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Productivities. Efficiency, and Three Policy Propositions

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The **PERSONAL SOCIAL SERVICES RESEARCH UNIT** undertakes social and health care research, supported mainly by the United Kingdom Department of Health, and focusing particularly on policy research and analysis of equity and efficiency in community care, long-term care and related areas—including services for elderly people, people with mental health problems and children in care. The PSSRU was established at the University of Kent at Canterbury in 1974, and from 1996 it has operated from three sites:

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Productivities, Efficiency, and Three Policy Propositions

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PRODUCTIVITIES, EFFICIENCY, AND THREE POLICY PROPOSITIONS

This note applies ECCEP estimates of service productivity curves, service prices, and service utilisation, and the predictions about the consequences of achieving perfect efficiency, in the discussion of three policy propositions. It deals primarily with only two of the seventeen outputs for which productivity curves have been estimated.

Section I

- defines two dimensions of productive efficiency analysed,
- explains and justifies in the context of reform argument the choice of three scenarios setting the framework for deducing the implications of productivities, prices and information about utilisation for what would be the best allocation of resources, and
- relates the targeting implications of making the best use of resources to targeting strategies for investment in efficiency improvement.

Section II suggests what light the results throw on three policy propositions:

- allocate more to the less on the less dependent, if necessary, releasing resources by allocating less to the more dependent
- spend less on the older community services, and
- give higher priority to caregivers, less to users

I. EFFICIENCY VARIATIONS

Aspects of efficiency

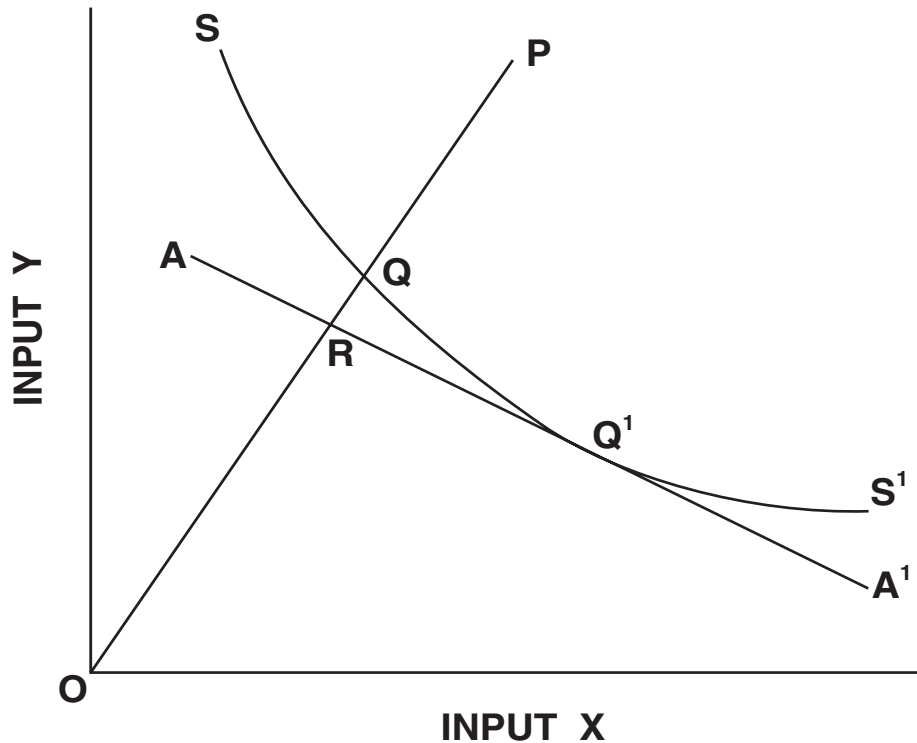
Following earlier PSSRU work, eg *Matching Resources to Needs* and *Resources Needs and Outcomes*, the analysis distinguishes two kinds of inefficiency in production: 'technical' and 'input mix'.

- By *technical efficiency*, we mean the quantity of outputs produced from the level and mix of inputs: the greater the output from the inputs, the higher the degree of efficiency.
- By *input mix efficiency*, we mean how effectively the relative productivities and prices of inputs are exploited to create the targeted outputs at the least cost: the more closely does the input mix correspond to what is required to balance the ratios of the marginal productivities of inputs to their relative prices at the margin, the higher is input mix efficiency.

Figure 1 explains the concept and shows how they are related. It is based on the pioneering paper by Farrell (1957).

Taken with a third aspect of efficiency, the degree of conformity of the mix of outputs to the relative marginal valuations of outputs, the dimensions wholly account for what economists call 'allocative efficiency'; that is, efficiency in the use of resources given the existing technology and the results of worth-while investments in applying that technology on the production relations. The contrast is with 'X-efficiency', which is activity to shift producing organisations from satisfying to optimising behaviour (Leibenstein, 1966, 1976, 1979).

Figure 1



Appendix 1, Inset 2

Input mix, technical and output mix efficiency

Diagram A: Technical and input mix efficiencies

TECHNICAL EFFICIENCY is the maximisation of the quanta of outputs from the chosen levels and mix of inputs.

P describes a producer which makes each unit of output with a certain input mix. The curve SS1 describes the substitutability of x and y at the production frontier; the combinations of x and y which the perfectly efficient producer could use to make the unit of output.

Q is a perfectly efficient producer making the unit of output with the same combination as P. The perfectly efficient producer makes OP/OO as much output as P from the same inputs. So OQ/OP is a measure of the technical efficiency of firm P.

INPUT MIX EFFICIENCY is the adjustment of the mix of inputs to their relative prices and technical substitutability so as to produce the chosen outputs at least cost given the degree of technical efficiency.

Substitution opportunities for the perfectly technically efficient firm is represented by SS1. The relative prices of inputs x and y are indicated by the slope of the line AA1.

Working with the input combination $Q1$, a firm of perfect technical efficiency would make the unit of output at OR/OO times the cost of a perfectly efficient producer working with input mix Q, assuming that input prices are invariant with respect to the quantities purchased. Also if producer P changed its input mix to that of $Q1$, its costs would be reduced by OQ/OR . So OR/OQ measures input mix efficiency.

Diagram A is taken from Farrell's classic paper. It assumes constant returns to scale; that the 'efficient production function', the true frontier production function, is known; and that input prices are invariant with respect to input quantities purchased. Relaxation of these assumptions complicates but does not basically change the argument. The axes measure inputs of two inputs, x and y, used in the production of a unit of output.

Three optimisation scenarios and the nature of the reform logic

We postulate three scenarios for the discussion of input mix efficiency.

- *Optimisation subject only to the overall budget: 'unconstrained optimisation'*. At first sight, this seems to be the most relevant concept. However, it assumes, first, flexibility in the potential commissioning and supply response. The model results based on it would be less reliable, the longer is the period required for a commissioning or supply response, since presumably the improvement of the productivities is continuing, albeit at varying rates and discontinuously in most places¹. Also made is an assumption underlying all of the subsequent optimisation analysis: that the supply of services is price elastic.
- *Optimisation subject both to the average budget per case for each analysis group: 'group-constrained optimisation'*. The device of fixing group budgets, and then inviting care management teams and managers at other levels to optimise within them is found in programmes in America and elsewhere, as *Matching, Resources Needs and Outcomes*, and *Care Management Equity and Efficiency: the International Experience* described. Fixing budgets for target subgroups is a technique well adapted to the post-reform devolution of responsibility and an invitation to optimise flexibly to care management teams and others. As well as assumptions about the resources required to produce the targeted level of output for the group, these group budgets implicitly embody equity judgements; ie they are statements of the relative priorities to be accorded to benefits for each group. The assumptions about the relations between service inputs and outputs are not what is of interest in the current pattern of allocations in this study, because productivities are directly estimated and yield more precise knowledge than would be available to managers. But it is illuminating to analyse the equity judgements implicit in the group averages observed. So this optimisation scenario is of interest because it illuminates the use of a device of the kind used in systems with the kinds of logic we have in post-reform community care, and because the actual observed group averages reflect collective equity judgements.
- *Optimisation with fixed total budget of each service: 'service-budget-constrained' optimisation*. The community care white paper of 1989 diagrammatically contrasted the pre- and post-reform systems. In the pre-reform system, the total budget was divided between services covering a wide geographical area, and filtered down within services to service production units. The effect was incremental change in service supply of the kind described for a wide range of local government expenditures in such studies as that by

¹ This is probably the case taking all authorities together, because the speed of their adoption of arrangements based on the post-reform logic has been so different. Some of the ECCEP authorities have changed discontinuously. For them, what is more important than a rate of change continuously occurring than the timing of some major change which is their response to the reform for a substantial period of time. The late adoption of an innovation may sometimes be a sensible strategy to ensure that the change is made with fuller information (Dong and Saha (1998)), but that appears generally not to be the case among authorities delaying the full implementation of the devices central to the community care reforms until after 1995. In all cases of the diffusion of innovations, what is important is the degree to which the change accomplishes the most efficient relationships observed between resources and outcomes. That degree probably varies greatly between production units. It was the experience of the PSSRU community care projects in budget-devolved care management, that there was no within-project technical progress other than in the original Kent Community Care Project, and that the other project operated with a relationship between resources and outputs at or below the KCCP half-way through its learning period, rather than at the level achieved by the end (Davies and Chesterman, 1996).

(Greenwood, Hinings, and Ranson, 1977; Kelly, 1989). From this would be predicted a permanent imbalance in the same direction: the excessive supply of the services with the longest history over which to build the budget base, and the under-supply of the relatively new services. In the post-reform system, the budget was to be allocated from a high level to the care management team who would then buy in services already at bulk-contracted set prices or spot purchase services. The DH SSI and Audit Commission have continually pressed authorities to redistribute spending between services and suppliers in response to relative price and quality and needs for change and diversity. However, most authorities are working with a hybrid between the White Paper's old and new models for the flow of purchasing power. So the significance of this optimisation scenario is that it assumes a form of rigidity important in the authorities whose behaviour has been least affected by the reforms.

Alternative targeting policies for investment strategies

Investment can be seen as the diversion of resources from direct service consumption in order to improve productivities, efficiency in exploiting them, and the capacity of the system to balance outputs and who benefits from them most fairly. So efficiency improvement is best seen as an investment activity.

The selection of investment strategies requires a balancing of benefits and costs. ECCEP has little direct evidence for the evaluation of the costs of alternative strategies. However, the optimisation analysis allows some simulation of alternative targeting policies for investment².

Equity and Efficiency, the next report to the DH on this stream of ECCEP will describe efficiency variations and their implications. Section II instead uses the results to test and explore the implications of three propositions about equity and efficiency

II. THREE POLICY PROPOSITIONS DISCUSSED

Space precludes the analysis of more than three, although many more could be postulated. The propositions are to:

- *Allocate more to the less dependent, if necessary releasing resources by allocating less to the most dependent, so as to release resources to achieve preventative effects for the least dependent. The released resources might be used for some combinations of more users of lower dependency and higher outputs for those of lower dependency now receiving service.*
- *Spend more on the newer services*
- *Give higher priority to outputs for caregivers compared with users.*

² In particular, the study is considering benefits from focussing

- only on the most inefficient input mixers, and
- evenly on most cases.

Within the former, it is simulating the benefits of fixing different levels for the boundary of the efficiency tail below which the effort would be concentrated. Results are stated in Davies, Fernandez and Nomer (1998).

1. ALLOCATE MORE TO THE LESS DEPENDENT

Context

Pre-reform community care was not targeted with fine discrimination. A higher proportion than now of total resources were allocated to persons of low dependency, there were few high cost and complex service packages, and the content of services were geared towards persons of low dependency, to the degree that they had been deliberately managed to serve an identified target group. The result was that many obtained services without the benefits most stressed in the policy logic of the reforms, though users appreciated the services, partly because they were then very heavily subsidised or free for most.

It has become conventional wisdom in several countries to argue that this new pattern of targeting causes the loss of effects which could be of importance to policy goals; for instance, the loss of effects which make less likely admission to institutions (Tinker, 1996; Clark, Dyer and Horwood (1998), Howe (1997), Turvey and Fine, 1996). However, many statements of the arguments have not been highly developed, and few have tested the arguments against evidence. For instance, the argument often fails to distinguish the case for the subsidisation of 'low level services' to larger numbers of users, from the case for the subsidisation of 'preventative services'. Nor does it distinguish between services for whom the rationale is partly that they have 'preventative' effects, and it is the combination of user circumstances with service content which actually achieve statistically demonstrable preventative impacts.

The issue is whether the provision of low levels of service to larger number of cases would reverse the productivity gains created by the reforms. Currently, the pressure of needs and resources causes most authorities to discriminate among low dependency cases on the basis of risk and other subtle factors affecting productivities. So the very stringency of targeting in many authorities has probably greatly improved productivities over the sample as a whole.

The argument by those advocating redistribution to low level service does not distinguish

- *Redistribution of resources and outputs to the less dependent without greatly extending numbers of lower dependency.* The productivities shown by ECCEP are likely to be maintained in this scenario.
- *Redistribution towards many more persons of lower dependency.* The proportions of lower dependency levels now smaller in the user population than fifteen years ago. Current productivities would be more difficult to maintain.

It is probable that the complete loss of the productivity gains would be unlikely for various reasons.

- There is now much greater clarity in the prioritisation of goals by ssds and the consensus about the priority attached to some of them at all levels of management. The evidence of *Need and Service Productivities in Post-Reform Community Care*, based on 150 interviews with managers at all levels in the departments, is particularly striking about this, and how the new sense of purpose is associated with patterns and outcomes at the case level.
- The big improvements in the standards of management have enabled the priorities to be applied more effectively. ECCEP interviews with 133 managers at all levels in the twelve areas established that there was a high degree of consensus within and between authorities about some goals (Davies, Fernandez and Nomer, 1998). It would be surprising if this consensus did not pervasively affect policy and practice detail, structures and

arrangements at all levels. There is a sense in which the British social services for elderly people have been managed in such a way as to achieve the effective attainment of goals for the first time in their history.

- Mechanisms have been put in place which make discerning targeting feasible. The reforms have focused field attention on securing better performance of the core tasks of care management. Without the care management mechanisms, it is difficult to see how the productivity improvements could have happened.

In particular, if there were statistically reliable guidelines describing the relationships between circumstances observable at screening and assessment and the preventive effects, it is arguable that the loss of productivity caused by broadening the range of low dependency recipients would be reducible. But is it logically and technically feasible to target a larger population of low dependency cases on the basis of high productivity for important outputs?

- ECCEP productivity curves indicate that there are good assessment markers of productivity effects among the existing user population, despite its relative homogeneity, and further refinement (eg using standard assessment information alone as predictors) would clarify the limits of the predictability of the productivity effects. However, more analysis is needed.³
- The effects of extending low level service to a much larger number of users are difficult to estimate. That would require the prediction of the predictors of productivity differences for persons in the broad age group at risk but not yet in contact with the social services and related agencies. The difficulty with testing the predictability from the general population is that databases are thin with respect to subtler assessment-type predictors.⁴

These arguments illustrate both that the issues demand analysis well outside the ECCEP remit and that there are analyses for which the ECCEP database can be used.

Service contributions, productivities, and efficiency variation

The resources released could be used either to cover more lower dependency cases or to improve their outcomes. The model tells us more about second. The reason is that to greatly increase the number of low dependency cases will be to change their risk factors in ways not

³ Were results of good predictive power not to be forthcoming, it would probably be for one of three reasons. [a] One is that the population is already selected by the likely risk factors, and so might be too homogeneous for the risks to differ enough to be statistically predicted. [b] The second is that for many, the risks may appear to be inherently random events; ie unrelated to any of the circumstances which could be observed. (In practice, the issues are likely to be of the form whether strokes, falls causing fractures with permanent handicapping consequences, disease-caused degeneration in function, the death of a spouse and the like are predictable.) These two reasons are connected. The incidence of some events and changes in circumstances which might seem to be random in a homogeneous population might be predictable in a more heterogeneous population. [c] The event or change might be very rare, lowering the reliability of prediction (ie increasing the ratio of standard errors to true proportions and confidence intervals around estimates), other things being equal. Given their intrinsic visibility, rare events may also be less reliably recorded.

⁴ The appropriate database would have to be for a more general population. Because some of the events and changes it would be necessary to predict are rare, large samples are necessary. Also the nature of the risk factors require a database with a specialised focus. There are examples of such longitudinal databases internationally, with greater scale and depth of cover of relevant variables than in the UK, but there are few of large scale in the UK. For this population, the population would be heterogeneous, and the more events and circumstances might be predicted. But the events and changes might be very rare, lowering that probability.

allowed by the analysis.⁵ So the ECCEP modelling provides more reliable estimates for the second rather than the first.

The ECCEP productivity and efficiency results raise important policy issues for the handling of the balance, but the evidence and argument is complex.

⁵ Both options change relative demands on services, and so crawl up or down the service supply curves, affecting optima.

Figure 2

Output gains and average productivities by interval need category

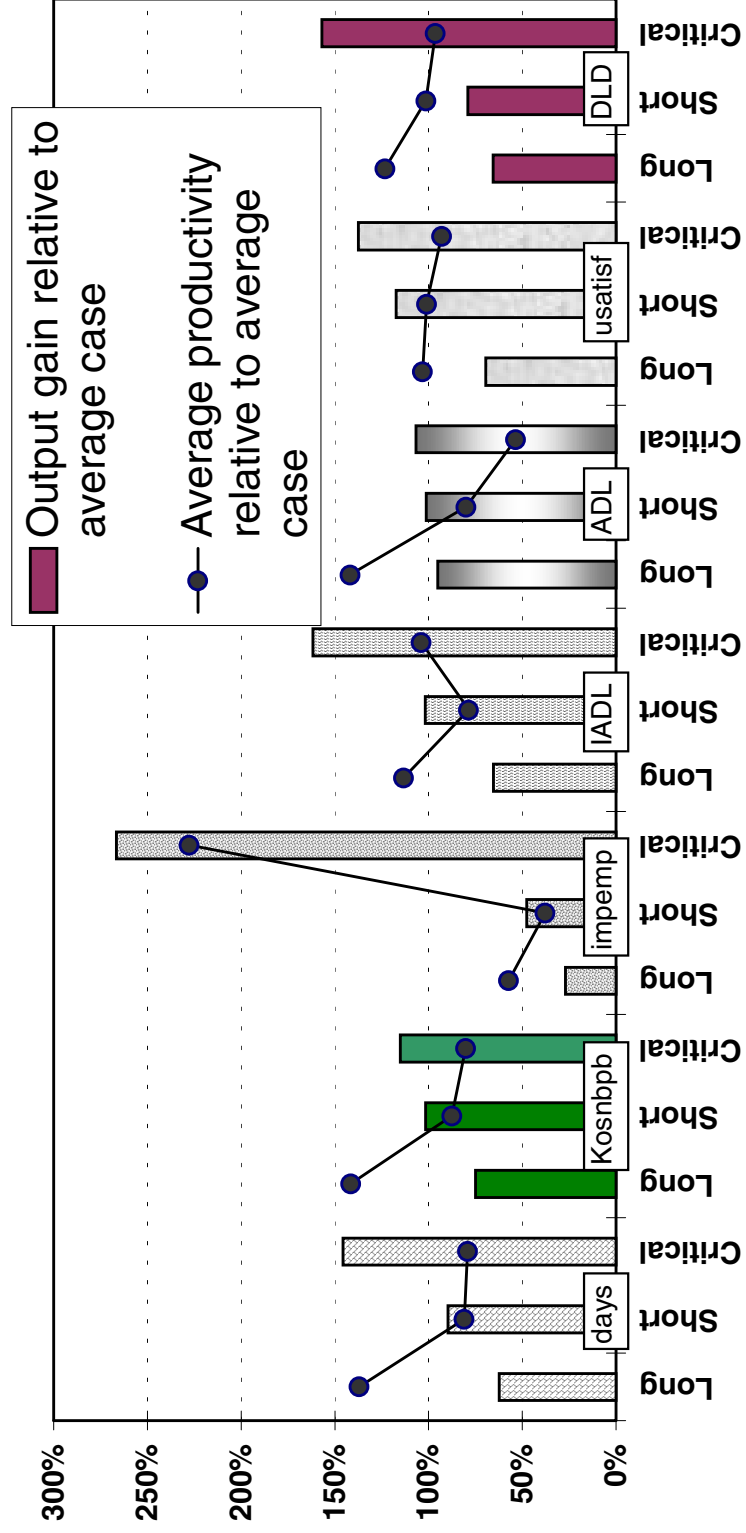


Figure 3
Technical inefficiency index* for days living at home prior to entering institutions

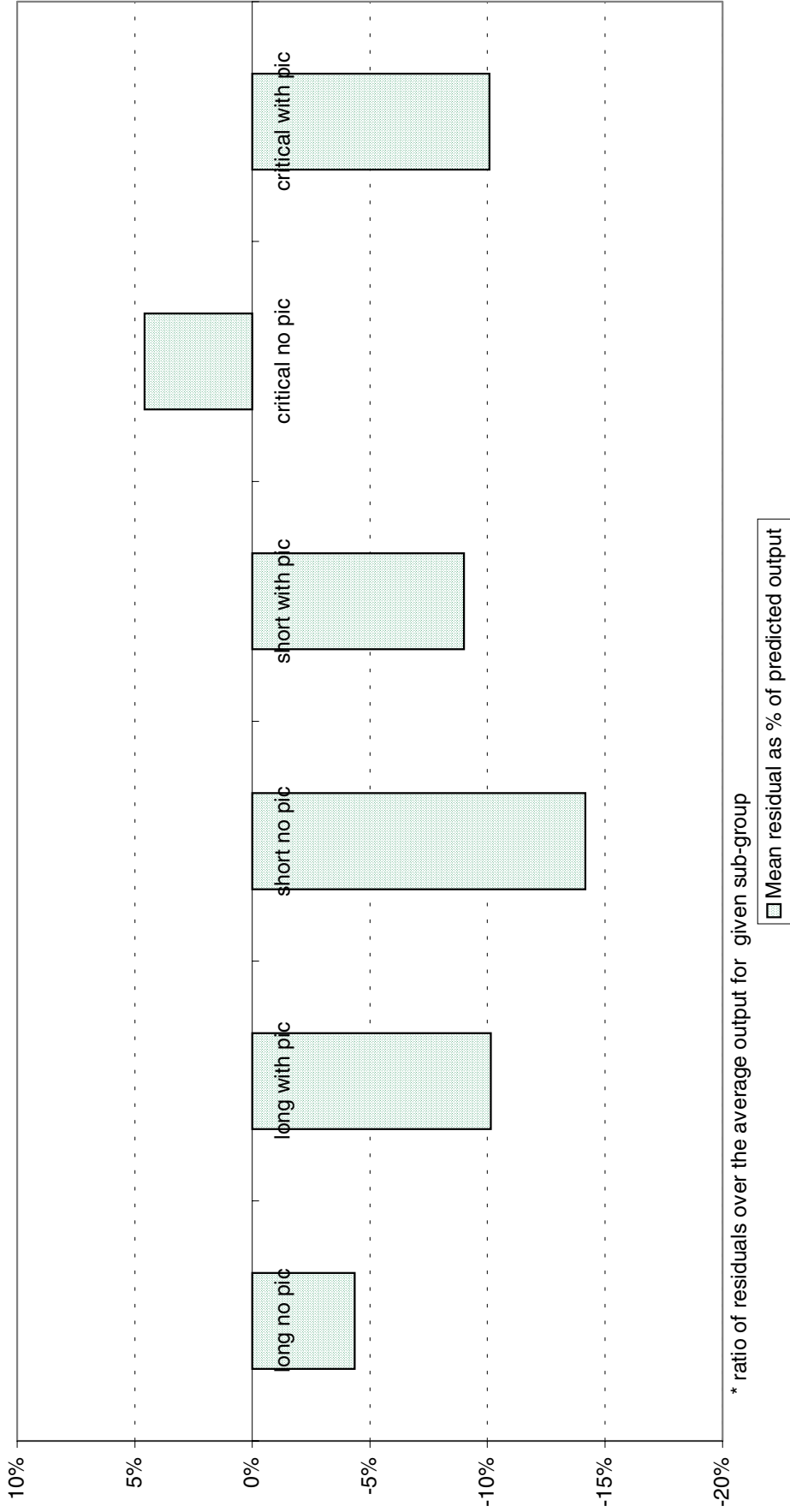


Figure 4
Technical inefficiency index* for Kosberg carer burden scale

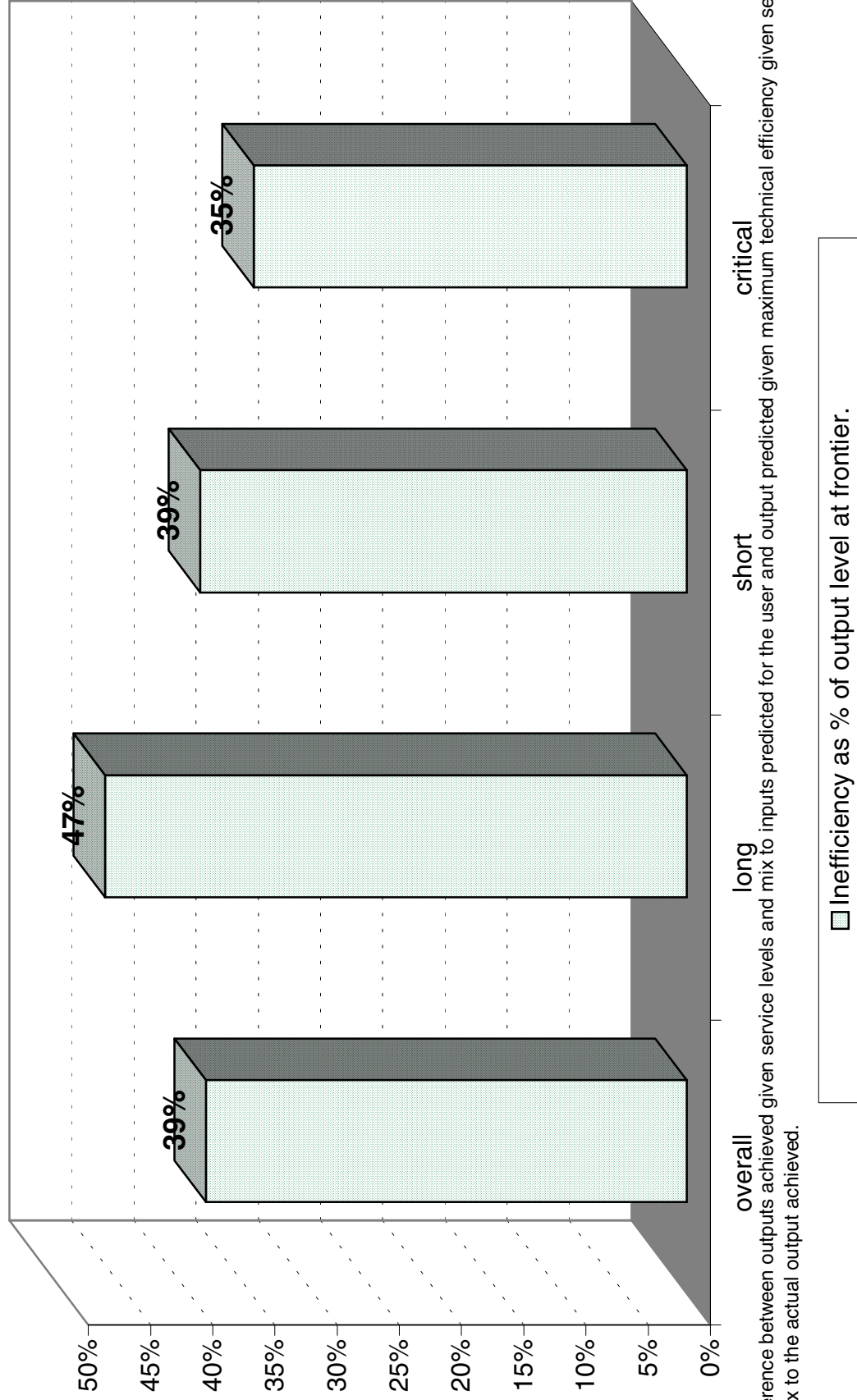


Figure 5

Allocative efficiency for days living at home prior to entering institutions: fixed overall budget case

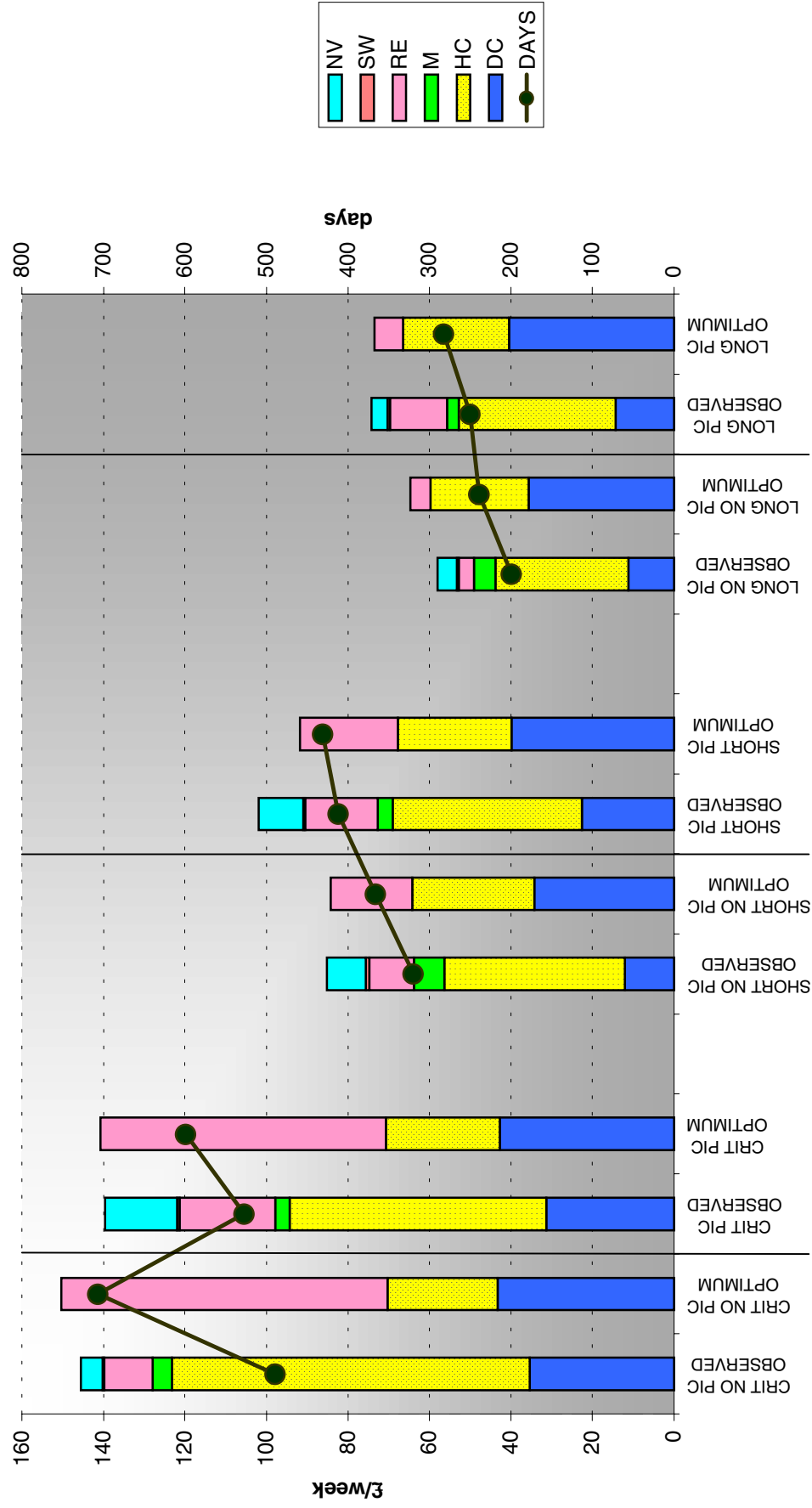


Figure 6

Allocative efficiency for Kosberg carer burden scale: fixed overall budget case

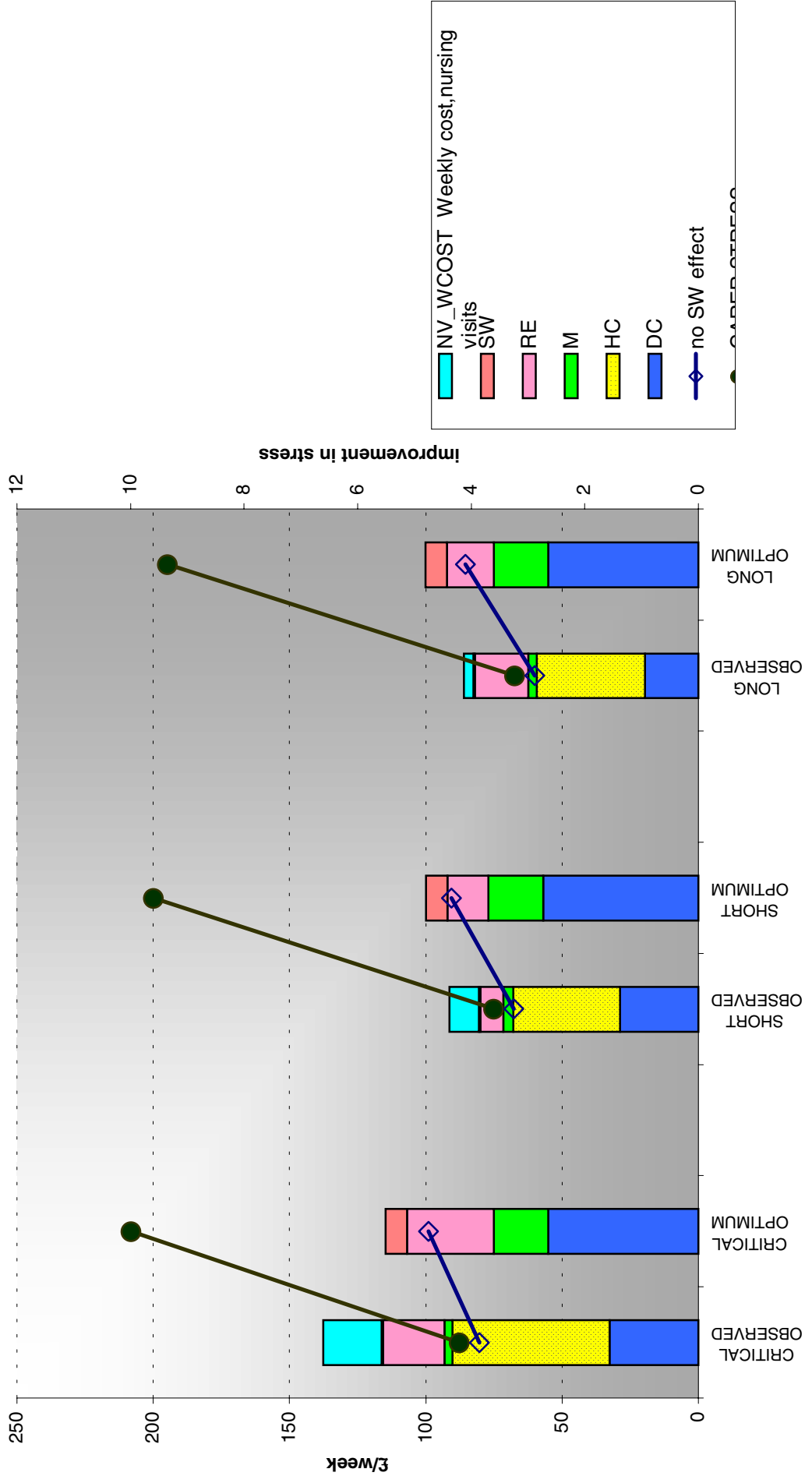


Figure 7

Allocative efficiency for days living at home prior to entering institutions: fixed groups' budget case

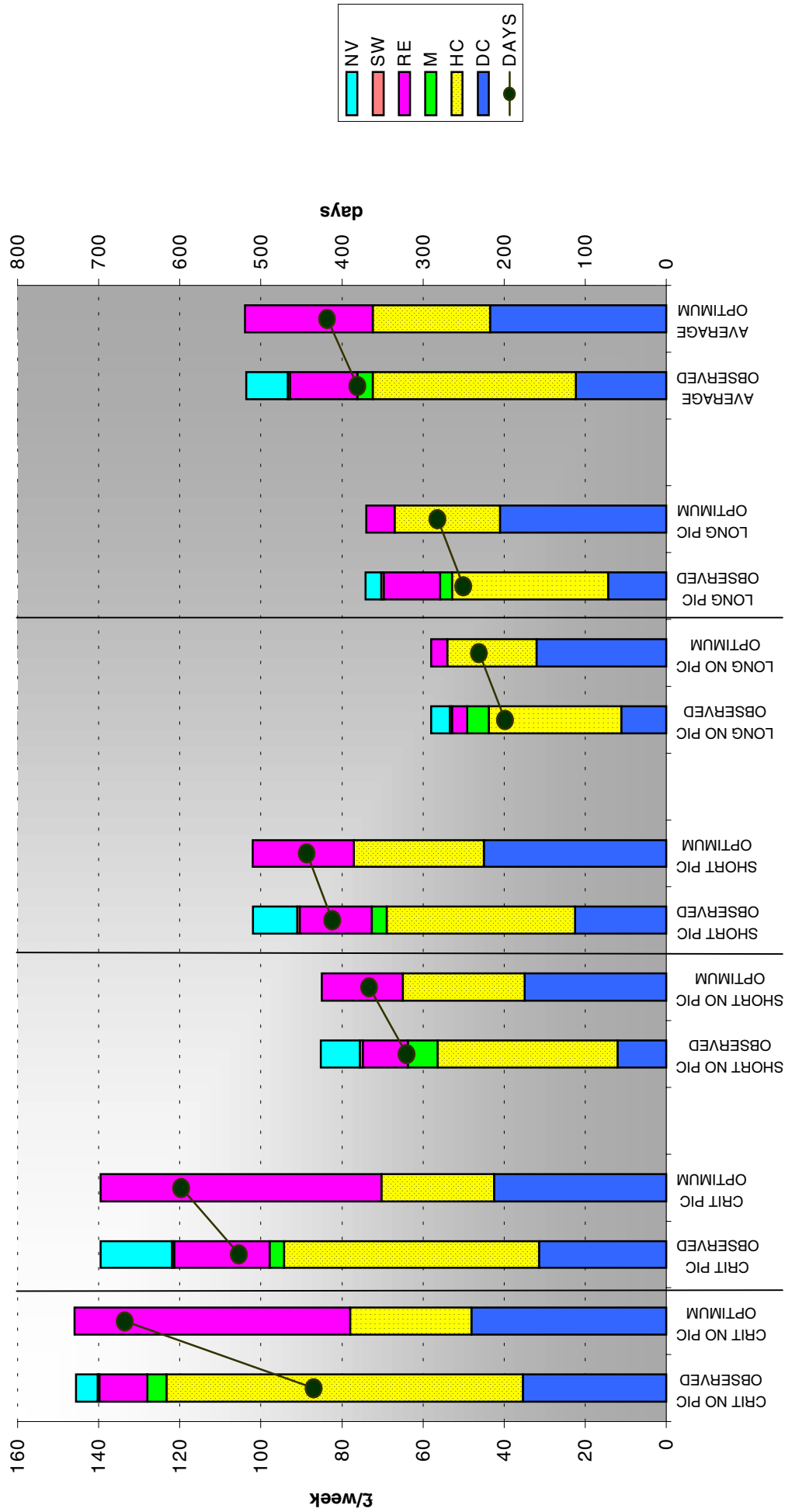


Figure 8

Allocative efficiency for Kosberg carer burden scale: fixed groups' budget case

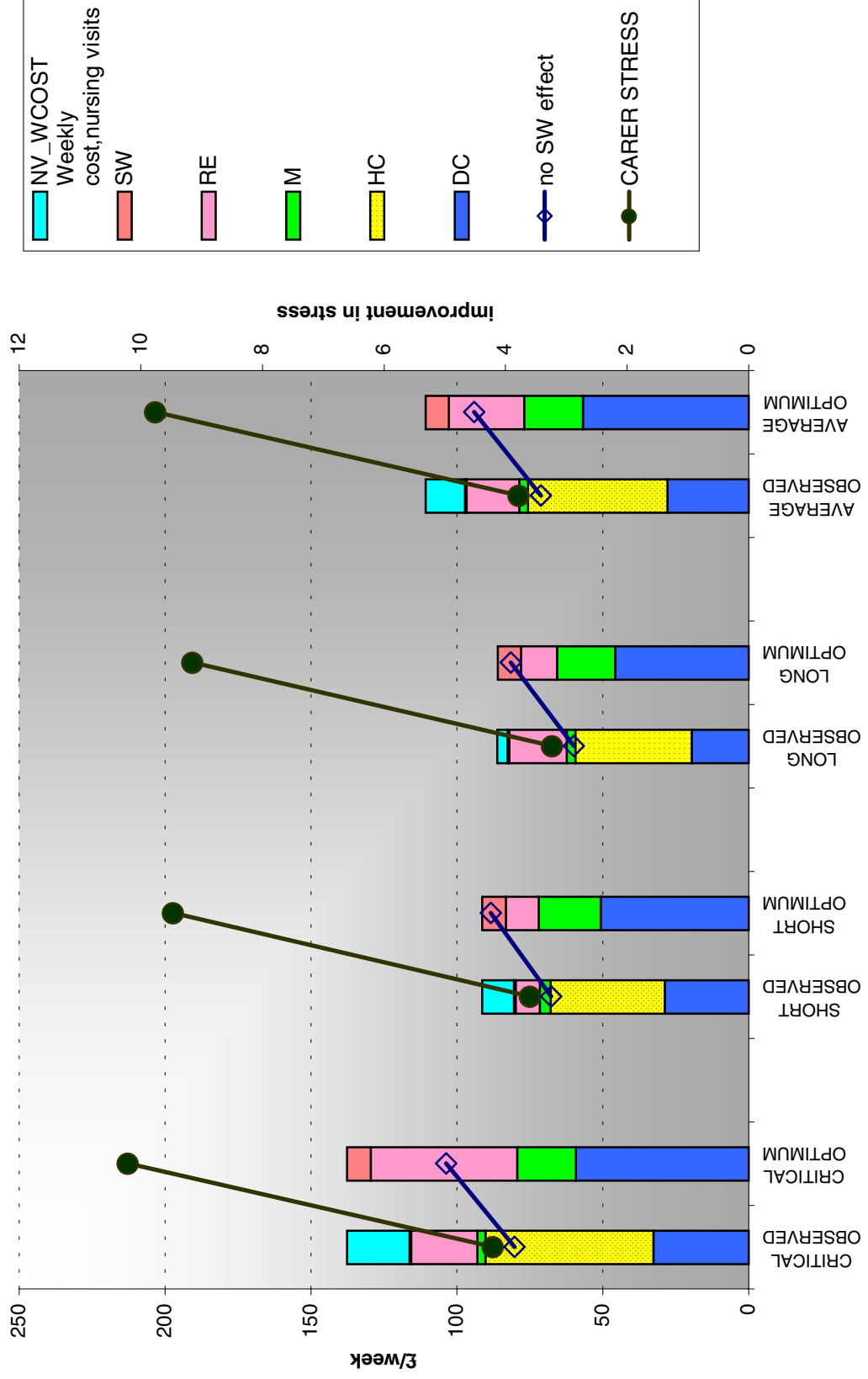


Figure 9

Allocative efficiency for days living at home prior to entering institutions: fixed input's budget case

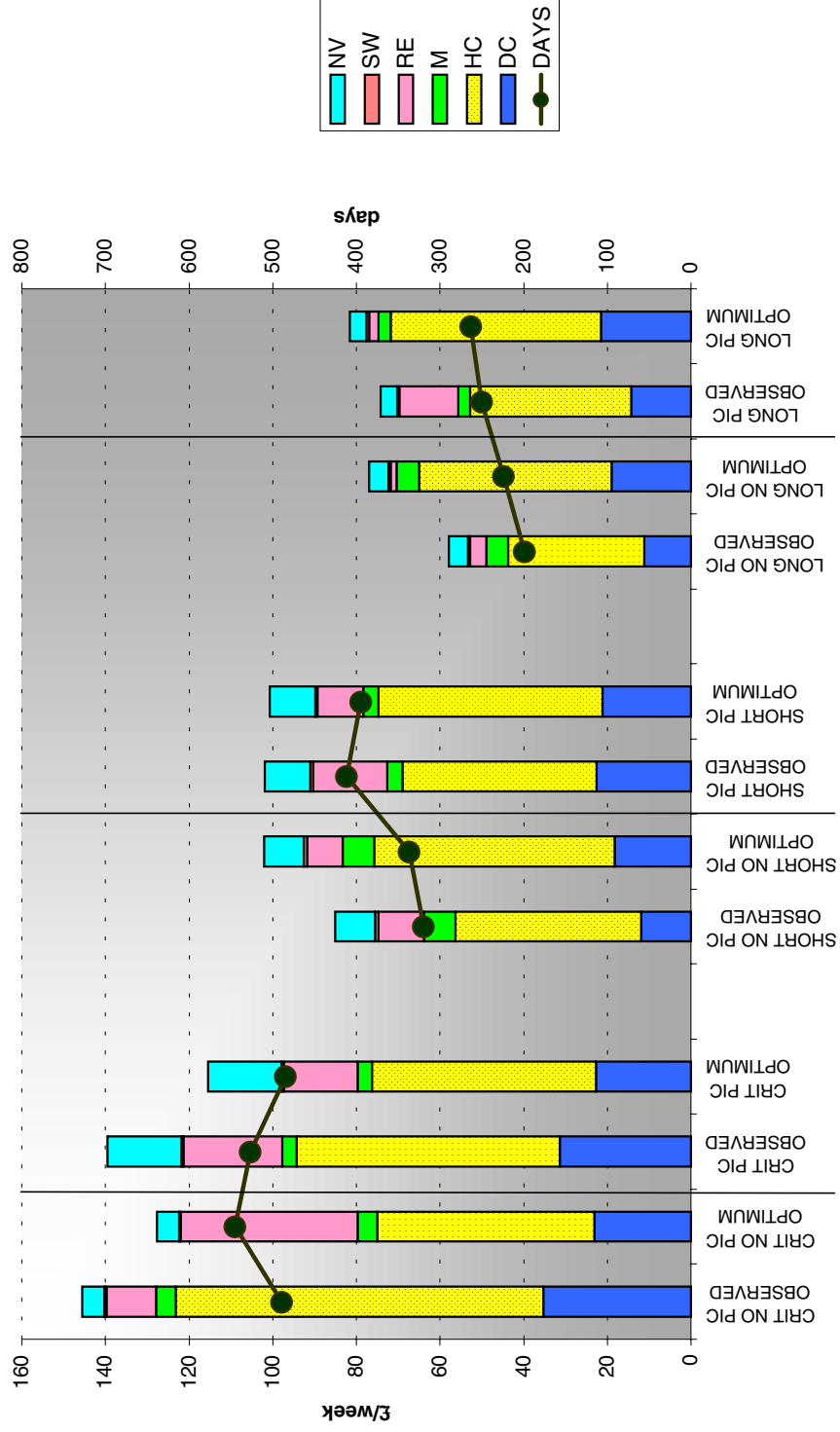
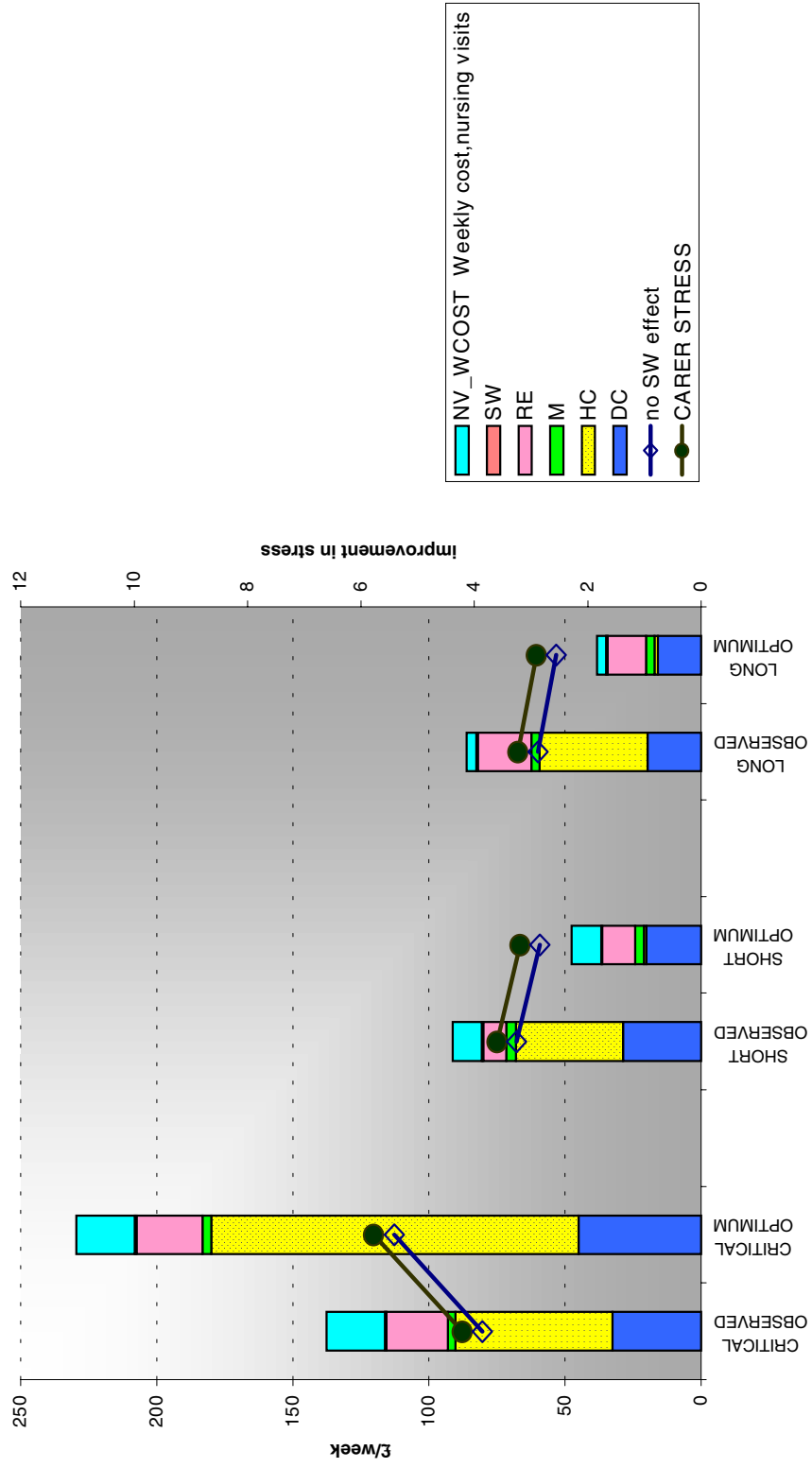


Figure 10

Allocative efficiency for Kosberg carer burden scale: fixed service budget case



The starting point is **Figure 2 [12.1]**, which shows all 17 outputs. For most outputs, there is a negative correlation between average service contributions to analysis groups and the outputs for them; the higher the dependency, the greater the service contributions (outputs), but the lower the productivities. The reasons can be seen by comparing service contributions with the service productivities for groups. Examples are shown for days or perceived caregiver burden. What the modelling shows is that inputs of services for the most dependent are more than large enough to compensate for the lower productivities for them and any other influences which work in the same direction.

What happens if we improve efficiencies?

Consider the two kinds of efficiency distinguished in section III.

- ***Technical efficiency Figures 3 and 4***

The modelling shows that for caregiver stress, technical efficiency is lowest for the most dependent, highest for the least dependent. So the additional resource allocations are compensating for greater inefficiency as well as for the lower intrinsic productivities. There is not the same pattern of association for the number of days spent in the community before entering institutions.

- ***Input mix efficiency***

The scenario with **unconstrained optimisation** is described in **Figures 5 and 6**.

Outputs achieved. [a] For the variable days, with only the budget constraining optimisation, the biggest gainers in output from improved efficiency would be critical interval users without PICS; among the most, not the least dependent. So for this group, investing in improved input mix efficiency is a partial alternative to reallocating to lower dependency.

[b] For the variable reduction of caregiver stress, all groups gain equally in outputs by a large amount.

Budgets allocated. [a] For the variable days, there are only small changes in the average cost of the package.

[b] For the variable reduced caregiver stress, there are more substantial changes. The average package for the critical interval group is reduced, and that for the long interval group increased. So part of the higher cost for the critical interval group is due to inefficiency. Efficiency improvement is again seen to be a partial alternative to cutting outputs for the most dependent users in order to release resources for higher outputs for the long interval users.

The scenario where optimisation is within **existing analysis group budgets** is described in **Figures 7 and 8**.

Outputs achieved. [a] For the variable days, the gain remains greater for users with critical interval need but no PICS than for others, all other groups gaining by approximately the same extent.

[b] For the variable reduction of felt caregiver burden, all groups gain by a large amount, as they did with unconstrained optimisation. It is not necessary to have big reallocations between groups to have the gains from improved allocative efficiency.

Budgets allocated. Budgets allocated are constrained to remain the same after optimisation. The results for this scenario even more clearly illustrate that investment in efficiency improvement is an important potential alternative to the redistribution of the budget. Balancing the investment in efficiency improvement against redistribution is one of the keys to keeping some of the gains from the reforms for the most dependent and making other preventive gains for the less dependent.

The scenario with **fixed overall service budgets** is described in **Figures 9 and 10**.

Outputs achieved. [a] For the variable days, there remained a small increase for critical interval cases without PICS, but only small changes for other groups, with perhaps marginal improvements for long interval cases without PICS. [b] For the variable reduction in felt caregiver burden, there was an increase for critical interval cases, but a reduction for others.

Budgets allocated. [a] For the variable days, the increased outputs for critical interval cases without PICS would be accomplished with a smaller budget. There would be a substantial reduction in the allocation to critical interval cases with PICS, and a reduction in the output among them. Short and long interval cases without PICS would be allocated more expensive packages, though there would be little output gain compared with actual allocations. There would be little difference in the budget for other groups.

Overall, inflexibility in changes to the balance of services through macro- and micro-commissioning negates the gains from efficiency improvement.

The overall conclusion is that there is a case for the redistribution from higher to lower dependency users. But investment to improve efficiency is a partial alternative. The models provide the benefits side of cost-benefit evaluations of alternative strategies for efficiency improvement. The analysis in *Equity and Efficiency* investigates the sensitivity of these benefits to two alternative targeting policies for the investment: targeting at the most inefficient, and targeting evenly irrespective of actual efficiency.

2. SPEND MORE ON NEWER SERVICES

Context

We have argued that the pre-reform system allocated the budget between broad services at a high level of the organisation, in response to only the most filtered signals about what would be the aggregate of the optimal – or even substantially better - mixes for individual cases; and that it was part of the reform argument to create a system which would allow such signals to work more directly and in a way which would secure greater and faster change in service balance and content. However, we argued, the implementation of the reforms are far from complete in this respect. In most authorities, there remains an element of macro-allocation to broad services on the basis of filtered and distorted signals about what would be the best mix to make available. Moreover, the development of new services frequently depends on bottom-led initiative and innovation. Our studies of efficiency-improving innovations during the late 1970s and early 1980s showed their patchiness, low incidence, the uncertainty of

their lives, and their dependence on local pioneers of unusual skill and determination. (Davies, 1981; Davies and Ferlie, 1982; 1984; Ferlie, Challis and Davies, 1989).

Therefore, it is likely that the older services would have an in-built budget advantage. Though not incrementalist to the degree found during the 1970s and 1980s, the adjustments of quantities as well as content would be less than required for the best mixing of services. There are still many obstacles even to precisely the kind of innovation which the new managerialist argument, of the mid 1980s and later, was most anxious to see developed (Audit Commission, 1985). That would create a bias towards the provision of excessive quantities of old, well-established services, and insufficient quantities of newer services. If this were so, it would be reflected in the patterns of difference between actual allocations and the best use of resources.

The evidence which follows investigates this by comparing the results of optimisation for the two outcomes. Again, the three optimisation scenarios are considered. The two oldest-established services are home care and meals. The hypothesis is tested by comparing redistributions to and from them with redistributions to day and respite care, as newer services. Packages also contain social work and nursing visits.

The balance of new and old services in current and optimal packages

For the comparisons for the **unconstrained optimisation**, we return to **Figures 5 and 6**.

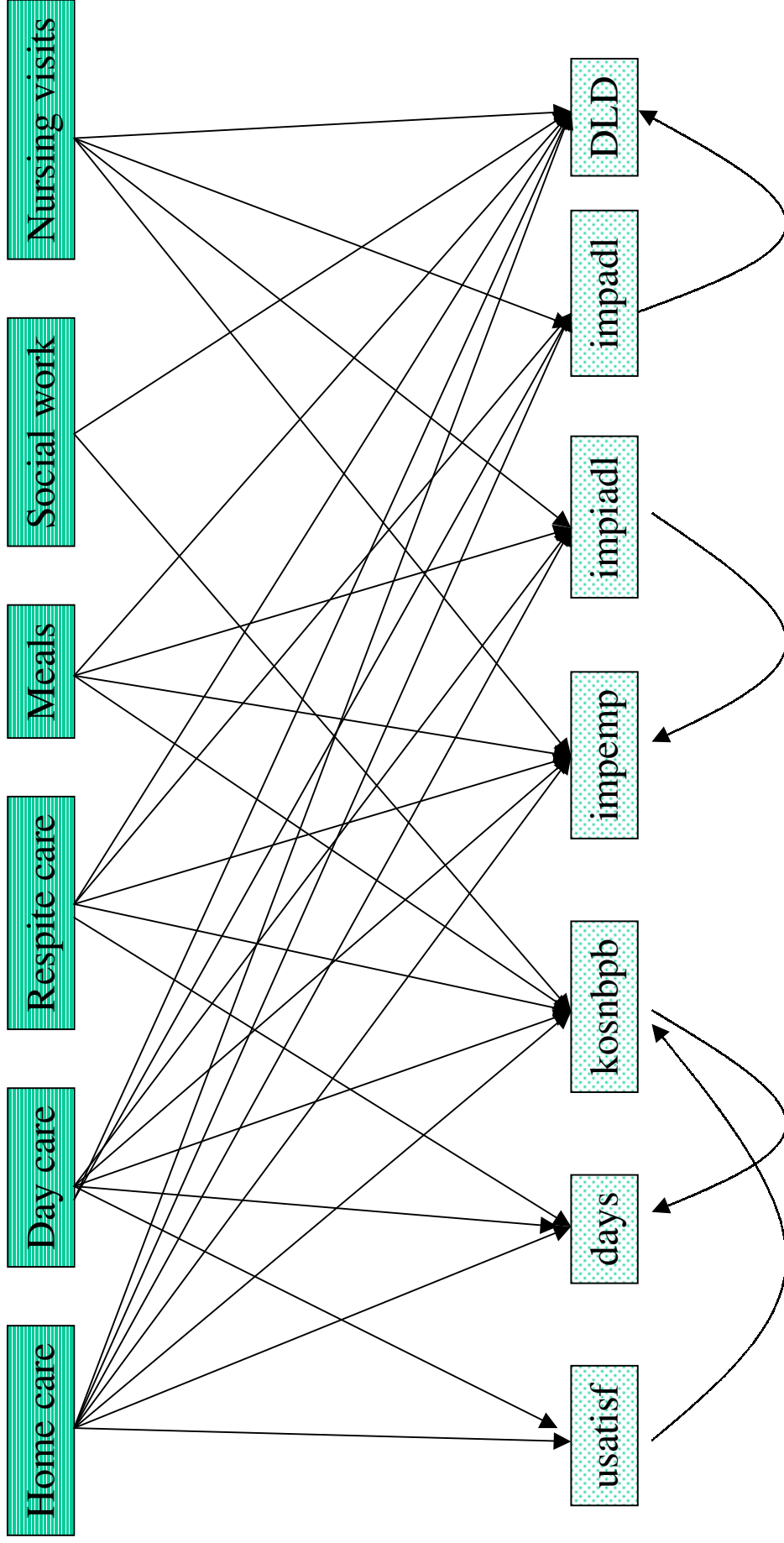
- For the variable days, the most efficient input mix would on average contain considerably less home care for every user group. It would also contain fewer meals. In contrast, the packages for critical and short interval cases would contain more respite care; very much larger quantities in the case of critical interval groups. The package for each group would contain more day care; much more in the case of long interval cases. Quantities of day care and home care would be much less unequal between group packages, reflecting the diminishing returns for each service.
- For the variable reduced felt caregiver burden, home care would disappear from the average package. But the consumption of meals would increase in line with the consumption of day care in every group, reflecting the complementarity between the two services shown in the productivity diagrams (Figure 8.28). Respite care is increased for every group also.

For the comparisons for the **optimisation with fixed budgets for each analysis group**, we return to **Figures 7 and 8**.

- For the variable days, there is again a reduction (and equalisation of allocations between groups) in home care. There is also the reduction of meals. For all groups, there is an increase in day care. For all groups except one, the respite care level is either maintained or increased, and by a substantial amount for critical interval cases.
- For the variable reduced caregiver burden, home care is reduced drastically in all groups. But the utilisation of meals is increased, again by all groups. Respite care is increased for most groups, particularly for critical interval cases, as might be expected.

The specification for the **optimisation with fixed budgets for each service** precludes a test of the hypothesis.

Figure 11
The production of welfare process



The results confirm that optimal input mixes would involve much smaller quantities of the two older services. Only when there is a complementarity with a newer service is there an increase in utilisation. Whether the explanation is the inherent incrementalism of the pre-reform system and the incompleteness of the abandonment of the arrangements which reinforced it, the implication remains that it will be important to secure greater flexibility in commissioning, and more attention to the development of an argument about the circumstances in which what variant of each of the new services should best be used.

3. GIVE HIGHER PRIORITY TO CAREGIVERS COMPARED WITH USERS

It was argued by critics of the community care reforms, and some of the programmes which in important respects resembled them, that the accompaniment to care *in* the community by care *by* the community inevitably meant increasing the already excessive burden on caregivers, particularly female caregivers (Parker, 1985; Walker and Warren, 1996; Finch and Groves, 1983). Rebalancing the benefits in favour of caregivers was an important device to encourage informal caregiving in the argument of the White Paper, and the *Community Care (Carers Recognition) Act 1996* extended the principle of recognising caregivers as potential beneficiaries for additional reasons.

A full analysis would require the comparison of all the analyses undertaken, drawing fully on other insights yielded by the ECCEP project. This section confines itself to

- an analysis of the degree to which the achieving the most important outcomes for caregivers increases or diminishes the service effort required to achieve the most important outcomes for users; and
- an analysis of the differences in packaging required if priority is given to the most important output for caregivers rather than for users.

How user and caregiver outputs diminish the services required for one another

Levels of one or more of the outputs affect the levels of services required to improve another or others, as illustrated in **Figure 11**.⁶ In effect, [a] achieving a higher level of user satisfaction reduces the additional resources required for a given reduction in perceived burden of caregiving among PICS (but not vice versa); [b] achieving lower perceived burden of caregiving among PICS reduces the additional resources required for a given increase in the number of days at home rather than in institutional care. The level of caregiver burden has a direct effect on the resources required for the targeted increase in days. The user satisfaction achieved has an indirect effect on the number of days in the community among those with principal informal caregivers [PICS].

It follows that in general, the interests of users and caregivers are complementary rather than competitive.⁷ The result is compatible with what care managers considered to be the proportions of cases in which the main beneficiaries were considered to be users, caregivers,

⁶ The models in effect illuminate whether one output *causes* another to some degree.

⁷ While some policy critics argued otherwise (ie care *in* the community meant care *by* the community, and that in general an increased burden on women as PICS), the result suggests that community care directed primarily at improving user satisfaction is likely to make it easier to reduced caregiver burden.

or both. In 57 per cent of the cases, the caregiver was expected to be a beneficiary, though the sole beneficiary in only 12 per cent of cases. They are also compatible with care managers' views that the interests of users and caregivers were in conflict for only 21 per cent of cases.

Optimal mixes compared, given carer rather than user benefits

The two outputs taken are days and reduction in caregiver burden. The comparison is between the diagrams for the outputs.

For the comparisons for the **unconstrained optimisation**, we return to **Figures 5 and 6**.

It is clear that making one output rather than the other the sole criterion does not result in identical utilisation patterns given actual efficiency levels. Neither would it do so given efficient input mixes. It would be surprising were either the case, if for no other reason than the high productivity of social work for caregiver burden.

However, there are strong similarities in the patterns, and particularly the change in patterns required to improve efficiency. These follow on from similarities in the patterns of productivities derived from inputs for the two outputs. To a lesser degree, home care, and to a greater degree day care, have important effects in both, and both have diminishing returns. There are productivities for respite care in both. But for reduced caregiver stress, there is a very powerful effect generated by social work inputs.

These similarities help to explain why the reduction of caregivers' burden reduces the service input required to achieve greater lengths of stay in the community.

III. CONCLUSIONS

- **The range and scale of the productivity effects suggests that the reforms have been successful.** That is illustrated by the values of the risk offset proportions and the user cover of productivity proportions for each of the 17 outputs.
- **A key question begged by proposals to redistribute resources towards low level services for the less dependent is whether productivities could be maintained**
 - Productivities can be maintained if the resources released are used to improve outcomes only for existing users.
 - A big extension of the numbers allocated low levels of services make it more difficult to maintain productivities, because the selection of users is now partly made on the basis of productivity-improving circumstances lacking in many of those not allocated services and too complex to be captured by targeting and eligibility criteria. Risk of a return to pre-reform productivity levels by the greater capacity of authorities to set priorities, improvements in management which allow them to be worked through to the provision of frameworks for field operation, and the focus on the performance of care management tasks. But few who advocate redistribution to low level of services suggest precise targeting policies for it.
 - Investment to improve efficiency is a useful and potentially powerful complement to redistributing resources away from the most dependent.

- Results suggest that
 - Productivities tend to be higher, the lower is the level of dependency. But service contributions tend to be higher. So the application of some equity criteria might suggest reallocation towards users of lower dependency.
 - The degrees of input mix and technical inefficiency are substantial, so that investment in improving efficiencies can allow a redistribution towards persons of low dependency without loss to those of high dependency.
 - Investing in efficiency improvement would be much less successful were the improvement in efficiency to be constrained to reflect the existing pattern of total expenditure on services.
- **The results do suggest that older services, particularly home care, consume an excessive proportion of the total budget.** However, the extent of the redistribution would depend on the priority given to different outputs. And home care itself is in the process of change which may improve the productivities. However, much of the argument of those advocating more low level services suggest the great importance of the most conventional forms of home care, because that is what is most appreciated by most users; in effect, domestic help with housework. There is little international evidence demonstrating that this necessarily has either high or low productivities for the most important outputs, though it can be inferred that much depends on precision in targeting.
- **Achieving high levels of reduction in felt caregiver burden reduces the service input required to achieve longer stays in the community because there are similarities in the productivity patterns for the two outputs, but different prioritisations of outputs require differences in service mixes.** A policy of investing to achieve higher benefits for caregivers would release more resources for increasing the number of days in the community than investing to increase days would improve the circumstances of caregivers. The gains from improvements in input mix efficiencies in the reduction of caregiver burden would be greater than the gains from efficiency improvements in lengthening stays in the community.
- **The collection and analysis continues. They will yield further insights for the discussion of the policy propositions discussed here, and for other policy propositions.**
- **But the results of the model cannot be relied on for major changes, and securing productivity improvements is at least as important as improving efficiency during a reform process.**

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