# Chapter II
# Is Regulation a Roadblock on the Information Highway?

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## ABSTRACT

*Regulatory policy in telecommunications must balance short-term efficiency (low prices) against the firms' incentives to innovate, which have longer reaching impacts on economic welfare. Historically, policy tended to sacrifice dynamic efficiency for the sake of competitive prices and static efficiency. In the last few decades, economists and other researchers have begun to document the large welfare costs of ignoring dynamic efficiency. We analyze the theoretical impact regulation has on innovation. We then turn to the empirical evidence that regulation dampens firms' incentive to innovate in the telecommunications industry in general and the market for broadband Internet access in particular. Both product and process (cost reducing) innovation are discussed. The chapter forms a compendium of available research on the intersection of telecommunications regulation and innovation. We conclude with lessons the literature provides to policy makers and a discussion of future regulatory trends.*

## INTRODUCTION

For much of the 20th century, regulatory policy directed toward the telecommunications market was concerned with "getting the prices right". Regulators took the set of existing firms and products as given and sought prices that maximized consumer surplus, subject to the constraint that the regulated firm cover its costs of providing the current set of services. Although other regulatory objectives such as universal service played a role, regulation was framed within an essentially static view of the market. In the latter part of the century, however, as the pace of technological change increased in

the telecommunications industry, it became clear that regulation could hinder innovation. In this chapter, we consider the evidence that regulation dampens firms' incentive to innovate. We begin by laying out the theoretical reasons underpinning this notion. In the main section of the chapter, we review the empirical studies in the literature, focusing on the U.S. market. In so doing, we find remarkably consistent evidence from numerous institutional and geographic settings that lighter forms of regulation encourage innovation.

Before proceeding, we must ask what innovation is. The term is used in the economics literature to refer to everything from basic invention to new product introduction to diffusion of existing technology. We use the term in a broad sense to refer to the making available of something new in a given market. It is useful, however, to distinguish between process and product innovation. Process innovations are advancements in the methods of creating existing products, and may not be directly apparent to consumers. Process innovation lowers the cost of producing goods or services currently available to consumers. Product innovation is the creation (or diffusion to new markets, in our expansive definition) of new goods previously unavailable to consumers.

Regulation affects firms in many ways. Regulators historically deemed regulation justifiable, to reap the economies of scale and scope created by a single service provider and to further social goals such as universal service, while avoiding the inefficiency due to monopoly pricing. Regulatory control over prices and profits was chosen instead of reliance on competition or antitrust policy, which is generally not designed to prevent market expansion by firms with legitimate cost advantages over rivals. Competition law, at least in the U.S., furthermore does not outlaw the unilateral exercise of market power in setting prices.

The economic inefficiency created by prices above their competitive level is illustrated in Figure 1, which depicts the demand and marginal cost curves for a telecommunications service. Total economic benefits from the service are the entire area between the demand and the marginal cost curves. Benefits are maximized when quantity $Q^*$ is provided (as would happen if the competitive price $P^*$ is charged). These social benefits, shared between the consumers and the firm, arise because one part of society (consumers) consumes units for which it is willing to pay more than it costs another part of society (the firm) to produce. If a carrier with some market power charges a higher price, such as $P^m$, then a lower quantity $Q^m$ of the service is purchased and the market loses benefits in the amount of area DWL in Figure 1. This deadweight loss, also known as the "Harberger triangle", represents the dollar value of the economic benefits lost to consumers and the firm from units between $Q^m$ and $Q^*$ that are not consumed at the higher price. Deadweight loss is a static loss in welfare, because it is calculated given the service is already available.

The Harberger triangle is not the end of the story, because a regulatory regime that attempts to squeeze static inefficiency out of market prices may create dynamic inefficiency. Dynamic efficiency stems from the additional net surplus created by new products and services. In Figure 1, the surplus obtained by consumers each period from the existence of the service is triangle CS, sometimes called the "Dupuit triangle".[1] The firm gains producer surplus, the unshaded area PS. If regulated prices are too low to encourage in-

*Figure 1. Static versus dynamic efficiency*