Competitive Rail Regulation Rules

Should Price Ceilings Constrain Final Products or Inputs?

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Abstract
There is no prospect at present that railroad rates in the United States will be deregulated and left entirely to the control of market forces. Because of this there is a need for defensible regulatory rules to be adopted. The authors consider the US regulatory rules of constrained market pricing with particular reference to the pricing of final products (namely, origin to destination rail transport) and the pricing of a bottleneck. They conclude that economic efficiency, and through it the public interest, is served most effectively by rules that impose the same behaviour that market forces would impose on firms if those forces were present.

1. Introduction
In this article we discuss a controversy that has recently arisen in US rail regulation. As participants in the resulting litigation, we will report the issues and describe our positions, which were by and large upheld in the decision of the regulatory agency.1

For some years regulation of railroad freight rates in the US has been governed by a set of rules called "constrained market pricing". These rules are intended to serve as a substitute for competition in arenas where effective competition does not currently seem to be possible, and are intended to constrain the behaviour of the regulated firms exactly as would be the case if the market were really competitive, circumscribing these firms' behaviour no less and no more. Two key elements of constrained market pricing are: (1) the rule for the pricing of final products (origin-to-destination [henceforth O-D] rail transport); and (2) the principle for the pricing of a bottleneck input. First, it is held that final product price should not be permitted to exceed the amount at which an efficient entrant-rival could afford to supply the product in a competitive market in which inputs are available on competitive terms. This price ceiling is called the "stand-alone cost" of

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1 Surface Transportation Board, Docket Nos 41242 et al., served 31 December 1996.
the final product. A price constrained not to exceed stand-alone cost ensures that purchasers will pay no more for this item than they would have to if it were sold in an effectively competitive (contestable) market. The rule, then, limits the price of a final product, but places no limits on the price of any individual input of the firm. In addition, it does not force any price of either an output or an input down to marginal or incremental cost because railroading is characterised by economies of scale (density), meaning that if all rail prices were forced down to that level, as we know, the firm would be condemned to revenues that fall short of its costs.

Constrained market pricing also fits in directly with the proposition that when a railroad possesses a "bottleneck input", that is, an input, owned by a single railroad, for which there are no acceptable substitutes, and which is needed by its competitors in the supply of final product, then that input should be priced in a competitively neutral manner. This means that rivals of the railroad that is the monopoly supplier of the services of the bottleneck input should pay the same amount for those services that the owner of the bottleneck charges its customers for the of use, so that rivals will suffer no competitive disadvantage from the bottleneck-input price. This principle has been spelled out in detail in a set of relationships referred to as the "efficient component-pricing rule" (ECPR) or "parity pricing". There is some controversy over whether the owner of the bottleneck and one of its competitors will be impelled by self-interest to agree voluntarily to the ECPR price for the input, or whether it must be imposed by regulation, but this discussion does not concern us here.2

The attack upon these principles by some of the shipper organisations took the position that they needed to be supplemented by yet another rule. This rule, in essence, held that there should be a ceiling not only on the price of the final output; in addition, the price of the service of any bottleneck input should be constrained not to exceed what they described as the "stand-alone cost" of the input.

In summary, our response was that it is only the final-product price, not the price of any of the inputs, that affects the consumer of rail services. When we purchase a car, we care about the price we pay for the car, not the share of that price that is attributed to the transmission. If the final-product price does not exceed a competitive level, then that is all the shippers can expect. Moreover, if the addition of a ceiling on the price of bottleneck-input services were to lead to a reduction in the price paid by shippers for the final product, then that price must, consequently, be forced below the competitive level, meaning that it would yield revenues insufficient to cover the total costs of the railroad. In the long run that must be damaging to the shippers and the general public as well as the railroads, because the resulting losses will impede or prevent investment in maintenance, replacement, modernisation and improvement of the rail network, as well as expansion of capacity where it will be needed to meet the changing requirements of shippers.

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2 This article does not focus on the issues related to ECPR. For our latest discussion of this subject see Baumol, W. J., J. A. Ordover and R. D. Willig (1997): "Parity Pricing and its Critics: a Necessary Condition for Efficiency in the Provision of Bottleneck Service to Competitors", *Yale Journal on Regulation*, 14, 145-63.
2. The Current Situation: US Railroads and their Regulation

For almost twenty years, we, as well as many other economists, have been advocating some basic principles of economic efficiency that we believe should govern regulation of the railroads, as well as other industries, in order to serve the public interest. In the 1980s the agencies that regulated the railroads in the US adopted rules explicitly founded on those economic principles, referring to them in aggregate terms as “constrained market pricing” (CMP).

Here, it is relevant to observe that since the regulatory agency adopted the original constrained market pricing rules, railroad service in the US has demonstrably improved. From the deteriorating core rail network inherited from the 1970s, parts of which were near collapse, there has been a dramatic improvement and a transformation into a reasonably efficient system for rail transport of the nation’s freight. Average real freight rates have declined dramatically — by over 50 per cent. Simultaneously, productivity has increased substantially. For example, since 1983 railroad output per employee (measured in revenue ton-miles) has increased 170 per cent. While railroad earnings are not yet up to the competitive level, and the industry’s economic profits continue to be negative, the railroads have moved towards that standard. The additional revenues (and a regulatory regime that provides grounds for investors to expect competitive returns in a future period that is not extremely distant) have allowed the railroads to increase their capital investment. The railroads’ annual capital investment has almost doubled since 1983. We believe that the CMP rules adopted by the regulator deserve a significant part of the credit, having contributed by offering the appropriate incentives, and replacing forms of regulation that systematically stultified the industry.

The beneficial role of these rules has not been fortuitous. They were carefully designed on the basis of economic analysis to satisfy competitive market guidelines for economic regulation and the principles for public-interest pricing. That is, the rules were carefully designed to replicate the behaviour and outcomes that would occur in a competitive market and satisfy necessary conditions for economic efficiency.

3. The Proposed Modification of Constrained Market Pricing

In 1995, the regulatory agency was asked by some shipper groups to consider alternative approaches to the current rules governing the rates that are to be charged for services to or from points exclusively served by one railroad. The proposal to be discussed here, in substance, called for continuation of the current practice of allowing rates to be set on an O-D basis, but advocated a change in the rules governing the standard of maximum reasonableness. Here, it was proposed to limit the O-D rate to the sum of what was called the stand-alone cost of the bottleneck service and an actual or imputed “competitive” rate for the non-bottleneck portion of the move.

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3 See, for example, Ex Parte No. 393 (Sub-No. 1) Standards for Railroad Revenue Adequacy, Economists’ Statement in Support of the Staggers Act, attached as Appendix A to Joint Verified Statement of William J. Baumol and Robert D. Willig, filed 4 August 1986, on behalf of the Association of American Railroads.

4 Origin-to-destination service is, for purposes of economic analysis, the railroad’s final product.
The question posed by this proposal is whether it makes sense to allow railroads to charge rates that cover an amount up to the full economic costs of efficient movements, or whether, in response to shipper requests, full cost recovery should be allowed for only the bottleneck portion of the moves, with the remainder of such a movement priced at its incremental cost.

These new proposals appear to have been inspired by two suspicions: (1) that railroad earnings on movements that utilize bottleneck facilities have a discomforting appearance of monopoly returns; and (2) that such earnings violate the valid rule for the pricing of O-D services that forbids those prices to exceed the stand-alone costs of those services. We will demonstrate here that neither of these suspicions has any justification. First, we will show that as long as O-D prices do not exceed their stand-alone costs there can be no monopoly component in the earnings from a movement over a bottleneck.

In competitive markets, prices for final products (in the railroads' case, O-D services) will at times be as high, or almost as high, as stand-alone cost, but they cannot exceed that level because at any higher price, by definition, entry by another firm will become profitable and entry will therefore occur, driving prices back down to the competitive range. Thus, under current regulation, O-D railroad services cannot provide any monopoly rents to the railroad or railroads providing the service. By "monopoly rents" we mean here long-run profits that are higher than the normal profits that a firm would earn in a competitive market. Competitive markets permit prices to rise to stand-alone cost when demand is sufficient.

Second, we will show that, in these circumstances, the earnings attributable\(^5\) to a bottleneck service may exceed what can (misleadingly)\(^6\) be thought of as the stand-alone cost of the bottleneck, but will not exceed what would be required to secure the entry of a stand-alone bottleneck entity in an effectively competitive market. This is because, in an industry characterised by substantial fixed and common costs, the very notion of the stand-alone cost of an isolated component of O-D service is seriously misleading and, in a sense, meaningless. The only prices that would allow a bottleneck to "stand alone" in conjunction with assets priced to cover their incremental costs\(^7\) would be prices that covered all the fixed and common costs of both the bottleneck and the other assets required to provide the O-D service in question.

The most tempting misapplication of the basic rules governing railroad price regulation is the notion that the pricing rule appropriate for the pricing of final products should

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\(^5\) We say "the earnings attributable to" because the bottleneck service can be part of an integrated O-D service provided by one entity and/or a separate service offered in conjunction with non-bottleneck services provided by other entities.

\(^6\) See Section 8 below.

\(^7\) The incremental cost of a service is the (per unit) cost, including the incremental capital cost directly imposed on the supplier firm by its provision of the service in question. It corresponds to marginal cost but is calculated for a much larger increment; here, the amount supplied of the product in question. Incremental cost never includes any contribution towards the fixed and common costs of the enterprise. That is because a piece of equipment that is needed for each of two services, A and B, would still be required to provide service A even if B were discontinued or had never been offered. Hence, that equipment is not part of the incremental cost of service B, and it is not part of the corresponding cost of A for exactly the same reason.
be applied to the pricing of bottleneck services. In particular, it is tempting to argue that because the revenues from O-D services should not be permitted to exceed their stand-alone costs, the same should be required for the revenues attributable to bottleneck services. A little consideration of the matter shows that this conclusion is entirely indefensible.

The main reason is that such a rule would preclude financial viability of the services in question and the railroads themselves. Let us review why this must be so; that is, why neither the O-D services nor the railroads can survive financially if the price of bottleneck services covers only the cost of replacement of the bottleneck facility. Here, it is helpful to think of the inputs of an O-D service as having three parts: (1) the competitive facilities that are incremental to the service; (2) the fixed and common facilities; and (3) the bottleneck facilities. For example, the track of a railroad is largely a fixed and common cost serving simultaneously the many types of freight the railroad carries, and is not part of the incremental cost of any one of them. It is clear that such fixed and common costs constitute a substantial share of rail outlays.

As is well-known, with vigorous competition in the non-bottleneck portion of an O-D railroad service, market forces can be relied upon to drive the prices of that portion of the rail service towards incremental cost. If the revenues attributable to the related bottleneck services are not permitted to cover more than the replacement ("stand-alone") costs of the bottleneck(s), it follows inexorably that there would be no source from which to recoup any of the very substantial fixed and common costs of the O-D movement. There can be no simpler recipe for rail insolvency and financial disaster.

If railroads are not permitted to charge rates that help to pay for the common costs of their non-bottleneck lines, then they cannot earn revenues adequate to attract capital. Without capital, efficiencies will not be obtained or continued, and variable costs will increase. Those shippers who cannot afford those rates will leave the railroad, leaving the fixed and sunk costs to be borne by the remaining shippers who, presumably, are paying as much as they can already. As revenues decline, so will service, thus driving away more shippers. Less and lower quality rail service will result; in extreme cases, lines that could have been sustained will be abandoned, and shippers near those lines will lose the service altogether.

Of course, this will not last forever. At some point, where there are today two rival lines, there will be only one. At that point, both market forces and the current as well as the proposed regulations will permit the remaining railroad to set its rate at stand-alone cost (it will now constitute a bottleneck line), and it will attempt to bring back service to the levels it once enjoyed. If the line has not deteriorated too badly, and if enough shippers have not closed their facilities, that may be possible. In any event, the shippers on the other line will have lost their service forever.

It is not clear that it will be possible to bring the line back. Rail systems are not neatly divided into bottleneck and non-bottleneck lines. What is a bottleneck line for one shipper may be a non-bottleneck for another. If rates are forced down by regulation, inadequate revenues on the "non-bottleneck" segment of Shipper A's route may force it to be
closed, thus also closing the bottleneck segment of Shipper B's route. The loss of those revenues may force Shipper C's route to be closed, and so on. The railroads are a network and are operated as a network. Therefore, when the railroads' profits as a whole decrease, investors will not continue to invest in those bottleneck segments that can remain viable. Rather, they will cease investing in the railroads, because they will find safer and better returns on their investments elsewhere in the economy.

4. The Effective Ceilings on Prices in Competitive Markets
We know how the market mechanism handles such a problem. Suppose that we are dealing with a totally unregulated industry with cost characteristics similar to those just described, but with absolutely no cost or other impediments to rapid entry and exit. Such an industry is said to be contestable. In our example, there is a bottleneck and a competitive input, but the monopoly owner of the bottleneck is forced to operate like a competitor by the constant threat of entry — the threat that if the price is too high a rival supplier of bottleneck services will enter and take away the business.

Now assume, first, that as a consequence of actual and potential competition, none of any firm's activities is compensated sufficiently to cover more than (a) the incremental costs of some portions of its operation, and (b) the replacement costs of a few other portions. With little or nothing left over to cover any of the fixed and common costs of their services, some of the firms will inevitably be driven out of the field, and no firm will have any incentive to enter. Eventually, there will be one firm left in the field, and the price of the final product will move to a level just sufficient to cover all costs, both incremental and fixed and common. If the competitive services remain competitive and continue to cover no more than their incremental costs, as one expects in effectively competitive markets, then the price for the bottleneck services will have to cover fully both the costs of the supply of the bottleneck services and the fixed and common costs. That must be so, because in this competitive scenario there is no other source of the needed revenues.

This, then, is how one expects prices to be set in industries whose competitiveness is ensured by perfect freedom of exit and entry, but which have fixed and common costs of any substantial amount. Prices will equal the stand-alone cost of the final product. If bottleneck and competitive services are priced separately, the prices for the bottleneck and competitive services will in total cover all fixed and common costs of the final product.

Universally recognised economic analysis shows that exactly the same outcome must emerge where the industry's operations are characterised by more general types of significant economies of scale or density, because, in any such case, if each element of a firm's activity receives revenues no higher than its incremental cost, the total revenue of the firm must always be insufficient to cover its total cost. Therefore, in any such case, the competitive market forces will always lead to final-product prices that cover more than the sum of incremental costs and that do cover total costs, with bottleneck services covering the difference. However, because of the constant possibility of entry,
no individual final product of any firm will be able to sell at a price that exceeds its stand-alone cost, thereby ensuring that the firm earns no monopoly profit on any one or any combination of its products.

Thus, the only viable solution — the only solution consistent with the principles of the free market — is that the railroads must be permitted compensatory rates on O-D services, including coverage of the fixed and common costs as part of the stand-alone cost of that service. Since any competitive segments of a service could contribute little or nothing above their incremental costs if they had to be priced separately through competition among alternative service providers, the bottleneck segment, if it were priced separately, would have to make up for the shortfall. So long as the O-D service price is not allowed to exceed the stand-alone cost of the service, monopoly profits are impossible. That is the bottom line of the analysis showing why the current regulatory arrangement serves not only the interests of the public in an efficient rail network and the interests of the railroads themselves, but also the long-run interest of shippers in keeping rail prices at the lowest levels consistent with the viability of the railroads that serve them.

By contrast, the proposed modifications that amount to abandonment of these rules would force behavior to deviate substantially and systematically from that in a competitive market. The objective of these modifications is obviously to use regulation to limit the rates railroads may charge to levels well below those that would occur in a competitive market. Advocates of these modifications asked the regulators to limit the rates charged on "bottleneck" segments and to force the railroads to set what they term "competitive" rates on "non-bottleneck" segments of a railroad route.

Such rates set at incremental costs cannot possibly cover the total costs of "non-bottleneck" segments in the light of their scale economies, with the non-bottleneck segments making up much of the rail system and serving as indispensable parts of the overall railroad network. Consequently, such rates would not occur in competitive markets except in an industry destined for early termination by lack of need for its products or services. The competitive market result is permitted under the current structure of rate regulation. The proposed modifications in that structure would preclude the results that competitive markets achieve, and would dramatically circumscribe the provision of efficient railroad service.

5. Bottleneck Service Prices under Competition and Current Rules

Competitive markets do effectively impose ceilings on bottlenecks, albeit indirectly, and so does the current regulatory regime for railroads. The present regime ensures that the bottleneck railroad can derive no more from its bottleneck input than the stand-alone cost of O-D service minus the bottleneck railroad's incremental cost of providing the non-bottleneck portion of that service. That is the ceiling that a competitive market would impose. This is, of course, the ceiling corresponding to the parity principle, or the efficient component-pricing rule.
6. Competition in Bottleneck Services under the Proposed Price Ceiling?

A very basic misconception that seems to underlie the alternative rules under consideration for the pricing of bottleneck services is a false analogy — the idea that if a stand-alone ceiling is appropriate for O-D service, then it must be appropriate for bottleneck services as well. This may rest on the notion that if a bottleneck service is priced above its stand-alone cost then it will, by definition, be profitable for an efficient rival to enter and offer competing bottleneck services at the same price or one that is slightly lower.

But this is a total misapprehension. The bottleneck services are clearly worthless to the entrant or to anyone else unless the remaining (competitive) route segments served by the bottleneck remain in operation. But if the price of the O-D service overall is below the compensatory level, and the costs directly associated with the bottleneck are covered, then it follows beyond any question that the remaining (competitive) segments of the railroad cannot be paying their way. The rest of this sad story is obvious. Some or all of the competing providers of non-bottleneck services will be driven out of the market. The entrant to bottleneck service will thereby be threatened with an end to its traffic, and the shippers will suffer along with the insolvent railroads.

There is presumably a very different scenario in the minds of those who propose that the prices of bottleneck services be regulated separately, and be prevented from exceeding the replacement cost of the bottleneck facilities with, of course, a competitive return on that investment. They seem to envisage a situation in which rival firms will be willing to enter in order to provide just the bottleneck service (since, under the proposed plan, the revenue attributable to the services of an individual bottleneck facility will cover the replacement cost of the bottleneck facility and a competitive return on that investment). As we have just said, this scenario invites a serious misunderstanding particularly threatening to rationality in rate regulation.

The reason that no rational firm will then enter the bottleneck service is that the bottleneck provider cannot survive without the availability of a supply of the remaining components of O-D service. Otherwise, who will want to buy any bottleneck service? Viability of the supply of remaining components can be ensured only if the O-D service covers all of its fixed and common costs: those of the bottleneck; those in common with the other links of the production chain if the final product is to be produced; and those of the other links. A firm will not enter as a segment provider unless the final product is paying enough to cover all these costs; otherwise, in a perfectly contestable market, it can expect the exit of the other firms in the joint production chain and the failure of its investment in the ostensibly profitable bottleneck segment.

7. The Competitive Market Rules Under Regulation

How, then, can a competitive outcome be retained? As we have consistently emphasised, we must begin by recognising that there is, by definition, no intramodal competition over the bottleneck. By definition, so long as it remains a bottleneck, there cannot
possibly be any change in bottleneck pricing that can increase competition in the bottleneck arena. The pertinent question is how competition can best be promoted beyond the bottleneck. The answer, widely espoused by economists and long accepted by regulators in the US, is to ensure that the bottleneck carrier does not price in a way that forecloses the operation of efficient competitors using efficient alternative routes. Again, this is carried out by the current competitive pricing rules.

Regulation must ensure that the bottleneck operator does not use its position to foreclose the ability of consumers to choose the efficient service provider beyond the bottleneck. Since bottleneck services can be used both by the bottleneck owner and by its competitors, the bottleneck owner must leave a level playing field in which competitive success depends on the relative efficiency of the rival routes.

While the logic of these requirements is virtually self-evident, they have in the past been subject to misapplication -- both by those who may not fully understand the implications of the logic and by those who seek their own particular and short-term advantages at the expense of the public interest.

8. The Proposed Ceiling for Bottleneck Services
   is not at Stand-Alone Cost

The preceding discussion has another, rather startling, implication. It shows that, in general, what is spoken of by the advocates of modified regulatory rules as the "stand-alone cost" of a bottleneck portion of an O-D route is not, in fact, anything that can pretend to be such a price, because it is not the entry price for a bottleneck railroad. Here, it should be recalled that the stand-alone-price concept refers to the price at which it will pay an efficient entrant to come in and compete in the supply of the item in question. However, we have just seen that whether it will pay the entrant to do so depends, in the last analysis, not on the price at which the entrant firm chooses to offer the bottleneck service, but on the price of the final product (the O-D transport) upon which the demand for the bottleneck component depends. If the O-D price reduces demand or makes it unprofitable to supply the remaining inputs that are needed to provide the final product, then there may not exist any bottleneck price that permits profitable entry. What proponents of the revised rules call the bottleneck's stand-alone cost is not itself the entry price for a bottleneck railroad.

That is another way of looking at the detrimental results of adoption of the proposed rate regulation rules limiting the price of bottleneck services to their purported stand-alone cost. Since this would prevent compensatory pricing of O-D service, the proposed rules would prevent the bottleneck price from making it profitable to enter into the provision of bottleneck service. In short, only O-D service has a stand-alone cost that can rationally be used as a ceiling for railroad rates.

9. The Special Case of Routes that Traverse Several Railroads
The principle we have been discussing — that railroad regulation should be concerned only with the price of the final product (railroad O-D service) — may seem less readily
acceptable in the case where two or more railroads each provide part of a single route. But under rational regulation the same maximum rate rules should apply to service by one railroad over a single-line route, and to service provided by two or more railroads over a joint-line route. The reason is that, in competitive markets, the prices of two end-products will be the same if their costs are the same, no matter whether they are produced by one firm or twenty firms each providing a different part of the end-product. There may well be differences over the division of that revenue among the joint producers, but there will be no question about the overall O-D price. Economic efficiency clearly requires that final product prices reflect their competitive economic costs, not the number of firms among which the production process happens to be divided. Once a defensible and sustainable rate is set for O-D service, the only proper role for regulation to protect consumers is to ensure that the apportionment of that rate between segments of the route is consistent with both efficient routeing and the economic survival of the efficient route.

10. Stand-Alone Cost and Recovery of the Historic Costs of Assets whose Services are no longer Demanded

A further confusion to which the discussions by the proponents of modification of the regulatory rules have given rise is the distinction between a railroad's efficient fixed and common costs (which, like any firm, it must recover in order to stay in business) and any investments in excess capacity inherited from the past (which a firm in an unregulated competitive market cannot expect to recoup). The substantial fixed and common costs of assets such as track that remain necessary to supply a variety of services, including transport of different commodities, are, of course, recoverable in a contestable market. Fixed and common costs must be covered by any firm that is to avoid insolvency and will need to maintain and replace its fixed and common investments. Such recovery is clearly permitted by the current rules.

In contrast, the current rules preclude the recovery of excess-capacity costs — that is, of any capacity for which there is no current demand, and for which no sufficient future demand is in prospect. The rules do so by imposing the stand-alone cost ceiling on the prices of O-D services. Stand-alone costs are defined to be the costs of an efficient firm, and any firm that is burdened with excess capacity cannot be a most efficient supplier. Thus, current rules prevent any recovery of the costs of such excess capacity.

11. Concluding Comment

There is no prospect, at least in the near future, that railroad rates in the United States will be deregulated and left entirely to the control of the forces of the market. As a result, it seems particularly important in the case of this industry that defensible regulatory rules be adopted. We believe that here, as elsewhere, unless for particular instances conclusive evidence to the contrary can be provided, the competitive market model is the best guide for rate regulation. Economic efficiency, and through it the public interest,
is served most effectively by rules that elicit from firms the same behaviour that competitive market forces would impose on them if those forces were present. Our role in the design of the current rules was to suggest regulations that would be consistent with the competitive model, and we believe the evidence confirms that this continues to be true of the rules in place today.

Obviously, no regulatory rules can pretend to be perfect, and the continuing improvements in the cost computations and other calculations used to execute these regulations confirm that there is, and always will be, room for improvement. But that is very different from an attempt to undermine those rules and alter them fundamentally. In particular, when shippers propose modifications that will effectively prevent the railroads from covering their total costs even under perfectly efficient operation, those shippers will be seeking a gain that must be very temporary, and for which they and others will in the long run pay very dearly.

_Date of receipt of final manuscript: May 1998_