Seesaw in the Air: Interconnection Regulation and the Structure of Mobile Tariffs

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Invisible prices (to us)

- Interconnection between networks
- Call termination is one of the most important interconnection services
- Interconnection prices are “invisible” to us, but affect competition a lot and, ultimately, the tariffs we pay
Very interesting findings

- Competitive “bottlenecks”
- Some prices are monopolised
- “Two-sided” markets and skewed pricing structures
- Policy question: intervene to achieve efficiency (regulation vs. competition policy)
The “waterbed” effect

⇒ Mobile telephony largely unregulated, with the important exception of Mobile Termination Rates (MTR).
⇒ Mobile customers bring a “termination rent”.
⇒ Competition for customers might exhaust this rent.
⇒ Justification for regulatory intervention to cut MTR -> BUT this can potentially increase prices for mobile subscribers.
⇒ This is the “waterbed” effect!
Is there a waterbed effect?
– MTR down -> retail prices up?

Is it “full”?
– Sector fully competitive, so just a rebalancing of structure of prices?
– Or market power, so negative impact on operators’ profits?

Empirical strategy
– Exploit differential regulation between countries and, within countries, between operators
Data

- MTR from Cullen International
- Teligen (2002-2006):
  - Total bill paid by consumers with a given calling profile (fixed weights)
  - High/medium/low user
  - Pre-paid/post-paid
  - ARPU (already includes incoming)
  - EBITDA
Average Price Around the Introduction of Regulation
This paper: Arbitrage

- Regulation affects ALL termination rates.
- If F2M rates >> M2M rates -> room for arbitrage!
- Indeed, look at France ("GSM Gateways").
- Hence regulation affects both F2M and M2M calls.
- Complicating effects since the termination rate will affect also the cost of making a call to mobile phones, and ultimately the intensity of competition for the market ("raising each-others’-costs").
Theory on “two-way” access charges

- “Linear tariffs” (e.g., pay-as-you-go): competing MNOs “collude” by setting *high* termination charges
  - Countervailing effect to waterbed
- “Multi-part tariffs” (e.g., monthly contracts): competing MNOs “collude” by setting *low* termination charges
  - In the same direction as waterbed
  - Effect should come through the fixed component of the tariff
Empirical Hypotheses

- **H1.** The waterbed effect is stronger for post-paid (monthly) contracts and weaker for pre-paid deals.

- **H2.** Among post-paid (monthly) contracts, the waterbed effect should prevail particularly via a change of the fixed component of the contract.
Econometric Framework

We estimate the following diff-in-diff regression:

\[ \ln P_{ujct} = \alpha_{ujc} + \alpha_t + \beta_1 \text{Regulation}_{jct} + \varepsilon_{ujct} \]

where \( P_{ujct} = \) total bill, \( u = \) usage profile, \( j = \) operator, \( c = \) country, \( t = \) time.

- “Treated” group: countries that introduced regulation.
- “Control” group: non-reforming countries.

We estimate (1) separately for pre-paid and post-paid users.

For post-paid users, estimate a variant of (1) where the dependent variable is divided in \( P_{ujct} = \text{Fixed}_{ujct} + \text{Voice}_{ujct} \) (where \( P_{ujct} = \text{Fixed}_{ujct} + \text{Voice}_{ujct} \)).
Concern

- **Exogeneity** of regulation.
- Theory: all countries should be regulated sooner or later.
- In practice, EC regulations.
- What if countries and operators which have witnessed slower decrease in prices (including F2M prices) than comparable countries are more likely candidates for regulation?
Results (separate pre- & post-paid contracts)

<table>
<thead>
<tr>
<th>Estimation method</th>
<th>OLS ( \ln P_{ujct} )</th>
<th>OLS ( \ln \text{Fixed}_{ujct} )</th>
<th>OLS ( \ln \text{Voice}_{ujct} )</th>
<th>OLS ( \ln P_{ujct} )</th>
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</thead>
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<tr>
<td>Dependent variable</td>
<td>( \ln P_{ujct} )</td>
<td>( \ln \text{Fixed}_{ujct} )</td>
<td>( \ln \text{Voice}_{ujct} )</td>
<td>( \ln P_{ujct} )</td>
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<td>Monthly subscriptions</td>
<td>Pre-paid</td>
<td>Pre-paid</td>
<td>Pre-paid</td>
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<tr>
<td>Waterbed Effect</td>
<td>15.9%</td>
<td>5.1%</td>
<td></td>
<td></td>
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<tr>
<td>( \text{Regulation}_{jct} )</td>
<td>0.159***</td>
<td>0.667***</td>
<td>0.066</td>
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<td>(0.052)</td>
<td>(0.166)</td>
<td>(0.063)</td>
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<tr>
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<td>Observations</td>
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<td>Clusters</td>
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<td>147</td>
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<td>Within-R(^2)</td>
<td>0.329</td>
<td>0.160</td>
<td>0.391</td>
<td>0.239</td>
</tr>
</tbody>
</table>
Evolution of the waterbed effect (post-paid)
Evolution of the waterbed effect (pre-paid)

- Regression Coefficients
- 95% Confidence Interval

Quarters around the introduction of Regulation (T)
Main Results

- The waterbed effect on prices exists and significant.
- Effect is diluted for pre-paid consumers, where regulation counteracts the “collusive” effect of access charges.
- Other interpretations: Receive less calls? Expectation of receiving less future incoming revenues? Loss leaders to fight unregulated rivals?
- Effect is stronger for post-paid.
- The magnitude of the effect varies from 5% to 16%.
Caveats

- No data on handset subsidies (should be ok).
- No country-time dummies (though we did regional-time joint effects).
- Results may be biased if a country, which is regulated with low MTR is concentrated and compared with another country not regulated but competitive.
- Not “real” consumer bundles.
Why do we care?

1. Existence and magnitude of the waterbed effect is key to understanding the costs and benefits of regulation of termination charges.

2. Many other examples of regulating “only” one price: Payment Protection Insurance (UK CC).

3. Two-sided markets. The structure of prices (who pays for what) is fundamental for the development of these markets.

4. Our analysis has implications for the current debate about regulation of “roaming charges” within EU. Our
Average Price around the introduction of Roaming Regulation

Commission launched a consumer website on roaming tariffs in (October 05)

Commission publishes proposal for a regulation to lower international roaming charges within the EU (July 06)

The regulation entered into force (June 2007)

Quarterly time series of average price paid (PPP adjusted euros/year) per usage profile (time demeaned)
Average Price around the introduction of Roaming Regulation

Quarters around the introduction of Roaming Regulation

- The regulation entered into force (June 2007)
- Regulation becomes stricter: -7% wholesale, -6% retail outgoing, -8% retail incoming
- Regulation becomes stricter: -7% wholesale, -7% retail out, -14% retail in

Average price paid (PPP adjusted euros/year) per usage profile (time demeaned)
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