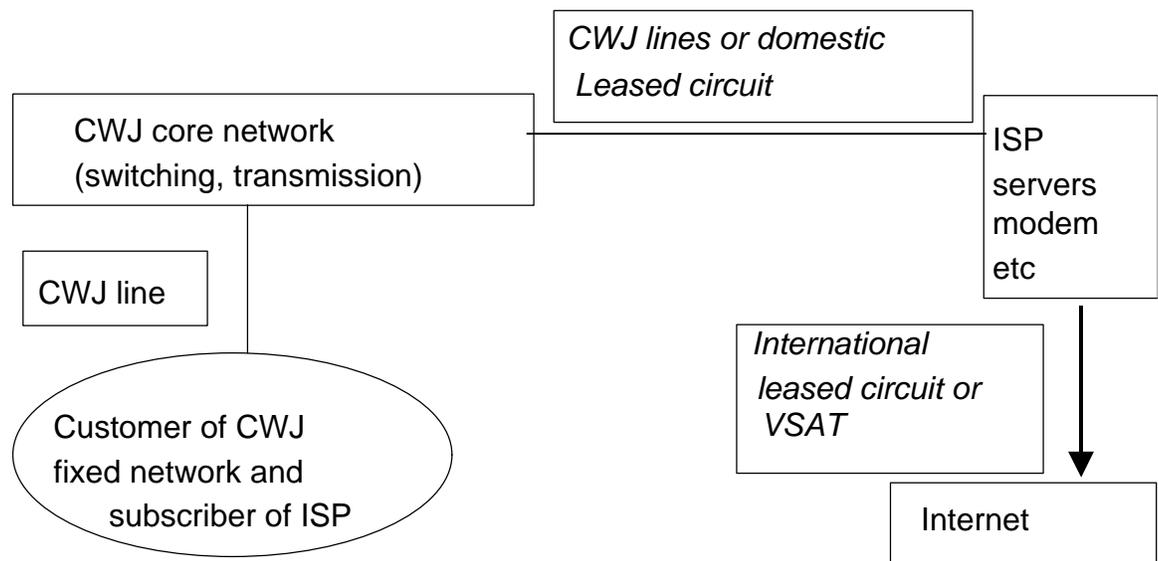
Introduction

5.1 Interconnection services are services provided by one telecommunications organization to another for the purpose of the conveyance of messages and information between the two systems and including any ancillary services necessary for the provision and maintenance of such services. As highlighted in Chapter 2, two categories of interconnection are of relevance: interconnection of VASPs to the public network; and the interconnection of public network operators. This chapter discusses the various services purchased by each group.

Value Added Service Providers (VASPs)

5.2 VASPs are usually purchasers of normal retail services from the public network. Value is added to these services and they are then sold to the general public. The services purchased are normal retail calls and line rentals, domestic and international leased circuits, or VSAT. VASPs may also purchase ancillary services, for example operator services, directory and emergency services.

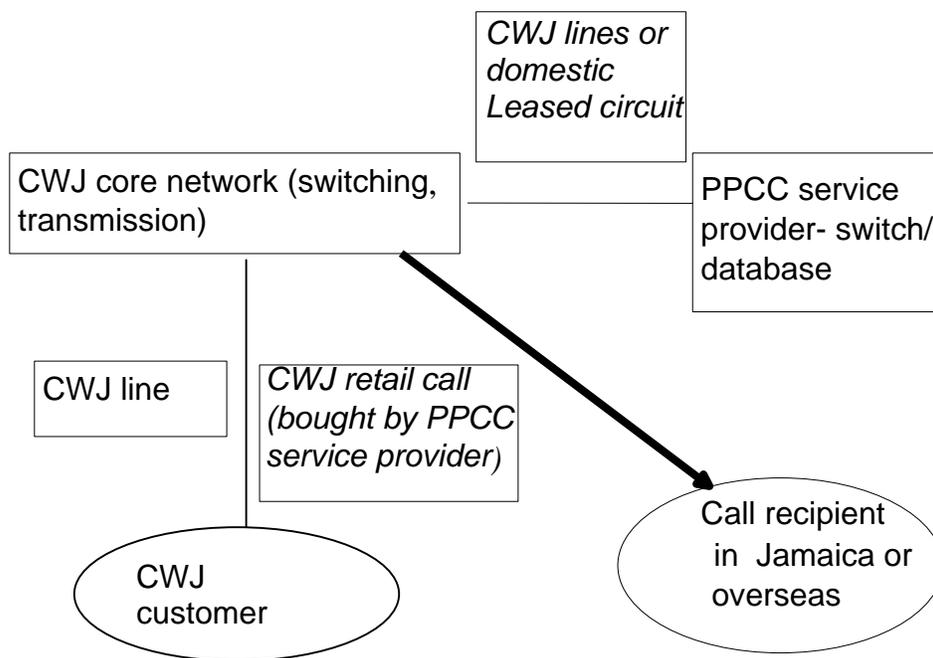
Figure 5.1: Interconnection of a Typical Internet Service Provider (ISP)



5.3 Two examples of types of VASPs are discussed. First, internet service providers and second, pre-paid calling card providers. Figure 5.1 highlights the services purchased by a typical VASP who sells internet services to the public, using the dial-up access mechanism. A subscriber of internet services may rent a fixed telephone line from the incumbent public network operator, and by virtue of this arrangement gain access to its

ability to make and receive calls like any other retail customer. In order to access the internet, the customer of the ISP makes a retail call to the ISP via a modem. The call reaches the ISP across a fixed telephone line from the incumbent, for which the ISP pays CWJ normal line rental, or a circuit leased from CWJ. The call is linked to the servers and modems of the ISP. The final link to the internet is facilitated by the ISP leasing an international leased circuit from CWJ or arranging its own VSAT circuit.

Figure 5.2: Interconnection by a Typical Prepaid Calling Card Provider



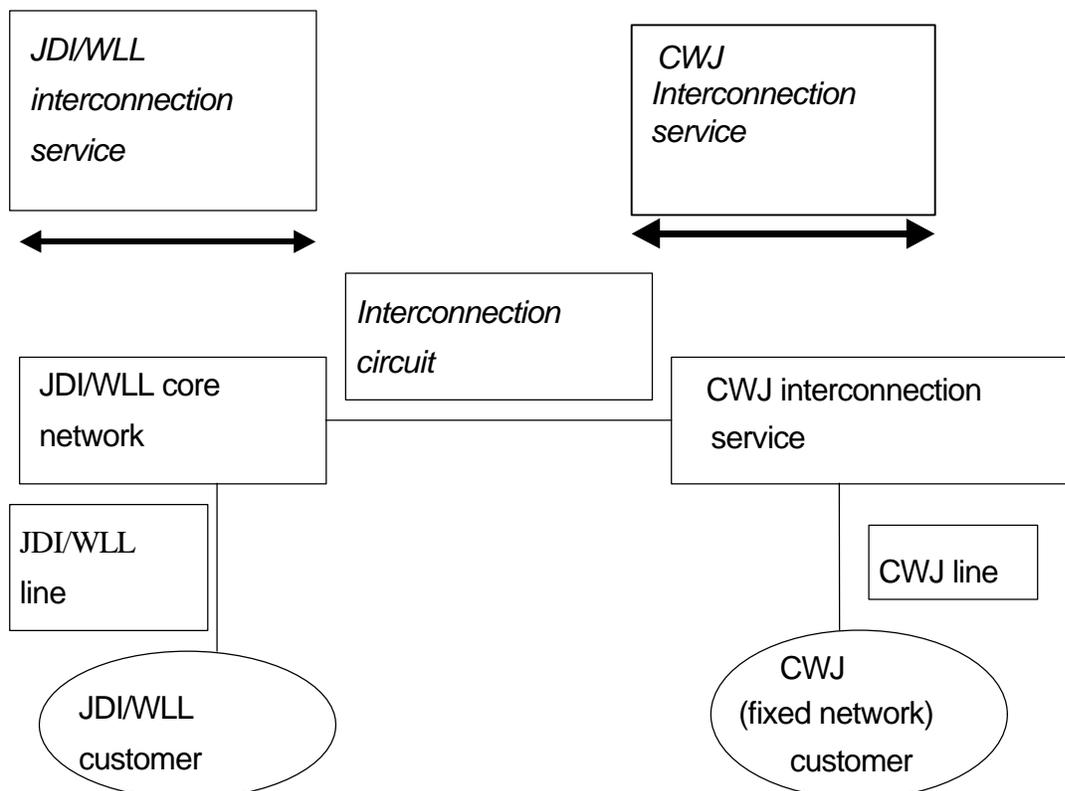
5.4 Figure 5.2 illustrates the services purchased by providers of prepaid calling cards (PPCC). In this case a member of the public buys a prepaid calling card from the service provider and becomes a card holder. The card holder places a call to the prepaid calling card service provider typically using a toll free number. For this service the prepaid calling card provider pays the normal retail price to CWJ. Using the caller's personal identification number, the PPCC service provider will be able to verify that he or she has a card from that provider as well as the amount in monetary terms remaining on the card. If the customer's account is in good standing, calls can then be made by the customer to the location of preference - domestic or international. Calls made by the customer using the PPCC are paid for by the PPCC service provider to CWJ.

Q5.1 OUR would be interested to hear from actual or potential VASPs who consider that their needs or wishes would go beyond normal retail services. If so, they are invited to indicate the type of additional functionality required and why.

Public Network Operators

5.5 Interconnection in this category is far more complex than that purchased by VASPs. For the purpose of identifying the services in this category various interconnection possibilities are postulated. These are segmented into four categories: (i) fixed-fixed interconnection of public networks (Figure 5.3), (ii) mobile-fixed, and (iii) fixed-mobile interconnection of public networks (Figure 5.4) and (iv) mobile-mobile (Figure 5.5). Examples of the first are the interconnection of Jamaica Digiport International (JDI) or Wireless Local Loop (WLL) to CWJ's fixed network, and vice versa.

Figure 5.3: Fixed-fixed Interconnection of Public Networks



Jamaica Digiport International (JDI) or Operator of Wireless in the Local Loop (WLL) to CWJ fixed Network

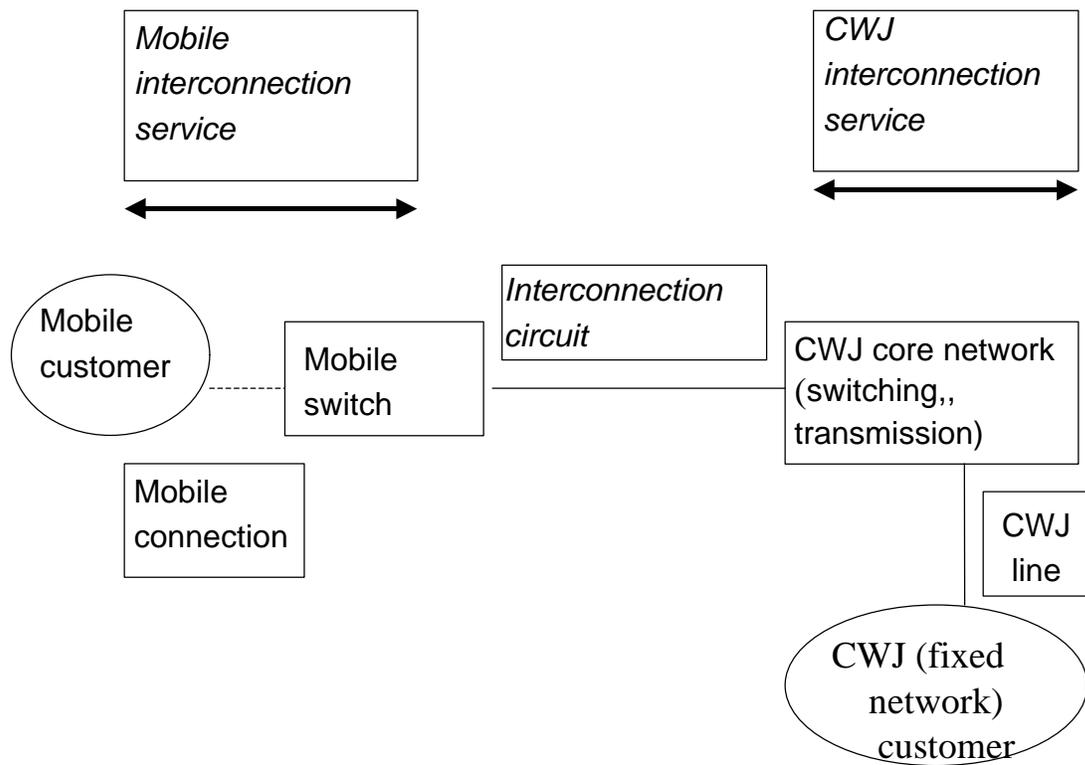
5.6 Using Figure 5.3, and moving from left to right assume that a customer of JDI or wireless local loop operator makes a call to a CWJ customer. To place the call the customer will use the service provider's line (JDI or WLL). For this service the customer will pay a retail price to JDI or WLL operator for providing the service. To fulfill the *any-to-any* criterion use of CWJ's switching and transmission facilities are purchased and the JDI or (WLL) network is interconnected to the CWJ's network using an interconnection circuit. JDI or the WLL operator pays CWJ for a call termination interconnection service.

Arrangements to pay CWJ for the cost of the interconnection circuit also need to be made.

CWJ Fixed Networks to Jamaica Digiport International (JDI) or Operator Wireless in the Local Loop (WLL)

- 5.7 In this case and moving from right to left of Figure 5.3, a customer of the incumbent makes a call to a customer of JDI or WLL service provider, and pays retail price to CWJ. The networks of CWJ and JDI or WLL provider are interconnected to the latter's switches and transmission facilities by way of a interconnection circuit. CWJ pays JDI or WLL provider for call termination interconnection service.

Figure 5.4: Mobile-fixed and fixed-mobile Interconnection of Public Networks



CWJ Fixed to Mobile Public Networks (If caller pays)

- 5.8 In this case and moving from right to left of Figure 5.4 a fixed line customer makes a call to a mobile customer and pays retail price to CWJ. An interconnection circuit is used to interconnect the mobile operator and CWJ's fixed network, between switches. CWJ pays the mobile operator for call termination interconnection service. CWJ does not know the geographical location where the call will be terminated, so typically hands over the call to the mobile network at the nearest point of interconnection to the originating switch - 'near end hand over'.

CWJ Fixed to Mobile (If both caller and call recipient pay)

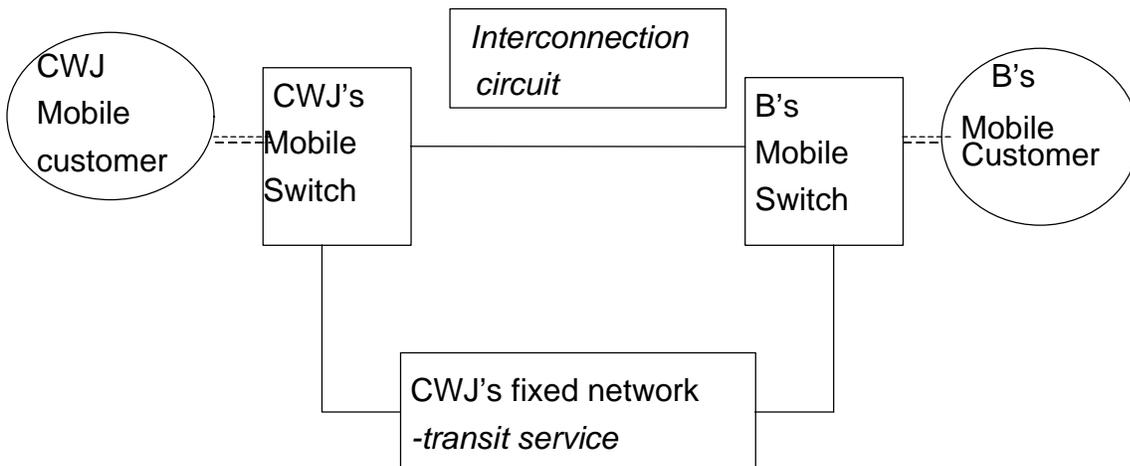
5.9 The only difference from the previous case is the payment arrangements. The calling customer pays CWJ for use of the fixed network, the call recipient pays the mobile operator for use of the mobile network, so no interconnection payments flow between the two operators.

Mobile to CWJ Fixed Network

5.10 Again using Figure 5.4 and moving the opposite direction (left to right) mobile customers making calls to a CWJ fixed line customer pay the retail price to the mobile operator. The mobile customer may be a customer of CWJ's mobile service or of the new entrant. An interconnection circuit is used to connect the mobile operator's network and CWJ's fixed network switches. The mobile operator in turn pays CWJ for a call termination interconnection service. The mobile operator can find out from the number dialled where the call will be terminated so can hand over the call to CWJ at the nearest point of interconnection to the terminating switch - 'far end hand over'.

5.11 The interconnection services purchased by a mobile operator from a fixed operator are the same as those bought by a fixed operator from another fixed operator. The same arrangements and charges should therefore apply.

Figure 5.5: Mobile-Mobile Interconnection of Public Networks



Mobile to Mobile Network

5.12 Figure 5.5 captures the situation between two mobile operators. Moving from left to right of the diagram, a CWJ mobile customer calls someone on another operator's (operator B's) mobile network and pays the retail price to the CWJ mobile business. CWJ's mobile switch and operator B's mobile switch are interconnected by an interconnection circuit. This direct route (ie physical interconnection) would be used only if the volume of traffic between both networks was sufficiently large to warrant the investment. Where the volume of calls between the two networks is such that it is not financially viable to

expend capital to interconnect both mobile networks physically, logical interconnection can be achieved via CWJ's fixed network. In this particular instance CWJ's fixed network is providing a transit service, and would receive payment for this interconnection service.

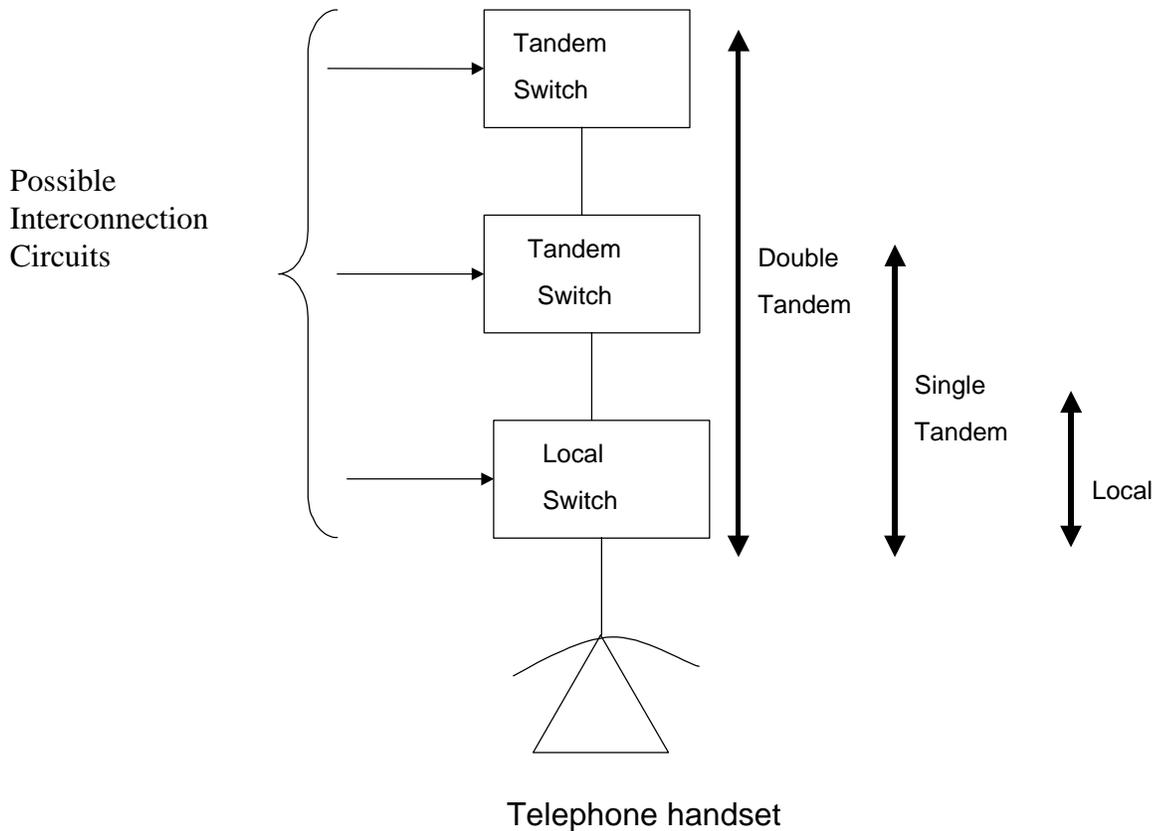
Dominant Fixed Network Operator

Call termination and origination

- 5.13 The dominant fixed network operator should unbundle domestic interconnection services sufficiently that the purchaser need not pay for networks elements or components or facilities that it does not require. The need for network unbundling is to guard against abuse of dominant position. There are two ways for a dominant network operator to satisfy the unbundling requirement:-
- (i) Identify and offer for sale separate network elements or components such as use of local and tandem switches (inclusive of software features), transmission facilities, signaling and call-related databases, operations support systems, operator and directory assistance facilities.
 - (ii) Identify and offer for sale a sufficiently large number of interconnection services (defined average combinations of network elements) to satisfy the requirement that the interconnecting operator need not be forced to purchase more than is required for interconnection. The operator therefore would provide a menu of unbundled services. When this approach is adopted the main services offered by the dominant incumbent network operator could include: local interconnect, single tandem interconnect, and double tandem interconnect, as shown in Figure 5.6.
- 5.14 Figure 5.6 identifies three interconnection services as a function of the point of interconnection and the location of called user. To reach the identified handset, each POI requires a different number of switching stages and inter-exchange links in transmitting a call. Because of the unbundling requirement the new entrant is not bound to buy switching and inter-exchange services that is not required to originate or terminate a call. For example, an entrant should have the option of building out its network and establish POIs to the incumbent's local switches and so only pay for local interconnect services. If the dominant firm is not required to fulfill the unbundling requirement then the entrant may be forced to interconnect at the first tandem switch, thereby paying the cost of single or double tandem interconnect services.
- 5.15 The first approach of unbundled network elements is used in North America, while in most other countries the second approach of a menu of services is used. In the OUR's view either of the approaches would be acceptable.

Q5.2 How should the unbundling requirement be satisfied?

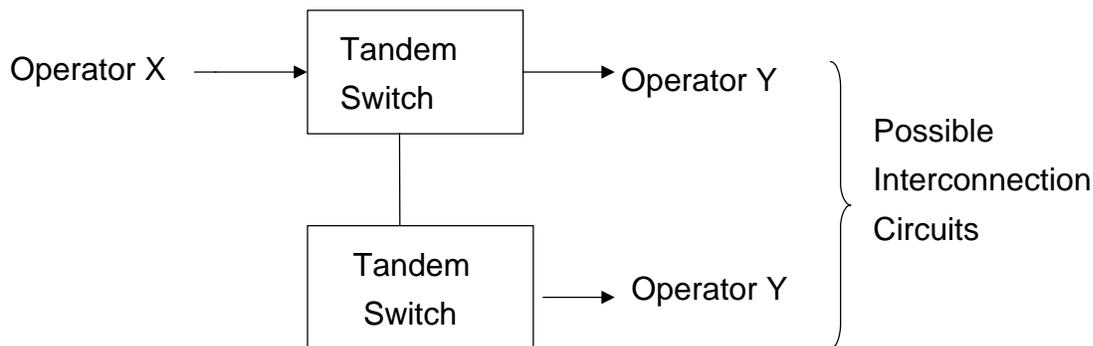
Figure 5.6: Call Termination and Origination - Dominant Network Operator



Transit Service

- 5.16 Where for example, two networks are not physically interconnected the principle of *any-to-any* interconnection is only possible if these networks are logically interconnected via a third network. The third network operator in this case is effectively conveying the message from say the customers of network operator X to those of say network operator Y-Figure 5.7. The third network is simply providing a transit service since the call did not originate or terminate on the third operator's network.

Figure 5.7: Transit Service



International switching and transmission

- 5.17 The dominant fixed network operator should provide international interconnection services to other public network operators. This means that, for example, a new entrant mobile or WLL operator must be able to purchase interconnection services for calls to any country in the world. Otherwise, in order to offer the ability to make outgoing international calls to its customers, it would need to have its own international network. Just as CWJ provides use of international network facilities to its downstream retail arm, so such services would have to be provided on the same terms and conditions to interconnecting operators.
- 5.18 The charge for these services would include the settlement rate paid by CWJ to the foreign operator in the destination country for terminating the call. It would also cover the costs of international switching and transmission (and, where relevant, domestic switching and transmission) incurred by CWJ.

Point of Interconnection

- 5.19 The physical linking of networks should be accommodated at any point of the network which is technically and practically feasible. This means locations where traffic is switched such as local switches, tandem switches, and international switches. Priority should be given to establishing interconnection at tandem and international switches where new entrants are most likely to wish to interconnect.
- 5.20 In general, there are two types of interconnect link. Each operator may build out a circuit from its switch and the circuits are linked somewhere in between (in-span interconnect) or one operator might provide the whole circuit to the other's switch building (customer sited interconnect). It is for operators to decide which method to employ (but see the discussion of cost sharing at the end of Chapter 7).

Ancillary Services

- 5.21 The dominant network operator should sell ancillary services to entrants. These services include: emergency operator and directory assistance services, fault reporting, customer inquiries, network maintenance, and inter-carrier billing.

Dominant Mobile Operator

- 5.22 The primary interconnection service that needs to be provided by a mobile operator is call termination. However, unlike the dominant fixed network, where the service provided should depend on the location of the POI and the call recipient, there is a much stronger case for the averaging of mobile call termination services into a single service, which does not vary with the POI. The reason is that the mobile number does not indicate the location of the call recipient. Hence, the originating fixed or mobile operator does not know where the call will be terminated, so typically hands over the call to the mobile network at the nearest POI to its originating switch - 'near end handover'.
- 5.23 Another interconnection service that might be provided is roaming. Roaming allows a customer of one mobile operator (the 'home' network) to make or receive calls using another mobile operator (the 'host' network). When roaming, the customer uses the host network, but is billed by his/her home network (which is billed for the service by the host network). The use of the host network would be automatic when the home network is not available, so that the customer may not even be aware that roaming is occurring. Roaming requires that the host and home networks exchange information, eg so that the host network can verify that the customer has an active account with the home network, and to facilitate billing between the networks. One form of roaming, seamless roaming, would allow the call to be passed between the networks whilst in progress, eg as the customer crosses the boundary of the coverage area of the home network – this would require a higher degree of interworking between the networks.
- 5.24 If a dispute was to arise about roaming, eg if the incumbent was to refuse to offer roaming to an entrant, there are various considerations that the OUR would need to take into account in reaching a decision. First, roaming gives rise to customer benefits and is especially beneficial to customers if the mobile networks have different coverage. Second, where a new entrant is competing against an established incumbent, there is a case for roaming to be provided by a dominant incumbent mobile network in order to facilitate entry. Roaming would allow the new entrant to offer to its customers the same geographical coverage as the incumbent, even while it was still rolling out its network. But third, undue reliance of the entrant on the incumbent's network should be avoided.

Q5.3 *What interconnection services should be provided by dominant mobile networks?*

Facility Sharing

- 5.25 In some instances the dominant incumbent may be encouraged to open up its facilities to other public network operators. There are two reasons for encouraging the incumbent to share its facilities with entrants. First, where the duplication of facilities amounts to inefficiency in the use of resources. Second, the need to minimize disruption to the environment. An example of the latter is the opening up of very busy public roadways to construct ducts for the laying of fibre optic cables, etc. In this regard the construction of additional ducts to host the entrant will inflict a negative externality (undue hardship and dislocation) on the motoring public, including delays. In this instance the authorities may

reject requests for the construction of such a facility. The existing facility of the incumbent could then constitute a "bottleneck" facility and the inability of the new entrant to share that facility amounts to a barrier to entry. Other examples of the negative externality are damage to other utility service providers (electricity, etc) and harm to the visual surroundings from erecting radio masts and poles.

- 5.26 A particular aspect of facility sharing is the physical collocation or the installation of entrant's radio and cable equipment, necessary for interconnection on the incumbent's premises. In return the entrant pays the incumbent a fee for allowing access to its building. One possible method is for the rented building segment to be enclosed in a cage. Only the entrant has access to this area. For technical, or safety reasons, or because of lack of space physical collocation might not be possible. The burden of proof is on the dominant provider to demonstrate that physical collocation is not practical. In this regard the incumbent would still be obligated to share facility with entrant using an alternate approach known as virtual collocation. With virtual collocation, unlike physical collocation, the entrant does not rent building space from the incumbent. Instead the entrant leases equipment to the incumbent for a fee. It is the duty of the incumbent to operate and maintain the equipment. The entrant uses this equipment to gain access to the incumbent's switching and transmission facilities without physically having to enter the incumbent's premises.
- 5.27 Other facilities might be wireless masts, ducts, and towers. Facility sharing like other interconnection services should be based on fair and non-discriminatory commercial practices. Facility sharing agreements are matters of commercial negotiations between the parties. But the global experience has been that incumbents lack the incentive to share their facilities. To this end national regulatory agencies have tended to develop guidelines to facilitate effective arrangements for facility sharing. Below are the guidelines the OUR proposes to determine whether facilities sharing is to be encouraged:-
- whether the facility is a bottleneck (ie a facility that cannot be technically or economically substituted and at the same time is essential to the provision of service by the entrant);
 - whether the facility can be reasonably duplicated or substituted in a reasonable time frame and this does not impose undue financial burden and time penalties or inconvenience on the entrant;
 - the cost, time penalties and inconvenience to the licensees and the public of the alternatives to the shared provision and use of the facility; and
 - whether the facility has available capacity having regard to the current and reasonable future needs of the licensee to which the facility belongs.
- 5.28 Where there is a dispute in making the case for facility sharing the party seeking to share must demonstrate to the OUR that there is no feasible or economical alternative based on the guidelines identified above. On the other hand the party who is being requested to share the facility must prove to the OUR that sharing will cause

unreasonable or excessive constraints and adverse impact on its current and future operations. OUR will mandate sharing where it is convinced that sharing is required for entry and fair competition and is also feasible.

Q5.4 What facilities should be subject to sharing between operators and under what circumstances?

Conclusion

- Value-added service providers are usually purchasers of normal retail services.
- There are four types of interconnection between public network operators: fixed-fixed, mobile-fixed, fixed-mobile, and mobile-mobile.
- A dominant fixed network should unbundle call termination and origination either by offering unbundled network elements or a menu of interconnection services such as local interconnect, single tandem and double tandem.
- A dominant fixed network should offer services such as transit, international interconnect and ancillary services.
- A dominant mobile network should offer call termination service(s).
- Dominant fixed and mobile networks should offer to share facilities, such as switch buildings, ducts and towers, where justified for economic or environmental reasons.

CHAPTER 6:INTERCONNECTION CHARGES FOR VALUE ADDED SERVICE PROVIDERS

Introduction

- 6.1 The aim of GOJ and OUR is to encourage further expansion in the network, greater efficiency in the allocation of scarce resources, innovation, and to minimize cost. Effective competition is the most appropriate way of achieving these goals. Hence, care must be taken to ensure that interconnection charges encourage efficiency, effective competition, and improvements in product and service quality. In summary, interconnection charges should be at a level commensurate with the true economic cost of providing the service, including an adequate return on investment.
- 6.2 The GOJ's Telecoms Policy requires that prices, including interconnection charges, be cost oriented. There is no universal definition of what constitutes cost orientation. In fact there are various definitions of cost orientation, depending on the costs that are included, how assets are valued, and how costs are apportioned across services.
- 6.3 Two categories of services are related to the issue of interconnection pricing. First, the interconnection of the incumbent's networks with value-added service providers' (VASP) operating systems. Second, is the physical linking of public networks which is discussed in the next chapter (7). For example, the linking or the interconnection of the incumbent's network and that of a new entrant.
- 6.4 Below is a description and assessment of the two main methodologies for pricing services provided to VASPs, which OUR would consider and might adopt if required to resolve interconnection pricing disputes between the incumbent and entrant. Views of interested parties are invited, and the OUR's proposals, amended as appropriate in the light of consultation responses, will be included in the Interconnection Guidelines.

Retail Minus

- 6.5 One approach to the pricing of services purchased by VASPs from the incumbent network provider would be to start from the observation that these service providers are essentially purchasing normal retail services. It can then be argued that due to this they should face price levels similar to those the incumbent charges its end-users for similar services. The cost to the incumbent of providing these services to its own end-users is made up of relevant network costs, an appropriate share of common cost, retail costs and a reasonable return on investment. However, the retail costs to the incumbent for providing these services to its end-users may be higher than the cost incurred to provide the same services to VASPs, because they may have smaller associated billing and marketing costs. If so, it might be argued that cost orientation would suggest that VASPs should be charged a lower price than end-users to reflect these cost savings. At the least the charge paid by VASPs, should be no higher than that paid by an end-user

for the same or equivalent service.

- 6.6 At present CWJ has two prices for dedicated internet access depending on whether access is for own use or resale. These are associated with different priorities for packet throughput (higher priority for resellers, lower priority for own use). OUR considers that price should not distinguished simply on the basis of whether purchaser is end-user or reseller. It is reasonable to have different prices for different grades of service, but both grades should be available to end-users and resellers. It is unclear to the OUR whether this price difference reflects cost difference
- 6.7 In some jurisdictions, for example the USA, the retail price is discounted by a percentage amount (that is regulated) to reflect the cost saved by the incumbents for providing the service to VASPs as opposed to their end-users. The incumbent is not allowed to offer a higher discount rate to itself and a lower rate to VASPs.
- 6.8 The size of the discount could be a source of contention between the incumbent and the entrant. One possible way of resolving disputes relating to the size of the discount would be to establish the discount rate by benchmarking of the ratio of interconnect charges to end-user prices in a select group of countries. For example, the default discount range established by the Federal Communications Commission for the USA (in the absence of specific cost information) is 17-25%. But, retail pricing strategies differ markedly between countries and the level of retail costs may also vary and hence will affect the size of the discount rate. Another possibility would be to conduct specific studies on the extent to which the retail costs of serving VASPs are lower than end-users in Jamaica.
- 6.9 Another approach would be to allow the incumbent to determine the size of the discount, with strong safeguards to ensure that it is not applied in a discriminatory fashion. For example, the size of the discount to the incumbent's downstream value-added arm would have to be the same as that applied to the entrant's purchases from the incumbent. This method is adopted for example in the UK and it involves regulation of the non-discriminatory condition (see Chapter 9), but no regulation of the size of the discount.
- 6.10 An important feature of the current structure of CWJ's retail prices is that some may be above cost (eg international calls), whilst others appear to be below cost (eg line rental and intra-Parish calls) - see Chapter 4 of *Rebalancing Telephone Prices*, OUR, November 1998. Therefore, basing interconnection charges to VASPs on retail prices would benefit some types of value-added service - those that used the retail services priced below cost- but be to the disadvantage of others - those that used the retail services priced above cost. However, competition in the value-added services would not be distorted if the non-discrimination condition were properly applied, ie where CWJ itself offered value-added services in competition to new entrants, the prices of such services should reflect the prices charged to VASPs for the retail services used as inputs, not the underlying costs of the retail services.

6.11 Over time it is expected that CWJ's retail prices will become more cost reflective ('rebalanced'). This depends upon the outcome of the OUR's consultation exercise on rebalancing, which itself will be strongly influenced by external events (such as the actions of the FCC and ITU). The size of the positive and negative gaps between retail prices and costs should therefore decline over time (but how quickly is not yet clear).

Cost based charges

6.12 A different approach to interconnection charges for VASPs would be to base them on the costs of the services purchased, not the retail price of the services to end-users. This would recognise that, although VASPs may consume the same services as end-users, they are a rather different class of customer. It might be argued, for example, that VASPs should not obtain services from CWJ at prices below cost, since this would lead to CWJ incurring a loss in supplying inputs to other service providers.

6.13 The cost of supplying the services could include the directly related network costs, a share of common costs, the retail costs incurred to supply VASPs and a reasonable return on investment. If cost-based charges were the subject of a dispute, the OUR would need to verify that only relevant costs had been included by CWJ and that reasonable attribution and allocation methods had been used.

6.14 Under this approach also, charges would need to be non-discriminatory, so that the charges paid by CWJ's own value-added services were the same for the same services as the charges paid by VASPs, ie in this case based on the costs not the retail prices of those services.

6.15 One practical problem that might arise under cost-based charges is that VASPs might buy only those services whose cost was below the retail price, and attempt to purchase those services whose cost was above retail price masquerading as an end-user.

Q6.1 How should interconnection charges to value-added service providers be set?

Conclusion

6.16 Two approaches to the pricing of VASPs have been outlined:-

- retail price of the service minus an appropriate amount for marketing, billing and other expenses saved by serving VASPs (compared to end-user), and
- cost based charges.

6.17 In the OUR's view, either of the approaches outlined above would be acceptable as long as it was applied consistently and is transparent and non-discriminatory. If it was considered that VASPs should pay charges based on retail prices, less a discount to reflect lower retail costs, then all services to VASPs should be priced in this way, ie not only services such as international calls whose retail prices are above cost, but also

services such as intra-Parish calls whose retail prices may be below cost. Or, if it was considered that VASPs should pay charges based directly on the cost of the services, this should apply to all services. This would mean that the VASP charges for some services could be below the retail price (eg international calls), but the charges for other services could be above the retail price.

- 6.18 If cost-based charges were proposed by CWJ they would need to be backed up and justified by robust cost information. This might be difficult in the near future because so little disaggregated cost information has so far been produced by CWJ and examined by OUR. At least in the early stages of liberalisation, this consideration would favour the use of retail prices minus discount.

CHAPTER 7: INTERCONNECTION CHARGES FOR PUBLIC NETWORK OPERATORS

Introduction

- 7.1 This Chapter addresses the issue of charges to be paid by public network (mobile and fixed) operators for use of the incumbent's dominant network. Interconnection charges of dominant networks must be cost oriented. This is set out in GOJ's Telecommunications Policy and is part of Jamaica's WTO commitments. But the term 'cost orientation' is potentially consistent with a variety of cost standards and methodologies to set interconnection charges. The main possibilities are discussed in this Chapter.
- 7.2 Regulators may be called in to set prices where prices cannot or should not be set in the market. In the case of interconnection, dominant network operators have incentives to overcharge not merely to earn an excessive profit on interconnection itself, but also to reduce competition in downstream retail markets. Interconnecting operators are to negotiate agreements, but with the opportunity to refer a dispute to the OUR for resolution. It is expected that disputes, especially about charges, are quite likely to arise where a dominant network is one of the parties to the agreement. The interconnection charges of a dominant network should be "cost oriented". The OUR's Interconnection Guidelines will provide a definition of cost orientation to allow negotiating operators to understand how the regulator will approach the issues of charges, if required to resolve a dispute. In this way, the negotiations themselves should be facilitated and operators will start from a clear understanding of the OUR's position.
- 7.3 The Chapter is set out as follows:-
- In the next section there is a discussion of the possible interpretations of cost orientation in terms of cost concepts.
 - Then there is an analysis of the practical approaches to implement the chosen interpretation(s), ie how figures for charges might be derived. The discussion is especially relevant to the following types of interconnection service provided by a dominant fixed network (see Chapter 5): call termination and origination, transit, international, and ancillary services.
 - Next, there is a discussion of charges for interconnection circuits, and the recovery of the costs of other activities required to establish interconnection (such as switch upgrading or conditioning).
 - Finally, charges for shared facilities are considered.

Cost Orientation

- 7.4 For an approach to be cost oriented, at the heart of the charges the principle of **cost causation** must be respected. This has two important implications. First, charges should include the costs incurred by the incumbent in providing interconnection services to the interconnecting operators. On occasion, there may be a case for diverting from

this aspect of cost causation or modifying its effect, because of the implications of some of the other principles set out in Chapter 4 as discussed later in this chapter in relation to the costs required to establish interconnection. Second, costs that are unrelated to the provision of interconnection services should be excluded. Examples of such costs are retail costs and the costs of providing exchange lines (the access network). The latter are not relevant to the basic interconnection charge, because the costs of lines do not vary with the amount of traffic, but depend on the number of lines. Since the costs of lines are not caused by interconnection traffic, the principle of cost causation means that they should be excluded from the basic interconnection charge; whether or not there should be a surcharge relating to the 'access deficit' (the shortfall of revenues from line rentals and connections below the costs of lines) is an issue discussed in Chapter 8.

7.5 The three main cost standards or charging methodologies are:-

- (i) Fully Distributed Cost (FDC);
- (ii) Total Service Long Run Incremental Cost (TSLRIC), and Stand Alone Cost (SAC);
- (iii) Efficient Component Pricing Rule (ECPR).

Each is discussed in turn and then the OUR's initial view on the meaning of cost orientation is set out and explained. Additional discussion of these charging methodologies is provided in Annex B. In all cases, the cost is taken to include a reasonable return on investment.

Fully Distributed Cost (FDC)

7.6 In many countries the charges for interconnection services have been set equal to their FDC, derived from the accounting records and accounting system of the operator. To derive FDCs the total costs of the operator are split or distributed among the various services that it provides. Precisely how the distribution of costs is done depends upon the accounting attribution and allocation methods adopted. Some types of cost can be attributed to particular services on a causal basis. For more indirect costs, such as overheads, a reasonable allocation method should be adopted to divide the cost among the services.

7.7 The rationale for using FDC to set prices is that, if used to set the price of every service, it would ensure that sufficient revenue was generated in aggregate to cover the total costs of the company, because (by definition) the sum of the FDCs of the services equals total cost. Also, because FDC is derived from the operators' accounting records, various types of verification can be obtained for the cost information: in particular, the FDCs can be audited.

7.8 But for the following reasons FDC may generate results that may not accurately measure economic costs:-

- FDCs are strongly influenced by the accounting conventions used, such as the use

- of historical cost or replacement cost for asset valuation;
- the cost allocation process is complex and notoriously arbitrary. There is no single correct answer to the question of how costs should be allocated;
- it can be extremely difficult for the regulator to prevent companies from acting on the incentive to allocate costs unduly towards non-competitive services and away from competitive services; and
- FDC does not measure the cost to the firm of providing additional units of the service (marginal cost), or the amount the operator would save by ceasing to provide the service (total service incremental cost). Thus, comparing FDC to the service's average revenue does not really indicate whether or not it is really profitable, in the sense that its continued provision at existing prices makes a net contribution to the operator's profitability, or whether instead it is a burden on the users of other services.

7.9 One important difference between the FDCs, when produced by CWJ, and FDCs in many other countries is that the approach to asset valuation used in CWJ's accounts is replacement cost, not historical cost. The use of historical cost has been one of the most important criticisms of the FDC around the world, as being a poor measure of the economic costs. Such a criticism would be less valid for CWJ, although the precise characteristics of the replacement cost approach require further investigation to establish the extent to which they reflect sound economic principles.

Total Service Long-Run Incremental Cost (TSLRIC) and Stand-alone Cost

7.10 TSLRIC sets the minimum price for regulatory purposes. It is the cost that the operator would incur to provide the service in question, given that its other services are already provided and, as such, includes only costs casually related to the service in question. The rationale for using TSLRIC as the basis to set interconnection charges is that it is a measure of the economic cost incurred. Since TSLRIC is an economic concept, it should reflect an economic approach to costs, which means for example the use of Modern Equivalent Asset (MEA) for asset valuation (the asset in place is valued at the cost of replacing it with the lowest cost asset currently available that serves the same function).

7.11 TSLRIC appropriately satisfies both aspects of cost causation, since it includes all costs that are casually related to the provision of the service, and it excludes all irrelevant costs. As such, it can provide a sound price signal to allow interconnecting operators to make appropriate investment decisions. There is a clear trend around the world towards the use of TSLRIC as the basis for interconnection charges. Such interconnection charges are now in place in the USA⁶, UK, Netherlands and Hong Kong⁷. Many other

⁶ The term in the USA is Total Elements Long Run Incremental Cost (TELRIC).

⁷ Charges based on long run incremental cost have also been in place for some years in Canada. However, the meaning of 'incremental cost' there is not TSLRIC, but rather the cost of a defined expansion in capacity (such as 10%), which is conceptually closer to marginal cost than TSLRIC. Typically, a mark-up of the order of 25% is added to the 'incremental cost' to derive the interconnection charge.

countries are expected to follow soon (eg other countries in the European Union and Japan have work in progress to derive charges based on TSLRIC data).

- 7.12 In all of the countries that have charges based on TSLRIC in place, apart from Hong Kong, the interconnection charge includes a mark-up added to the TSLRIC. The charges in Hong Kong are based on TSLRIC with no mark-up for reasons of entry assistance. It has been recognised that this approach is not sustainable in the long run and will be reconsidered in due course by the regulator, the Office of Telecommunications Authority (OFTA). In the other countries, the approach typically used to determine the size of the mark-up has been the equal proportionate mark-up rule, under which the proportional mark-up over TSLRIC is the same for all services (and the size of the mark-up is set to allow the common costs just to be recovered). Although this mark-up rule lacks sound conceptual justification, it has practical advantages in that it is relatively easy to implement and is widely regarded as reasonable by interested parties.
- 7.13 While TSLRIC sets the minimum price, the stand alone cost (SAC) sets the maximum price. SAC is the cost that would be incurred if the operator were to provide a single service by itself. SAC is the sum of TSLRIC of the service and all the common costs, because the operator would continue to incur these costs even if it withdrew all other services.⁸ SAC sets the maximum price, because a price above SAC would not be sustainable in a competitive market. A price above SAC could be undercut by new entrants, even those that did not benefit from the incumbent's economies of scope.
- 7.14 In the UK regulatory regime for interconnection with British Telecommunications (BT), the concepts of the TSLRIC and SAC play a central role. The charges of (some of) BT's interconnection services are regulated under price caps. Each price cap applies to a basket of services and regulates the weighted average price, and BT has flexibility to set the charges of individual services in the baskets subject to meeting the overall price caps. The limits of BT's flexibility for the price of any one particular service are given by floors and ceilings, which are derived respectively from the TSLRIC and SAC of the service.⁹ The definition of cost orientation that is explicitly used in the UK is the range of possible charges between TSLRIC and SAC.

Efficient Component Pricing Rule (ECPR)

- 7.15 Under ECPR the price of the interconnection service is the sum of the TSLRIC of providing interconnection (AIC) and the net revenue foregone by the incumbent (or its 'opportunity cost') by providing interconnection. The entrant uses the interconnection

⁸ Strictly speaking, all of the common costs relevant to the service in question. It is possible that a proportion of the common costs are common among a subset of service that does not include the service in question. If so, this part of the common costs would not be included in the SAC of the service.

⁹ Charges may lie outside the range given by floor and ceiling if there are special circumstances to justify the charge and mean that it is neither anti-competitive nor excessive.

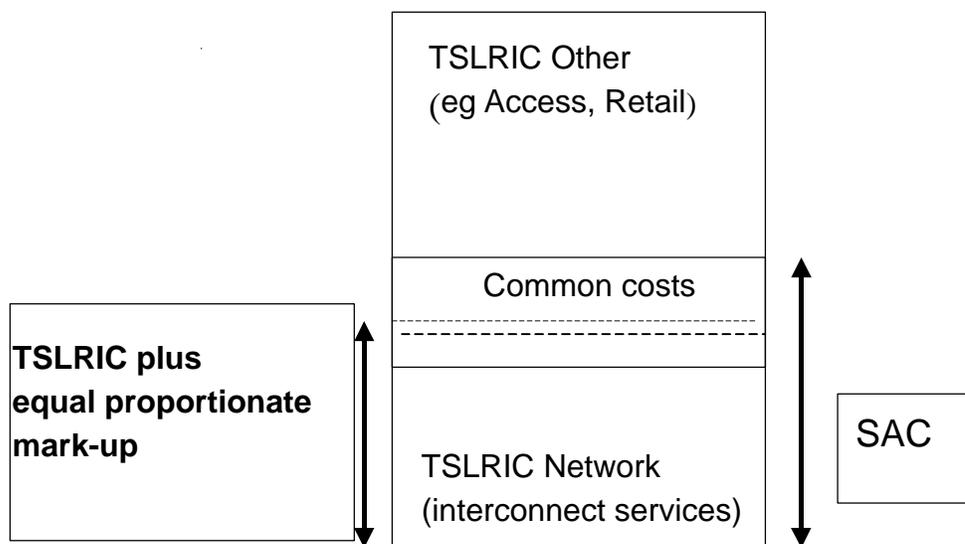
purchased from the incumbent to provide a retail service or value-added service, which may be in competition with a retail service provided by the incumbent. The net revenue foregone is the margin of the retail price over the incremental cost of its retail service that the incumbent loses by providing the interconnection service to the entrant (or the contribution to the recovery of common costs that is lost).

- 7.16 The proponents of ECPR argue that it encourages efficient entry while deterring inefficient entry. If an entrant's cost of providing the retail service were lower than the incumbent's (excluding the cost of the interconnection service), then there would be a profitable entry opportunity. But if the entrant has higher costs than the incumbent, entry at interconnection charges determined according to the ECPR would not be profitable.
- 7.17 One major drawback to ECPR, which makes it problematic to implement is that a distinction should be made between generated and diverted traffic and this might not be feasible (because revenue foregone is zero for generated traffic). Secondly, because the incumbent's net revenue foregone is included, ECPR tends to result in relatively high interconnection charges. The argument that ECPR only deters inefficient entry is derived from a static model that does not take account of the dynamic benefits of competition. These include increased choice for customers, enhanced incentives for cost reduction, improved customer service and greater innovation. The use of ECPR risks the loss of some of these benefits. For these reasons, ECPR is not used to determine the level of interconnection charges in any country, except as a rationale for access deficit (sur)charges (see Chapter 8).

OUR's Definition of Cost Orientation

- 7.18 As a standard against which to set charges, regulators generally use the prices that would prevail in a competitive market. In this vein, one possible definition of cost orientation is that **cost oriented charges lie between TSLRIC and SAC**. TSLRIC sets the lower bound or floor, because a charge below TSLRIC would make the interconnection service unprofitable, it might be anti-competitive, and it could not be sustained in a contestable market. SAC sets the upper bound or ceiling, because a price above SAC could not be sustained in a competitive market – it would be undercut by new entrants. Furthermore a charge outside of the range between TSLRIC and SAC would send the wrong signals for investment. A charge below TSLRIC would encourage entrants to use the incumbent's facilities even where it could provide those facilities at lower cost. A charge above SAC would encourage entrants to bypass the incumbent's network and build their own facilities, although it may be inefficient to duplicate infrastructure.

Figure7.1: Cost Oriented Charges



- 7.19 This definition of cost orientation may be appropriate when considering the price of any particular interconnection service in isolation, as in the UK. However, it would not generally be considered appropriate when applied to all interconnection charges simultaneously. The concern of interconnecting operators would be that the dominant network might choose to set the price of every interconnection service at the ceiling of SAC. This would mean that all of the costs that were common between interconnection services and the dominant network's retail services were being recovered through interconnection charges and none through retail prices. Such a situation would be considered unfair and economically inefficient.
- 7.20 In this context, it is important to note that the regulatory regime in the UK makes precisely this distinction between cost orientation for individual service charges and for all services (the average charge). In the UK in interconnection markets where the incumbent, British Telecommunications (BT), is dominant, interconnection charges are regulated by price caps. The level of the price caps, ie the *maximum* average charge permitted, was set at BT's TSLRIC plus an equal proportionate mark-up. If the charge of one service is increased to the ceiling, BT must reduce the charges of the other services covered by the price cap by a sufficiently large amount to prevent an increase in the average charge. Otherwise, the price cap constraint would be breached.
- 7.21 The experience around the world strongly indicates that in the early stages of liberalisation, interconnection charges need to be tightly regulated at least on average (unless charges can be negotiated that the interconnection purchaser finds acceptable as well as the seller). This means that the important definition to establish is that concerning the cost orientation of all interconnection services. The OUR, therefore,

proposes the following conceptual definition of cost orientation¹⁰ :

Cost oriented charges lie between TSLRIC and SAC, but interconnection services should not bear a disproportionate burden of the recovery of common costs.

Fully Distributed Costs (FDC)

- 7.22 This definition reflects the growing trend around the world for interconnection charges to be set at TSLRIC plus an equal proportionate share of common costs. But it would not necessarily preclude other cost standards from being used. In particular, it is quite possible that charges set equal to FDC could be cost oriented, as defined. This would be more likely, the greater the extent to which CWJ's accounting policies and methods were based on sound replacement cost and other economic principles.
- 7.23 Very often FDC is identified with historical cost and severely criticised by entrants on this basis. For example, this is the case in the USA where the regulation of interconnection charges of local operators has been much debated. However, FDC accounts can be derived using sound replacement cost principles for asset valuation and depreciation. In principle, therefore, there are two distinct types of difference between FDC and TSLRIC plus mark-up. First, the difference between historic costs and replacement costs. Second, the difference between FDC, derived using replacement cost, and TSLRIC plus (say) an equal proportionate mark-up.¹¹

Table 7.1: BT's fully distributed and incremental costs in 1995/96

<i>Pence per minute</i>	<i>FDC, historical cost</i>	<i>FDC, current cost</i>	<i>TSLRIC plus equal proportionate mark-up</i>
Local exchange segment	0.46	0.37	0.35
Single tandem	0.69	0.56	0.53
Double tandem	0.94	0.78	0.73
Approximate percentage difference from TSLRIC plus mark-up	30%	5%	

Source: OUR from BT Regulatory Accounts and OFTEL

- 7.24 The relative importance of these two factors can be quantified for BT in the UK, because there has been a recent period when BT has been required by OFTEL to produce and publish cost information on interconnection services on the following three cost bases: FDC using historical costs, FDC using current (or replacement) costs, and TSLRIC plus equal proportionate mark-up. Table 7.1 shows the comparison in financial year 1995/96 for three main interconnection services. The FDC on a replacement cost basis is similar to TSLRIC plus equal mark-up (although slightly higher), but significantly lower than the FDC on a historical cost basis. This suggests that FDC could be consistent with the

¹⁰ An addition to this definition, to allow for appropriate surcharges, is set out in Chapter 7.

¹¹ If TSLRIC is defined as the efficient level of costs, a third difference would be between the incurred and the efficient cost, reflecting the degree of inefficiency of the operator.

definition of cost orientation above, if it includes only relevant costs and if it is derived using sound economic principles. But these caveats are extremely important.

Efficient Component Pricing Rule (ECPR)

- 7.25 Charges derived from a simple or modified version of the ECPR would be unlikely to be consistent with the definition of cost orientation. Under ECPR, charges could be below TSLRIC, eg if the end-use retail service was loss-making, or charges could be above SAC, eg if the end-use retail service was highly profitable. The OUR would not consider ECPR an acceptable basis to derive the basic interconnection charges. ECPR principles are, however, taken into account in the discussion of access deficit charges in Chapter 8.

Q7.1 How should cost oriented interconnection charges be defined?

Cost Measurement

- 7.26 If the OUR was required to resolve a dispute about charges, how would cost oriented charges be derived? The three main options are deriving cost information from accounting data (the 'top-down' approach), constructing economic-engineering cost models or cost proxy models (the 'bottom-up' approach), and using a comparison with interconnection charges in other countries. Each of these has advantages and disadvantages.

Top-down approach

- 7.27 The top-down approach builds upon the company's accounting information. To derive FDC information, the company's costs are attributed and allocated amongst the company's services. To derive TSLRIC information, the accounting information may be used as inputs into a set of cost functions that distinguishes between the costs that are causally related to a particular service and those that are common between services. Results from a top-down approach are verifiable in the sense that they can be traced back to recorded costs, and so can be audited.¹² But accounting information may not reflect economic costs, and the quality and relevance of the results depend greatly upon the accounting methods and allocation techniques. For example, asset valuation and depreciation might lead to misleading results, or irrelevant costs might be erroneously attributed to a particular service. Since the accounting information reflects the company's incurred costs, it will include the company's inefficiencies so that the results will be above the efficient level of costs.

Bottom-up approach

- 7.28 The bottom-up approach or cost proxy modelling involves the construction of an engineering model that builds up the elements of a hypothetical network required to supply a given quantity of a service (or set of services), using the most efficient commercially available technology and production process. A number of such cost

¹² Although less common, audit certification can be obtained for TSLRIC results as well as FDC, eg BT in the UK.

models exist and have been used by regulators in other countries (such as USA, UK, Netherlands, France, Hong Kong). Some of these models are publicly available and could be adapted as appropriate for Jamaica. In these models the costs are derived from explicit cost functions that identify the primary cost drivers. The model algorithms and the parameter values used are fully transparent and can be openly debated, unlike top-down models where such details tend to be commercially sensitive. However, bottom-up models have been criticised for understating the true level of costs by omitting relevant costs and assuming idealised, unrealistic network design and operation.

International charge comparison

- 7.29 Comparison with charges in other countries requires that published information on interconnection charges in other countries be collected. Average charges or charging ranges may be derived from such an analysis and used to set or guide charges in Jamaica. One advantage is that it avoids both the incumbent (and entrants) and the regulator incurring costs to construct and verify top-down or bottom-up models. It provides a basis on which charges may be set rapidly, because it avoids the lengthy process of analysing in detail cost models to ensure that the results are robust. Furthermore, charges derived by benchmarking have some credibility, because they reflect interconnection charges that are actually in place in other countries, and are not merely hypothetical. However, charges in other countries do not directly reflect costs in Jamaica. This problem is smaller, the more that charges in closely comparable countries are used as the benchmarks.
- 7.30 All three approaches have been used around the world to set interconnection charges. For example, in many countries charges have been set at the (fully distributed) costs derived from the incumbent's accounting system. In the USA the interconnection charges of local operators have recently been set using bottom-up cost proxy models. In the UK and the Netherlands a hybrid approach has been used: constructing and verifying both top-down and bottom-up models and then reconciling the results. Charge comparisons have been used as the basis to set interconnection charges in Germany, and they played an important role in France.¹³
- 7.31 If cost information specific to Jamaica is to be used, ie the top-down and/or bottom-up models, it needs to be robust and both new interconnecting operators and the OUR need to have confidence that this is the case. For accounting based information (top-down approach) the OUR believes that a number of conditions would need to be satisfied before it could be considered a suitably robust basis for interconnection charges:-
- it must follow sound cost causation principles and, most especially, interconnection service costs must include only relevant costs (eg no retail costs or costs of the

¹³ A comparison of charges is also the approach being used by the ITU to derive its recommendations on target settlement rates for international call termination. See Web site www.itu.int/sg3focus.

- access network);
- it must reflect sound economic costing principles, such as asset valuation using the Modern Equivalent Asset method;
- the results should be audited;
- the results should be published, including documentation of the detailed accounting methods used; and
- the cost measure should preferably be TSLRIC, not FDC.

7.32 Similarly, for the bottom-up approach to be used:-

- it must reflect sound cost causation and economic costing principles;
- it must be transparent;
- the model algorithms must be demonstrated to be sound;
- the values of the inputs (parameters) must be supported by relevant evidence; and
- the results and documentation of the model and the methodology must be published.

7.33 Ideally, both top-down and bottom-up models would be constructed and reconciliation between the two carried out. This would provide results that were robust, reflective of costs incurred in Jamaica but also transparent and understandable to interconnecting operators. But this process is long, difficult, resource intensive and relatively costly, and so may not be suitable especially at this stage in the development of telecoms markets and regulation in Jamaica. Moreover, the problems in Jamaica will be much greater than in the other countries where both models have been built and reconciled: for example, there is no established or sound, disaggregated top-down accounting information from which to start, and there are no competing operators that can provide alternative views and information on the costs of operation in the country to feed into a bottom-up model. It will undoubtedly take time to develop one or other, never mind both top-down and bottom-up models, and ensure that the results are robust. But, because robust cost models provide the best way to ensure that charges properly reflect costs in Jamaica, for the medium and long term either or both top-down and bottom-up models should be constructed.

Q7.2 To what extent should the OUR rely upon accounting data (top-down) or cost modelling (bottom-up) if required to derive cost oriented charges?

7.34 Since it is quite likely that such work would not be completed before the OUR might be called in to resolve a dispute about CWJ's interconnection charges, serious consideration needs to be given to the use of charge comparisons. They would allow reasonable charges to be derived in the absence of robust cost information. They would also play a useful role in the development of Jamaican cost information, by serving as a guideline against which the reasonableness of top-down or bottom-up model results could be assessed. It is possible that there are good reasons why cost conditions in Jamaica are materially different from other countries, but cross-country comparisons will serve to point to areas requiring further investigation and justification.

- 7.35 The OUR has carried out a comparison of the domestic interconnection charges of incumbent fixed networks around the world – this is reported at Annex D. Most of the countries included in the analysis are developed countries. This was not a deliberate feature of the comparison, but arises because there are few developing countries (of which the OUR is aware) that publish information on interconnection charges. However, comparing CWJ's costs against charges in developed countries may not be unreasonable, because of the nature of its telecoms network, which is fully digital and includes internationally used switching and transmission equipment. Also, as CWJ has noted, the cost of "...the switch and inter-office transmission networks ...are less dependent on local operating conditions" (See page 29 of CWJ's response of 1999 February to the OUR's Consultative Document, *Rebalancing Telephone Prices*, November 1998). Additions to and comments on the OUR's comparison of interconnection charges would be very welcome – see Annex D.
- 7.36 The OUR's initial view is that the recommendations on interconnection charges made by the European Commission would be especially helpful benchmarks for setting charges for domestic interconnection services provided by CWJ's fixed network. The Commission issues guideline ranges for the national regulators in European Union countries to take into account when regulating interconnection charges of dominant fixed networks.¹⁴ The recommendations, which are themselves based on the charges in 'best practice' member countries of the EU, are shown in Table 7.2. They have proven to be influential as shown in Annex D.
- 7.37 In the absence of better information, the OUR is minded to use EU Commission pricing guidelines, since they are internationally established benchmarks that are already in use and appear reasonable for Jamaica. The reasonableness of the guidelines for Jamaica is suggested by CWJ's claim that inter-Parish calls generate a small surplus.¹⁵ This means that the price of J\$0.76 peak (and J\$0.38 off-peak) is above the sum of the network cost for an end-to-end call and the retail costs. Such costs need to be revised downwards for direct comparison with the costs of the interconnection services shown in Table 7.2 for two reasons. First, the interconnection services represent a segment of the call, not the full call or, to put it another way, only one end of the call, not both ends. Second, retail costs must be excluded from interconnection charges. Inter-Parish calls will use tandem switches, so single and tandem interconnection services are more relevant comparators than local interconnect. A reasonable inference would therefore be that CWJ's interconnection costs are likely to fall within the ranges shown in Table 7.2.

Table 7.2: European Commission recommended 'best current practice' interconnection charges for 1999

<i>Peak rate charges for call</i>	<i>In ECU cents per</i>	<i>In J\$ per minute</i>
-----------------------------------	-------------------------	--------------------------

¹⁴ These guidelines do not apply to call termination purchased from mobile networks.

¹⁵ See CWJ's response of January 1999 to the OUR's Consultative Document, *Rebalancing Telephone Prices*, November 1998.

<i>termination</i>	<i>minute</i>	
Local interconnection	0.5 – 1.0	0.21 - 0.42
Single tandem	0.8 – 1.6	0.34 - 0.67
Double tandem	1.5 – 2.3	0.63 - 0.97

Source: OUR from Directorate General XIII of the European Commission
See www.ispo.cec.be/infosoc/telecompolicy/en/study-en.htm

Note: The exchange rate used to convert from is J\$42 per ECU, which is roughly the current exchange rate.

7.38 One argument for setting charges towards the top end of the range would be that CWJ is permitted a significantly higher rate of return than in European countries. Under its licence CWJ has a permitted rate of return on ordinary shareholder equity of between 17.5% and 20%, which is defined as a post-tax rate of return and is effectively a real return because of the accounting policies (asset values are updated for inflation). The comparable rate of return used in the European Union would be of the order of 6-8%. CWJ's permitted rate of return relates to its overall profitability, so in theory it would be possible to use a different rate of return to set interconnection charges. However, the OUR would not favour such an approach, because it would mean that CWJ's retail customers would have to pay the difference between the permitted rate of return and the rate used for interconnection charges (or the other way round, if a higher rate of return was used for interconnection charges).

7.39 This argument could also be used to suggest that interconnection charges should reflect CWJ's incurred costs, even if above the efficient level of costs. Otherwise retail customers would have to make up the difference. But on the other hand, lower interconnection charges would increase the competitive pressure in retail and value-added markets, which would in turn provide a greater incentive on CWJ to increase the efficiency of its retail operations. However, to justify charges below incurred cost, a degree of inefficiency in CWJ's provision of interconnection charges would need to be demonstrated. A further discussion of charges being based on efficient or incurred costs is in Annex B.

Q7.3 Should interconnection charges reflect efficient or incurred costs? Please explain the reasons for your view.

Conclusion on cost measurement

7.40 The OUR's definition of cost oriented charges is in terms of the cost concepts of TSLRIC and SAC. But, it was noted that it was conceivable that other cost standards, such as FDC could be consistent with this definition, if important cost causality and other economic principles were followed in their derivation. However, at present there is none of the necessary cost information to implement any of the cost standards. CWJ has not yet supplied the OUR with any cost information on interconnection, and the OUR is not aware of any modelling of Jamaican telecoms costs that would be directly relevant to the costs of interconnection services. The OUR's initial view, therefore, is that it would adopt

the strategy shown in Table 7.3, if it were called upon to resolve a dispute about interconnection charges.

- 7.41 It will take time for either top-down or bottom-up models to be developed. Even once developed, there will need to be time spent on the verification of the results to ensure that they are robust, and to give confidence that this is the case. It seems likely that it will not be possible to complete this exercise before the OUR is called upon to resolve a dispute about charges – this period of time is referred to as the ‘short term’. If so, the OUR is minded to use a cross-country comparison as the basis for interconnection charges and, in particular, the EU Commission recommendations (see Table 7.2), which are consistent with charges in a large member country (See Annex D).

Table 7.3: OUR’s proposed strategy to setting cost oriented charges

	<i>FDC</i>	<i>TSLRIC plus mark-up</i>
Cross-country charge comparison (eg EU Commission recommendations)	Short term	
Top-down (accounting data)	Medium term	Long term
Bottom-up (cost modelling)		

- 7.42 The objective in the longer term should be to set charges explicitly derived from TSLRIC information, in accordance with the OUR’s proposed definition of cost orientation. This might be derived from top-down or bottom-up, or both. However, it is recognised that this is a difficult and time-consuming process. In the transition towards this long term position, it may be sensible to set charges based on appropriately derived FDC information – this is the approach proposed in Table 7.3 for the ‘medium term’. An alternative, more ambitious strategy would be to attempt to move straight from cross-country charge comparisons to TSLRIC plus mark-up, by developing top-down and/or bottom-up models. However, deriving TSLRIC in a short timeframe could have resource implication for the incumbent operator, the regulator, and new entrants

Q7.4 What use should the OUR make of cross-country comparisons of interconnection charges?

Q7.5 What cost measurement methods and cost standards should be used by the OUR in the short, medium and long run when resolving disputes about interconnection charges?

Interconnection Circuits and Establishing Interconnection

- 7.43 Interconnection circuits are used to connect two networks to allow traffic to pass between them. Some circuits may be one way, ie only carry traffic in one direction, in which case the costs should be borne by the network operator sending the traffic. This follows the principle of cost causation. However, different arrangements are appropriate if the interconnection circuit is two-way and carries traffic in both directions. Both operators benefit from such a circuit in the sense that both use it to hand over to the

other operator calls that are billed to their own customers (ie on which they earn retail revenue). Hence, it would be inequitable for all of the costs to be borne by one operator. Consistent with the principle of equal responsibility the cost of the circuit should be shared, broadly in proportion to the operators' shares of billed traffic carried across the POI. This might be achieved, for example, by one operator providing the whole circuit to the other's switch building but sharing the costs with the other (either a one-off cost or ongoing costs shared according to actual or forecast traffic volumes). Or it could be achieved by each operator providing a circuit up to a POI approximately mid-way between the networks in-span interconnect and bearing its own costs.

- 7.44 Operators are also likely to incur other costs in order to facilitate the establishment of interconnection, such as switch upgrading and network conditioning. Since all operators can be expected to incur costs of those sorts and because all public networks should have an equal responsibility to interconnect with each other, each operator should bear its own costs of making the necessary technical preparations to allow interconnection to occur. This would provide all operators with incentives to carry out the necessary technical measures in the most efficient manner. Operators could expect to recover the costs through their retail prices. But, where a specific request is made by an interconnecting operator for network conditioning over and above the normal requirements, a specific charge to that operator for the legitimate costs incurred would be reasonable.

Facility Sharing

- 7.45 The parties seeking to share the "bottleneck" facility will negotiate the terms and conditions of the arrangement including prices. Charges must reflect the economic cost, including a reasonable return on capital, of providing the service. If they are set below cost then the incumbent is allowing the entrant to "free ride" as the entrant would be enjoying a subsidy. On the other hand if charges are above cost then the incumbent would be over-compensated for providing the service and the entrant's investment decision would be distorted. There is no incentive for the incumbent to set these charges below cost.
- 7.46 In some cases it may be possible to use market prices to evaluate the cost oriented charge. For example, the price for renting space in an incumbent's switch building might be set using the rentals generally charged for building space in similar areas. In other cases the OUR proposes to adopt similar principles of cost orientation and cost measurement as for other interconnection services.

Conclusion

- The OUR's proposed conceptual definition of cost orientation is cost oriented charges lie between TSLRIC and SAC, but interconnection services should not bear a disproportionate burden of the recovery of common costs.
- FDC could be consistent with this definition if it is calculated using replacement cost

- asset valuation and other economic principles.
- To derive charges, if required to do so to resolve a dispute the OUR proposes to use international benchmarks in the short term, such as the European Commission's recommended ranges, FDC in the medium term, and TSLRIC plus mark-up in the long-term.
 - The cost of two-way interconnection circuits should be shared between operators, and each operator should bear its own costs of establishing interconnection consistent with the principle of equal responsibility.

CHAPTER 8: POSSIBLE INTERCONNECTION SURCHARGES

Introduction

- 8.1 Arguments can be made for two types of possible surcharge to the basic interconnection charge discussed in Chapter 7, relating respectively to universal service and unbalanced tariffs. The OUR has previously drawn the distinction between the concepts of universal service and unbalanced tariffs (see *Rebalancing Telephone Prices*, OUR, November 1998). Universal service - a line to every household that wishes to be connected to the network – is an objective of Government policy. Unbalanced tariffs – the pricing of some services, especially the line rental, below cost and other services, especially international calls, above cost – is the main means that has been used to attempt to make tariffs affordable and so promote the achievement of this objective. This distinction is extremely important when considering the nature of the possible surcharges.
- 8.2 This Chapter, first explains the difference between the costs of universal service and the costs of unbalanced tariffs (access deficit). Next the case for a surcharge relating to the costs of universal service is considered. Then there is an analysis of the case for a surcharge relating to the costs of unbalanced tariffs.¹⁶

Difference Between the Costs of Universal Service and Unbalanced Tariffs

Cost of universal service

- 8.3 The universal service obligation (USO) resides with CWJ, as laid down in certain conditions of its licences. In effect, CWJ is required to supply a telephone line to all households that wish to be connected to the public network. This includes the provision of basic voice telephone services to rural communities and low income users.
- 8.4 Since 1988 marked strides have been made towards the achievement of universal service. For example, in 1990 there was only 8% of households with a telephone, but by 1995 this had risen to 21%. New lines continue to be added each year at a growth rate of about 18% per annum. However, many rural areas and poorer areas of urban centres remain unserved. The Government has reiterated its commitment to achieving universal service in its Telecommunications Policy.
- 8.5 The USO imposes a cost upon CWJ, as the universal service provider (USP). A methodology is now well-established internationally to estimate the costs of universal service. It was originally developed in Australia and has been used subsequently in many countries, including Hong Kong, France, the Netherlands, Norway, Sweden, Switzerland and the UK. The cost of the USO is the difference in the USP's profitability with and without the universal service obligation. The methodology seeks to identify those customers that the operator serves only because of its obligation. This involves

¹⁶ The discussion in this Chapter draws upon Annex E of *Rebalancing Telephone Prices*, OUR, November 1998.

identifying those customers or clusters of customers that the USP would be better off (ie more profitable) by not serving - such customers are referred to as 'uneconomic'.

Table 8.1: Differences between the access deficit and the cost of universal service

<i>USO costing methodology</i>	<i>Access deficit</i>
Customer based approach	Service based approach, looking only at one service: the line (access)
Long run avoidable cost, which excludes common costs and some fixed costs that are included in fully distributed costs	Typically, fully distributed cost (FDC), although, in principle, long run avoidable cost could be used
Modern equivalent asset (MEA) valuation, ie assets valued at their cost of replacement by an asset serving the same function that incorporates the lowest cost proven technology	Typically, embedded or historic cost asset valuation, although FDC can be derived using MEA asset valuation
Inclusion of incoming call revenue (net of avoidable costs)	<i>Does not take account of profits from incoming international calls or other types of call</i>
Only the loss from serving unprofitable customers is measured	The gains (if any) from serving customers with below average line costs is netted off against the losses from serving customers with above average costs
If tariffs were rebalanced <i>on average</i> (ie the average line rental equals the average line cost), a universal service cost may remain because it may still be unprofitable to serve customers with above average cost (or who pay a below average line rental)	If tariffs were rebalanced <i>on average</i> , the access deficit would be zero

- 8.6 An uneconomic cluster of customers may be in a remote rural area. If the USP was to discontinue service to that area, it would save the long run avoidable costs (the cost that can be avoided by not providing the defined amount of output, such as the given number of lines and call minutes). It would forego not only the revenues billed to the customers in that area, but also the revenue from calls made by the USP's other customers to that area. An area is uneconomic, therefore, only if the long run avoidable costs exceed the sum of the revenue from the fixed charges, such as the line rental, and the revenue from outgoing and incoming calls to that area. An individual consumer may be uneconomic because he or she makes and receives few (international) calls and the line rental is below the avoidable cost of his or her line.

- 8.7 In summary, the USO costing methodology is a customer based approach. It measures the reduction in profitability imposed on the USP from bearing the obligation to provide service on a universal basis to all consumers.¹⁷

Access deficit

- 8.8 A tariff is said to be unbalanced when it is not cost reflective. The key feature of unbalanced tariffs in Jamaica and many other countries around the world seems to be is the pricing of the line rental below cost, and the pricing of international calls above cost. The 'cost' of unbalanced tariffs to the incumbent can be measured by the access deficit, which is the difference between the costs of providing lines (the access network) and the revenues raised from line rentals and connection charges.
- 8.9 The access deficit is a service based approach, ie it measures the extent to which the price charged for a particular service, the provision of lines, falls below the cost of that service. This contrasts with the cost of universal service, which arises from unprofitable customers, each of whom purchases a range of services.

Conclusion

- 8.10 The USO cost may be more difficult to estimate in practice than the access deficit. The USO costing methodology depends upon very detailed and disaggregated cost and revenue information, because it measures the loss incurred in serving particular customers or areas. The access deficit measures the loss on a particular service, so it is the total (or average) cost and revenue of that service that are relevant. Table 8.1 describes some of the differences between the access deficit approach and the USO costing methodology.

Universal Service Funding

Contributors

- 8.11 In Jamaica the costs of universal service are currently funded by CWJ's profitable telecoms consumers. CWJ has a minimum and maximum permitted rate of return, and so any loss incurred from the requirement on CWJ to serve unprofitable customers is offset by higher prices, so that CWJ may earn a rate of return within its permitted range. However, this cross-subsidy from profitable to unprofitable customers occurs implicitly and is not explicit, eg the size of the cost of universal service is not known, nor the size of contributions made by any customers.
- 8.12 As liberalization occurs, the question arises whether the customers of any new entrant public networks should also make a contribution towards the recovery of the costs of

¹⁷ Further details of the methodology may be found in Costing and Financing Universal Service Obligation, a report by WIK, available on www.ispo.cec.be/infosoc/telecompolicy/en/study-en.htm or in Note 1 of Universal Telecommunications Services, OFTEL Consultative Document, February 1997, available at www.oftel.gov.uk

universal service, as well as CWJ's customers. If so, then new entrants should make an appropriately calculated payment to CWJ to contribute towards the funding of the costs of the USO. This would require that the current implicit universal service funding arrangements were made explicit.

- 8.13 The OUR considers that the customers of all operators should contribute towards the achievement of universal service, ie all operators, including CWJ itself, should make explicitly calculated universal service contributions.¹⁸ In either case, since these operators would pass such costs on to their customers, in reality it would be the customers of the operators that would bear the ultimate incidence of universal service funding.
- 8.14 A case can be made that in the early stages of liberalisation, new entrants should not be burdened with universal service contributions. They face a variety of barriers to entry, some of which it may not be possible for the regulator to dismantle. If this is the case, then exempting new entrants from universal service contributions for a defined number of years (such as three) could be seen as an attempt to 'level the playing field'. Once the new entrant has had the opportunity to establish itself in the market, the argument for continuing exemption would be much weaker. This would suggest a transitional waiver of the universal service contributions. But, on the other hand, it could be argued that such an approach would amount to unwarranted entry assistance that tilted the playing field against the incumbent. There would also be practical issues of implementation, such as deciding the appropriate length of time for a waiver and when the clock should start ticking (eg when the licence is issued, when service is first offered, etc).
- 8.15 The OUR's initial view, subject to responses to this consultation, is that new entrants should not be exempt. The nature of the calculation of universal service contributions should itself address transitional issues, because when a new entrant's traffic is small, so too will be the proportion of the USO cost that it will be required to fund.

Q8.1 *Should (the customers of) new entrant public networks be exempt from making universal service contributions and, if so, for what period of time?*

- 8.16 If the charges paid by value added service providers (VASPs) for interconnection are based on retail prices (minus a discount), in principle this would automatically include contributions to universal service. This is because the operator's retail prices already reflect the need for the costs of universal service to be recovered. Under this approach, therefore, there would be no change in the position faced by VASPs compared to the existing situation. If the charges paid by VASPs are based directly on the costs incurred to supply them with interconnection, a decision would have to be taken about whether or not a universal service contribution should be added on. One argument for excluding such contributions would be that innovative services could be deterred and growth in

¹⁸ Or possibly that instead they would take on the USO in a defined geographical area or for a defined set of services (giving new entrants this option is usually referred to as 'pay or play').

value added markets constrained.

Q8.2 If charges to VASPs are directly cost-based should (the customers of) value added service providers be exempt from making universal service contributions?

Funding mechanism

- 8.17 Countries that have chosen to require operators competing with the incumbent to make universal service contributions have adopted one of two mechanisms:-
1. Surcharge on interconnection charges with the incumbent's fixed network, so that contributions are in proportion to operators' shares of minutes of use of the incumbent's fixed network.
 2. Payments into a specially created universal service Fund, with contributions from operators either in proportion to their shares of total call minutes or total revenues.

An example of a country that is using an interconnection surcharge is France. Specially created Funds are being used in Australia, Hong Kong, and the USA.

3. A third option would be for taxpayers to provide the funding of universal service, as in Chile and Poland.
- 8.18 In the early stages of liberalisation there are good arguments in favour of using a surcharge on interconnection charges. First, such funding arrangements are easier and less costly to set up, because they 'piggy-back' upon the interconnection billing mechanism. Second, the share of minutes of use of the incumbent's fixed network in the early stages of liberalisation is likely to be a reasonable indicator of each operator's size. As the new networks mature, there may become an increasing proportion of calls that does not touch CWJ's fixed network (such as mobile-mobile calls), in which case this contribution basis becomes less reasonable. Third, the USO surcharge on interconnection is unlikely to represent a material distortion of competition in interconnection markets. But, later on, if the incumbent starts to face serious competition in interconnection markets, the inclusion of a USO surcharge on interconnection with the incumbent, but not on interconnection sold by any other operator, will tend to distort competition to the disadvantage of the incumbent.
- 8.19 The size of the USO surcharge per minute would be calculated as the USO cost divided by total CWJ fixed network minutes, ie the sum of CWJ's minutes of use of its own fixed network and interconnecting operators minutes of use of CWJ's fixed network. In this way, new entrants would make some contribution towards the funding of universal service, although CWJ itself, as by far the largest user of its own fixed network, would make the largest contribution.

Q8.3 Should universal service funding arrangements use a surcharge on interconnection payments to CWJ, or a specially created universal service Fund?

8.20 If universal service contributions using interconnection surcharges are to be made by any new entrant public network operator or value added service provider, a number of necessary conditions would have to be met:-

- The universal service contribution must be a separate and transparently identified surcharge on interconnection payments.
- The surcharge must be fully justified and derived from an explicit calculation of the universal service cost, using the internationally accepted avoidable cost/foregone revenue methodology.
- The surcharge must be applied in a non-discriminatory manner, which means in particular that it must be included in the transfer charges paid by CWJ retail and value added services to its own network business.
- The burden of proof must be on the universal service provider to demonstrate to the OUR, and contributing operators and service providers (within the constraints imposed by legitimate commercial confidentiality), that a cost of universal service exists and that it is not being overstated.

8.21 Since the USO surcharge must first be derived from a proper calculation of the USO cost, it might not be an initial feature of the charges. Using the language of Chapter 7, if in the 'short term' relatively little robust cost information is available, and say the basic interconnection charges are set using international benchmarks, introduction of the USO surcharge would be delayed until the 'medium term'. What length of time would constitute the 'medium term' would depend in large part upon CWJ's ability to make available robust cost and revenue information at a sufficiently disaggregated level to implement the USO costing methodology in Jamaica. It would not be possible to use a cross-country comparison to derive an estimate of the USO cost, because it is highly dependent on local conditions both in terms of costs, especially the access network, and revenue patterns.

8.22 The USO cost will vary over time, and it could move in either direction. It might fall as costs decline with technological advances, or as tariffs are rebalanced, or as call volumes per line increase. Or it might rise as new lines are added in areas that are more costly to serve or which generate relatively low revenue. Therefore, after the initial calculation of the USO cost there will need to be subsequent periodic reviews, say every year or every second year, to ensure that the USO surcharge is appropriately updated.

Access Deficit Charges

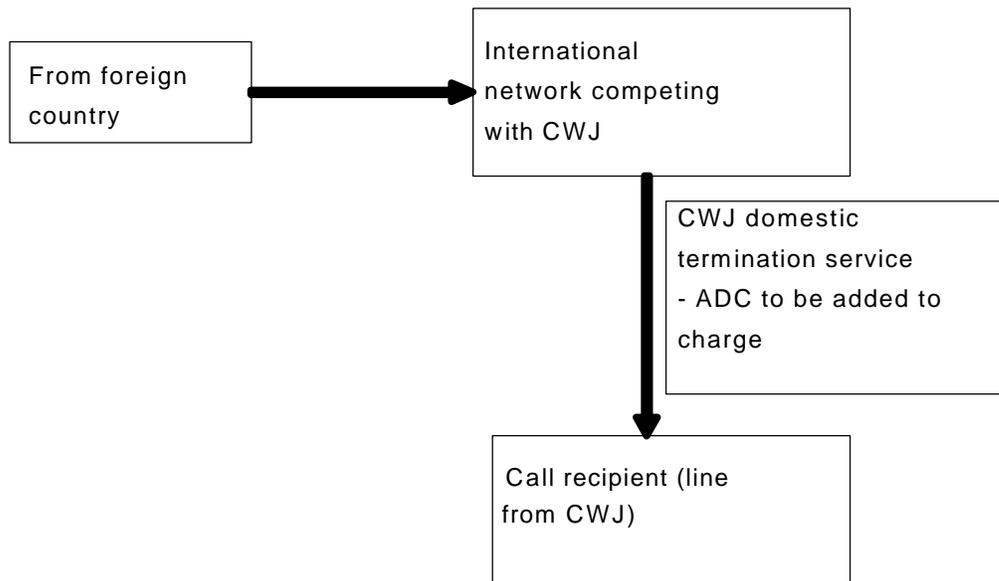
8.23 In some liberalised environments, the access deficit is included in the charge for interconnection paid to the incumbent. This surcharge is included to provide competitive neutrality (and the flip-side of this reason, to enable the incumbent to sustain unbalanced tariffs), but it is not there to fund universal service. For reasons of

competitive neutrality, this surcharge is to be paid, for example, by those operators who do not themselves incur costs of lines but who compete with the incumbent for calls, eg indirect access (or long distance) operators. Indirect access operators sell domestic or international calls to consumers in competition to the incumbent, but using the incumbent's existing lines. An indirect access call originates on the consumer's line provided by the incumbent and is handed over to the indirect access operator from an incumbent's switch. The indirect access operator buys call origination from the incumbent (and may need also to buy call termination to deliver the call). Consumers may choose different indirect access operators by dialling different access codes before the dialled number (in some regimes a 'preselect' option is also available).

- 8.24 The argument is that the competing operator should face the same access deficit 'cost' as the incumbent implicitly faces because of its unbalanced tariffs (which may be imposed on the incumbent by explicit or implicit government or regulatory policy). Otherwise, an indirect access operator could undercut the incumbent's call prices, even if it had higher costs of supplying calls (ie were less efficient) than the incumbent. This argument bears a strong similarity to arguments used to support the ECPR as the appropriate approach to set interconnection charges (see Chapter 7 and Annex B).
- 8.25 In the limit, the incumbent could lose all of its profit on calls and so would be unable to sustain the line rental below cost (without suffering an overall loss). Hence, indirect access operators pay these access deficit charges (ADCs) but mobile operators generally do not, because it is considered that mobile calls do not compete directly with (are not close substitutes for) calls on fixed networks. This is the case, for example, in France and in the UK (before ADCs were abolished in 1996). Local operators should not pay ADCs, because they also incur costs of lines as well as calls.¹⁹
- 8.26 In the case of Jamaica, the most important source of profit used by CWJ to sustain the line rental below cost is incoming international calls. Outgoing international calls are a less important source of profit. Domestic calls are either not profitable or not a major source of profit (unlike say France and the UK). If CWJ's tariffs are rebalanced over time, this position may change but it seems a fair representation of the current and near future position.

Figure 8.1: Illustration of domestic termination service to which ADC would be relevant

¹⁹ In the UK before 1996, although local operators were to pay ADCs, they were also to receive 'reverse ADCs' (ie allowed to levy a surcharge on interconnection for their own access deficits).



8.27 Faced with this situation, there would be the potential that CWJ's prices for incoming international calls (ie settlement rates) would be forced down by the pressure of competition, and that volumes of terminating minutes would be lost to competitors and, as a result, its rate of return could start to fall below its minimum permitted level. This would create pressure for rebalancing, and in particular increases in the line rental to reduce the size of the access deficit. These competitive pressures would be in addition to the considerable pressures for rebalancing that already exist as a result of the following reasons why CWJ's profits from international calls may decline:-

- The Benchmarks Order of the US regulator, the FCC, which seeks to reduce the settlement rates paid by US carriers worldwide – if implemented, the impact on CWJ would be a reduction in its settlement rate with the USA of about 70% by the start of 2001.
- The proposed recommendations of the ITU to reduce the settlement rates charged worldwide – if implemented, the impact on CWJ would be a reduction in its settlement rates from all origination countries, perhaps by as much as 60% by the end of 2001.
- Increasing opportunities for bypass and arbitrage, such as created by technological advancements.

8.28 One perspective would be to recognise that these external pressures for rebalancing already exist and that it will not be easy to make the tariff changes that they are likely to require, because they are likely to make some consumers worse off. It might be argued that it would be undesirable to greatly increase the pressures to rebalance, which could

make the tariff adjustments even more painful for consumers. This perspective would suggest that access deficit charges (ADCs) would be an appropriate surcharge on domestic cost-based interconnection purchased from CWJ used by the interconnecting operator to terminate incoming international calls²⁰ – see Figure 8.1. ADCs would constitute end-use charging, because the same interconnection service would include or exclude the ADC depending upon whether or not the service were used by the interconnecting operator to provide termination of an international call.

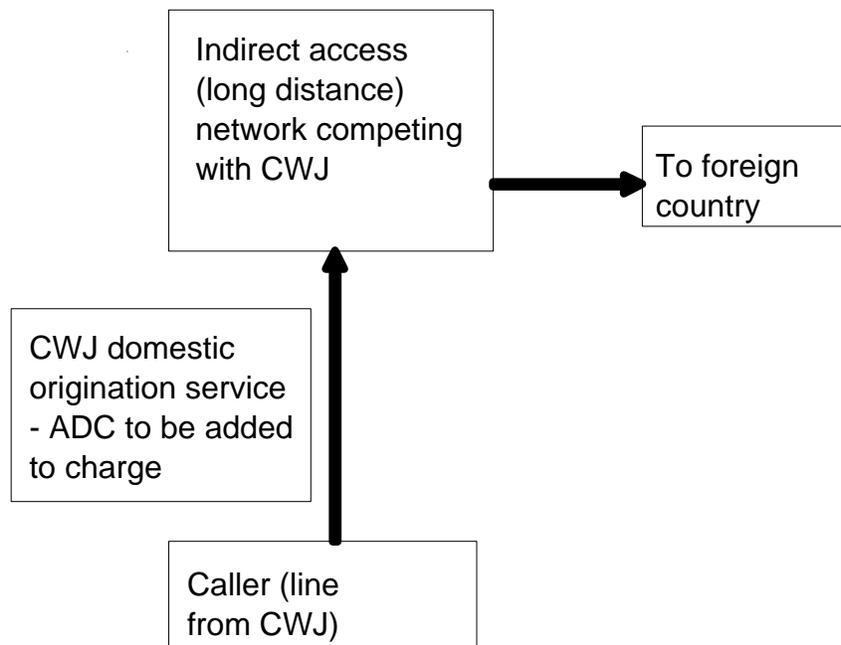
- 8.29 Extending this principle further, the argument could be made that ADCs should be applied to call origination purchased from CWJ and used by the interconnecting operator to provide outgoing international calls. The logic would be that outgoing international calls are the other material contributor (though less important than incoming calls) to alleviating the pressure to raise domestic prices, such as the line rental. If it was considered desirable for this contribution to be perpetuated, there would be a case for an ADC here also. By applying the ADC to call origination used for outgoing international calls, WLL and mobile operators would be excluded from its payment (because they would originate calls on their own networks), as would interconnection used for the provision of domestic retail services (which are not major contributors to the support of unbalanced tariffs).
- 8.30 The level of the ADC could be different as between interconnection used for incoming and outgoing international calls, on the argument that the profit earned by CWJ differs depending upon the type of call.²¹ If there was a different surcharge for each end-use, there could be an increase in the complexity of the arrangements, since each surcharge level would need to be robustly calculated and justified, and it might be more difficult to calculate the amounts due from each interconnecting operator. On the other hand, if there was a uniform surcharge level for both incoming and outgoing international calls, then a distortion would result. Domestic origination used for outgoing international calls would be overpriced and domestic termination used for incoming international calls would be underpriced, because of the varying profitability. Therefore, as long as it was practical to implement, different levels of ADCs for incoming and outgoing international calls would be preferable.
- 8.31 The size of the different ADCs would depend upon the access, the volume of international call minutes and the relative profitability of incoming and outgoing calls. The access deficit would be the difference between the cost of the access network, ie the costs dependent upon the number of lines such as local loops and line cards, less

²⁰ One way to limit or avoid competitive pressure for the settlement rate to fall would be to impose a rule of ‘parallel accounting’, ie that all international facilities operators must have the same accounting and settlement rates (as for example imposed on US operators by the FCC. However, this would not prevent a decline in CWJ’s profitability from terminating volume lost to competitors.

²¹ In the countries that have ADCs, it is usually a uniform charge and does not vary with the end-use. However, the ADC regime in the UK involved ADCs varying with whether the end-use was a local, national or international call. The ADC regime in the UK was abolished in 1996 when the constraint on BT increasing the line rental was removed (previously there had been a specific sub-cap limiting increases to RPI+2% per annum).

revenues from line rentals and connection charges. Since a service is in receipt of a cross-subsidy only if its revenue falls short of its TSLRIC, this should be the cost measure used to assess the access deficit. The average ADC per minute would be the access deficit divided by the total volume of relevant incoming and outgoing international calls (ie those that terminate or originate on CWJ's domestic network). The ratio of the ADCs for each of incoming international calls and outgoing international calls would be the same as the ratio of CWJ profitability on each service. For further details of the ADC formulae and their derivation, see Annex E.

Figure 8.2: Illustration of domestic origination service to which ADC would be relevant



- 8.32 An alternative perspective would be to argue that ADCs are either unjustified in principle, too difficult and costly to implement in practice, or too burdensome for new entrants. On this basis there should be no ADCs and any additional pressures for rebalancing by CWJ resulting from competition in the termination of international calls would simply have to be tackled and should not be suppressed, eg by accelerated rebalancing.
- 8.33 The OUR considers that it would be unhelpful for this second perspective to be adopted, and for large additional pressures for rebalancing to be created beyond the substantial external forces that already exist due to actions by overseas regulators, international

organisations and developments in new technology. Jamaica already faces the prospect of radical tariff changes, because of the expected major reductions in settlement rates and increased bypass opportunities. Large increases in the line rental at least for some customers could be the result. Some consumers are likely to be made worse off, even though attempts will be made to limit such effects. The scale of the necessary tariff changes is not yet clear – it is an issue being pursued by the OUR in its consultation process on rebalancing. The exclusion of ADCs, especially if there is competition in the termination of international calls, runs the risk of unduly exacerbating the situation and making the adjustment process even more difficult.

Conclusion on Access Deficit Charge

8.34 The OUR recognises the logic that underpins the case for appropriately calculated ADCs added to:-

- Domestic termination purchased from CWJ and used by the interconnecting operator for incoming international calls; and
- Domestic origination purchased from CWJ and used by the interconnecting operator for outgoing international calls.

The case for the former is the stronger, because incoming international calls are a more important source of profit. ADCs should not be paid by WLL operators, who face their own costs of providing lines, or mobile operators who do not compete directly with fixed networks. Hence, they would only be applicable to indirect access (long distance) operators that did not provide local networks to originate/terminate calls. Nor should ADCs apply to other end-uses, such as domestic calls.

8.35 However, there are legitimate questions about the effect of ADCs on competition. If the access deficit is large, then the surcharge would also be large, and this would weaken competition to CWJ from indirect access (long distance) entrants. In principle, a distinction should be made between that part of the entrant's traffic which is substitutional and that which is new generated traffic, and the ADC should only apply to the former. But such fine distinctions are unlikely to be possible, with the result that the introduction of ADCs would introduce distortions, such as stifling traffic growth. There are also practical issues about the implementation of ADCs whilst avoiding the introduction of undue complexity. If CWJ wished to propose ADCs, it would need to set out how the calculation of the surcharge(s) would be done and the interconnect billing arrangements.

8.36 The size of any such surcharges would need to be transparent, explicitly calculated, fully justified, and non-discriminatory (ie applied equally to all relevant operators, including CWJ itself). Implementation of ADCs would, therefore, first require robust cost and revenue information from CWJ, preferably on a TSLRIC basis. This might mean that there could be insufficient information to implement it initially, ie in the 'short term'. As for the USO surcharge, the introduction of ADCs might be a subsequent development as

more and better cost information becomes available from CWJ in the 'medium term'. If ADCs were implemented, their calculation would need to be updated regularly, since the size of ADCs would be expected to fall over time. ADCs would fall with increases in incoming and outgoing international call volumes and also as the access deficit declines when the line rental rises due to rebalancing. On the other hand, this may be offset by the provision of new lines, whose cost is greater than the line rental.

- 8.37 The choice, therefore, is between two imperfect options. The absence of ADCs, if there were competition to CWJ in international networks and/or indirect access, would run the risk of exacerbating the already strong pressures for tariffs to be rebalanced. But their presence could lead to distortions, such as the retardation of growth in international traffic. Given the pressures on the current tariff structure arising from alternative calling procedures and settlement rate reductions, especially as proposed by the FCC, the OUR's initial view is that appropriately calculated ADCs would be reasonable, especially for the termination of incoming international calls. But consideration should be given to distinguishing between new and substitutional traffic or, if this is not possible, making a downward adjustment to the ADCs. If there was no competition in international facilities or from indirect access (long distance) operators, no ADCs would be warranted.
- 8.38 If an ADC was permitted, the OUR would propose to review its ongoing rationale after a suitable period to decide whether it is still required. The appropriate time for such a review would be on completion of the rebalancing strategy, which will be specified in the outcome of the consultation process on rebalancing (a Statement on rebalancing by the OUR is currently planned for October 1999).

Q8.4 Should access deficit charges (ADCs) be considered a legitimate surcharge and why? If so, how should ADCs be calculated and to what end-use calls should they be applied?

Conclusion

- 8.39 Subject to the responses to this document, the OUR would consider reasonable:-
- A surcharge on interconnection prices charged to all public network operators by CWJ's fixed network, because it bears the universal service obligation.
 - A surcharge on interconnection prices charged by CWJ's fixed network, arising from the access deficit (line rental below cost) on domestic termination services used by competing international facilities operators to terminate incoming international calls and origination services used by indirect access operators to provide outgoing international calls. If there are no such competing operators, no surcharge for the access deficit should apply.
- 8.40 In both cases, the size of the surcharge must be transparent, non-discriminatory and appropriately calculated, with the burden of proof residing with CWJ. The onus would therefore be on CWJ to make available the necessary cost and revenue information,

sufficiently robust and disaggregated to demonstrate that a need for USO surcharges and/or access deficit charges exists.

- 8.41 If there are to be two surcharges, double-counting needs to be avoided. In France there are two separate surcharges: one is for the costs of universal service (and is paid by all operators); the other is an access deficit charge (and is only paid by indirect access operators). To avoid double-counting the universal service cost is calculated on the assumption of a fully rebalanced line rental (as used in deriving the size of the access deficit) rather than the actual line rental.
- 8.42 To allow for the possibility of surcharges, the definition of cost orientation proposed in Chapter 6 needs to be extended:-

Cost oriented charges lie between TSLRIC and SAC, but interconnection services should not bear a disproportionate burden of the recovery of common costs. In certain specified circumstances, appropriate surcharges relating to the cost of universal service and the access deficit may be added to the basic interconnection charge. If so, each surcharge must be transparent, non-discriminatory and appropriately calculated to reflect respectively the cost of the universal service obligation and the access deficit.

CHAPTER 9:ENSURING NON-DISCRIMINATION AND FAIR COMPETITION

Introduction

9.1 There need to be safeguards to ensure that the incumbent does not adopt price squeeze or other anti-competitive pricing strategies to frustrate the competitive efforts of new entrants. The potential for this arises because the incumbent is both:-

- a supplier of a critical input (interconnection) to new entrants; and
- a competitor against new entrants in downstream retail and value-added markets.

The incumbent could advantage itself in the downstream markets through discrimination for similar services , eg charging new entrants more for interconnection than it effectively charges itself. *Non-discrimination* in interconnection charges by a dominant network operator needs, therefore, to be fundamental element of the interconnection regime. There needs also to be non-discrimination in other important aspects of the arrangements, such as the quality of network services and numbering (eg equal access, such as dialling parity or carrier pre-selection, for indirect access (long distance operators)).

9.2 Furthermore, the incumbent serves a range of markets, some of which may be open to competition but others that may remain. There is a concern, therefore, that the incumbent might beat the competition not by being more efficient or providing a better service to customers, but by cross-subsidizing from monopoly markets to the services subject to competition. The regulatory regime needs, therefore, to be able to identify and prevent unfair- *subsidies*.

9.3 A cross-subsidy is deemed to exist if the revenues from supplying a service are not enough to cover cost, including a reasonable return on capital employed. From an economic standpoint the relevant cost is total service long run incremental cost (TSLRIC). The rule is that as long as the total service long run incremental cost of supplying the service is equal to or less than the revenues generated from supplying the service, the service is profitable since the firm is better off by continuing to supply the service than by withdrawing it. But if revenue exceeds TSLRIC, the provision of the service does not impact negatively on the firm's profitability and so there is no subsidy.

9.4 In the absence of robust TSLRIC information, it would be necessary in practice to use the available cost information to assess the existence of cross-subsidies. It could be that, for example, only fully distributed cost (FDC) information exists, in which case here the price of a service was less than its FDC there would be a prima facie case that a cross-subsidy existed.

9.5 Not all subsidies are necessarily unfair or anti-competitive. Some may have existed for a substantial period of time, such as the likelihood that CWJ's line rental is below cost. Other subsidies may have economic justifications. For example, it could be efficient to

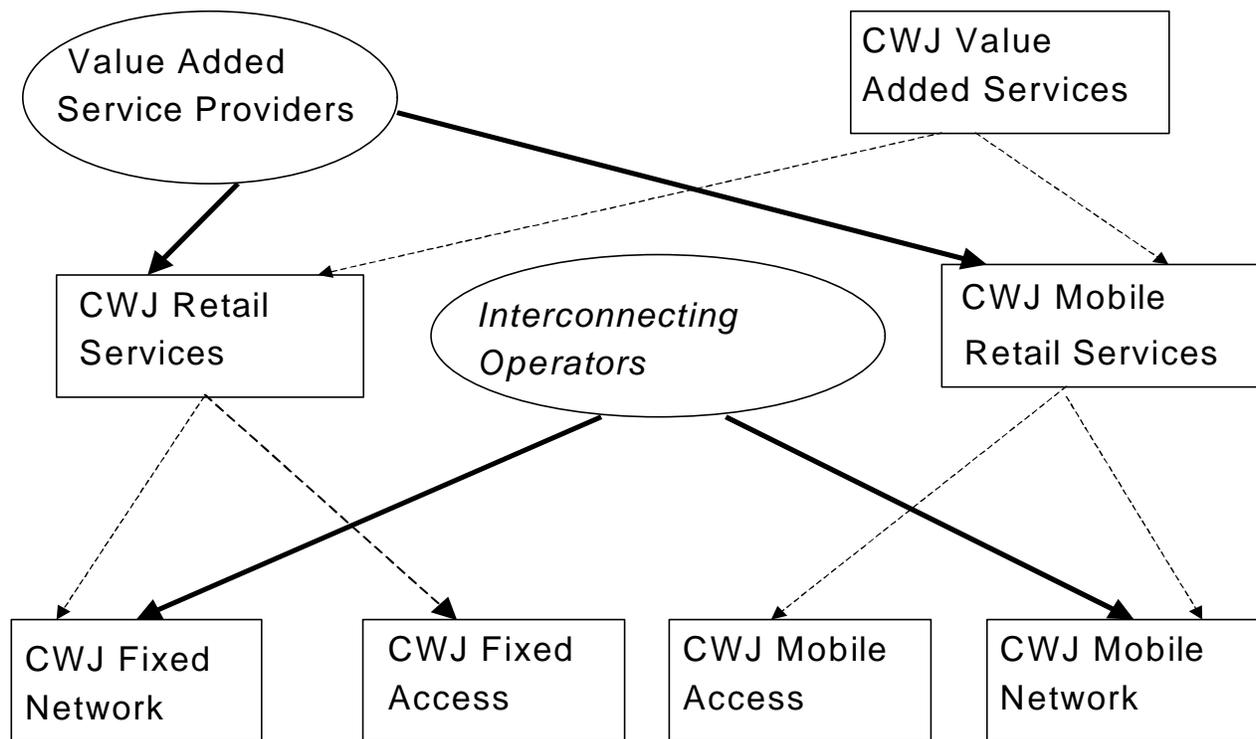
set the price of directory assistance calls below cost, if such calls generate additional calls on which a profit is earned. Whether a subsidy is unfair or anti-competitive needs to be judged in the context of the relevant market and whether dominance exists (see Annex C).

Accounting Separation

- 9.6 The enforcement of non-discrimination in interconnection charges requires a separation in the incumbent's activities between the business or activity supplying interconnection services (such as the network) and the business or activity such as retail services using or 'purchasing' similar services. In this way the transfer charges paid by one business to the other can be explicitly identified and it can be ensured that the incumbent is charging itself the same for the same service, as it charges interconnecting operators. The identification of cross-subsidies requires a separation between the incumbent's monopoly services and its services subject to competition. The question is which is the most appropriate mechanism to achieve these requirements.
- 9.7 There are three main options:-
- Ownership separation;
 - Structural Separation; and
 - Accounting separation.
- 9.8 Ownership separation would mean that there would be different owners of the interconnection supply and interconnection purchasing businesses, and of the monopoly and competitive services. It would require divestment of substantial chunks of the incumbent's existing activities. The main advantage is that, unlike the other options, it would remove the *incentive* to engage in the types of anti-competitive behavior identified. However, even if there were the legal powers to implement, the OUR does not consider that this course of action would be appropriate. It would be costly and highly disruptive. It would result in the loss of economies of scope between the businesses, and so would raise industry costs. Moreover, the regulatory objectives identified can be adequately achieved by one of the other options.
- 9.9 With structural separation the incumbent would be required to establish separate business units for interconnection supply and interconnection purchasing and for monopoly and competitive activities. The business units could all remain under common ownership, but this would mean that the incumbent would have to organize the way it ran its operations in a particular way. Although structural separation would achieve the objectives, it has a number of drawbacks. It would impose costs of reorganization on the incumbent, which would be disruptive. It could require the incumbent to operate its activities in ways that it did not wish to and could be inefficient (eg through the loss of economies of scope). It could be complex to implement, because it would require a definition of exactly what is meant by 'separate', that is the degree of separation of management, business systems, and facilities that is required by the regulator.

Furthermore, the OUR considers that, unless no other option is available to implement a necessary regulatory requirement, it is inappropriate for the regulator to interfere in the way that an operator chooses to operate its activities and run its business. The operator should be free to organize its business in whatever form it so desires, so long as competitors have adequate protection against anti-competitive behavior. The OUR considers that this regulatory objective can be satisfied by using accounting separation.

Figure 9.1: Illustration of Accounting Separation - External and Transfer Prices



CWJ Value Added: value added services
CWJ Fixed Retail: intra-Parish calls, inter-Parish calls, international calls
CWJ Cellular Retail: mobile calls
CWJ Fixed Network: interconnection services
CWJ Fixed Access: lines (local loop) and other line driven costs, eg line card
CWJ Cellular Access: costs driven by number of connections not traffic

9.10 Accounting separation is the most common tool used worldwide to address the concerns identified about anti-competitive behavior. Under this approach, the operator's activities are split for accounting purposes into separate businesses or services. The key difference from structural separation is that it does not impose on the operator a set of rules about how its activities should be organized, but simply how accounting information is to be collected and reported. The transfer charges from one business to another can be explicitly identified, allowing non-discrimination to be enforced, and the profitability of particular businesses or services can be monitored, allowing cross-subsidies to be

identified. Accounting separation would also ensure a systematic division of costs between retail and network. Ensuring that the cost base for interconnection charges included only relevant costs. It would also form a sound basis for the production of robust cost information on the main retail services required to support decisions on tariff rebalancing.

- 9.11 Figure 9.1 provides an illustration of accounting separation, focusing on the identification of transfer prices and the non-discrimination condition. External prices, ie prices charged by the incumbent to interconnecting operators and service providers are shown by unbroken lines. Transfer prices from one of the incumbent's accounting businesses to another are shown in dotted lines. For the purposes of Figure 9.1, it has been assumed that interconnection charges to value-added service providers are derived as retail prices (minus a discount), and so are paid to the retail business. To allow proper identification of cross subsidies, there might need to be disaggregation within the businesses shown to identify the costs and revenues of (say) particular value-added services.
- 9.12 One possible disadvantage of accounting separation is that it imposes a regulatory cost on the incumbent to develop a suitably detailed and disaggregated accounting system. The cost incurred would be included as a relevant cost in assessing retail and interconnection prices. A potentially less costly approach would be to define a minimum set of information that would be essential and require additional information to be made available by CWJ only on specific request. For example, CWJ analysing costs as and when required by the OUR, such as triggered by an allegation of anti-competitive behaviour. The minimum set of information might comprise:-
- Robustly derived cost base for interconnection charges, separating network costs from access and retail costs, and deriving the costs of network elements, such as local switches, tandem switches, and transmission.
 - An ability to obtain properly derived cost information disaggregated down to individual services, in order to be able to implement imputation tests (see below).
 - The costs of the main retail services to inform judgements about tariff rebalancing (and charges to VASPs, if cost based).
- 9.13 If CWJ wished to follow up possibilities such as interconnection surcharges for the costs of universal service and the access deficit, it would need to provide additional cost and revenue information (highly disaggregated in the case of universal service costing). Given this, it is possible that the further demands of accounting separation, such as robust and audited transfer charges between defined businesses, might impose relatively little additional implementation costs.
- 9.14 The OUR considers that separated regulatory accounts are likely to be required for it to be able to discharge the functions and duties that GOJ's Telecommunications Policy sets out. Experience around the world has shown that the type of anti-competitive concerns as described above do arise. Without setting in place regulatory accounting

requirements in advance, when a possible problem arises there is a risk that OUR would lack the necessary information to analyze the issue. Any cost information obtained would be on an ad hoc basis and could consequently lack robustness and credibility. However, the cost of developing the necessary accounting systems would be a relevant consideration in deciding the appropriate timeframe for the introduction of separated accounts and their level of detail and disaggregation.

Q9.1 What measures, such as accounting separation, should be adopted to identify discrimination in charges and cross-subsidies and what should be the timetable for their introduction?

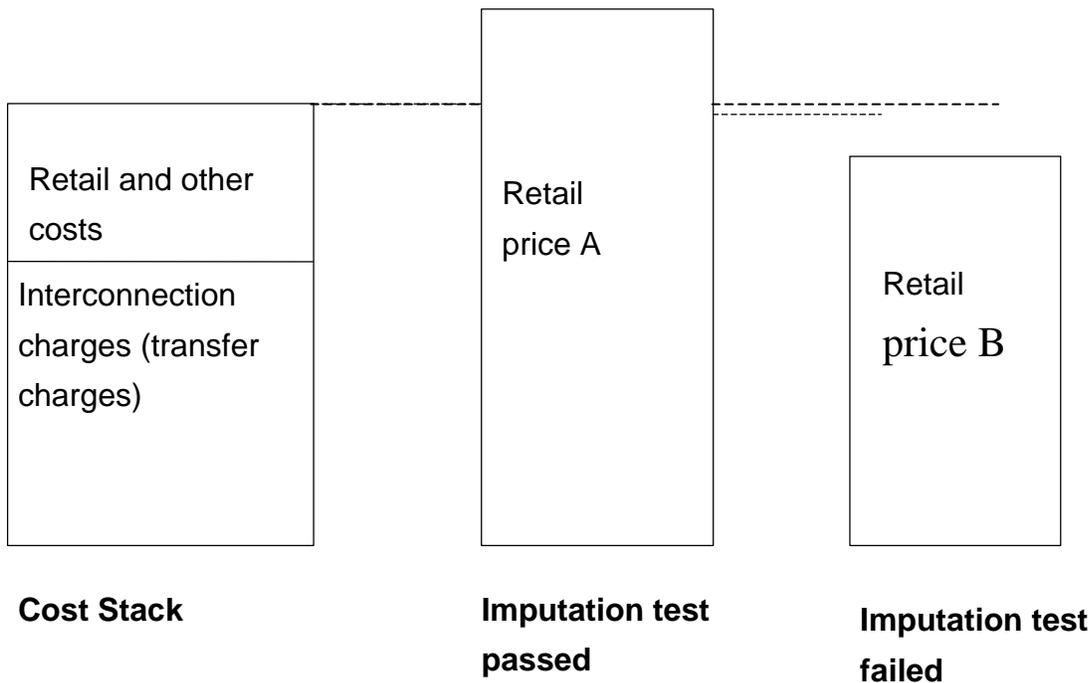
- 9.15 One drawback of accounting separation compared to ownership separation is that it does not remove the incentive to engage in anti-competitive behavior. Given this and the range of possible accounting practices to attribute and allocate costs, a number of measures are needed to enhance the robustness of the regulatory accounts. The accounts should be audited to a high standard. The nature of the audit opinion and the auditor's terms of reference should be developed by the regulator in conjunction with the incumbent. The regulatory accounts should be reconciled to the company's statutory accounts. The accounting principles and allocation methods used should be documented. The accounts should be published, as should the documentation of the principles and methods used. All of the above represent regulatory best practice, for example in place in the UK.
- 9.16 In some countries imputation tests are applied before the incumbent is permitted to introduce a new or changed retail price (eg the UK). Another option would be to apply imputation tests on a case-by-case basis as and when required, for example if a concern is raised that one particular retail price charged by the incumbent involves a price squeeze. In either case, it would be necessary for the incumbent to ensure that it collects in the appropriate form and level of disaggregation the information necessary to apply the test.

Imputation Tests

- 9.17 It is important to establish not only that the transfer charges from one of the incumbent's businesses to another are calculated in a non-discriminatory manner, but also that these are treated by the incumbent as 'hard' charges and not simply paper accounting transactions. In other words, when the incumbent sets the prices for the retail and value-added services that purchase network services, it must treat the transfer charges as real costs that need to be recovered. Otherwise, a price squeeze may be occurring: because of the incumbent's discriminatory pricing behavior, the margin between the interconnection charges and the incumbent's retail price, against which the entrant is competing, may be insufficient to allow an efficient competitor to make a profit. This would constitute a distortion of competition.
- 9.18 A widely used technique to ensure that such price squeezes are not occurring is the

'imputation test'. For each service subject to competition, the retail price charged by the incumbent is compared against the 'stack' of costs incurred to provide that service, as shown in Figure 9.2. These costs comprise the transfer interconnection charges for that service plus its retail costs (and any other relevant costs). The interconnection charges relevant to the service are calculated using the same charges as paid by interconnecting operators, and depend on the particular interconnection services that it uses as inputs. The imputation test is failed if the retail price charged by the incumbent fails to cover the stack of costs. If so, the incumbent must take action to remove the price squeeze. This would be achieved either by lowering by a sufficient amount interconnection charges, not only to itself but to all other interconnecting operators purchasing the relevant interconnection services, or by increasing by a sufficient amount the retail price in question.

Figure 9.2: Illustration of Imputation Test



Q9.2 *Should imputation tests be applied to the incumbent's retail prices? If so, should they be applied to before any new or changed price is introduced or only as and when concerns about anti-competitive pricing arise?*

Confidentiality

9.19 In order to facilitate the provision of interconnection services by the incumbent, the entrant may be required to provide information that is confidential and commercially sensitive. For example, to permit the incumbent to undertake proper network planning, it may need detailed information from the entrant on current and expected traffic volumes,

its time of day profile, its geographical pattern, etc. The confidentiality of such information needs to be respected by the incumbent. It must not be disclosed to the entrants' competitors, including the incumbent's own retail and/or value-added businesses. Such disclosure could constitute a distortion of competition.

- 9.20 Interconnection agreements should contain suitable confidentiality commitments, and where the incumbent passes confidential information to the entrant for interconnection purposes, the entrant should also undertake a similar commitment. In addition, since the incumbent will at least initially be dominant in both network and retail markets, it should demonstrate to the OUR and interconnecting operators and service providers that it has put in place stringent procedures to ensure its compliance with the confidentiality commitment.

Q9.3 What mechanisms and/or procedures should the incumbent be required to put in place to ensure that it respects the confidentiality of information supplied to it for interconnection purposes?

Conclusion

- There need to be safeguards to ensure non-discrimination, especially in charges, and that the incumbent does not engage in unfair cross-subsidies.
- The OUR favours accounting separation to enable the necessary information to be made available and to be robust.
- Imputation tests are important because they ensure that transfer charges are 'hard' charges and not just accounting flows.
- It needs to be ensured that operators do not use in an anti-competitive fashion information that they receive from other operators for interconnection purposes.

CHAPTER 10: REFERENCE INTERCONNECTION OFFER (RIO), NEGOTIATION AND DISPUTE RESOLUTION

Reference Interconnection Offer (RIO)

- 10.1 To address the incumbent's incentive to delay access to its networks in an effort to frustrate the entry of new players into the market, who will be competing against it should produce for general circulation separate Reference Interconnection Offers (RIOs) for its fixed and mobile networks, both of which are currently dominant. These Offers should also cover those facilities of the incumbent to be shared with entrants. The RIO will be available to all interested parties free of cost. The cost of preparing and distributing these manuals will be borne by CWJ, but it will be allowed in the cost base for interconnection charges. The OUR is of the view that there are benefits to be had by requiring the dominant networks to produce and make available RIOs:-
- to provide new entrants with sufficient information about the incumbent's network which can be used to make informed business decisions, example to plan its interconnection requirement ;
 - to ensure that new entrants wishing to interconnect with a dominant network are initially presented with a standard offer against which they may negotiate and do not have to start from scratch in negotiations; and
 - to assist in ensuring non-discrimination among interconnecting operators through the publication of a standard offer.
- 10.2 Interconnection agreements should refer to the OUR as the agency with responsibility for dispute resolution.
- 10.3 Rulings by the OUR should become part of the interconnection agreement.

Contents of a typical RIO

- 10.4 The RIO and interconnection agreements should specify the following. This list is not intended to be exhaustive, so the RIO and agreements may include specifications of other factors.
- General Principles:*
- 10.5 Commercial and financial relations, including the terms of billing and collection procedures; requirements concerning the exchange of information between the two operators; requirements concerning the use of information exchanged between the two operators for the purpose of interconnection; definition and limitation of liability and indemnity between operators; procedures to be followed in the event of alterations being proposed to the interconnection offer or agreement by one of the parties.
- Technical Characteristics:*
- 10.6 CWJ is to make the following information available to entrants on its network infrastructure: comprehensive technical description of the interconnect interface,

including the signaling protocol used; measures or restrictions required to ensure network security or integrity; billing information supplied at the interconnect interface; the quality of the services provided, including availability, security, efficiency, and synchronization; full details of the points of interconnection available and their location; description of the physical arrangements for the interconnection; traffic routing arrangements; arrangements for clearing and recording faults.

Description of Interconnection Services to be provided:

- 10.7 List of interconnection services offered to value-added service providers and public network operators; full description of each interconnection service; conditions governing access to services; conditions governing physical or virtual co-location.

Schedule of Charges for Interconnection Services:

- 10.8 The full charge for each interconnection service - where relevant broken down into or built up from the charges for the network components; where relevant, showing the different charges for the same service depending on time of day or day of week; surcharges must be shown separately; the charging unit (eg. per second).

Arrangements for the Establishment of Interconnection:

- 10.9 Conditions governing service provision: traffic forecasting arrangements and the implementation of interconnection interfaces; arrangements for the reciprocal sizing of the interface equipment and the systems common to each network so as to maintain the quality of service provided and network integrity; arrangements for testing the operation of interfaces and the interoperability of services; deadline for interconnection to be established following receipt of a request.

Other:

- 10.10 Where appropriate, billing services for third parties (example, arrangements for billing on behalf of service providers); arrangements for dispute resolution, including the right of either party to request the OUR to resolve a dispute.

Q10.1 What provisions should be included in a Reference Interconnection Offer?

- 10.11 The dominant firm should consult with the OUR prior to the RIOs becoming effective in order for there to be a check that the minimum requirements have been satisfied. A possible drawback to this approach is that OUR may 'sign off' on a document but later find that there are material deficiencies, eg following comments or concerns raised by new entrants. The consultation with the OUR would therefore be 'without prejudice' to subsequent changes being required, if the case for such changes can be proven. Any subsequent changes should not adversely affect those interconnected to the network prior to the changes.

Negotiation

- 10.12 Each RIO should contain a section setting out the procedure for initiating and conducting

negotiations over interconnection agreements. It should specify how a request for interconnection is to be made, to whom it is to be sent, and the information that needs to be included in the application. Ideally, the RIO should contain a standard application form for an interconnection request, which an applicant should complete.

10.13 The RIO should set out that confirmation of the receipt of an application for interconnection is to be issued by CWJ within a specified number of working days, such as five (5). The confirmation should either state that all of the necessary preliminary information has been provided by the applicant, or should specify which further information needs to be provided. CWJ should set out in writing to the applicant a suggested date and time for the commencement of the negotiation. The negotiation should commence within a specified number of days, such as ten (10), from the receipt of all the required preliminary information from the applicant.

10.14 The RIO should include guideline timings for the completion of negotiations. These may vary depending upon the nature of interconnection requested by the applicant. The more complex the interconnection requested, the longer the timeframe for concluding negotiation. In the OUR's a specified timeframe should elapse before a submission could be made to the OUR to resolve a dispute. The OUR proposes three calendar months from the date when negotiations should have started. For details of the dispute resolution procedure, see below under Settlement of Disputes.

Q10.2 How should the negotiation process for interconnection agreements operate, and how long should be allowed for each stage of the process?

Publication Requirement

10.15 In the interest of transparency and to assist in ensuring that interconnection agreements are non-discriminatory, the OUR considers that the public availability of agreements should be desirable. Interconnection agreements are to be submitted to the OUR within [five (5)] working days following signing. Any of the parties to an agreement may, upon submission, indicate the provisions that they considers trade or operating secrets. In such case, the party shall provide the OUR with an additional submission containing a variation of the agreement which does not, in that party's opinion, disclose sensitive business and trade secrets. If the OUR does not consider the request for confidentiality justified, it shall consult with the submitting party prior to taking a decision on allowing third parties to inspect the agreement.

Q10.3 What limits (if any) should there be on the publication of interconnection agreements?

Settlement of Disputes

10.16 Failure to arrive at an interconnection agreement or in the event of dispute arising subsequent to the conclusion of an interconnection agreement, either party may refer

the dispute to the OUR. The OUR's initial views of how the dispute resolution process should operate are as follows. First, an operator would need to send the OUR a request for dispute resolution. This request would need to include:-

- the reason(s) for the disagreement. This must be substantiated;
- what network services were requested, and on which issues agreement failed to be reached;
- full description of the complaint, including in particular, what attempts have been made to reach agreement before referral to OUR;
- essential information about the dispute which is the subject of the complaint;
- an indication of what is sought from OUR and why regulatory intervention is appropriate; and
- name, address, telephone number and facsimile number of the parties to the dispute and their designated representatives.

10.17 OUR will acknowledge receipt of the request for dispute resolution within five (5) working days.

10.18 OUR will decide on the case taking into account the interests of both parties and the principles and approaches to be set out in the Interconnection Guidelines such as:-

- the need to ensure satisfactory end-to-end communications for users;
- the needs of the seller and buyer of interconnection services,
- resources and market power;
- the need to stimulate innovation;
- the need to stimulate a competitive market; and
- protect the integrity of the network as well as interoperability.

10.19 The OUR will gather evidence from the parties to the dispute and other affected or interested parties. It will seek to reach a draft decision within three months of the request for dispute resolution or the complaint. Some investigations may be concluded in a shorter period, but others involving especially complex issues, or where time is required to obtain important evidence, may take longer than three months. But the OUR should reach a draft decision on all matters within six months.

10.20 The OUR proposes that the draft decision will usually be made available publicly in writing including the underlying reasoning, and interested parties will have a period of fourteen days within which to make also their final representations in writing. Shortly thereafter the OUR will issue its final decision which will be publicly available. When the matter is private between the two parties to the dispute and has or is likely to have no wider implications for others (eg setting a precedent for provisions in other interconnection agreements) then the draft decision might only be made available to the parties to the dispute. Once a decision is arrived at it should be implemented within a period not exceeding 30 working days from the date of the announcement. However, the OUR may extend this period if either party can put forward convincing evidence that it is

incapable of complying with the specified timeframe.

Q10.4 How should the OUR's dispute resolution process be structured and how long should be allowed for each stage?

10.21 Many of the disputes about interconnection agreements would have regulatory aspects or implications that make the OUR the appropriate body to resolve the dispute. But some might be about purely commercial matters on which the OUR is not best suited to adjudicate. In such cases, although an application can be made to the OUR for dispute resolution, the parties are encouraged to find mutually acceptable alternative bodies more suited to the task, with the requisite mediation or arbitration skills.

CHAPTER 11: LIST OF CONSULTATION QUESTIONS

The role of the OUR in interconnection

- Q1.1 Is there need for the OUR to intervene even when there is agreement between the parties?

Connection issues

- Q3.1 Do respondents agree with the OUR's position that CWJ should not have responsibility for CPE approval?
- Q3.2 What approval mechanism should be adopted for CPEs?
- Q3.3 What regulatory approach should OUR adopt in dealing with the issue of "leaky PBXs"?
- Q3.4 What balance should be struck between CWJ's investigation rights and the burden of proof required for enforcement action, such as disconnection, to prevent bypass of settlement rates?
- Q3.5 What role should the OUR play in the process of identifying and taking action against those allegedly engaged in bypass of the settlement rate system via "leaky PBXs"?

Principles of interconnection

- Q4.1 In developing a regulatory framework for interconnection, what should be the objectives of the OUR?
- Q4.2 What principles should apply to interconnection agreements between entrant and incumbent?

Interconnection services

- Q5.1 OUR would be interested to hear from actual or potential VASPs who consider that their needs or wishes would go beyond normal retail services. If so, they are invited to indicate the type of additional functionality required and why.
- Q5.2 How should the unbundling requirement be satisfied?
- Q5.3 What interconnection services should be provided by dominant mobile networks?
- Q5.4 What facilities should be subject to sharing between operators and under what circumstances?

Interconnection charges for VASPs

Q6.1 How should interconnection charges to value added service providers be set?

Interconnection charges for public network operators

Q7.1 How should cost oriented interconnection charges be defined?

Q7.2 To what extent should OUR rely upon accounting data (top-down) or cost modelling (bottom-up) if required to derive cost oriented charges?

Q7.3 Should interconnection charges reflect efficient or incurred costs? Please explain the reasons for your view.

Q7.4 What use should the OUR make of cross-country comparisons of interconnection charges?

Q7.5 What cost measurement methods and cost standards should be used by OUR in the short, medium and long run when resolving disputes about interconnection charges?

Possible interconnection surcharges

Q8.1 Should (the customers of) new entrant public networks be exempt from making universal service contributions and, if so, for what period of time?

Q8.2 If charges to VASPs are directly cost-based, should (the customers of) value added service providers be exempt from making universal service contributions?

Q8.3 Should universal service funding arrangements use a surcharge on interconnection payments to CWJ, or a specially created Universal Service Fund?

Q8.4 Should access deficit charges (ADCs) be considered a legitimate surcharge and why? If so, how should ADCs be calculated and to what end-use calls should they be applied?

Ensuring non-discrimination and fair competition

Q9.1 What measures, such as accounting separation, should be adopted to identify discrimination in charges and cross-subsidies and what should be the timetable for their introduction?

Q9.2 Should imputation tests be applied to the incumbent's retail prices? If so, should they be applied to before any new or changed price is introduced or only as and when concerns about anti-competitive pricing arise?

Q9.3 What mechanisms and/or procedures should the incumbent be required to put in place

to ensure that it respects the confidentiality of information supplied to it for interconnection purposes?

Reference interconnection offer, negotiation and dispute resolution

Q10.1 What provisions should be included in a Reference Interconnection Offer?

Q10.2 How should the negotiation process for interconnection agreements operate, and how long should be allowed for each stage of the process?

Q10.3 What limits (if any) should there be on the publication of interconnection agreements?

Q10.4 How should the OUR's dispute resolution process be structured and how long should be allowed for each stage?

QD.1 What published information on interconnection charges is available that is missing from the OUR's analysis? Provision of such information, or identification of the source from which it could be obtained would be especially helpful.

QD.2 How could the approach used by the OUR to compare interconnection charges across countries be improved?

ANNEX A: EXTRACTS FROM (1) WTO REFERENCE PAPER, AND (2) GOVERNMENT OF JAMAICA'S TELECOMMUNICATIONS POLICY

1. Extract from WTO Agreement on Basic Telecommunications Services, Reference Paper

Scope

The following are definitions and principles on the regulatory framework for the basic telecommunications services.

Definitions

Users mean service consumers and service suppliers.

Essential facilities mean facilities of a public telecommunications transport network or service that

- (a) are exclusively or predominantly provided by a single or limited number of suppliers; and
- (b) cannot feasibly be economically or technically substituted in order to provide a service.

A major supplier is a supplier which has the ability to materially affect the terms of participation (having regard to price and supply) in the relevant market for basic telecommunications services as a result of:

- (a) control over essential facilities; or
- (b) use of its position in the market.

1. Competitive safeguards

1.1 Prevention of anti-competitive practices in telecommunications

Appropriate measures shall be maintained for the purpose of preventing suppliers who, alone or together, are a major supplier from engaging in or continuing anti-competitive practices.

1.2 Safeguards

The anti-competitive practices referred to above shall include in particular:

- (a) engaging in anti-competitive cross-subsidization;
- (b) using information obtained from competitors with anti-competitive results; and
- (c) not making available to other services suppliers on a timely basis technical information about essential facilities and commercially relevant information which are necessary for them to provide services.

2. Interconnection

2.1 This section applies to linking with suppliers providing public telecommunications transport networks or services in order to allow the users of one supplier to communicate with users of another supplier and to access services provided by another supplier, where specific commitments are undertaken.

2.2 Interconnection to be ensured

Interconnection with a major supplier will be ensured at any technically feasible point in the network. Such interconnection is provided.

- (a) under non-discriminatory terms, conditions (including technical standards and specifications) and rates and of a quality no less favourable than that provided for its own like services or for like services of non-affiliated service suppliers or for its subsidiaries or other affiliates;
- (b) in a timely fashion, on terms, conditions (including technical standards and specifications) and cost-oriented rates that are transparent, reasonable, having regard to economic feasibility, and sufficiently unbundled so that the supplier need not pay for network components or facilities that it does not require for the service to be provided; and
- (c) upon request, at points in addition to the network termination points offered to the majority of users, subject to charges that reflect the cost of construction of necessary additional facilities.

2.3 Public availability of the procedures for interconnection negotiations

The procedures applicable for interconnection to a major supplier will be made publicly available.

2.4 Transparency of interconnection arrangements

It is ensured that a major supplier will make publicly available either its interconnection agreements or a reference interconnection offer.

2.5 Interconnection: dispute settlement

A service supplier requesting interconnection with a major supplier will have recourse, either:-

- (a) at any time or
- (b) after a reasonable period of time which has been made publicly known to an independent domestic body, which may be a regulatory body to resolve disputes regarding appropriate terms, conditions and rates for interconnection within a

reasonable period of time, to the extent that these have not been established previously.

2. Extract from the Government's Telecommunications Policy: A Framework

Interconnection

This is a complex area as the Government must balance two competing policies, namely the preservation of a monopoly in basic voice wire line telephone communications and the promotion of competition in other services to ensure efficiency, innovation and economic growth.

Interconnection will be divided into three classes:-

- Class 1: This is the connection or attachment of Customer Premise Equipment (CPE), the connection of private networks and the interconnection of value added or enhanced service providers. For example, pre-paid calling cards, PBX and Internet Services.
- Class 2: This is the connection of new public fixed long distance or local networks. For example Jamaica Digiport.
- Class 3: This is the connection of cellular networks and other wireless systems, and the connection of satellite systems.

Interconnection will be permitted in all classes except basic voice wire line telephony, which is a sub-category of Class 2.

The OUR will develop and make available guidelines which should be used in commercial negotiation of the terms and conditions of interconnection contracts between the entrant and the incumbent PTC. If an agreement cannot be reached, either of the parties will be able to refer the matter to the Regulator for resolution.

In carrying out its functions, the Regulator should have regard to the following guiding principles:-

- 1 Non-discrimination. To ensure fair competition, there should be non-discrimination in the charges for and quality of interconnection that the incumbent PTC offers to itself and to others.
2. Fair terms and conditions. Technical standards and specifications should be reasonable and appropriate points of interconnection should be made available. Charges should be cost oriented, and interconnection services should be sufficiently unbundled that the purchaser need not pay for components or facilities that it does not require.
3. Inclusion of relevant elements in the charge. In addition to the cost of provision of interconnection services, the Regulator may also take into account, as appropriate, the net cost to the PTC in providing Universal Service and requirements to provide free

access to the emergency services, and constraints on the rebalancing of rates.

4. Transparency. Interconnection agreements or a reference interconnection offer by the incumbent PTC should be made publicly available, setting out the basis on which interconnection will be provided. All elements of the charges to be paid for interconnection should be explicitly identified, and sufficient information should be made available to justify the charges, within the reasonable bounds of commercial confidentiality.

Interconnection will be required to ensure access to the incumbent PTC's public telephone infrastructure in a fair and non-discriminatory manner, with recourse to the Regulator in case of dispute.

ANNEX B: COST STANDARDS AND CHARGING METHODOLOGIES

1. Four cost standards or charging methodologies are discussed:-
 - (i) Fully Distributed Cost (FDC);
 - (ii) Total Service Long Run Incremental Cost (TSLRIC) and Stand Alone Cost (SAC);
 - (iii) Efficient Component Pricing Rule (ECPR); and
 - (iv) Ramsey Prices.

In the case of the first three, the discussion in this Annex adds further detail but generally does not repeat the points made in Chapter 7.

Fully Distributed Cost (FDC)

2. One critical set of issues in assessing the usefulness and applicability of FDC accounts produced CWJ will be the appropriateness of the attribution and allocation methods used. Regulatory experience around the world has shown that the analysis and improvement of allocation methods is a long and ongoing regulatory task. Where regulatory decisions are taken on the basis of accounting information, the quality and characteristics of that information are critical, and this often depends in large part upon the particular allocation methods employed. Furthermore, regulatory decisions typically affect not only the incumbent but also new entrants, who consequently have a legitimate interest in the incumbent's accounting methods. As much transparency as is consistent with the incumbent's legitimate commercial confidentiality is required, both in the cost and revenues figures derived in the FDC accounts and in the accounting principles and methods involved.
3. In terms of asset valuation, the best measure from the economic perspective would be the cost of the Modern Equivalent Asset (MEA). Under the MEA approach the asset in place is valued at the cost of replacing it with the asset incorporating the cheapest proven technology that serves the same function. Where technology is rapidly changing, as in telecoms,, the MEA would often embody a more up-to-date technology than the firm's existing asset. It would need to be established to what extent CWJ's accounting methods use the MEA approach.
4. In terms of depreciation, CWJ's accounting methods do not recognise holding gains and losses (which may reflect the lack of current cost accounting standards in Jamaica). The holding gain or loss is the change in the asset valuation between years. If the replacement cost of the asset declines, there is a holding loss and, to ensure consistency between the profit and loss and balance sheet, it should be taken through the profit and loss account by increasing the amount of depreciation. Otherwise, if prices were set equal to accounting cost in every year of the asset's life, the company would not get back its investment, including a reasonable return on capital. If the replacement cost of the asset were to increase, there would be holding gains, which should reduce the amount of depreciation - otherwise, the company would receive too large a return. Including holding gains and losses in depreciation is the approach in countries with well

developed current cost accounting standards ²², eg in the UK where the incumbent is required to produce regulatory accounts on a replacement cost basis.

Total Service Long Run Incremental Cost (TSLRIC)

5. One important difference between the FDC and TSLRIC approaches is that the sum of the TSLRICs of all of the services (including interconnection services) is less than the total costs of the company. The remaining cost are the common costs (sometimes also referred to as joint costs). Where the regulator is involved in setting (or approving) prices based on TSLRIC, one key question is whether there should be mark-ups over TSLRIC to allow the recovery of common costs and, if so, how the mark-ups should be calculated. The argument for including mark-ups is that TSLRIC merely gives the *minimum* price in a perfectly contestable market. So long as the operator's revenues from the service exceed the TSLRIC, the service makes a net contribution to profits and the operator is better off by continuing to supply the service than by withdrawing it. But, as has already been noted, if the operator were to set the price of all of its services equal to the respective average TSLRIC s, it would make a loss because it would fail to recover its common costs. The operator should have the opportunity to recover its common costs, which means by definition that the price of some of its services must be above their average TSLRICs.

6. To implement TSLRIC an important decision to be made is the definition of the increment, ie the 'service' in Total Service LRIC. It could be the switching and transmission network as a whole, as in Hong Kong and the UK, or each network element could be defined as a separate increment, as in the USA (or each individual interconnection service could be taken as a separate increment). In the latter case, intra-network common costs, ie between the different elements (or services), would be explicitly identified and an appropriate way to recover such costs would need to be found when setting prices. Such intra-network common costs are quite distinct from the common costs between the network and access or retail services, which give rise to the need for a mark-up, as discussed above. If the increment was defined as the switching and transmission network as a whole, the costs derived would (by definition) include the intra-network common costs.

Efficient or incurred cost

7. One other issue is whether TSLRIC should assume 'best practice', the most efficient, commercially available method of providing the service. On this issue there are differences among the countries that have implemented TSLRIC. For example, the definition of cost used in the USA is the efficient level of TSLRIC, whereas in the UK the cost measure used is the incumbent's incurred TSLRIC which is higher than the efficient TSLRIC to the extent that the incumbent is less than perfectly efficient.²³ This issue

²² Under the Financial Capital Maintenance principle.

²³ It is important to note that the TSLRIC used in the UK is a measure of economic costs, eg the asset valuation approach used in the UK is essentially MEA. Differences arise from the efficient level of costs in two respects. First, the replacement cost of the assets deployed by the incumbent is measured - the incumbent may use more of an asset than the fully efficient level.

raises both practical and conceptual questions.

8. It might be argued that the efficient level of cost is more difficult to identify because it typically depends upon controversial judgements or comparisons with other companies or operators in other countries. In one sense, this is avoided by using accounting based information which reflects recorded and verifiable cost. However, cost measures derived from accounting systems involve myriad subjective judgements even where the attempt is just to derive the casually related costs of the service.
9. Conceptually, the choice in setting charges is between using the efficient level of costs or the cost of the resources actually deployed. This involves a trade-off between allocative and productive efficiency. For allocative efficiency the incurred cost should be used, because this measures the cost of the resources used. This is the appropriate signal for interconnecting operators, who should be encouraged to build out their networks and use less interconnection from the incumbent, if they can do so using fewer resources than the incumbent. However, incentives for productive efficiency, for the incumbent to reduce its costs, may be lost if charges are set at the incumbent's incurred cost. In the UK, where incurred costs were used to set initial interconnection charges, the question of incentives for productive efficiency have been addressed using an additional regulatory tool, because interconnection charges are regulated by price caps.

Efficient Component Pricing Rule (ECPR)

10. ECPR states that the interconnection charge should be the sum of average incremental cost of the interconnection service and the net revenue foregone by the incumbent (or its 'opportunity cost') by providing interconnection.

Advantages

11. The key rationale underlying ECPR is that under certain assumptions, it provides an efficient entry signal. If the entrants' cost of providing the retail service was lower than the incumbent's (excluding the cost of the interconnection service), then there would be a profitable entry opportunity. If the entrant has higher costs than the incumbent, entry at interconnection charges determined according to the ECPR would be unprofitable. Hence, the proponents of the ECPR argue that it encourages efficient entry and deters inefficient entry.
12. Other advantages of ECPR have been claimed. It is sustainable in the sense that it ensures that the incumbent is able to recover all of its cost. Any profit lost by the incumbent on a retail service is, by construction, obtained from the price at which interconnection is sold. So, the incumbent earns the same profitability regardless of whether it succeeds in retail markets where it faces competition. It could be argued that, as a result, the incumbent would be less likely to attempt to shield liberalized markets from competition, except of course interconnection markets. It has also been suggested

Second, the operating costs included are those incurred by the incumbent (and casually related to the service) - the incumbent may have a degree of operational inefficiency.

that ECPR charges are relatively easy to calculate and so straightforward to implement.

13. Another characteristic of ECPR charges is that they guarantee a margin for the entrant between the incumbent's retail price (against which it is competing) and the interconnection charge it pays to the incumbent. This can be demonstrated by an equivalent restatement of the ECPR. As described above, under ECPR the interconnection charge is the sum of the average incremental cost of interconnection and the incumbent's net retail revenue foregone. The latter is the retail price less the cost incurred by the incumbent, comprising the average incremental cost of the interconnection service (which the incumbent also uses for itself) and other average incremental costs (both retail and network costs, as applicable). Then the interconnection charge under ECPR can also be stated as the incumbent's retail price less these other incremental cost:-

$$\begin{aligned}\text{Interconnection charge} &= \text{AIC interconnection} + \text{net retail revenue foregone} \\ &= \text{AIC interconnection} + (\text{retail price} - \text{AIC interconnection} - \text{AIC other}) \\ &= \text{retail price} - \text{AIC other}\end{aligned}$$

Note: AIC stands for average total service long run incremental cost

14. One implication is that, in principle, ECPR allows for competition even in the incumbent's retail services that are loss-making, because the interconnection charge is always less than the retail price. The explanation of this under the earlier formulation of the ECPR is that the incumbent's net revenue foregone from losing one unit of a loss-making retail service to a competitor is negative (ie the incumbent would be better off by losing sales to a competitor), so the interconnection charge is less than the average incremental cost of providing interconnection. The incumbent's profit is the same before and after entry, because the loss it incurs on providing interconnection is matched by the reduced loss on the retail service; and the retail service is provided more efficiently by the entrant (because otherwise the entrant could not earn a profit).

Disadvantages

15. In the theoretical models from which ECPR was derived, various assumptions are made that are unrealistic. Relaxing these assumptions leads to a variety of modifications to the relatively simple rule stated above. For example, the simple rule assumes that one unit of the retail service provided by the entrant displaces one unit of the service provided by the incumbent. In a wide range of circumstances this will not be accurate. The entrant's service may not be a perfect substitute for the incumbent's, in which case it might not displace units of the incumbent's service one-for-one. Competition typically stimulates market growth which means that the entrant's sales may not displace the incumbent's - indeed the incumbent may benefit from the stimulation to demand. In theory, these points can be accommodated by appropriate refinements of the charging formula, resulting in a downward adjustments in charges. But in practice it is all but impossible to estimate the adjustments with any accuracy. Distinguishing which of the entrant's sales represents generated or diversionary traffic might not be feasible, could be costly and would certainly be highly controversial. In the absence of the adjustments, the simple

ECPR leads to excessive interconnection charges.

16. One feature of the ECPR is that charges for the same interconnection service vary depending on the entrant's end-use, ie the service for which it uses interconnection as an input ('end-use charging'). To take a simple example, assume that the incumbent provides one highly profitable retail service (say international calls), and one that is loss making (say domestic calls). Under ECPR, if the entrant purchasing interconnection is doing so in order to provide an international call, the interconnection charge should be much higher than if the entrant is competing against the incumbent to provide a domestic call. The reason is that the incumbent's net revenue foregone is larger for the international than for the domestic call. This is central to the concept of the ECPR, because otherwise it could not be claimed that it resulted in efficient entry signal. Also, if the entrant was to purchase interconnection to provide a new, innovative retail service that did not compete against any of the incumbent's services, it should pay an interconnection charge equal to the incremental cost of provision (because the incumbent's revenue foregone would be zero). Any higher charge would be inefficient and would damage the incentive to innovate.
17. It is not uncommon in interconnection regimes around the world for there to be regulatory rules placing severe restrictions on end-use charging. For example, until recently there was an outright ban on end-use charging in all countries in the European Union; currently, there is a presumption against it, although it may be permitted by national regulator where it decides that the markets are sufficiently competitive. Interconnecting operators find it intrusive to have to identify precisely which services they are offering, in what volumes and using what interconnection services. Moreover, it gives the incumbent privileged and potentially commercially sensitive information that could be used in an anti-competitive manner.
18. These and other conceptual and practical problems associated with the ECPR have meant that, although it is a widely cited theory, is not being used to set interconnection charges anywhere in the world. In many countries it has been considered and rejected.²⁴ The theory does sometimes serve as a useful theoretical standard and, for example, the case for access deficit charges, present in various countries (eg France), can sometimes be viewed as deriving from ECPR -type arguments - see the discussion of surcharges in Chapter 8.

Marginal Cost (Ramsey Pricing)

19. Marginal cost is the cost of producing one more unit of service. In theory economic efficiency requires that prices equal the marginal cost of output, instead of the average total costs. The justification for marginal cost (MC) pricing is that MC is the cost of the resources expended to supply the unit of the service. Price is a primary variable influencing the amount of a good or service that people are willing to purchase at a

²⁴ Only one country, New Zealand, has ever implemented ECPR. However, it is understood that it is no longer the approach used there to set interconnection charges.

particular time. If a consumer is to make an informed and economically efficient decision whether to purchase more or less of a service or good, the price paid should indicate the resource cost.

20. Where price exceeds marginal cost for a particular service, for example because the seller is dominant, the consumer will purchase less than the economically efficient level of output. Consumers who are willing to pay a price in excess of the additional resources required (in effect willingly forego the alternative goods and services that those resources could have produced) will refrain from making those purchases because the price to them is too high. Conversely, if the price of the service is less than marginal cost, production and consumption of the service will be higher than it ought to be. Society is giving up more of other services to produce the additional unit of the subsidized service than customers would willingly have authorized, had the price to them fully reflected the marginal opportunity cost. In this case the willingness to pay at the margin is greater than the price, but below the resource cost of supply.
21. Marginal cost pricing has a fundamental shortcoming in industries characterized by economies of scale and scope in that the firm will experience losses since the prices will not cover fixed, common and joint costs. Ramsey pricing allows for the mark-up over marginal costs that results in the most economically efficient outcome, given the need of the company to breakeven (just earn a normal return on investment). Ramsey prices relate the size of the mark-up of the price of a service over its marginal cost to the inverse of the elasticity of demand for that service. Where the demand for a service is less sensitive to price changes (price inelastic) vis-a-vis other services, its price should bear a disproportionate share of fixed and common costs. This set of prices results in the least distortion in the pattern of consumption compared with strict marginal cost pricing and avoids the firm suffering a loss.
22. The relevant elasticities are the service' own price elasticity and the cross price elasticities. Own price elasticity of demand is the responsiveness of the demand for a service to a change in its price, assuming all other factors influencing demand remain constant. Cross price elasticity of demand measures the responsiveness of the demand for service A to a change in the price of service B. Where the two services are substitutes the cross price elasticity is positive and for complements or joint services the cross price elasticity is negative. Where the two services are unrelated the cross price elasticity is zero. Even the simplified version of Ramsey pricing that only takes account of the own price elasticities is generally considered not to be practically implementable, primarily because of the difficulties in obtaining robust estimates of the various elasticities.

ANNEX C: MARKET DEFINITION AND DOMINANCE

Market Definition

1. Identifying the relevant market is the initial step in ascertaining whether or not a firm is a dominant provider of a service. It is only by defining the relevant market that competition authorities and regulators will be able to get a perspective on the various relevant services, how prices are formed, as well as the extent of competition among firms. In seeking to identify the relevant market consideration is given to the set of products or services comprising the market plus the geographic dimension of that market. This approach to market definition is for the purposes of competition analysis and regulation and so the term 'market' as used here has a specific economic meaning. There may well be legitimate reasons for the definition of the relevant economic market to differ from other perspectives of the 'market', such as the company's own view for marketing purposes.
2. The approach widely adopted in many jurisdictions is to focus on identifying the factors constraining the price setting behavior of a "hypothetical monopolist". The 'hypothetical monopolist' test involves the following thought experiment: if there was a sole supplier of a defined set of products or services in a defined geographical area, would that 'hypothetical monopolist' find a small but significant (and permanent) price increase (say 5-10%) profitable? If so, then a relevant market can be defined for competition and regulatory purposes. The logic is that, if such a price increase was profitable, then other products or services and other geographical areas would not provide a competitive constraint on the set of services and geographical area under examination. To apply the test, one starts first with the narrowest set of services and geographical area, and gradually widens it until the answer to the question is in the affirmative. The reason why a small but significant price increase might not be profitable is that the hypothetical monopolist could lose a sufficiently large volume of sales because of the demand-side and supply-side substitution.
3. Demand-side substitution would mean that as the price of the 'hypothetical monopolist' increases, consumers substitute away from the service(s) under examination to other competing services. If sufficient consumers behave in this way, even if many other consumers do not, the price increase would be unprofitable. An example of demand-side substitution would be some consumers reacting to an increase in the price of red Irish potatoes by switching to purchasing white Irish potatoes.
4. Demand-side substitution can be measured by the cross-price elasticity of demand for the service in question vis-à-vis other services - this gives the sensitivity of the demand for one service (say X) in response to a change in the price of another service or basket of services (say Y). The cross-price elasticity of demand may be zero, negative or positive. The only case relevant to demand-side substitution is if the cross-price elasticity is positive, meaning that the services are substitutes (ie an increase in the price of X leads to an increase in the demand for Y). If the cross-price elasticity is zero, demand for the services is unrelated. If the cross-price elasticity is negative, the services are complements (ie an increase in the price of X leads to a decrease in the demand for Y).

5. The existence of substitutes, ie goods with positive cross price elasticity of demand, indicates that there are constraints to the price setting behavior of the 'hypothetical monopolist'. In light of this a small, but significant increase in the price of X will lead to an increase in the demand for the substitute product Y. Users of X are able to switch to Y without significant and having to incur significant switching expenses. In addition, consumers of X are able to switch to the close substitute in sufficient number so that the imposition of a price increase on X is unprofitable for the 'hypothetical monopolist'. For these reasons product Y should be included in the relevant market for X, since the demand for Y constrains the price setting behavior of the supplier of X.
6. The ability of suppliers not presently providing the service, to increase or switch production capacity to the production of the service in response to a price increase by the 'hypothetical monopolist' is a major constraining influence on the pricing behavior of the 'hypothetical monopolist'. For example, suppliers of beef patties would find it easy to switch to the supply of callaloo patties, if the 'hypothetical' monopoly supplier of callaloo patties was to increase price. If there was sufficient entry by supply-side substitutes , then the price increase would be unprofitable, because a sufficiently large volume of sales would be lost. Supply-side substitution is a form of new entry, but a class of entry that is especially easy, cheap and effective. Other types of entry are considered by assessing the extent of barriers to entry (see below). The easier it is for these supply-side substitutes to make alternate goods available and in sufficient quantity the greater the constraint on the 'hypothetical monopolist' Where these suppliers are unable to respond or unable to switch supply in a reasonable time period or face significant cost of doing so, then the monopolist has sufficient market power for a price increase to be profitable. If this is the case, the other services should be excluded from the definition of the relevant market for the service in question.
7. In defining what is the relevant market the focus is not only on the products or services and potential suppliers but also the geographic boundary of the market. This may be defined in terms of the entire country, a region within a country, etc. By establishing the geographic boundaries of the relevant market the extent to which the product or products of rival suppliers can impose competitive constraints on the pricing behavior of firms operating in the market becomes clear.

Dominance

8. Once the relevant market is appropriately defined, the next step is to assess the firm's market power ie whether it is able to raise and maintain price above the competitive level and act with a degree of independence from the wishes of customers and competitors. Although it is convenient and analytically desirable to separate these two steps (market definition and assessment of market power), they are not entirely self-standing. For example, the usual approach is to split potential entrants into two categories: supply-side substitutes and others. The former are considered as part of the definition of the market, the latter as part of the assessment of market power. In the final analysis, it should not matter whether the different types of entry are taken into

account in step one or step two. This emphasises the point made at the start of this Annex that market definition is not an end in itself, but a means to identify market power.

9. The concept of 'dominance' and 'market power' are very closely related. Dominance is usually considered a stronger version of market power, ie a firm is said to be dominant when it clearly possesses significant market power.
10. In assessing dominance there are several factors to consider, including those listed below:-
Market share: If not used in conjunction with other indicators this alone is an extremely poor measure of market power. A firm that has substantial market share in the relevant market might be constrained in its price setting behavior by the fact that entry is easy. In addition, buyers could also have substantial bargaining power as is the case if the buyer is a monopsony. If the firm has a small market share it is unlikely that it would have market power but it would be possible if barriers to entry were large. Thus, even if a firm has significant market share an examination of market condition such as entry conditions and the behavior of competitors and customers must be considered.
11. *Barriers to entry:* The degree of dominance in a market is a function of the ease with which potential competitors may enter the relevant market. In telecommunications entry is very frequently restricted by the terms and conditions of the licences governing incumbent operators. For example, in Jamaica CWJ enjoys a monopoly in the market for fixed line telephony. But even in markets in which entry is not barred by legal restrictive arrangements, there are economic barriers which serve to deter entry. Economic barriers to entry may from incumbency advantage, for example customer inertia, the large sunk cost of building a telecoms network, cost of switching from the incumbent service provider to a competing service provider, uncertainty of new entrant's service quality, and unfair access by entrants to incumbent's networks. Incumbency advantages also arise through control over "bottleneck" facilities which may include wireless antennae, ducts, etc. The finite nature of the spectrum places a restriction on the number of entrants in the mobile telephony business.
12. *Prices and profitability:* In examining dominance, and by extension the extent of market competition, focus is usually directed on the process of price formation in the relevant market. This requires an examination of the way in which prices are set which might include predation, price leadership, and parallel pricing. In addition, the profitability of firms operating in the relevant market can be an indication of the extent to which market power is influencing price formation. Dominance is often associated with the existence of super-normal profit (profit in excess of what is required to reasonable compensate shareholders).
13. *Vertical relationships:* In analyzing market power the vertical integrated nature of firms operating in the industry need to be taken into account. Evidence of vertical relationships is where a firm operates at both the downstream and upstream segments of an industry. For example the incumbent providing interconnecting services to entrants and

simultaneously competing with entrants in certain market segments. In this regard the vertical integrated firm has both the power and incentive to frustrate market entrants. Vertical integration need not constitute a barrier to entry since such firms may have low market share and there might not be any regulatory economic or technological barriers to entry. Vertical relationship is only important if it is coupled with significant market power which can be used in an anti-competitive manner.

Interconnection Markets

14. Various different interconnection markets may be defined. For example, international interconnection is in a separate market from domestic interconnection. This distinction is perhaps clearest in those countries that have separate international and domestic operators, but in principle it applies generally. There is no demand-side substitution because international and domestic interconnection are complements, not substitutes. Supply-side substitution is absent because a domestic network cannot be used to provide international interconnection and vice versa.
15. Among international services, different routes can have very different economic characteristics. On the demand side, an interconnection service to one country is not a good substitute for another country. On the supply side, although some facilities may be common among routes, such as international switches, others may not be, such as transmission facilities. In some regulatory regimes, therefore, separate markets are defined for each international route (or group of routes, eg to a set of neighbouring far-end countries, where sufficient supply side substitution may exist).
16. Distinctions may also be made among domestic interconnection services. Interconnection services supplied by a mobile network are in a separate market from those supplied by a fixed network. Demand side substitution between the two is limited. The demand for an interconnection service is a derived demand, ie it depends upon the demand for the retail services in which it is used. At the retail level, mobile and fixed calls may be a substitute for some calls for some consumers, but the two are generally not close substitutes. Most telecom regulators around the world currently consider that the price of mobile services does not provide a competitive constraint on fixed network prices and vice versa (although this may change at some point in the future). By implication, at interconnect level also, mobile and fixed services are not sufficiently close substitutes to be defined in the same economic market. In addition, there is insufficient supply side substitution. Mobile and fixed networks are technologically different: fixed networks cannot be used to provide mobile services and, although mobile networks can technically be used to provide fixed services, they generally cannot do so at competitive prices where they are in direct competition with the fixed network.²⁵
17. It might also be appropriate to define separate markets within fixed (and mobile) network interconnection services. In some countries long distance interconnection services would be defined in a separate market from local services, ie call termination and origination.

²⁵ This is not to exclude the useful role that mobile networks may be able to play in extending service to previously unserved areas.

The services are complements not substitutes, and a long distance network cannot be used to supply local services and vice versa.

18. Another distinction that is sometimes made is between termination and origination. Even though the same network elements are used for termination as for origination but in different directions, in some countries interconnection charges differ between the two – see Annex D. Demand-side substitution does not exist between termination and origination, because they are complements, not substitutes. Even where there is competition between networks, the economic characteristics of termination can be very different from origination, especially under calling party pays arrangements, because it is the caller that pays the call termination charge (via the retail price), but the call recipient that has the choice of which network to take service from. For origination the same individual pays the call origination charge as has the choice of networks. A network may therefore be able to raise the charge for call termination without adverse effect, because it is the customers of other networks that end up paying for the increase. Raising the price of call origination, in contrast may result in the loss of customers to competitors. For this reason call termination can be defined as a separate market for each local network operator, even if operators compete in the provision of call origination.
19. For the present, as a working approach, the OUR proposes the market definitions shown in Table C.1. In the light of circumstances, developments and additional evidence, these definitions may need to be refined. For example, it may become appropriate to make finer distinctions among interconnection services, eg long distance from local, termination from origination, and one international route from another.
20. In all of the markets either CWJ’s fixed or mobile networks are currently dominant. This is because CWJ has a market share of 100% in all of the markets, and because there are appreciable barriers to entry in the form of control of bottleneck facilities, large sunk costs, economies of scale, inertia and other incumbent advantages. Dominance needs to be reviewed periodically because it can be eroded over time, eg AT&T was initially dominant in long distance services in the USA, but is now considered non-dominant by the FCC. However, in network industries, including interconnection markets, it generally takes significant time for new entrants to overcome the incumbent’s dominance.

Table C.1: Interconnection markets

<i>Interconnection market</i>	<i>Current dominant network</i>
Domestic fixed	CWJ fixed network
Domestic mobile	CWJ cellular network
International	CWJ international (part of CWJ fixed network)

ANNEX D: INTERNATIONAL COMPARISON OF INTERCONNECTION CHARGES

Introduction

1. This Annex reports the results of a comparison of interconnection prices charged by incumbent fixed network operators in various countries around the world. The OUR has collected and analysed published interconnection price information from 16 countries. The recommended 'best practice' benchmark interconnection charge ranges derived by the European Commission are also included. All of the data are contained in an Excel spreadsheet file which may be downloaded from the OUR's Website at www.cwjamaica.com/~office.our/consult.htm
2. Almost all of the countries in the comparison are in the developed world and most are in Europe. This does not reflect an intentional bias in the OUR's information gathering, but rather that there appears to be a greater tendency for interconnection charges in developed countries to be published. However, interconnection charges in developed countries would seem to be reasonable comparators for CWJ, whose network is fully digital and so uses the same types of switching and transmission equipment. Also, as CWJ has itself noted, the costs of "...the switch and inter-office transmission networks... are less dependent on local operating conditions."²⁶
3. Different approaches to price comparisons may be appropriate for different uses. The purpose here is to derive information that may be useful benchmarks for the charges for interconnection services in Jamaica. The approach, therefore, has been to derive price information on a basis as closely equivalent as possible to the three main domestic interconnection services, which are described in Chapter 5 (eg see Figure 5.6):-
 - i) Local interconnect
 - ii) Single tandem
 - iii) Double tandem

The basis of the comparison and additional information about the nature and structure of the services and the charges is shown in Table D.1.

The Main Results

4. The results of the international comparison of interconnection charges are shown in Tables D.2-D.4. The level of the charges of the incumbent fixed network operators in the countries included in the comparison fall into three broad categories:-
 - (1) Hong Kong, UK and USA
 - (2) Denmark, France, Germany, Irish Republic, Netherlands, Norway and

²⁶ See page 29 of CWJ's response of 1999 January to the OUR's Consultative Document, *Rebalancing Telephone Prices*, 1998 November.

Sweden

(3) Austria, Australia²⁷, Belgium, Italy, Japan and Spain

5. Table D.2 shows the comparison of *peak rate* charges for call termination, which is the form in which the European Commission's recommended ranges are expressed. Countries are shown in ranking order for the single tandem charge. Category (1) comprises the countries where the charges are comfortably the lowest and they fall at or below the bottom end of the European Commission's ranges. The countries in category (2) have charges that fall within the ranges. The charges in category (3) countries are above the top end of the ranges, typically by about 20%, though in some cases by more than 50%. Figure D.1 presents the peak rate single tandem charges in graphical form, illustrating the three categories. It can be seen that only Japan and Australia have charges that are more 25% above the European Commission's upper bound for single tandem.
6. Comparing on the basis of peak charges favours countries with no peak/off-peak variation (Hong Kong, Italy, Japan, USA). In the other countries the peak charge tends to exceed the average charge by about 20%. However, the same three broad categories of countries can also be seen from Table D.3, which shows the comparison on the basis of *charges averaged across peak and off-peak periods*. The average single tandem charges are graphed in Figure D.2. The categorisation remains the same, but the ranking of some of the countries alters.
7. The justification for including USA in category (1) is shown in Table D.4. Interconnection charges of Incumbent Local Exchange Carriers (ILECs) in the USA are specified for each unbundled network element.²⁸ In all other countries in the comparison, charges are specified for interconnection services (pre-specified average combinations of network elements). However, because the service charges of the incumbent in the UK, British Telecommunications (BT), are also broken down into the charges for their constituent network elements, a comparison can be made between ILEC and BT network element charges. The comparison in Table D.4 suggests that, whilst charges vary materially between states, they are often comparable to BT's charges, though sometimes higher and sometimes lower.

Assumptions and Sensitivity

8. In attempting to put charges into a common format and obtain like-for-like comparisons, various issues arise and assumptions have to be made. What exchange rates should be used? Are the services strictly comparable? How are differences in the structure of charges accounted for? For each of these issues, in the discussion below, there is an indication of the sensitivity of the results to the assumptions made.

²⁷ The Australian regulator, ACCC has recently issued a draft decision, which states that the charges of the incumbent, Telstra should be halved – see www.accc.gov.au. If this occurred, Australia would move to category (2).

²⁸ Many of the unbundled network elements are not included in this analysis, such as unbundled loops.

Exchange rates

9. Clearly, the comparisons will vary with the particular exchange rates used to convert into the same currency. The approach adopted is to convert all charges into US cents per minute, using Purchasing Power Parity (PPP) exchange rates. Where information on PPP exchange rates is not available, current (spot) exchange rates are used. The exchange rates are shown in Table D.2. PPPs are generally considered more appropriate for international price comparisons, because they attempt to reflect the long term exchange rates, ie those that would equalise general price levels between countries. They are also far less volatile than spot exchange rates.
10. Table D.2 shows the percentage difference in the interconnection charges in each country if spot rather than PPP exchange rates were to be used. The largest difference would be for Japan, where charges would be some 40% higher. Charges in the Scandinavian countries – Denmark, Norway and Sweden – would be about 20-25% higher. On the other hand, charges in Australia and Spain would be 15% lower with spot exchange rates instead of PPPs.

Comparability of services

11. The basis of the comparison of services is shown in Table D.1. In most of the countries there are three services defined, depending on the point of interconnection and the number of switching stages. But in Hong Kong single services are defined for each of PSTN termination/origination and mobile to HKTC (termination by the incumbent fixed network of calls originating on mobile networks). The services in Hong Kong are shown as corresponding respectively to local interconnect and single tandem, but these may not be strict like-for-like comparisons.
12. In the case of the incumbent in Germany, Deutsche Telekom, another type of difference arises. The charges depend solely on distance, not on the point of interconnection or the number of switching stages. For the purposes of comparison, it has been assumed that there is a correlation between the distance bands and the number of switching stages involved, which seems a reasonable assumption. In some other countries, eg Belgium, Denmark and Norway, the services are defined by whether the call stays within or is carried outside of specified interconnection zones. There is likely to be a good correlation with the number of switching stages, but there will not be a precise match.
13. In Australia, the interconnected call is to be carried by Telstra within specified Call Collection Areas, of which there are 66 in total. There is a basic charge differing between three types of geographical area: CBD (Central Business District), Metropolitan and Country. Trunk charges are levied if the call is carried outside of the Local Call Area. The trunk charges increase with distance (in four distance bands). For the comparison, a similar matching of distance to interconnection service equivalents is used as for Deutsche Telekom. For the charge comparison, within each trunk band a simple average is taken across the geographically deaveraged charges for CBD, Metropolitan and Country.

14. In four countries - Australia, Germany, Irish Republic and UK - there is more than one double tandem (or equivalent) service, depending upon distance bands. For example, BT has three double tandem services: short (< 100 km), medium (100-200 km), and long (> 200 km). For the comparison, a single charge for double tandem has been derived by taking a simple average across the distance bands. If interconnecting operators tend to buy short (long) links, the comparison will understate (overstate) the relative attractiveness of charges.
15. The European Commission's benchmark range for double tandem relates to the charge for a transmission distance exceeding 200 km. Therefore, it will tend to overstate the average double tandem charge. For illustration, BT's charge for double tandem (long) exceeds the charge for double tandem (medium) by 20% and double tandem (short) by 40%.
16. In a few countries the charges for origination are different from those for termination, eg Austria, Belgium and Netherlands. The size of the differences are noted in Table D.2.

Structure: two-part and time of day charges

17. In about half of the countries, there are two parts to the interconnection charge:
 - a set-up or per call charge which is levied on each (successful) call attempt and does not vary with call duration; and
 - a per minute charge.

Other countries have only a single part to the charge, levied on a per minute basis. To convert two-part charges into a common overall per minute charge, an average call duration of 3 minutes has been assumed. This is likely to be a representative average length of call for many countries. But, for calls of longer duration than 3 minutes, the assumption adopted will overstate the two-part charge on an overall per minute basis, because the per call charge would be spread over a greater number of minutes. For example, if an average call duration of 5 minutes was assumed, the overall per minute charges in countries with two-part charges would generally be about 5% to 10% lower.²⁹

18. The logic for two-part charges is that some costs are caused by the volume of call attempts and do not vary with call duration. This is the case, for example, for the processing costs of switches. Appropriately derived two-part charges are therefore more cost reflective than single part charges.
19. Charges in most countries differ between peak and off-peak periods of the day (or days

²⁹ On the other hand, the charges of the incumbent in Denmark, Tele Danmark, are understated, because its set-up charge is levied on unsuccessful as well as successful calls (except where due to network failure). Assuming 1.5 call attempts per successful call, and average call duration of 3 minutes, this effect means that Tele Danmark's peak charges are understated by about 10%. Telstra's set-up charge is also levied on unsuccessful as well as successful calls.

of the week). Typically, this reflects the peak/off-peak variation in the retail prices of calls in those countries. But, in a few countries there is no variation in the interconnection charges by time of day (these countries have the same charges in Table D.3 as in Table D.2). For countries with time of day variation, the assumption used to average across peak and off-peak charges for Table D.3 is that 65% of traffic occurs during peak periods³⁰. If it was assumed that 50% of traffic occurred during peak periods, use of the 65% assumption would overstate average charges by about 5% to 10% for all countries except Australia (about 20% difference).

20. The logic for charges varying by time of day is that the majority of the costs of the switching and transmission network depends on dimensioned capacity, which in turn depends upon the magnitude of demand at peak times. The time of day profile of traffic therefore matters, not just the volume of traffic in the day. If retail prices varied by time of day, but interconnection charges did not, interconnecting operators would have an incentive to increase demand at peak times when the margin between the retail price and the interconnection charge was largest. This would tend to exacerbate the peakiness of the time of day profile, which is the opposite of the desired outcome, since a flatter profile is more efficient (because more traffic could be carried in the day for the same cost). This reasoning explains why the peak:off-peak ratio of interconnection charges is often closely related to the corresponding ratio of retail prices.³¹ Another reason is that it avoids price squeezes between the incumbent's retail prices and interconnection charges at particular times of day.

Access to POIs

21. In several countries there are connection and rental charges for access to POIs or interconnect switch ports, such as Belgium, Denmark, France and Norway. These are in addition to charges for the provision of the interconnection circuits themselves. Since in other countries charges for access to POIs are not levied, but are part of the per minute charges, for a like-for-like comparison these rental charges should be converted into pence per minute equivalents and included. Where the rental charge is expressed per 2Mbit/s, it has been included in the per minute charges shown by assuming a volume of interconnect traffic of 1.8 million minutes per 2Mbit/s per annum³² (11% of the theoretical maximum). The amount of traffic carried may well differ from the assumption, but the overall charges would not be much changed, because the interconnect switch port does not make up a large proportion of the total charge shown (the largest is 0.4 cents per minute in France; it is 0.2 cents in Belgium and less than 0.1 cents elsewhere). In the Scandinavian countries some of the charges are specified per POI and these have not

³⁰ This is the illustrative assumption that has been used by ART, the French regulator.

³¹ The extension of this logic would be to set interconnection charges on the basis of the busy hour call attempt and call minute capacities that the interconnecting operator wished to book. This would be the closest reflection of how costs arise, because it relates to the way in which network capacity is dimensioned. But capacity based charges give rise to a large number of practical difficulties and so are very rarely used for interconnection charges. Almost all interconnection agreements around the world specify charges on a per minute basis (and sometimes also per call).

³² This is the illustrative assumption that has been used by ART.

been converted into pence per minute equivalents – to this extent the charges in those countries are understated.

QD.1 What published information on interconnection charges is available that is missing from the OUR's analysis? Provision of such information, or identification of the source from which it could be obtained would be especially helpful.

QD.2 How could the approach used by the OUR to compare interconnection charges across countries be improved?

Table D.1: Peak Rate Interconnection Charges for Call Termination in US cents per minute

Country	Operator	Local interconnect	Single tandem	Double tandem	Per call charge
Australia	Telstra [Charges average of CBD, Metropolitan and Country]	Trunk Band 0 (within Local Call Area)	Trunk Band 1 (<50 km)	Trunk Bands 2 (50-100 km), 3 (100-150 km) & 4 (>150 km)	Yes+
Austria	Telekom Austria (TA)	n/a	V3	V4	No ³³
Belgium	Belgacom	Local	Intra Access Area	Extra Access Area	Yes
Denmark	Tele Danmark	Local area	Within interconnect area	Between interconnect areas	Yes+
European Union	European Commission	Local	Single transit	Double transit >200 km	n/a
France	France Télécom (FT)	Intra-local exchanges ³⁴	Single transit	Dual transit	No
Germany	Deutsche Telekom (DTAG)	City Zone (0-20 km)	Regio 50 (20-50 km)	Regio 200 (50-200 km) Fernzone (>200 km)	No
Hong Kong	Hong Kong Telephone Company (HKTC)	Termination (PSTN)	Mobile to HKTC	n/a	Yes
Irish Republic	Telecom Eireann (BTE)	Primary	Tandem	Double tandem Double tandem (>50 km)	No
Italy	Telecom Italia (TI)	Via SGU	Via SGT	Via doppio SGT	No
Japan	Nippon Telegraph and Telecom (NTT)	GC connection	ZC connection	n/a	Yes
Netherlands	KPN Telecom	Local	Regional	National	Yes
Norway	Telenor	Local segment	Inside interconnect zone	Outside interconnect zone	Yes
Spain	Telefonica	Local	Single tandem	Double tandem	No
Sweden	Telia	Local segment	Single segment	Double segment	Yes
United Kingdom	British Telecommunications (BT)	Local exchange segment	Single tandem	Double tandem short (<100 km), medium (100-200 km), and long (>200 km)	No
USA	Selected ILECs – see Table D.4	Unbundled Network Elements (UNEs) - see Table D.4			No

+ Per call charge is levied on unsuccessful as well as successful calls.

³³ But charges for origination have two parts: per set-up and per minute.

³⁴ A service is additionally offered at some local exchanges for termination via an adjacent local exchange. Charges for this service are not included in the results shown.

Table D.2: Peak Charges for Call Termination in US cents per minute

Country	Local interconnect	Single tandem	Double tandem	Exchange rate per \$	% change if spot exchange rate used	Other comments
European Commission	0.6 - 1.1	0.9 - 1.8	1.7 – 2.6	0.885~	n/a	Double transit relates to distance exceeding 200 km.
Hong Kong	0.4	0.8	n/a	7.75~	n/a	
UK	0.6	0.9	1.5	0.656	+ 7%	Charge for Double tandem (>200 km) is 1.7 cents/min.
Norway	1.1	1.5	2.2	8.99	+18%	
Netherlands	1.1	1.5	1.8	2.07	+ 6%	Charges for origination are about 10%-25% higher.
Sweden	1.0	1.6	2.1	9.63	+22%	
Germany	1.0	1.7	2.3	2.01	+16%	Fernzone charge (>200 km) is 2.6 cents per minute.
Denmark	1.0	1.7	2.1	8.38	+27%	
Irish Republic	1.2	1.8	2.4	0.694	- 1%	
France	0.9	1.9	2.6	6.51	+12%	Rental for interconnect switch port is converted to per minute and included in the charges at 0.3-0.4 cents/min. Universal service and access deficit charges are excluded.
Spain	1.3	2.1	4.1	126	-15%	
Italy	1.2	2.1	3.1	1621	- 6%	
Belgium	1.4	2.2	3.0	36.8	+ 3%	Rental for access to access points is converted to per minute and included in the charges at 0.2 cents/min. Charges for origination are about 15% higher.
Austria	N/a	2.3	3.1	1.31	+11%	Charges for origination (single tandem only) are 67% higher.
Japan	1.3	2.6	n/a	163	+43%	
Australia	1.4	3.3	6.9	1.31	-15%	Charges for Customer Access Network (CAN) are excluded.

~ Spot exchange rates; all other rates are PPPs.

Source: OUR from European Interconnect Atlas – see www.analysys.com/atlas; European Commission – see www.ispo.cec.be/infosoc/telecompolicy/en/Study-en.htm; OFTA (Hong Kong regulator) – see www.ofta.gov.hk; BT Carrier Price List – see

www1.btwebworld.com/interconnect; OPTA (Dutch regulator) – see www.opta.nl; ACCC (Australian regulator) – see www.accc.gov.au; PPP exchange rates for 1998 from OECD – see www.oecd.org/std/ppp1.pdf

Figure D.1

Single Tandem - Peak Rate

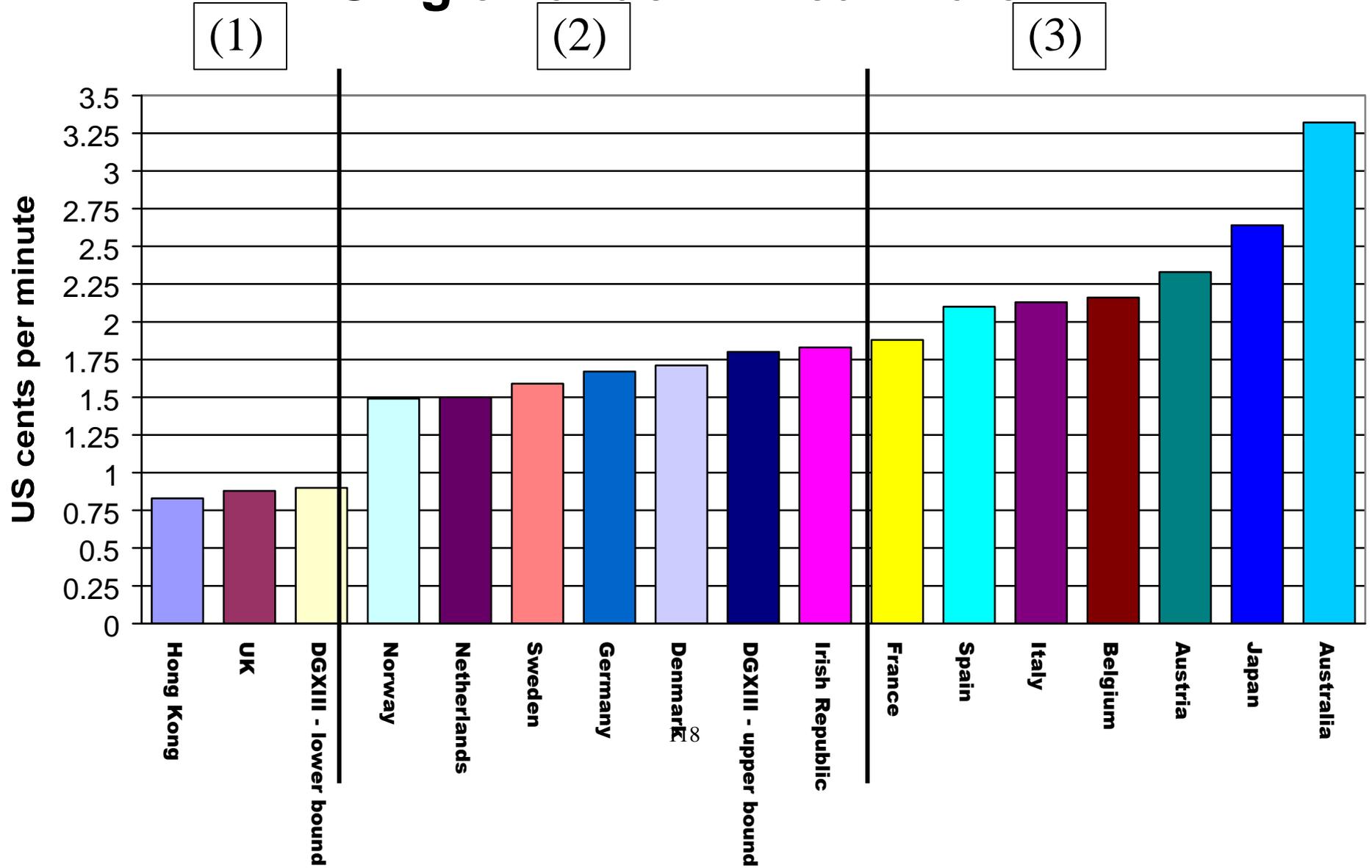


Figure D.2

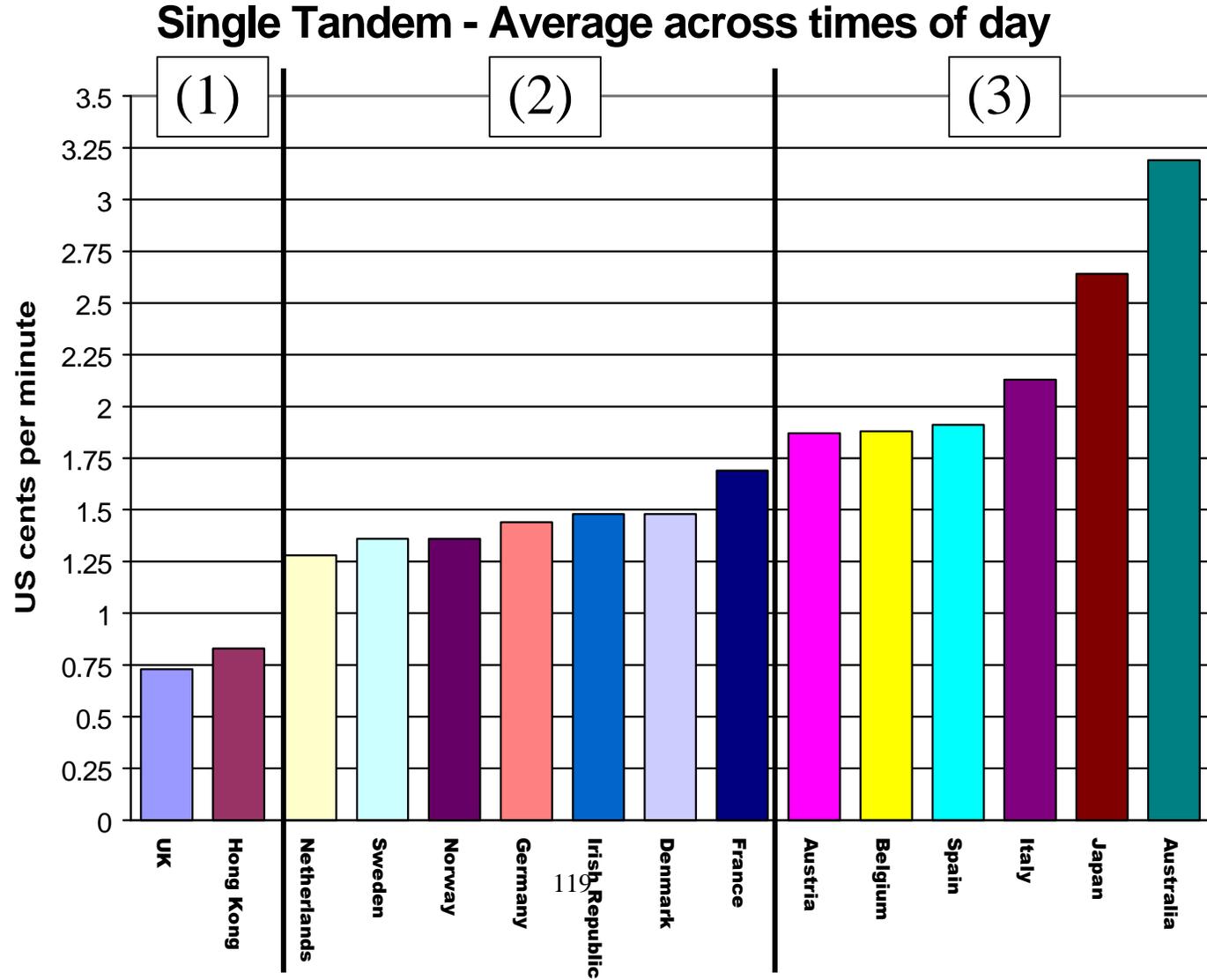


Table D.3: Average Charges in US cents per minute

Country	Charges averaged across times of day			Peak:off-peak ratio
	Local interconnect	Single tandem	Double tandem	
Hong Kong	0.4	0.8	n/a	1.0
UK	0.5	0.7	1.2	2.0
Norway	1.0	1.4	1.9	1.4*
Netherlands	0.9	1.3	1.5	1.7
Sweden	0.9	1.4	1.8	1.7*
Germany	0.9	1.4	2.0	1.7**
Denmark	0.8	1.5	1.8	1.7*
Irish Republic	1.0	1.5	1.9	2.2
France	0.8	1.7	2.3	1.6
Spain	1.2	1.9	3.7	1.3**
Italy	1.2	2.1	3.1	1.0
Belgium	1.2	1.9	2.6	1.7
Austria	n/a	1.9	2.4	2.1
Japan	1.3	2.6	n/a	1.0
Australia	1.3	3.2	6.7	4.5* **

* Peak to off-peak ratio varies between per call and per minute charges.

** Peak to off-peak ratio varies among services.

Source: As for Table D.2

Table D.4: Comparison of Network Element Charges for Selected ILECs in USA and BT in UK

State	Carrier	Local switch	Tandem switch	Common transport
Connecticut	SNET	0.31	0.21	0.38
Florida	Bell South	0.92	0.03	0.001
Maine	NYNEX - urban	0.29	0.25	0.092
	- suburban	0.49		
	- rural	0.87		
Maryland	Bell Atlantic	0.30		
New Mexico	US West	0.08 +		
	GTE	0.13 +		
Washington	US West	0.12 +	0.13	
	GTE	0.14 +		
Washington, D.C.		0.30		
Wisconsin	Mid-Plains	0.74		0.026
United Kingdom	BT	0.27	0.10	0.010

+ Rates to be increased to include billing and collection costs.

Wisconsin transport charge is per minute per mile; in Decisions for other states it is not specified whether the charge is per mile or for an average number of miles. The transport charge shown for BT is per minute per mile based on 15 miles of local-tandem transmission. There are two parts to the charges: per link per minute and per km per minute, and three different types of transmission: local-remote, local-tandem and inter-tandem. (Local-remote charge per minute per mile for 15 miles is 0.016).

Source: OUR from various State Commission Decisions on www.nrri.ohio-state.edu
BT network component charges in Network Charge Change Notices 111 and 112 on
www1.btwebworld.com/interconnect

ANNEX E: FORMULAE FOR ACCESS DEFICIT CHARGES

1. This Annex sets out a way to derive the formulae for access deficit charges (ADCs) per minute that vary between the end-uses of incoming international calls and outgoing international calls.
2. The access deficit (AD) is derived as the difference between the total service long run incremental cost (TSLRIC) of the access network and revenue from line rentals and connection charges. The proposal is to levy an ADC on termination services used for incoming international calls (ADC_i) and origination services used by interconnecting operators for outgoing international calls (ADC_o). The total volume of relevant call minutes is therefore the sum of the minutes of incoming international calls that terminate on CWJ's domestic network (V_i) and the minutes of outgoing international calls that originate on CWJ's domestic network (V_o). The access deficit divided by this sum is the average access deficit charge (weighted by the respective call minute volume shares):-

$$(1) \quad \frac{AD}{V_i+V_o} = ADC_i \frac{V_i}{V_i+V_o} + ADC_o \frac{V_o}{V_i+V_o}$$

3. The reason for the ADCs differing is that incoming international calls are more profitable for CWJ than outgoing calls. The ratio of the ADCs should be equal to the ratio of the profitabilities:-

$$(2) \quad \frac{ADC_i}{ADC_o} = \frac{\Pi_i}{\Pi_o}$$

Or rearranging,

$$(2a) \quad ADC_i = \frac{\Pi_i}{\Pi_o} ADC_o$$

$$(2b) \quad ADC_o = \frac{\Pi_o}{\Pi_i} ADC_i$$

4. Substituting (2a) and (2b) respectively in (1) and rearranging yields the ADCs:-

$$(3a) \quad ADC_i = \frac{AD}{V_i + \frac{\Pi_o}{\Pi_i} V_o}$$

$$(3b) \quad ADC_o = \frac{AD}{\frac{\Pi_i}{\Pi_o} V_i + V_o}$$

GLOSSARY OF TERMS

ADC

Access deficit charge

Allocative efficiency

Allocative efficiency concerns the relationships of prices to costs, and the level of output. So-called 'first best' allocative efficiency is attained when prices are equal to *marginal costs* because consumers then face a price signal that reflects the resource cost, the cost to society of supplying the product or service. Only where price equals marginal cost is it the case that all consumers, whose willingness to pay exceeds the resource cost, purchase the service (and no consumers purchase whose willingness to pay is less than the resource cost). In industries exhibiting *economies of scale* and *scope*, prices equal to marginal cost do not allow the firm to recover its *common, joint* and fixed costs. Consequently, the 'first best' is considered unattainable and the 'second best' allocative efficiency, achieved by the set of Ramsey prices, becomes the relevant benchmark.

BT

British Telecommunications plc

CCD

Canadian Department of Communications

Common costs

Those costs that arise when there are *economies of scope* between products or services that are produced in variable proportions and which are not casually related or incremental to any of the products or services taken individually. Another definition is the costs that are part of the stand-alone costs of each of a set of services

CPE

Customer Premises Equipment - equipment on customers' premises which is not part of the public telecommunications network and which is connected to it.

Cross -subsidy

A service is in receipt of a subsidy only if its revenue fails to recover its incremental cost. No service provides a subsidy unless its revenue exceeds its stand-alone cost. Therefore, for service A to provide a cross-subsidy to service B, A's revenue must be less than A's incremental cost and B's revenue must exceed B's stand-alone cost.

Economies of scale

There are economies of scale if the average costs falls as the level of output rises.

Economies of scope

Economies of scope exist if product or services can be produced at lower cost if they are produced together by the same firm than by single product or stand-alone producers (say because of sharing facilities).

Efficient Component Pricing Rule (ECPR)

Is a costing methodology for determining interconnection charges. Under this technique the

charge for interconnection is the incremental cost of providing the service plus the net loss in profit, including contribution to common cost that the network operator gives up by selling interconnection services rather than the final service.

Engineering costs

A method of measuring the costs of a network by building up the engineering components of an hypothetical network providing the same services.

Entrant

Operator of telecom network or service provider other than the incumbent PTO entered the market and seek or obtain interconnection services from the PTO.

FCC

Federal Communications Commission - telecoms regulator in the USA

Frame relay

Is a packet switched data service providing for the interconnection of Local Area Networks (LANs) and access to host computers at speed of up to 2 Mbits/s.

FTC

Fair Trading Commission

GMPCS

Global Mobile Personal Communications by Satellite

Gross Replacement Cost

The price that it would cost the operator if it was to replace the asset today.

Interconnecting operator/organization

Purchaser or seller of interconnection; customer of a network, but not an end-user.

Interconnection services

Services provided by one telecommunications organization to another for the purpose of the conveyance of messages and information between the two systems and including any ancillary services necessary for the provision and maintenance of such services.

ISDN

Integrated Services Digital Network

ITU

International Telecommunications Union

JBS

Jamaica Bureau of Standards

JDI

Jamaica Digiport International

Joint cost

The cost where there are *joint costs* between products or services that are produced and which are not incremental to any of the products or services taken

capacity for service A (eg electricity in a cogeneration plant) implies that the capacity for service B (eg heat) is greater than the demand it faces. In such circumstances, the cost of

Long run

The period of time over which all assets are replaced. Capital costs tends to be excluded from measures of short run cost, on

Marginal cost

Is the cost of producing an extra unit of service or

Market power

Ability to raise and maintain price above the competitive level and so earn super normal return,

market power enables a firm to act with a degree of independence from consumers. Note that it is the ability to earn super normal profits such profits might not be

may be costs of market *productive efficiency* *allocative*

Modern Equivalent Assets (MEA)

Valuation of a firm's existing assets at the cost of replacing them with assets which serve the same purpose using available technology, which a new entrant might be able to

NRA

National Regulatory Agency

OFTEL

Office of Telecommunications, telecoms regulator in the UK

OFTA

Office of the Telecommunication Authority, telecoms

Operator

Provider of a public telecoms network

alternative use.

PBX
Private Branch Exchange

PCS
Personal Communication System

POI
Point of Interconnection

Productive efficiency
This occurs when output are produced at minimum cost, ie the fewest possible resources are used to produce the given amount of output.

Private Network
A network typically comprising leased circuits which is often used for telecom services within an organization that (say) has offices at different locations, possibly in different countries or in different parts of the same country, but is not used for the provision of services to the public.

PSTN
Public Switched Telephone Network

RIO
Reference Interconnection Offer

Service provider
Provider of telecoms service (public and private)

Spectrum
A radio frequency of hertzian waves used as a transmission medium for cellular radio, radiopaging, satellite communication, over-the-air broadcasting and other services.

USF
Universal Service Fund

USO
Universal Service Obligation

USP
Universal Service Provider

VASPs
Value-added service, example internet service provider, and prepaid calling card provider.

VSAT
Very Small Aperture Terminal

WTO
World Trade Organization

Wireless in the Local Loop (WLL)

Technique using radio technology to provide the fixed connection from the telephone exchange