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Country Case Studies



THE CHANGING INTERNATIONAL TELECOMMUNICATIONS ENVIRONMENT: COUNTRY CASE STUDIES

OVERVIEW

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Rebecca Wettemann and Tim Kelly, ITU Strategic Planning Unit

Note: The views expressed in this draft document are those of the authors, and do not necessarily represent the opinions of the International Telecommunication Union or its membership.

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1. INTRODUCTION

1.1 The Changing International Telecommunications Environment

The last quarter of the 20th century has witnessed a number of significant changes in the technology, market structures, and regulation of international telecommunications. Rapid developments in microprocessors, digital switching technology, fibre optics, and satellites have expanded the capabilities of modern telecommunications, and the convergence between the telecommunications, computing and broadcasting industries has given birth to the Internet. In addition to technological evolution, the decisions of many governments to liberalise and privatise what was traditionally a government-run sector have resulted in increased competition. This has produced, for most customers, more choice and lower prices for telecommunications services.¹

For competitive operators in this evolving environment, achieving lower costs of service has been the key to profit and growth in the global telecommunications market. In the shift to a market-oriented model of operation, telecommunications service providers have sought to reduce their costs for providing domestic and international services. While the majority of international telecommunications traffic continues to follow the bilaterally-negotiated correspondent agreements of the traditional accounting rate system, there is nevertheless a growing range of alternative arrangements based on least-cost routing and market rates. Some three-quarters of international telecommunications traffic now originates in countries that permit competitive service provision. A growing proportion of this traffic now flows outside the existing international settlement rate system. Those not operating in a competitive market are not immune to change: operators in non-liberalised environments as well are feeling the pressure to negotiate with correspondents to develop alternative arrangements which are more closely based on the real market costs of transmission and termination. They are also seeing the effects of the use of alternative routing procedures, such as refile and call-back, on customer demand for international services.

These changes in the technology and market structure are now being reflected also in regulatory reform. The World Trade Organization (WTO) basic telecommunications agreement, which was concluded on 15 February 1997 and entered into force on 5 February 1998, commits some 72 countries² to a progressive opening of their basic telecommunications services markets to competitive entry and increased foreign investment. In addition, the WTO reference paper on regulatory principles, included in the schedule of commitments of most participants in the agreement, requires that countries establish regulatory bodies that are independent of operating companies and services providers and establish a dispute settlement mechanism to resolve interconnection disputes.

For WTO Members, the timetable for enacting new domestic laws that reflect the terms of their commitments may differ (Section IV of the General Agreement on Trade in Services recognizes the specific needs of developing countries). For developing countries, adopting WTO rules based on the principles of market access and national treatment, and on the regulatory principles in the Reference Paper, will provide an opportunity to develop their telecommunication services sector while benefiting from participation in the emerging "single market" for telecommunications services. In order to benefit, however, many countries will need to make significant changes in the governance and financing of their telecommunications sector, including separating regulatory and operational functions, planning the liberalisation of all or part of their telecommunications markets, granting greater financial and management autonomy to incumbent operators, and attempting to attract foreign investment, including possible private ownership of their incumbent public telecommunication operator.

¹ A more in-depth discussion of these trends can be found in the 1996/97 World Telecommunication Development Report on Trade in Telecommunications, which is available for purchase from the ITU Website at <http://www.itu.int/ti/publications/index.htm#wtdr96/>.

² The original 69 countries which made commitments in February 1997 have been joined by Barbados, Cyprus, and Suriname, which made commitments after the agreement was concluded.

1.2 The WTO Process³

The WTO agreement will mean, for countries representing 93 per cent of global telecommunication revenues, the introduction of competition into a sector which has traditionally not been subject to multiple suppliers. It will also mean private-sector entry (both domestic and foreign). This liberalization process will grow as more and more countries are encouraged to commit to opening their telecommunication service markets and as WTO Members improve their market-opening commitments. One of the main principles of the GATS is progressive liberalization, which ensures that WTO Members can and, indeed, must improve their commitments in the direction of greater liberalization.

The changing international telecommunication environment will encourage many different types of relationships between service providers and countries. In general, there are likely to be three different types of relations between countries, albeit with many different shades or degrees of market openness:

- **Monopoly-to-monopoly:** Relations between monopoly environments will become increasingly few in number. Countries which choose to retain monopoly suppliers will be affected to some degree by the changing telecommunication environment even if they are not parties to the GATS or the basic telecommunications agreement.
- **Competitive-to-competitive:** Between competitive markets, which will account for the major bulk of international traffic, it is likely that new arrangements will quickly emerge which will supersede the traditional correspondent relations. With liberalized market entry, individual carriers, or alliances of carriers, will be able to establish a commercial presence in foreign countries, obviating the need for settlement payments. Thereafter, they could establish a national interconnection with the network of one of the domestic carriers in the foreign country. Thus the settlement rate could be replaced by a market-based interconnection payment, call termination charge, or other arrangement.
- **Competitive-to-monopoly/Monopoly-to-competitive:** In the short term, the number of asymmetric market relations will rise sharply. Carriers operating in a competitive market environment wishing to terminate traffic in a monopoly environment will be obliged to work with the incumbent monopoly carrier to deliver calls. These arrangements may be based on bilaterally-negotiated settlement rates, as now, or may take the form of other options. Carriers operating in a monopoly market environment wishing to terminate traffic in a competitive environment may be able to negotiate interconnection agreements at rates which are significantly below those which they themselves charge. They may also be entitled to establish their own infrastructures on the territory of the competitive market.

As liberalization spreads globally, monopoly carriers will not be able to avoid pressure from competitive markets as they seek to negotiate bilateral correspondent relations. Carriers operating in a liberal environment, with strong domestic and international pressure on prices, will become increasingly less willing to pay settlements arising from accounting rate levels which are not cost-oriented.

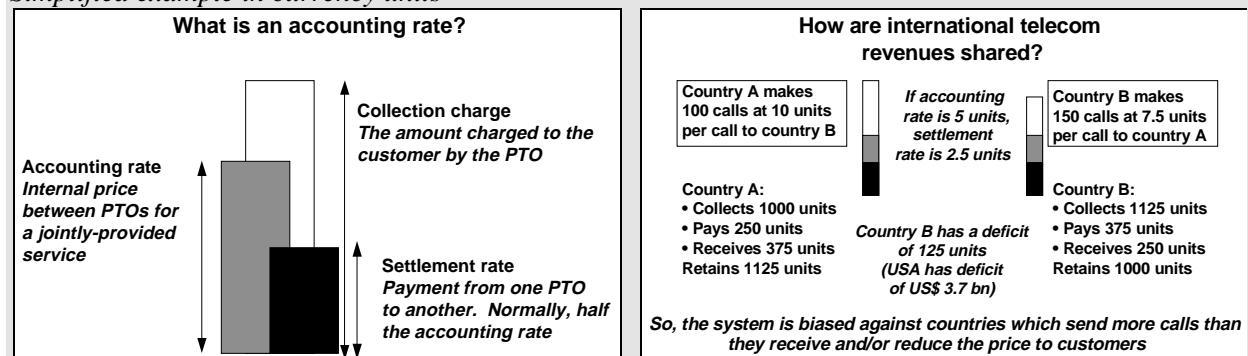
1.3 Accounting Rate Reform

1.3.1 The Accounting Rate Framework

One of the primary reasons for foundation of the International Telecommunication Union (then the International Telegraph Union) in 1865 was to determine a means to divide the revenues from international telecommunication services between originating, terminating and transiting countries. The resulting dual-price system is known as the accounting rate system.

³ For a more detailed discussion of the implications of the WTO basic telecommunications agreement, see the Secretary-General's Report to the World Telecommunication Policy Forum, available at http://www.itu.int/wtpf/info/sg_rep/index.htm.

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Figure 1.1: How the International Accounting Rate System Works*Simplified example in currency units*

Source: Adapted from ITU/TeleGeography Inc., *Direction of Traffic: Trends in International Telephone Tariffs*, Geneva, November 1996.

The subscriber pays the retail price, known as the collection charge, to the operator which originates the call. A second price, the accounting rate, is negotiated between the originating operator and the operator terminating the call for each minute of traffic. If there is an imbalance in the volume of incoming and outgoing traffic, then the originating operator which generates more outgoing traffic compensates the terminating operator with a net settlement payment. This is calculated as the number of excess minutes sent (outgoing minus incoming) multiplied by half the accounting rate—the settlement rate (see Figure 1.1).

As traffic flows have become more unbalanced, so has the amount of settlements paid out, with the most extreme example being the United States, which paid out more than US\$5 billion in net settlements to foreign operators in 1996.

1.3.2 Arguments for Reform of the Accounting Rate System

The WTO agreement on basic telecommunication services has established a new set of trade rules which are based on a multilateral framework. In particular, under a trade regime, principles of non-discrimination, transparency and market access must be applied. The accounting rate system, as it currently works, is based on bilaterally-negotiated correspondent arrangements which, for the most part, are discriminatory and non-transparent. The countries which make the highest net settlement payments have led the crusade for accounting rate reform. Their argument is that current settlement rates bear little or no relation to the actual costs of terminating international traffic.

The accounting rate system as it currently functions also holds a number of other disadvantages when employed in a liberalised telecommunications environment. Bilateral negotiation means that carriers periodically set a certain rate for settlement and do not go below that rate without re-negotiation, even if the actual transaction costs fall – effectively placing a lower limit on price competition. This rigid price structure limits carriers' incentives to provide lower-cost services to consumers.

Furthermore, the traditional accounting rate framework which is based on revenue sharing takes little account of the inherent cost differences between networks. In a world of different interconnecting networks and technologies, the chances of achieving perfectly symmetric cost structures for call termination are slim. Many factors are likely to affect the cost of a call, including the volume of traffic; the degree of network penetration (teledensity); the costs of purchasing, operating, and maintaining the infrastructure; as well as labour costs, financing costs and tax differences. If a carrier employs a more cost-efficient technology than its partner, it could split the accounting rate in an asymmetric manner (i.e., not 50/50) but there is little incentive to do so. The accounting rate system, however, is based on an agreement to share revenues rather than as an assessment of true costs. In that respect it creates incentives for operators which are recipients of settlement payments to resist pressures for reduction.

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An additional weakness of the current system is the large range within each countries' accounting rates which often bear little relation to the level of development and costs of the networks involved. For example, in Uganda in 1995, the total accounting rate with Germany was only 1.40 SDR⁴; while for neighbouring France, it was 1.96 SDR – simply because that was the rate Uganda had negotiated with each country. This sort of artificial call cost variance – based neither on network development nor distance – creates incentives for arbitrage, refile, transit, and other alternative routing procedures that tax the efficiency, and increase the costs to users, of international telecommunication services.

1.3.3 The US FCC Benchmarking Order

The US Federal Communications Commission, responsible for regulating US carrier's activities outside the United States, is campaigning to reduce settlement rates, and has taken an aggressive strategy with its International Settlement Rates Report and Order of August 1997.⁵ The FCC Benchmarking Order, as it has come to be called, does not seek to change the traditional accounting rate system but rather to see it function more efficiently, specifically by seeking to ensure that all countries implement ITU-T Recommendation D.140. The Order sets "benchmark" settlement rates for the termination of international traffic, based on a calculation of the "average" per minute incremental cost of international transmission facilities, international gateway switches, and the national extension charge in each country within each income group. These benchmarks are applied with different transition paths according to each country's teledensity and level of economic development, as outlined in Table 1.1, for the countries covered in the case study project.

Table 1.1 Proposed FCC benchmarks for case study countries

<i>Country</i>	<i>Level of Economic Development (income group)</i>	<i>US Settlement Rate, 1 March 1998 (US cents)</i>	<i>Proposed Benchmark Rate (US cents)</i>	<i>Effective Date of Benchmark Rate</i>	<i>% Reduction per Year Needed from 1997 Peak Rate to Reach Benchmark</i>
Bahamas	High	30, 15 ¹	15	1/1/1999	-50%
Colombia	Lower-middle	50	19	1/1/2001	-28%
India	Low	79	23	1/1/2002	-27%
Lesotho*	Low	54	23	1/1/2003	-16%
Mauritania*	Low	84	23	1/1/2003	-23%
Samoa*	Lower-middle	75	19	1/1/2001	-37%
Senegal	Lower-middle	84.5	19	1/1/2001	-39%
Sri Lanka	Low	100	23	1/1/2002	-31%
Uganda*	Low	50	23	1/1/2003	-14%

Note: 1. 30 cents is the peak rate; 15 cents, the off-peak rate. Percentage reduction calculated from peak rate.

Countries marked with an asterisk are recognized by the UN General Assembly (UNGA) as being among the 48 Least Developed Countries (LDCs). Senegal is treated by the UNGA "as if" it were an LDC.

Source: Case Studies, FCC, ITU.

According to the Order, the FCC will prohibit US carriers with foreign affiliates and foreign carriers with a US presence from operating in the US market unless the carriers' foreign affiliates settle at

⁴ An SDR, or Special Drawing Right, is worth \$1.35 US at current exchange rates (10 March 1998).

⁵ Full detail of the FCC Report and Order can be found at <http://www.fcc.gov/Bureaus/International/Orders/1997/fcc97280.html>.

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benchmark rates or below (by the appropriate deadline) with all US carriers. Additionally, the FCC could order US carriers not to pay settlements in excess of the benchmark rate. While this unilateral accounting rate cutting approach technically applies only to carriers who do business in the United States, it is expected that such a measure would drive down accounting rates between other correspondents as well. In any case, US-originated traffic accounts for about one third of global international traffic.

Will the benchmarking order actually take effect, and if so, what will be the result? Some carriers have argued that the order violates US WTO market entry commitments, and much will depend on the FCC's actions to implement the WTO agreement.⁶ The benchmark Order is currently subject to a legal challenge in the US Court of the District of Columbia. On a more practical level, it has been argued that the timeline for accounting rate reduction that the FCC proposes is simply too short and will seriously retard the efforts of those developing countries which depend on settlement payments to develop and maintain their telecommunications infrastructures. One thing is clear: the debate surrounding the FCC Order highlights the problems with the accounting rate system, and has added to the urgency of need for multilateral efforts to reform it.

1.3.4 The European Directive and Recommendation on Interconnection

European Community Members have taken a radically different approach to accounting rate reform, originating from the Community Directives on interconnection established to promote competition between operators within Europe.⁷ The January 1, 1998 liberalization of telecommunications markets within the European Union provides for open and competitive provision of telecommunications services provision Europe, with specified derogations to delay entry into force in certain EU Member States. In order to facilitate the market entry of new competitors, and recognizing that interconnection charges present one of the highest costs for new entrants, the European Parliament and Council Directive on Interconnection in Telecommunications outlined rules for cost-oriented interconnect pricing, based on the following guidelines:

- the establishment of transparent cost-accounting systems for evidence that interconnection charges follow the principles of cost-orientation and transparency;
- until sufficient and appropriate accounting practices can be developed, the employment of a "best current practice" approach (based on the three lowest-priced Member States) to ensure that charges proposed by the incumbent are consistent with effective market practices;
- the publication of a reference interconnection offer to aid new entrants in negotiations;
- the funding of any universal service schemes to be carried out in a transparent and competitively-neutral fashion.

⁶ Full details of the FCC Order implementing the WTO agreement can be found at <http://www.fcc.gov/ib/wto.html>.

⁷ Full details of the EC Directives and related documents can be found at <http://www.ispo.cec.be/infosoc/telecompolicy/>.

Table 1.2. “Best Current Practice” Interconnection Charges in Europe

<i>Termination Level</i>	<i>Best Current Practice Range (per minute at peak rate), ECU/100</i>	<i>Best Current Practice Range (per minute at peak rate), US cents</i>
LOCAL <i>interconnection at the local exchange to which the destination user is connected</i>	0.6 - 1.0	.65 - 1.08
SINGLE TRANSIT (METROPOLITAN LEVEL) <i>interconnection with all customers in a metropolitan region</i>	0.9 - 1.8	.97 - 1.94
DOUBLE TRANSIT (NATIONAL LEVEL) <i>interconnection with all customers on an incumbent's national network</i>	1.5 - 2.6	1.62 - 2.81

Note: Interbank exchange rate between ECU and US dollar was 1 ECU = \$1.08 on 10 March 1998. The termination levels relate to the best current practice (i.e., range between the rates in the lowest three EU countries for different points of interconnection (local, metropolitan region, or national). They are not intended to be additive and do not include the international component of the call.

Source: European Commission Recommendation on Interconnection in a liberalised telecommunications market

Community law specifies that cross-border intra-European charges should follow the same cost structure as those for traffic originating and terminating within the same country, i.e., they should be non-discriminatory. In short, correspondents of intra-European traffic may soon cease to “settle” accounts under the accounting rate system and instead rely upon a cost-based interconnection fee system. This will be asymmetric. Directorate-General IV (competition policy) of the European Commission is currently conducting an inquiry into the current level of rates. It is expected that over time EC Members will establish similar arrangements with competitive correspondent operators outside Europe.

1.3.5 ITU Recommendations and The Work of ITU-T Study Group 3

Recognising the pressures on the international accounting rate system and the need to develop alternatives better suited to a market environment, ITU-T Study Group 3 has focused its work on the future of international telecommunication settlement systems. At its meeting in May 1997, there was general agreement that the move toward cost-oriented accounting rates was inevitable and was the most desirable means for operators to deal with the growing number of settlement alternatives. ITU-T Recommendation D.140, approved in 1992, recommends that accounting rates for international telephone services should be cost-oriented and should take into account relevant cost trends. The Recommendation classifies network elements used to provide international telephone services into the following three categories:

- International transmission facilities - international terrestrial transmission or international submarine cables, or international satellite transmission or a combination; includes links between earth stations or cable landing stations and the international switching facilities.
- International switching facilities - international switching centers and their associated transmission and signalling equipment.
- National extension - national exchanges, national transmission facilities and, if appropriate and identified under a bilateral or multilateral agreement, the local loop.

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According to D.140, the related costs are those identified in accordance with generally-accepted accounting practices and are divided into direct costs including investment costs, operation and maintenance costs, rental and lease of facilities, switched transit costs where applicable, cost of access to national or local networks, if applicable, and directly attributable research and development costs; and indirect or common costs that cannot be solely attributed to providing international services, including general administration, management systems, other research and development, and appropriate taxes. D. 140 allows for other costs to be included by bilateral agreement.

At its most recent meeting in December 1997, Study Group 3 discussed transitional arrangements to cost-oriented mechanisms. Some 78 of the 80 countries present at the meeting agreed to submit to Members for approval a revised Recommendation D.140, which outlines proposed transitional arrangements to cost-oriented mechanisms. Details of the revisions included an initial goal of reducing accounting rates to less than 1 SDR per minute by the end of 1998, utilization of appropriate costing methodologies to determine relevant costs, and continued ITU work to develop cost methodologies. There was also consensus on the need to expand the menu of remuneration options listed in ITU-T Recommendation D.150. The three additional options included for consideration, to be discussed and developed at the next SG 3 meeting in June 1998, included a bilateral, possible cost-oriented and asymmetric settlement rate procedure; a transparent, cost-oriented termination charge procedure; and any other commercial arrangement, bilaterally negotiated, which is more suited to the nature of correspondents' relations.

1.4 Development of the Case Study Project

1.4.1 Background

The Secretary-General invited an Informal Expert Group to provide him with independent advice on the likely direction of accounting rate reform and its implications for ITU Members. Chaired by Robert Bruce, the group met in Geneva from 24 to 26 March, 1997, and proposed the following guiding principles for the ITU to follow regarding reform of the accounting rate system:

- support liberalization and competition in telecommunications markets and evolution of current settlement arrangements to transparent, non-discriminatory, and cost-oriented rates;
- provide the initiative for cooperative relationships between stakeholders;
- provide accurate and timely data collection and dissemination;
- assist ITU membership in developing cost methodologies, implementing the WTO agreement, and dealing with universal service issues;
- help to articulate a general range for future international settlement rates in a competitive environment; and
- mobilize support for transitional steps to aid those countries hardest hit by settlement rate reform.

The Informal Expert Group also recommended a number of ITU initiatives to help mitigate the immediate impact of a possible reduction in net settlement payments on developing countries, including the commissioning of a series of case studies. The case studies, as viewed by the Expert Group, would “*aim to determine the sensitivity of the operator to a reduction in international settlements in relation to income, to network capacity, to investment, to network development plans, to universal service obligations, to the provision of various services, to quality of service, to debt servicing, to maintenance, to employment, and to tax payments.*”

Recognising the potential impact of accounting rate reform on the activities of all ITU Members and Sector Members, and on the strategic plans of the three Sectors of the ITU, the 1997 ITU Council incorporated the case studies proposal into Council Decision 475 concerning the Second World Telecommunication Policy Forum. Specifically, it stated that “*a working group composed of*

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representatives of the ITU-T and ITU-D Sectors and the ITU Secretariat, in collaboration with other organizations, should conduct case studies particularly in developing countries, the result of which should be made available to the participants ... The case studies should be conducted on the basis of agreed models and specifications with the necessary guidelines from ITU-T and ITU-D.” To this end, a working group was established, chaired by Mr. Bernard Rouxville, with representation from ITU-T, ITU-D, and the Strategic Planning Unit (SPU). Other international organizations and governmental bodies with an interest in the impact of the WTO agreement on developing countries, including the European Union, Commonwealth Telecommunications Organization (CTO), Asia-Pacific Telecommunity and the World Bank’s *InfoDev* programme, contributed to the development of the goals and structure of the case study project; in particular, CTO and *InfoDev* sponsored the case studies of Sri Lanka and Uganda.

1.4.2 Case Study Methodology and Selection Process

Considering the sensitivity of the topic and the urgency of the issue, ITU undertook the commission of the case studies via a sealed competitive bidding process with the goal of selecting independent consultants, experienced in the field, who could provide an objective, impartial evaluation of the potential impact of accounting rate reform and settlement payment reduction.

On 5 September 1997, the ITU launched a “call for expressions of interest” to conduct case studies of the changing international telecommunications environment which was published on the Internet. Based on the expressions of interest received, the working group on case studies pre-selected 19 consultants to tender bids to undertake up to a maximum of two studies each. The consultants were pre-selected on the basis of their statements of interest in the project, profile of capabilities in performing case studies in developing countries, profile of capabilities of work on the changing international telecommunications environment, notably on reform of the existing international settlement system, the curriculum vitae of proposed staff, and estimated time to complete the project.

Countries to be studied were selected on the basis of their willingness to take part in the study, as indicated by formal requests to ITU, and willingness and ability to provide appropriate data in sufficient detail and to assist the consultants/experts as necessary. Priority was given to least developed countries and others less able to cope with significant reductions in settlement revenues. Consideration was given to regional balance, with the goal of selecting at least one country from major sub-regions.

The first call for bids for preparation of country case studies on Bahamas, Colombia, India, and Senegal, was issued on 29 September 1997. The second call for bids for Lesotho, Mauritania, Sri Lanka, and Uganda, was issued on 17 October 1997. Based on the merits of their sealed bids, eight consultants were selected by the Working Group and briefing meetings were held with the consultants and country representatives on 28 October 1997 and 7 November 1997. A country study of Samoa was also performed by personnel of the ITU Regional Office in Bangkok, Thailand. The nine case study countries include four of the Least Developed Countries (Lesotho, Mauritania, Samoa, and Uganda) plus Senegal which is treated by the United Nations “as if” it were an LDC. The nine countries account for 18.5 percent of the world’s population but less than one percent of international outgoing telephone traffic.

The following consultants were selected:

- Bahamas - David Townsend and Associates, United States
- Colombia - David Townsend and Associates, United States
- India - Tarifica, United Kingdom, in association with the Indian Institute of Management, India
- Lesotho - Clifford Chance / Booz Allen Hamilton, United Kingdom
- Mauritania - Ingénieurs Conseil et Economistes Associés, France
- Samoa - Bill Withers, ITU Regional Office, Thailand
- Senegal - Ingénieurs Conseil et Economistes Associés, France

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- Sri Lanka - Antelope Consulting, United Kingdom / Finland
- Uganda - Clifford Chance / Booz Allen Hamilton, United Kingdom

Consultants delivered interim reports on the progress of the case studies to ITU and CTO on 15 December 1998 and submitted their final reports on 31 January 1998.

1.4.3 Case Study Outline

In order to provide a standard basis for comparison between countries studied, a basic outline of topics to be covered and data requirements was required of each of the consultants. The six chapters of each case study explore the following issues:

1. General socio-economic situation of the country, including a brief review of economic, social, geographical, and demographical characteristics; significant of net settlement payments in the economy; and plans for future development.
2. Telecommunication policy and network development, including review of current policy and planned policy changes, a listing of telecommunications operators and telecommunications indicators including tariff structure, and a description of the gateways for international traffic.
3. Evolution of the international telecommunications environment, covering legal status of international services including call-back, International Simple Resale, and Internet telephony; analysis of trends in international traffic and prices over the period 1990-1996; and analysis of trends in accounting and settlement rates and the direction of net settlement payments over the period 1990-1996.
4. Cost evaluation of international telecommunication services, including discussion of the country's available cost data, with the goal of estimating the relative costs of originating and terminating traffic and the degree of cross-subsidy from international to domestic services.
5. Analysis of scenarios for changes in the international accounting system and the impact of such scenarios on each country concerned, including exploration of benchmarks, staged reductions, call termination charges, sender-keeps-all, and revenue stabilisation measures.
6. A review of the options for the country concerned and the implications of WTO commitments.

1.4.4 Next Steps

This draft overview has been prepared by the ITU Secretariat on the basis of draft reports submitted by the case study consultants for the ITU World Telecommunication Policy Forum on Trade in Telecommunication Services, 16-18 March 1998. The case studies were presented at an Information Session preceding the Policy Forum. They will now be revised on the basis of discussions at the Policy Forum and the World Telecommunication Development Conference, held March 23-April 1 in Valletta, and will also incorporate changes made in the final versions of the case studies submitted by the consultants. The full case study package will be made available to ITU-T Study Group 3 Meeting in June 1998 and will be an important input to the work of the focus group of Study Group 3 proposed for establishment by Policy Forum Opinion C. The case studies will also be used in any Policy Forum follow-up work, such as the regional seminars proposed in Policy Forum Opinion B. The European Union has commissioned four additional case studies covering Indonesia, Lebanon, Ukraine and Zimbabwe. The ITU is also invited, under Policy Forum Opinions B and C, to continue the case study work, including validation of the existing case studies. The case studies in final form will be published both on the ITU Website and in paper form.

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2. COUNTRY PROFILES

2.1 Economic Situation

The countries studied represent a wide economic range, from the Bahamas, a high-income country that relies on tourism and financial services for most of its revenues, to Uganda, whose 1996 GDP per capita was US\$251, ranking it as one of the poorest countries in the world. As is the case in Uganda and many of the low income countries studied, agriculture and agricultural products drive a large portion of the economy. Citizens resident outside the home country provide an important source of foreign exchange in a number of the case study countries, notably Lesotho.

Table 2.1 Basic Economic Indicators (1996)

<i>Country</i>	<i>Population</i>	<i>GDP/Capita \$US</i>	<i>Main economic activities</i>
Bahamas	284'000	12'280	tourism, offshore banking
Colombia	39'510'000	2'205	agriculture
India	944'580'000	368	services, agriculture
Lesotho	2'078'000	414	agriculture, export labour to South Africa
Mauritania	2'351'000	455	agriculture, mining, services
Samoa	166'000	2'030*	agriculture, manufacturing
Senegal	8'572'000	602	services, agriculture
Sri Lanka	18'300'000	760	services, manufacturing, agriculture
Uganda	20'256'000	251	agriculture

Source: Case Studies, ITU World Telecommunication Indicators Database

Note: *GNP Data

For many of the countries studied, provision of services plays an important role in the overall economy as well; and in most cases, that role is growing. For example, in Sri Lanka, the tertiary sector including utilities and tourism makes up about half the country's GDP, and has accounted in the past few years for most of the economic growth. The Bahamas is the extreme example, with more than 60% of GDP in 1996 derived from tourism and financial services alone. The size and growth rate of services takes on even greater significance when considering the role of telecommunications in the service sector.

Telecommunications services play two roles in the global economy. Telecommunications may provide a direct service, such as the transmission of a telephone conversation between two people. But it can also act as a conduit for the transaction of other services, as in electronic data interchange between financial institutions. Thus, the level of development of telecommunications services—and significant changes over time—have a dual impact on the economy as whole.

2.2 The Significance of Net Settlement Payments

For many countries, the revenues from telecommunications operations themselves represent a significant portion of the national economy. In developing countries where the cross-subsidisation model—keeping local access charges low and financing network development from high international call revenues—has

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traditionally been used as a means to increase teledensity, settlement payments often make up a large percentage of those revenues. Hard currency settlement payments can be used to purchase foreign telecommunications equipment, repay infrastructure loans, or (in some cases) fulfil other national fiscal demands outside the telecommunications sector. In the case of the countries studied, settlement payment revenues comprised up to 40.8 percent of telecommunications revenues in 1996 in the case of Samoa. On average, 11.6 percent of the telecommunication revenues of the countries studied were derived from net settlement payments.

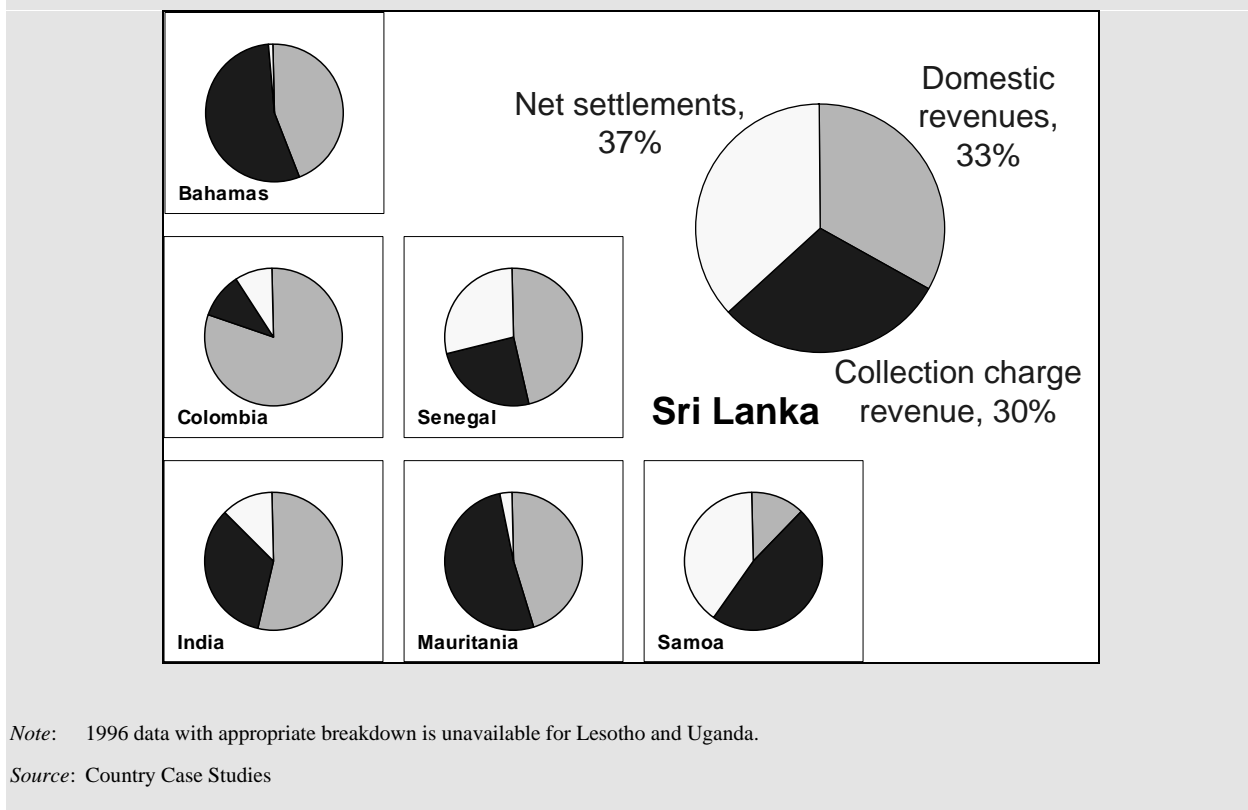
Table 2.2 Telecommunication revenues and estimated net settlement payments, 1996

<i>Country</i>	<i>Total telecom revenues (US\$M)</i>	<i>Net settlement payments (US\$M)</i>	<i>% of revenues derived from net settlement payments</i>
Bahamas	144.6	1.6	1.1
Colombia	2'042.1	157.3	7.7
India	3'088.0	389.0	12.6
Lesotho	na	-.41	na
Mauritania	27.4	0.22	0.8
Samoa	7.1	2.9	40.8
Senegal	121.5	35.6	29.3
Sri Lanka	176.0	66.0	37.5
Uganda	47.0	3.0	6.4
Total / average	5'653.7	655.62	11.6

Note: 1996 Revenue figures for Lesotho are unavailable.

Source: Country Case Studies

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Figure 2.1. Sources of Telecommunications Revenues, 1996**2.3 Other Factors**

The political climate of a country can clearly influence both its general economy and telecommunications sector, and the relative costs of its infrastructure development and maintenance. The ability of a government to secure loan funds for infrastructure development, spend those loans through effectively developed policies and projects, and update and support infrastructure once it is established depend on which other demands are placed upon it, and the relative priorities accorded to them.

While political stability is not a guarantee of high levels of telecommunications development, it is very difficult for a country to sustain effective infrastructure development efforts without it. In India, for example, the government policies of the last decade have served to open a very restricted market to some degree of market competition, and the result has been a significant increase in foreign direct investment and infrastructure development. On the other hand, political instability in Uganda from the 1960s to the 1980s limited the government's ability to pursue strategic telecommunications and other infrastructure development policies; civil instability hampers Sri Lanka's pace of development today.

It is also important not to overlook the role of geography in a country's economic and telecommunications network evolution. Network development costs for island economies such as Samoa and Sri Lanka are very different from those of large countries such as India, as well as small landlocked countries such as Uganda and Lesotho. Relationships with more economically-advanced neighbours may also have a profound impact on international telecommunication traffic development.

3. TELECOMMUNICATION POLICY AND NETWORK DEVELOPMENT

3.1 Telecommunication Policy - Degree of Liberalization

Many developing countries have outlined ambitious strategies for improving the reach and quality of their telecommunications networks before the turn of the century. While some have relied on development loans, service revenues and other sources of capital to finance their strategies, a number have looked to liberalization and privatization of some portion of their national telecommunication services operations as a means to fund development efforts in other sectors, gain technological advice and expertise, and promote network development. The countries studied in the case study project fall at various points in the spectrum of liberalization, from those which have not yet formally separated the roles of telecommunications operator and regulator to those which have opened considerable portions of their telecommunications services markets, including domestic network service provision, to competition.

Colombia, India, Senegal, and Sri Lanka are signatories to the General Agreement on Trade in Services (GATS) and have made commitments under the WTO basic telecommunications agreement. In line with those commitments, they have established independent regulators to set and administer policy in the telecommunications sector. These countries are the most liberalised among the countries studied, with all allowing some degree of competition within their domestic markets. Colombia allows competition in cellular, local, national, and international telephony. Senegal and Sri Lanka's formerly state-owned operators are now partially-owned by foreign investors (France Telecom and NTT of Japan, respectively). VSNL of India was also partially privatised in March 1997.

Lesotho, Mauritania, and Uganda are signatories to the GATS but did not participate in the basic telecommunications agreement. They are all considering, or are in the process of, establishing independent regulators for their telecommunication sector. In Lesotho and Uganda, licenses have been granted to private operators for cellular services provision; in Uganda, plans are underway to privatize a portion of Uganda Posts and Telecommunications Corporation (UPTC) and a second national operator is expected to commence operations in the near future.

Bahamas and Samoa are not WTO Members. In the Bahamas, BaTelCo holds the monopoly on all telecommunications service provision except paging and Internet access and currently holds regulatory responsibility for the sector as well; there are plans to corporatize and privatize part of BaTelCo in the future. In Samoa, two public operators exist, the Posts and Telecommunications Department (PTD) — which also serves as the telecommunications regulator — and a government-private joint venture, a cellular and wireless local loop service operator. Plans are in place to corporatize the PTD in 1998.

Table 3.1: Regulatory status of telecommunications in the case study countries

<i>Country</i>	<i>WTO status</i>	<i>Telecommunications environment</i>
Colombia	GATS signatory; made commitments under basic agreement on telecommunications	Government-run portion of sector divided into national operator (Telecom), policy-maker (Ministry of Communications) and regulatory body (CRT); CRT established independent of Ministry in 1994. Competition in cellular, local, and national and international telephony.
India	GATS signatory; made commitments under basic agreement on telecommunications	Two incumbent domestic service operators: Department of Telecoms (DOT) and Mahanagar Telephone Nigam Limited (MTNL). Liberalization and license-bidding process for basic domestic services enacted in 1994; local license holders must access international network through the DOT. International service monopoly held by Videsh Sanchar Nigam Limited (VSNL). Independent regulator, TRAI, established in January 1997.
Senegal	GATS signatory; made commitments under basic agreement on telecommunications	Regulator officially separated from operator (Sonatel) in 1985. 1996 legislation allowed for the partial privatization of Sonatel and liberalization of certain telecommunications market segments; 33.3% of Sonatel was acquired by France Telecom in 1997.
Sri Lanka	GATS signatory; made commitments under basic agreement on telecommunications	Telecommunications Act of 1991 introduced licensing framework for network operators, established independent regulator, and converted operator into state-owned corporation (effectuated in 1996). In March 1996, two new wireless local loop local service competitors were licensed. In August 1997, 35% of Sri Lanka Telecom was sold to NTT of Japan.
Lesotho	GATS signatory	Lesotho Telecommunications Corporation holds a monopoly on all service provision. Government currently considering establishment of an independent regulator and partial privatization. Mobile services licensed exclusively to Vodacom Lesotho, a Vodacom/LTC joint venture.
Mauritania	GATS signatory	Office of Posts and Telecommunications holds a monopoly on all telecommunication services provision. Both operations and regulation are handled by the OPT.
Uganda	GATS signatory	Uganda Posts and Telecommunications Corporation has historically held a monopoly on national and international service provision. The MTN Uganda Consortium was recently awarded the country's second network operator license for fixed-line and cellular services. The Uganda Communications Act of 1997 codified plans to establish an independent regulator and privatize a portion of UPT.
Bahamas	Non-member of WTO	BaTelCo holds the monopoly except in paging service provision and Internet access. BaTelCo also holds certain regulatory responsibilities. Plans to privatize BaTelCo in the future.
Samoa	Non-member of WTO	Two public telecommunication operators exist: the Posts and Telecommunications Department (PTD) and a joint venture cellular and WLL provider. Full corporatization of PTD with separation of regulatory and operational roles planned for July 1998.

Source: WTO, Country Case Studies

3.2. Network Development

Network development continues to be a challenge for many developing countries. Technological developments in the recent past have provided new lower-cost options, such as wireless local loop, for network development, and have driven down the cost of switching, transmission, and terminal equipment in many cases. However, the investment needed to develop and maintain network infrastructure, particularly in remote regions, can present a large hard-currency drain on telecommunication operators in developing countries.

For the *Bahamas*, with the highest income and highest teledensity of all the nations studied, network development has presented unique problems. Connecting the communities on the 15 inhabited islands

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that make up the national service area demands an extended star architecture with numerous exchanges; in some cases, several nodes on each island. All inter-island calls must pass through one of two national hubs. A submarine cable and satellite earth station carry traffic from the Bahamas to international destinations; a direct satellite link to Switzerland also exists. The country's plans for future development include an investment of US\$140 million over the next three years, with the goal of achieving universal service.

Colombia has a national long distance network in which 84% of switches are digital. The government has announced a 10-year, US\$10 billion investment plan for development of all sectors of telecommunications, including US\$5 billion for development of basic voice telecommunication networks and services. Colombia followed a somewhat unusual path in developing local telephony, with 37 independent local telephone companies and a dominant operator, Telecom, for the provision of national and international long distance services, which has certain universal service funding obligations. The first competition for local network services provision began in 1996.

India has a national service network with a direct exchange capacity of 14.5 million lines and 100% digital switching. International traffic is carried via four main gateways to satellite transmitters, submarine cables, and microwave links. In 1996, the international services provider, VSNL, utilized almost 14'000 international voice circuits, of which approximately 9'000 were satellite. As part of a 5-year plan beginning in 1997, VSNL plans to invest approximately US\$1.4 billion in improving network development in order to position itself as a regional hub.

Lesotho provides telecommunications services via a tri-level star network with 11 switches, one of which, in Maseru, serves as the international switch. There are four PABXs and a one-cell cellular network providing voice services in the country. One earth station connects Lesotho via a 300-channel link with South Africa and other states in the South African region; a digital microwave link also exists between South Africa and Lesotho. Not all international traffic goes through the international switch; some cross-border calls between Lesotho and South Africa are not treated as international calls and are treated outside the accounting rate system.

In **Mauritania**, switching facilities include a single international switching centre, three national transit centres, and 11 digital telephone exchanges. International traffic is served via an INTELSAT earth station for France, Spain, the United States, Senegal, and the Cote d'Ivoire and an ARABSAT earth station serves the Arab States. Some 12 Domsat earth stations provide services within the country.

Table 3.2. Telecommunications Indicators for Case Study Countries, 1996/1997

Country	Total main lines 1996	Teledensity 1996	Growth rate (%) 1990-96	Cellular subscribers (12/3/97 unless stated)
Bahamas	79'000	27.82	0.32	5'700
Colombia	4'645'453	11.76	8.40	522'857
India	14'542'651	1.54	16.98	374'350
Lesotho	15'975	0.77	1.83	1'262 (31/3/97)
Mauritania	10'204	0.43	6.73	0
Samoa	9'100	5.48	13.53	1'545 (28/2/98)
Senegal	95'070	1.11	10.63	7'000
Sri Lanka	254'500	1.39	12.00	118'000
Uganda	47'927	0.24	6.04	5'000
Total/average	19'699'880	5.61	8.49	1'035'714

Source: ITU World Telecommunication Indicators Database, Country Case Studies.

Samoa maintains a digital switching centre in Apia and a star architecture to provide telecommunication services to the four islands that make up the national service area. Samoa has direct links to New Zealand, Australia, the United States, Japan, and Fiji; all other traffic must transit through one of its five direct correspondents. The private cellular operator can terminate calls on the fixed network on a sender-keeps-all payment basis. An estimated US\$2.8 million of network investment is planned over the period 1996-2000.

Senegal's operator, Sonatel, operates a network that is 85 percent digital and follows three major routes within the country. Switching facilities consist of 12 automatic switching exchanges, two international transit centres, and an international network connection centre. Four submarine cables which land in Dakar, as well as an INTELSAT earth station, are the channels for Sonatel's international traffic. Two radio relay stations, part of PANAFTEL and INTELCOM, connect Senegal with other cities in the Northwest African sub-region.

A nationwide subscriber trunk dialling network serves the nation of *Sri Lanka*. Recently, two wireless local loop (WLL) licenses have been granted, linked to specific penetration requirements, with the goal of improving network development. WLL and mobile service providers' calls are terminated on the fixed network on a sender-keeps-all basis. An estimated network improvement investment of US\$383 million in 1998, with an additional US\$283 million in 1999, is planned.

Uganda's domestic telecommunications network has seven switching centres. Some 89 percent of subscribers in the mesh-star system are connected to automatic switches. Satellite links connect UPTC's network to the United States, Canada, United Kingdom, Italy, France, Germany, Switzerland, South Africa, Belgium, and Sweden. Microwave links carry traffic between Uganda and its African neighbours.

3.3 Evolution of the International Telecommunications Environment

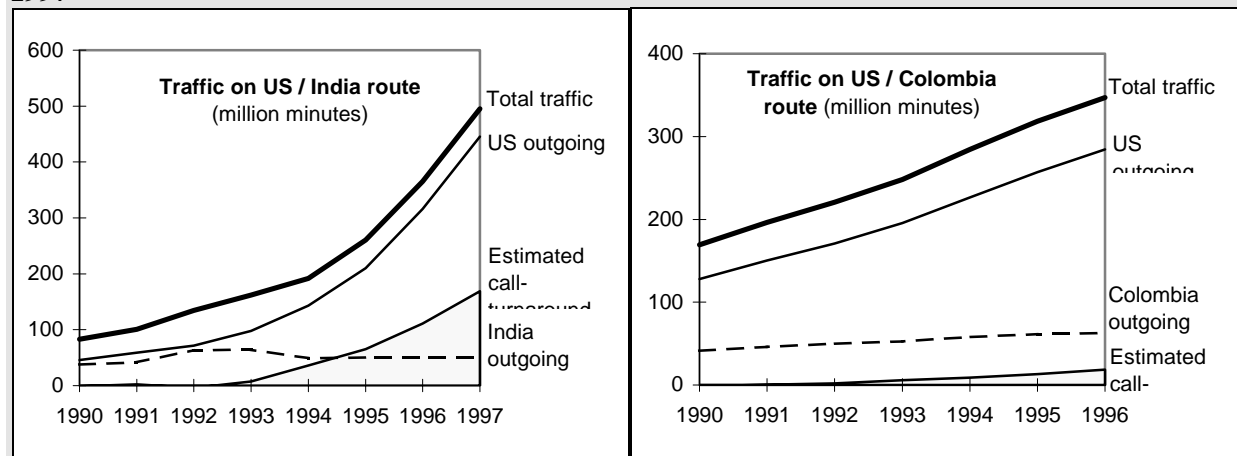
Alternative Calling Procedures

For many developing countries, the cross-subsidization model—keeping local access charges low and subsidizing access and network development using the surplus from high international call revenues—has long been used with the goal of increasing teledensity. Thus, prices for outgoing international long-

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distance calls have been kept artificially high. Imbalances in the costs for international calls, and the mark-up between the settlement rate operators must pay and the price charged to consumers (collection charge), have allowed new market entrants in competitive markets to take advantage of opportunities to provide alternative calling procedures for international calls. In India, for instance, call-back traffic was estimated at approximately 168 million minutes in 1997; in Colombia, call-back traffic was estimated at approximately 19 million minutes (see Figure 3.1).

Figure 3.1. Estimated Call-turnaround Traffic in India and Colombia, Millions of Minutes, 1990-1997



Source: ITU

The provision of alternative calling procedures, including call-back, refile, and country direct services, enables callers to evade the high prices of outgoing international calls by reversing the actual origination point of the call. It is difficult to detect call-back from simple examination of call traffic statistics because call-back traffic appears not as outgoing calls but as incoming calls from the country hosting the service. Call-back traffic has increased at least tenfold since 1993; industry estimates suggest that transit and refile traffic (including call-back) reached as much as 6.4 billion minutes in 1997.⁸

Many countries claim to have outlawed call-back operators from providing services; however, few actual laws exist and in reality, call-back use is increasing in many countries where it is supposedly illegal. Although call-back has been viewed by many countries as a threat to the outgoing call revenues of their operators, call-back often results in an increase in incoming call minutes, and thus an increase in net settlement payments to the operator. In fact, a significant share of the sharp increase in net settlement payments paid out by the United States over that last five years is likely to be due to call-back services operating out of that country.

3.4 International Traffic Trends and Prices

During the past few years, average international call prices have been falling at a steady rate, and total traffic flows have continued to grow as more users gain access to the global network and make greater use of international telecommunication services. Traffic flows in the case study countries mirror this global trend: between 1990 and 1996, the average rate of growth of bothway international traffic for the case study countries was 14 percent per year, and the average price of placing an international call fell.

⁸ Scheele, Michael and Cathleen Woodall, "The Market for Refile and Transit Traffic," *TeleGeography* 1997/98. Washington DC: TeleGeography, Inc. 1997.

Table 3.4 Incoming and Outgoing Traffic, Millions of Minutes, 1990-1996 and status of call-back

	<i>Outgoing 1990</i>	<i>Outgoing 1996</i>	<i>CAGR 1990-1996</i>	<i>Incoming 1996</i>	<i>Traffic split (incoming/ outgoing) 1996</i>	<i>Status of call-back</i>
Bahamas	34.1	57.3	9%	72.7	1.4	call-back use and operation prohibited
Colombia	69.4	135.5	12%	384.2	2.4	call-back use and operation prohibited
India	146.7	341.4	18%	806.2	1.5	call-back use and operation prohibited
Lesotho	8.9	24.2	18%	21.9	0.9	no law prohibiting call-back use or operation
Mauritania	2.6	4.9	11%	3.9	0.7	no law prohibiting call-back use or operation
Samoa	2.9	3.7	5%	9.8	1.4	no law prohibiting call-back use or operation
Senegal	13.6	24.2	10%	52.8	1.7	no law prohibiting call-back use or operation
Sri Lanka	15.6	31	15%	98.5	3.2	no law prohibiting call-back use or operation
Uganda	3.9	4.7	3%	8.5	0.7	call-back use and operation prohibited
Total/average	297.7	626.9	11.2%	1'458.4	2.33	

Source: Country Case Studies

Note: Outgoing traffic data from India, Samoa, and Sri Lanka is from 1991 and 1996.

3.5 Net Settlement Payment Trends

The various accounting rates negotiated with different correspondents, and the amount of incoming and outgoing traffic minutes originated or terminated by each correspondent, determines the level of a country's net settlement inpayments or outpayments. Using data about incoming and outgoing traffic and negotiated settlement rates with each country's top 20 correspondents, a rough estimate of effective net settlement rates for 1996 for each country can be made, as found in Table 3.5.

Table 3.5. Estimated Effective Settlement Rates

Per minute, in US\$, 1996. Calculation based on a weighted average of traffic minutes divided by settlement rates for incoming and outgoing traffic in 1996.

<i>Country</i>	<i>Incoming Settlement Rate</i>	<i>Outgoing Settlement Rate</i>
Bahamas	0.35	0.40
Colombia	0.55	0.60
India	0.96	1.05
Lesotho	0.73	0.94
Mauritania	0.59	0.59
Samoa	0.46	0.46
Senegal	1.32	1.16
Sri Lanka	0.90	0.90
Uganda	1.02	1.07
Average	0.79	0.80

Source: ITU-calculated figures based on data collected in case studies. Available data on traffic patterns and settlement rates were used to develop an average settlement rate, weighted as possible to take into account the different mix of incoming and outgoing traffic.

Settlement payment imbalance is not a trend that is specific to countries of a certain income level, type of telecommunication sector, or region. In fact, developing countries receive a relatively small portion of the total net settlement payments paid out each year. However, that small amount can have a significant impact on small economies which rely on hard currency payments as a significant source for foreign exchange.

Lesotho, in fact, has become a net outpayer of settlements. In India, a rapidly-broadening split between incoming and outgoing traffic, notably with the United States and United Kingdom, has contributed to a strong upward trend in net settlement payments received.

CHAPTER IV. COST MODEL DEVELOPMENT

4.1 Cost-based Pricing: the Accounting System Challenge

In the evolving market-based international telecommunications environment, operators must know their own cost structures if they want to be able to compete. Whether they wish to remain competitive in a domestic market that is being liberalized, prepare themselves to enter into competition elsewhere, or simply negotiate call-termination agreements with operators in other countries, they need accurate accounting and records management systems that enable them to determine their real costs and negotiate on the basis of those costs. Without such systems, they will likely either set their demands too low and be taken advantage of, or set their demands too high and risk losing potential traffic to other players, such as call-back operators. Developing effective accounting systems is one of the greatest challenges facing most operators in developing countries today. Simply applying a neighbour's or peer's cost estimate is troublesome because costs do not break out evenly among countries, even those with similar levels of income or development. Operational costs depend much more on staff expenses, accounting methodologies, and means for calculating depreciation than they do on the country's income or size of the network.

As outlined in ITU-T D.140, the costs for terminating international traffic can conveniently be divided into three components: international switching, international transmission, and national extension. The consultants' estimates of the costs for each component are outlined in Table 4.1.

Table 4.1. Estimated Cost Components, Case Study Countries, in US cents

Country	Bahamas	Colombia	India ³	Lesotho ³		Mauritania		Samoa ⁶	Senegal		Sri Lanka		Uganda
				High	Low	Low	High		Low	High	Low	High	
Int'l. Trans. Facilities	5.2	12.5	19	16.5	2.7	18	24	16.5	10	10	na		18.85
Intl. Switching Facilities	1.9	4.8				4	06	1.9	4	4	na		4.8
National Extension	18.9	17	18.3	22	22	22	30	3.1	14	19	na		20.9 ⁴
Subtotal	26	34.3	37.3	38.5	24.7	44	60	21.5	28	33	13	17	44.5
Other	24 ¹	1.7 ²											
Total cost	50	36	37.3	38.5	24.7	44	60	21.5	28	33	13	17	44.5

Note: Some consultants provided two scenarios for cost estimates; for specific details, please refer to the individual case study reports.

1. Joint/common costs share, as outlined by DNTA (see individual case study).

2. Colombian regulations require that 5% of net international revenues be contributed to universal service fund. This requirement is applied in a non-discriminatory fashion for all competing operators.

3. In some cases, estimates for international transmission and switching costs were reached in the aggregate. For purposes of calculating the mean, it is assumed that 2/3 of the total number is attributable to transmission facility costs.

4. The tariff per minute for the most expensive national call was used as a proxy for national extension costs in this case, because the given cost estimate for national extension (60 US cents) was unsupported by cost data.

5. Breakdown of costs was not available because figures were derived from a top-down approach.

6. The figures for Samoa were derived using the TCP (Tariffed Component Price) methodology rather than representing true costs due to the lack of cost data.

Source: Country Case Studies

Table 4.2. High, Low and Average Costs Per Minute for International Traffic in US cents

<i>Country</i>	<i>High</i>	<i>Low</i>
Bahamas	50	26
Colombia	44	36
India	37.3	37.3
Lesotho	38.5	24.7
Mauritania	60	44
Samoa	21.5	
Senegal	33	28
Sri Lanka	17	13
Uganda	44.5	
Unweighted average	38.4	30.6

Source: Country Case Studies

4.1.1 International Transmission

International transmission component costs, as determined by the consultants, range from 1.8 US cents to 19 US cents per minute, with a mean value of 11.6 US cents per minute. In some cases these estimates differ greatly from the related FCC study cost estimates. It is important to point out that FCC estimates for international transmission component costs were based on international leased circuit prices on typical usage patterns of US carriers, which may not necessarily have the same circuit occupancy patterns as the operators studied in the country case studies.

4.1.2 International Switching

International switching component costs in the countries studied ranged from 1.9 to 4.8 cents per minute, with a mean value of 3.9. International switching costs are based on the number of international switches, the level of digitisation of the network, and in some cases, the vintage of the switches.

4.1.3 National Extension

National extension component costs in the countries studied ranged from 14 to 30⁹ cents per minute, with a mean value of 20.5.

Because of the limitations on available national extension cost data in many developing countries, the FCC employed a price or tariff-based model to calculate approximate national extension costs. This technique provides some indication of national extension costs, however, using price data as a proxy for actual costs poses a number of problems. First, it does not take into account any cross-subsidization between international or domestic long-distance and local access that may be taking place. Second, it does not recognize any portion of monthly subscription charges that contribute to local network development or use. Third, it considers national extension costs based on where within the domestic

⁹ The figure of 60 US cents was reported for Uganda, but was not supported by available evidence and was twice as high as the next highest value reported. Thus it was excluded from the calculation of the average. The price of a long distance national call (20.9 US cents) was used instead as a proxy.

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network most international calls are originated or terminated – weighting the national extension cost model towards calls placed or received in urban areas, where costs are typically lower.

A number of the cost models presented by the consultants reflect, in different ways, the dependence on funds for investment in network development and universal access strategies. For example, the Bahamas's joint/common cost figure for national extension charges part of local loop costs to the national extension component; Colombia's model poses a transparent and nondiscriminatory 5% "universal access tax" on operators' net international revenues. For Mauritania and Senegal, models both with and without distributed network costs are presented.

These various calculations provide a guideline for developing more detailed estimates of the real costs of terminating international traffic, but also provide some valuable insight into the discrepancies between net settlement rates, domestic outgoing call tariffs, and the actual costs of terminating traffic. In the Bahamas, for example, an outgoing long distance call to the United Kingdom has a domestic tariff of US \$2.75 per minute, and a settlement rate with the UK of 65 US cents per minute. The consultant's high average cost estimate is 50 cents per minute (which includes the joint/common cost addition for part of the local loop costs). Based on these estimates, for every incoming call from the UK, Bahamas makes a 30 percent profit; for outgoing calls, it collects more than twice its costs.

A similar story is found when examining effective cost per minute, effective outgoing settlement rates per minute, and effective price per minute for most of the countries studied, as is shown in Table 4.3. The markup of effective settlement rates over costs ranges from -2 percent to 252 percent, with an average of 99 percent. A significant markup also exists between effective call prices and effective costs, from 40 percent to 1985 percent, with an average markup of 370%.

Table 4.3. Net Settlement Rate and Cost Estimate Comparison

Country	Effective Cost Per Minute (range), US cents	Effective Outgoing Settlement Rate Per Minute, US cents	Effective Price Per Minute, US cents	% Markup of Effective Settlement Rate over Cost	% Markup of Effective Price over Cost
Bahamas	26—50	40	139	-20%	178%
Colombia	36—44	60	142	36%	223%
India	37.3	105	309	182%	728%
Lesotho	24.7—38.5	94	54	144%	40%
Mauritania	44—60	59	281	-2%	368%
Samoa	21.5	46	89	114%	314%
Senegal	28—33	116	124	252%	276%
Sri Lanka	13—17	90	193	429%	429%
Uganda	44.5	107	174	140%	291%
Average	30.8—38.6	80	189	107%	389%

Note: Where a cost range is presented, the higher cost is used to calculate markup. The average is a simple, unweighted average.

4.2 The Costs of Transit Traffic

When calculating the costs of international traffic transmission, and the effective settlement rates per minute for developing countries, it is important to recognize that these estimates may not accurately reveal the revenues and costs generated by traffic that reaches its destination via transit. A number of developing countries, including Lesotho, Mauritania, Samoa, and Uganda, have developed transit relationships with large or powerful neighbours by which the majority of their international traffic passes through a neighbouring nation's hub.

Before satellite or microwave transmission was an option, landlocked countries had no other choice than to negotiate some sort of transit relationship with their neighbours. Additionally, technical assistance relationships or other political or economic links often served to institutionalise and reinforce transit relationships. Today, transit relationships create a self-perpetuating economic and technological dependence that serves to further disadvantage the operator of the transit-using country. In the absence of onerous transit relationships, operators in developing countries can take advantage of satellite links and competitive offerings to provide less expensive international telecommunications for consumers.

While a confidential, long-term transit agreement may have made sense in a monopoly to monopoly environment, in a liberalized environment it limits the ability of a country to find the most cost-effective route for its international traffic, thereby decreasing its settlement outpayments.

In the case of Lesotho, for example, a landlocked country that transits the majority of its traffic through South Africa, despite fairly balanced incoming and outgoing traffic flows, the country paid out more than US \$400'000 in net settlement payments in 1997—presumably because of the settlements it paid to South Africa to transit international traffic. In fact, settlement data for 1995-1997 indicates that even though traffic between South Africa and Lesotho was incoming in favour of Lesotho, settlement of the transit share for traffic with South Africa resulted in net outpayments from Lesotho to Telecom South Africa.

5. SCENARIO ANALYSIS

How will changes in the accounting rate regime affect the countries studied? This chapter examines a number of possible scenarios for changes in the system, and analyses the effects of the changes on the collection charges, incoming and outgoing settlement payments, and international revenues of each operator. Lesotho and Uganda have been excluded from the scenario analysis, however, because not all the necessary data on which the modeling is based were available or were provided to the case study consultants. In particular, the lack of itemized breakdown of total revenues and unreliable figures for international revenues made analysis and projection of future international revenues impossible.

5.1 The “Base Case” Scenario

In order to examine and compare the effects of changes in the accounting rate regime on the countries studied, a common “base case” scenario projecting future traffic, net settlement payments and collection charge revenues (without changes in settlement rates) is a necessary starting point. Although the individual case studies may utilise valid, albeit different, means to develop a base case scenario, it is important to define a single common scenario, based on the same assumptions, for all the countries to enable comparison. The base case scenario used for comparison in this chapter is based on the following simplified assumptions:

- **Total traffic.** It is assumed in the base case that the total amount of traffic into and out of each country continues to follow the average rate of growth of the past 6-year period. The actual figures for total traffic in minutes are forecast by calculating the compound annual growth rate (CAGR) of bothway traffic between 1990 and 1996 and using that growth rate to project forward traffic growth through the year 2001. This ranges between 8 percent in the Bahamas and 21 percent in India (see Table 3.1).
- **Incoming/outgoing traffic split.** It is assumed in the base case that the balance between incoming and outgoing traffic will follow the same trend it has followed over the past 6-year period. The actual figures for incoming/outgoing traffic are forecast by calculating the rate of change in the incoming/outgoing split between 1990 and 1996 and using that rate of change to project a linear rate of growth in traffic through the year 2001. Separate projections for incoming and outgoing traffic can then be derived from this split.¹⁰
- **Accounting rate and settlement payments.** Because historical figures of accounting rates and total settlement inpayments were not available for all countries, an approximation of effective settlement rates per minute of incoming and outgoing traffic were derived using traffic figures for each country’s major correspondents.¹¹ The base case assumes no change in that rate, so that the figure for the effective settlement rate per minute of incoming traffic for 1996 is used with the projected minutes of incoming traffic to forecast incoming and outgoing settlement payments through the year 2001.
- **Effective price (collection charge) per minute for outgoing traffic.** For many of the countries studied, detailed international tariff information was not available. Additionally, high levels of non-payment as well as use of off-peak and discounted prices make tariffs an unreliable indicator of actual revenues generated from outgoing traffic. Dividing actual international collection revenues

¹⁰ An alternative methodology would have been to project incoming and outgoing traffic separately for each country rather than projecting bothway traffic and the split. The chosen methodology was selected because it better captures the effects of demand elasticity introduced through price cutting by alternative service providers, such as call-back operators. In India, for example, the rapidly-growing imbalance in incoming to outgoing traffic is presumably largely due to alternative service provision, and will probably continue to grow rapidly unless domestic tariffs are significantly reduced or call-back prohibition is enforced.

¹¹ Note that even though the settlement rate for a given route is usually the same, the effective settlement rate for incoming and outgoing traffic differs due to the traffic mix. For instance, the Bahamas send a higher proportion of traffic to high settlement rate relations but receive traffic mainly from low settlement rate countries. Thus, its effective incoming settlement rate is lower than its effective outgoing settlement rate.

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by outgoing minutes of traffic yields an effective proxy for the per minute price of outgoing international traffic.

- **International and total revenues.** Each country's total telecommunication revenue equals total domestic revenues, plus total international collection charge revenues, plus total inpayments minus total outpayments. To calculate total revenues from international traffic, settlement inpayments and outgoing traffic collection charges are added together; then settlement outpayments are subtracted from that figure. Total telecommunication revenues are derived from international revenues based on the proportion of international to domestic revenues in 1996.

Utilising these assumptions, an estimation of future international revenues can be made, as outlined in Table 5.1. It is important to note, however, that this base scenario does not take into account the pressures many governments (including those studied here) are under to accelerate reductions in settlement rates. That pressure can only increase as implementation of the WTO basic agreement on telecommunications moves forward and competitive operators seek lower costs for terminating international traffic, which will result in a downward trend in settlement rates.

The base case scenario, as presented here, also does not take into account any further slow-down in the growth of in outgoing traffic caused by alternative calling procedures such as call-back, which may greatly contribute to increased net settlement payment revenues. In countries such as India, for instance, significantly lower per-minute prices can be obtained via call-back operators. On the other hand, the scenario also omits assumptions about the growth of Internet telephony as an alternative to traditional calling procedures. As Internet telephony technology improves, more consumers may utilize it as a means to bypass high-priced international calling procedures. Such calls may decrease the officially recorded amount of international traffic, and result in a decrease in net settlement payments, as no payments will be received by those terminating traffic.

Table 5.1. Projected International Revenues, Base Case Scenario, US\$M, 1997-2001

<i>Country</i>	<i>1997</i>	<i>1998</i>	<i>1999</i>	<i>2000</i>	<i>2001</i>	<i>CAGR 1997-2001</i>
Bahamas	88.2	94.9	102.2	110.0	118.4	8%
Colombia	361.5	407.6	459.7	518.8	585.7	13%
India	1'871.1	2'378.3	3'017.1	3'820.6	4'829.7	27%
Mauritania	14.2	15.3	16.6	17.9	19.3	8%
Samoa	6.8	7.6	8.6	9.6	10.9	13%
Senegal	74.8	79.6	86.1	94.5	104.9	9%
Sri Lanka	124.8	131.1	139.0	149.0	161.1	7%

Note: Lesotho and Uganda have been omitted from this analysis as key data items (e.g., revenues from international traffic) are unavailable or were not provided to consultants.

Setting aside, for the moment, the issues of tariff rebalancing and using 1996 figures for the proportion of international revenues to total operator revenues, it is possible to make a top-line estimate of total operator revenues for 2001, based on international revenue projections, as shown in Table 5.2.

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Table 5.2 Projected Total Operator Revenues based on International Revenues, US\$M, 2001

<i>Country</i>	<i>Projected international revenues</i>	<i>Projected total revenues based on 1996 int'l. revenue contribution</i>	<i>% of total revenues derived from international revenues</i>
Bahamas	118.4	211.3	56.0%
Colombia	585.7	2'972.2	19.7%
India	4'829.7	10'335	46.7%
Mauritania	19.3	35.1	54.9%
Samoa	10.9	11.9	91.5%
Senegal	104.9	194.2	53.9%
Sri Lanka	161.1	228.7	70.4%

Note: Total revenue figures are based on historical figures for proportion of international to total revenues in 1996. Insufficient data made projection of the trend in international to total revenue proportion unreliable.

Analysis of the total revenues generated in the baseline scenarios shows that for some countries, continuing with the current system of accounting rates would not necessarily mean any growth in total revenues and funds for investment in infrastructure development. In the Bahamas, for example, revenue inflows and outflows at current rates, coupled with trends in traffic flows, would leave revenue largely unchanged by 2001. On the other hand, Colombia and India, with the two largest telecommunications sectors by value of all the countries studied and the largest dollar values of net settlement inpayments, would continue their fairly rapid pattern of revenue growth in the baseline scenario.

Considering that many of the countries studied have embarked on substantial tariff rebalancing schemes, and that some operators supplied anecdotal or other evidence suggesting that efforts had been initiated or would soon be underway to decrease the contribution of international revenues to overall operator revenues, using 1996 proportions to project total operator revenues in 1996 is somewhat unrealistic. In the following scenarios, effects of changes in the accounting rate system are analysed in terms of percentage deviation from the baseline scenario *for international revenues*, as confining the analysis to that area provides a more clear view of effects of different scenarios and isolates, to some extent, the influence of overall telecommunications market growth in some countries.

5.2 FCC Benchmarks

The FCC Benchmark scenario examines the impact on revenues of reducing bilateral settlement rates to "benchmarks" (see Table 1.1) by the specified dates, as outlined in the FCC Order. The total traffic forecast and the split between incoming and outgoing traffic remains the same as in the base case scenario, although in reality, over time, lower settlement rates should translate into lower tariffs and greater demand stimulation. Other assumptions include the following:

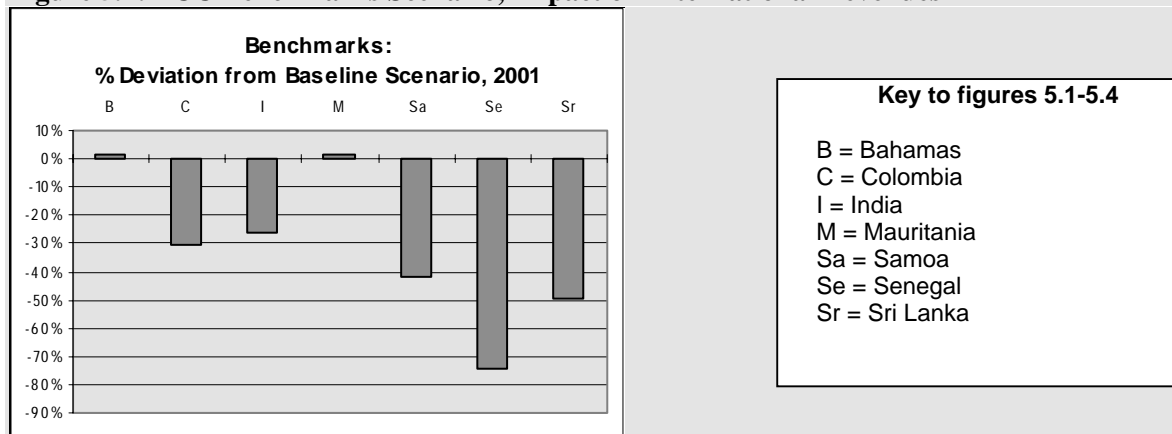
- **Accounting and settlement rates.** It is assumed that settlement rates on all routes will decrease at a steady annual rate to meet the benchmarks by the FCC implementation deadlines. Although the FCC-designated settlement rates of 15, 19, and 23 US cents are officially only applicable to correspondent relations with US carriers, it is expected that many carriers will follow or accelerate the FCC's position. Additionally, for most of the countries studied, a large percentage of incoming traffic minutes comes from the United States or other countries with liberalized telecommunications environments most likely to follow the benchmarking rates if implemented by the FCC. Thirdly, assuming that settlement rates for all traffic follow benchmarking guidelines enables us to examine

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the “worst case scenario” (from a developing country’s viewpoint) in terms of reductions in incoming settlement payment revenues for the countries studied.

- **Net settlement payments.** Net settlement payments in this scenario are calculated by multiplying the forecast minutes of incoming traffic by the effective incoming settlement rate, and the forecast minutes of outgoing traffic by the effective outgoing settlement rate, and subtracting the outpayment from the inpayment.
- **Outgoing collection charge revenues.** Outgoing revenues in this scenario are calculated by multiplying the forecast effective price per minute by the forecast minutes of outgoing traffic. The forecast split already reflects some measure of historical price elasticity (as the price per minute has been reduced, outgoing minutes have increased); for the sake of simplicity, variable price elasticity is not considered in this scenario. Demand elasticity assumptions will be varied in the next draft of this report, as they are outlined in several of the case studies.
- **International revenues.** To calculate total revenues from international traffic, settlement inpayments and outgoing traffic collection charges are added together; then settlement outpayments are subtracted from that figure.

Figure 5.1: FCC Benchmarks Scenario, Impact on International Revenues



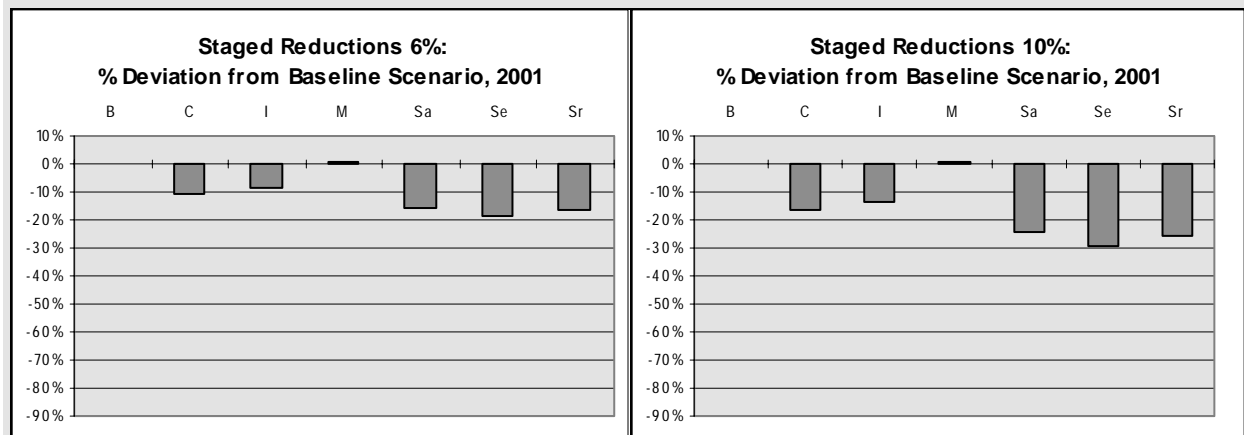
Note: Zero percentage change represents the baseline scenario of no change in settlement rates after 1997. The charts in figures 5.1-5.4 show the % deviation from this baseline, by 2001, under different scenarios.

As indicated in Figure 5.1, all countries analysed with the exception of Bahamas and Mauritania would experience a decrease from the baseline figure for international call revenues of at least 20 percent under the FCC benchmarks scenario as examined here. Senegal would be the most affected, with a projected decrease in international revenues of more than 70 percent from baseline projections. For Bahamas and Mauritania, with very low dependence on settlement payments as a source of international revenues, the FCC benchmarks scenarios would have little impact.

5.3 Staged Reductions

The staged reductions scenario assumes that instead of a rapid decrease to benchmark-level rates, accounting rates decline by a set percentage each year until reaching benchmarks. For this scenario, two possibilities are analysed: standard staged reductions from current rates of 6 percent and 10 percent each year. Other assumptions incorporated in this scenario are those used in the Benchmark scenario.

Figure 5.2: Staged Reductions Scenarios, Impact on International Revenues



The staged reductions scenarios reflect, to some extent, the accounting rate reduction trend occurring in many countries, and while the effects are not as extreme as in the FCC Benchmarks scenario, staged reductions would result in a decrease in international revenues, if other contributing factors such as symmetric settlements and collection charges remain constant. As shown in Figure 5.2, staged reductions would produce, for all countries studied except the Bahamas and Mauritania, a decrease from the baseline projections for international revenues of 10 to 30 percent.

5.4 Asymmetric Rates

The asymmetric rate scenario is based on the assumption that settlement payments will migrate from a symmetric revenue sharing system to an asymmetric system as they become more closely aligned with the actual costs of terminating traffic within a specific country.

5.4.1 Termination Charge – Variable Benchmarks

The termination charge scenario assumes that the accounting rate scenario is replaced by one of termination charges based on unbundled interconnection payments, much like those outlined for European Union interconnection charges. In this scenario, the income group of the country is used as a predictor of its costs, thus that high income countries are assumed to have lower costs than low income ones. Thus, this scenario depends on both the level of income of the country and the level of income of its primary correspondents, according to the following assumptions:

- **Incoming and outgoing traffic.** This scenario employs the same ingoing and outgoing traffic forecasts as in the previous scenarios, but take into account the proportion of outgoing traffic coming from correspondents with high income, middle income, and low income. These proportions are rough averages, derived separately for each country, based on the trends in traffic with their top 20 correspondents in 1996, as follows:
 - Bahamas (high income) - 80 percent high income, 5 percent middle income, 15 percent low income
 - Colombia (middle income) - 70 percent high income, 10 percent middle income, 20 percent low income
 - India - 50 percent high income, 20 percent middle income, 30 percent low income
 - Mauritania - 70 percent high income, 5 percent middle income, 25 percent low income
 - Samoa - 80 percent high income, 10 percent middle income, 10 percent low income
 - Senegal - 70 percent high income, 5 percent middle income, 25 percent low income
 - Sri Lanka - 50 percent high income, 30 percent middle income, 20 percent low income

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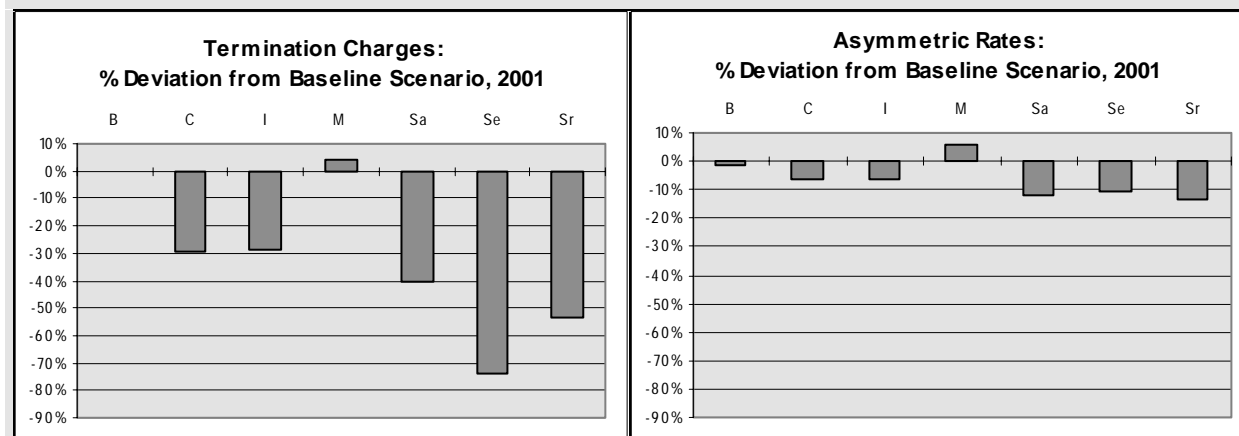
- Incoming traffic termination charges. For every minute of traffic terminated, the country receives a payment based on its level of income – 23 US cents for low income countries, 19 US cents for middle income countries, and 15 cents for high income countries.
- Outgoing traffic termination charges. For every minute of outgoing traffic, the country pays a termination charge based on the terminating country's level of income – 23 US cents for low income countries, 19 US cents for middle income countries, and 15 cents for high income countries.
- International revenues. Calculated as in previous scenarios.

5.4.2 Asymmetric Settlement Rate

The asymmetric settlement rate scenario assumes that instead of a 50-50 split of the accounting rate, a 60-40 split favouring the lesser-developed country prevails, according to the following assumptions:

- Incoming and outgoing traffic. This scenario employs the same incoming and outgoing traffic forecasts as in the previous scenarios.
- Accounting rates and settlement payments. Accounting rates are reduced in staged reductions of 10% until they reach FCC Benchmark rates. However, settlement accounts are settled differently depending on the country of origin and termination: For all traffic originating or terminating in high income countries (e.g., US, EU, Japan, Australia, and New Zealand), traffic accounts are settled with 60 percent going to the lower-income country and 40 percent to the high income country. For all other traffic, traffic accounts are settled 50-50.
- International revenues. Calculated as in the previous scenarios.

Figure 5.3: Asymmetric Rates Scenarios, Impact on International Revenues



While the termination charge scenario shows some of the positive effects of asymmetric rates, the rapid drop in rates to FCC Benchmark levels utilized in this scenario results in a significant decrease in international revenues from the baseline scenario, and may not reflect the actual costs of terminating traffic in a number of the countries studied. Use of a more accurate proxy for the actual cost of terminating traffic would result in a more positive impact on international revenues than reflected in Figure 5.3. For a 60-40 asymmetric rate using an assumption of 10 percent annual reductions in settlement rates, the picture is clearly quite different. While some decrease from the baseline international revenue projections occurs, for most countries studied it is between 0 and 15 percent. Mauritania actually experiences a significant increase in international revenues under both asymmetric scenarios.

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5.5 Very low rates - sender-keeps-all

The very low or sender-keeps all scenario assumes an accelerated decline of accounting rates resulting in very low or no settlement payments. This scenario would be a possible result of a total breakdown of the accounting rate system.

5.5.1 Very Low Rates

Rapid competitive market entry and a trend towards interconnection payments instead of accounting rate settlements could lead to a more rapid decrease in settlement rates than those projected by the FCC benchmark scenario. The very low rates scenario assumes a rapid decrease in current levels of accounting rates until they reach 8 US cents per minute in 1999, based on the following assumptions:

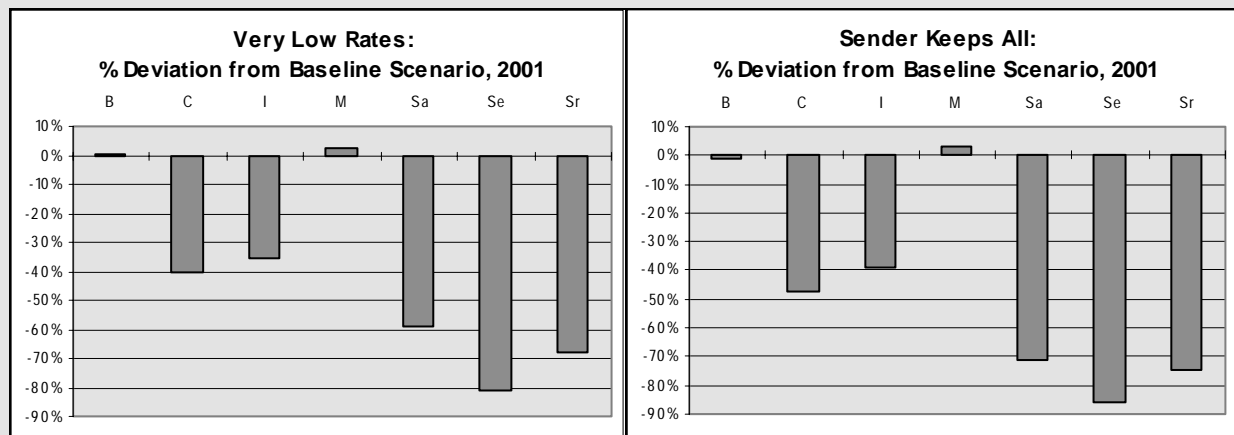
- Incoming and outgoing traffic. This scenario employs the same incoming and outgoing traffic forecasts as in the previous scenarios.
- Accounting rates and settlement payments. Accounting rates remain at current levels for 1997, and decrease at an accelerated rate so that they reach 8 US cents per minute in 1999. Settlement payments function normally.
- International revenues. Calculated as in the previous scenarios.

5.5.2 Sender Keeps All

This scenario examines the potential effects of each operators' growing ability to bypass the accounting rate system, either by financial alliances with other operators, routing of international traffic via the Internet, or other means. The sender-keeps-all scenario follows the same rapid accounting rate decline pattern as in the previous scenario, but is slightly more exaggerated so that accounting rates reach 0 US cents by 1999.

- Incoming and outgoing traffic. This scenario employs the same incoming and outgoing traffic forecasts as in the previous scenarios.
- Accounting rates and settlement payments. Accounting rates remain at current levels for 1997, and decrease at an accelerated rate so that they reach 8 US cents per minute in 199. Settlement payments function normally.
- International revenues. Calculated as in the previous scenarios.

Figure 5.4: Very Low Rates, Sender Keeps All Scenarios, Impact on International Revenues



As shown in Figure 5.4, the impact of a sender-keeps-all or very low rate scenario is the worst possible scenario for most of the countries studied, in particular those with high dependence on settlement payments as a source of international revenues. For those experiencing a negative impact, very low rates produce a decrease from the baseline scenario of 30 to more than 80 percent; sender keeps all results in decreases of nearly 40 to more than 80 percent. Senegal, Sri Lanka, and Samoa fare the worst of all countries studied.

5.6 Scenario Comparison - Country-by-Country Analysis

The impact of each of the possible scenarios on the different countries studied depends, to a great extent, on their operators' dependence on settlement payments as a source of revenues. For Samoa, Sri Lanka and Senegal, which have the highest dependence on net settlement payments, the impact of a rapid reduction in settlement rates is likely to be dramatic on both operator revenues and national sources of hard currency. For India and Colombia, the effects are less profound though the sums involved are much greater because of the relative size of these countries. The effects are even less significant for Mauritania and Bahamas, with a relatively small dependence on settlement payment revenues as a source of income. Lesotho, which is not included in the analysis here, was a net outpayer of settlements in 1996.

The type of reduction also makes a significant difference. All countries studied fare badly under the FCC Benchmarks scenario, because it cuts settlement payments without taking into account the cost asymmetries that are present in comparisons of different networks. Staged reductions have a less dramatic impact than do the Benchmark scenarios, and may be a more realistic short-term route to the reform of the accounting rate system than the benchmark proposal, especially considering the lack of availability of concrete cost data for many countries.

In general, the case study scenarios show that developing countries fare best when asymmetric charges, such as termination charges or 60-40 revenue split is introduced, because they takes into account the assumption that terminating traffic is more expensive in the developing world than in the developed world.

Table 5.3: Key to Figures 5.2 - 5.9

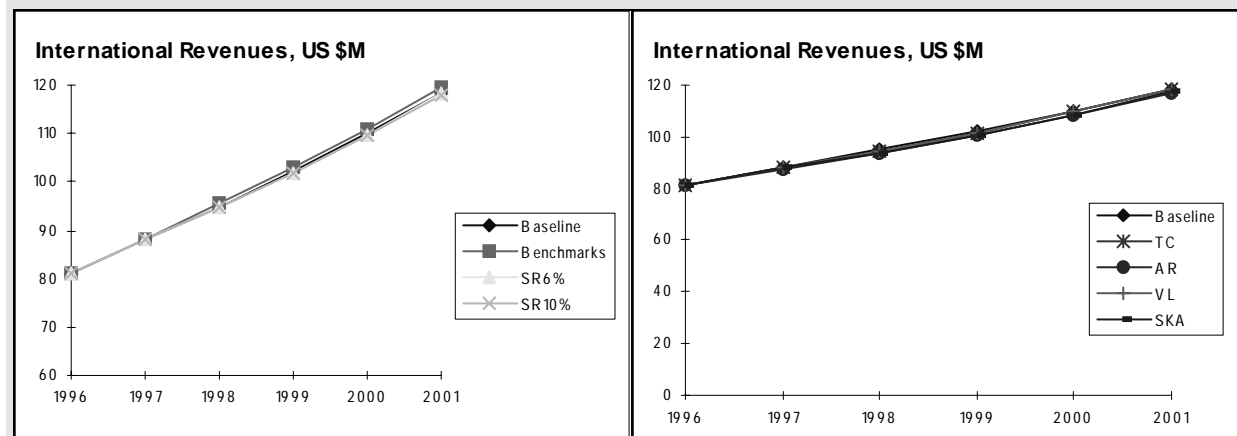
<i>Label</i>	<i>Scenario</i>
Baseline	Base case scenario, based on assumptions outlined in section 5.1

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Benchmarks	FCC Benchmarks scenario, based on assumptions outlined in section 5.2
SR 6%	Scenario of staged reductions of 6% annually, based on assumptions outlined in section 5.3
SR 10%	Scenario of staged reductions of 10% annually, based on assumptions outlined in section 5.3
TC	Termination charge scenario, based on assumptions outlined in section 5.4.1
AR	Asymmetric settlement rate scenario, based on assumptions outlined in section 5.4.2
VL	Very low rates scenario, based on assumptions outlined in section 5.5.1
SKA	Sender keeps all scenario, based on assumptions outlined in section 5.5.2

5.6.1 Bahamas

Figure 5.2: Scenario Analysis of International Revenues, Bahamas, \$USM

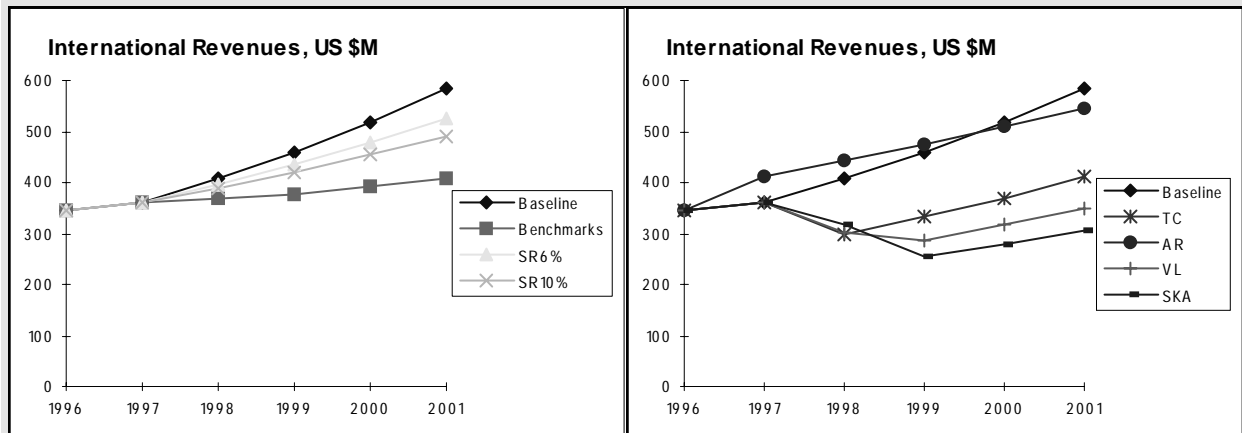


Bahamas’s correspondent relations are dominated by the United States, which accounts for about 80 percent of incoming and outgoing traffic. The United States is the principal source of net settlement income for the Bahamas; it incurs a significant net settlement payment deficit in its relations with the rest of the world, particularly other Caribbean countries. Net revenue settlements constitute less than 5% of BaTelCo’s total revenue, and this figure has fluctuated up and down over the past five years. Because Bahamas is considered a high income country, and a significant portion of Bahamas’s settlement outpayments are to lower-income countries, a 60-40 or termination charge scenario does not offer the advantages seen in the other countries studied.

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5.6.2 Colombia

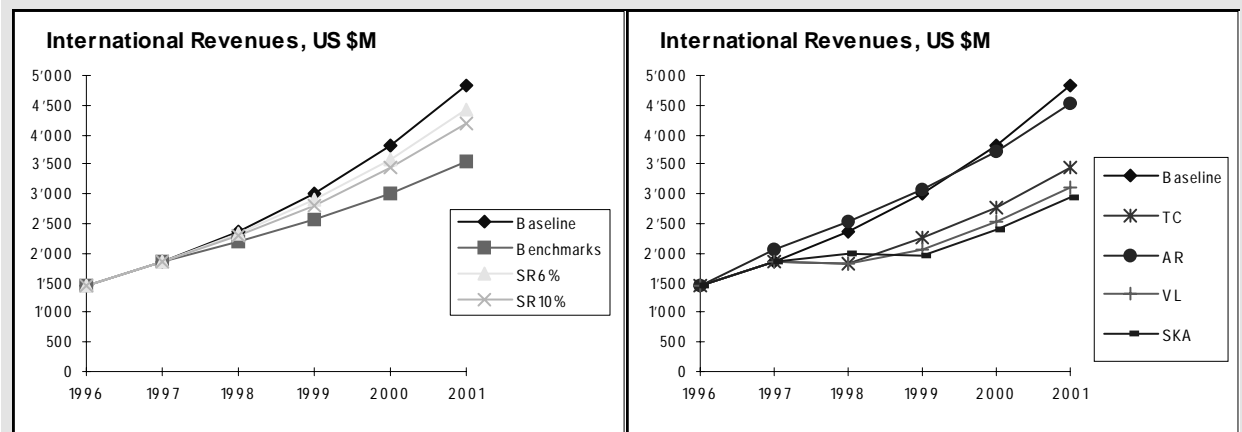
Figure 5.3: Scenario Analysis of International Revenues, Colombia, \$USM



Colombia experiences the greatest traffic imbalance in its relations with the United States, with the US accounting for only some 67 percent of total minutes of traffic but approximately 80 percent of Colombia's total net settlement inpayments. While staged reductions would have some impact on Colombia's total telecommunications revenues, the country is better prepared than others because it has already been reducing settlement rates, and its traffic growth trends suggest that that impact should not be so onerous as for other countries.

5.6.3 India

Figure 5.4: Scenario Analysis of International Revenues, India, \$USM

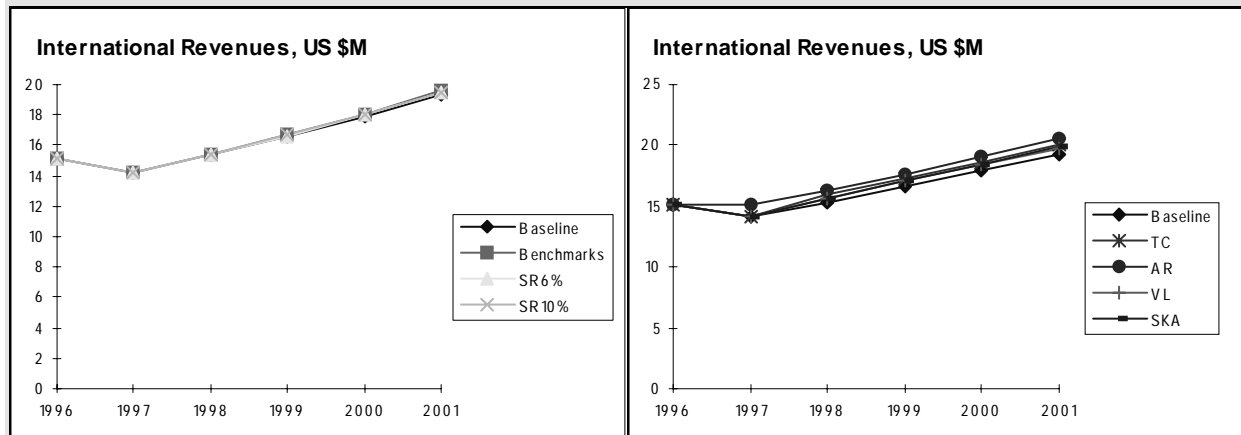


Because of India's increasing dependence on settlement payments as a source of telecommunications revenues, any move to reduce settlement rates will have some impact on total telecommunications revenues. However, India has the highest traffic growth of any of the countries studied here (18 percent annually) as well as the highest price per minute for outgoing traffic (US \$3.09). For this reason, India fares relatively well on most of the scenarios, with the exception of benchmarks.

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5.6.4 Mauritania

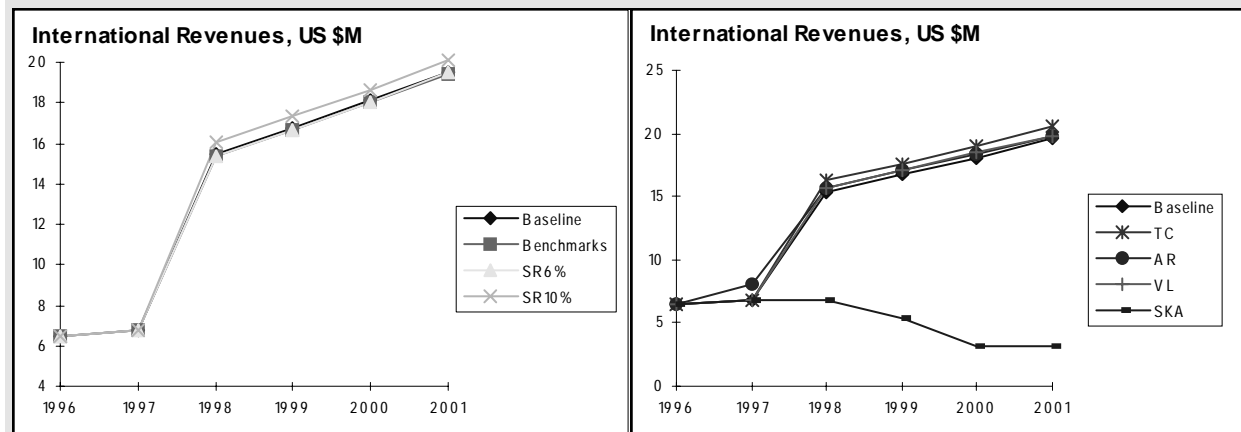
Figure 5.6: Scenario Analysis of International Revenues, Mauritania, \$USM



Mauritania has a relatively low dependence on international settlement payments as a source of telecommunications revenues. Furthermore, because of its transit relationships, and its position as a low income country, the analysis produces the result that a reduced settlement rate asymmetric system, could actually prove better for total telecommunications revenues, in the short term, than the base case of no change.

5.6.5 Samoa

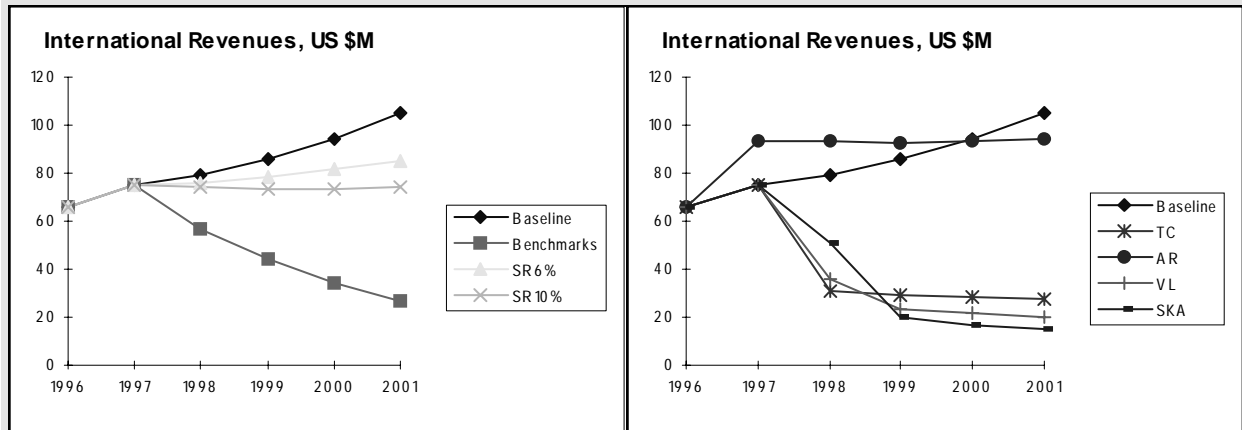
Figure 5.7: Scenario Analysis of International Revenues, Samoa, \$USM



Samoa's relatively high dependence on settlement payments as a source of revenues mean that a rapid decrease in settlement rates will have a significant impact on the revenues of the telecommunications sector. However, because it is a low income country, a reduced-settlement-rate regime that includes some allowance for asymmetric rates would benefit the country's total telecommunications revenue structure, at least in the short run. Sender-keeps-all would have the most detrimental effect, though ironically this is already practised internally in relations between PTD and the cellular operator.

5.6.6 Senegal

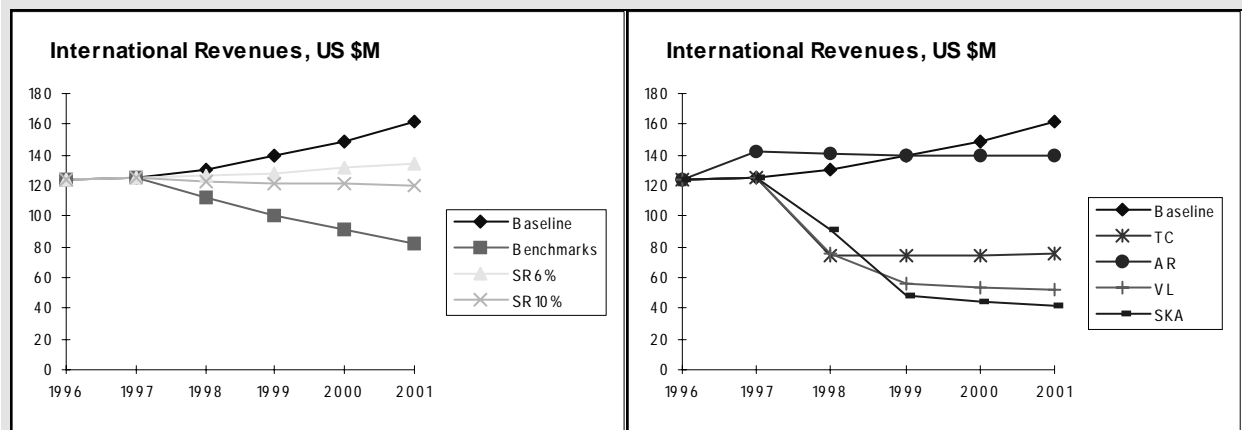
Figure 5.8: Scenario Analysis of International Revenues, Senegal, \$USM



For Senegal, most alternatives to the base case produce a worse outcome, although staged reductions, at either 6 or 10 percent per year, would be broadly neutral. Perhaps surprisingly, the termination charge scenario, while profitable in the short run, proves less so in the long run. This is because much of Senegal's outgoing traffic is with low income African countries whereas Senegal itself is classified as a low-income country. The scenarios based on benchmarks or very-low/no settlement rates would be uniformly bad for Senegal, in the absence of a sustained response, as Senegal derives a large proportion of its total revenues from international services.

5.6.7 Sri Lanka

Figure 5.9: Scenario Analysis of International Revenues, Sri Lanka, \$USM



Sri Lanka, like Samoa and Senegal, has a high dependence on international revenues and settlement payments, with more than two-thirds of its 1996 revenues deriving from outside its borders. For this reason, the scenarios show a significant impact of Sri Lanka Telecom's total revenues. Sender-keeps-all and very low scenarios are the most detrimental, followed by the benchmarks. Staged reductions are broadly neutral in their revenue impact.

6. CONCLUSION

The changing international telecommunications environment will undoubtedly have a significant impact on the telecommunication sectors of all the countries studied here. The WTO basic telecommunications agreement signals a sea-change in the operating environment for public telecommunications operators, irrespective of whether they operate in countries which have made commitments under the agreement or not. In this report, the implications of that agreement are examined with a particular focus on the evolution of the international accounting and settlements system. While the report has highlighted some of the challenges that lie ahead, notably in adapting to an environment based on lower settlement rates, there are also many opportunities which will be opened up for developing countries. This concluding chapter examines some of those challenges and opportunities.

6.1 Cost Accounting

This report has illustrated that there are significant differences between countries in the cost of terminating international telephone calls. It is evident that some of these differences result from alternative cost-accounting methodologies (in particular, fully allocated versus incremental cost methodologies) and from inadequacies in the management information systems used to derive cost data. Nevertheless the differences are significantly large to suggest that there are real, underlying cost differences. In particular, the range of cost estimates revealed in the case studies—between a low of 13 US cents per minute and a high of 45 US cents per minute¹²—is higher than the range calculated in the FCC benchmark study (15 to 23 US cents per minute) and higher still than “best practice” rates currently available on competitive rates in Europe (below 8 US cents per minute). What this means is that any shift towards a cost-oriented settlements regime must logically result in asymmetric rates between high, middle and low income countries.

Only limited cost, accounting rate, and international and domestic revenue data was available for many of the countries studied in the case study project. In some cases, this was because the data is regarded as confidential, but in many cases, notably Lesotho, detailed cost-accounting data is probably not known even to the operators themselves. Developing effective cost-accounting methods would enable telecommunication operators to negotiate settlement arrangements based on a realistic assessment of their demands, to set tariffs that enable them to realise profits, and to build a telecommunications business that better contributes to other developing services sectors of the national economy. As illustrated in this study, the cost of terminating calls in many developing countries may well be higher than in the developed world. But in order to negotiate reasonable rates with international correspondents, operators will be increasingly demanded to *prove* that their costs really are higher. While the benefits of accounting systems are clear, the difficulties of developing and implementing such a system are equally clear. For that reason, it is imperative that the international community is able to agree upon common cost accounting systems for international traffic. The ‘inter-sessional group’, reporting to ITU-T Study Group 3, which is proposed in Draft Opinion C of the Secretary-General’s report to the World Telecommunication Policy Forum should help in establishing such a methodology.

6.2 Tariff Rebalancing

For many developing country operators, cross-subsidisation between international call tariffs and local access has been the unquestioned means for funding network development. In a competitive market, this position is unsustainable because new market entrants will selectively target those parts of the tariff structure which afford the largest margins over costs, and will set their own tariffs accordingly. Furthermore, the traditional system has acted to limit local user’s access to affordable international

¹² In some of the case studies, where there are separate high/low cost estimates, the ‘high’ estimates are in excess of 45 cents per minute. This figure represents the highest of the ‘low’ cost estimates.

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communications and has served to encourage the growth of call-back and other alternative calling options. Clear cost-accounting systems will enable operators to evaluate more effectively their tariff structures, and to bring domestic and international long-distance tariffs into line with their actual costs. Thus tariff rebalancing represents not so much a threat but an opportunity:

- to offer users access to affordable, lower costs international telecommunication services;
- to reclaim some of the traffic currently being lost to call-back operators and alternative calling providers;
- to prepare operators for the challenges of a competitive marketplace.

While the case studies carried out for the World Telecommunication Policy Forum do not attempt to be prescriptive, they nevertheless provide a guide to the direction that countries should take. Settlement rates need to be reduced towards costs, and the preferred route, according to the scenarios analysed, is likely to be through staged reductions. The level of those staged reductions, and the timing of the transition towards costs, will vary between countries, but the cost analysis provided here provides an indication of how far and how fast they must proceed in each country.

If developing countries are to gain the full benefits from these reductions, then operators must pass on the reductions to their customers. In that way, they will gain both from an increase in total traffic on particular routes, and a higher share of the traffic being outgoing rather than incoming. In the long-run, if current traffic distortions are reduced, the debate over accounting rate reform will become less of an issue. The price reductions offered by call-back operators indicate the level of price elasticity of demand, notably in India which has the highest levels of bothway traffic growth of all the countries studied.

6.3 Towards Universal Access

The 1998 edition of the ITU's World Telecommunication Development Report focuses on the theme of extending universal access to telecommunication services. On the basis of research carried out for the report, it is concluded that, if telecommunication services were uniformly available and sensibly priced, then a further 300 million households worldwide could afford to have telephone service, in addition to the 500 million that already have it. This finding is significant because it highlights the extent to which the telecommunications development gap is a result of the failings of supply-side strategies rather than any real lack of demand. The policies which developing countries need to adopt, therefore, to reduce the telecommunications development gap are those that seek to increase the number of suppliers and investors that can participate in the market.

The case studies presented in this project have focused on the 'supply side' rather than the demand side of international telecommunications. All of the countries studied have a waiting list for telephone service and they have ambitious targets for network roll-out. The addition of new subscribers to the network is likely to be a major driver of new demand for international services in coming years. And yet the case study countries have effectively only a single public telecommunications operator licensed to provide international telecommunication services. That situation is likely to change as a result of the market-opening moves ushered in by the WTO basic telecommunications agreement. New market entrants are likely to seek to enter the international business wherever they are allowed to, as this is the domain where profit margins are the most generous. The combined effect of new market entry together with pressure to reduce settlement rates is likely to reduce the price of international telephone calls significantly. That can only be good news for customers.