RAMSEY PRICING BY U.S. RAILROADS

Can It Exist?

By Sylvester Damus[*]

The policy of maximum rail charges recently proposed by the Interstate Commerce Commission (ICC) for captive coal traffic involves "constrained market pricing", subject to the provisos that shippers are not to be required to pay for obvious management inefficiencies and that carriers may not raise their rates by more than 15 per cent (after allowing for inflation) in a single year (ICC, 1983, page 1). The decision allows use of Ramsey's inverse elasticity formula, but the rates on captive traffic may not exceed the cost of securing that traffic without regard to any other traffic ("stand-alone cost"). The adoption of these guidelines was preceded by an extensive discussion of Ramsey pricing. And, although the new guidelines are not designed to result in pure Ramsey pricing, the Commission hoped (page 11) that "the resulting rate structure should approximate that which would be achieved under the economically efficient Ramsey pricing system".

The Ramsey pricing system had been examined by Baumol and Bradford (1970). They extended Frank Ramsey's rules for optimum taxation to second-best pricing by a firm which would otherwise be driven by marginal cost prices into deficit finance. The theory was developed further by Baumol and his associates, who showed that Ramsey pricing can deter wasteful entry into the market served by a natural monopolist and that fixed costs are not the cause of objectionable pricing behaviour.

Ramsey's is a theory of multi-product pricing, and thus seems tailored for pricing the many kinds of railroad traffic. Indeed, Baumol and Bradford (1970) traced the origin of Ramsey's principles back to nineteenth century value-of-service pricing. Century-old regulated and unregulated railroad rates were in fact shown to have had some of the properties of Ramsey prices (Damus, 1981a). The Ramsey theory was also used to re-estimate the welfare cost of regulation (Winston, 1981). In the proceedings leading up to the Ex-Parte 347 decision (ICC 1983), railroads and their witnesses argued for Ramsey pricing and asked the Commission to confine itself to a determination that the break-even constraint on pricing must be adhered to without cross-subsidisation.

The critics of Ramsey pricing in Ex-Parte 347 argued that the railroads have no demonstrable increasing returns to scale---which the critics thought to be a prerequisite for Ramsey pricing (see the Verified Statement (VS) by David R. Kamerschen)--- or, alternatively, that railroads must first shed some of their excess capacity (VS by George H. Borts). Ramsey pricing is designed to meet requirements for minimum revenue, the amount of which depends on the excess capacity that is retained. Some excess transport capacity seems inevitable. The simple reason for this is that transport serves a trade that balances interregional payments for inbound and outbound tonnages and is thus incapable of balancing inbound tonnages with the outbound cargo. Empty hauls are therefore inevitable, and so is excess transport capacity (Damus, 1981b). Ramsey pricing appears to be a good way to deal with this.

However, there remain some unresolved problems. One may ask: "should the effects upon competing firms enter into the Ramsey calculation, and if so, how?" (Baumol *et al*. 1979).

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One answer to this question was given by Ronald Braeutigam (1979) in his analysis of intermodal competition. This was very influential in Ex-Parte 347, but the testimony given to the commission made little explicit reference to competition. The railroad witnesses' arguments were coloured by visions of natural monopolies serving captive markets. However, the reality also includes intra-modal rivalry in competitive markets.[1] In addition, there is cooperation in service to shippers of interchange traffic. Potential problems in pricing interline service were not considered in Ex-Parte 347 hearings or in the ICC decision. For instance, there may be two lines from A to C (Figure 1), one via B and the other via D with a branch from D to B. They compete for traffic on the A-B, A-C and B-C routes. But traffic between any two points not on the same line is carried by them jointly in cooperation and the rates quoted to shippers are either joint or combined rates. No analysis has yet been made of Ramsey prices for interline service. This paper seeks to fill that gap. The conclusion is that Ramsey pricing is much more difficult than had been thought, is incompatible with deregulation, and contravenes recent transport legislation. The middle ground suggested in Ex-Parte 347---breakeven pricing without collusion and cross-subsidy--- does not exist. Ramsey's rules dictate total regulation of a revenue-pooling cartel. The alternative is discriminatory pricing for maximum profit, either unrestricted or non-collusive, and with great upheaval in the through-rate system. The difficulty arises from a variety of cross-subsidies embedded in efficient transport prices; these conflict with other objectives of transport policy, such as the promotion of transport competition and adequacy of railroad revenue, and with policy measures such as the prohibition of collective rate-making and the prohibition of revenue pools. The following sections discuss these cross-subsidies, beginning with the most familiar arising from complementarity.

1. CROSS-SUBSIDIES ARE PART OF THE RAMSEY RULES

Ramsey prices are usually presented under the assumption of zero cross-elasticities of

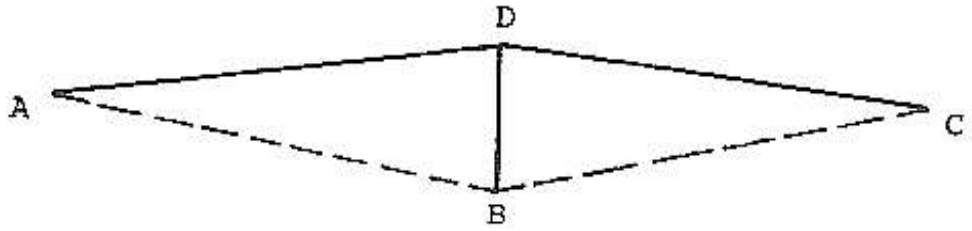

FIGURE 1
Competitive and Cooperative Network Configuration

[1] Perhaps the only reference to competition is in Alfred Kahn's testimony on behalf of the National Coal Association (in this VS, pp. 18-25). He noted that one of the main causes of differences in elasticity in demand among railroad customers is "the fortuitous circumstances of their location near or far from competing transporters", and on that basis questioned the desirability of Ramsey pricing by an industry composed of more than one seller, pricing independently. His argument is formalised in Section 3 below.

demand. The effect of this assumption is that all prices are equal to or exceed their corresponding marginal costs. I shall temporarily remove this assumption of zero cross-elasticities so that we may be reminded of the possibility that Ramsey pricing results in cross-subsidisation, in the sense that some prices may fall below marginal cost. This must not be lost sight of in practical applications, since cross-subsidies invite entry, and can be maintained only with controls on entry (Faulhaber,1975).

The possibility of cross-subsidies is well-known. For profit-maximising firms there is R.G.D. Allen's example of a monopolist who sells razor blades and gives away the razors (Allen,1971, example XIV-27, page 281). For second-best pricing one maximises a benefit to consumers net of avoidable cost, subject to a zero net revenue constraint. The benefit to consumers from the output of a multi-product firm is a function $B(x)$, where x is the output vector. The revenue of the firm is $p'x$, and must be equal to its total cost $C(x)+K$. The Lagrangean function for this constrained maximisation problem is

$$L = B(x) - C(x) + \lambda[p'x - C(x) - K] \quad (1)$$

Consumers can be relied upon to make $\partial B(x)/\partial x_j = p_j$ for all j. Substituting this into $\partial L/\partial p_i$, setting $\partial L/\partial p_i = 0$, and converting into elasticities, one finds

$$(p_i - MC_i)/p_i = -\lambda/[(1+\lambda)e_{ii}] - \sum_{j \neq i} [(p_j - MC_j)/p_j] x_j e_{ii}/[x_i e_{ii}] \quad (2)$$

e_{ji} is the elasticity of demand for x_j with respect to p_i. Since e_{ii} is always negative, but the e_{ji} can be negative, zero or positive, the Ramsey price P_i given by equation (2) can be greater or less than the corresponding marginal cost MC_i. Revenue requirements cannot be met, unless prices generally exceed marginal costs. If strong complementarities ($e_{ji} < 0$) cause some prices to fall below marginal costs, then the remaining prices must exceed marginal costs by more than what would otherwise be necessary to meet revenue requirements. The excess revenue is applied to subsidise the consumption of complementary goods. The excess revenue from some product lines can attract competitive entry, which undermines the Ramsey pricing scheme.

The fact that cross-subsidising Ramsey prices cannot be sustained may on occasion be no cause for concern. The structure of consumer demand is such that substitution predominates over complementarity, and competitive entry need not be considered in every public finance or taxation problem, such as Ramsey's. But in the case of multiproduct firms, competitive entry is not ruled out by assumption of sovereign taxation privileges, unless the State cedes its taxing power to the firm by the concession of a monopoly. Also, the firm does not supply a range of goods and services as wide as that demanded by its patrons. Therefore, although substitution predominates in the consumer's shopping basket, it need not predominate over the small bundle of goods produced by the firm for inclusion in that basket. In the case of a railroad, for example, the transport of coal and the transport of iron ore to a steel mill are complementary, and may be sufficiently so for either of them to be charged less than its marginal cost.

In the sections that follow I will assume that cross-elasticities are zero. The purpose of this is to simplify the analysis and to highlight another form of cross-subsidy produced by Ramsey pricing. It is not to suggest that cross-elasticities can be neglected in a case like Ex-Parte 347.

2. OPTIMAL PRICING BY TWO FIRMS

Let there be two firms that supply consumers with a product or service X, and let their patrons be indifferent about the source from which they supply themselves. This could be the case of two parallel railroads in point-to-point competition or of competing road and rail services.

The benefit from the i-th service depends on the total quantity produced by firms 1 and 2, which is $x_i = x_{1i} + x_{2i}$. Ramsey pricing of x_i requires that the net benefit over avoidable cost be maximised subject to a single revenue constraint. The Lagrangean for this problem is

$$L = B(x_{11} + x_{21},\ldots,x_{1n} + x_{2n}) - C_1(x_{11},\ldots,x_{1n})$$
$$-C_2(x_{21},\ldots,x_{2n}) + \lambda\left[\sum_i (x_{1i} + x_{2i})p_i - C_1(.) - C_2(.) - K_1 - K_2\right] \qquad (3)$$

Each firm can maximise the net benefit (B - C) on the assumption that the other firm's output is given. Since x_{2i} is assumed constant by the first firm, $\partial L / \partial x_{1i} = \partial L / \partial x_i$ in the eyes of this firm. Consequently, the first order conditions for maximisation by the first firm imply

$$(p_i - MC_{1i})/p_i = - \lambda /[(1 + \lambda)e_i] \ldots\ldots\ldots\ldots\ldots\ldots\ldots(4)$$

where e_i is the market elasticity of demand for the i-th service.

Similarly, the second firm assumes that $\partial L/\partial x_{2i} = \partial L/\partial x_i$, and therefore it sets prices so that

$$(p_i - MC_{2i})/p_i = - \lambda /[(1 + \lambda)e_i] \ldots\ldots\ldots\ldots\ldots\ldots\ldots(5)$$

Since p_i, e_i, and are the same for both firms, their marginal costs must be equal ($MC_{1i} = MC_{2i}$). If their cost functions are different, their outputs will not be equal.

The presence of a single constraint on net benefit means that the Ramsey prices given by (4) and (5) are second-best. But the function of the constraint is to meet the global revenue requirements of two firms, not their individual requirements. The condition that $\partial L/\partial \lambda = 0$ assures only that the two-firm industry breaks even, not that either individual will have adequate revenue. One firm's profit equals the other firm's loss. Both firms may therefore object to Ramsey pricing. One will resent its loss, the other will demand protection from potential entry of competitors. The regulator must buy the losing firm's participation in his Ramsey pricing scheme by turning over to it the other firm's excess profit. The apparent partial expropriation of the latter will give potential entrants second thoughts. The important point is, however, that Ramsey pricing operates like a revenue-pooling cartel.

One may wonder how such a situation can arise, if both firms have access to identical technology and serve the same market where they pay the same factor prices. But this is not exactly the situation of railroads. Two railroads can carry coal from different mines to the same utility. Their costs are different because they run over different routes of different lengths and traverse different terrains. Revenue-pooling Ramsey pricing assures them that all coal reaching the utility has the same

marginal cost of mining and transportation.[2] It is this equality of marginal costs at the utility gate that makes revenue-pooling Ramsey pricing at least second-best. However, shippers using the profitable railroad would object---as they did in Ex-Part 347---to payment of rates in excess of the carrier's stand-alone costs.

The alternative to revenue pooling is to let one firm break even while the other profits behind an entry barrier, as in Ronald Braeutigam's "totally regulated second-best (TRSB)" (Braeutigam, 1979). In that case, the p_i are higher than necessary for adequate revenue, and therefore TRSB is not second- but third-best.[3] The system presented here is closer to that of Pigou (1960), which also required taxes on one firm to subsidise another (see also Baumol,1979). This interfirm cross-subsidy, like the inter-commodity cross-subsidy noted before, is the reason for the greater efficiency of second-best compared with TRSB. To show this difference, in the next section I relax the industry-wide revenue constraint and allow for firm-specific constraints.

3 "OPTIMAL" PRICING SUBJECT TO FIRM-SPECIFIC REVENUE REQUIREMENTS

The unattractiveness of revenue-pooling cartels makes one wish for a pricing system that allows each firm to stand on its own two feet. If each firm is to stand alone while maximising a social benefit without receiving cross-subsidies from other firms, one must impose firm-specific constraints on their pricing behaviour. The Lagrangean function for this new problem is

$$L = B\left[\left(x_{11} + x_{21}\right),\ldots,\left(x_{1n} + x_{2n}\right)\right] - C_1\left(x_{11},\ldots,x_{1n}\right)$$
$$- C_2\left(x_{21},\ldots,x_{2n}\right) + \lambda\left[\sum_i p_i x_{1i} - C_1(.) - K_1\right] \qquad (6)$$
$$+ \mu\left[\sum_i p_i x_{2i} - C_2(.) - K_2\right]$$

Now let each firm choose an optimum p_i on the assumption that the other firm's output is constant. From the first-order conditions for optimum pricing we have for the first firm:

$$(p_i - MC_{1i})/p_i = (\lambda x_{1i} + \mu x_{2i})/[(1 + \lambda)\, x_{1i}\, e_{1i}] \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots (7)$$

and similarly for the second firm:

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[2]The equalisation of marginal costs at the utility gate involves differential taxation of the locational rent of mines. On this-which requires analysis of Ramsey prices in a spatial context-see Damus (1981a).

[3]That TRSB results in excessive revenue for the industry is made abundantly clear by Braeutigam's third requirement for TRSB, on page 42 of his article: "The regulator would have to prevent free entry" into the markets served by competitive modes, "or else impose a set of taxes designed to hold tariffs above marginal costs." His "partially regulated second-best" would be seen to be less appealing if his model were extended to contemplate not only two transport sectors (trucks and railroads) but several (trucks and n-1 railroads).

$$(p_i - MC_{2i})/p_i = (\lambda x_{1i} + \mu x_{2i})/[(1 + \mu)\, x_{2i}\, e_{2i}] \quad \text{.....(8)}$$

Note that now the relevant elasticity is not that of market demand e_i but the elasticities faced by the firms, e_{1i} and e_{2i}.

The firms' "Ramsey-pricing" formulae (7) and (8) imply that their marginal costs of competitive services, MC_{1i} and MC_{2i} must be different unless

$$(1 + \lambda)x_{1i}e_{1i} = (1 + \mu)x_{2i}\, e_{2i}\ ,$$

which is unlikely. Consequently, this kind of firm-specific Ramsey pricing cannot minimise the cost of supplying consumers with any *i*-th good. Production and its location are distorted. Goods will not be carried over the cheapest route, or shipped from the most convenient location, or sold in the market where they are valued most highly. The cause of inefficiency is the difference in welfare effects of relaxing one or the other constraint; that is, a dollar of revenue in excess of avoidable cost is not equally productive in both its uses. This unproductive distribution of revenue is avoided by pooling under a single constraint on the pricing behaviour of the industry. Whether or not the inefficiency of meeting separate revenue requirements is less than the cost of putting up with a revenue-pooling Ramsey-pricing cartel is an open question. Much has been written about the inefficiency of the existing regulation, but the standard by which it was measured was inappropriate. Deregulation has not ushered in the perfectly competitive ideal but, in Ex-Parte 347, has invited the notion of "Ramsey pricing" under firm-specific constraints and elasticities. When that is brought into effect, economists may return with new estimates of persistent losses from inefficiency in transport. These are potentially large since, as is shown in the next section, firm-specific Ramsey prices appear incapable of allocating resources to interline traffic.

4. THROUGH RATES

More than half of all shipments pass over the rails of two or more carriers (Spychalski,1981). Approximately 90 per cent of Conrail's route/rate pairs are interline traffic (see VS no. 5, by Richard H. Steiner, page 42). Thus carriers do not just compete for traffic. They also cooperate widely to complete each other's work. To be useful, a new pricing system such as Ramsey's must be able to allocate resources to this cooperative work.

Suppose good X_1, is transferred from one line to another. The tonnage involved is $x_1 = x_{11} = x_{21}$, and two railroads are required to carry it from origin to destination. The costs per ton of the work done by each can of course be very different. But there is only one price quoted to the public, $p_1 = p_{11} + p_{21}$. This price can be arrived at by joint maximisation subject to a joint revenue constraint or to separate revenue constraints. The alternative to a joint through rate is a combined rate made up by the sum of independently determined single-line rates.

When maximum profit is the objective, joint rates are found to be lower and more profitable than combined rates (Ellet,1839; Allen,1971, example XIV-28). But neither combined nor firm-specific joint Ramsey prices can exist. The reason why they do not exist will be shown below, but it was apparent for a long time, as it is well known that duopolists cannot find any rational way to divide their revenue while jointly maximising their objective function. The impossibility of a rational division of revenues means that one cannot impose firm-specific revenue constraints and yet maximise something, be it profit or social welfare.

When x_i is transferred between lines, the benefit function is

$$B[x_1, (x_1 + x_{22}),..., (x_{1n} + x_{2n})].$$

The price p_1 is shared in some proportion k between the carriers, and so the Lagrangean for firm-specific joint Ramsey pricing is

$$L = B(.) - C_1(x_1, x_{12}, \ldots, x_{1n}) - C_2(x_1, x_{22}, \ldots, x_{2n}) + \lambda\left[kp_1x_1 + \sum_{j=2}^{n} p_j x_{1j} - C_1(.) - K_1\right] + \mu\left[(1-k)p_1x_1 + \sum_{j=2}^{n} p_j x_{2j} - C_2(.) + K_2\right] \qquad (9)$$

For second-best pricing, $\partial L / \partial k$ must be zero. This implies that λ must equal μ, a condition that contradicts the rationale for separate constraints, which is that the social value of a dollar of revenue in excess of avoidable cost is deemed to differ between firms.

Equally frustrating is the condition for firm-specific combined Ramsey pricing. As before, $x_1 = x_{11} = x_{21}$ and $p_1 = p_{11} + p_{21}$. But now each firm sets its single-line rate to or from the interchange point $p_{o.1}$ independently of the other carrier's rate. The Lagrangean is now

$$L = B(.) - C_1(.) - C_2(.) + \lambda\left[p_{11}x_1 + \sum_{j=2}^{n} p_j x_{1j} - C_1(.) - K_1\right] + \mu\left[p_{21}x_1 + \sum_{j=2}^{n} p_j x_{2j} - C_2(.) - K_2\right] \qquad (10)$$

Assuming that neither firm changes its prices in reaction to the other firm's pricing decision, $\partial p_1 / \partial p_{11} = 1$ for the first firm, as $\partial p_1 / \partial p_{21} = 1$ for the second firm. Keeping this in mind while differentiating L with respect to p_{11} and p_{21} one finds that the first firm will set its single-line rate for its leg of the through trip according to

$$(1 + \lambda)(p_{11} - MC_{11}) + (1 + \mu)\, p_{21} - MC_{21}) = -\lambda p_1 / e_1 \text{.....} (11)$$

Similarly for the other carrier

$$(1 + \lambda)(p_{11} - MC_{11}) + (1 + \mu)\, p_{21} - MC_{21}) = -\mu p_1 / e_1 \text{.....} (12)$$

Again, the condition for equilibrium pricing is $\lambda = \mu$ which is unlikely to be met and contradicts the rationale of firm-specific pricing.

To overcome the frustration of Ramsey pricing I reintroduce pooling of revenue, which

means a single constraint:

$$L = B(.) - C_1(.) - C_2(.) + \phi[kp_1x_1 + \sum_{j=2}^{n} p_j x_{1j}$$

$$-C_1(.) - K_1 + (1-k)p_1x_1 + \sum_{j=2}^{n} p_j x_{2j} - C_2(.) - K_2] \qquad (13)$$

Setting $\partial L / \partial p_1 = 0$ and $\partial L / \partial k = 0$ we have

$(p_1\text{-}MC_{11}\text{-}MC_{21})/p_1 = -\phi/[(1+\phi)e_1]$ and $\phi p_1x_1 - \phi p_1x_1 = 0$ .....(14)

and therefore any *k* can satisfy the Ramsey pricing rules. The irrelevance of the division of revenues arises from pooling, which makes the determination of *k* a redundant task.

Ramsey pricing of interline movements must be illegal if it can only be accomplished by pooling. However, nothing stands in the way of pooled rate-making for traffic moving on branch- and main-lines of the same carrier. There are two interesting aspects to this.

First, the single constraint on the combined revenue of branch and main lines implies that efficiency may demand branch-line deficits. Secondly, merger is an inevitable result of transport competition.[4] The way this works is as follows. As Baumol et al. (1977) had shown, (potential) competition forces the adoption of Ramsey's rules. They are not adopted for the sake of Ramsey, but in search for the lowest possible entry-deterring prices. This search must lead to a way round the prohibition of revenue pools. Merger is one way round. The previous two results may have historical significance. For the present time, however, the main result is that the firm-specific Ramsey pricing proposed in Ex-Parte 347 does not exist. It does not exist even for single-line movements. The single-line rate is one of a number of simultaneous solutions for all rates, including the through rates. As there is no firm-specific Ramsey solution for the through rates, there cannot be one for the single-line rates.

It is of course possible for each carrier to seek to fill its own revenue requirements while maximising a firm-specific benefit function that depends only on the output of the firm. This firm would maximise

$$B_1(x_{11},\cdots,x_{1n}) \text{ subject to } \sum_i p_i x_{1i} \geq C_1(x_{11},\cdots,x_{1n}) + K_1$$

given the prices charged by the other firm. This will obviously not maximise the welfare of the customers of both firms (the *B* function) nor will it equalise the marginal costs of services for which the two firms compete. Thus the cost of competitive services is not minimised. Failure to maximise the benefit from joint service creates incentives for end-to-end merger. Failure to minimise cost creates opportunities for entry and makes it impossible for the firms' prices to be sustained (see Baumol et al., 1982).

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[4] Numerous references to the effect of competition on merger activity can be found in 19th century transport literature. See, for instance, Adams (1888), page 121, and United Kingdom, Parliament (1872).

5. RAMSEY PRICING BEFORE THE INTERSTATE COMMERCE COMMISSION

On 17 May 1978, the Interstate Commerce Commission issued an Advance Notice of Proposed Guidelines for setting maximum rates on western coal. After a lead investigation, the Commission issued on 18 November 1980, in Ex-Parte 347 (Sub No. 1), a Notice of Proposed Guidelines for setting rates on coal-nationwide. An interim decision was reached on 16 December 1981, in which the commissioners "remain committed to the concept of differential pricing" and "recognise that a strict costing approach based on a rigid cost formula is an inappropriate device for establishing maximum rate levels (ICC, 1981, pages 3 and 8). At the time, they had not accepted Ramsey pricing and appeared disturbed by the idea. The commissioners were right in reserving a decision on this pricing method, since the railroads and their witnesses had presented them with inconsistent arguments. It was stated (VS no. l, by William J Baumol and R. D. Willig) that the elasticity of demand relevant for pricing decisions was that faced by the individual carrier. This was confirmed in a calculation of allegedly optimum price/variable cost ratios, which made it clear that firm-specific constraints were thought to be the binding ones (VS by William E. Wecker). However---as we saw in Section 3---firm-specific constraints prevent the equalisation of marginal costs, and therefore cannot produce the equiproportional reduction in consumption claimed as the reason for the efficiency of stand-alone Ramsey pricing (VS by Baumol and Willig). Firm-specific revenue constraints also do not permit the minimisation of an index of freight rates, which was said to be produced by Ramsey prices (VS by Kenneth J. Arrow). Furthermore, much emphasis was put on stand-alone cost tests as a means to avoid cross-subsidies (VS no. 1, by Baumol and Willig; VS no. 3, by Marion L. Hall). These tests were proposed, although "the prohibition of cross-subsidies, which is often regarded as a criterion of fair pricing practices, may in fact reduce total welfare" (Baumol et al.,1979, page 657), and may thus be inconsistent with Ramsey's rules (Faulhaber,1975, page 972), especially when there are strong complementarities. Avoidance of cross-subsidies would also fail to ensure the alleged equiproportional reduction in consumption by firm-specific Ramsey pricing. Worse still, the stand-alone cost test was found by its authors to be impractical.[5] They thought it would only be possible to apply this test to groups of commodities. However, to determine whether any rate within the group is subsidy-free, one would still have to make arbitrary allocations of the costs common to the group. Thus the railroads' argumentation went full circle, back to where their witnesses began. They had rejected the customary cost allocations and wanted to replace them with pricing based on demand, but they led the Commission back to a point where it needed such allocations as much as ever. Fully allocated costs reappeared in Step 6 of Appendix F to ICC (1983). Finally, the firm-specific Ramsey pricing proposed in Ex-Parte 347 inadvertently promised the impossible: to maximise an objective function while also determining the division of revenues.

The inconsistencies in Ex-Parte 347 are not surprising, since Ramsey pricing is essentially a public finance tool or a pricing technique for a nationalised industry. As such it is not a suitable response to deregulation. The attention given by the commission and the witnesses to Ramsey pricing shows that they do not regard first-best marginal cost pricing as a viable alternative. The

[5] William J. Baumol and Robert D. Willig, VS no. 1 in Ex-Parte 347 (Sub no. 1), page 80; Chessie System Railroads, Consolidated Rail Corporation, Family Lines Rail System, Norfolk and Western Railway Company, and Southern Railway System, “Comments of Five Railroads,” VS no. 12 in Ex-Parte 347 (Sub no. 1), May 11, 1981, Volume I, pp. 111-12; and Marion L. Hall, VS no. 3, pp. 89-90.

second best is illegal because it requires revenue pooling. The railroads' version of second-best does not exist. The third-best position is occupied by Braeutigam's "totally regulated second-best". Therefore, deregulation must be fourth-best or worse. Perhaps fourth-best is the normal state of the transport industry. Deregulation should then be advocated on its own merits, and not for disappointing efficiency reasons.

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