International Settlement: Analysis & Alternatives

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Overview

- Accounting/Settlement Rates
- Mechanics of Settlements
- Recent Activities
  - International Telecommunication Union
  - United States Government

Accounting/Settlement Rates

- Settlement Rate
  - Bilateral negotiation
  - One-half of accounting rate

Mechanics of Settlements

- US $, SDRs, or Gold Francs
- Based on traffic differences

International Revenues, USA

**Alternative Procedures**

- Interconnection Fees
- Sender-keeps-all
- Value-based Pricing
- Resale and Callback
- Cost-based Pricing
- Negotiated/Flexibility
- Benchmarking

**Survey of the Literature**

- Demand Analysis
- Asymmetry of Prices
- Models
- Policy Recommendations

**Demand Analysis & Asymmetry**

- Taylor, Lester, *Telecommunications Demand*
- Larsen, A. C. and Dale Lehman, Symmetrical Pricing and Arbitrage*
- Larsen, A. C., Dale E. Lehman, and Dennis L. Weisman, "A General Theory of Point-to-Point Long Distance Demand"

**Models: Policy**

- Alleman, J. H., P.N. Rappoport, and K. B. Stanley, "Alternative Settlement procedures in International Telecommunications Service"
- Ergas, Henry. and P. Paterson, “International Telecommunications Settlements Agreements”
- Frieden, Robert., "International Toll Revenue: Tracking the Inequities and Inefficiency"
Models: Duopoly

- Hakim, S. R. a. and D. Lu, "Monopolistic Settlement Agreements in International Telecommunications Agreements"
- Yun, Kyoung-Lim, Hyun-Woo Choi and Byong-Hun Ahn, "The Accounting Revenue Division in International telecommunications: Conflicts and Inefficiencies"
- Cheong, K. A.. and M. Mullins, "International Telecommunications Service Imbalances"

Observation

Accounting Rates are Intermediate/Interconnect Prices

Models: Callback

Price

<table>
<thead>
<tr>
<th></th>
<th>No Callback</th>
<th>Callback</th>
</tr>
</thead>
<tbody>
<tr>
<td>price</td>
<td>$2.00</td>
<td></td>
</tr>
<tr>
<td>settlement</td>
<td>($1.06)</td>
<td></td>
</tr>
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Models: Callback

Settlement

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Models: Callback

- Callback
- Competitive
- Monopoly/Competitive
Models: Callback

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Models: Callback, Monopoly

- No Incentive to Reduce Accounting Rate
- Settlement Improved
- Demand Stimulated
- Consumers/Producer Gain
- Trade Balance Deteriorates

Models: Callback, Competitive

- Neutral on Accounting Rate
- Settlement Exacerbated
- Demand Stimulated
- Consumers Gain
  (via trade effects)

Models: Competitive

- Callback
- Competitive

Models (continued)

- Callback
- Competitive
  - First-best
  - Cost-based prices
  - Fifty-fifty split
  - Sender-keeps-all (Bill-and-keep)

Models: Competitive

\[ q_0: \text{joint service (two-way) traffic} \]
\[ q: \text{international service (one-way) traffic} \]
\[ Q = q_1 + q_2 \]
\[ c_s, c_i, c_r: \text{average incremental costs and product specific (constant) marginal cost} \]
Models: Competitive

Prices:
- \(a_i\): settlement
- \(p_i\): international (collection rate), country \(i\), \(i = 1,2\)

First-best prices are marginal costs:
- \(p_1 = c_0 + c_1 + c_2\)
- \(p_2 = c_0 + c_1 + c_2\)

Implies: \(a_1 = c_0 + c_2\), \(a_2 = c_0 + c_1\) & \(p_1 = p_2\)

Models: Monopoly/Competitive

Maximize:
\[
\pi = D(q_c, q_m) q_c + [D(q_c, q_m) - c_c - c_o](q_c - q_m) - C(Q)
\]

with the settlements, the problem becomes maximize:
\[
\pi = D(q_c, q_m) q_c - (c_c + c_o)(q_c - q_m) - C(Q)
\]

Models: Monopoly/Competitive

Maximize:
\[
\pi = D(q_c, q_m) q_c - (c_c + c_o)(q_c - q_m) - C(Q)
\]

First order conditions:
\[
\frac{\delta \pi}{\delta q_c} = \left[\frac{\delta (D(q_c, q_m))}{\delta q_c}\right] q_c + D(q_c, q_m) - c_c - c_o - \frac{\delta C(Q)}{\delta q_c} = 0
\]
\[
\frac{\delta \pi}{\delta q_m} = \left[\frac{\delta (D(q_c, q_m))}{\delta q_m}\right] q_c + c_c + c_o - \frac{\delta C(Q)}{\delta q_m} = 0
\]
Models

- Callback
- Competitive
- Monopoly/Competitive
  - Lack of incentives
  - Price higher than monopoly

Policy Recommendations/Summary

- Cost-based Prices Confirmed
- Benchmarks Offers Improvement
- Callback Ineffective (in some cases)
- Inappropriate
  - Sender-keep-all (Bill-and-keep)
  - Fifty-fifty split
  - Value-based pricing

Future Research

- Refine Models
  - Specification of demand functions
  - Inclusion of callback/benchmark
  - Ramsey pricing of settlements

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  - Benefits of cost-based settlements
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