A SPATIAL AND ECONOMIC ANALYSIS FOR TELECOMMUNICATIONS: EVIDENCE FROM THE EUROPEAN UNION

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This paper evaluates the role of a number of determinants of telecommunication services in the European Union. We use a logistic model with spatial covariates to estimate the demand function for telecommunications in the Union. Our results show that different types of interconnections generate diverse estimates for country specific demand. The impact on telecommunications from countries with spatial, economic or social similarities differs based on those characteristics. Omitted variable bias from not modeling spatial interdependence is limited in models under spatial connectivity criteria. This satisfies the statistical inference drawn by previous empirical studies regarding determinants of telecommunications.

I. Introduction

Over the last few years, the telecommunications sector has received increasing attention in the economic literature and a large volume of theoretical and empirical work has been published in this area. The telecommunications market has changed to a more deregulated environment (Armstrong 1998) following the rules established by regulatory authorities and the demand for telecommunications services has increased tremendously as a result of the expansion of the economic activities of

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many multinational organizations. This paper focuses on explaining the demand for international telecommunications at a European country level.

There are a number of papers in the existing literature that are related to our work. Gatto et al. (1988) model residential demand by developing systems of five interdependent equations, corresponding to alternative ways of placing a call for each state. However, they do not apply a *spatial* econometric framework and thus their results may suffer significant bias. Interestingly, Christaller (1966) uses the number of telephone stations per person to develop a hierarchy of centers among Southern Germany's cities in 1963 and illustrate his central place theory (CPT). Green (1955) employs telephone call data to define the common boundary of the hinterlands of New York City and Boston. Various inter-city flows (e.g., migration, commuting, and tourism) have been used to analyze regional settlement structures, uncover central place hierarchies, delineate functional and nodal sub-regions, and identify regional disparities (e.g., core and periphery). The latter regional structure motivates the *social* correlation of telecommunications. Finally, De Fontenay and Lee (1983) analyze residential calls between British Columbia and Alberta. They find that call duration has an inverse relationship with price (*economic* factors). All the above results justify the empirical formulation of our model. However, the contribution most closely related to ours is that of Gruber and Verboven (2001) who studied the technological determinants of mobile telecommunication services in the European Union and their analysis provided us with considerable insights of the workings of telecommunications market in Europe. In contrast to Gruber and Verboven (2001) and considering the results of the existing empirical literature, we analyze the determinants of demand for telecommunications and evaluate them using a multidimensional method (spatial econometrics).[1] Thus, the contribution of the paper is three-fold: (i) decompose the impact of alternative factors that stimulate the demand for telecommunications, (ii) illustrate the effect of geographic proximity, trade and tourism flows on the demand for telecommunication services per country and, (iii) modify and extend the model of Gruber and Verboven (2001) to correct for multifactor bias of the estimates.

We take a more general look (Blonigen et al. 2006) at empirically modeling spatial interactions in demand for telecommunications and ask three fundamental

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[1] Several empirical studies, such as Agiakloglou and Yiannelis (2005), Bewley and Fiebig (1988), Acton and Vogelsand (1992), Madden and Savage (2000), Sandbach (1996), Garin Munoz and Perez Amaral (1998), and Wright (1999) have tried to estimate price elasticities for international telecommunications demand for different countries based on time series data.