

This tariff compromise seemed like a good idea at the time

1. The Boss was busy greeting the new arrival into the interview room. Beancounter, meet Wise Owl from the Ministry, he said. Owl will help us choose a tariff manager today. Owl, meet Beancounter, our finance director.
2. He then moved on to the business for the day. The four applicants for the tariff manager job are coming in for interview today, he explained.
3. In each interview, I'll start by asking Beancounter to outline our company's situation. Then we'll see how the candidate would set our tariffs. I'll ask questions to make them squirm if they come up with anything too stupid.
4. We have to use code names for the applicants. In today's running order, they are Rabbit, Mole, Rat and Fox.
5. The Boss did not like tariff managers very much: he saw them as a bit of a nuisance.
6. Owl gently intervened. You must remember the undertakings that the company gave after the monopoly investigation, he said. You promised that the tariff manager would have freedom to set charges, particularly charges to independent operators.
7. The Boss agreed. Since the investigation, The Boss always agreed with Owl, as Owl was from the Ministry.

Beancounter's presentation

8. Rabbit is let in as the first candidate to be interviewed.
9. After the introductions, Beancounter starts her presentation of the situation.
10. The company runs a ferry service and a railway tunnel shuttle through a busy short sea crossing. Most of the demand is from containerised freight. The company owns its own tunnel, its own shuttle trains, its own ferry docks and its own ferries.
11. Recent research on demand found that total demand is for about 2.2 million containers to go across every year. Of those:
 - (a) 1 million containers a year will go by train no matter what, perhaps because timing is critical to them or they are connecting with other railway services to and from the crossing.

- (b) 1 million containers a year will go by ferry no matter what, perhaps because they are carrying dangerous goods.
 - (c) 200,000 containers a year will go whichever way is cheapest.
12. The company has produced some cost models. Here are the results:
- (a) Rebuilding the ferry docks would cost £500 million; these docks are big enough for at least 1.2 million containers a year, and there is no prospect to save money with smaller docks designed for only 1 million containers a year.
 - (b) Buying enough ferries to carry 100,000 containers a year would cost £150 million.
 - (c) Rebuilding the tunnel would cost £3 billion; that tunnel is big enough for at least 1.2 million containers a year, and there is no prospect to save money for a smaller tunnel designed for only 1 million containers a year.
 - (d) Buying enough train sets to carry 100,000 containers a year would cost £100 million.
13. For all of the assets involved, the company estimates that, on the open market, the combined cost of operations, maintenance, repairs, depreciation and return on capital works out to an annuity of 10 per cent a year on gross asset replacement cost.
14. Someone has recently put a railway track on a causeway parallel to the tunnel. This accepts the same trains as the tunnel, but the causeway can only be used at low tide. The company sometimes hires its trains to the independent causeway operator.
15. There are believed to be plans for some independent docks, an independent train operator, and there are already a few independent ferrymen. The company is quite happy, at the right price, to allow independent trains in its tunnel, independent ferrymen on its docks, or to hire out its ferries to any independent dock operator wishing to provide a full container crossing service.
16. Whilst there are some alternatives to the company's services, the recent Ministry investigation found that the company was by far the biggest and most powerful operator, that it was not effectively constrained by competition, and that it was a monopoly.
17. The investigation report said it was important for the company to set fair charges for services offered to independent operators. Owl has developed some models to calculate how costs might be allocated between infrastructure and vehicles, and would be happy to let the tariff manager use these models to set charges.

Rabbit's interview

18. Rabbit had entered the interview room carrying a 1984 typewritten book entitled the Tariff Formulation Manual. Once Beancounter has finished her presentation, he opens the book. Reading from it, he says that he wants to set charges that give

customers 'messages' about the costs that they impose on the company, and that encourage 'correct' allocation of national resources.

19. To do that, he says, you must ignore fixed or sunk costs and focus on variable marginal costs in the long run.
20. Long-run marginal costs are £100/container for a tunnel crossing, and £150/container for a ferry crossing. He proposes these figures as his tariff.
21. Beancounter points out that this would only raise £270 million of revenue a year, which is not enough to keep the shareholders happy. Apparently, shareholders expect the company to earn 10 per cent of the gross replacement cost of its assets, in line with open-market charges for operation, maintenance, replacement and financing.
22. Rabbit looks scared. He calculates total asset replacement costs to be about £6 billion. He knows that he could not raise anything like £600 million of revenue whilst encouraging a 'correct' allocation of national resources between the short sea crossing sector and the rest of the economy. He runs away.

Mole's interview

23. Mole also has the 1984 book. After listening to Beancounter's presentation, he says that the most important objective he took from the book was the need to bring in the 'right' amount of revenue.
24. Subject to that, he was also very keen on giving customers 'messages'. The key 'message' is that the long-run marginal cost of going by train is lower than that of going by ferry. Therefore the 200,000 price-sensitive containers must go by train.
25. He tots up the assets that the company needs: £3 billion tunnel, £500 million docks, £1.5 billion ferries, £1.2 billion train sets, total £6.2 billion. And therefore the 'right' amount of revenue is £620 million.
26. Mole emphasises that it is essential to preserve the sanctity of the price signal 'message'. This means that the £50/container difference in long-run marginal cost between ferry and tunnel must be reflected in tariffs.
27. Mole says that to recover the 'right' amount of revenue whilst preserving the 'message' he needs to use what he calls a fixed adder, which is a single additional amount to be charged in addition to the marginal cost for each container going across. The adder must be the same whether a container goes by ferry or by train.
28. Mole calculates that to raise the 'right' amount of revenue whilst preserving the 'message' he needs a fixed adder that will cover the revenue shortfall between £270 million and £620 million, which he calculates to be £350 million. He says that, with demand of 2.2 million containers, the fixed adder should be set at $350/2.2 = £159/\text{container}$.
29. Mole presents his charges.

Mole's charges

	Charge for each container crossing
Ferry crossing	$£150 + £159 = £309$
Tunnel crossing	$£100 + £159 = £259$

30. The Boss starts screaming that £309 is a suicidal price, and that the company's ferry business will be spanked in the market by other ferry operators. How much sacrifice must the company make to preserve the sanctity of marginal price signals? Is Mole suggesting that the company should get a few gunboats to deter competition, or what? Mole says not to worry about fringe competition. The Boss groans.
31. They turn to charges for independent operators. Owl gets his vehicle/infrastructure allocation model out. In fact, Owl has three models: one for the ferry business; one for the tunnel business; and one for the company as a whole, aggregating tunnel and docks to get total infrastructure, and trains and ferries to get total vehicles.
32. Mole asks for an explanation of Owl's vehicle/infrastructure allocation models.
33. Owl goes through the example of the ferry-only model. Mole's ferry business would have £1.5 billion worth of ferries and £500 million worth of docks, so one quarter of the £309 charge, which is £77, is attributed to access to the docks infrastructure, and the rest, £232, is attributed to the ferry vehicles.
34. Owl presents the results of his models.

Owl's allocations of Mole's charges

	Charge per container (single allocation for ferry and tunnel)	Charge per container (separate allocations for ferry and tunnel)
Ferry hire to independent dock	£135	£232
Dock access for independent ferry	£174	£77
Train hire to independent railway track	£113	£74
Tunnel access for independent train	£146	£185

35. Mole looks at Owl's results. He looks a bit unhappy that his 'messages' are not being given to independent operators. But he has nothing else to offer as a method to set charges to independent operators.

36. He decides that he cannot stomach the idea of charging £108/container more for tunnel access than for dock access under the separate allocation method, since both infrastructure activities impose no marginal costs, and if there is any premium charge it should be imposed on the ferries and not on trains. So he chooses the single allocation method.
37. He says that the end user, who makes the choice of mode of transport, would probably receive the ‘messages’, even if they cannot be given fully to independent operators.
38. The Boss comes back to the attack. He claims that some customers are now trialling minicontainers. A minicontainer is two thirds of the length of a normal container. On a ferry, you can put three minicontainers in the same space as two containers. On a train, however, a minicontainer uses as much space as a container, because it needs a whole wagon to itself.
39. Now, says The Boss, how does this fixed adder business work with minicontainers?
40. Mole realises that he does not know whether to apply an additional charge of £159 to each minicontainer, as he has done to each container, or whether he should apply only 67 per cent of the charge to a minicontainer to preserve ‘messages’ in respect of a given volume of freight. The impact of container size on marginal cost is different on trains and ferries. He is suddenly unsure of what preserving the sanctity of price signals actually requires. He loses his faith. The interview ends abruptly.

Rat’s interview

41. All that matters to Rat is to set prices that are in line with what would happen in a hypothetical competitive market. He says that these are prices that cover all costs and that reflect the constraints on charges arising from the threat of competition and new entry.
42. He says that the only safe way to set charges given the threat of competition law litigation is to ensure that everything can be justified by reference to the assets actually used by the company — hypothetical efficient or marginal costs are mere theoretical constructs of no practical use.
43. He claims that the competitive price stuff might sound all a bit airy fairy in theory, but the practice is really quite simple.
44. He starts with the docks business. The hypothetical new entrant that is as efficient as the company, in that case, is someone that would build £500 million worth of docks, and advertises for ferries to use them. For this to be an attractive business proposition, the price must be set such as to raise £50 million a year. At best, the new entrant captures a total traffic of 1.2 million containers a year, so that starting point for dock access charges is £42/container.
45. For the ferry hire business, the cost-based charge is £150/container, irrespective of how you look at it. Therefore his all-the-way charge for everything involved in carrying a container across the sea by ferry is £192.

46. The same calculation for the tunnel would give a tunnel access fee of £250/container, recovering £300 million from total tariff of 1.2 million containers. But Rat says that it would be wrong to price on the basis of a 1.2 million container throughput for the tunnel service, since clearly the price will be higher than for ferries, therefore there is no realistic prospect of either the company or a new entrant attracting 1.2 million containers to the railway and still making a profit out of it.
47. Instead, calculations for rail must be based on 1 million containers a year. This gives a tunnel access charge of £300/container, a train hire charge of £100/container, and an all-the-way charge of £400/container.
48. The Boss tries his minicontainer trap again. Rat says that a minicontainer is equivalent to two thirds of a container on the ferry and one container on the train, and calculates tariffs for them.
49. Rat puts all his proposals in a big tariff table.

Rat's charges

	Charge for each container crossing
Ferry crossing (all-the-way charge)	£192
Tunnel crossing (all-the-way charge)	£400
Ferry hire to independent dock	£150
Dock access for independent ferry	£42
Train hire to independent railway track	£100
Tunnel access for independent train	£300
Ferry crossing (minicontainer)	£128
Tunnel crossing (minicontainer)	£400

50. Rat works out that total revenue from these charges would be £630 million a year. The assets are a £3 billion tunnel, £500 million docks, £1.8 billion ferries, and £1 billion train; total £6.3 billion. Rat claims that the revenue-to-asset ratio of 10 per cent confirms that prices reflect costs that are as efficient as those of the company.
51. Owl asks whether price signals are being applied correctly to ensure allocative efficiency. Owl is concerned that Rat might have failed to do that. His ferry charges are lower than his tunnel charges, so people who have a choice will take the inefficient ferry instead of the efficient train.
52. Rat says that he does not care. The company's job is about getting people across the sea, not planning the economy. He says that grandiose central planning attempts by

Government are doomed to failure, and are unfair, unduly anti-competitive, and illiberal.

53. Owl starts getting his models for access pricing ready. Rat interrupts and says that he does not need Owl's models. He has given a full set of charges already, including charges to independent operators.
54. Owl insists on presenting results from his models. He says that they can be seen as a useful crosscheck in any event.

Owl's allocations of Rat's all-the-way charges

	Charge per container (single allocation for ferry and tunnel)	Charge per container (separate allocations for ferry and tunnel)
Ferry hire to independent dock	£85	£150
Dock access for independent ferry	£106	£42
Train hire to independent railway track	£178	£100
Tunnel access for independent train	£222	£300

55. Rat notes that Owl's separate allocations method gives, coincidentally perhaps, the same results as his proposed tariffs.
56. He also claims, rather rudely, that Owl's single allocation method might be in breach of competition law. For example, he says, an independent ferryman using the company's docks could not compete in the market at a price higher than £192; if he pays £106 for dock access then the margin that he competes for is only £86/container. This margin is much lower than the £150/container total cost and profit requirement that the company estimates for its own ferry operations. Rat says that this is unfair.

Fox's interview

57. Fox's written application said that he wanted to set cost-reflective charges that would give marginal cost 'messages' and recover the 'right' amount of revenue. He said that he would do that by adding a cost-reflective mark-up to the marginal cost 'message'.
58. Fox turns out to be quite clever. He goes quickly through similar lines of thought as both Rabbit and Rat had done in their interviews. He constructs a spreadsheet model that calculates charges on these two sets of principles, as a starting point for his work.
59. Then he explains that a good cost-reflective way of giving 'messages' whilst recovering the 'right' revenue is to apply a cost-reflective mark-up on top of his marginal cost charges (which are the same as Rabbit's proposal). This method ensures that the marginal cost 'message' is still given in full, and cost signals are then

further improved by the cost-reflective mark-up. Fox explains that the cost-reflective mark-up can be set by using his average cost estimates (which match Rat's proposal).

60. In order to calculate the cost-reflective mark-up, Fox first calculates the shortfall between the revenue from marginal cost charges and the 'right' amount of revenue. Fox's spreadsheet says that the shortfall is £350 million a year.
61. Then Fox determines what percentage of his average cost estimates would need to be added as a mark-up on top of the marginal cost in order to fill-up this shortfall. The answer comes out at 55.56 per cent.
62. The interview panel is a little dazed, but all members feel confident that Fox's spreadsheet does what he says it does. Fox presents his proposed tariffs.

Fox's charges

	Charge for each container crossing
Ferry crossing	$£150 + 55.56\% * £192 = £256$
Tunnel crossing	$£100 + 55.56\% * £400 = £322$

63. At this point, Owl complains that the ferry charge is lower than the tunnel charge, even though marginal costs are higher for the ferry service than for the tunnel service.
64. Fox explains that he is trying to reach a sensible compromise between marginal cost pricing and cost-reflectivity. He highlights the dangers of an attempt at preserving marginal cost signals in isolation, without also taking account of the need for a broader notion of cost-reflectivity. This reminds the panel of Mole's difficulties.
65. Fox presents his traffic light indicator evaluation matrix for his tariff compromise method, against a marginal cost pricing method and an average cost pricing method.

Fox's traffic light indicator evaluation matrix

	Marginal cost charging	Average cost charging	Tariff compromise
Recover the 'right' amount of revenue	RED	GREEN	GREEN
Cost-reflective charges	GREEN	GREEN	GREEN
Reflect marginal cost 'messages'	GREEN	RED	AMBER

66. Independent operators are raised. Fox says that he is in favour of allocating all-the-way charges in proportion to total costs, to ensure that competition is not distorted. He invites Owl to run his models and present the results.

Owl's allocations of Fox's charges

	Charge per container (single allocation for ferry and tunnel)	Charge per container (separate allocations for ferry and tunnel)
Ferry hire to independent dock	£114	£201
Dock access for independent ferry	£142	£56
Train hire to independent railway track	£143	£81
Tunnel access for independent train	£179	£242

67. Fox does not like having a train hire charge which is higher than the ferry hire charge. He adopts Owl's separate allocations method.

The choice

68. The panel meets again. Rabbit and Mole have withdrawn their applications.
69. Beancounter says that she thought that Rat was too focused on a single issue. Rat's ideological response to the question about marginal cost 'messages' was probably just a cover up for his failure to develop a charging method to meet other objectives.
70. The Boss agrees. He did not like Rat's attitude, particularly towards Owl.
71. The company appoints Fox. The panel was particularly impressed by his balanced approach and his traffic light evaluation table.
72. Once appointed, Fox prepares a memo announcing the company's new tariffs. At Beancounter's request, he includes an estimate of average total cost for each service.

Fox's costs and charges memo

	Charge for each container crossing	Company's average total cost per container
Ferry crossing (all-the-way charge)	£256	£192
Tunnel crossing (all-the-way charge)	£322	£400
Ferry hire to independent dock	£201	£150
Dock access for independent ferry	£56	£42
Train hire to independent railway track	£81	£100
Tunnel access for independent train	£242	£300

Epilogue

73. The train hire business does well. No independent train operators actually enter the market, as they realise that they cannot compete against a price of £81/container.
74. The company's ferry business starts to lose market share to competing ferry operators, but even The Boss is not looking too worried about it at first.
75. The independent causeway operator sues for margin squeeze. Its long and wordy statement of claim says that by offering a tunnel crossing at £322/container the company is practising predatory pricing; that the company's tunnel business is receiving an unfair cross subsidy from the ferry or docks side of the business; and that by having a differential of only £242/container between its railway crossing charge and its train hire charge the company is practicing a margin squeeze, given that the company's own tunnel costs seem to be about £300/container.
76. The independent causeway wins the case on the margin squeeze claim. The court orders the company to cease the margin squeeze.
77. Fox tries to ask Owl for advice. But Owl has flown to a higher perch within the Ministry.
78. Fox decides that nothing in the court judgment challenges his all-the-way tariff methodology. Therefore the solution must be to make some adjustments to Owl's allocation model.
79. Fox decides to lower the train hire charge to £21/container, keeping the tunnel crossing rate at £322/container, so that the causeway can now compete for a margin of £301/container.
80. After a while, following further reductions in the profitable ferry business and growth in the less profitable rail business, Fox finds that he needs to rerun his method in order to continue collecting the 'right' amount of revenue. The resulting price increase finishes off the company's ailing ferry business.
81. The Boss and Beancounter meet in the pub after they have both been made redundant. Strange to think, one of them is heard to say, that this tariff compromise seemed like a good idea at the time.

Contact Franck Latrémolière (020 7841 5858, f58@reckon.co.uk, reckon.co.uk/franck) to discuss anything raised by this story. © 2010 Reckon LLP. You can share or adapt this story provided that you retain contact details and do not misrepresent authorship.