



The economics of fixed cost recovery by utilities

Severin Borenstein

Haas School of Business, University of California, Berkeley, CA 94720-1900, United States



ARTICLE INFO

Article history:

Available online 28 August 2016

ABSTRACT

Economics provides policymakers guidance when they must depart from efficient pricing (equal to societal marginal cost) to cover an electric utility profit shortfall. Options include raising volumetric retail prices, tiered pricing, fixed charges, minimum bills, and demand charges. There is no ideal policy, but balancing efficiency and equity suggests using a combination of fixed charges and increased volumetric prices. Economics does not support the use of demand charges or minimum bills.

© 2016 Elsevier Inc. All rights reserved.

1. Introduction

Among the many claims about the lessons that economics teaches for fixed-cost recovery, the most common is that fixed costs should be recovered with fixed charges. Standard microeconomics, however, has very little to say directly about how utilities should recover fixed costs, and certainly nothing as simple as this claim. Rather, microeconomics offers fairly clear direction on how volumetric prices for electricity should be set to maximize efficiency, that is, to generate the greatest total value for the economy.

The simple guidance on volumetric pricing of electricity is that the retail price of a kilowatt-hour (kWh) should reflect society's full short-run marginal cost of supplying it. To be clear, "society's" cost includes not just the marginal fuel, labor, capital, and other production costs of the utility, but also the externalities caused by generating and selling that incremental kWh of power. Those externalities include greenhouse gas emissions, local air pollution, and other disamenities from the presence of generating stations, as well as transmission and distribution lines.¹ The focus is on short-run social marginal cost, because at any point in time price should reflect the incremental cost of producing one more unit, which will likely be higher when production capacity is strained than when there is plenty of excess capacity.

Largely because of the existence of fixed costs, however, setting the volumetric price of electricity equal to its full social marginal

cost in many cases won't raise sufficient revenue to cover the utility's total costs, though the size of the shortfall will depend on many attributes of costs and demand.² The shortfall raises the critical question of the most efficient and equitable way for the utility to raise additional revenue. In this article, I present an economist's view of a number of alternatives that have been proposed to allow a utility to recover its costs, including fixed going-forward costs that the utility incurs each period, as well as sunk costs that result from past decisions and actions.

In the next section, I briefly outline the foundational principle of economic efficiency in market transactions, which underlies all economic analyses of pricing. In the third section, I apply this principle to electricity pricing and explain why it is likely to lead to a revenue shortfall. The fourth section then analyzes an array of alternative proposals that allow utilities to recover additional revenue. Though the focus is primarily on economic efficiency, I also discuss equity considerations and impact on lower-income customers. My conclusion is that there is no perfect approach to increasing revenue, but some approaches make much more sense than others. Once the options are narrowed, policymakers face a fundamental tradeoff between economic efficiency and equity.

2. The economic efficiency of pricing

The idea that economic efficiency is maximized when price reflects full short-run social marginal cost (SMC) is a bedrock

E-mail address: severinborenstein@berkeley.edu (S. Borenstein).

¹ Of course, the true cost of pollution is itself controversial, but any policy to address externalities confronts this issue, either implicitly or explicitly, when costly actions are taken to reduce pollution. Addressing the externality cost question directly is critical to arriving at transparent and credible environmental and energy policy.

² It is worth noting that because economic efficiency starts with setting price equal to short-run marginal cost, it avoids the debate about which costs are fixed. Rather, the focus of revenue collection is on covering total costs (a much less controversial figure), and the question becomes how much additional revenue must be raised to do so starting from the point at which price equals short-run social marginal cost.

principle of microeconomics, because it is straightforward to show that any departure from SMC is likely to reduce the economic value that the industry can create. Producing a good requires inputs – labor, fuel, machinery, land, etc. – and those inputs have alternative uses. The price of an input is generally a good indicator of its value in its next best use, so economics suggests that the inputs should only be brought together to produce this good if the value of this good to whoever consumes it exceeds the value of all the inputs necessary to make it. Setting price equal to short-run social marginal cost creates the incentive to consume an incremental unit of the good if and only if one values it more than the value that the inputs would create in their next best use.³ At the same time, customers who are considering an investment in energy efficiency receive a price signal that accurately reflects the social value of the savings such an investment would create.

To illustrate, let's say the incremental input costs of producing one additional unit of a hypothetical good add up to \$8, but the production process also creates a negative externality (some sort of pollution, for instance) that imposes an additional cost of \$1. If one sets the price for this good at \$9, then everyone who buys it values it more than \$9. As a result, there is no unit purchased that is valued less than the collection of inputs (including pollution) that went into making it and every unit purchased is valued more than the collection of inputs.

But what if the price for the good were set at \$12? Then anyone who valued an additional unit of the good more than \$9, but less than \$12, would not buy it. This would be value-destroying, because the value that could have been created by putting together inputs with a cost to society of \$9 in order to create a good that gives some specific buyer with a value of, say, \$11 would not be created. The failure to make that deal is a loss of \$2 of value to society.⁴ And there are likely to be many such losses among customers who value the good more than \$9 and less than \$12. To economists, these losses – illustrated in Fig. 1 by the upper (pink) triangle – are known as “deadweight loss” or, equivalently, a loss in economic efficiency.

In practical terms, for example, if we price electricity at \$0.22 per kWh when its true SMC is \$0.12 (including all pollution externalities), then we might discourage someone from purchasing an electric vehicle when they would have done so had they been able to buy electricity at the true SMC.

Deadweight loss also is created if a good is priced below its SMC. If the hypothetical good illustrated in Fig. 1 were priced at \$5, then anyone who valued the good above \$5 would purchase it. But if they valued it less than \$9, the value they would be getting from the good would not be great enough to justify all the inputs (including pollution) that went into making it. The deadweight loss created by such underpricing is illustrated by the lower (blue) triangle in Fig. 1. For instance, if there is a buyer who values the good at \$7.25, that purchase of the good would generate \$1.75 in deadweight loss or, put differently, would lower the total value

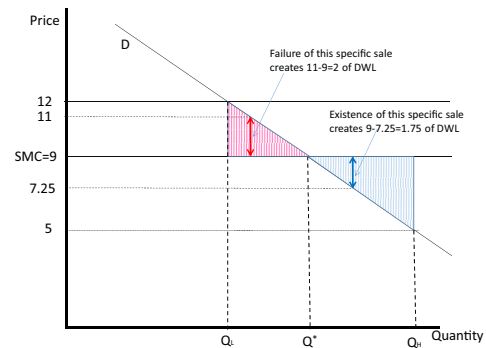


Fig. 1. Illustration of deadweight loss (DWL) from pricing above or below social marginal cost.

created in the economy by \$1.75. In practical terms, for example, if the true SMC of electricity is \$0.12 per kWh and the price is set at \$0.08 per kWh, then we will encourage people to leave some lights on when the value they are getting from doing so is less than the cost they are imposing on society.

3. Efficient pricing of electricity

In textbook competitive markets, price equals marginal cost, and all gains from trade are realized. But the relationship can break down for at least three reasons:

1. *Externalities.* If sellers in the market are highly competitive, but producing the good generates negative externalities, then competition will set a price below the social marginal cost to reflect only the marginal cost that the sellers have to bear. Because those sellers don't internalize the cost of externalities (by definition), the price will be too low, and too many sales will occur.
2. *Market power of sellers.* If the market is not highly competitive, then sellers may be able to make greater profit by raising prices above competitive levels. Because sellers have such “market power,” prices will be too high, and too few sales will occur. Some transactions that would have created economic value will be stifled.
3. *Failure to cover costs when price is equal to marginal cost.* In some cases, generally ones in which firms have significant fixed costs, competitive pricing might not be sustainable because it does not generate enough revenue to cover a firm's total costs. In economics, these situations are referred to as “natural monopoly,” because the presence of large fixed costs suggest that it would be more economically efficient to have one firm do all production. Standard examples include local distribution lines for electricity or telephones, because it is widely agreed that it does not make economic sense to have duplicate wires running down the street.

All three of these potential distortions exist in regulated electric utility markets. There are clearly large fixed costs and natural monopoly tendencies in local distribution, and probably also transmission, of electricity. As a result of this tendency toward monopoly, electric utilities are either regulated by a state agency or owned by a local government or consumer-owned cooperative, in part to prevent the electricity provider from exercising market power and raising price above competitive levels. At the same time, generation and distribution of electricity creates negative externalities.

So then what does economics bring to the question of how to recover fixed costs? The answer begins by recognizing the ideal

³ Some analysts have argued that price should reflect *long-run* marginal cost (LRMC) in order to reflect the capital costs of production. This would not in general yield economic efficiency. For instance, if a system is underbuilt and has a shortage of capacity, economic efficiency dictates that price increase to reflect the scarcity value of the electricity at each moment, regardless of the cost of capital to expand the system's capacity in the longer run. LRMC is appealing as a rough guideline for financing capital expansion, but it is not a good guide to economic efficiency of pricing. Precise economic analysis starts with pricing efficiently, which then makes clear the size of the revenue shortfall. Electricity also differs from many markets due to the need to balance supply and demand with no storage. Borenstein (2000), particularly footnote 1, discusses application of the concepts to that case.

⁴ Who bears that loss depends on the price at which a particular deal would have been made. The point is that when the buyer values the good more than it would cost the seller to supply it, there are gains from trade, and failure to make such deals imply a failure of anyone to capture those gains.

Download English Version:

<https://daneshyari.com/en/article/5001684>

Download Persian Version:

<https://daneshyari.com/article/5001684>

[Daneshyari.com](https://daneshyari.com)