

A firm-level panel-data approach to efficiency, total factor productivity, catch-up and innovation, and mobile telecommunications reform (1995-2007)

May 2009

 Efficiency, TFP,
 Catch-Up and
 Innovation and
 Mobile
 Telecoms
 Reform

BACKGROUND

- By the late 1990s, a widespread consensus had been reached that liberalization and deregulation in the telecommunications sector were essential. Since then, massive regulatory reforms have been seen in the worldwide telecommunications markets.
- Most recently, the picture has been dominated by mobile telecommunications sector reform, in terms of the privatization of incumbent mobile telecommunications providers, the introduction of competition, and the building up an independent industry regulator.

METHODOLOGY

- The author examines the relationship between regulatory reforms and the performance of firms in the mobile telecommunications sector.
- The efficiency and total factor productivity of 22 mobile carriers from seven countries over the period 1995 - 2007 are examined. Two different frontier approaches are employed: (i) non-parametric data envelopment analysis, and (ii) parametric stochastic frontier analysis. The estimated total factor productivity change is decomposed into two components: efficiency change (catch-up effect), and technical change (innovation).
- A second-stage panel-data econometric analysis is conducted to further explore the relationship between regulatory reforms and the estimated measures of firm technical efficiency, total factor productivity change, efficiency catching-up and innovation.

KEY FINDINGS

Theoretical findings

- The results of analyses suggest that measures of efficiency and total factor productivity change are fairly sensitive to the choice of methodology. Nevertheless, the second-stage econometric analysis provides robust results, suggesting that mobile sector reforms, in general, improve firms' efficiency and total factor productivity growth, with competition and an independent industry regulator making particularly important contributions.

Competition is found to have a positive effect overall: the higher the level of competition in a mobile market, the faster the growth of firms' total factor productivity, efficiency catch-up and technological innovation. It is concluded that a four-firm oligopolistic market structure is highly likely to be associated with the best sector/firm overall performance.

Privatization exerts complex effects on the performance of mobile carriers: it is associated with few benefits in technical efficiency, but it is associated with significantly enhanced total factor productivity growth, efficiency catch-up and technological innovation. These results imply that it is not necessary for firms to be privatized in order to be more technically efficient; but a privatized firm is more capable of enhancing its total factor productivity growth, efficiency catch-up, and technological innovation in the production process in a shorter time period.

An independent regulator is associated with the higher technical efficiency of a firm. It also makes remarkable contributions to enhancing firm total factor productivity growth, efficiency catch-up, and technological innovation.

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Methodological findings

- Non-parametric data envelopment analysis may produce meaningless and/or unrealistic results, in particular, when the number of observations is small and/or substantial unobserved heterogeneity exists across carriers/countries in the data.
- However, parametric stochastic frontier analysis can deal efficiently with statistical noise in the data and thus reports more manageable and reliable results.
- Therefore, when examining industry/firm efficiency and total factor productivity, one should pay close attention to the choice of methodology, especially when the industry/sector at issue is undergoing fast growth and is volatile.
- In addition, all measurement results should be checked for robustness using different methodologies when making comparisons of performance across decision-making units and years.

POLICY ISSUES

- The results of analyses confirm the crucial positive effects of competition and an independent industry regulator on firm efficiency and total factor productivity growth.
- Competition is beneficial to industry performance in many senses, but policy must not be driven by the notion of 'the more, the better'. Better industry performance can be achieved only at the effective competition level, which should be neither too high nor too low, and which will vary from market to market. Therefore, attention should be given to the relationship between competition levels and industry/market/firm performance.
- Whether a market should be privatized depends on policy objectives. Privatization will be the desirable strategy if the preferred outcome of reforms is to enhance firms' capabilities in terms of productivity growth, efficiency catch-up and technological innovation, with a view to enhancing international competitiveness.
- The existence of an independent industry regulator is not only a key element in ensuring good regulatory governance, but it also plays an explicit and essential role in improving overall firm performance.

THE CCP

The ESRC Centre for Competition Policy (CCP), at the University of East Anglia, undertakes competition policy research, incorporating economic, legal, management and political science perspectives, that has real-world policy relevance without compromising academic rigour.

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The full working paper (CCP Working Paper 09-6) and more information about CCP and its research is available from our website: www.ccp.uea.ac.uk

ABOUT THE AUTHOR

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- She has strong research interest in two major research areas: the impact of regulatory reforms on industry/firm performance, and methodology for efficiency and TFP measures.

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