

***The relationship between
mobile and fixed line communications:
A survey***

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The changing landscape

- **Mobile telephony started in earnest less than 30 years ago. Now there are more than 4 billion users worldwide against only about 1.2 billion fixed-network subscribers**
- **Most phenomenal growth in LDCs, where a lack of fixed network infrastructure spurred mobile penetration.**
- **This survey concentrates on the entirely different situation in DCs with full fixed-line penetration to begin with. Here fixed networks first nurtured mobile telephony and now are pushed back by it.**
- **Advanced case of Austria, where the ratio of users is almost 5:1 in favour of mobile and the ratio of telephone usage 3:1**
- **Main topic is therefore fixed-mobile substitution (FMS): The replacement of fixed-line services with mobile services**

Overview

**Positive
questions**

- **What is the empirical evidence on the occurrence, extent and patterns of FMS ?**
- **What factors explain the evidence on FMS?**
- **How is FMS related to competition?**
- **What are the policy consequences of FMS?**
- **What are the gaps in and shortcomings of the literature and how can they be filled?**

Empirical evidence on FMS

- **FMS is not really tested in the literature. Instead, there are**
 - **Diffusion models for mobile penetration**
 - **Demand elasticity estimates for own and cross effects between fixed and mobile services**

Empirical evidence on FMS: Diffusion models

- **Dynamic models to characterize and explain shape and speed of mobile penetration**
 - **Mostly cover period until 2000**
 - **Main explanatory variables refer to supply side**
 - **1G/2G**
 - **Standardization**
 - **Competition**
 - **FMS is addressed by fixed penetration as explanatory variable**
 - **Positive effect for LDCs and emerging markets**
 - **Mixed effect for DCs**

Empirical evidence on FMS: Cross-elasticities

- **Subscription**
 - **Multiple countries**
 - **Mixed results for mobile subscription**
 - **Negative elasticities for fixed-line subscription (LDCs only?)**
 - **Single countries**
 - **Positive cross-elasticities for mobile and fixed-line subscriptions**
- **Calls**
 - **Only single-country estimates**
 - **Problems of price variables**
 - **All positive for fixed and mobile call demands**


Empirical evidence on FMS: Own demand elasticity

- Own-price elasticity should increase as cross effects increase.
- **Mobile**
 - **Subscription**
 - Grzybowski and Pereira (2006 and 2007, Portugal): -0.34
 - Waverman et al. (2005, LDCs): -1.50
 - **Calls**
 - Hausman (1999, U.S) and a number of other studies around -0.5
- **Fixed**
 - **Subscription**
 - Generally -0.0 to -0.1, but Briglauer et al. (2009, Austria): -0.5
 - **Calls**
 - Generally -0.25 to -0.7, depending on distance.
 - Briglauer et al. (2009, Austria): -1.38 long run, -0.74 short run

Empirical evidence on FMS: Conclusions

- **Weak evidence of early complementarity**
- **Substitutability not that strong**
 - Clearer on calls than on penetration
 - No study with new data
 - Serious price data problems
 - Diffusion models dynamic but not well grounded in theory; also, shrinkage model of fixed penetration is missing

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Explaining the evidence on FMS

FMS \approx demand substitution + network effects + competitive effects + relative supply shifts, which lead to price reductions and quality improvements

Explaining the evidence on FMS

- **Theoretical demand models**
 - **Rohlfs (1974)**
 - **Includes network externalities**
 - Demand can be upward-sloping
 - **Jeon (2001)**
 - **Models calling demand**
 - Substitutability assumed at basic micro-level of individual calling
 - Complementarity arises from network effects
 - As penetration increases substitutability dominates.
 - **Andersson et al. (2006)**
 - **Include call-back effects**
 - Call-back effects \approx complementarity
 - Complementarity increases with increased penetration.

Explaining the evidence on FMS

- **Price changes in favor of mobile**
 - **Cost reductions: What explains supply shifts?**
 - **Economies of scale**
 - Paucity of literature on cost functions
 - Fixed-sunk cost effect of initial network coverage
 - **Learning effects**
 - **Technical change**
- **Decreases in price-cost margins**
 - **Increased competition: Large effect of 2nd entrant**
 - **Waterbed effect from high FTM termination rates**

Explaining the evidence on FMS: Mobile termination

- **Relevant factors**
 - RPP vs. CPP: Natural experiment of U.S. vs. other countries
 - Regulated vs. unregulated FTM rates
 - Asymmetry to MTF, which is regulated virtually everywhere
 - Waterbed effect
- **Factors leading to reduced termination charges**
 - FTM/MTM arbitrage
 - Relevant at high mobile penetration
 - Waterbed effect does not work for MTM in symmetric networks
 - Multihoming as termination bypass
- **Declining effect of FTM termination charges on mobile penetration, due to regulation and mitigating factors**

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The relationship between FMS and competition

A lack of models

- **Cremer et al. (1996): Feature cost structures and mobile advantage in demand**
- **Missing literature from areas like**
 - **Dynamic dominant firm models: Could explain dynamic feature of FMS**
 - **Models of 2-sided markets**
 - **Platform competition**

The relationship between FMS and competition

Market convergence

- **FMS → Increased competition in both sectors???**
- **Under market convergence mobile and fixed networks would compete with differentiated products.**
- **SSNIP test of single market possibly supported for calls, definitely not for subscription (Stumpf, 2007; Briglauer et al., 2009)**
- **Analysis of influence of mobile on ILEC market power does not require SSNIP test.**

The relationship between FMS and competition

Bundling and integration of fixed and mobile services

- **Incumbents offer fixed and mobile services**
 - Beneficial if complements, but not necessarily so if substitutes
 - However, could be complements in supply
 - Incumbents try to avoid FMS
 - Zimmerman (2007, 2008)
 - However, Austrian incumbent?
- **New trend towards bundling (quadruple play) and fixed-mobile integration**
 - New market?
 - Competitive disadvantage of “-only” firms?
 - What about cable TV?

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The policy consequences of FMS: Fixed network deregulation

- Core networks and fixed line calling is/will be deregulated even without FMS.
- Fixed-line access and origination may remain regulated even with strong FMS
 - Fixed and mobile markets for independent firms may not grow together for a while: Low own and cross elasticities
 - Continued fixed network regulation leads to price rigidities that handicap fixed networks against competition from non-regulated mobile rivals.
 - Fixed-mobile integration may allow integrated incumbents a dominant status.


The policy consequences of FMS: Mobile termination charges

- **No U.S. issue**
- **European Union and other DCs**
 - **Externality surcharges outdated**
 - **Path to lower FTM termination charges continues**
 - **More cost symmetry due to move towards NGN**
 - **Multihoming, termination arbitrage + termination bypass are possible alternatives to regulation.**

The policy consequences of FMS Universal service

- **Mobile communication cheaper to provide for low-density areas and low-income customers than fixed networks**
- **Mobile more effective in increasing total penetration (higher subscription elasticity)**
- **However, universal service may become a broadband-only issue, because mobile low-user access is already cheap enough.**
 - **Counter: Total penetration in U.S. has slipped in spite of mobile expansion**

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Gaps in and shortcomings of the literature

- **Empirical evidence of FMS requires**
 - New, better data
 - More micro-approaches
 - More on broadband and other fixed-line developments
- **Explanation of empirical evidence requires**
 - More analyses of cost functions
 - Analysis of effects of broadband in limiting and possibly reversing FMS
- **Competition analysis requires**
 - More theoretical modeling
 - Capturing effects of fixed-mobile integration
- **Policy consequences require analyses about**
 - How to deal with excess capacity in fixed networks
 - Simultaneously dealing with FMS and NGN: Fixed-mobile integration