METHODOLOGICAL NOTE ON DEVELOPING "RANGES OF INDICATIVE TARGET RATES"

Contribution to the Focus Group on accounting rate reform, from the ITU Secretariat.

It is circulated to Members of the Focus Group, at the request of the Chairman, for <u>information and discussion</u>.

Background

The terms of reference for the Focus Group invite it to work on "The development of proposals for solutions for transitional arrangements towards cost orientation beyond 1998, including ranges of ***indicative target rates*** …" taking into account the nine case studies and other existing analyses of market trends and statistical studies. The initial Chairman's report proposes to examine four possible methodologies for developing indicative target rates:

- Determination of a price cap for the settlement rate and the transit rate;

- Designated target ranges, as used, for instance, in the work of the African Regional Tariff Group (TAF: see document TAF-R2, para 10);

- Estimated cost components obtained in the nine country case studies;

- Best practice rate or least cost routing.

This methodological note is aimed at exploring the third of these approaches, using the data contained in the case studies[1], to develop indicative target rates for settlement rates (or their equivalent). The Annex to this note shows what data would be required to extend this research to other countries, on a voluntary basis. This paper is intended to stimulate discussion within the Focus Group.

Options

In order to develop a data-based model for deriving indicative target ranges, it is necessary to define a series of options about what the desired end goal should be. If these options are stated clearly, then they can be debated and modified, according to the wishes of the Focus Group.

1. The first option relates to whether the *indicative target range* should be stated in the form of a target settlement rate (expressed, for instance, in SDR per minute) or a rate of change (expressed in terms of percentage change over a period of years). Study Group 3, in developing a set of transitional arrangements, has set a global target range for the Total Accounting Rate of below 1 SDR (excluding transit rates) by the end of 1998, (i.e. a settlement rate of below 0.5 SDR per minute) and has also invited individual countries to submit a schedule of percentage reductions. A similar approach will be taken here.

2. The second option concerns how long any transitional period should be; in other words when the transition should be deemed complete and cost-oriented rates achieved. ITU-T Recommendation D.140 foresees a period of five years, but it is necessary to take account of the situation of individual countries. Here, a period of between five and ten years is studied.

3. The third option concerns the cost estimates derived from the case studies. The cost estimates in the case studies remain to be validated (see document WTDC-200) as they are based on different costing methodologies and were hampered by a lack of data. For that reason, it is not recommended to use the cost estimates for individual countries but rather to use the average figures for the group as a whole. These range between high estimates of SDR 0.28 (US 38 cents) and low estimates of SDR 0.22 (US 30 cents), depending on whether a fully-allocated or a long-run incremental cost methodology is used. While the cost estimates for individual countries may change as a result of the validation process, it is not expected that the average will change significantly. The cost estimates cover all costs related to

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[1] For the full text and latest drafts of the nine country case studies, see the ITU website at http://www.itu.int/wtpf/cases/index.htm.

international telephone service including transit charges and an element of subsidy to achieve universal service where this is separately identified (for instance in the case of Colombia).

4. Fourthly, it is necessary to consider what the *average* rate of reduction should be (before adjusting for individual national circumstances). Over the last three years (as measured in the TSB survey reported in document COM 3-53), accounting rates have been falling by some 11 per cent per year and a further acceleration is expected in 1998, in association with the implementation of the transitional arrangements of a global target rate of 1 SDR (after deducting transit charges). For that reason, a baseline reduction rate of 12 per cent per year is used in the analysis, and sensitivity analysis is carried out using reduction rates of 9 per cent and 15 per cent per year

5. To what extent should the individual circumstances of the country be taken into account when considering a schedule of reductions? The FCC approach (benchmarks) takes account of just two factors, income group and teledensity. The TAF research (designated target ranges) also takes account of two factors: the percentage of total telecommunications revenue derived from net settlements and the expected date for implementing settlement rates/termination charges at or below 1 SDR. For the case study countries, a much wider range of data is available. However, it is still desirable to limit the number of variables to be used in any analysis to ensure that important factors do not get overlooked. In this analysis it is proposed to take account of the four variables listed in Table 1.

Table 1: Proposed variables to be taken into account in calculating indicative target ranges

Variable	*Effect on schedule of reductions*	*Comments*
1. Rate of network growth (main lines installed per year)	The higher the rate of growth the slower the rate of reduction (inverse correlation)	The purpose of this factor is to take account of the investment requirements and universal service obligations of the incumbent operator(s). Countries with high network growth are more likely to be investing revenues derived from settlement payments rather than passing them on to shareholders in the form of dividends or customers in the form of subsidies. Network enlargement helps both countries in a correspondent relationship through the stimulation of extra traffic. The rate of network growth is a better variable to use than simple teledensity as teledensity is already highly correlated with other variables (notably 2 and 4 below)
2. Percentage contribution of net settlement payments to overall telecommunication revenues	The higher the contribution, the slower the rate of reduction (inverse correlation)	Countries with a high level of dependence on net settlement payments (e.g., island states, LDCs etc) may find that the structural adjustment required to move towards a cost-oriented settlements regime more difficult to undertake than a country with a low level of dependence, or even a net outpayment.
3. Weighted average settlement rate, 1997, in SDRs	The higher the current settlement rate, the faster the rate of reduction (positive correlation)	The weighted average settlement rate is calculated as the incoming traffic (minutes) from the (10) major correspondent countries multiplied by the prevailing settlement rate (including transit charges) on that route.
4. Income group	The higher the income group of the country, the faster the rate of reduction (positive correlation).	The income group (high, upper middle, lower middle, low, LDC) is defined according to the criteria used by the World Bank (for income groups) and the UN General Assembly) for LDCs.

Constructing the model

Initially, each of these variables will be afforded the same weighting, though this could be modified if additional factors are added to the model. For the case study countries, the maximum, minimum and mean ranges of these four variables are shown in Table 2.

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Table 2: Ranges for proposed variables among the case study countries

Country	1. Rate of network growth: CAGR, in main lines, 1990-96, in % (-)	2. Percentage contribution of net settlements to total telecom revenues, 1996/97 (-)	3. Weighted average settlement rate,1997, in SDR (+)	4. Income Group (+)
Bahamas	**0.32**	1.1	**0.261**	High
Colombia	**8.40**	**7.7**	0.406	Lower middle
India	**16.98**	12.6	0.713	Low
Lesotho	1.83	**<0**	**0.544**	LDC
Mauritania	6.73	0.8	0.442	LDC
Samoa	13.53	**40.8**	0.341	LDC
Senegal	10.63	29.3	**0.979**	"As if" LDC
Sri Lanka	12.00	37.5	0.664	Low
Uganda	6.04	6.4	0.762	LDC
Mean	8.50	17.03	0.64	n.a.
Median	**8.40**	**7.70**	**0.54**	
Standard deviation	5.42	16.31	0.23	n.a.

Note: The maximum, median and minimum figures for each indicator are indicated in bold. CAGR = Compound Annual Growth Rate. The "+" and "-" symbols indicate a positive or an inverse correlation with the scheduled rate of reduction.

Source: ITU/CTO Country Case Studies.

In order to use this data, it is necessary to convert it to ordinal form and to enter it into the model. The approach taken has been to divide the data for each variable into quartiles, with two divisions either side of the median. This can then be converted to ordinal form by assigning each country an adjustment variable of plus or minus two per cent, depending how it scores on each of the variable. The net effect for the group as a whole (pluses and minuses combined) should be zero. Table 3 shows how this can be applied to the case study countries.

Table 3: Application of model assumptions to the case study countries

Ranges	Countries	Score
Compound Annual Growth Rate, in main lines, 1990-96 (%)		
16.98-12.69 %	India, Samoa	-2
12.69-8.40 %	Sri Lanka, Senegal	-1
Median (8.40 %)	Colombia	0
8.40-4.36 %	Mauritania, Uganda	1
4.36-0.32 %	Bahamas, Lesotho	2
Percentage contribution to total telecom revenues 1996/97		
Ranges	Countries	
40.80-24.25 %	Samoa, Senegal, Sri Lanka	-2
24.25-7.70 %	India	-1
Median (7.70 %)	Colombia	0
7.70-3.85 %	Uganda	1
3.85-0 %	Bahamas, Lesotho, Mauritania	2
Weighted average settlement rate, 1997 (in SDRs)		
Ranges	Countries	
0.261-0.403 SDR	Bahamas, Samoa	-2
0.403-0.544 SDR	Colombia, Mauritania	-1
Median (0.544 SDR)	Lesotho	0
0.544-0.762 SDR	India, Sri Lanka	1
0.762-0.979 SDR	Senegal, Uganda	2
Income group		
LDC	Lesotho, Mauritania, Samoa, Senegal, Uganda	-2
Low	India, Sri Lanka	-1
Lower middle	Colombia	0
Upper middle		1
High	Bahamas	2

The next stage is to apply these individual country adjustments to the baseline percentage reduction of 12 per cent per year, assigning each score of plus or minus one to equal one percentage point. This gives a range of figures between 16 per cent per year for the Bahamas and 4 per cent year for Samoa. These rates can then be applied to actual settlement rates to derive a baseline schedule of reductions (in SDRs) as shown in Table 4a. One country (the Bahamas) already has a settlement rate that falls inside the indicative target range of 0.22-0.28 SDR. Two other countries (Colombia and Mauritania) reach that target by the year 2001; two more countries (Samoa and Uganda) reach it in 2002; Lesotho reaches it in 2003 and the remaining three countries (India, Senegal and Sri Lanka) reach it in 2004.

Sensitivity analysis

As indicated above, it is also possible to carry out a sensitivity analysis to show what would happen if a rate of reduction which is higher or lower than the baseline were used. For the purposes of the analysis, rates of plus or minus 3 per cent (i.e., 9 per cent per year or 15 per cent per year) have been used (see Tables 4b and 4 c). As would be expected, the effect is to slow down or speed up the transition period. If rates of reduction based around 9 per cent per year are used, then the transition would be completed only by 2008 in India, Senegal and Sri Lanka and as late as 2015 in Samoa (Table 4b). If rates of reduction based around 15 per cent per year are used, then all but four of the countries would have completed the transition by 2001 and the remaining countries would complete in 2002 (Uganda) and 2003 (India, Senegal and Sri Lanka: Table 4c).

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Table 4a: Baseline schedule of reduction in settlement rates for the case study countries, 1997-2004, in SDRs

Country	Baseline annual rate of reduction (%)	1997 (actual)	1998 *	1999	2000	2001	2002	2003	2004
Bahamas	16%	0.26	0.22						
Colombia	11%	0.41	0.36	0.32	0.29	0.26			
India	9%	0.71	0.50	0.46	0.41	0.38	0.34	0.31	0.28
Lesotho	12%	0.54	0.48	0.42	0.37	0.33	0.29	0.25	
Mauritania	12%	0.44	0.39	0.34	0.30	0.26			
Samoa	4%	0.34	0.33	0.31	0.30	0.29	0.28		
Senegal	9%	0.98	0.50	0.46	0.41	0.38	0.34	0.31	0.28
Sri Lanka	9%	0.66	0.50	0.46	0.41	0.38	0.34	0.31	0.28
Uganda	14%	0.76	0.50	0.43	0.37	0.32	0.27		
Highest		0.98	0.50	0.46	0.41	0.38	0.34	0.31	0.28

Note: Scenario based around a baseline indicative rate of reduction of 12 per cent per year.
* Those countries with settlement rates above the agreed target range for year end 1998 (0.5 SDR) have been reduced to that figure. These should be corrected for transit rates once this data becomes available.
Once each country falls within the indicative target range of 0.22 - 0.28 SDR, the model is stopped for that country.

Table 4b: "Slow" scenario for schedule of reduction in settlement rates for case study countries, 1997-2008, in SDRs

	Indicative annual rate of reduction (%)	1997 (actual)	1998 *	1999	2000	2001	2002	2003	2004	....	2008
Bahamas	13%	0.26	0.23								
Colombia	8%	0.41	0.37	0.34	0.32	0.29	0.27				
India	6%	0.71	0.50	0.47	0.44	0.42	0.39	0.37	0.34		0.27
Lesotho	9%	0.54	0.50	0.45	0.41	0.37	0.34	0.31	0.28		
Mauritania	9%	0.44	0.40	0.37	0.33	0.30	0.28				
Samoa	1%	0.34	0.34	0.33	0.33	0.33	0.32	0.32	0.32		0.31
Senegal	6%	0.98	0.50	0.47	0.44	0.42	0.39	0.37	0.34		0.27
Sri Lanka	6%	0.66	0.50	0.47	0.44	0.42	0.39	0.37	0.34		0.27
Uganda	11%	0.76	0.50	0.45	0.40	0.35	0.31	0.28			

Note: Scenario based around an indicative rate of reduction of 9 per cent per year.
* Those countries with settlement rates above the agreed target range for year end 1998 (0.5 SDR) have been reduced to that figure. These should be corrected for transit rates once this data becomes available.
Once each country falls within the indicative target range of 0.22 - 0.28 SDR, the model is stopped for that country. Samoa would reach the indicative target range only in the year 2015

Table 4c: "Fast" scenario for schedule of reduction in settlement rates for case study countries, 1997-2003, in SDRs

	Indicative annual rate of reduction (%)	*1997 (actual)*	*1998 **	*1999*	*2000*	*2001*	*2002*	*2003*
Bahamas	19%	0.26	0.21					
Colombia	14%	0.41	0.35	0.30	0.26			
India	12%	0.71	0.50	0.44	0.39	0.34	0.30	0.26
Lesotho	15%	0.54	0.46	0.39	0.33	0.28		
Mauritania	15%	0.44	0.38	0.32	0.27			
Samoa	7%	0.34	0.32	0.29	0.27			
Senegal	12%	0.98	0.50	0.44	0.39	0.34	0.30	0.26
Sri Lanka	12%	0.66	0.50	0.44	0.39	0.34	0.30	0.26
Uganda	17%	0.76	0.50	0.42	0.34	0.29	0.24	

Note: Scenario based around an indicative rate of reduction of 15 per cent per year.
* Those countries with settlement rates above the agreed target range for year end 1998 (0.5 SDR) have been reduced to that figure. These should be corrected for transit rates once this data becomes available.
Once each country falls within the indicative target range of 0.22 - 0.28 SDR, the model is stopped for that country.

Revenue impact of the baseline scenario on the case study countries

The final stage of the analysis is to apply the baseline model to the forecast revenue of each of the case study countries over the period 1998-2004. The assumptions used concerning change in the level of traffic (incoming and outgoing) and the effective price per minute (for collection charges) are essentially the same as those used in the Case Study Overview Chapter (see http://www.itu.int/wtpf/cases/overview.htm). The results are shown in Table 5. For most countries the overall impact is positive or broadly neutral. Only two countries (Senegal and Uganda) experience a marginal fall in total international revenues. These two countries had the highest prevailing settlement rates in 1997.

Table 5: Impact of the baseline schedule of revenues on the international telecommunication revenues of the case study countries, 1997-2004, (in US$ million)

	1997 (actual)	*1998*	*1999*	*2000*	*2001*	*2002*	*2003*	*2004*
Bahamas	91.5	97.6						
Colombia	370.1	396.7	425.4	456.5	490.0			
India	1'784.6	1'885.0	2'157.7	2'466.4	2'815.7	3'210.8	3'657.3	4'161.8
Lesotho	16.9	17.7	18.5	19.4	20.3	21.3	22.3	
Mauritania	14.2	15.4	16.7	18.0	19.5			
Samoa	6.8	7.4	8.1	8.9	9.7	10.6		
Senegal	74.7	57.0	59.0	61.0	63.0	65.1	67.3	69.5
Sri Lanka	128.9	119.2	121.6	124.1	126.7	129.5	132.4	135.4
Uganda	13.4	12.5	12.8	12.9	12.9	12.9		

Note: For more detail on model assumptions, see Case Study Overview Chapter (http://www.itu.int/wtpf/cases/overview.htm).
International revenue figures for 1997 in Lesotho and Uganda are estimates.

By contrast, the impact of several of the other scenarios, investigated in the Case Study project, would be markedly disadvantageous to the countries concerned. The imposition of benchmark settlement rates for example, as envisaged by the FCC, would imply a reduction in international revenues, compared to the baseline scenario, of up to 70 per cent by the year 2001.

Summary

This paper has presented a possible methodological approach for one of the four approaches to be studied in the Focus Group, using the Case Study countries as a model for developing indicative target ranges for settlement rates (or their equivalents). The indicative rates of reduction examined (9, 12 and 15 per cent) have been modified according to the national circumstances of the countries concerned, using four socio-economic variables. Depending on the outcome of discussion within the Focus Group, this research could be extended to other developing countries on a voluntary basis. This approach would require the collection of data according to the format shown in Annex 1 of this document. The variables and the assumptions used in the model can be adjusted once more experience is gained with the analysis of other countries.

Annex 1: Data requirements

1. Annual increase in the number of telephone main lines installed, 1990-96 (data available in the World Telecommunication Indicators Database.

2. Total telecommunications revenue, 1996/97 broken down as follows:

- revenue derived from domestic services

- revenue derived from international collection charges

- revenue derived from net settlement payments.

3. Weighted average settlement rate, in SDRs, based on traffic to top 10 destination and origin countries. Where possible, the element of transit rates should be separated out.

4. Total international incoming and outgoing traffic, 1997, in minutes.

5. Income group (data available from World Bank / UN General Assembly).