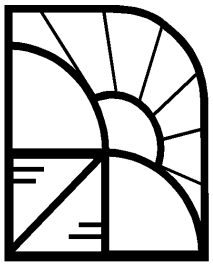

PHOENIX FOR ADVANCED
CENTER LEGAL & ECONOMIC
PUBLIC POLICY STUDIES
www.phoenix-center.org

PHOENIX CENTER POLICY PAPER SERIES

Phoenix Center Policy Paper Number 7:

Flow-Through and Competition in the International Message Telephone Service Market

George S. Ford

(September 2000)

Flow-Through and Competition in the International Message Telephone Service Market

George S. Ford*

Abstract. One of the most contentious debates in modern telecommunications policy regards whether or not a regulatory mandated reductions in the per-minute costs of long distance carriers - access charges domestically and settlement rates internationally - are fully reflected in the per-minute prices for long distance calls. In this paper, we evaluate the flow through of settlement costs to international long distance prices and find strong evidence that IMTS prices are closely related to settlement costs, and that these prices fully reflect differences in settlement costs. Further, the estimated relationship between prices and settlement cost indicates, under certain assumptions, that the IMTS industry is very competitive.

I. Introduction

One of the most contentious debates in modern telecommunications policy regards the relationship of the per-minute prices for long distance calls to their per-minute costs. Specifically, the debate centers on whether or not a regulatory mandated reduction in the per-minute costs of long distance companies - access charges domestically and settlement rates internationally - are fully reflected in the per-minute prices for long distance calls. In some cases, the flow-through of unit cost to price is used to assess the competitiveness of long distance markets.

On the domestic front, the instigators of the debate are the incumbent monopoly local exchange carriers that are motivated by two factors: 1) the desire to have the ban on their provision of long distance service lifted, which is more likely if the long distance industry is, at present, not competitive enough; and 2) the desire to discourage regulators from mandating further reductions in access

* Adjunct Fellow, Phoenix Center for Advanced Legal and Economic Public Policy Studies; Affiliated Scholar, Auburn Policy Research Center. The analysis and conclusions of this paper represent those of the author and do not necessarily reflect the views of the Phoenix Center, the Auburn Policy Research Center, or their respective staffs and sponsors.

charges, the profit center of the local phone monopolies. Internationally, for most countries, settlement payments represent a huge inflow of cash from the United States. In 1997, the U.S. carriers paid foreign carriers a net $5.5 billion (Blake 1998). The Federal Communications Commission (FCC) has worked diligently over the years to reduce the settlement costs of domestic carriers. Perhaps the most popular rejoinder to the FCC's efforts to reduce settlement rates is to question the consumer benefit of such reductions, i.e., to question the flow-through of settlement rate reductions to prices.

The purpose of this paper is to evaluate empirically the issue of flow through. Our approach is rather straightforward. Specifically, we estimate the relationship between per-minute international message telephone service (IMTS) prices and settlement costs using cross-sectional data. A cross sectional approach to flow through is possible in international markets because there is substantial variation in both cost and prices. This approach is not possible with domestic calls because interstate-interLATA domestic prices are uniform across the United States.[1] Thus, time series analysis is required for domestic flow-through.

Flow-through is typically considered in a temporal sense – what would happen to the price of an IMTS call to London if the settlement rate fell by ten cents? The cross-sectional approach used here ask a slightly different question - what would happen to the price of a call to London if the settlement rate was identical to that of Spain? For practical purposes, the questions are identical given the assumption that the competitive process that determines prices in the cross-section is stable over short periods of time.

II. Specification of the Empirical Test

In common parlance, flow through is said to occur when a reduction in the unit cost of supplying a service (*C*) produces an equivalent reduction in the unit price (*P*):

$$\text{Flow through} = \frac{\text{Change in Price}}{\text{Change in Cost}} = \frac{\Delta P}{\Delta C} = 1 \qquad (1)$$

[1] The cross sectional approach might be applied to intrastate prices and costs, but these prices are so burdened with regulatory interference that little market information can be derived from them. For example, not all states allow customers to choose a long distance carrier. The local phone company provides all intrastate service. In others, competition is possible in only part of the state. In some cases, entrants are handicapped because their customers must dial extra digits.

where a dollar-for-dollar relationship is the benchmark expectation. The definition of flow through expressed in equation (1) suggests a straightforward manner by which to evaluate the flow through settlement rate reductions to IMTS prices. By specifying an OLS regression with price as the dependent variable and settlement cost as an explanatory variable, the relationship of interest ($\Delta P / \Delta C$) can be estimated using standard econometric techniques. We formulate a test of flow-through by specifying a price equation of the following form

$$P_i = a_0 + a_1 C_i + a_2 Z_i + u_i \qquad (2)$$

where the country specific variables are: P is price per-minute, C is settlement cost, Z is a vector of other cost factors, u is the econometric disturbance term. The α_i's are the parameters to be estimated by regression analysis.

The coefficient on settlement cost (α_1) is of primary importance since it measures $\Delta P / \Delta C$. If variations in settlement cost across country-pairs are fully reflected in IMTS prices, then $\alpha_1 = 1$. Alternatively, if price fails to reflect fully the differences in settlement rates, then $\alpha_1 < 1$. Finally, if settlement cost changes are more than reflected in price, $\alpha_1 > 1$. Of course, if IMTS prices are not related to settlement cost, then $\alpha_1 = 0$.

In reality, the relationship $\Delta P / \Delta C$ is not determined by the ad hoc demands of telecommunications regulators expressed by equation (1). Rather, $\Delta P / \Delta C$ is, of course, the derivative of equilibrium price with respect to marginal cost and the value of the relationship will depend on numerous factors including the elasticity and specification of the demand curve (e.g., linear or constant elasticity), the degree of competition, the rigidity of prices, and so forth. We briefly discuss this issue in Section III, providing a very general specification of the relationship.[2]

A. *Derivation of Settlement Cost*

If one seeks to assess flow-through, it is imperative that a proper measure of unit cost be employed. Accurate measures of unit costs are especially important

[2] It is worth noting, however, that $\Delta P / \Delta C = 0.50$ if demand is linear, regardless of the degree of competition in the market (as long as the demand curve is not infinitely elastic).

in the case of IMTS, since the settlement rate does not (in every case) equal the settlement cost of the carrier. The settlement cost of the domestic carriers (as opposed to the settlement rate) is derived below.

For most countries, international telecommunications traffic exchange occurs under the International Settlements Policy (ISP). Under the ISP, every minute of U.S. originating IMTS traffic requires the domestic carrier of the call to pay the per-minute settlement rate to the foreign country's telephone carrier.[3] Likewise, for every minute of IMTS originating in a foreign country and terminating in the U.S., the foreign telephone carrier must pay the terminating domestic carrier the per-minute settlement rate. An integral component of the settlement process is that the foreign carrier does not simply choose the terminating domestic carrier. Rather, each domestic carrier terminates a share of terminating foreign traffic equal to its market share of U.S. originating minutes to the country in question. This practice is called *proportionate returns*.

The domestic carrier's costs of providing IMTS service to a given country under the ISP is

$$E = S \cdot q - S \cdot F(q/Q) \tag{3}$$

where E is total cost, S is the settlement rate, q is the quantity of the firm's minutes, F is terminating minutes, Q is total U.S. originating IMTS minutes, and q/Q is the carrier's market share.[4] Subscripts, indexing each country, are suppressed. An IMTS carrier's total settlement costs would equal the sum of settlement cost for all countries served by the carrier.

The interpretation of the cost function is as follows. For every minute of the carrier's originating traffic (q), the domestic carrier pays the foreign carrier the settlement rate S. Total settlement payments are $S \cdot q$. For every minute the foreign carrier terminates in the U.S. (F), the foreign carrier pays U.S. carriers S. Each domestic carrier is guaranteed its originating market share (q/Q) of these terminating minutes so that total settlement receipts for any one domestic carrier are $S \cdot F(q/Q)$. Each minute of originating or terminating traffic also incurs an access charge which is paid to the domestic local exchange carrier. Originating

[3] Carriers negotiate the accounting rate. The settlement rate is typically equal to one-half the accounting rate.

[4] Total originating minutes is the sum of all individual firm's minutes so that $Q(q_i,q_{-i})$.

and terminating access charges (approximately $0.03 per minute) are, for now, assumed equal and subsumed in *S* to simplify the analysis.

We are interested in how the IMTS carrier's total settlement costs change as output in increased, i.e., the carrier's *marginal cost.* The partial derivative of (3) produces an expression for the (marginal) settlement cost of the domestic carrier for country *i*

$$\frac{\partial E}{\partial q} = C = S\left[1 - \frac{F}{Q}(1 - w)\right] \tag{4}$$

where *C* is the settlement cost, *w* is the market share of a given domestic firm (q/Q), and (F/Q) the ratio of terminating to originating IMTS (i.e., the *input-output ratio*).[5] All of the variables in equation (4) are country specific -- each country will have its own unique *C.*

Note that only if IMTS is supplied by a monopolist ($w = 1$) will the settlement cost equal the settlement rate.[6] This point is critical. For a monopoly foreign carrier, the appropriate measure of flow-through is the relationship between price and the settlement rate. For the competitive U.S. carriers, alternatively, it is the relationship of price to settlement cost as measured by equation (4). Thus, it is not surprising, though no less incorrect, that foreign entities often complain that there is no direct relationship between settlement rates and domestic IMTS prices. Equation (4) reveals that there should not be. Thus, while the protection of settlement revenues is no doubt an important factor to the flow through rhetoric, confusion also may be an important contributor.

Under existing conditions in domestic IMTS markets, the settlement cost will be less than the settlement rate and positive since the input-output ratio and market shares are typically less than one ($F/Q < 1$; $w < 1$).[7] Under certain

---

[5] The intercept of the firm's settlement cost curve is $S(1\text{-}F/Q)$ while the slope is $S(F/Q)\ w$.

[6] It can be shown that the industry average settlement cost is $S(1\text{-}F/Q \cdot \text{HHI})$ where HHI is the Herfindahl Index of market concentration.

[7] The net settlement rate, which is total settlement payments minus total settlement receipts expressed in per-minute terms $[S(1 - F/Q)]$, is often used to measure the unit cost of IMTS service. The net settlement rate is, however, an average cost and not a marginal cost. Settlement cost, as defined here, will typically be above the net settlement rate and below the settlement rate.

conditions, the settlement cost can be negative and this occurs when $(F/Q) > 1/(1 - w)$ which is more likely to occur for a firm with a small market share.

Ceteris paribus, an increase (decrease) in the settlement rate will increase (decrease) the settlement cost of the carrier:

$$\frac{\partial C}{\partial S} = \left[1 - \frac{F}{Q}(1-w)\right]. \tag{5}$$

Note that the right-hand side of equation (6) is always less than one unless $w = 1$ and can be negative if $(F/Q) > 1/(1 - w)$.[8] Thus, a given change in the settlement rate will (in every case but monopoly) have less than equivalent effect on settlement cost.[9] This condition is extremely important to an analysis of flow-through. Specifically, it is inappropriate to evaluate flow-through by the relationship of price to the settlement rate, since the change in a carrier's cost will (nearly always) be less than the change in the settlement rate.[10]

---

[8] Since the input-output ratio (F/Q) is less than one in nearly every case or just greater than one in a few instances, a negative sign is unlikely.

[9] The average effect of a settlement rate reduction on the settlement cost of a domestic carrier can be estimated from our sample of 149 countries. For our sample, the mean input-output ratio is 0.33 and MCI's mean market share is 30 percent. Thus, a \$0.10 change in the settlement rate, ceteris paribus, will reduce the settlement cost of MCI by \$0.077 [i.e., 1 - 0.33(0.70)]. For AT&T, with an mean market share of 56 percent, a \$0.10 change in the settlement rate will change its settlement cost by \$0.085, ceteris paribus. Since market shares vary from country to country, these calculations will vary by country.

[10] The effect of increases in U.S. originating minutes (terminating in the foreign country) on settlement cost can is $\left.\frac{\partial \$}{\partial Q}\right|_{\bar{w}} = S\frac{F}{Q^2}(1-w) > 0$. This positive relationship is intuitive: an increase in total output, Q, will decrease the input-output ratio which increases settlement cost. Thus, the FCC's proposed 'benefit' of decreasing the input-output ratio works against its goal of lowering domestic IMTS prices since it raises the settlement cost of domestic IMTS carriers. Finally, differentiating with respect to market share (w) gives $\left.\frac{\partial \$}{\partial w}\right|_{\bar{Q}} = S\frac{F}{Q} > 0$ where increases in market share increase settlement cost. Thus, firms with larger shares of IMTS traffic to a given country have a higher marginal cost than smaller firms. In effect, the international settlement policy generates an 'increasing cost' component to the cost function of IMTS, implying the average settlement cost, $S(F/Q)$, is less than the marginal settlement cost.

B. *Data*

A sample of IMTS prices, settlement payments, traffic volume, and market shares were gathered to estimate equation (2). The initial sample consisted of 232 countries, but only 161 of these are under the ISP. Twelve observations were rejected due to missing data and one country was eliminated due to a negative settlement cost. Only one country in the Pacific region survived these filters, so it was excluded from the sample. The final sample consists of 147 countries.

Price is measured by tariffed rates to selected countries for AT&T's One Rate International and MCI's One residential IMTS service plans.[11] The two carriers account for, on average, over eighty percent of the U.S. originated IMTS traffic.[12] These particular tariffs were chosen for two reasons. First, these calling plans have a single rate for each country with no time of day variations or volume discounts. Thus, no distributional assumptions are required to produce a single measure of price. Second, both of these plans were the 'best-price' or 'flag-ship' product for the time-period in question and were available to all customers regardless of traffic volume.[13]

Unit costs other than settlement costs are unlikely to vary much by country, but may vary by region given dissimilarities in the mix of cable and satellite facilities and other regional factors. Thus, Z is specified as a vector of regional dummy variables that proxy regional cost variations. Originating and terminating access charges are added to the settlement rate prior to the calculation of settlement costs. Descriptive statistics are summarized in Table 1.

---

[11] Tariff FCC No. 1, Page No. 19.9.1.9.2.107 and 19.9.1.9.2.108 (effective February 1997). MCI, and other carriers, offer a variety of calling plans with substantial discounts. For example, Friends & Family Worldwide provides for a 30 percent discount off international rates to calls within the customers calling circle and a 20 percent discount otherwise. The discounts are available for a $3.00 monthly charge.

[12] Market shares between country pairs vary substantially.

[13] In addition to the per-minute rate, both plans required a $3 per month fixed charge. Since our focus is on the effect of the per-minute settlement cost on per-minute IMTS prices, the presence or absence of a fixed charge is irrelevant. Further, the fixed charge will have no effect on the consumption of minutes by the consumer, especially when one considers the large disparity between these prices and the standard or basic rates. Still, very low volume consumers might prefer not to incur the fixed charge and pay higher per minute prices. It is unlikely, however, that prices charged to occasional users are appropriate for flow-through calculations or as an indicator of the degree of competition in the market.

C. *Specification Issues*

While heteroskedasticity can be a problem with cross-sectional data, White's test applied to our least squares estimates did not indicate its presence.[14] In addition to testing the null hypothesis that the disturbance terms are homoskedastic, the White test also indicates whether or not the errors are independent of the explanatory variables and whether the linear specification of the model is correct. Thus, the White test is also a general test for model specification. The non-significant test statistic on the White test is reassuring, since it implies that none of the three conditions mentioned above is violated.

In addition to the White test, RESET was performed for the detection of specification errors resulting in a non-null mean of the theoretical disturbance vector which may be caused by simultaneity, omitted variables, errors in variables, and/or incorrect functional form. Recall that the null hypothesis of RESET is "no specification error" (of any of the above types); thus it is a weak test under the alternative hypothesis.

We could reject the RESET null for the estimated equation at the 10 percent significance level when ordinary least squares (OLS) was used, probably due to a simultaneity bias produced by the inclusion of market share (w) in settlement cost. To remedy this potential simultaneity problem, we replaced the marginal settlement cost with an average settlement cost $[S(1 - F/Q)]$.[15] This approach has two desirable features. First, it is the measure of cost most often employed in regulatory proceedings to assess flow-through.[16] Second, the average settlement cost is highly correlated with the marginal settlement cost but does not contain market share ($\rho = 0.989$). Thus, average settlement cost can serve as a (textbook) instrumental variable for marginal settlement cost. For this alternative, instrumental variables (IV) specification, we could not reject the RESET null hypothesis of "no specification error" at standard statistical levels, further indicating that the inclusion of market share was the culprit. Note that the estimated coefficients were not much affected by the different specifications.

---

[14] We could not reject the White null-hypothesis at the 0.10 percent level for any of the model specifications.

[15] Another approach that allowed us to accept the null of "no specification error" was weighted least squares, where the weighting variable was the difference between price and net settlement cost.

[16] *In the Matter of International Settlement Rates: Notice of Proposed Rulemaking*. FCC Docket No. 96-484 (December 19, 1996), ¶ 91.

III. Results and Interpretation

The results from the estimation of equation (2) are reported in Table 2. The overall statistical fit of the equations is exceptional for cross-sectional data, with a typical adjusted R-square of 0.88. Given the *t*-statistic on α_1 of about 22 and an R-square of 0.88, there can be little question as to whether or not settlement cost are a primary determinant of IMTS prices. Our rather simple equations explain about 88 percent of price variation across markets. All of the variables are statistically significant at the one percent level. The statistical significance of the regional dummy variables suggests that there are cost differences across regions.

The coefficient of primary interest is that on settlement cost (*C*). In the OLS equation, the point estimate of α_1 is 1.04, suggesting that the domestic IMTS carrier's prices closely reflect differences in settlement cost across countries. The point estimate of α_1 implies that for every $0.10 change in settlement cost (not the settlement rate), the domestic carrier will adjust price by $0.104. The standard error of the estimated coefficient is very small (leading to high t-statistic) suggesting the point estimate is quite precise. The 95 percent confidence interval on a_1 bounded by 0.96 and 1.12. Thus, we can be 95 percent confident that the true value of the "flow-through" coefficient (dP/dC) lies between 0.96 and 1.12, i.e., a $0.10 change in the settlement cost will lead to price change ranging from $0.096 to $0.12.

The close relationship between IMTS prices and settlement costs is readily visible by plotting the data. Figure 1 illustrates the relationship between IMTS prices and settlement cost using the entire sample of 147 countries. Note that the constant terms of the regression have been subtracted from the IMTS prices, and that the 45-degree line (slope = 1.0 not 1.04) is added to illustrate the near one-to-one relationship between IMTS price and settlement cost. Both the econometric results and the figure provide strong evidence that IMTS prices are related to settlement cost on a near one-to-one basis.

Under certain conditions, the estimate of dP/dC can provide information on the competitiveness of the IMTS market. The relationship between price and marginal cost can be written as $P = mC$, where m is the markup rule that defines the relationship between price and marginal cost. One markup rule that is flexible enough to define equilibrium price at any level at or between the monopoly and perfectly competitive price is

$$P = \frac{h}{h+f} C \tag{6}$$

where h is the own-price elasticity of *market* demand and f is a conjectural variation elasticity that encapsulates the degree of competition in the market (Bresnahan 1989, Crandall and Waverman 1995).[17] This basic framework has been used extensively in empirical industrial organization over the past decade (e.g., Crandall and Waverman 1995, Rubinovitz 1993, Baker 1989, McGahan 1995). For $f = 0$, price equals marginal cost, the equilibrium price under perfect competition. Alternatively, for $f = 1$, price equals the monopoly price. Under the simple Cournot model, $f = s$ where s is market share of the firm. Note that that the firm's residual demand elasticity is h / f and equilibrium requires $f < h$.

In the case of constant demand elasticity, dP/dC is

$$\frac{dP}{dC} = \frac{h}{h+f} \tag{7}$$

which, according to our estimated regressions, is equal to about 1.04. If we know the market demand elasticity, then the conjectural variation elasticity can be computed as can the firm's residual demand elasticity. Recent and past studies of IMTS service suggest that the long run price elasticity is about (minus) unity (Lande and Blake 1998, Ford and Jackson 1999). Using our estimates from Table 1, the conjectural variation elasticity for IMTS service is $f = 0.04$ (for $\eta = -1$). For a market demand elasticity of -2, $f = 0.08$. Thus, the IMTS industry is far more competitive than the standard Cournot model would imply, and very close to perfect competition.[18] These results suggest that domestic IMTS carriers face residual demand elasticities (on average) of about -20 (1 / 0.04; 2 / 0.08).

---

[17] For our analysis, these conditions include constant elasticity of demand, that the competitiveness of the industry can be summarized by a single parameter, that the elasticities of demand do not vary by region, and that the prices are equilibrium prices (Bresnahan 1989, and Bulow and Pfleiderer 1985). Equation (6) is one of many markup rules in an oligopolistic industry, and there has been much debate over the legitimacy of confining the "competitiveness" of a market to a single parameter (Bresnahan 1989).

[18] For our sample, the sample mean market shares for AT&T and MCI are 0.56 and 0.30, respectively.

IV. Conclusions

The telecommunications industry is undergoing a sea change in both policy and competitive forces are threatening the last vestige of the telecommunications monopoly -- the local exchange. Since the profit margins most susceptible to competitive erosion are those on per-minute access and settlement charges, it is no surprise that regulatory and competitive threats to these margins are met with strong opposition from the incumbent monopolists. The flow through debate is perhaps the most frequently employed advocacy tool of the incumbents.

In this paper, we evaluate the flow through of settlement costs to IMTS prices. We find strong evidence that IMTS prices are closely related to settlement costs, and that these prices fully reflect differences in settlement costs. Further, the estimated relationship between prices and settlement cost indicates, under certain assumptions, that the IMTS industry is very competitive.

REFERENCES

Acton, J.P., and Vogelsang, I. (1992). Telephone demand over the atlantic: evidence form country-pair data, *Journal of Industrial Economics*, 40, No. 3, pp. 305-323.

Alexander, D. L. (1988). An empirical test of monopoly behavior: an application to the hardwood case, *Applied Economics*, 20, pp. 1115-1127.

Baker, J. B. (1989). Identifying cartel policing under uncertainty: the u.s. steel industry, 1933-1939, *Journal of Law and Economics*, 32, pp. S47 - S82.

Blake, L. (1998). *International Telecommunications Data, 1997 Section 43.61*. Federal Communications Commission, Common Carrier Bureau, Industry Analysis Division, Washington, DC..

Bresnahan, T. F. (1982). The oligopoly solution concept is identified, *Economic Letters*, 10, pp. 87-92.

Bresnahan, T. F. (1989). Empirical studies of industries with market power, in R. Schmalensee and R. D. Willig (eds.), *Handbook of Industrial Organization*, North-Holland, Amsterdam.

Bulow, J.I. and Pfleiderer, P. (1983). A note on the effect of cost changes on prices, *Journal of Political Economy*, 91: 182-85.

Ford, G.S. and Jackson, J. (1999). *Demand elasticities for international message telephone service*. Unpublished Manuscript.

Greene, W. (1990). *Econometric analysis*. MacMillan, New York.

In the Matter of International Settlement Rates: Notice of Proposed Rulemaking. FCC Docket No. 96-484 (December 19, 1996).

In the Matter of Price Cap Performance Review. CC Docket No. 94-1 and CC Docket No. 96-262 (May 7, 1997).

Joint Petition of MCI Telecommunications Corporation, AT&T Communications of the Southern States, and Sprint Communications Company, L.P. for Approval of Alternative Flow Through Rate Reduction Proposals. Docket No. P-55, SUB 1013 (May 8, 1997).

Lande, J., and Blake, L. (1996). *Trends in the international telecommunications industry*. Federal Communications Commission, Common Carrier Bureau, Industry Analysis Division, Washington, DC.

Lande, J., and Blake, L. (1998). *Trends in the international telecommunications industry*. Federal Communications Commission, Common Carrier Bureau, Industry Analysis Division, Washington, DC.

McGahan, A. M. (1995). Cooperation in prices and capacities: trade associations in brewing after repeal, *Journal of Law and Economics*, 38, pp. 521 - 560.

Rubinovitz, R. (1993). Market power and price increases for basic cable service since deregulation, *Rand Journal of Economics*, 24, pp. 1-18.

Statistics of communications common carriers (1996). Washington: Federal Communications Commission.

White, H. (1980). A heteroskedasticity-consistent covariance matrix and a direct test for heteroskedasticity, *Econometrica*, 48, pp. 817-38.

Table 1. Descriptive Statistics

	Carrier	*Mean*	*Standard Deviation*	*Maximum*	*Minimum*
Price	AT&T	0.736	0.309	1.581	0.120
Settlement Cost (C)	AT&T	0.513	0.265	1.327	0.057
Avg. Settlement Cost	AT&T	0.424	0.260	1.222	0.014
Price	MCI	0.737	0.308	1.581	0.120
Settlement Cost (C)	MCI	0.474	0.267	1.259	0.034
Avg. Settlement Cost	MCI	0.424	0.260	1.222	0.014
Asia	…	0.116	…	1.000	0.000
Africa	…	0.204	…	1.000	0.000
Central America	…	0.054	…	1.000	0.000
Eastern Europe	…	0.095	…	1.000	0.000
Western Europe	…	0.150	…	1.000	0.000
South America	…	0.082	…	1.000	0.000
Middle East	…	0.088	…	1.000	0.000
Oceania	…	0.061	…	1.000	0.000
Caribbean	…	0.150	…	1.000	0.000

Table 2. Regression Results[a]

	AT&T		MCI	
	OLS	*IV*	*OLS*	*IV*
Settlement Cost (C)	1.027	…	1.040	…
	(21.927)		(23.342)	
Avg. Settlement Cost	…	1.036	…	1.037
		(22.857)		(22.850)
Asia	0.222	0.299	0.239	0.299
	(5.706)	(8.536)	(6.591)	(8.514)
Africa	0.265	0.349	0.284	0.349
	(7.263)	(10.868)	(8.416)	(10.841)
Central America	0.177	0.236	0.210	0.236
	(3.867)	(5.489)	(4.884)	(5.474)
Eastern Europe	0.224	0.316	0.265	0.316
	(5.799)	(9.085)	(7.453)	(9.065)
Western Europe	0.192	0.266	0.231	0.266
	(7.500)	(11.199)	(9.643)	(11.183)
South America	0.165	0.251	0.203	0.250
	(3.845)	(6.403)	(5.095)	(6.385)
Middle East	0.200	0.319	0.225	0.319
	(4.092)	(7.401)	(4.961)	(7.380)
Oceania	0.314	0.417	0.376	0.417
	(7.019)	(10.211)	(9.686)	(10.192)
Caribbean	0.134	0.225	0.188	0.229
	(4.464)	(8.363)	(6.867)	(8.531)
Adj. R-squared	0.87	0.88	0.88	0.88
White F-statistic	1.45	1.26	1.32	1.25
RESET F-statistic	2.71[b]	1.47	3.51[b]	1.41
Observations	147	147	147	147

[a] All regression coefficients are statistically significant at the 0.01 level or better.
[b] Statistically significant at the 0.10 confidence level.

Figure 1. Price and Settlement Cost

(*p is the dependent variable minus the regional constant terms)**