COMMENTS ON CALEDONIAN MACBRAYNES FARES REVIEW STUDY BY MDS/EKOS

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SUMMARY

- This Note comments on the recent Caledonian MacBrayne Fares Review Study carried out by MDS Transmodal Ltd in association with EKOS. We base our arguments on reviews of empirical research in this field as well as perspectives on the effects of fare changes recognised at UK level by the Department of the Environment, Transport and the Regions.

- We conclude there is an economic case for across-the-board fare decreases on CalMac routes of at least 20% in the first instance.

- Fares decreases of this magnitude would have a major impact on the economies of the north and west of Scotland and would be largely or entirely self-financing through the concomitant growth in user numbers. CalMac has the capacity to absorb expanded traffic levels of this magnitude.

- The arguments here are based on the observation that the MDS/EKOS report is seriously limited and incomplete in its analysis of the possible effects of fare changes on CalMac routes. It restricts itself to looking at the immediate and temporary short-term effects of fare changes, considerably understating the full and complete user response.

- We note that it should be possible to choose from a wide spectrum of possible fare levels on CalMac routes without making a significant difference to CalMac revenues or profits, or to levels of government subsidy for CalMac. CalMac's pricing regime appears to be have settled towards the high price/low volume end of this spectrum.

- The economic case for further fare decreases of even greater magnitudes should also be seriously considered. In these cases, the investment costs of expanding capacity should also be included in calculations.

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This Note comments on the Caledonian MacBrayne Fares Review Study carried out by MDS Transmodal Ltd in association with EKOS (unless otherwise stated, page numbers in references below are to this report). Interestingly, although no mention is made of this in the MDS/EKOS report, BC Ferries, the major Canadian (West Coast) state-owned ferry company has also been undertaking an exhaustive fares review and consultation exercise (details and findings are posted at www.bcferries.com, find under "Corporate Info": see especially "Tariff Review Summary Report" –Nov. 2000, but also see "Tariff Equity Discussion Paper", June 2000). Those interested in the present exercise may find the arguments and discussion in the BC Ferries Report also of relevance since a number of issues discussed here were also explored in the BC Ferries fares review.

In this Note we shall take CFares (the current CalMac system) as a given, though this should not be taken to suggest that the system itself should not be revised or replaced. We shall focus instead on a single issue, the nature and quality of the information on effects of price changes that have fed, or may feed, into CFares calculations. We shall suggest that this may be as important, or even more important, than questions relating to precisely how fares are calculated, and this issue will be relevant whatever system is used for calculating CalMac fares.

There is a danger that the opportunity for a more radical overview of fare structures on CalMacs routes may be passed up in the present exercise. In a parallel development, the Executive has promised to safeguard fares and service levels on the CalMac routes in the face of the current competitive tendering exercise, which represents a barrier to *raising* fares. At the same time, as the MDS/EKOS study notes,

> "It should be noted that the Minister's letter, asking CalMac to undertake the review, stated that 'any proposals to amend pricing structures should not result in a decrease of fares revenue overall'" (p.1).

Since the MDS/EKOS study tends to find that all fares reductions on all routes and for all categories of user would lead to a reduction in revenue, both per route and network wide, this prohibition would appear to represent a barrier to *lowering* fares[1]. The danger is that if we are constrained from giving serious consideration to the effects of either raising *or* lowering route-specific, category-specific or general levels of fares, the net effect may be to reinforce the status quo by default, and encourage tinkering with the system rather than a more thorough re-appraisal.

The Terms of Reference encourage a very disappointing and narrow debate (reported in the consultants report) which shies away from considering the implications of the present overall level of fares. Issues such as no-shows, rebates, discounts etc are all important issues in themselves, but in the context of local economic development, the general level

[1] However we shall suggest below that this perspective may be too gloomy

of fares become important, not just the distribution of fares. There is little point in an island hotelier receiving significant frequent user discounts for ferry travel if high standard tariffs discourage tourist custom for his business. There may be little or no gain to an island resident being able to take advantage of off-peak fares if it has to be paid for by increased freight charges (and local prices) for the goods he or she consumes.

This is potentially serious since there are grounds for believing that the present level of fares is at least partially due to an accumulation of ad hoc factors such as short run political influences, rather than any consistent and balanced long term overview of what the fare level and structure should look like.

In fact, there have been frequent complaints that CalMac's fares are too high, in general, and on particular routes. As far as I know, there have been no systematic studies of CalMac fare levels compared to other operators but there certainly appear to be grounds for arguing that CalMac's fares are high compared to domestic ferry operators in other countries. About two years ago, in a separate exercise, I looked at the costs of trips on various Canadian ferries and found that a one way trip of medium length (95-120 minutes) would cost about £12-17 for a car and driver. At the same time a 105 minute trip to the Western isles by CalMac (Uig to North Uist or Uig to Harris) for a car and driver cost £38-45. Roy Pedersen of HIE[2] also reported similar levels of difference between CalMac and Norwegian prices for a 19km crossing (Ardrossan-Brodick in the CalMac case). The state-owned Canadian ferry operator BC Ferries also provides tables in their Annual Reports each year comparing ferry rates in different countries[3] and it certainly seems to be the case that CalMacs fares are consistently high compared to *domestic* ferry operators in most other countries (international operators such as the cross-channel ferries often appear to be relatively expensive compared to domestic ferry operations on a mile-for mile basis, possibly reflecting the role of subsidy in domestic ferry operations).

It is not immediately clear why there should appear to be such marked differences between CalMac's fares and those generally prevailing in domestic ferries in the US, Canada and Norway. One possibility is that at least part of the reason could lie in economies of scale and subsidies enjoyed by other operators in some cases. These may be contributory factors and this could account for some of the differences. At the same time, there may be other factors at work that I discuss below. It should be remembered that we have to explain why CalMac's fares can be three times higher (or more) than those of operators in other countries, a quite remarkable differential by any standards.

Not only that, the consultants reports (pp.36-45) shows that CalMac fares have been rising both in nominal and real (after allowing for inflation) terms from 1993/94 to 1997/98. The median (midpoint) rise in passengers fares considered on a route by route basis over this period was 23% (nominal), 7% (real) for passenger winter single fares, and 25% (nominal) and 10% (real) for summer fares. For cars, the corresponding

[2] Roy Pedersen, "Ferry Futures" conference paper
[3] See the annual reports on their web page at www.bcferries.com

increases were 17% (nominal) and 1% (real) for both winter and summer, for CVs the median price increases were 22% (nominal) and 6% (real).

The direction of price changes is also important since they may affect user expectations concerning future price changes. If residents (and potential residents) and businesses (and potential businesses) expect fares to continue to rise, it may discourage residency and business investment once the expected price changes are factored into plans. This also has implications for CalMac's objectives, especially local economic objectives

CFARES OBJECTIVES

> "The CFares objectives are: **Local economic objective:** to maintain or improve economic and social conditions in the area; **National economic objective:** to ensure that resources are used efficiently and in a cost-effective manner; **Financial objective:** to produce a return to contribute towards resources for capital expenditure" (p.7)

The consultants also add:

> "The financial objective is critically impacted by the extent of subsidy provided and, as costs vary, fully achieving this objective would in general be seen as acting against the local economic objective. This is not strictly the case as there are circumstances where increased revenues are consistent with lower fares and thus greater benefits to island economies." (p.10)

This is slightly misleading since the consultants then go on to assume that there are *no* cases for a route or category of user on a route in which "increased revenues are consistent with lower fares" (this would require elastic demand, this is discussed further below). In the case of CalMac then, fully achieving the financial objective *will* be seen as consistently acting against the local economic objective - if we accept the consultants' findings.

The point here is that the different objectives may trade off one against the other, and in the case of financial and local economic objectives they almost certainly will (again, if we accept the consultants own findings). Thus, if we have an administration in which more weight may be put on financial objectives (especially reduction of subsidy) as opposed to local economic objectives, there may be an inbuilt political pressure to increase fares. There is some evidence that this happened at least at some points during the last government. The consultants themselves report cases where financial objectives have dominated over local economic objectives in CalMac pricing, and the consultant's report a "general disposition against fare decreases", even where these are allowed for in the CFares model (pp. 29-30).

An issue that will be returned to below is that the relevant time horizons may differ for all three objectives. In principal, there are long term horizons for each of them, in practice, local economic development may be a long term objective which may be difficult to

quantify and weight against the more immediate and visible financial implications of fare changes. This does not make these long term effects any the less important or real

The main argument in this Note is that empirical research suggests that the longer term effects (more than two years) of fare changes in transportation services may be significantly greater than the short term effects. The present current consultant's study only looks at short term effects, does not take on board the implications of the wealth of empirical research in this area[4]. Therefore it is likely to be a highly misleading guide to the effect of fare changes on all three objectives (but especially local economic development) for the purposes of policy formulation in this area.

THE ROLE OF SUBSIDY

One unhelpful aspect in this context is the tendency to associate the role of subsidy and public support for CalMac with its conduct of supposed "lifeline" or "essential" services. Apart from the difficulty of distinguishing what is actually an essential or lifeline service from other services provided by CalMac, such perspectives do not provide a balanced justification for subsidy in this context. For example, rail is rarely, if ever classified as providing "lifeline" services yet it also tends to be heavily subsidized (e.g. ScotRail's £240mill annual subsidy).

The only non-subsidised rail operator in the UK is the Gatwick Express and there are interesting economic parallels here with the highly profitable (and privately owned) Western Ferries cross-Clyde run. Both operate over high frequency/high volume/short distance routes targeting a particular category of user (CalMac's Kyle-Kyleakin ferry had similar characteristics and was also reportedly highly profitable before it was replaced by the Skye bridge). These routes help to demonstrate that is possible to make a non-subsidised profit running domestic ferry and rail services under certain highly favourable circumstances - if you are allowed to cherry pick. However, most rail and ferry routes have to be subsidised, in many cases for similar economic and social reasons.

ELASTICITY OF DEMAND AND CAPACITY

For policy purposes, one of the most important economic measures is "elasticity of demand". By "elasticity" is meant sensitivity or responsiveness (in percentage change terms) of user numbers to changes in the price (here CalMac fares). Since user numbers tend to respond in the opposite direction to that of the price change causing it (cut back by price increases, stimulated by price decreases), demand elasticity values tend to be negative.

A useful benchmark elasticity value here is –1 or unitary elasticity. In this case, a 10% increase in price would lead to a 10% fall in user numbers, and correspondingly a 10% fall in price would lead to a 10% growth in user numbers. The fall (or rise) in price is

[4] Appendix 2 of the consultants report makes brief mention of elasticities often being greater in the long run, but does not pursue the implications of this point.

balanced by a compensatory rise (or fall) in user numbers in the opposite direction, and so overall revenue from fares stays constant.

For our purposes, the interesting issue is what would happen to revenues at the farebox if we reduce prices. If elasticity is between 0 and –1, (inelastic demand) then there will be an overall reduction in revenues. For example, if elasticity is –0.7, then a 10% fall in fares will lead to a 7% increase in user numbers, this partially but not fully compensating for the reduction in operator revenues from reduced fares per users. Between 0 and –1, the closer that elasticity gets to a value of –1, the lower the loss in revenue from reducing prices. Correspondingly, the closer that elasticity gets to a value of zero, the less the extent to which fare reductions are compensated for by increased user numbers.

If elasticity has a numerical value greater than –1, (elastic demand) then reducing price will actually *increase* revenues. For example, is elasticity is –1.2 then a 10% fall in price will increase user numbers by 12%, the increase in paying customers being more than enough to compensate for the loss in revenue per user. This is the golden scenario described by consultants above where local economic objectives may be consistent with financial objectives.

The key point is that fare decreases are likely to be at least partially self-financing seen from the perspective of the operator. The greater the elasticity value (the more elastic the demand for this service) the greater the extent to which the fare decrease can be compensated for by increases in traffic volumes.

An important parallel issue here on the cost side is the existence and extent of spare capacity on a service. If there is spare capacity, the cost of providing a service for an extra user is at or close to zero (though this issue is complicated by the existence of daily, weekly or seasonal peaks). If there is spare capacity, the profitability of a service will be driven largely by the elasticity of demand for that service since varying fare levels may affect revenues but have little effect on costs.

In turn, these issues have major implications for local economic development. For example, suppose we have an elasticity of demand for a service of –1 (unitary elasticity) and spare capacity. Then, varying fares up or down will have no effect on revenues, costs - or operator profits. The operator could settle on a high price/ low traffic volume regime, a low price/high traffic volume regime, or any combination in between in the knowledge that it makes no difference to profitability. But of course the decisions will have major implications for local economic development. A high price regime will increase transport costs and restrict access and trade, while a low price regime would reduce transport costs and encourage access and trade.

If elasticities are greater than –1 and there is spare capacity on a route then there is no obvious conflict between the commercial objectives of the operator and local economic development since reducing prices should boost both operator profitability and trade. On the other hand, if elasticities are between 0 and –1, then reducing prices could have an adverse effect on operator profitability but boost local economic development. There is

therefore a policy decision to make as to whether and how to trade off financial objectives for local economic development objectives.

Capacity can be varied in the long run with bigger, faster or more frequent ships and variations in shore based facilities, bringing these cost elements into consideration.

ESTIMATES OF ELASTICITY OF DEMAND FOR CALMACS SERVICES

As far as is known, there are three major studies which have attempted to provide elasticity measures for CalMac's routes in recent years. First, there was Henderson and Maddison's study (H&M)[5], followed by a study by Cambridge Policy Consultants (CPC)[6], and now the MDS/EKOS study (2000) referred to above. The CPC study concluded that such statistical evidence as was available suggested the following price elasticity ranges: passengers –0.2 to –0.6: cars –0.4 to –0.8: commercial vehicles (CVs) –0.4 to –0.5 (CPC study, pp. 30-31). The H&M study (p.16) reported a range of elasticities for passengers and cars with median values about –0.8 to –0.9 for passengers and cars, around or beyond the top end of the range identified in the CPC study. By way of contrast, the median elasticities of -0.3 for passengers, -0.5 for cars and -0.2 for CVs in the MDS/EKOS study (Table 2, Appendix 2) fall around or below the low point of the range identified in the CPC study.

A further study of relevance here for comparative purposes is one by IBI Group who in 1997 carried out estimates of elasticities based on market research for BC Ferries, the major Canadian state owned ferry company. These are published on the BC Ferries web page in the BC Ferries Tariff Review Summary Report (November, 2000)[7]. Interestingly, although the median elasticities estimated for passengers and cars on BC Ferries' 24 routes appear to be in line with the MDS/EKOS estimates for CalMac, the elasticities for the three busiest routes (accounting for over two-thirds of BC Ferries tariff revenues) suggested they were relatively price sensitive with elasticities ranging between –0.58 and –0.82. This demonstrates the importance of attaching appropriate weights to routes in terms of estimating the likely effects of system-wide fare changes.

EKOS measured the elasticities as follows:

> "For the elasticities applied in this study, the consultants' identified a set of key factors that, a priori, would influence price elasticities. On the basis of these a judgement (based on analysis of route characteristics) was taken on a route-by-route basis as to the likely elasticity for each traffic type on each route. At a minimum, elasticities for all passengers, cars and CVs on each route are provided although in most cases these are built up from estimates of sub-categories of each traffic type. This

[5] "Fare Price Elasticities on the Caledonian MacBrayne Ferry Network", R.A Henderson and D. J. Maddison, ESU Research Paper no 30, The Scottish Office, 1992_

[6] An Evaluation of Ferry Subsidies on the Northern and Western Islands of Scotland (CPC Study for Scottish Office, 1998)

[7] see www.bcferries.com and find under "Corporate Info"

> approach is preferred because we do not need to rely on ex-post rationalisation of the previously estimated elasticities." (MDS/EKOS Appendix 2)"

In short, guesstimates. The consultants provide a range of factors which they think could affect elasticities on the various routes. There is no citing of the sources and authorities they use for these various estimates, no discussion of how ferries may differ from other forms of transport, crucially there is no setting out of the weightings they give (or do not give) to the various potential influences on elasticity (for example, although they mention in passing that elasticities tend to be higher in the long run, as we discuss below their estimates are short run estimates, and so they give an implicit weighting of zero to long run influences). So there is no obvious way of checking or judging the basis or quality of their estimates.

Some further brief points about this.

> (1) Suppose for the sake of argument that these are accurate estimates. What happens if a major change takes place in one of the notional influences they cite as possibly affecting elasticity? Should we adjust the EKOS estimates of elasticity on individual routes or for CalMac routes overall? We do not know because, other than the casual discussion of possible influences in the entry for each route, we have no systematic knowledge of the weighting, if any, the consultants gave to this influence in producing their estimates
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> (2) The estimates are guesses. There is no indication of the degree of confidence that should be placed in them (indeed, in the absence of qualification the danger is that we are being advised there is strong confidence in these estimates). The fact that they are guesses suggests it would be extremely difficult to be confident about how accurate they are. The danger is that they will be accepted as firm and reliable measures when they are not.
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> (3) There are a number of criticisms that could be made regarding individual estimates. I will restrict myself to expressing concern that the consultants talk about "inelastic" and "elastic" demand on the routes and indeed mistakenly describe their estimates in their discussions of some runs in Appendix 2 as indicating "elastic" demand (e.g.Claonaig-Lochranza, Mallaig-Castlebay-Lochboisdale, Mallaig –Small Isles, Oban-Castlebay-Lochboisdale). However these estimates (and indeed all the elasticities described in the MDS/EKOS study) actually indicate *inelastic* demand. At best this is misleading, at worst it raises questions as to whether what is meant by "elastic" and "inelastic" demand is really understood in this report.

SHORT RUN AND LONG RUN ELASTICITIES

For our purposes the most important issue here is the time frame over which response by users to a given price change was estimated. The CPC study was concerned with the

short run elasticity of demand: "the overall model being tested is that the demand for ferry services as measured by the volume of ferry carryings will vary in the short term according to changes in real ferry prices and changes in income" (p.18). The short run or short term in the CPC study was up to 2 years (p. A182). The MDS/EKOS study was also concerned with short run elasticity of demand:

> "…theory would suggest that if there are little or few alternative modes of transport and that journeys are essential then travellers will be fairly unresponsive to price changes in the short term (i.e. inelastic). *On that basis* we would expect in general that elasticities on CalMacs routes will tend to be inelastic and usually less than –1.0"
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> MDS/EKOS, Appendiz 2, italics added.

An example given by MDS/EKOS was the Ullapool run (see MDS/EKOS, Appendix 2) where fixed short run contracts of hauliers lead to the consultants guessing a highly inelastic response of -0.1.

There are grounds for questioning the low elasticities of demand in the MDS/EKOS study even on a short run basis, given that these can be major elements in household disposable income for residents. "….ferry fares account for a significant proportion of household income and expenditure. Expenditure on ferry fares account for around 5% of household incomes after tax in the Western Isles, Orkney and Shetland, though significantly less for Arran at 3.8%" (CPC study, p. vi). The body of theory referred to (but not cited) by the consultants suggests that this would be expected to contribute to price sensitivity.

However, the H&M study models the short and long run elasticities as if they were the same (H&M p.4). If we make the generous assumption that the median EKOS estimates are in the right ball park region (even if individual estimates are dubious) we shall see this may go some way to accounting for the wide variation in estimates between the three studies. The crucial issues here are, the difference between the short and long run, and the implications this may have for elasticity measures.

In many respects it is more helpful not to think of the long run as a particular time period or number of years, but as a lengthy process over which a whole series of effects slowly unwind: people migrate and change jobs, business move in or out, start up or close down in response to actual or anticipated economic influences. As we note below, a DETR Advisory Committee found that the long run was typically 5-10 years in studies reviewed by it. In some perspectives the long run can be seen as up to 13-15 years before all the effects are worked out, as is also noted below. Changing fares on CalMac routes would also result in short run and long run effects; in the short run people are restricted in terms of the range of decisions they can make; but in the longer term they will have more discretion over where they live, work and operate businesses;

> "Transportation elasticities tend to increase over time as consumers have more opportunities to take prices into effect when making long-term decisions. For example, if consumers anticipate low automobile use prices they are more likely to choose an automobile dependent suburban home, but if they anticipate significant increases in driving costs they might place a greater premium on having alternatives, such as access to transit and shops within convenient walking distance. These long-term decisions affect the options that are available. For example, if consumers are in the habit of shopping in their neighborhood, local stores will be successful. But if they always shop at large supermarkets, the quantity and quality of local stores will decline.
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> For this reason, it may take many years for the full effect of a price change to be felt. Studies cited by Button (*Transport Economics*, Second Edition, Edward Elgar, Aldershot), 1993, p. 41) estimate that short-term elasticities are typically one-third of long-term elasticities. Short run is typically less than two years, medium run is two to 15 years, and long run is 15 years or more, although definitions vary. Large price changes tend to be less elastic than small price changes, since consumers make the easiest accommodations first. Dargay and Gately ("Demand for Transportation Fuels: Imperfect Price-Reversibility?," *Transportation Research B*, Vol. 31, No. 1, 1997, pp. 71-82) conclude that about 30% of the response to a price change takes place within 1 year, and that virtually all takes place within 13 years.":
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> Transportation Elasticities: *How Prices Affect Travel Behavior*, Victoria Transport Policy Institute, Canada.

One of the most important set of elasticities in the transport field relate to the derived demand for fuel, and Thompson and Formby (*Economics of the Firm*, Prentice Hall, Sixth edn, 1993 p.124) report that economists estimates of the elasticity of demand for petrol at the pump in the US tend to be about –0.1 in the short term, with estimates clustering in the -0.25 range for periods of 2-3 years after the price change. Professor Robert Pindyck of MIT projected estimates of elasticities of demand for petrol in the US of -0.49 (5-years after the price change), -0.82 (after ten years) and –1.03 (after 15 years) (see Thompson and Formby, p.124).

This importance of recognising how long run elasticities may differ from short run in the field of transport has been recognised by a DETR Advisory Committee;

> **"**To give an idea of the order of magnitudes concerned, several reviewers of the field as a whole …have come to their own conclusion that a 10% change in fuel price will lead to around a 1.5% effect on total vehicle kilometres in the short run (one year) and around 3% in the long run (typically found to be 5-10 years). The effects on fuel consumption in the short and long run are suggested to be about twice as great as this"

Department of the Environment, Transport and the Regions, 1999, *Transport and the Economy*, The Standing Advisory Committee on Trunk Road Assessment

And another study of the effect of fares changes of demand for one form of transport (in this case, bus travel) commissioned by the DETR similarly found major differences between short and long run elasticities in research in this area broadly consistent with those reported by Button above:

> "As a background to the study, the report includes a review of the most recent evidence regarding bus fare elasticities, both for the UK and for other countries. A most striking feature is the variation in the elasticities obtained in the individual studies, which is not surprising given the differences in data and methodology used and circumstances considered. Concerning the aggregate market, a short-run (one year) fare elasticity of around –0.3 seems to be the consensus. There is also a good deal of empirical evidence that the elasticity increases over time, with the long-run elasticities generally from 1 ½ to over 3 times higher than the short-run elasticities. Although there is far less agreement as to the long-run elasticity, the majority of estimates range from -0.5 to -1.0"

Report to the Department of the Environment, Transport and the Regions, Joyce M Dargay and Mark Hanly, This project was carried out for the DETR by the ESRC Transport Studies Unit, University College London and the TAS Partnership Ltd.

In the long run we are all dead, though hopefully the long run in such circumstances will be longer than the DETR's 5-10 year horizon for the long run. But if we ignored the long run we would never take out mortgages, invest in higher education, or worry about pension rights. And, crucially, we are all affected *now* by what happens in the long run – for example, the present level of demand for CalMac services (and current local economic activity) directly reflects decisions taken in the Nineties as to what CalMac's fare levels should be. We cannot ignore the long run – it is where we all inevitably finish up, whether dead or alive.

Therefore long run elasticities are crucial to developing a coherent policy approach in this area. If we just look at the immediate short run effects, analysis of the effects of fare changes will be grossly incomplete and misleading.

If we were to compare the relative importance of short run and long run elasticities for policy purposes, by definition short run effects are transient and typically are seen as occurring over a period of no more than 1-2 years, while long run effects impact over periods of several years and may continue indefinitely. In terms of an overall policy review of a particular pricing regime (here CFares), long run elasticity should be given far more weight than short run elasticity. If we had to use just one elasticity measure, long run should be used rather than short run.

As we shall see this transforms the analysis, and is of critical importance for all three objectives of CFares, including local economic development.

A BACK-OF–THE-ENVELOPE EXERCISE

Since this is only a first response to the consultants study, I will conduct a crude back-of-the-envelope exercise.

Suppose we accept the EKOS estimates as indicative of what the median elasticities will be for different categories of traveller .

This gives us median short run elasticities of -0.5 for cars -0.3 for passengers, and -0.2 for CVs (MDS/EKOS study)

Now we take Buttons review of the empirical literature (see above) which suggests that long-run elasticities are typically 3-times that of the corresponding short-run elasticity measure.

In the case of CalMac routes, this would imply median long run elasticities of –1.5 for cars –0.9 for passengers and -0.6 for CVs. This implies elastic demand in the long run in the case of cars, near unitary elasticity in the case of passengers and, still, inelastic demand in the case of CVs.

If we were to give equal weighting to each of these elasticities, then we would approximate unitary elasticity of –1, that is a given increase or decrease in CalMac fares across the board would be balanced by an equal proportionate change in the opposite direction in terms of volume of traffic, that is any fare change up or down would in the long run be revenue neutral. Subject to capacity constraints, you could choose any fare level and it would make no difference to revenues. You could choose high fare levels (and low traffic volumes) or low fare levels (and high traffic volume), or any fare level in between, and it would make no difference to CalMac revenues.

It would, however, obviously make a major difference to local economic development. Traffic volume and local economic activity (involving residents, businesses and tourists) are likely to be strongly related to each other.

We have one further twist to add. It would not be fair to give equal weighting to the three major categories of user. As the consultants report (p. 34) notes, CalMac receives 41% of its revenue from cars, 33% from passengers, and 23% from CVs. If we were to weight the long run elasticities by their relative importance in the revenue stream, then the elastic demand (cars) would receive most weight and the least price sensitive (CVs) would receive least weight.

Doing this means that we would now estimate that the long run elasticity of demand for CalMac services to be elastic, that is any across the board increase in fares would lead to

a *decline* in revenues in the long run, while any across the board decrease in fares would lead to an *increase* in revenues in the long run.

It should be remembered that EKOS provide the most inelastic set of short run elasticities of the studies we have looked at here, more inelastic even than the CPC studies. If they represent under-estimates of elasticity in the short run, then the corresponding long run elasticities may be even more price elastic than suggested by this exercise.

This means we now have a different perspective on the constraint in the consultants Terms of Reference to the effect that 'any proposals to amend pricing structures should not result in a decrease of fares revenue overall'. If we wish to adhere to this constraint in the long run we should either *decrease* fares or hold them constant, but *not* increase fares. Increasing fares would be likely to lead to a short-term boost in revenues which is likely to turn into a loss in revenue in the long run. This also suggests that any attempt to use fare increases as a device to reduce overall levels of subsidy is likely to be superficially attractive in the short run but ultimately self-defeating.

Is there significant spare capacity on CalMac routes that could accommodate significant increases in volume of traffic from fare decreases? Yes. Capacity limitations are more likely to be binding for vehicles than passengers, and on six under-utilised routes identified by the consultants capacity utilisation ranged between just 14% and 32% (p. 72). Even on the four capacity-constrained routes identified by the consultants, capacity utilisation (vehicles) ranged between 54% and 64% (p. 70). We would therefore expect that vehicle capacity utilisation is below 50% on most CalMac routes.

Clearly there will be seasonal, and possibly weekly and daily peaks, where capacity may be put under pressure on individual routes, but that is what differential pricing such as seasonal and peak pricing exists for (CalMac tends to introduce peak pricing in cases where capacity utilisation is greater than 85% (p.26). The point is that there is already substantial spare capacity across the CalMac fleet that could absorb significant increases in user numbers.

What would be the cost and the benefits of instituting major across-the-board fare decreases? How much should the fare decreases be? That would require much more work than has been possible here, but there is room on the back of my envelope for one more calculation which may be useful in indicating ball park orders of magnitude. CalMac's traffic revenues in 1998-99 were £32mill (p.34). Suppose EKOS is right, implying that the short term weighted elasticity of demand for CalMac services is only about -0.4, but suppose also that the elasticity of demand rises up to and even beyond unitary elasticity in the long term, as the empirical literature suggests it might

Let us start with a fares decrease of 10% across the board. The immediate effect of this would be to increase traffic volumes by about 4% (weighted by importance in the revenue stream), partially compensating for the loss in revenue per user. The immediate cost in terms of loss of revenue would be about £1.8mill. After this immediate impact, user numbers will increase and the implied loss in revenue will decrease as the longer

term effects of the fares decrease filter through. In the longer term, we would expect the stimulating effect on user volume should compensate for the loss in revenue per user and the longer term effect may be to boost traffic on CalMac routes by 10% or more.

Caledonian MacBrayne ferries carried 4.8 million passengers in 1999, 895,000 cars, and 96,000 commercial vehicles (*Scottish Transport Statistics*, No 19 - 2000 Edition, Scottish Executive), and using the median long run elasticities of –1.5 for cars –0.9 for passengers and -0.6 for CVs we developed above, that suggests that in the long run the 10% fare decrease would lead to CalMac carrying about 130,000 extra cars, 430,000 extra passengers and 58,000 extra CVs annually – and at this point the initial fares decrease should be responsible for *increasing* CalMac revenues on an annual basis, compared to what they would have been in the absence of the fares decrease.

This is likely to represent a considerable and (and, crucially, sustainable) boost to local economic development that would be highly cost effective and largely (or entirely) self-financing in the long term. There are economic techniques which can be applied in such cases to provide estimates of the effect on local areas and in the aggregate.

In fact, the implications of our earlier analysis is that it would be worthwhile considering immediate fare decreases of 20% or even more, given the expected price elasticities, the likely scale of potential economic impact on the economies of the Highlands and Islands, and the current absorptive capacity of the CalMac fleet. Larger fare decreases should also be put on the agenda, but these are more likely to bring in additional longer term investment implications, reflecting need to expand capacity.

CONCLUSIONS

The main argument in this note is that it is essential to fully set out the likely impact of fare changes in the long run as well as the short run. If we do so properly, it radically alters the conclusions we come to about the effects of CalMac fare changes on its three objectives. Trade-offs (e.g. between financial and economic objectives) that appear strong and severe in the short term can soften or even disappear altogether in the long run. It is quite conceivable that a programme of systematically reducing (immediately and over time) the overall level of fares on CalMac will be consistent with *all* three objectives of CFares in the long run.

This note also suggests a possible factor that may at least have contributed to the high level of fares in CalMac (compared to domestic ferry operators in many other developed countries) that we noted earlier. When elasticity of demand is around –1 in the long run, we can opt for a variety of price regimes including high fares/low volume and low fares/high volume and it will make little difference to company revenues and profits (subject to available capacity). Through a preoccupation with short run effects it seems that Scotland may have opted for the high fare/low volume end of the spectrum when other options have been available.

We have only looked at the demand side here and a full analysis would have to bring in the supply side, including short run capacity and long run investment considerations. The Scottish Office in the past recognized the importance of these considerations (e.g. see The New Ship Effect on the Caledonian MacBrayne Ferry Network, R. A. Henderson *Economic Research Paper*, no 2, Scottish Office, 1996).

All we have been able to do here is raise questions and suggest that there is a need for reassessing the basis on which the economic effects of fare changes on CalMac routes. Joined up policy thinking reveals that there are many ways that local economic development can be stimulated through grants and subsidies in the regions of Scotland. If we consider reductions in ferry fares for local residents, local businesses and tourists, the analysis in this Note suggests that reductions in ferry fares may be a highly effective method compared to alternative methods. Not only can it directly stimulate local economic activity, the analysis here suggests that such reductions may be largely or entirely self-financing in terms of CalMac revenues.

Ironically, the analysis here suggests that, if we had to use an existing set of elasticity estimates to guide policy and fare setting in this area, that the most appropriate would be the old H&M (Henderson and Maddison) estimates. However, there is a real need for new and empirically grounded elasticity estimates of CalMac's routes to be produced, and on a consistent and continuing basis.

It is perhaps surprising that so much emphasis has been placed on fuel prices compared to ferry prices in public debate in Scotland recently. Fuel prices are a reserved matter for Westminster while CalMac's fares are a devolved matter and can be a major cause of transport costs for whole regions of Scotland. Ferry prices are actually something that we can do something about in a Scottish context. This lack of fuss about ferry prices may be because high ferry prices are taken for granted. If this note has served any purpose, then hopefully it has shown that this attitude can be queried.

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