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Franchising Passenger Rail Services

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I. Introduction

The Government has published a White Paper, *New Opportunities for the Railways* (Department of Transport, 1992a), and a consultative document, *The Franchising of Passenger Rail Services* (Department of Transport, 1992b). The plans are for far-reaching changes to the rail system, which I argue are fundamentally flawed. At the time of writing, many details remain unclear until the associated Bill is presented but, broadly, access to routes ('railpaths') will be sold off with private companies competing for between thirty and forty operating franchises for passenger services. In the rare instance - or just possibly instances - where a rail route is profitable, an operating franchise will be auctioned to the highest bidder in terms of a lump sum fee. For the most part operating a rail route is not profitable and franchises will be awarded to companies offering to accept the lowest subsidy on a route.⁰ Freight and parcel services, which are profitable and which I do not analyze, will simply be sold off. The franchising system has similarities with one already in place for broadcasting in the UK (Dnes, 1993).

In this paper, I show that auctioning can be used to improve welfare arising on passenger rail travel but that a different form is required. Allocative results are improved by applying the contract-management scheme first proposed by the Victorian social reformer Edwin Chadwick (1859), and developed by Demsetz (1968) for use with natural monopoly. In this scheme, bids are in terms of the maximum prices firms would charge for the service. Interestingly, Chadwick (1859, 385) developed an argument for *nationalizing* rail services around the idea of bidding 'for the field'. He also intended the scheme to apply regardless of cost conditions in an industry.

II. The Proposals

Before applying a simple model of franchise bidding to passenger rail (henceforth simply 'rail') I consider the detailed proposals put forward by the Government up to November 1992. These are the stylized facts to which the analysis applies.

The Government has stated a number of policy objectives for its treatment of the railways. Foremost among these is the aim of '[improving] the quality of railway services by creating many new opportunities for private sector involvement' (Department of Transport, 1992a, Forward by John Macgregor). Some weight is also given to establishing a scheme that is 'responsive to the market' (Department of Transport, 1992b, p.5) and to '[cutting] out waste and ... [reducing] costs' (Department of Transport, 1992a, p.5). These aims are somewhat tangled up with the means of achieving them in both policy documents, but they are probably compatible.

The principal method of improving operating efficiency is to auction franchises, so as to '[maximize] private sector involvement in the operation of railway services' (Department of Transport, 1992b, p.5). The private sector is seen as likely to be far more sensitive to market conditions than British Rail (BR). The Government accepts the need to subsidize most routes, as it subsidizes BR at present. Lest this be seen as an argument for closing most rail services, the Government takes care to justify continuing operation on environmental grounds (Department of Transport, 1992a, p.1, paragraph 2) although note there is no clear statement of the value of environmental benefits.

The Government therefore has unusually low financial expectations from the proposal to franchise services.¹ It is fair to summarize its approach as aiming at the reduction of subsidies whilst maintaining or improving services for travellers.

Franchising will create a distinct regulatory and institutional framework. An independent Regulator will be established, modelled on the agencies created for privatized industries like telecoms and gas (Department of Transport, 1992a, p.15). The Regulator will govern access to the rail network including the cost of such access for franchisees and for other entrants, who may indeed be permitted over time. Tracks and signalling are to be provided by Railtrack, which is to be established as a wholly owned, arms-length subsidiary of BR. Railtrack is to be a common carrier and could exercise market power. The Regulator will also issue licences permitting approved firms to compete for franchises or to act as independent operators, which amounts to creating a quality threshold for the firms, and will also promote the interests of consumers and encourage fair trade. If, in due course, routes were sold outright to the private sector, then the Regulator would be responsible for price capping of fares if this were thought appropriate.

A Franchising Authority will be responsible for the creation and monitoring of franchise contracts (Department of Transport, 1992b, p.9). It will group routes for franchising, define the level and quality of service for each contract, impose controls on fares where franchises have limited competition, determine the pace of the programme, and administer the collection of franchise fees and the payment of subsidies. So far, it is clear that the starting quality and levels of service are to be those of BR (Department of Transport, 1992b, p.15, paragraphs 4.1 & 4.4). Franchisees will be able to reduce or increase services as demand changes subject to rules laid down in their contracts, which should control overbidding on services and/or quality with subsequent opportunistic reductions. Fees and subsidies will result from competitive bidding for the most part, although Passenger Transport Authorities and Local Authorities will continue to offer some subsidies. Note that these arrangements make the

Franchise Authority responsible for price capping a service like Network SouthEast, which has limited competition. For the most part, franchisees will be free to charge whatever prices commercial conditions suggest. The Authority will enforce contracts with franchisees, with removal of a franchise being the ultimate sanction at its disposal.

The franchising procedure will not necessarily be identical for all groupings of routes. The Government rejects the idea of a 'universal template' (Department of Transport, 1992b, p.5). Once the Franchise Authority decides upon a grouping of routes and given the charges from Railtrack for railpaths, licensed firms will be invited to obtain information on service requirements and provide details of themselves. The Franchise Authority will then draw up a short list of suitable firms. The firms passing this qualitative hurdle will then bid for the franchise in terms of the maximum fee they would pay for profitable routes or in terms of the minimum subsidy each would accept to run a loss making service. It is an example of a first-price sealed-bid auction in either profits or subsidies (McAfee & McMillan, 1987). Bids take the form of draft contracts with the Authority and with Railtrack. BR is prohibited from competing with private companies for franchises, although its workers and managers can bid for routes as separate management-buyout units. BR is the default provider of the service if no acceptable bidder is found and will continue to provide services until they are progressively franchised. Operating franchises will be for fixed periods of time but there need not necessarily be a repeat of the full procedure, as the Authority may simply try to reach an acceptable renewal of an agreement with an incumbent franchisee who has performed well (Department of Transport, 1992b, p.25, paragraph 7.7).

Franchisees will have access to existing stations and may build new ones. They can purchase or lease rolling stock from the current BR stock. They will have to provide through ticketing, which will require a revenue-

allocating mechanism for the system. If franchises do transfer between firms, the Authority will have the right to compulsorily purchase sunk assets subject to an arbitrator's valuation if franchisees cannot agree on transfer of assets. Franchisees should have little incentive to practise creative accounting as an example of the kind of opportunism described by Williamson (1985, 341). Also note that the Authority retains an implicit continuing disciplining device, as additional operators could be placed on routes where franchisees performed badly. The franchises are not to be exclusive (Department of Transport, 1992b, p.15, paragraph 4.3).

Safety regulation for franchisees, independents, BR operations and Railtrack will be the responsibility of the Health and Safety Executive, which anyway incorporates HM Railway Inspectorate. Safety assessment is part of the licensing procedure as well as a continuing issue.

III. A Model of Rail Franchising

I now construct a simple model of the franchising system proposed by the Government. I deal first with the less interesting case in which a route is profitable and then move on to the more interesting one where losses are expected. I ignore issues of price discrimination, which are not central to the analysis. I also simplify things by assuming that a route is a single train journey, where the single train is adequate to serve the likely range of passenger demand. The payment to Railtrack for access to railpaths is identical for all firms. Anything deduced from the case of a single journey can be extended by aggregation to cases where bundles of journeys are franchised. Our starting point is an auction in which the Franchising Authority accepts the highest sealed bid for the right to operate the route at or above the existing level and quality of service.

III(i). Profitable Routes

Figure 1 shows demand and cost conditions for a profitable route. Price is a decreasing function of quantity demanded, as shown by the demand curve and its associated marginal revenue function. These are linear for simplicity. Quantity is defined as the number of passengers, given that the route is a single journey. I initially define total cost as linear, giving a constant average cost equal to marginal cost. In reality, the cost function could not be as smooth as the one assumed here, as it would change discretely as a firm added carriages to the train travelling the route, but smoothness does no harm to the argument. The cases of decreasing and increasing costs make no significant differences to the analysis at this stage.²

Costs are shown as higher for BR compared with a franchisee ($MC_{BR} > MC_Z$) reflecting the Government's beliefs. I also wish to capture the idea that even a rare profitable rail route faces a relevant price constraint from a competing mode such as air or coach travel. I assume travellers are indifferent between the modes in all respects except price. Therefore, a maximum is imposed by the price line labelled P_{MAX} , giving the effective demand curve P_{MaD} for rail, with associated marginal revenue P_{MabMR} . Taking a Marshallian approach, optimal output can be defined as q^* , where MC_Z equals price.

If BR's prior behaviour were as a monopolist it would produce at q_M where MR equals MC_{BR} , which is in the discontinuous range ab for MR reflecting the relevancy of the maximum price as a constraint. Since MC_Z equals MR beyond q_M at q_1 , bidding for the route involves an expansion of output as the franchisee maximizes profit. This does not necessarily mean those profits (area $fPzgc$) will be bid as a franchise fee. Under first-price sealed bidding, the would-be franchisee has to beat the nearest rival, offering just more than another firm with higher costs (McAfee &

McMillan, 1987). If there is no rival, the firm might succeed by offering just more than BR's previous profits. It all depends upon the number of competitors and the information available to bidders. We pass over this issue as our focus is on allocation. The case described dominates the other possibility under monopolistic prior behaviour by BR, where MC_Z might intersect the discontinuity in MR between points h and b and where there would be no expansion in output. The bidding scheme cannot draw output to the social optimum q^* under monopolistic behaviour. It can select a more efficient monopolist and confers benefits on travellers to the extent that output expands and price falls.

Non-monopolistic prior behaviour by BR can be shown by replacing the maximum price constraint, P_{MAX} , by a lower price between points a and d on the demand curve. This reflects the government's previous policy towards control of the nationalized industries, in terms of requiring BR to expand services subject to some profit constraint. Making the case as tough as possible for a successor franchisee, let the maximum price be k (associated with point d) moving the discontinuity in MR to de . Again, there is an output increase (q_2 to q_1) at best, along with some reduction in price (k to P_Z) as long as the franchisee's costs are low enough to cut MR to the right of its discontinuity. Once more, this is not sufficient to take the traveller to the optimum, q^* .

The Franchise Authority might place a price cap on the route. To the extent that this differs from the price limits just discussed, it amounts to pushing the discontinuity in MR further rightwards in Figure 1 and can take output with it. Consider a price cap at t . This gives rs as an upper part of the discontinuity in MR and output becomes q_3 , where MR equals MC_Z . By pushing the price cap down to MC_Z , the Franchising Authority could get to optimal q^* but it would need information on firms' costs before bidding began. Note that the Government's plans for profitable

routes do not include price capping, which is mentioned for the loss-making Network SouthEast.

With a profitable route, the proposed auction creates a private monopoly with limited or zero benefits for travellers. The monopoly could be controlled by price capping that has severe information requirements.

III(ii). Loss-making Routes

Figure 2 shows the case of a loss-making route for which unsubsidized marginal costs always exceed the maximum price ($MC_{BR} > MC_Z > P_1$). I continue with similar linear cost and revenue conditions to those used in the profitable case.³ Firms bid in terms of the minimum unit subsidy required for producing at least the quality and quantity of service provided by BR. Note that this type of bidding is indicated as a possibility by the Government in its recent consultative document (Department of Transport, 1992b, p.23, paragraph 6.3) where it discusses 'either the amount or the formula' for a subsidy.⁴ The nationalized regime requires a unit subsidy of af , giving a total subsidy equal to area P_1efa to produce at q_R , which I take as a starting point.⁵ Assuming MC_Z represents the lowest available costs, the franchisee requires a unit subsidy of ag on the same output.

If the subsidy were minimized for the prior service level, the franchisee's marginal costs fall to P_1 over the unchanged output q_R , with the traveller paying P_1 . This would happen if the franchisee thought there were competition from at least one other firm with costs very close to its own. There is a saving of public subsidy equal to area $defg$.

If the would-be franchisee thought there were no competition for the route, it would bid the higher subsidy requirement equal to (or strictly just less than) $af (=ng)$. The franchisee's marginal costs then fall to k over the unchanged output q_R . Price remains unchanged at P_1 , and the

franchisee makes profits equal to area kP_1an .

Ideally, policy would aim at production at a point like h if the maximum subsidy af truly represented environmental savings from using rail rather than other forms of transport. This is not obtainable under the Government's proposal. Even in the case of extremely large cost reductions following franchising, the bidding scheme will fail to promote optimality. If the franchisee's costs after subsidy corresponded to the line cr , output still only moves to a position like q_1 in Figure 2.

Operation at points like h or s (if costs are at k or c respectively) could be obtained through the use of price capping - asking for bids in terms of the required subsidy to produce at least q_R at a price no higher than k or c depending on costs. Price capping is not seen as a general feature of dealing with subsidized routes, but may apply in the case of Network SouthEast.

As in the profitable case, subsidy bidding confers a private monopoly that requires control through price capping. It could then confer greater benefits on travellers, in addition to generating benefits for the exchequer if there is sufficient competition to reduce the subsidy.

IV. Chadwick-Demsetz Franchising

The problem with a first-price sealed-bid auction in profits or subsidies is that it does nothing to correct a bidder's monopolistic perception of marginal revenue. A natural alternative is a first-price sealed-bid auction in prices, which is the scheme promoted by Demsetz (1968). Bidders are asked to state the prices at which they would supply the possible range of outputs, giving Chadwick's (1859, 406) 'contracts ... for the attainment of results'. The procedure identifies the firm with the lowest average costs. That firm bids its average cost of production for each output, if it fears competition from at least one other firm with close costs.⁶ For simplicity,

I examine this case as the focus is on allocation and not with rent extraction. Assume the operating franchise id for a fixed period.

IV(i). Profitable Routes

The general result is that firms bid their average cost schedules for the right to run the route. Demsetz (1968) has already demonstrated that decreasing costs and the rules of this bidding scheme cause the franchisee to just cover costs with average-cost pricing. This is a second-best (Ramsey) optimum when we require maximization of consumer surplus subject to the firm breaking even (Baumol, 1982, 2). In the case of constant marginal cost, average cost pricing gives a first-best optimum because marginal cost equals average cost.

The increasing-cost case has an interesting feature. Since the franchisee charges an average-cost price it produces beyond the optimum, as average cost is below marginal cost. In Figure 3 this is shown as q_F , which is to the right of the optimum (q^*). The use of Chadwick-Demsetz bidding schemes with increasing costs would carry the risk of creating a welfare loss equal to an area like abc in Figure 3, which could under some cost conditions outweigh the area equal to dea representing the welfare gain in moving from a prior regulated output like q_R .⁷ I have shown elsewhere, using the case of broadcasting in the UK (Dnes, 1993) that the rules of the Chadwick-Demsetz auction could be amended to incorporate a tax representing the difference between average cost and marginal cost to constrain output to a first-best optimum such as q^* in Figure 3. This tax is not difficult to impose since firms provide information on average cost from which marginal cost can be derived.

Since marginal cost is dC/dQ and

$$dC/dQ = d(AC \cdot Q)/dQ = AC + Q(dAC/dQ) \quad (1)$$

and since the bidder sets price equal to AC , the required tax is $Q(dAC/dQ)$

per unit. Bidders could be told they face a per-unit tax L_j on any given level of output Q_j according to the rule

$$L_j = (P_j - P_{j-1})Q_{j-1} \quad (2)$$

which is a good numerical approximation of (1). They would then bid a supply schedule

$$P_{Lj} = P_j + L_j \quad i = 1, \dots, n \quad (3)$$

as the final bids. In effect, they bid their marginal cost schedules.

Note that the required amendment to Chadwick-Demsetz bidding answers an old question. Chadwick (1859, 388) certainly wished to apply the scheme under increasing costs, and covered examples like funeral services (inadequate competition owing to overwhelming grief upon bereavement) beer retailing ('rapacious' competition giving immoral practices) and baking (information asymmetry leading to product adulteration). John Stuart Mill, a supporter of Chadwick, was concerned that there was no apparent limit to the applicability of the scheme (Crain & Ekelund, 1976, 149). The required amendment implies a limit: without a tax equal to the difference between marginal cost and average cost, Chadwick's scheme could lower welfare compared with unregulated monopoly. Chadwick's (1859, 498) suggested limit was simply 'where waste stops'.

Chadwick's (1859, 385) argument for rail *nationalization* was in terms of using franchise bidding to avoid wasteful duplication ('multiplied conflicts') which suggests sub-additivity rather than simple decreasing cost on a route. The Government's proposals are limited to operating franchises on tracks owned and charged for by Railtrack. This suggests that increasing or constant marginal costs are relevant cases. The tax (if needed) does not seem problematic and therefore Chadwick-Demsetz franchising could be used, even under increasing costs, to achieve an

Generally, contractual details equally affect both Chadwick-Demsetz and the Government's proposal for rail.

The choice of auction mechanism has a similar effect on the alternative schemes and is not an issue in choosing between them. Assuming private values and risk neutrality, a first-price sealed-bid auction will select the most efficient firm in both cases but may leave rents with producers. Assuming a profitable route in the case of auctioning to the highest bidder, the firm will not bid all its profits if it believes the next-best bid to be much lower. With Chadwick-Demsetz, the most efficient firm can win by bidding prices just lower than those achievable by its nearest rival. Second-price sealed bidding selects the most efficient firm in both cases but deliberately leaves rents. Other mechanisms, such as the English or Dutch auctions are also similar in impact.⁹

Williamson (1985, 335) has argued that firms will overbid for franchises. They might promise low prices for travellers but try to renegotiate once the contract is awarded, whereupon it would be disruptive and costly to find another franchisee. This pitfall exists equally if the firms bid in terms of profits, where there is scope for firms to seek rebates from Railtrack or to reduce the level of service. Note that Zupan (1989) shows that reputation effects have controlled this type of post-contract opportunism in US contracts for cable television.

Problems of asset transfer are similar under both procedures, with an independent arbitrator - as proposed by the Government - being the best bet for a solution. Finally, the cost of running the auction and of subsequent regulation is likely to be identical.

Conclusion

Careful analysis of the Government's plans partly to privatize BR by franchising routes to private operators reveals several serious problems. Auctioning to the highest bidder will select the most efficient monopolist in the case of (rare) profitable routes. Auctioning to the lowest bidder of the subsidy required to run a loss-making route at best simply minimizes the subsidy without paying attention to wider allocative issues. At worst, most of BR's current subsidy could be transferred to the private sector without any gains to travellers. The Government's proposals may confer small gains on travellers and could be much improved by the simultaneous application of price-capping.

If the worst happens and subsidies are transferred to firms that could in fact expand services and lower fares, but choose not to, the policy will benefit the firms but not travellers. This danger does not so much describe a case of policy 'capture' (Stigler, 1971) but rather one of advanced capitulation by Government. The Government does appear to be worried that it will attract very few bidders for loss-making routes, which supports this result.

Chadwick-Demsetz franchising is best seen as an alternative form of regulation. Chadwick (1859, 420) was well aware of this aspect of his scheme, and saw himself as giving 'relief by showing that those evils [of competition] may be almost entirely prevented by ... its Regulation'. If the 'field' were put up for auction in terms of the lowest fares firms would charge travellers, possibly with the imposition of the tax described in Section IV(i), an incentive to benefit consumers would dominate. Welfare would be improved compared with the Government's proposals: or, as Chadwick (1859, 412) put it, 'duty' would replace 'sinister interest'. There would be no need for separate price-capping.

The superiority of Chadwick-Demsetz franchising follows through in cases where loss-making routes are to be subsidized. It would then be best to start with a clear definition of the subsidy based on the external value of preserving a rail service, which is missing from the Government's proposals. It does seem at present as though policy is dominated by a very narrow public-finance consideration which is preventing a more imaginative approach.

Footnotes

1. See Department of Transport, 1992b, p.31, Table 3. In addition it may well be that the profit of £2m shown for Intercity in 1991/92 would become a loss under accounting rules that were less generous over allocating capital cost across the system.
2. Financial expectations were initially much higher in the earlier franchising exercise applied to broadcasting (Dnes, 1993).
3. Increasing cost makes no difference at all to the comparisons made under first-price sealed bidding. Decreasing cost generally makes no difference, given profitability of the route and the private firm's lower costs, except for one case arising if a price cap were imposed below average cost - when no bid would be forthcoming.
4. Again the logic of what follows is not disturbed by increasing or decreasing costs. Note that losses on the route at a point of social optimum could be the result of decreasing costs.
5. Bidding in lump-sum subsidies makes no significant difference to the results.
6. A larger subsidy just moves q_R to the right without altering the logic of what follows.

7. This is different from contestability (Baumol 1982) where two or more competing firms must set price equal to marginal cost, not average costs. The difference arises because bidders cover the whole range for prices and outputs and do not just state an isolated price and output.
8. Not that this cannot happen with contestability.
9. Although an output tax may *also* be needed in the case of increasing costs, as explained in Section IV(i).
10. McAfee and McMillan (1987) discuss these mechanisms in depth.

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Figure 1: Auctioning to the Highest Bidder in Profits

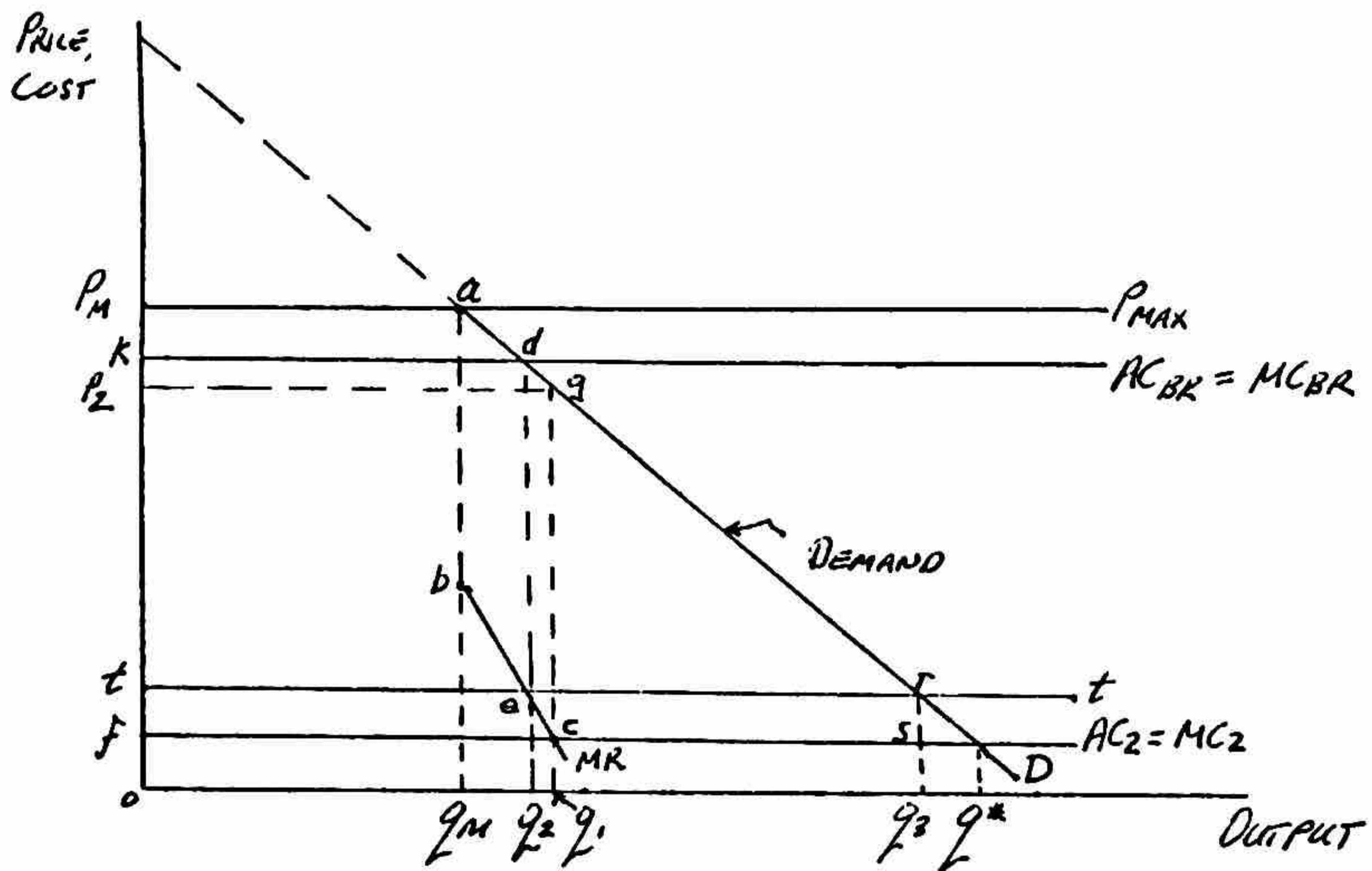


Figure 2: Auctioning to the Lowest Bidder in Subsidies.

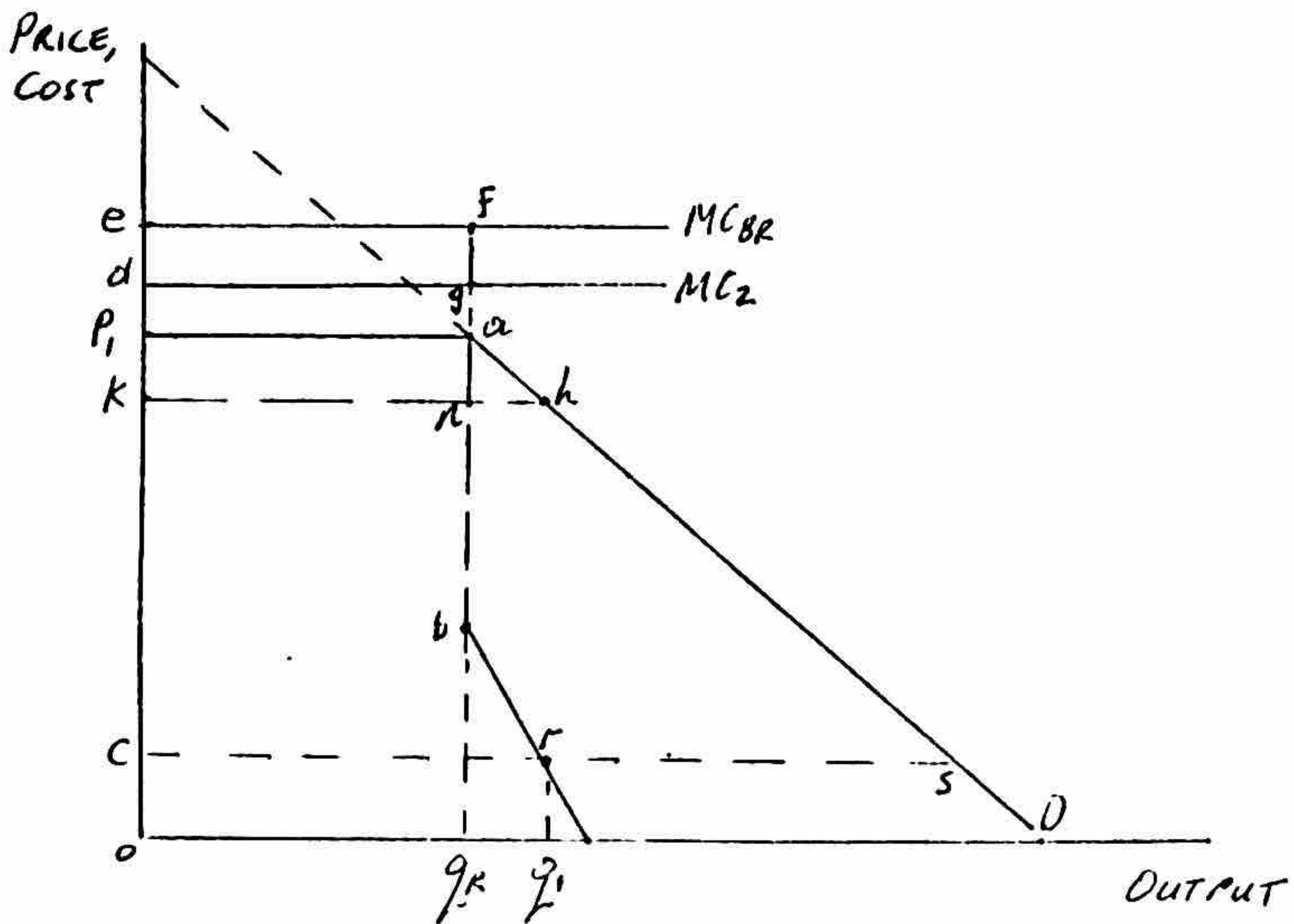


Figure 3: Chadwick-Demsetz Bidding with Increasing Costs

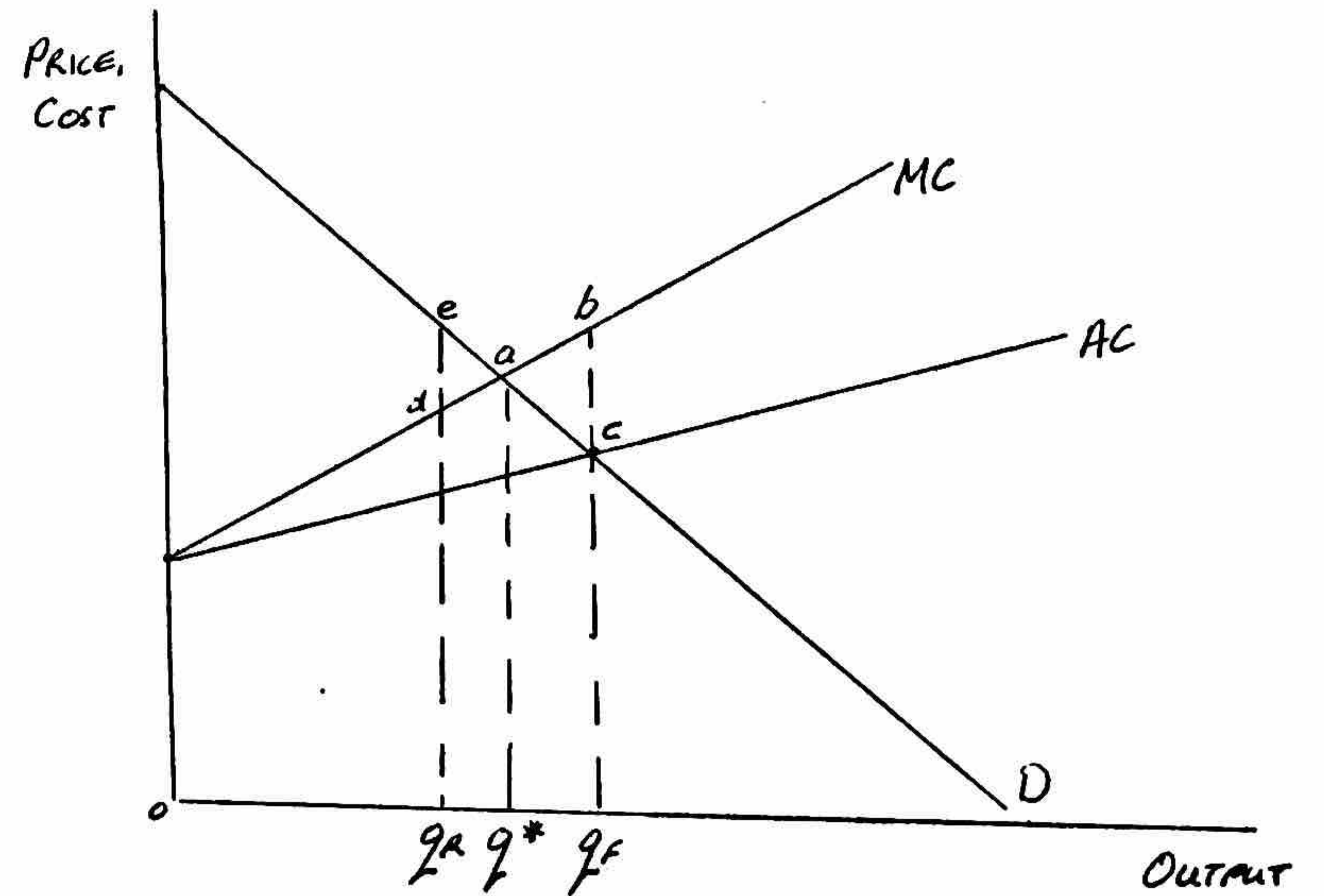


Figure 4: Chadwick-Demsetz Bidding with a Subsidy

