LIRNE*asia*
Learning Initiatives on Reforms for Network Economies

Preliminary Methodology for Comparisons of Mobile Tariffs

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1.0 Study in Context

The study has been undertaken in keeping with the proposed 2006 theme of the World Dialogue on Regulation for Network Economies (WDR), 'Sector and Regulatory Performance Indicators.' The definition of standardized benchmark indicators with their respective viable methodologies in the Asian context is required for an accurate comparative analysis of the regulatory and sector performance in information and communication technologies (ICTs).

Recognizing that this constitutes a participatory exercise among experts in the telecommunication industry standards and regulatory affairs, telecom authorities and statistical organizations as well as academics and interested individuals, this preliminary methodology framework document was commissioned to lay the groundwork to initiate and foster active discussion among the aforementioned participants on issues related to the proposed 2006 WDR theme.

With these guiding principles, this preliminary methodology on evaluation mobile tariffs (based on the OECD basket methodology) was formulated to evaluate the relative affordability of access of mobile telecommunication services. LIRNE*asia* intends to test the methodology first in the South Asian region and then extend it to the rest of Asia. Furthermore it is hoped that the preliminary results will especially engage discussion with operators from the region on issues related to formulating an appropriate and standardized methodology which will make comparisons meaningful within developing Asia.

1.1 Background

Mobile tariffs are of significance because they are a good gauge of sector performance and affordability. In a study done for the Department of Trade and Industry in the United Kingdom – the Transparency of Mobile Phone Tariff Information Report, it was confirmed that price and value were the most important considerations for those choosing a mobile phone package. Affordable tariffs determined the use of a package and the amount of use thereafter.

The study also proved that standardizing of tariffs was essential for the benefit of all stakeholders.

Consumers complained about the lack of organization and consistency in the way tariffs were presented by different operators. They would like to be able to compare connection charges, monthly line rental, free call allowances, call charges and billing charges; and within call charges, they would like to be able to compare daytime rates, evening rates, weekend rates, peak/off peak times, rates to the same network, rates to different networks, voicemail rates, SMS rates and WAP rates among others.

From the government's point of view, given the different approaches taken by different operators in different countries, the tariffs used worldwide were found to not always be compatible, impeding the computing of comparable statistics on mobile tariffs.

The Core ICT Indicators document that came out of the Partnership on Measuring ICT for Development in 2005 states that "comparable statistics on access to, and use of, information and communication technologies (ICTs), are critical to formulating policies and strategies concerning ICT-enabled growth, for social inclusion and cohesion, and for monitoring and evaluating the impact of ICTs on economic and social developments. However, internationally comparable information society statistics are very limited, in particular in the developing world."

The ICT Indicators document prescribes methods and measures for computing comparable indicators to set standards and harmonize ICT statistics at the global level. Other institutions such as ITU and OECD had previously developed various means of calculating these indicators, however these methodologies are either too basic or were developed for use only at a regional level.

2.0 Methodology

The methodology has been derived from the following established methodologies:

- OECD Telecommunication Basket Definitions document published by the Organization for Economic Co-operation and Development (OECD[1]) in 2000 and the subsequent Mobile Basket Revision of 2001 (referred henceforth as OECD methodology);
- OECD Mobile Basket Revision of 2001.

The OECD methodology was modified to account for the following:

1) *Receiving Party Pays (RPP) and Calling Party Pays (CPP)*
   RPP is currently in place only in a few countries. However since Sri Lanka, one of the initial test countries for this methodology still utilized an RPP regime, a simple assumption of an equal number of incoming and outgoing minutes was utilized to account for RPP.
2) *Prepaid and Postpaid*
   Prepaid is the market driver for the mobile sector in most developing countries. Additionally, conventional perception in the South Asian region is that prepaid is more expensive than postpaid. Hence it was decided that postpaid and prepaid would be studied separately.

2.1 Proposed Methodology

1. *Currency calculations:* Tariffs are available in US Dollars and US Dollars adjusted for Purchasing Power Parity (PPP).

2. *Treatment of taxes:* Tariffs include value added tax (VAT) and/or any other communication levies.

3. *Basket composition:*

   a. The price of the handset and handset subsidies are **not** taken into account in the basket.

   b. 1/3 of the registration or installation charges (i.e. depreciated over 3 years) where applicable.

   c. Monthly rental charges and any optional charges that may apply to the package.

   d. The usage profile will also include a number of SMS messages per month

   e. The three user baskets are:

      - *Low user basket*: The usage level of this basket is low, with a call volume less than half of that in the Medium user basket.
      - *Medium user basket*: This basket will have 75 outgoing calls per month.
      - *High user basket*: The usage level is about twice the Medium user basket.

[1] OECD is a forum of 30 developed countries who work together to address the economic, social and environmental challenges of interdependence and globalization.

f. Call and SMS message volumes for each basket are:

	Minutes of use/month	SMS/month
Low User	25	30
Medium User	75	35
High User	150	42

4. *Prepaid vs. Postpaid packages:* There will be different baskets for prepaid and postpaid.

5. *RPP differences:* In countries where RPP is used, the basket will be calculated assuming the same number of incoming and outgoing minutes and then dividing by two. For example the low user basket will be calculated assuming 25 minutes of outgoing and 25 minutes of incoming and then averaging the two.

6. *Call destination:* Only national calls (that is calls within the national boundaries) are accounted for in the basket:

    a. Local area fixed line calls. This is used to accommodate the tariffs that have separate charges for the local area. When such charges are not available, this proportion of calls is included in the 'National fixed line' call category.

    b. National fixed line calls. This covers all fixed line calls outside the local area, except in cases as noted above.

    c. Same network mobile calls (On-net). This includes all calls made to mobiles in the same mobile network as the caller.

    d. Other network mobile calls (Off-net). This includes calls to all other mobile networks in the caller's country. When the charges are different depending on destination network, the market shares based on subscriber numbers are used for weighting the charges. Up to 3 other networks will be considered in each country.

    e. Distribution per destination for each basket are:

% of total # of calls	Fixed Local area	Fixed National area	On-net mobile	Off-net mobile
Low user	28.0%	14.0%	40.0%	18.0%
Medium user	24.0%	12.0%	43.0%	21.0%
High user	26.0%	14.0%	42.0%	18.0%

7. *Peak/off-peak differentials:* Instead of splitting time and day into distinct times and days the following approach will be used:

    a. Peak time calls at weekdays, most expensive time during daytime.

    b. Off-peak time calls at weekdays, cheapest time before midnight.

c. Weekend time calls, at daytime Sundays.

d. Distribution over time and day (ToD) for each basket are:

% of total # of calls	ToD Peak	ToD Off-peak	ToD Weekend
Low user	38.0%	35.0%	27.0%
Medium user	47.0%	30.0%	23.0%
High user	63.0%	22.0%	15.0%

8. *Call duration:* There will be 3 separate call durations:

   a. Local and national fixed line calls.

   b. Same network mobile calls (On-net).

   c. Other network mobile calls (Off-net).

   d. Call durations for each basket:

Minutes per call	Duration of Fixed national	Duration of Mobile On-net	Duration of Mobile Off-net
Low user	1.6	1.4	1.4
Medium user	2.1	1.9	1.9
High user	2.2	2.0	2.1

9. *Call allowances:* Any call allowance value included in the monthly rental will be deducted from the usage value once the basket is calculated. The deduction cannot be larger than the actual usage value i.e. negative usage is not allowed. No transfer of unused value to next month is taken into account.

10. *Inclusive minutes and SMS messages:*

    a. Any inclusive minutes will be deducted from the basket usage before starting the calculation of usage cost. The inclusive minutes are assumed to be used up with the same calling pattern is described in the basket i.e. the same/peak off-peak ratio and the same distribution across destinations. Where the inclusive minutes are clearly limited to specific destinations or times of day this will be taken into account. No transfer of unused minutes is taken into account.

    b. Any inclusive SMS message will be deducted from the basket before starting the calculation of the SMS message cost, up to the number of messages in the basket.

11. *Selection of package and operator:*

    a. For each of the operators covered a set of packages shall be included so that the cheapest package offered by that operator can be calculated for each of the 3 baskets.

b. Multiple operators in each country shall be included with at least the two operators with the highest number of subscribers in each country. The included operators shall have a composite market share of over 50% based on the previous year's subscriber figures.

12. *Timeframe:* Basket results are reported once a year.

2.2 Benchmarking

The benchmark price for a specific capacity and distance mix will be a determinant of the number of countries studied. The following table outlines the proposed methodology for choosing the benchmark.

Number of Countries	**Benchmark**
1-5	The lowest tariff is chosen as the benchmark
6-20	The 2nd lowest tariff is chosen as the benchmark
21-40	The 3rd lowest tariff is chosen as the benchmark

2.3 Notes on the Methodology

1. *Choice of operator*
   The choice of the operator to consider is based on the previous year's figures. However it has to be noted that with mobile penetration increasing at a phenomenal rate, it may be the case that dynamics of the market share ranking may change quite frequently.

   For example in India, the number of mobile subscribers increased by almost 2.7 million in August 2005 which represented a 4.8% growth in just one month or a 52.1% growth for the one year period ending in August 2005[2]. The largest mobile operator was Bharti in August 2005.

2. *CPP vs. RPP*
   As of 2004, with the exception of a few countries most follow a CPP regime. However some major mobile markets such as the US and China still follow an RPP regime. In the South Asian context, RPP is still utilized in Sri Lanka. Hence RPP is accommodated for in this methodology by assuming an equal number of incoming and outgoing calls and taking the average, since different rates apply for incoming and outgoing calls. There has been some preceding work which accommodates an RPP regime by assuming that half the minutes constitute incoming and the remaining half constitute outgoing. Ponder and Markova (2005) utilized a 50-50 split to accommodate Russia's RPP regime in their analysis of stimulating mobile telecommunication diffusions in transition countries. However, with most countries switching to CPP, the accommodation for RPP in this methodology could be eventually dropped.

[2] Press Release No. 72/2005, Telecom Regulatory Authority of India, 8th September 2005, http://www.trai.gov.in/pre8sep05.htm

3. *Which package to consider?*
   If we are looking at one company's tariffs, then which package(s) do we look at? The answer is to apply the basket methodology to all the tariff packages and report the cheapest for each basket i.e. low user, medium user, and high user.

4. *USD and USD adjusted for PPP*
   There are theoretical arguments both for and against considering a mobile call as a tradable good. The decision was made to report the findings in both USD and USD adjusted for PPP since relevant exchange rates are available for both.

5. *Weights in OECD Methodology*
   Weightings are assigned in the OECD for the following situations:
   - Distribution of call destinations.
   - Distribution over time and day for each basket.
   - Distribution of call durations over each basket to each destination.

   The issue is that these weights are calculated once every couple of years. The preliminary methodology utilized the latest OECD weights, However these weights may not reflect usage patterns in the Asian region. Nevertheless for the purposes of this preliminary study the basic weight distributions were deemed applicable for this context and were loosely verified using LIRNEasia's Teleuse on a shoestring study findings.

6. *ITU methodology*
   The ITU methodology for tariffs consists of separate indicators for connection charges, monthly subscriptions, SMS messages and the price of a 3-minute local call. When it comes to cross country comparisons of mobile tariffs, it is generally the case that people end up quoting just the tariff indicator for a 3-minute call. This gives an incomplete and incorrect estimate of what the cost of a phone call is to the user.

   The implicit advantage of using a basket methodology like OECD's consists of its ability to incorporate these different ITU indicators into one comprehensive indicator that gives a true picture of what mobile tariffs a user has to pay. ITU's indicators and their methodology is given below and it can easily been seen that ITU's methodology for each individual indicator is not sufficiently robust as the OECD methodology.

   Key Indicators of the telecommunication/ICT sector version 3.0 (revised 2005)

   The fourth World Telecommunication/ICT indicators meeting (Geneva, February 2005) discussed the following mobile indicators:

		Mobile cellular tariffs
34.1.1	Mobile cellular connection charge	The initial, one-time charge for a new subscription. Refundable deposits should not be counted. Although some operators waive the connection charge, this does not include the cost of the Subscriber Identify Module (SIM) card. The price of the SIM card should be included in the connection charge. It is preferable to use the connection charge for pre-paid service to enhance inter-country comparability. A note should indicate whether taxes are included (preferred) or not.
34.1.2	Mobile cellular monthly subscription	The monthly subscription charge for mobile cellular service. Due to the variety of plans available in many countries, it is preferable to use pre-paid tariffs. In that case, the monthly subscription charge would be zero. However in some countries, a monthly air time charge is applied even for pre-paid service. If so, that amount should be used. A note should indicate whether taxes are included (preferred) or not. The note should also specify the amount of free monthly minutes included if applicable.
34.1.3	Mobile cellular - price of 3 minute local call (peak)	The price of a three minute peak rate local call from a mobile cellular telephone. If operators charge different prices depending on who is being called (e.g., same mobile network, fixed network, another mobile network) these should be listed separately. In order to enhance inter-country comparability it is preferable to use pre-paid tariffs. A note should indicate whether taxes are included (preferred) or not.
34.1.4	Mobile cellular - price of 3 minute local call (off-peak)	The price of a three minute off-peak rate local call from a mobile cellular telephone. If operators charge different prices depending on who is being called (e.g., same mobile network, fixed network, another mobile network) these should be listed separately. In order to enhance inter-country comparability it is preferable to use pre-paid tariffs. A note should indicate whether taxes are included (preferred) or not.
34.1.5	Mobile cellular – price of SMS	Price of sending a national Short Message Service (SMS) message from a mobile handset.
34.2	Mobile termination rate	Many telecommunications companies outside a country now impose substantial fees to complete telephone calls to mobile phones and other wireless devices including pagers, Personal Computers and Personal Digital Assistants. In order to recover these fees, the operator inside the country adds a mobile termination charge to all calls completed to wireless devices in the affected countries. The charge amount varies by country and applies to all calls that are placed to wireless device.

ITU tariff indicators take account of the initial one-time connection charges, the monthly subscription charges (including free monthly minutes and SMS messages), SMS messages and the prices of a 3-minute peak/off peak local call. Indicators are based preferably on prepaid tariffs because this would mean the monthly subscription charge will possibly be zero.

7. *Core ICT Indicators document, Partnership on Measuring ICT for Development*
   This document takes into consideration more than what the ITU methodology does, but is not as thorough as the OECD methodology. The mobile cellular tariff indicator compares the cost of 100 minutes of use per month (50 minutes of local peak time calling and 50 minutes of local off-peak calling), and is intended to represent an average use basket which is applicable to individual consumers.

   The tariff indicator includes the monthly service rental for 50 minutes of local peak time calling and 50 minutes of local off-peak calling, plus tax. Differences in distance of calls (if relevant), international calls and SMS messages are not taken into account. The one-time connection charge is also omitted from this methodology (except where this is bundled into the costs of a pre-paid account). The tariff indicator is calculated on either postpaid or prepaid services, whichever is most popularly used.

   It is clear that the OECD methodology takes a more comprehensive approach when compared to the ITU methodology or the recommended methodology for mobile tariffs as per the Core ICT Indicators document. Understandably, the OECD methodology provides indicators that are accurate and that are a closer reflection of what the mobile user actually has to pay per minute.

3.0 South-Asian Case Studies

The preliminary methodology has been tested in India, Pakistan and Sri Lanka. Bharti, which is the largest mobile operator in India with approximately 28% of market share, and Mobilink with 58% of market share in Pakistan were taken into account. Similarly, Dialog with approximately 60% of market share was considered in Sri Lanka.

The study was carried out in December 2005, using Indian and Sri Lankan tariff and subscription figures for August 2005, and Pakistani figures for December 2005.

Due to time constraints the application of the methodology deviated slightly from the prescribed methodology by only considering the largest mobile operator based on subscriber figures.

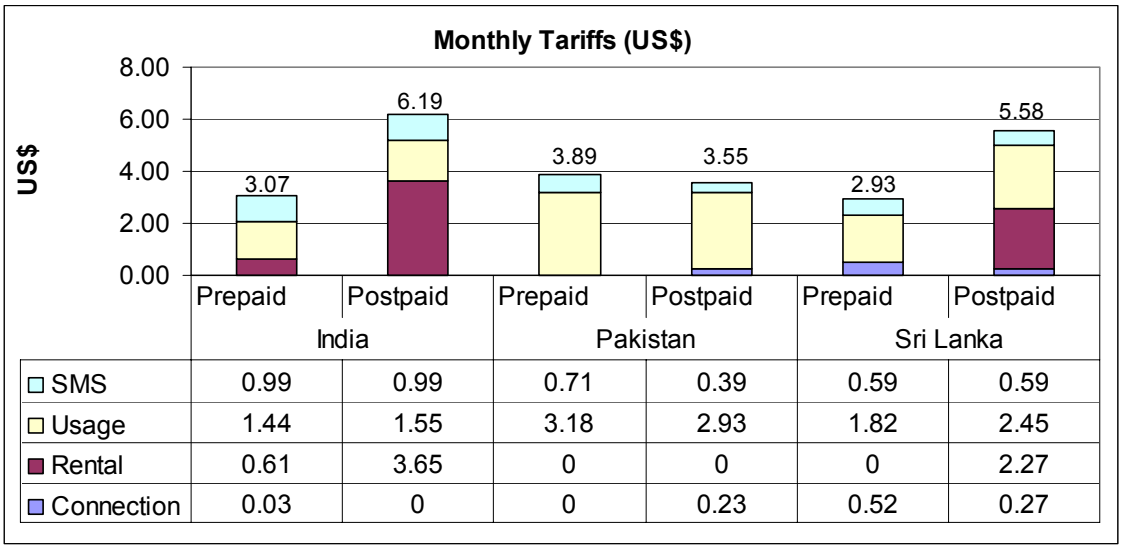
Common perception suggests that prepaid tariffs are more expensive when compared to postpaid tariffs. Per minute prepaid usage rates are usually higher than postpaid rates and when comparing the two tariffs structures, it is solely this charge that is almost always considered, fueling the notion that prepaid is, in general, the more expensive option of the two.

However, using a basket methodology, the per minute call cost incorporates all relevant costs (connection, rental and other costs), taking a holistic approach and thus giving a very realistic figure. This is the reason why the findings of the preliminary study using this methodology were contrary to common perception – Indian and Sri Lankan postpaid tariffs were evidently much more expensive at low levels and even at medium and high levels of mobile phone use.

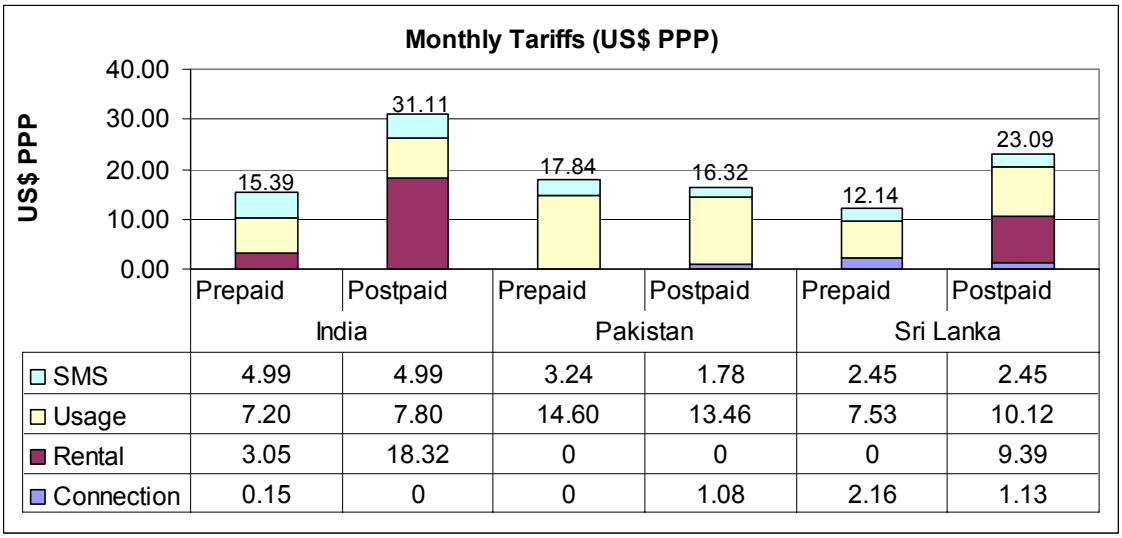
The analysis on Pakistani mobile rates, however, revealed that postpaid tariffs were actually cheaper than prepaid tariffs at all levels of use. The main reason for this was because there were no rental charges for prepaid or postpaid packages. Even though postpaid plans did have a connection charge, the per minute charge of a postpaid call was still cheaper than a per minute charge for a prepaid call.

While Pakistani per minute prepaid call charges for medium and high user baskets were high compared to Indian and Sri Lankan charges, Pakistani prepaid costs for low user baskets were much less. Sri Lankan prepaid and postpaid tariffs were also higher than Indian tariffs for medium and high users, but were cheaper for low user baskets. It must be noted that Sri Lankan tariffs included charges for outgoing and incoming calls whereas both India and Pakistan have CPP regimes.

Figure 3.1: Low User Basket Tariffs (USD & USD adjusted for PPP)

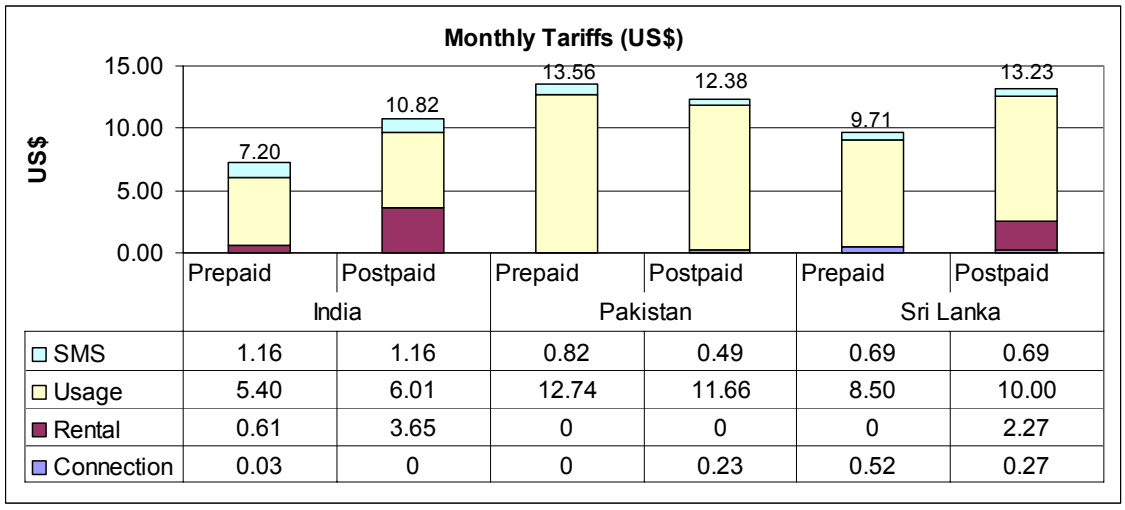


	India		Pakistan		Sri Lanka	
	Prepaid	Postpaid	Prepaid	Postpaid	Prepaid	Postpaid
SMS	0.99	0.99	0.71	0.39	0.59	0.59
Usage	1.44	1.55	3.18	2.93	1.82	2.45
Rental	0.61	3.65	0	0	0	2.27
Connection	0.03	0	0	0.23	0.52	0.27

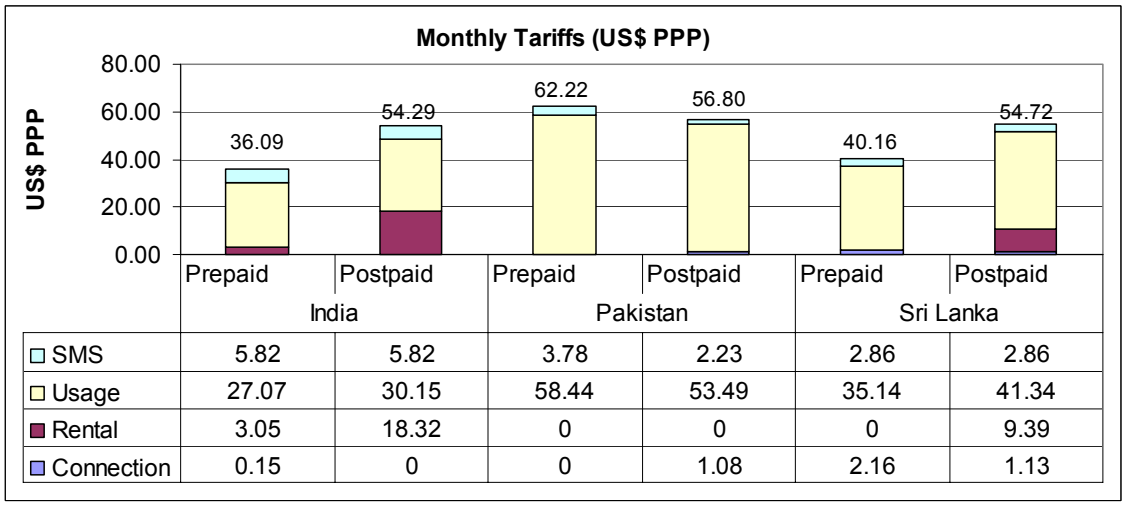


	India		Pakistan		Sri Lanka	
	Prepaid	Postpaid	Prepaid	Postpaid	Prepaid	Postpaid
SMS	4.99	4.99	3.24	1.78	2.45	2.45
Usage	7.20	7.80	14.60	13.46	7.53	10.12
Rental	3.05	18.32	0	0	0	9.39
Connection	0.15	0	0	1.08	2.16	1.13

Figure 3.2: Medium User Basket Tariffs (USD and USD adjusted for PPP)

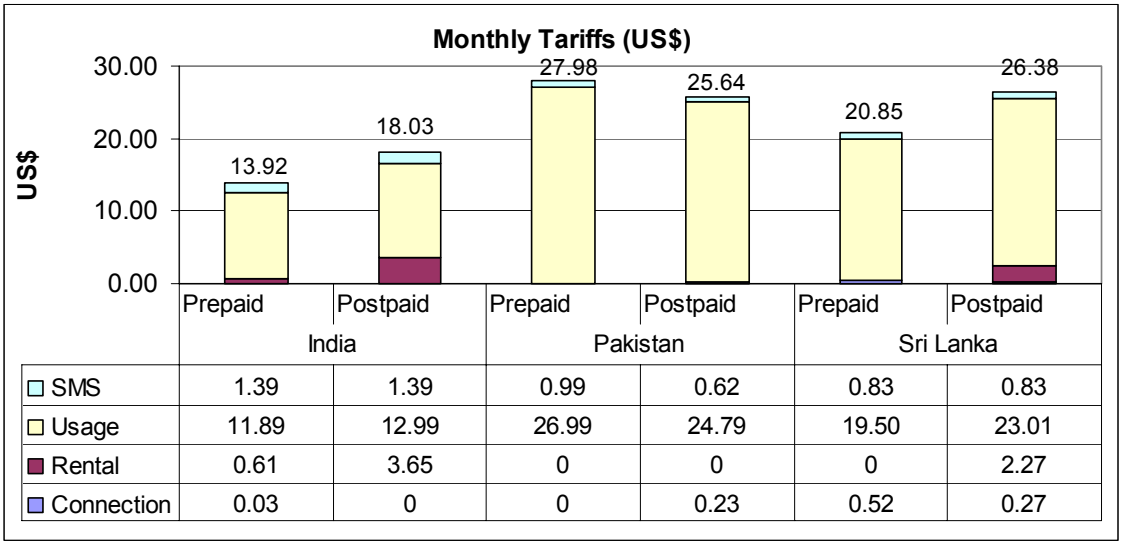


	India		Pakistan		Sri Lanka	
	Prepaid	Postpaid	Prepaid	Postpaid	Prepaid	Postpaid
SMS	1.16	1.16	0.82	0.49	0.69	0.69
Usage	5.40	6.01	12.74	11.66	8.50	10.00
Rental	0.61	3.65	0	0	0	2.27
Connection	0.03	0	0	0.23	0.52	0.27

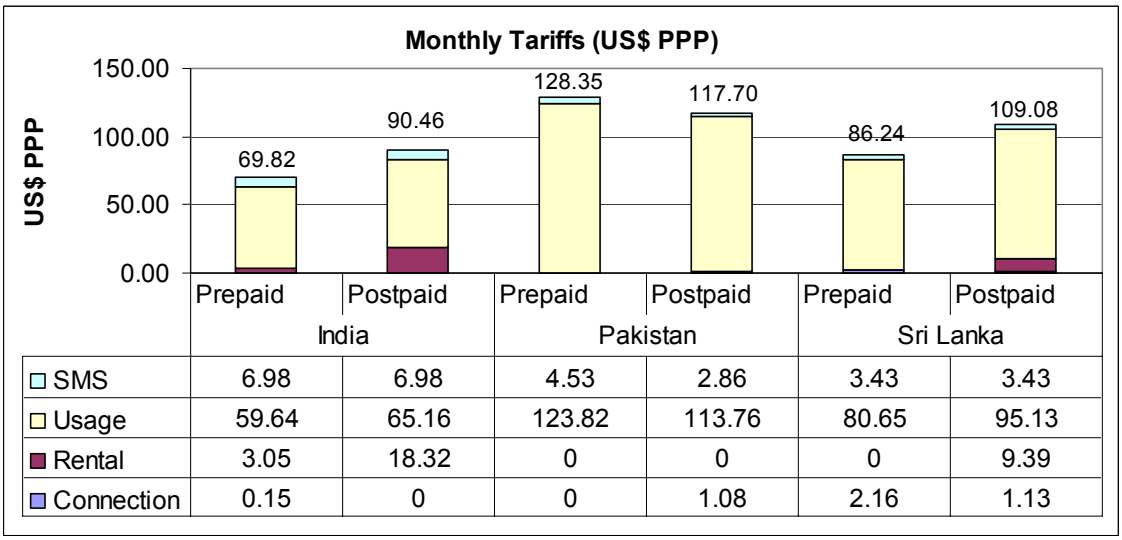


	India		Pakistan		Sri Lanka	
	Prepaid	Postpaid	Prepaid	Postpaid	Prepaid	Postpaid
SMS	5.82	5.82	3.78	2.23	2.86	2.86
Usage	27.07	30.15	58.44	53.49	35.14	41.34
Rental	3.05	18.32	0	0	0	9.39
Connection	0.15	0	0	1.08	2.16	1.13

Figure 3.3: High User Basket Tariffs (USD and USD adjusted for PPP)



	India		Pakistan		Sri Lanka	
	Prepaid	Postpaid	Prepaid	Postpaid	Prepaid	Postpaid
SMS	1.39	1.39	0.99	0.62	0.83	0.83
Usage	11.89	12.99	26.99	24.79	19.50	23.01
Rental	0.61	3.65	0	0	0	2.27
Connection	0.03	0	0	0.23	0.52	0.27



	India		Pakistan		Sri Lanka	
	Prepaid	Postpaid	Prepaid	Postpaid	Prepaid	Postpaid
SMS	6.98	6.98	4.53	2.86	3.43	3.43
Usage	59.64	65.16	123.82	113.76	80.65	95.13
Rental	3.05	18.32	0	0	0	9.39
Connection	0.15	0	0	1.08	2.16	1.13

4.0 Conclusions

The sample analysis of the tariffs in India, Pakistan and Sri Lanka contradicts the conventional perception that prepaid is more expensive than postpaid. Prepaid in India and Sri Lanka is cheaper even at high levels of use. In the case of Pakistan, however, postpaid *is* cheaper than prepaid at all levels of use.

The conventional perception that prepaid is more expensive than postpaid it seems is borne out of the incorrect tendency to consider just the per-minute cost of a call when comparing the two.

However the methodology requires utilization of more applicable component weights which can more accurately reflect the usage patterns within the Asian region.

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