

TELECOMMUNICATIONS COMPETITION, RATE-REBALANCING, AND CONSUMER WELFARE IN NEPAL

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ABSTRACT

This paper examines two important aspects of telecommunications liberalization as a policy for economic development. The first involves the tradeoff between increased efficiency from competition and the consequences of higher prices for basic services resulting from rate-rebalancing. The second addresses an entrant's ability to provide efficient, high-quality service under the given competitive environment. Using new data from Nepal, we analyze how the introduction of competition in landline and mobile services and subsequent rate-rebalancing has affected the welfare perceptions of residential consumers. We find that while many consumers remain sensitive to prices, competition is viewed as a way to satisfy growing demand for telecommunications services. However, service quality remains a problem, and the incumbent operator has succeeded in maintaining a higher overall level of satisfaction relative to entrants. This suggests that a more aggressive rate-rebalancing strategy may be necessary to fully bring out the benefits of efficient and fair competition.

Keywords: *Rate-rebalancing, Telecommunications, Regulation, Consumer Welfare, Nepal*

1. INTRODUCTION

Governments have traditionally subsidized basic telephone services by charging above-cost prices for long-distance and international calls, creating prices that are "unbalanced". However, as countries pursue efforts to introduce competition in the telecommunications industry, unbalanced prices create obstacles in the process. Thus, the need for rate-rebalancing becomes increasingly important. Rate-rebalancing describes the adjustment of retail prices among services such that prices reflect their actual cost while allowing a fair market return on investment. The goal of rate-rebalancing is to foster a competitive market where incumbents and entrants are allowed fair market access. At the same time, promoting universal service to the poor and to rural areas is a priority that often poses a challenge under rate-rebalancing.

Rate-rebalancing is a fundamental objective when competition is introduced in former state-owned monopolies such as telecommunications. In a regulated monopoly, subsidies to low-income and rural consumers can be sustained using profits from other services; however, competition tends to spur entry only into profitable services, reducing the incumbent's ability to provide subsidies to fulfill its universal service obligations. Such cream-skimming distorts the market by providing incentives for less efficient entrants to compete against efficient firms (Smith, 1995; Armstrong, 2001). While successful rate-rebalancing creates viable competition among all services, for a regulator to maintain equity among consumers and firms, it must strike a balance between promoting efficiency and appropriately allocating gains and losses (Quiggin, 1997; Birdsall *et al*, 2003).

Nowhere has the introduction of competition and rate-rebalancing in telecommunications been more critical than in developing countries that have relied on cross-subsidies by monopoly providers to keep the price of local services affordable. This paper analyzes the effect of competition and rate-rebalancing on consumer welfare in Nepal, a developing country that has recently experienced both rate-rebalancing and competition in its landline and mobile services. Using unique survey data collected among Nepalese residential telephone subscribers, this paper studies how national regulatory policies aimed at increasing efficiency at an aggregate level have affected welfare perceptions at the household level.

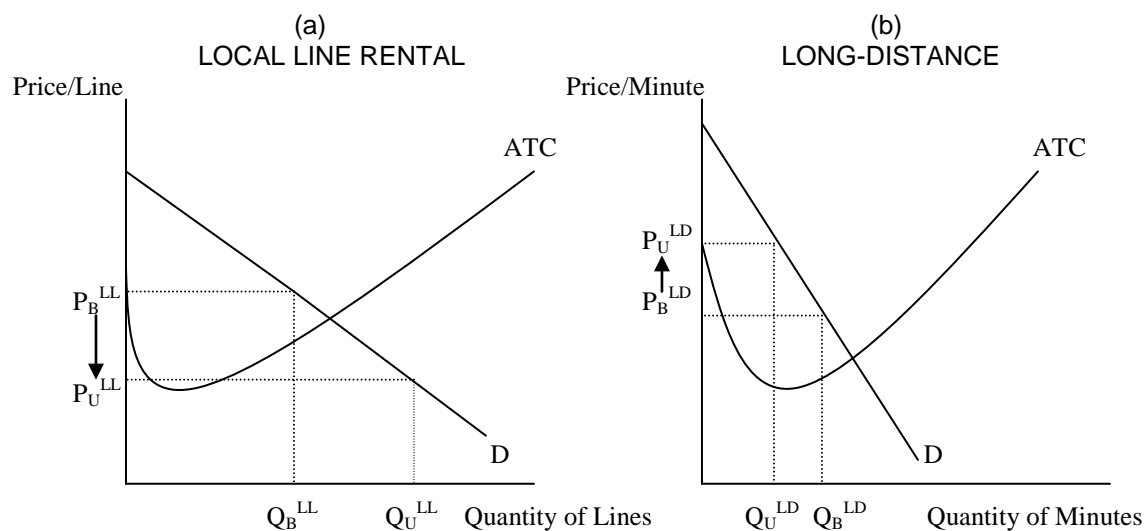
2. EFFICIENCY EFFECTS OF RATE-REBALANCING AND COMPETITION

Earlier work on the effects of rate-rebalancing has described its role in creating two overarching effects on social welfare: 1) an increase in overall economic efficiency by reducing market distortions and 2) a reallocation of resources between consumer groups along with a reallocation of resources between

incumbents and entrants. Specifically, Martins-Filho and Mayo (1993) analyzed how universal service obligations that force operators into serving unprofitable areas create market distortions that reduce the social benefit that such policies aim to achieve. Following this work, Wolak (1996) found only a minimal impact of rate-rebalancing on low-income customers in the U.S. Yet, the costs of telecommunications services constitute a significantly larger share of household income in developing countries. While subsequent papers by Cronin *et al* (1997), Cremer *et al* (2001), and Birdsall *et al* (2003) address the social welfare effects of rate-rebalancing using various empirical methodologies, this paper emphasizes its effects on developing countries where affordability concerns play a dominant role in policymaking. Next, we characterize the efficiency effects of rate-rebalancing using a simple model.

Consider two services, local line rental and long-distance, served by a single regulated monopoly. Figure 1 shows the market demand and average total cost curves for local and long-distance services. Assuming that the firm chooses its profit-maximizing quantity and price, the resulting outcome is one where prices are 'balanced' between services, and the firm earns a modest profit (as allowed in a rate-of-return setting) for each service. Now assume an unbalanced case. If the price of local line rental is reduced to P_U^{LL} (in Figure 1a), the resulting increase in demand and subsequent costs causes profits for local line rental services to decrease relative to the balanced case. To keep the operator financially viable, the regulator would need to raise long-distance prices (in Figure 1b) such that profits rise enough to offset lost profits from local line rental in addition to adjusting for lower demand for long-distance as prices rise.

FIGURE 1: ANALYSIS OF LOCAL LINE RENTAL AND LONG DISTANCE SERVICES



In sum, under the unbalanced structure, long-distance services subsidize local services. From the operator's perspective, it is performing equally under both scenarios, and is able to offer lower local rates. For the regulator, it can achieve universal service objectives without affecting operator profits. However, this argument in favor of unbalanced prices wanes when competition is allowed. Even without considering the effects of competition, consumers are affected by unbalanced prices via high prices for long-distance. Low-income customers benefit from lower local line rental prices while wealthier customers who typically make more long-distance calls pay more. While some would support this outcome, it is interesting to note that P_U^{LL} (in Figure 1a) actually subsidizes many customers who do not need to be subsidized, thereby not increasing universal service despite generating profit losses. Thus, alternative approaches to address equity and universal service may be necessary as countries pursue rate-rebalancing strategies.

A critical reason for rate-rebalancing in the telecommunications industry is the fostering of competition; e.g., in long-distance, international, mobile, and local services. While an efficient entrant can extract market share from an incumbent in a competitive environment, an inefficient incumbent can continue to compete effectively if it can cross-subsidize services subject to competition by charging higher prices on services subject to less competition (Baumol, 1999). However, cross-subsidization cannot be sustained in

a market where all services are allowed to be competitive. Another reason for rate-rebalancing is that it is necessary for price-cap regulation, which allows operators to propose price changes within a service basket. However, initial prices must reflect the competitive nature of the market in which entrants can fairly compete. If initial prices are unbalanced, inefficiencies will persist as firms exploit prices to secure market share (Berg and Foreman, 1995). By balancing prices, it creates a competitive environment where changes in prices better reflect changes in costs that result from productivity increases.

Aligning an incumbent's retail prices closer to actual cost forces an entrant to compete in services where it can increase efficiency and encourages the incumbent to be more efficient (Laffont and Tirole, 2000). However, rate-rebalancing does not resolve the universal service and equity issues as incumbents lose the ability to serve low-income and high-cost areas.

3. EQUITY CONCERNS: SERVICE TO THE POOR AND UNIVERSAL SERVICE IN NEPAL

A significant concern with rate-rebalancing is that while overall consumer welfare is enhanced as prices are pushed closer to costs, these gains are disproportionately allocated towards customers that use long distance services, while customers that only use local services face higher costs. This creates equity concerns that have led to various regulatory strategies to lessen the adverse effects of rate-rebalancing. Of particular concern is how rate-rebalancing affects service obligations to low-income and rural areas.

Raising prices to reflect costs can render high-cost services unaffordable and restrict infrastructure expansion (Kridel *et al*, 1996). Therefore, countries must develop strategies to ensure the provision of services to low-income and high-cost customers. However, in most countries universal service obligations prevent prices from rising to their actual cost in high-cost areas. Irwin (1997) summarizes the basic options countries have pursued, which include preserving the monopolist's price structure, forcing entrants to pay fees to offset the costs of operators serving high-cost areas, providing targeted subsidies to customers from a designated fund, or offering menu tariffs. Regardless of the methods used to promote universal service, the costs of ensuring equity with telecommunications reform is not without debate, even among developed countries (Hazlett, 2006). Yet, equity and universal service remain key priorities facing many developing countries, such as Nepal, the focus of this paper.

The country of Nepal has undergone significant changes in its telecommunications industry in the past decade. Nepal is a developing, land-locked mountainous kingdom located in the Himalayas with a population of about 28 million and a purchasing power index-adjusted per capita income of \$1,500 (World Development Indicators, 2006). Overall teledensity in Nepal of 5.86% (Nepal Telecommunications Authority, 2007) remains very low. While the government declared the opening of the telecommunications industry to competition in 1992, actual competition did not commence until 2003 for landline services and 2005 for mobile services. In 1997, Nepal enacted the Telecommunications Act, which established the Nepal Telecommunications Authority (NTA) and subsequently transferred regulatory duties including licensing, regulation, and dispute resolution to the NTA. Competition in landline and mobile services soon followed. In landline services, the incumbent telephone provider, Nepal Telecom, maintains a dominant market share, though the entrant provider, United Telecom Ltd., is growing rapidly. For mobile services, the incumbent Nepal Telecom again maintains a dominant market share, though entrant provider Spice Nepal Pvt. Ltd is quickly gaining market share. Table 1 shows the providers for landline and mobile services and their corresponding market share by revenue from 2002 to 2006.

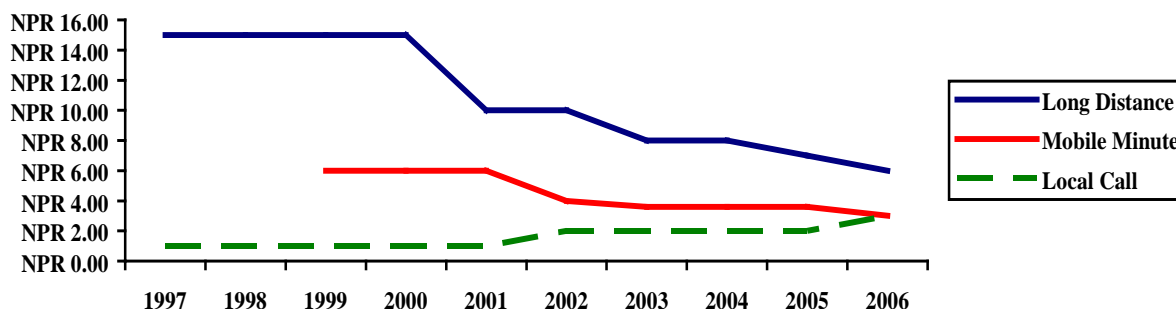
TABLE 1: TELEPHONE SERVICE PROVIDERS AND MARKET SHARE, 2002–2006

<u>Landline Services Provider</u>	<u>2002</u>	<u>2003</u>	<u>2004</u>	<u>2005</u>	<u>2006</u>
Nepal Telecom (incumbent)	100%	97%	94%	91%	88%
United Telecom Ltd. (entrant)	---	3%	6%	9%	12%
<u>Mobile Services Provider</u>	<u>2002</u>	<u>2003</u>	<u>2004</u>	<u>2005</u>	<u>2006</u>
Nepal Telecom (incumbent)	100%	100%	100%	78%	75%
Spice Nepal Pvt. Ltd (entrant)	---	---	---	22%	25%

Data Source: Nepal Telecommunications Authority (market shares accurate as of December 31 of each year)

With competition, there has been a downward price trend in most telephone services, though with rate-rebalancing there is some upward trend in prices for basic telephone services. This trend is consistent with other developing countries that have opened telephone services to competition, as local service providers can no longer rely on subsidies from profitable long-distance and international services. Figure 2 shows how prices for local, long-distance, and basic mobile services have changed from 1997 to 2006.

FIGURE 2: PRICE TRENDS FOR TELECOMMUNICATIONS SERVICES IN NEPAL: 1997–2006



Key: Long Distance = price per minute for post-paid outbound SAARC^a (in Nepal Rupees)
 Mobile Minute^b = price per minute for post-paid outbound (in Nepal Rupees)
 Local Call = price per call (4 minutes) for post-paid peak outbound (in Nepal Rupees)

Notes: a: SAARC refers to members of the South Asian Association for Regional Cooperation, which includes Bangladesh, Nepal, Bhutan, India, Maldives, Pakistan, and Sri Lanka. However, calls to India are priced separately and are not included here.
 b: Mobile service in Nepal commenced in 1999, hence no data reported for 1997 and 1998.
 Data Source: Nepal Telecommunications Authority

4. DATA AND EMPIRICAL METHODOLOGY

Given the potential consequences of a rate-rebalancing strategy on low-income consumers, it is important to assess the impact of changing prices and service quality on consumer welfare. Our empirical analysis measures consumer well-being using satisfaction indicators which capture the various changes in the industry. Using this approach, we can determine the factors that influence consumer welfare, and whether price changes are offset by new choices of providers and their quality of services. Also, we can assess differences in consumer satisfaction between incumbents and entrants under a rapidly changing industry.

Our empirical analysis uses survey data collected among randomly selected telephone subscribers in Nepal in 2006. A total of three surveys were undertaken, relating to landline, mobile, and Internet services; however, in this paper we focus on landline and mobile services. A complete description of the survey methodology, summary statistics, and translated survey can be found in Hada (2007). The primary goal of the survey is to assess the level of consumer satisfaction following the introduction of competition and rate-rebalancing. Our dependent variables consist of customer satisfaction indicators, including quality of service, customer service, response time for repairs and disruptions, and supplementary services. Each variable is measured using a scale ranging from 1 = “very poor” to 5 = “excellent”. A total of 500 completed surveys were collected for landline services and 550 surveys for mobile services.

The empirical model estimates the quality of service and customer service indicators as dependent variables using the following reduced-form specification for respondent *i*:

$$Y_i = \alpha_i + X_i'\beta + W_i'\gamma + Z_i'\zeta + \epsilon_i \quad (1)$$

where *Y* is the dependent variable, *X*, *W*, and *Z* are the vectors of independent variables based on the following categories, respectively: price and service choice, service elements, and demographics; the coefficients β , γ , and ζ are vectors of parameters to be estimated; and ϵ is a standard error term.

The first category addresses how respondents perceive the extent of price changes since the introduction of competition. As rising prices typically reduce welfare of consumers, this variable is expected to be negatively correlated with the dependent variables. A question that follows is how satisfied respondents

are to their choice of service providers; this variable is expected to increase satisfaction. Lastly, we include the provider currently being used by the respondent: Nepal Telecom (NT), the incumbent, or United Telecom Ltd. (UTL), the entrant for landline services or Spice Nepal Pvt. Ltd. (SNPL), the entrant for mobile services. We do not have an *a priori* expectation on the provider effect, though evidence from other countries has shown entrants to be successful in capturing consumer satisfaction and market share.

The second category deals with individual elements relating to telephone services. Respondents are asked to assess specific service elements, including length of time subscribed to the service, length of wait required to establish service, cost of basic services, cost of off-network calls, number of dialing attempts to connect call, frequency of line disconnections, billing performance (for landline service), and signal quality (for mobile service). We predict that satisfaction is negatively correlated with the cost of services along with the length of wait, number of dialing attempts, and frequency of disconnected calls, while positively correlated with the accuracy of billing performance and the signal quality of the network.

The third category includes demographic variables such as the profession of the respondent and the respondent's age category. Because of the structured hierarchy of professions in Nepal, a respondent's profession is a good proxy for income. While we do not predict the effects of age, we predict low-income households are more sensitive to price changes, and therefore may experience less satisfaction if prices for basic services rise. Lastly, while race or ethnicity is included in most demographic indicators, Nepal has a homogeneous population with respect to race but a diverse ethnic composition with nine major ethnicities. Because there is little differentiation in race, this indicator was not included in the survey.

5. EMPIRICAL RESULTS

In Table 2, summary results from each of the four dependent variables for landline and mobile services are presented for the full sample and by service provider: Nepal Telecom (NT), United Telecom Ltd (UTL), and Spice Nepal Pvt. Ltd (SNPL). Tables 3 and 4 show the summary statistics for all variables for landline and mobile, respectively. Ordinary least squares (OLS) estimates for the two primary dependent variables, service quality and customer service for both landline and mobile, are shown in Table 5.

TABLE 2: SUMMARY OF DEPENDENT VARIABLES: LANDLINE AND MOBILE SERVICES

Dependent Variable	Rating	Landline Service			Mobile Service		
		Overall	NT	UTL	Overall	NT	SNPL
Service Quality	Excellent (5)	55	55	0	4	4	0
	Good (4)	239	205	34	142	110	32
	Satisfactory (3)	188	137	51	306	233	73
	Poor (2)	16	11	5	87	60	27
	Very Poor (1)	2	2	0	11	4	7
	Average	3.66	3.73	3.32	3.07	3.12	2.94
Customer Service	Excellent (5)	38	34	4	25	16	9
	Good (4)	163	136	27	187	158	29
	Satisfactory (3)	211	169	42	268	194	74
	Poor (2)	68	52	16	54	34	20
	Very Poor (1)	20	19	1	16	9	7
	Average	3.26	3.28	3.19	3.27	3.34	3.09
Response Time	Excellent (5)	22	20	2	18	11	7
	Good (4)	138	105	33	142	113	29
	Satisfactory (3)	198	152	46	276	209	67
	Poor (2)	129	122	7	94	65	29
	Very Poor (1)	13	11	2	20	13	7
	Average	3.05	3.00	3.29	3.08	3.11	3.00
Supplemental Services	Excellent (5)	45	37	8	48	29	19
	Good (4)	211	184	37	228	178	50
	Satisfactory (3)	210	168	42	216	167	49
	Poor (2)	20	18	2	48	30	18
	Very Poor (1)	4	3	1	10	7	3
	Average	3.56	3.57	3.54	3.47	3.47	3.46
Number of Observations		500	410	90	550	411	139

In Table 2, it is interesting to find that the incumbent, NT, achieved a higher overall rating for service quality in landline services (average = 3.73) than the entrant, UTL (average = 3.32); further, NT performed better in service quality in mobile services (average = 3.12) than the entrant, SNPL (average = 2.94). Also, NT achieved marginally higher marks in landline services for customer service and supplemental services and higher marks in all categories in mobile services. These results suggest that NT has performed well under competition, which could be the result of pressure placed on NT to improve services and efficiency. Or, it might also suggest that there remain substantial obstacles faced by entrants in establishing viable competition against an established incumbent, particularly those that are formerly state-owned.

Tables 3 and 4 provide a comparison in perceptions of landline and mobile services among various service elements. First, the wait time to establish service varies dramatically from two weeks (on average) for mobile service to over a year (on average) for landline service. This is consistent with most developing countries that face obstacles in expanding basic infrastructures, which has led to the number of mobile subscribers surpassing landline subscribers. Consequently, however, despite an overall high perception of signal quality, consumers indicate low levels of satisfaction from mobile services, primarily spurred by the high number of dialing attempts and frequent line disconnections. Yet, subscriptions remain strong for mobile services due to the lack of viable substitutes resulting from the wait times for landline service.

We further investigate the underlying factors that determine perceptions of service quality and customer service among landline and mobile services. In Table 5, Regressions 1 and 2 provide estimates of the three categories of independent variables on landline service quality indicators, while Regression 3 and 4 show estimates for mobile service quality indicators.

TABLE 3: SUMMARY STATISTICS FOR LANDLINE SERVICES SURVEY: 500 OBSERVATIONS

Variable	Mean	Std. Dev	Min	Max
<u>Satisfaction Indicators</u>				
<i>Service Quality</i> (1 = very poor to 5 = excellent)	3.658	0.731	1	5
<i>Customer Service</i> (1 = very poor to 5 = excellent)	3.262	0.927	1	5
<i>Response Time</i> (1 = very poor to 5 = excellent)	3.054	0.902	1	5
<i>Supplementary Services</i> (1 = very poor to 5 = excellent)	3.566	0.745	1	5
<u>Price and Choice Variables</u>				
<i>Service Provider</i> (1 = UTL; 1 = Nepal Telecom)	0.180	0.385	0	1
<i>Tariff Structure</i> (1 = high increase to 5 = high decrease)	3.146	0.720	1	5
<i>Service Provider Choice</i> (1 = very poor to 5 = excellent)	3.754	0.662	1	5
<u>Service Variables</u>				
<i>Length of Subscription</i> (1=<1yr; 2=1-5y; 3=6-10y; 4=>10y)	2.754	1.016	1	4
<i>Wait Time to Sign-Up</i> (1=<6m; 2=6-12m; 3=1-3yr; 4=>3y)	2.208	1.215	1	4
<i>Cost of Basic Service</i> (1 = very cheap to 5 = expensive)	3.192	0.718	1	5
<i>Off-Network Calls</i> (1 = very cheap to 5 = expensive)	3.414	0.712	1	5
<i>Dialing Attempts</i> (1= 1; 2= 2-3; 3= 4-5; 4= 6-7; 5= >7)	1.474	0.598	1	5
<i>Line Disconnections</i> (1 = never to 5 = very frequently)	2.578	0.956	1	5
<i>Billing Performance</i> (1 = poor to 5 = excellent)	3.298	0.873	1	5
<u>Demographic Variables</u>				
<i>Profession: Government</i> (1 = Yes; 0 = No)	0.136	0.343	0	1
<i>Profession: Technical/Business</i> (1 = Yes; 0 = No)	0.356	0.423	0	1
<i>Profession: Non-working/Student</i> (1 = Yes; 0 = No)	0.262	0.325	0	1
<i>Age</i> (1= 18-25; 2= 26-35; 3= 36-45; 4= 46-55; 5= >55)	2.534	1.241	1	5

TABLE 4: SUMMARY STATISTICS FOR MOBILE SERVICES SURVEY: 550 OBSERVATIONS

Variable	Mean	Std. Dev	Min	Max
<u>Satisfaction Indicators</u>				
<i>Service Quality</i> (1 = very poor to 5 = excellent)	3.075	0.722	1	5
<i>Customer Service</i> (1 = very poor to 5 = excellent)	3.275	0.814	1	5
<i>Response Time</i> (1 = very poor to 5 = excellent)	3.080	0.837	1	5
<i>Supplementary Services</i> (1 = very poor to 5 = excellent)	3.465	0.842	1	5
<u>Price and Choice Variables</u>				
<i>Service Provider</i> (1 = SNPL; 0 = Nepal Telecom)	0.253	0.435	0	1
<i>Tariff Structure</i> (1 = high increase to 5 = high decrease)	3.013	0.829	1	5
<i>Service Provider Choice</i> (1 = very poor to 5 = excellent)	3.813	0.805	1	5
<u>Service Variables</u>				
<i>Length of Subscription</i> (1=<1yr; 2=1-3y; 3=4-6y; 4=>6y)	1.807	0.796	1	4
<i>Wait Time to Sign-Up</i> (1=<1wk; 2=1-2w; 3=3-4w; 4=>4w)	2.127	1.141	1	4
<i>Cost of Basic Service</i> (1 = very cheap to 5 = expensive)	3.685	0.799	1	5
<i>Off-Network Calls</i> (1 = very cheap to 5 = expensive)	3.675	0.531	1	5
<i>Dialing Attempts</i> (1= 1; 2= 2-3; 3= 4-5; 4= 6-7; 5= >7)	2.453	1.033	1	5
<i>Line Disconnections</i> (1 = never to 5 = very frequently)	3.458	1.003	1	5
<i>Signal Quality at Home</i> (1 = very poor to 5 = excellent)	3.153	0.865	1	5
<u>Demographic Variables</u>				
<i>Profession: Government</i> (1 = Yes; 0 = No)	0.093	0.290	0	1
<i>Profession: Technical/Business</i> (1 = Yes; 0 = No)	0.273	0.446	0	1
<i>Profession: Non-working/Student</i> (1 = Yes; 0 = No)	0.280	0.449	0	1
<i>Age</i> (1= 18-25; 2= 26-35; 3= 36-45; 4= 46-55; 5= >55)	2.113	1.022	1	5

In Regressions 1 and 2, the significantly negative coefficient for the variable UTL suggests that customers are overall less satisfied with the entrant, UTL, compared with the incumbent, NT. Yet, these measures are relative, as respondents provide their perceptions of quality on their own service provider. We do not have an absolute indicator for satisfaction with competition. However, this is captured to an extent by two variables: the choice of service providers and the overall price change. Interestingly, both variables are insignificant though they exhibit the expected signs, suggesting that customers may have developed expectations of price decreases and service quality enhancements, which may be due to advertising by service providers or government promises of better service quality with competition. As such, price reductions and the choice of service provider do not itself enhance a customer's perception of service quality, though we do not have data on expectations to test this argument. While service quality may have increased for both providers, NT has performed better in exceeding expectations, which could be attributed to its existing market share or historical incumbent position. This result is therefore not surprising since new competitors do not always become the dominant service provider, though it does have an effect of pressuring the incumbent to improve its service. We find similar results for mobile services in Regressions 3 and 4, though the overall perceptions of quality between NT and SNPL, while favoring NT, are insignificant. However, the choice of operators and the perceived decreases in tariffs all contribute highly to overall satisfaction, contrary to the results found for landline services.

The service elements measured in the regressions mostly conform to expectations. First, the cost variable coefficients in the landline regressions are negative and significant, which reflect a direct negative correlation between cost burden of telephone service and satisfaction. However, for mobile services the cost variables appear mostly negative and insignificant, which suggest that the decrease in tariffs has reduced the cost burden of mobile services. Next, while both of the reliability variables indicate persistent concern among consumers, the frequency of line disconnections was found to be a stronger negative indicator for landline services, while dialing attempts were a larger problem for mobile services. Billing performance was measured for landline services and was found to be important, especially in Nepal where telephone bills constitute a substantial share of expenses in many households. Errors in billing,

which could result in service disruption if customers cannot resolve them, remain an important factor. For mobile subscribers, perceptions of signal quality were a positive and highly significant determinant of satisfaction across all regressions, as expected. Lastly, length of service subscription and average wait time for service establishment are mostly insignificant. The former is likely influenced by the fact that both UTL and SNPL came into existence within the last five years, while high initial costs (actual and opportunity) of changing service providers reduces the extent to which customers change providers.

TABLE 5: OLS ESTIMATES FOR LANDLINE AND MOBILE SERVICES SATISFACTION VARIABLES

Regression Number	1	2	3	4
Service	Landline	Landline	Mobile	Mobile
Dependent Variable	Service Quality	Customer Service	Service Quality	Customer Service
<u>Price and Choice Variables</u>				
Provider: UTL	-0.287*** (0.085)	-0.302** (0.118)	---	---
Provider: SNPL	---	---	-0.065 (0.071)	-0.110 (0.085)
Tariff Decrease	0.054 (0.041)	0.155*** (0.057)	0.112*** (0.036)	0.132*** (0.043)
Choice of Operators	0.008 (0.042)	-0.052 (0.059)	0.132*** (0.033)	0.172*** (0.040)
<u>Service Variables</u>				
Length of Subscription	-0.026 (0.030)	-0.063 (0.042)	-0.095** (0.038)	-0.023 (0.045)
Wait Time for Service	0.034 (0.024)	-0.085** (0.034)	-0.036 (0.024)	0.035 (0.029)
Cost of Basic Service	-0.111** (0.045)	-0.109* (0.064)	-0.037 (0.040)	0.020 (0.048)
Cost of Off-Network Calls	-0.017 (0.045)	-0.153** (0.063)	-0.047 (0.057)	-0.062 (0.068)
Dialing Attempts	-0.132** (0.051)	-0.084 (0.072)	-0.097*** (0.031)	-0.070** (0.037)
Disconnections	-0.237*** (0.033)	-0.088** (0.046)	-0.007 (0.030)	-0.022 (0.036)
Billing Performance	0.180*** (0.035)	0.289*** (0.048)	---	---
Signal Quality	---	---	0.282*** (0.034)	0.243*** (0.041)
<u>Demographic Variables</u>				
Profession: Government	-0.077 (0.089)	-0.066 (0.124)	-0.212** (0.099)	-0.108 (0.119)
Profession: Business	0.003 (0.071)	0.064 (0.099)	0.010 (0.067)	0.140* (0.080)
Profession: Non-working	0.067 (0.075)	-0.030 (0.105)	-0.037 (0.070)	0.099 (0.084)
Age	0.039* (0.023)	-0.002 (0.033)	0.037 (0.028)	-0.022 (0.034)
Number of Observations	500	500	550	550
Adjusted R ²	0.3375	0.1942	0.2922	0.1933
Root MSE	0.5948	0.8320	0.6072	0.7309

Notes: Standard errors in parentheses. Significance at the 10%, 5%, and 1% levels are shown by *, **, and ***, respectively.

Finally, our regression analysis controls for profession and age of respondents. We find that profession does not affect the results much, with only sporadic incidences of significance across regressions, though business professionals and non-working individuals indicate higher levels of satisfaction compared to government workers (which have negative coefficients) and non-controlled professions (e.g., non-government organizations, technical, medical, and teaching) in all four regressions. We do find a significantly positive coefficient for the age variable in Regression 1, suggesting that older consumers are more satisfied with the current level of telephone services provided. This may reflect the fact that younger consumers demand more and better technology, and thus might not be satisfied with the relative slow pace at which telephone services are improving in Nepal. This can be attributed to the slow expansion of landline services in Nepal (compared to India and Pakistan which had opened their markets to competition at about the same time as Nepal), and the poor service quality of the rapidly expanding mobile services, likely due to the congestion of the network which results in reduced performance.

6. BALANCING EFFICIENCY AND EQUITY: A DISCUSSION

The idea that competition improves overall welfare comes with an important caveat, that at least in the short term, customers that have relied on cross-subsidies of a monopoly service provider could be harmed from rate-rebalancing. Using our data analysis, we were not able to specifically determine the extent to which lower income residents in Nepal were affected by the recent changes in the telecommunications industry. However, we conjecture from the results that many Nepalese residents, particularly those with lower-income professions, are more sensitive to the prices of telephone services than their counterparts in wealthier countries or business customers, and thus equity remains an issue that needs to be addressed with the continuing rise in competition and progress in rate-rebalancing.

While most developed countries have rebalanced telecommunications prices and created universal service programs to subsidize low-income and high-cost customers, many developing countries are still in the process, which brings to light the ongoing delicate balance between increasing efficiency and promoting equity. For example, in 1997, the government of Sri Lanka took action to promote infrastructure expansion and investment by establishing competition in all services and forcing an aggressive rebalancing strategy that ultimately led to lower prices overall. This coincided with the U.S. FCC decision to reduce international settlement payments which had been used to subsidize local services in many developing countries. But compared to other countries in the region, the extent of rate-rebalancing in Nepal and the overall level of competition remain low. Questions remain as to the strategy necessary to meet the prerequisite level of rate-rebalancing to meet competition objectives while at the same time continuing to address affordability issues and the provision of basic services to its citizens.

7. CONCLUSION

As much of the developing world opens its telecommunications industry to competition, rate-rebalancing remains a fundamental prerequisite to full liberalization. By rebalancing prices, inefficiencies are reduced while competition encourages innovation and cost-cutting. Yet, the concern that remains is how such reforms promote universal service objectives. While competition reduces overall prices, rate-rebalancing tends to increase prices for basic services. Until the benefits of the former offset the costs of the latter, policies are needed to ensure affordable services to low-income and high-cost areas. Even with full competition, affordability remains an issue, even among developed countries. As long as universal service is a goal, subsidies and other resource redistribution techniques will continue to be used.

Our empirical results focused on how competition and rate-rebalancing affected residential consumers in Nepal. Our results show that consumer satisfaction is strong overall, particularly among those who have a choice of service providers, despite the fact that those who subscribe to the entrant provider exhibited lower levels of satisfaction compared to those that remained with the incumbent provider. This may be due to the inability of entrant providers to meet expectations of better service among consumers that have changed service providers. Of specific interest are the factors that influenced satisfaction, which include cost factors and service elements, along with the age of the customer and the service provider chosen. We find that the incumbent provider, NT, has managed to not only retain a dominant market share (though slowly falling with entrant expansion) in Nepal in both landline and mobile services, but also

achieved a higher overall level of satisfaction among surveyed customers compared to its competitors, UTL and SNPL. Overall, satisfaction indicators for landline services surpass those for mobile services, suggesting that more needs to be accomplished in the mobile sector to improve service quality, particularly in reducing the number of dialing attempts and frequency of line disconnections, both consequences of a congested network that needs to improve and expand.

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