

Competition, Regulation, and Broadband Access to the Internet

Georg Götz

January 18, 2008

Very preliminary; please do not cite without permission.

Extended Abstract

High-speed access to the internet ranks highly on the political agenda. Penetration and coverage of so-called broadband access to the internet are top political priorities both in the EU and the US. Bridging the ‘digital divide’ by providing broadband to rural areas is a major goal of EU-policy. How to reach both high coverage and high penetration is a much disputed issue. The appropriate amount of regulatory intervention into Very High-Speed DSL networks (VDSL) is, for instance, the matter of an argument between the European Commission’s DG InfSoc and the German regulator. While the Commission takes a more interventionist position, the German regulator and the German federal government argued in favor of a regulatory holiday for investments in VDSL infrastructure. Anecdotal empirical evidence shows that more regulation need not yield better performance in terms of broadband access. In 2005 coverage and penetration was 98% and 45%, respectively, in Switzerland, where neither ex-ante regulation of wholesale tariffs nor unbundling of the local loop existed. In much more interventionist Germany, the respective numbers were below 90% and 20%, respectively.

This paper reexamines the effect of the regulatory regime on both penetration and coverage. The framework also allows for an evaluation of different public policy measures such as subsidization of broadband demand and supply. A welfare analysis asks what the optimal regulatory regime is and whether and how high-speed access to the internet should be subsidized.

Using an approach similar to Valletti et al. (2002), the paper highlights the importance of population density for whether firms invest to provide internet access. Due to fixed investment requirements to serve a local market, costs per potential user depend largely on population density in local markets. Therefore, the spatial distribution of population largely determines geographical coverage. For given technological and economic conditions, a population density threshold exists below which investment will not break even. The analysis reveals a trade-off between coverage and penetration; high – regulated – wholesale and retail prices, respectively, lead to wide coverage but low penetration. Higher prices create incentives for investment since they lead to higher profits for given market size. Low prices yield high demand in served areas and an increase in penetration even though coverage decreases. However, this holds only as long as the regulator prescribes tariffs which are above a certain threshold value. If the regulator sets prices too low, the negative effect on incentives to invest more than compensates for the demand increasing effect in served areas. Geographically averaged tariffs lead to a breakdown of the market if they are cost-based. Firms would not have an incentive to invest at all. Simulations, which reproduce key features of the German market, show that the optimum mark-up on average costs is between 70 and 100 percent as long as the population is not served fully.

Germany is also interesting in another respect. Mostly due to the fact that Deutsche Telekom until recently owned a major part of the cable network, inter-platform competition is almost absent. Simulations show that an earlier separation of the fixed-line and the cable network could have produced a higher welfare level than a sophisticated regulatory strategy based on intra-platform competition and unbundling. Inter-platform competition and the associated competition in infrastructure could have led to higher welfare, higher coverage and more product variety without further regulatory intervention.

In a situation of largely unregulated inter-platform competition, geographical uniform pricing (UP) is a potential constraint on incumbent prices. The paper shows that regulators

might introduce UP as a safeguard against preemption by an incumbent if consumers consider the different services as close substitutes. If products are more differentiated, uniform pricing and an unregulated benchmark yield about the same welfare level.

A regime with uniform pricing is also interesting from a technical point of view. In the case of close substitutes pure-strategy equilibrium in prices no longer exists for given coverage areas. The resulting equilibria in mixed-strategies exhibit two interesting and intuitive features. First, only the incumbent randomizes, not the entrant. In the interpretation of Varian (1980), the strategy of charging a high price with a certain probability α and a low price with probability $1 - \alpha$ implies that the incumbent makes special offers once in a while for a certain time span. Given that competition is very tough, in the remaining time the monopolist serves only consumers in monopoly regions. The second interesting feature concerns the effect of a change in the degree of product differentiation on the equilibrium price. In the region where pure-strategy equilibria exist, the 'standard' relation applies: As products become closer substitutes, competition intensifies and prices decrease. However, in the region of mixed-strategy equilibria, the opposite holds: A further decrease in the degree of product differentiation leads to higher (expected) prices. More intense competition leads the incumbent to extend the time periods in which she serves only consumers in the monopoly region. The probability that she charges a high price increases.

The article also contributes to the discussion of various public policy instruments to promote broadband penetration. I examine the positive and normative effects of subsidization of broadband demand and of investments in broadband infrastructure. The important result is that both demand and supply-side subsidies might increase welfare. Their relative effectiveness depends on the specific parameters of the model as well as on the details of the implementation. Simulations show that subsidization leading to 100% broadband coverage might lead to welfare levels which are at least as high as the situation without public policy intervention. This holds without accounting for potential network externalities.