The Impact of Telecommunication Regulatory Policy on Mobile Retail Price in Sub-Saharan African Countries

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3rd Annual Competition & Economic Regulation (ACER)
Outline

1. Introduction
   - Mobile number portability and termination rates

2. Literature Review
   - Switching Costs and Waterbed effect

3. Telecommunication Policies In Africa
   - Mobile Number Portability and MTRs

4. Data
   - Data Construction and statistics

5. econometric Model
   - Model implementation and identification strategies

6. Results
   - Supply Side Results
     - No waterbed effect in SSA, MNP policy not effective

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Regulatory Policy Impacts on Retail prices
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Switching Costs in the Mobile Telecommunication Industry

- Switching costs and mobile termination rates (MTRs).
- Introduction of mobile number portability.
- MTRs are wholesale charges among operators.
- Each network is a de-facto monopoly and they are a source of collusion.
- Glide path in MTRs.
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Switching Costs and Waterbed effect
Large Body of Theoretical Literature but Few Empirical

The paper is based on two strands of literature


- **Waterbed effects**: Genakos and Valletti (2011, 2015), Dewenter and Haucap (2005), Cerelli et al. (2012)
The paper is based on two strands of literature:


We add to this literature by assessing the effect of these policies (MNP and MTRs) on prices and competition in low income countries.

scarcity of data.
Lack of Policy Assessment for Developing Countries

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- scarcity of data.
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Mobile Number Portability and MTRs in Africa

- MNP in Africa Vs Europe
  - Regulation of MTRs to avoid welfare distortion in the structure of price
  - Mobile operators taking regulators to court
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Regulatory Policy Impacts on Retail prices
Data construction

- Quarterly time series data 2010Q4 to 2014Q4
- Data constructed by aggregation of price and subscription information for SSA countries
- Pricing data comes from RIA and subscriptions data from World Communication Information Services (WCIS)
# Simple Statistics

**Table: Simple Statistics**

<table>
<thead>
<tr>
<th>Variable</th>
<th>N</th>
<th>Mean</th>
<th>Std.Dev.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Price</td>
<td>136</td>
<td>5.272</td>
<td>3.224</td>
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<tr>
<td>rates</td>
<td>136</td>
<td>0.099</td>
<td>0.040</td>
</tr>
<tr>
<td>Subscr(’000000)</td>
<td>136</td>
<td>34.300</td>
<td>34.300</td>
</tr>
<tr>
<td>GDP(’000)</td>
<td>136</td>
<td>5.800</td>
<td>4.778</td>
</tr>
<tr>
<td>1/N</td>
<td>136</td>
<td>0.254</td>
<td>0.068</td>
</tr>
<tr>
<td>Fixed</td>
<td>136</td>
<td>2.451</td>
<td>3.346</td>
</tr>
<tr>
<td>Price*MNP</td>
<td>136</td>
<td>1.541</td>
<td></td>
</tr>
<tr>
<td>time</td>
<td>136</td>
<td>9</td>
<td>4.917</td>
</tr>
</tbody>
</table>
Pre-paid Mobile Subscriptions for Selected African Countries

Source: Author’s calculation
Mobile Prices for Selected Countries, 2010:Q4-2014:Q4

- **Botswana**: Prices decrease from Q1 to Q17.
- **Kenya**: Prices show a steady decline from Q1 to Q17.
- **Mozambique**: Prices decrease from Q1 to Q17.
- **South Africa**: Prices decrease from Q1 to Q17.
- **Ghana**: Prices show a fluctuating trend from Q1 to Q17.
- **Tanzania**: Prices show a fluctuating trend from Q1 to Q17.
- **Zambia**: Prices decrease from Q1 to Q17.
- **Nigeria**: Prices show a fluctuating trend from Q1 to Q17.
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Demand and Supply Estimation

Mobile operators are faced with the following inverse demand function:

\[ p_{ts} = f\left(\sum_{i=1}^{N} q_{its}, X_{ts}, \epsilon_{ts}\right), \quad (1) \]

\[ Q_{ts} = \exp\left(-\left(\alpha_0 + \alpha_1 R_{ts}\right)p_{ts} + X_{ts}\beta + \epsilon_{ts}\right), \quad (2) \]

\[ p_{ts}(.) = \frac{1}{N_{ts}} \frac{\lambda_{ts}}{\left(\alpha_0 + \alpha_1 R_{ts}\right)} + MC_{ts}(\cdot)\gamma + \omega_{ts}. \quad (3) \]

\[ \eta_{ts} = \frac{\partial Q_{ts}}{\partial p_{ts}} \frac{p_{ts}}{Q_{ts}} = -\left(\alpha_0 + \alpha_1 R_{ts}\right)p_{ts}. \quad (4) \]
Identification Strategies

Prices and MMP are endogenous
Instrumental variable techniques used
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<table>
<thead>
<tr>
<th>VARIABLES</th>
<th>PRICE</th>
</tr>
</thead>
<tbody>
<tr>
<td>MNP/N</td>
<td>24.397***</td>
</tr>
<tr>
<td>Constant</td>
<td>-0.532 (0.038)</td>
</tr>
<tr>
<td>Time</td>
<td>-0.155*** (0.038)</td>
</tr>
<tr>
<td>Rates</td>
<td>10.677** (5.371)</td>
</tr>
<tr>
<td>MNP</td>
<td>-0.962 (2.076)</td>
</tr>
</tbody>
</table>

Observations: 136
R-squared: 0.45

MNP insignificant but MTRs positive
MNP and MNP interacted with price insignificant

<table>
<thead>
<tr>
<th>VARIABLES</th>
<th>1</th>
<th>2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Price</td>
<td>-0.056***</td>
<td>-0.052***</td>
</tr>
<tr>
<td></td>
<td>(0.007)</td>
<td>(0.006)</td>
</tr>
<tr>
<td>Price*MNP</td>
<td>0.024</td>
<td>-0.006</td>
</tr>
<tr>
<td></td>
<td>(0.015)</td>
<td>(0.035)</td>
</tr>
<tr>
<td>MNP</td>
<td>0.070</td>
<td>0.087</td>
</tr>
<tr>
<td></td>
<td>(0.052)</td>
<td>(0.088)</td>
</tr>
<tr>
<td>Constant</td>
<td>0.632</td>
<td>11.870***</td>
</tr>
<tr>
<td></td>
<td>(0.723)</td>
<td>(1.900)</td>
</tr>
<tr>
<td>Observations</td>
<td>136</td>
<td>136</td>
</tr>
<tr>
<td>R-square</td>
<td>0.83</td>
<td>0.87</td>
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Conclusion

- Mobile termination rates (MTR) have a statistically significant positive impact on mobile retail prices.
- Our results oppose the hypothesis that MNP reduces prices and firms’ markups.
- Both on the demand and supply side we find that MNP is insignificant.