OECD Economics Department Working Papers No. 149

Health Care Reform Controlling Spending and Increasing Efficiency

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https://dx.doi.org/10.1787/338757855057

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OCDE/GD(94)101

ECONOMICS DEPARTMENT
WORKING PAPERS
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Howard Oxley and Maitland MacFarlan

ANNEX: FACTORS AFFECTING HEALTH SPENDING: A CROSS-COUNTRY ECONOMETRIC ANALYSIS

by
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ORGANISATION FOR ECONOMIC CO-OPERATION AND DEVELOPMENT

Paris 1994

HEALTH CARE REFORM
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The paper reviews trends in health-care expenditure and assesses the main forces underlying the increase since 1960. It then describes and evaluates various health-care reforms. The report argues that top-down budget controls appear to have had some success in reducing the growth in health-care spending but, to be sustainable, they need to be supported by microeconomic reforms. Significant improvements in micro-efficiency and effectiveness can be obtained by improving incentives facing health-care providers. Policy developments in a few leading countries suggest that a system where funders/insurers act as purchasers, contracting with competing health-care providers, is a promising model for reform. A statistical annex assesses whether differences in institutional arrangements for funding and providing health care explain international differences in health expenditure.

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Ce document porte sur l'évolution des dépenses de santé et les facteurs qui expliquent leur croissance depuis 1960. Il décrit ensuite et évalue diverses réformes des systèmes de santé. Il en conclut que les plafonnements budgétaires semblent avoir eu un impact sur la réduction de la croissance des dépenses de santé, mais pour que cette réduction soit durable ces contrôles doivent s'accompagner de réformes micro-économiques. Des améliorations sensibles de l'efficience au niveau micro-économique et de l'efficacité peuvent être obtenues grâce à une incitation accrue auprès des fournisseurs de soins de santé. L'évolution observée dans quelques pays où les réformes sont le plus avancées permet de penser qu'un système où les bailleurs de fonds/assureurs agissent en tant qu'acheteurs et passent des contrats avec des prestataires de soins de santé mis en concurrence constitue un modèle de réforme prometteur. Dans l'annexe, une analyse économétrique étudie si les différences dans les systèmes institutionnels de financement et de fourniture de soins de santé peuvent expliquer les différences constatées au niveau international dans les dépenses de santé.

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HEALTH CARE REFORM
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Howard Oxley and Maitland MacFarlan[1]

1. Introduction

1. The share of public health spending in GDP and in total public expenditure has increased significantly over the past thirty years. Reform efforts to date have slowed this trend, but have not been sufficient to deal with many of the underlying pressures contributing to spending growth. Projected demographic changes are going to be one of a number of influences putting further pressure on health-care spending over the next 20 to 50 years, arising at the same time as increased spending on public pensions. Unless there is a major change in public health care and pension policies, "transfers" from the shrinking working-age population to the growing retired population will increase significantly.

2. Given these developments and perspectives, health-sector reform is a major political issue in many OECD Member countries. Without more fundamental reforms than those implemented in the 1980s, tax increases or service cut-backs appear unavoidable.

3. There are three broad goals that governments generally pursue in the health-care area[2]:

-- **Equity:** citizens should have access to some incompressible minimum level of health care, and treatment should be based on need for care rather than solely on income. Further, individuals should be offered some degree of protection against the financial consequences of falling ill[3], and payment for this protection should be income-related rather than based on individual risk.

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1. Background support for this study was provided by Anick Lotrous and Chantal Nicq (statistics) and Jackie Gardel and Tara Gleeson (preparation for publication). We would like to express our appreciation to the many colleagues who took the time to comment on the drafts, in particular Jean-Pierre Poullier (DEELSA), Willi Leibfritz (ECO), Mike Feiner (ECO), Rick Imai (ECO), Bruce Montador (ECO), Derry Ormond (PUMA) and Patrick Hennessy (DEELSA).

2. See OECD (1992*c*). Depending on the system, some reforms have also aimed at increased "empowerment" via increased consumer choice and provider autonomy. In this paper, such objectives are treated as instruments for reaching some of the above-mentioned goals, even though they may have social value in their own right.

3. This protection may take the form of private or social insurance, income transfers or public supply.

-- **Micro-economic efficiency:** quality of care and consumer satisfaction should be maximised at minimum cost[4]. Micro-efficiency also requires taking into account "spill-over" effects (e.g. due to communicable diseases and productivity-related effects on the labour force). Dynamic efficiency considerations include searching for organisational forms and technological advances that improve the productivity of health resources. More broadly, in assessing the most efficient ways to improve health "outcomes" (or health status), governments need to consider whether increased resources channelled into mainstream health services are not draining resources from other, more effective, programmes[5].

-- **Macroeconomic cost control:** the health sector should consume an "appropriate" share of GDP. Although there is no necessary reason to restrain the level of spending simply because it is high or growing rapidly, spending limits can become desirable where government policies or private market failure lead to excess supply or demand for health services.

4. Two characteristics of the health market may lead to excess provision of services. The first concerns information failures. The vast majority of patients lack the information necessary for informed choice. Hence, they are compelled to delegate, to varying degrees, treatment decisions to medical professionals who also supply the services demanded -- creating a potential conflict of interest. Even within the medical profession, there are pervasive uncertainties about treatment options and consequences[6]. The second is the problem of moral hazard. On the demand side, this may be reflected in an increase in the demand for covered health care because patients do not face the full marginal cost. But moral hazard is not limited to demand. On the supply side, for example, the incentive to over-supply medical services may be heightened when a third-party pays the bulk of any services that doctors choose to provide. These effects may be strongest under fee-for-service payment arrangements. The upshot is that in most OECD countries governments place some form of overall restraint on health spending (at least in the public sector).

5. The principal aim of this paper is to discuss the various policy options for better achievement of health policy goals within the context of strained budgets. The paper is divided into five parts. A stock-taking of past trends in health-care spending and the major forces driving growth in expenditure, both in the past and in the future, is presented in Part 2. It is argued that, while income growth and wider insurance coverage have contributed to the increase in spending, probably more than half of the increase has arisen from developments on the supply side (i.e. arising from the regulatory framework and incentives facing health-care providers). This, in turn, suggests that the focus of policy should be there.

6. Some further support for the need for supply-side reforms is provided in Part 3. Wide differences in levels of spending, input costs and in resource levels, combined with generally weak correlation between

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4. Micro-efficiency has two aspects: productive efficiency associated with producing a fixed set of services at minimum cost; and effectiveness, defined as maximising services provided for a fixed set of inputs or maximising the impact on health goals, defined as the length and quality of life. Costs ought to include administrative expenses.

5. These could include, for example, housing, education, income maintenance, nutrition and hygiene programmes, all of which could influence the population's health.

6. For example, there are large, unexplained differences in medical practice within and across countries, suggesting considerable variability in accepted medical practice.

spending and measures of health outcomes, suggest large differences in production efficiency even after allowing for measurement difficulties.

7. An overview of recent reforms and reform proposals is presented in Part 4. Attempts to slow the growth of public health spending through budget caps or other "macro" instruments characterised the first round of reforms. However, with little attention paid to the underlying patterns of incentives, there is growing doubt about the capacity of purely macro-based approaches to sustain overall spending control, partly because of the negative effects they may be having on the efficiency of the system. Most of Part 4 deals with a broad outline of possible microeconomic reforms in the provision of publicly financed health services, drawing on the recent experience of a few leading countries. Also examined is the scope for controlling moral hazard by increased out-of-pocket payments by patients for medical care and from more appropriate institutional arrangements on the supply side. Some messages regarding the health-care sector are reiterated in Part 5, and links are drawn to broader policies concerning overall population health. In its discussion of the various institutional arrangements and policy options, the report draws on a consultancy report (Annex). This study uses a pooled cross-section time-series analysis of most OECD countries over a 20-year time period to assess the relation between institutional arrangements for health care (and the associated incentives) and overall health spending.

8. This report has attempted to bring together a broad range of policy issues, much of which will be familiar to those with a background of health policy and reform. In doing so, the Secretariat has drawn on and compressed a considerable amount of material, much of which has originated within the OECD. In some cases, this has meant "taking a view" regarding where governments should concentrate their attention (e.g. on the supply or demand sides of the market) and which reforms appear most likely to have some positive effect on achieving the goals indicated earlier in this introduction. It bears emphasising that there is considerable debate over many of these issues, partly reflecting differing weights placed on equity as opposed to efficiency goals. However, disagreement also arises from the fact that many reforms are in their early stages and their impact, particularly for the longer haul, is as yet unknown.

9. Some readers may find that inadequate attention has been placed on the institutional arrangements of and reforms in their own countries. Descriptions of country systems and reforms, and other aspects of health-care policy, have already received attention elsewhere in the OECD (DEELSA, PUMA, and in the OECD country surveys for selected Member countries) and the interested reader is directed to the numerous publications which report on this work[7]. Because of its recent entry into the Organisation and lack of readily available information on its health system, this report makes no reference to Mexico.

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7. An evaluation of health reforms has been underway under the aegis of the Employment, Labour and Social Affairs Committee (ELSA) (OECD, 1992*c* and 1994*e*), with additional studies concerning the frail elderly (OECD, 1994*a*). Country reports on health sectors have been carried out for selected countries within the framework of the Economic Development Review Committee and published under the Economic Survey series: the United States (OECD, 1992*b*), France (OECD, 1994*b*), Italy (OECD, 1992*a*), the United Kingdom (OECD, 1994*c*), Canada (1993*b*), Iceland (OECD, 1993*c*) and Switzerland (OECD, 1991). Finally, "market-type-mechanism" reforms in the health sector have been considered in the Public Management Service (OECD, 1993*d*). Statistical information has been drawn from the Health Data File and further detailed statistical information can be found in OECD (1993*e*).

2. Health-Care Expenditures and Their Driving Forces

2.1. Past trends

10. Health-care spending for the OECD area as a whole more than doubled as a share of GDP over the period 1960 to 1992, from under 4 per cent to just over 8 per cent (Table 1). In 1992, although levels may have been biased upwards by the recession in some countries, most OECD countries spent around 7 to 9 per cent of GDP on health services. The United States is a clear outlier, with 14 per cent of GDP being devoted to health care. The expenditure share is substantially lower in Greece and Turkey (5.4 per cent and 4.1 per cent respectively).

11. There has been considerable variation in spending growth across countries in individual periods (Table 2). The health spending share in trend GDP rose by 1.9 percentage points during the 1970s for the OECD as a whole, but by only 0.8 percentage points between 1980 and 1992. This slow-down has been even sharper within Europe, with the health share growing by around 0.5 percentage points since 1980, compared with growth of about 2 points during the 1970s. A similar sharp deceleration has been seen in Japan and Australia. In the United States and Canada, on the other hand, a quite different pattern emerged: in the United States, the spending share grew by 2.1 points during the 1970s (similar to the increase in Europe), but at twice this amount from 1980 to 1992; in Canada, the health share grew by only 0.5 points from 1970 to 1980, but by 2.2 points between 1980 and 1992[8].

12. The contributions of the main sub-categories of the health sector to spending growth are shown in Figure 1 for 1970-80 and 1980-90. In the 1970s, growth in the hospital services sector was the major factor behind expenditure growth in many of the countries shown, particularly for the sizeable group where the GDP share of health spending increased by around 1.5 to 2.5 percentage points of GDP. Hospital spending generally grew at a much slower rate during the 1980s, and in most cases its impact relative to other sub-categories also declined. In some countries (e.g. the United States, France, the United Kingdom, Australia, Finland, Spain and Sweden), slower growth in the GDP share of hospital spending between the 1970s and 1980s was partially offset by faster growth in the share of the ambulatory, pharmaceutical, and/or "residual" components; this may indicate some substitution towards these other sectors in response to spending constraints imposed on hospitals.

13. By design, health spending by the public sector (Table 3) rose even more rapidly than total health spending in the 1960s and 1970s as coverage of public insurance was expanded. The unweighted average OECD public share in total health spending rose rapidly from 64 per cent in 1960 to 74 per cent in 1970 and reached over 78 per cent in the early 1980s before declining slightly in more recent years. Excluding

8. Data in Table 1 use GDP as the denominator to permit a longer time period to be examined. A comparison of data in Table 1 (where the denominator is GDP) and Table 2 (which uses trend GDP) suggests that cyclical movements in the denominator "explain" 0.3 percentage points of the 0.5 percentage point increase between 1990 and 1992 in Table 1 for the OECD average. Notwithstanding the recession, medical consumption in a few countries, chiefly the United States and Switzerland, grew at a brisk pace in the early 1990s.

Turkey, the public share currently ranges from 46 per cent in the United States, to 78 per cent on average in Europe and up to 95 per cent in Norway[9].

14. The health-care sector is clearly an important industry in OECD economies. For the OECD countries taken as a group, employment in the health-care sector is in the range of 6 to 7 per cent of total employment; in Norway, Sweden and Switzerland it is between 9 and 10 per cent and it is over 8 per cent in Finland (Table 4). This suggests that, in considering reforms, governments need to look beyond the immediate problems of public finance and deficits to the broader issue of the efficiency of health-care provision and the implications for overall economic performance. Channelling more resources than necessary into the health sector reduces the capacity of economies to expand over time. Unnecessary increases in health-care spending also limit governments' fiscal capacity to address other social goals, including those which might have a greater positive impact on health outcomes.

2.2. Factors underlying past and future spending pressures

15. A complex mix of factors -- both supply and demand related -- has contributed to the increase in health-care spending. At the present state of knowledge, it is difficult to identify all factors and their importance with any precision. The following sub-sections first discuss demand-side effects associated with ageing, increased income and increased insurance coverage (price effects). Rough orders of magnitude of each of these are presented in Table 5 (based on limited available information). These numbers, while imprecise, suggest that these demand-side variables can explain only a portion -- probably under one half -- of overall expenditure growth. This leaves a large residual, which may be attributable to such factors as technological development, growth in medical personnel and facilities, and increases in real health-care prices. These influences can loosely be labelled as "supply effects", in the sense that they often stem from the incentives facing providers rather than consumers of health care. Clearly, the effects of low marginal prices to consumers for new technology and treatment cannot be ignored. But access to these services is still largely controlled by doctors and other health-care professionals, as a result of information asymmetries combined with the institutional role of the medical profession.

2.2.1. Ageing

16. As a broad rule of thumb (based on a range of observations for the early 1980s reported in OECD, 1987), persons aged over 65 consume, on average, roughly four times as much health care as those below 65. Using this ratio, some mechanical simulations presented in Table 6 indicate the possible effects of changes in the age structure on health spending [10]. These simulations suggest that, for the countries

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9. Only limited data were available for Turkey. More generally, uncertainty remains regarding the comparability of these data across countries.

10. Mechanical calculations, however, do not take into account changes in behaviour amongst older age groups. There may have been a "generation effect" such that for equivalent income and price, older individuals would choose more health care than formerly. For example Hourriez (1992) finds for France that in 1950 persons aged 70 saw generalists and specialists, respectively, 1.5 and 0.8 times more than persons aged 40; by 1990 this had increased to 2.6 and 1.1 times. But at the same time, the lengthening of lifetimes and reduction in early mortality may have been a temporary depressing influence on health-care costs (because these tend to be concentrated in the period just preceding death) (Fuchs, 1990).

listed, ageing has not been a dominant factor in overall health expenditure growth over the past three decades. An older age structure added, on average, 0.2 per cent per year to health spending in the 1980s, and could add around 0.3 per cent annually in the 1990s. By way of comparison, real OECD health spending increased at an average rate of nearly 4 per cent in the 1980s. If spending grows at the same rate as GDP during the 1990s (e.g. 3 per cent per year on average), ageing is unlikely to be a dominant factor during the current decade, with the exception of Japan and, to a lesser degree, Italy and Spain.

17. The importance of ageing is, however, expected to be stronger, and also more uniform across countries, at the beginning of the next century. The simulations suggest that from 2000 to 2020, annual health spending may grow by around 0.4 to 0.7 per cent due to ageing in two-thirds of the countries listed. The overall pattern given by the simulations is similar from 2020 to 2040. Considering individual countries, the influence of ageing occurs earlier in Japan than in other countries, with strong effects from 1980 to 2020 and a relatively weak impact thereafter. Ageing effects also become substantially weaker after 2020 in Finland, New Zealand and Portugal, but become much stronger in Belgium and Spain. In the remaining cases (including the G7 countries apart from Japan), the effects of ageing are more evenly distributed between 2000-2020 and 2020-2040.

18. The implications of population projections should be treated cautiously as the impact on spending will depend on, amongst other things, utilisation, forms of elderly care and technology[11]. For example, many countries are trying to reduce the use of acute-care hospital beds for long-term elderly care and to place more emphasis and more resources into community-based care. As noted elsewhere, some spending pressure apparently arises from supply influences. In this case also, health policies can have an important influence on spending growth. Indeed, the dramatically different results found in those individual country projections available to the Secretariat suggest that assumptions about these additional factors can easily swamp the effects arising from aging populations[12].

2.2.2. Increased income

19. As incomes rise, consumers demand more health care, abstracting from effects of changes in insurance cover. There is a wide range of estimates for the income elasticity of demand (McGuire *et al.*,

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11. Future trends may be affected by changes in technology, and by policies and individual behaviour in the area of chronic -- as opposed to acute -- diseases or conditions. As an illustration of the potential impact of technological advances, the costs of Alzheimer's disease would be halved if, in the absence of a cure, the onset of major disability was delayed by five years.

12. Country projections usually make some form of *status quo* assumption regarding utilisation rates of different groups and the broader institutional and policy context. For the United States (Burner *et al.*, 1992), national health expenditures are projected, on the basis of prevailing laws and practices, to increase from 14 per cent of GDP at present to 18 per cent by 2000, and 32 per cent of GDP by 2030, largely reflecting the continued growth in medical specific inflation. In contrast, projections for Japan (Ogawa, 1993) -- where aging is more important -- suggest that total medical expenditures will increase by just over 5 per cent per year between 1990 and 2025 --fractionally more than the projected growth rate in GDP. As a result, the share of health spending in GDP rises by very little (0.75 percentage points). Similarly, projections for France (reported in Commissariat Général du Plan, 1993) point to growth of 1 to 2 percentage points in the health share of GDP between 1993 and 2010 (assuming annual GDP growth of 2.5 to 3 per cent).

1986). Estimates with the widest acceptance in the United States have been derived from the RAND Health Insurance Experiment, which found an income elasticity for medical care (insurance cover held constant) of around 0.2 (Manning *et al.*, 1987) from cross-section data[13] [14].

20. Much higher estimates -- often greater than one -- are obtained using time-series and international cross-section data, most often using GDP as the income variable. However, it is unlikely that such estimates isolate those household demand effects which are solely income-related. For time-series data, it is hard to separate demand- from supply-related factors: supply-related variables are often not available; and those that are show little variance or are correlated with the income variable. Similarly, international cross-section data are unlikely to provide much information on underlying household demand for health care. Overall spending in many OECD countries is allocated via government budgets or public insurance arrangements. Thus, estimated elasticities with respect to GDP can also reflect both the political process (i.e. what countries are willing to allocate globally to health spending without unduly restricting spending on other goods and services); and institutional arrangements, which can affect both the cost of health services (e.g. through pricing arrangements) and the incentives facing both patients and providers. These factors can significantly affect the results. For example, in the Annex to this paper, initial estimates based on pooled cross-section and time-series data for 20 OECD countries resulted in elasticities of health-care spending with respect to GDP of considerably over one, and similar results were reported in OECD (1993*c*) for a shorter time period. However, elasticities fell to around 0.7 with the addition of country dummies (which allow for country-specific differences in data definitions, system arrangements and country preferences) and period dummies (which allow for increases which are common to all countries in individual years -- e.g. area-wide cyclical effects).

21. On this basis, it seems plausible that cross-country estimates using GDP as the main explanatory variable over-estimate the impact of income effects and, for the United States at least, Newhouse (1992*a*) argues that the income elasticity is probably less than one. In Table 5, the possible impact of income on health expenditure over the last 30-odd years has been calculated using a range of elasticities from 0.2 to

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13. These results may not be representative of other countries, but the absence of experiments of this type and scale elsewhere has meant that these results have been widely quoted in other countries.

14. Estimated values of the income elasticity of demand -- i.e. the per cent increase in health care as a result of a per cent increase in household income -- are likely to depend on a number of factors including the institutional environment and the type of health care considered. The majority of health care is for major health problems. In the United States, over 70 per cent of expenditure is by families spending more than $5 000 per year. Where there is no insurance, the income elasticity may be less than one for essential health care (e.g. for life-threatening conditions) -- the rich would be unlikely to spend much more than the poor (as long as the poor have savings or can borrow). The income elasticity would be even smaller, if both higher and lower income individuals have insurance covering similar health-care risks. However, the elasticity may be higher if, for any given medical condition, there is a variety of treatments which can be undertaken with different price tags (i.e. more refined techniques or doctors with a better reputation). Some components of health care -- for example, aesthetic surgery, physiotherapy, etc., or more comfortable surroundings (private rooms) -- may be more sensitive to income. However, these components do not take up a large share of health spending, and so their impact on overall income elasticities is muted.

1.0. Employing the value of 0.7 drawn from the Annex, income increases might "explain" 40 to 50 per cent of the total increase.

2.2.3. Increased access and insurance coverage

22. All but two OECD countries (the United States and Switzerland[15]) primarily rely on state insurance systems. These have progressively expanded over the last 30 years. Rough estimates of population covered by social insurance (Table 7, column A) show a major increase during the 1960s and 1970s[16]. By the end of the 1970s, the population in most countries was covered to a high degree[17]. Some of this increase represents a shift from private insurance cover such that the rise in total insurance cover is somewhat overstated[18]. At the same time, the average degree of cost sharing by patients fell during the 1960s and 1970s -- to ensure that those on lower incomes would confront fewer problems of access -- before being marginally reversed in some countries in the 1980s (Table 7, column B[19]).

23. Multiplying average cost-sharing by governments by the average coverage ratio provides a very rough estimate of the "total insurance cover" for the whole population and its change over time (Table 7, column C). For the OECD area as a whole, between 1960 and 1990, the share of health spending covered by public insurance (public and private insurance in the United States) increased from 58 to 83 per cent, i.e. by some 25 percentage points. An increase in "total insurance cover" is equivalent to a reduction in the price of medical care to the individual consumer at the point of delivery and, where price elasticities are negative, an increase in the demand for health care. Assessing the impact that this might have had on overall spending is difficult because there are few estimates of the price elasticity of demand. If estimates

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15. In Switzerland, a variety in insurance schemes, many of which are private, cover virtually the whole population. Most cantons invite or require their residents to enrol. This is why in OECD data files, Switzerland is treated as a (quasi)-social insurance system.

16. In this paper, the term "insurance cover" refers to cover provided by both the public and private sectors. Data presented in Table 7 largely refer to public insurance as accurate data on private insurance is unavailable for most countries. Data for the total share of spending covered by insurance (private as well as public) is, however, available for the United States.

17. Only Greece, Spain and Turkey were behind in the mid to late 1970s. By the end of the 1980s the latter two had caught up. See the following note on the Netherlands.

18. For example, although public cover fell in the Netherlands after 1975, this simply reflected those above a certain income level taking out private insurance. Virtually the whole population in Germany and the Netherlands have health insurance cover. For the United States, only 40 per cent of the population is covered by social insurance. Nonetheless, only 15 per cent of the population is without any insurance at all, although a higher portion do not have as much insurance as they would like (OECD, 1994*d*).

19. Note that column B shows the share paid by the state insurer.

of the effect of price changes found for the United States (Manning *et al.,* 1987)[20] are employed, the impact of the increased cover might be of the order of 10 per cent of the total increase in health spending over the period 1960 to 1990.

2.2.4. The residual

24. While such calculations provide only broad orders of magnitude, they suggest a large residual -- ranging from 40-50 per cent of the total increase (assuming an income elasticity of 1.0) to 65-75 per cent (assuming an income elasticity of 0.2) -- which is difficult to "attribute" to demand-side variables. Thus, there has also been a range of additional factors contributing to spending growth. To a large extent this residual may be attributable to the range of market imperfections, regulatory provisions and incentive structures that are particularly associated with the provision of health-care services. A first and important component of this residual has been technological change -- defined broadly to include techniques, drugs, equipment and procedures used in providing health care (Newhouse, 1992*a*; and Weisbrod, 1991). The capacity to treat both illness and disabling conditions has grown in many important respects: procedures such as improved cataract operations, renal dialysis, organ transplants, coronary bypass, hip and knee replacements and micro-surgery have increased the range of conditions which can be successfully treated; advances in anaesthetics have reduced the risks of operating on older patients; new imaging and other technology (echography, improved radiology, magnetic resonance scanners, endoscopy and biological tests) have improved the capacity of diagnosis; and there have been important advances in pharmacology.

25. Assessing the role of technology is complex. Some innovations have been cost-saving, particularly when indirect costs are taken into account. For example, drugs have reduced the need for surgery in the case of stomach ulcers, vaccines permit better control of diseases such as measles and polio, and antibiotics have aided in combatting infections. Despite this, much of the impact of technology appears to have increased health-care costs (Weisbrod, 1991)[21]. Part or all of these higher costs may have been balanced by positive effects on health outcomes; some, and possibly many, individuals might have been willing to purchase such treatment even in the absence of insurance.

26. However, under current institutional arrangements, markets play a relatively small role in assessing the value of new technology. In practice, few questions have been asked as to the effectiveness and appropriateness of new technology or how this should be balanced against costs. By and large, new technology has been included in the risks covered by insurers, although, for some very expensive

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20. While the literature is difficult to interpret as regards the likely magnitude of price effects, Manning *et al.* (1987) and Newhouse (1992*a*) provide what appears to be an upper estimate. They find that a rise in cost-sharing -- equivalent to a change in the average rate of cost-sharing of 33 percentage points -- could lead to an increase in health spending in the range of 40-50 per cent. See footnote 3 to Table 5.

21. Weisbrod (1991) argues that most technology is of an "intermediate" nature which, rather than providing a cure (such as a vaccine), deals with the incapacitating after-effects of disease. These include organ transplants and artificial organs, treatment of cancer or palliative medicines which limit the symptoms of disease. With much new technology concentrated in these areas, overall costs have increased. For example, one study cited by Weisbrod showed that between 1972 and 1982 the cost of treatment of heart attacks increased by a factor of three because of new techniques such as cardiac imaging, angiography and coronary bypass graft surgery.

procedures or equipment, countries have moved at different speeds to accept and diffuse these innovations. With the cost of using technology covered, the marginal cost to the patient has been low and doctors have been inclined (or felt morally obliged) to prescribe or use new treatments as long as some marginal benefit to the patient could be expected. Thus, the concern over technology in the present institutional context arises from a) the fact that institutional incentives to make such evaluations are weak, and b) lack of agreement as to the criteria and methodology to be used in judging whether new technology provides a significant enough benefit to warrant additional expenditure[22].

27. A second factor on the supply side is the increase in the stock of physical facilities for health care and in medical personnel. The supply of hospital beds per capita expanded rapidly in the 1960s and 1970s. In the early stages of this expansion, the increase in hospitals may have reflected pent-up demand as health insurance coverage widened, the uneven spread (relative to demand) of health services across countries as population shifted and the expectation of further population growth. Incentives also had a role to play as, in many countries, hospitals were paid on a fee-for-service or per bed-day basis, encouraging the hospitalisation of marginal cases and long hospital stays (see section 3.5). By the late 1970s, over-supply had begun to appear in most countries, particularly in light of the sharp decline in birth rates and technological advances in medicine permitting shorter hospital stays or day surgery. The number of beds per capita has declined moderately since then, with sharper falls in countries where budget restraint has been particularly marked. But there still appears to be an oversupply of beds in many, if not most, countries (see section 3.5) and this has raised the overall costs of operating the system. At the same time, doctor/patient ratios have been rising throughout most of the OECD area as the intake of medical schools progressively expanded. This has also meant that a larger share of doctors has had recent training in new medical technology, which has probably speeded its diffusion and increased the number of skilled persons able to carry out new treatments. In many countries, indications of excess supply of doctors have also begun to emerge -- in the form of unemployment and low incomes (OECD, 1992*a*; and Commissariat Général du Plan, 1993).

28. A key question is whether this increase in supply has led to higher overall health-care spending because of supplier-induced demand. This can arise for several reasons, although the form it could take and its extent depend on institutional arrangements. For example, doctors may attempt to reach some target income (Evans, 1974). Increasing numbers of doctors may make this difficult and, in fee-for-service systems, doctors could encourage patients to consume more services than is medically warranted. Alternatively, greater competition among doctors for clientele may make them more willing to comply with patient demands for referrals, prescriptions or other health services, particularly where the cost of these services is covered by insurance. Similar pressures can arise in the hospital sector: as noted, over-supply of beds may encourage the lengthening of hospital stays; or, under fee-for-service payment arrangements unnecessary tests or treatments could be made.

29. The degree to which this has affected costs is difficult to judge. Evidence for the United States is not clear cut (McGuire *et al.,* 1988; Newhouse, 1992*a;* and Reinhart, 1989), and Newhouse (1992*a*) argues that supplier-induced demand on its own is not likely to explain a large share of overall spending. As one possible measure of the impact, Health Maintenance Organisations (where incentives for supplier-

22. Estimates of costs per additional QALY (quality-adjusted life years) from different procedures provide one such technique for judging the relative benefits of various procedures.

induced demand are minimised -- see Part 4) in the United States provide health care at roughly 10 per cent less cost than fee-for-service arrangements (CBO, 1992)[23].

30. Third, there have been increases in the prices of inputs into the health-care sector relative to the GDP deflator (Table 9). To some degree, cost increases may have been offset by unrecorded increases in productivity in the hospital sector -- both in terms of quantity and quality -- which, if measured, would result in a slower growth in prices per episode of care[24]. In certain countries and over certain periods, providers and health-care professionals may have been able to raise their incomes relative to the rest of the economy, even in the face of increasing supplies of doctors (e.g. the United States in the 1980s) (OECD, 1993*e*).

3. Efficiency and Effectiveness of Health-care Supply: International Comparisons

31. Information on various dimensions of health-care activity and their effects, which may help assess the potential for cost savings, is presented in this part. Cross-country comparisons -- which throw up differences that are absent in analyses of single countries where one institutional approach to provision dominates -- appear to be particularly useful in this regard. One of the main themes of this report is that the incentive structures produced by different institutional arrangements are important determinants of the performance of the health-care sector and can, at least partly, explain some of these cross-country patterns. Background information on the financing and delivery of health services is presented in Box A (Finance/Insurance Systems) and Box B (Supply Arrangements). Implications of these arrangements are discussed in more detail in Part 4 in the context of health policy and reform.

32. Incentive problems arise within the contractual relations between "insurers" (or third party payers) and patients, and between insurers and providers of health care. For example, as noted in Part 2, insurance arrangements reduce the price paid by the patient when he receives care, and can lead to an increase in the demand for treatment. Although there can be some private insurance at the margin, most countries rely on some form of public insurance arrangement -- reflecting the political objectives of both full or nearly full health insurance coverage, and having contributions or premia based on income rather than individual risk. Public insurance, while not the only way of achieving these objectives (viz. Switzerland), is viewed as a preferred alternative to what otherwise might be a complex and uncertain regulatory framework for private insurance markets.

33. As regards supply arrangements, the asymmetry of information between providers and third-party payers makes it difficult for payers to judge whether treatments are, in fact, necessary. Uncompetitive

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23. This difference could arise from lower input prices, as well as from lower volumes of health care. This figure roughly corresponds to one estimate for France. Béraud (1992) and CNAMTS (1992) find that roughly 10 per cent of health care is medically unnecessary, with fraud accounting for a similar amount.

24. With a few exceptions, the output of the health sector is measured by the value of inputs with no allowance for productivity gains or improvements in quality, of which there is ample evidence at the micro-level.

BOX A. Characteristics of Health Finance/Insurance Systems

Types of insurance arrangement

Private insurance systems cover individuals or groups, setting premia on the basis of their risk characteristics. They are flexible, providing a range of insurance packages with different degrees of risk. High-risk individuals find it difficult to obtain cover. Only two countries (the United States and Switzerland) have private insurers covering major health-care risks for the bulk of the population, but in most other countries private schemes can complement public schemes at the margin. In some, higher-income groups (e.g. Germany) or certain groups (civil servants in Spain) can opt for private insurance often at lower premia[1]. In other countries, supplementary insurance is available from private insurers or "friendly societies" to cover patient cost-sharing (user charges) in state schemes (e.g. France), for better physical surroundings (private rooms), for care as private patients of hospital specialists (e.g. the United Kingdom, Austria, Denmark and Ireland) or for risks not covered by state insurers (e.g. Canada and Australia). In many countries these premia are tax deductible.

The social insurance systems are based on statutory sickness funds most often governed by the social partners and overseen and tightly regulated by the government. Risks are pooled in the fund and premia are income-related over some range. Premia sometimes vary across funds to allow for differences in risk structure of the membership; in some cases, these premium differences are offset by government support or transfers from their funds. Membership is compulsory for certain groups (e.g. those with lower incomes) and in some cases cover virtually the whole population. There are generally numerous funds organised on corporatist (i.e. blue or white collar), industry, religious or geographical lines (Japan, Germany, France, Austria, Belgium, Luxembourg and the Netherlands).

There are two forms of tax finance. In the first, the state insures and supplies health care in the same organisation and finances it as part of the budget. However, responsibility of production/provision is often delegated to lower levels of government (Italy, the United Kingdom (until recent reforms), Denmark, Finland, Greece, New Zealand (until recent reforms), Norway, Spain and Sweden). Alternatively, in some countries (Canada and, to a lesser degree, Australia) the government acts as a single insurer raising the necessary revenue through the tax system and paying largely private (mainly non-profit) suppliers.

Degree of insurance cover

As regards population coverage, the United States and Turkey are the only OECD countries where a significant portion of the population lacks insurance cover. In the United States, despite several government programmes covering 24 per cent of the population -- mainly Medicare for the retired and Medicaid for some

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1. In Germany, one-quarter has the option of taking out private insurance which can, in certain cases, be cheaper. However, those with higher risks, and with difficulty in getting low-cost private policies, take out cover with the statutory sickness funds. Only about 8 per cent are privately insured. The Netherlands had all the population covered for long-term and psychiatric care (approximately 45 per cent of total health spending). For the remaining risks, 60 per cent of the population is covered by social security health insurance, with civil servants and 30 per cent of those in higher-income groups having private insurance. Partly to remove the element of adverse selection in the system (older people were over-represented in the state scheme), all individuals are to be covered by a state scheme providing a basic package of cover.

groups of the poor -- around 15 per cent of the population does not have insurance[2]. Private insurance in Switzerland has been able to achieve high levels of coverage reflecting a number of factors: insurers cannot refuse coverage; some cities and cantons make insurance mandatory; and significant federal government subsidies to the insurance funds[3]. In both countries, the "affordability" of insurance has become a political issue as higher premia have taken an increasing share of income. Turkey aims at reaching full coverage in coming years.

There are relatively modest differences across countries in the risks covered (Annex Table 1)[4]. All countries provide coverage for hospital and ambulatory medical care. Under state systems, this package is generally defined by law and the procedures covered have been progressively widened over time as new medical technology has appeared and been incorporated into accepted medical practice. Greater differences exist in the area of drugs, dental care and protheses, eyeglasses and hearing aids, for long-term care and for *maisons de repos*, spas and sanitoria.

Cost-sharing by patient. Annex Table 2 presents information on the amount paid by individuals for health care. Co-payments vary depending on the type of service. For in-patient care (the largest component of health spending) ten countries have free services (or virtually so) and an additional six charge a daily rate of $10 or less. Larger co-payments are charged in Finland, Portugal and, given average incomes there, in Turkey. Most private insurers in the United States impose a large "deductible". Japan and France have large co-insurance rates (patients pay a percentage of the total). However, in France 83 per cent of the population has additional insurance which covers most of this charge while around 12 per cent of the population -- mainly the chronically ill who consume roughly half of the social insurance spending -- are exempt[5].

Co-payments and co-insurance tend to be higher for ambulatory care and medical tests. Only ten countries have free or virtually free services for GPs and nine for specialists. Co-insurance is nonetheless small in Luxembourg and in France once complementary insurance is taken into account, but is somewhat higher in the United States Japan, Belgium, Iceland, Norway, New Zealand, Portugal and Sweden. Pharmaceuticals have yet higher rates of co-insurance: only five countries have free drugs or charge only token payments.

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2. A significant additional number do not have as much insurance as they would like or temporarily lose insurance in between jobs. For some insurance is available but the cost is so high, that they have decided (or been obliged) to self-insure. This does not necessarily mean that they do not have access to health care as many are treated in public hospitals, but the amount and quality of care is lower (CEA, 1994).

3. However, pre-existing conditions can be excluded from cover for a certain period and there is often an initial waiting period. Premia are largely based on the age of entry into an insurance fund such that those obliged to change insurers later in life can face stiff increases in premia. This has become more prevalent: funds with an older age structure of insurees have higher premia, inciting younger persons to opt for funds with lower risk structures and premia. To ease the financial pressure on the funds with a high risk structure, funds have been amalgamated and then the premia of older members have increased.

4. For the United States this concerns Medicare and Medicaid only. For private insurance, the diversity of the system makes it difficult to characterise.

5. Those uncovered are largely in lower income groups.

BOX B. Supply Arrangements

Arrangements for the supply of medical services -- particularly ambulatory and hospital care -can be thought of in three categories. Drawing in part on OECD (1992*c*)[1], these will be termed the *reimbursement, contract, and integrated* approaches. The differences between these approaches reflect two inter-related influences: the nature of the relationship between funders and providers of health services; and the relative importance of patients and third-party funders in determining the distribution of health funding between providers. No country fits neatly into one category; indeed, many countries have elements of all three, whether because of various supply arrangements found in the hospital sector, or differing treatments of ambulatory and hospital-based services.

With the **reimbursement** approach, providers are funded retrospectively for services supplied to patients. These payments may be received either directly from patients (who are usually reimbursed in whole or in part by insurers), or by providers billing insurers for services supplied. Patient choice (based on location, services required, General Practitioners' (GP) advice, etc.) therefore has an important influence on how health funding is distributed amongst providers, and hence on how supply arrangements develop. The reimbursement approach, often coupled with fee-for-service payment arrangements, can be found in systems with multiple insurers and multiple (usually private) suppliers, as in the United States, Japan and Switzerland; closer contractual relationships may be difficult to arrange in such circumstances. There is also widespread use of retrospective, fee-for-service systems in ambulatory services, where freedom of consumer choice over GPs is often emphasised. Cost control by payers is difficult in this environment.

The **contract** approach involves some form of prospective agreement between third-party payers and health-care providers, establishing the terms and conditions of payments for health services. Such contracts give payers greater control over the total level of funding, and its distribution, than with the reimbursement approach. This approach tends to be found in social insurance systems where there is usually compulsory insurance provided through a limited number of public or non-profit agencies. Hospital funding is usually by some form of *per diem* rate or case-mix payment[2], but with prospective budgets or caps covering total allocations (as in Germany and Belgium). Preferred Provider Organisations (PPOs) in the United States also use this approach. Consumer choice, as far as pre-paid services are concerned, is restricted to providers having contracts with funders (but they may also be able to receive treatment from other suppliers under reimbursement conditions).

In **integrated** health systems, the same agency -- usually local or central government -- controls both the funding and the provision of health services. The cost uncertainties and contractual complexities in the above two approaches are therefore "internalised" through vertical integration, and administrative arrangement used to co-ordinate the funding and provision arms. Medical personnel -- including GPs as well as hospital-based doctors -- are generally paid salaries, and the remainder of hospital spending is bulk funded. This has been the main arrangement (usually for GPs as well as hospitals) in the Nordic countries and Turkey; for public hospital services in France, Italy, Australia, Greece, Iceland, Portugal and Turkey; and in the United Kingdom and New Zealand before recent reforms toward contract approaches. Health Maintenance Organisations (HMOs) in the United States are "micro" examples of the integrated approach: in choosing an HMO scheme (possibly because of a price advantage), consumers also accept restricted choices over primary and secondary providers.

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1. The eight-way categorisation of health systems in OECD (1992) is also based on whether insurance cover is compulsory or optional. In addition, the term "reimbursement" is used somewhat more broadly here, referring to retrospective payments to providers rather than (as in OECD, 1992) to payments from insurers to patients.

2. The main funding methods used for hospitals and doctors are described in more detail in Boxes E and F.

market structures limit pressures to align prices with marginal costs. In this environment, overall expenditure control and incentives facing suppliers to improve microeconomic efficiency are weakened. For example, expenditure control may be particularly poor within reimbursement systems, while integrated systems have been criticised as being inefficient and responding poorly to changing patterns of demand and patient need.

3.1. Differences in spending levels across countries

34. Spending on health care per capita varies widely across countries. Figure 2 (top panel) presents per capita levels of national health spending and GDP in OECD countries, adjusted to a common currency using U.S. dollar Purchasing Power Parities (PPPs) for GDP in 1992, and a regression line relating the two variables[25]. Large differences remain beyond what might be expected on the basis of income. Some countries, notably the United States, appear to spend substantially more on health care, even allowing for differences in income levels, while others -- including the United Kingdom -- are below. Even amongst the large group of countries with relatively similar GDP per head (around $20 000 to $22 000) there are substantial differences in expenditure: Denmark, for example spends around $1 400 per head, while in France spending is over $2 400. Some of this diversity may be more apparent than real, due for example to inconsistent definitions and inaccuracies in the data (OECD, 1993*e*)[26]. But data differences alone cannot account for all; alternative ways of supplying and pricing health care, and differences in the underlying institutional arrangements and associated incentive structures, have played a role as well. Cross-country comparisons of health-care spending per capita confirm the importance of income, but point also to a variety of other factors (see Table 10 and the Annex). For example, countries which use "family" doctors to filter access to secondary treatment (gatekeeper systems) and those with capitation arrangements for doctors (see Box F) tend to have lower per capita spending.

3.2. Health spending and health outcomes

35. Some selected indicators of health outcomes (life expectancy at birth and at ages 60 and 80; rates of perinatal and infant mortality; potential years of life lost[27]) are shown in Table 11, and correlations between these indicators and health spending per capita are presented in Table 12. In general, aggregate

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25. As other studies have suggested (Schieber and Poullier, 1989; Gerdtham, 1991), there may be some degree of international convergence towards an income-dependant "spending norm" for health. However, this should not be interpreted as a strict causal relation between health-care spending and GDP as the mechanisms determining the level of health spending in individual countries are complex, encompassing, as noted above, both supply and demand variables as well as decisions of a public choice nature.

26. In the example cited, Denmark's definition of services included in in-patient care are narrower than those of some other Nordic countries.

27. That is, deaths from all causes (except suicides) between ages 0 and 64, weighted in each case by the number of years until age 65 would have been reached.

BOX C. Determinants of Health: Some Evidence

While it is extremely difficult to assess the role of health care in health outcomes, a range of evidence suggests that environmental, social and other factors are important in explaining patterns of mortality and morbidity both within and across countries. For whole populations:

-- Life expectancy tends to increase with income, education and occupational class and these trends have persisted over time (United Nations, 1982). This positive relation (often referred to as health "gradients") exists for all major disease classes (Marmot *et al.,* 1987).

-- Such health "gradients" tend to be flatter in Sweden than for the United Kingdom (Vagero and Lundburg, 1986) and there appears to be an association between income inequality and life expectancy (Wilkinson, 1992).

-- Within the lowest-income countries or states, there is a small group (including Costa Rica and Kerala) which manage to achieve life expectancy of at or above 70 years, while elsewhere in the developing world it is below 60.

-- Life expectancy in Eastern Europe has stagnated since the 1960s to early 1970s depending on the country and has regressed in recent years at a time when economic conditions have weakened (Hertzman, 1993).

Looking at samples within countries:

-- U.K. civil servants at the bottom of the scale have three times as high a mortality rate as those at the top, even after controlling for lifestyle variables, and similar results are found for morbidity (Marmot and Theorell, 1988);

-- a study in California showed that inhabitants of a federally designated poverty area had lower health status even after allowing for income, access to care, lifestyle, social factors and factors influencing stress (Haan *et al.,* 1987);

-- Americans of Japanese origin have higher risks of heart disease than Japanese living in Japan (Marmot *et al.,* 1975; Marmot and Syme, 1976);

-- a number of studies show that early childhood conditions can influence health outcomes much later in life (Werner and Smith, 1982; Schweinhart *et al.,* 1985);

-- the incidence of most cancers varies at least ten-fold between countries with the highest and lowest levels of incidence (Hertzman, 1990).

While these studies suggest that health is likely to depend on a number of factors even beyond individual genetic differences, they can only suggest possible channels; there is only limited understanding of magnitudes or the degree they can be affected by government policy. However, depending on the importance of such social and environmental factors on disease and mortality, "mainstream" health care may, at the margin, not have significant further effects on aggregate outcomes. This does not exclude targeted and highly effective programmes improving outcomes in selected areas.

health outcomes are only weakly related to medical care spending[28] [29]. Amongst the life expectancy indicators, the relationship between health spending and outcomes tends to be stronger in the case of females than males, with the strongest result in the case of female life expectancy at age 60; this may reflect differences between OECD countries with respect to the access to and intensity of treatment for people in this age group, as well as the delayed impact of other factors affecting health during previous decades of life.

36. The generally weak association between health spending and available outcome indicators partly reflects well-established evidence that direct health spending does not capture the full array of social, environmental and cultural factors which influence health status. At the very least, these include dietary habits, exercise, child-raising practices, lifestyles, educational attainment and housing. There is growing evidence that even broader factors may be at play, associated with income distribution (Wilkinson, 1992), social status (Marmot, 1986), stress (Dantzer and Kelly, 1989), social support (Bunker *et al.*, 1989) and so forth. Some evidence is presented in Box C. While such factors may have an important bearing on health, there may be only limited scope for government policy to influence them (CIAR, 1993).

37. However, the weak relationships also reflect differences in the efficiency and effectiveness of health-care provision. An overview of some elements is given below.

3.3. Input prices

38. OECD Purchasing Power Parities (PPPs) for health attempt to measure the cost of the health-care component in public and private consumption (national accounts)[30]. This permits costs in the health sector to be compared to prices of the components of value added within a country, and these relative prices can then be compared across countries (Figure 3)[31]. Measured relative health input prices are, by far, highest

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28. Only Turkey, with the lowest level of health spending per capita in the OECD, has consistently poorer health outcomes than the remaining OECD countries. More broadly, the relationship between health expenditures and outcomes does become stronger when a wider array of countries, with lower levels of industrial development, are considered (cf. World Bank, 1993).

29. These indicators, however, are very partial and reflect the paucity of data on health outcomes. They abstract from the multitude of cures for health problems, individual satisfaction with health care received, and the quality of care due to medical advances.

30. These data should be interpreted with caution. Comparisons of health PPPs for 1980 and 1985 with those for 1990 do not always show consistent patterns across countries. For a number of European countries (those covered by Eurostat), the weights employed for calculating the public consumption component of health care PPPs have been approximated by the Secretariat using average weights for the remaining countries.

31. Per capita spending adjusted by health-sector PPPs (Figure 2, lower part) can be interpreted as international estimates of differences in the "volume" of health inputs per capita. The regression line in the lower part of Figure 2 can be used in comparing the two panels. The United States moves from far above to slightly below the regression line relating "volumes" of spending per capita and GDP, and the opposite is true for Japan. In France and in the United Kingdom, the

in the United States, where there are relatively low economy-wide prices and relatively high health prices. This "explains" a significant part of the high per capita spending in the United States (compare the upper and lower panels of Figure 2). The opposite is true for Japan which, after adjustment for relative price effects, exhibits the highest "volume" of aggregate health expenditures per capita in the OECD. Health prices also appear to be relatively low in the United Kingdom and Turkey. In the remaining countries, health prices are clustered in the range of 0.8 to just over 1.0 relative to 1990 economy-wide prices. This might suggest that government controls or competitive pressures have brought health prices close in tune with average prices, erasing much of the prevailing monopolistic rates of return identified in the 1960s (OECD, 1977), although evidence to support this is weak.

3.4. Production structure of the health sector

39. OECD countries differ widely with respect to how total health expenditures are divided between major sub-categories: in-patient care, ambulatory care, and pharmaceuticals (Table 13)[32]. For example, Japan and Germany appear to have particularly low proportions of hospital spending, and relatively high proportions of pharmaceutical expenses. Denmark and Norway have high rates of in-patient hospital care. More extensive use of higher cost in-patient care is generally associated with higher levels of health spending (cf. Gerdtham, 1991 and evidence from the cross-section time-series estimates reported in the Annex).

40. To some degree, these differences may reflect the broad institutional arrangements adopted by individual countries. For example, there may have been some tendency for countries with health services largely financed and supplied by the public sector -- such as in the five Nordic countries -- to emphasise hospital spending more strongly than in systems with social insurance and mainly private (not-for-profit) supply. In countries such as Germany and Austria, a considerable amount of care is carried out on an out-patient basis in well-equipped doctors' surgeries. However, incentives can be important. In France, general practitioners find little financial advantage from undertaking small operations on an out-patient basis. High pharmaceutical consumption in Japan may partly reflect the fact that pharmaceuticals in ambulatory care are sold by the doctors themselves.

3.5. Input volumes

41. Cross-country differences in spending also reflect significant variations in factor intensities and the way health care is delivered (Tables 14 and 15):

"volume" of medical expenditures is also relatively high as compared to the value of medical expenditure which points to relatively low prices. In contrast, health "volumes" in Denmark move even further below their "predicted" level than in the upper part of Figure 2.

32. These data need to be treated with caution. The boundaries between the different spending categories are not always clear, and allocation methods are not fully standardised across countries. For example, doctors' fees in hospital care in the United States and Belgium are included in ambulatory care so that in-patient (ambulatory) care is biased downwards (upward).

-- Wide differences are apparent in bed-use per capita and average length of stay (both overall and by disease category) in the hospital sector. While this may partly reflect demand factors and alternative approaches to care for the aged, cross-country differences are not independent of the number of available beds, suggesting that supply effects are important[33] (Figures 4 and 5). Indeed, despite technological changes permitting more out-patient treatment, admission and occupancy rates in hospitals remain high in many countries (Table 14).

-- Hospital staffing ratios and the number of nurses per bed vary considerably -- as much as a factor of three to four -- suggesting significant differences in labour inputs in in-patient care (Table 15). The hospital staffing ratio is particularly high in the United States, although part of this difference may reflect administrative costs related to the complex insurance system (see Section 3.6 below).

-- Average lengths of hospital stay have been dropping but admissions increasing (Table 14), possibly suggesting that there are still too many incentives to admit patients for diagnostic procedures.

-- The number of doctors per capita also varies considerably across countries (Table 8), by as much as a factor of two. Over-supply has appeared in numerous countries[34].

42. Some of the variation results from differences in definition (OECD, 1993*e*). Demand-side variables, such as greater use of hospitals for geriatric or other long-term care, substitution of family for institutional care or simply preferences for a different style of medicine may be important in explaining resource levels and intensity of use in different countries. Nonetheless, the differences are large enough to suggest that "best practice" -- either from a medical or managerial point of view -- is not being followed in many cases, particularly in the hospital sector. This points to scope for important economies or gains in efficiency.

43. The potential for gains is suggested by the experience of the United States; for example, the fall in admissions and the sharp reduction in length of stay and (consequently) acute hospital occupancy rates followed the shift from payment on a fee-for-service basis to a per case basis for Medicare-related hospital care[35]. The average length of stay in France fell even more sharply in the second half of the 1980s and

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33. This gives support to Roemer's "law" (Roemer, 1961): that an available bed is a filled bed. Incentives can be important, however: in Germany, payment by bed-days encourages longer stays because the marginal cost of keeping patients an extra day is generally less than the price paid. Global budget arrangements reduced this effect to some degree and the introduction of payment by case-mix from 1995 is likely to limit this further.

34. The cross-section time-series estimates presented in the Annex suggest that the number of doctors is negatively related to **overall** growth in health spending, but positively related to ambulatory spending. Nonetheless, the number of doctors has a positive effect on total spending (and also in-patient spending) in systems where doctors are paid on a fee-for-service basis.

35. This change introduced strong incentives to reduce length of in-patient stays and to switch to out-patient care as out-patient care continued to be paid on a fee-for-service basis. For an overview of results see Lave and Frank (1990).

continues into the 1990s, reflecting global budgeting from 1984-85. But further savings are possible for the United States at least: despite some fall in bed-use (Table 14), the average occupancy rate (or capacity utilisation) has risen only slightly so that average costs have remained higher than need be.

3.6. Administrative costs

44. Administrative costs also vary considerably across countries but this reflects, to a considerable degree, differences in definition and imprecise information, rendering international comparability difficult[36] [37]. Nonetheless, the data, such as they are, suggest that such costs appear to be affected by institutional arrangements for financing. Systems which both finance and supply health care in the public sector (as in the United Kingdom) or single-payer systems (such as in Canada) (see Box B), appear to have lower expenses (Table 16), while such costs are greater in insurance-based systems (e.g. the United States, Germany, France, Belgium, Luxembourg, the Netherlands and Switzerland). Within Europe, levels in France and Belgium may also reflect the operation of systems where ambulatory care is reimbursed to the patient rather than directly paid to the provider and, in France, the double layer of the social security and friendly society complementary insurance (*mutuelles*) also adds to overall costs.

45. Data in Table 16 suggest that administrative costs, as presented, are highest in Germany (and France after adjustment for missing components). However, they are probably the highest in the United States once the costs of making insurance contracts -- which appear to be inadequately recorded in the U.S. data -- are taken into account. Experience rating (premiums based on individual risk) plus the large number of individual and small group insurance policies considerably increases the cost of operating the U.S. system compared to Europe where insurance arrangements are largely based on pooling of risks in large funds (community rating). The cost differential would probably be even larger in the United States compared to other countries if costs of hospital administration were taken into account: costs in the United States appear to be substantially above other countries because individual hospitals have to deal with a range of insurers all with differing information requirements, risk cover and billing arrangements[38] [39].

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36. The United States definition -- which forms the reference standard in this area -- is the "net cost" of health insurance, i.e. administration of private and public programmes plus net additions to loss reserves and net underwriting gains or losses to private insurers. Thus, private administration includes sales, underwriting, enrolment, policy service, claim adjudication, utilisation reviews, actuarial functions, legal support services, investment functions, corporate overhead and risk charges. Public administration includes planning, monitoring and evaluation as well as implementation and managerial costs of federal, state and local government programmes.

37. France, New Zealand and Portugal appear to include only central government, whereas around four-fifths of the spending is undertaken by the health boards or social security systems. Many other countries have their definitional idiosyncrasies (Poullier, 1992).

38. The importance of this is suggested by a comparison between hospitals in the United States and Canada, which showed administrative costs in Washington State were 30.3 per cent of hospital budgets and 18.3 per cent in British Columbia (Katz and Schwendiman, 1990). In a comparison of hospitals in New York City and Paris, the major difference in cost structure was in administrative areas: in acute-care hospitals, for example, 26 per cent of employees in the New York system were classified as administrative, compared with under 10 per cent in Paris (Rodwin

46. The pattern and development of administrative costs over time can be related to the changing roles of insurers *vis-à-vis* providers. In the United States, the increased monitoring and assessment of medical practices by many insurers underlies the rise in costs in the 1980s[40]. Increases in Germany have reflected a number of factors: additional services covered by sickness funds (e.g. home help) and a large number of exemptions from cost-sharing, both of which are costly to administer, and also greater monitoring costs on hospitals and physicians since the 1977 reforms. The recent introduction of internal markets for health care in the United Kingdom has led to increased administrative expenses. As in Germany, where 2 per cent of all claims are audited every quarter, much of the increased administration is an unavoidable by-product of gathering the information required to enhance productivity and effective spending.

47. Overall, higher administration costs may be necessary and acceptable elements in the reforms that some countries -- such as the United Kingdom -- are pursuing to increase micro-efficiency in the financing and delivery of medical services. It may, for example, be costly to generate price and effectiveness data on medical treatments, but these costs may well pay their way where they are integrated into better managerial and medical practice. Such changes in administrative costs must be taken into account in any assessment of the costs and benefits of reform.

48. But at the same time, there probably remains scope for savings in many countries and reforms which are being pursued elsewhere may help contain administration expenses. Belgium, for example, has made considerable progress, possibly spurred by competition between sickness funds for members (see Boxes B and G). Significant economies have been realised in Japan by consolidating all payments of the various insurers in the Social Insurance Medical Reimbursement Fund.

3.7. Appropriateness of care

49. Cost savings and improved effectiveness of health care may follow from a closer look at what kinds of health care are provided. Medical practice patterns vary widely across and within countries, even after allowing for confounding variables such as age, morbidity, or systems of funding and health-care delivery (McPherson, 1990). In North America, large differences in procedures and utilisation rates (e.g. for surgery) among regions, hospitals and physicians cannot be attributed to differences in patient needs (Wennberg, 1987; Wennberg and Gittlesohn, 1973; and Brooke and Kosecoff, 1986). Prescribing

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et al. 1992). Experience rating -- i.e. setting premia on the basis of risk -- adds much to the U.S. administrative costs as contracts need to be renegotiated as workers leave and other workers with different risk characteristics are taken on. The CBO estimates that in small establishments, administrative costs are around 40 per cent of premia.

39. Indeed, overall administrative costs in the United States have been estimated by Woolhandler and Himmelstein (1986, 1991) to be in the range of 20-25 per cent of total health-care expenditure and similar results have been found by the GAO (1991, 1992). Woolhandler and Himmelstein, in their two studies, also estimate that the savings from moving to a Canadian single-payer system would have been 8.1 per cent in 1983 and 13.6 per cent in 1987.

40. Insurers are taking a more active role in ensuring what health care is appropriate by having care managers follow expensive sickness episodes and by reviews of doctor practice behaviour and the effectiveness and quality of hospital care.

varies enormously across countries: average numbers of medicines prescribed vary by as much as four or five times (OECD, 1993*e*). Even for systemic antibiotics, where the effects and accepted protocols for use are widely understood, France consumes nearly three times as much as Germany and twice as much as the United Kingdom; values for cardiac glycosids are two and three times, respectively, in France compared with Germany and the United Kingdom (OECD, 1993*e*)[41].

50. In fact, medical practice is confronted with considerably more uncertainty than is generally imagined. Four-fifths of medical procedures and two-thirds of medical goods have never been evaluated with respect to their effectiveness or cost. Once introduced, they are sometimes inappropriately used (Commissariat Général du Plan, 1993), such that, in many cases, they may provide only very marginal benefits to health outcomes (Weisbrod, 1991). As noted in Part 2, technology appears to have been one of the driving forces for increased expenditure over the past thirty years and this can be expected to continue. OECD countries are increasingly assessing medical technology, developing consensus conferences and introducing consensus criteria, but the level of commitment remains inadequate (Stocking, 1988).

51. Taken together, these various indicators suggest that there is scope for increasing the efficiency of health-care provision. It must be recognised, however, that cross-country cost variation has arisen from demand as well as supply factors -- individual countries may have different preferences in the degree of "caring" as opposed to cure, in the range of services to be provided or covered by the state insurance, and in the way services are delivered[42]. While these preferences may have become culturally engrained over time and may be difficult to change, there is no reason why they should be excluded from the process of reform. The key consideration for policy in this context should be the impact the reforms have on system effectiveness and health outcomes, while minimising the cost of provision. The diversity across OECD countries provides considerable scope for comparing different approaches to health-care provision and in assessing the effectiveness of reforms. Some of these issues are dealt with in Part 4.

4. Policies to Improve the Performance of Health-care Systems

52. Faced with budget pressures and evidence of cost inefficiency, all OECD countries have introduced reforms or are planning to do so in the near future. While the direction of reforms has not always been the same in all countries (the factors underlying this are discussed in Section 4.1), reforms can be broadly categorised as "macroeconomic" or "microeconomic". Budgetary caps and other top-down (macro) measures to control expenditure were, in general, introduced first as governments grappled with the budgetary consequences of the unremitting rise in health provision (Section 4.2). But as the limits and weaknesses of overall budgetary control have become clearer, more recent reforms have sought to tackle the various policy objectives in a more integrated and consistent manner, which also allows some of the broader influences affecting health to be taken into account (Section 4.3). At the same time, more attention is being paid to reducing demand for health care by increasing user charges (Section 4.4).

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41. Some of these differences may reflect absence of common definition.

42. Indeed, there is some evidence that there is greater satisfaction with health-care systems in countries with higher spending per capita (Blendon *et al.*, 1990).

4.1. Factors influencing the direction of reforms

53. Many governments have already undertaken substantial reforms to health systems over the past decade (for a detailed description see OECD, 1992*c* and 1994*e*). The direction of reform has not been uniform, however -- neither across countries nor across time -- and has depended on two sets of factors. The first is the starting point of the reforms. The wide variety of financing, contractual and regulatory arrangements (see Boxes A and B), and associated incentive structures, has meant that countries are not confronted with problems arising from financing and delivery of health care with the same intensity. For example, in countries such as the United Kingdom and Sweden -- where, until the early 1990s, on-budget financing of hospital care with salaried doctors helped restrain spending -- key reforms have been concerned with increasing effectiveness (with significant emphasis on reducing waiting times). In contrast, in the United States, Germany, France, and other systems which traditionally relied on fee-for-service remuneration of hospitals and doctors, the focus has been on overall expenditure restraint without loss in quality of delivery. The equity and access aspects of health provision are also prominent aspects of the reform debate in all countries, most visibly in the United States.

54. Second, countries place different weights on objectives, or face different political pressures from the health-care providers, patients and taxpayers. Reform packages have thus taken different shapes even for countries having similar problems. Inherent in this is the potential conflict between the three objectives described in the Introduction. For example, restraining general government expenditure can be achieved by increasing the amount of out-of-pocket payments by patients or by restraining the revenues of the health-care providers. The first, however, can conflict with the goal of widespread access to health care. The second, particularly if not accompanied by measures to improve effectiveness, may lead to reductions in output, growing waiting lists, and less consumer satisfaction. Governments have had to balance these different objectives, in part by shifting emphasis over time as the consequences of their original choices manifest themselves.

4.2. Measures to control spending (macro control)

55. Most OECD governments now impose some form of overall constraint on health spending. Particular attention has been paid to hospital services -- usually the largest spending item and, in the past decade, the most closely controlled. But the rapid rise in ambulatory and pharmaceutical spending has led a few governments to broaden control to include these components as well.

56. One feature contributing to cost control is strong monopsony power in dealing with providers -- either by having all funds flowing through one budget, or through consultation between funders in the formulation of overall spending constraints (Evans *et al.*, 1990; Abel-Smith, 1992; and Wolfe and Moran, 1993). The actual process that this takes depends on the degree of centralisation of spending and decision-making. For example:

- Overall spending control is easiest in systems where there is a single funder; for example, in the United Kingdom, Ireland and New Zealand, health-care spending is a line budget item with much of health supply provided by the state. However, such a system needs to be complemented by sanctions to prevent or re-coup overspending[43].

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43. For example, weak sanctions on health providers in Italy in the 1980s forced the government to regularly inject new funds into the health system.

-- Where local, county or regional governments organise health supply, central authorities can find overall expenditure control more difficult. However, constraints on transfers from central to local government and/or centrally-imposed limits on local tax rates may help create implicit targets and the means to achieve them[44].

-- In social security systems (especially where there is a large number of sickness funds), expenditure restraint requires co-ordinated action on the part of the funds *vis-à-vis* the providers, often accompanied by government-induced restrictions on increases in compulsory health insurance contributions[45].

57. The techniques of control have varied across countries. In the hospital sector, controls have had the following elements:

-- Prospective budgets per hospital are widely used, with sanctions in the case of cost over-runs and measures to prevent income substitution (e.g. hospitals requiring patients to pay supplementary charges). Variants of prospective budgets were in place in all but four countries by the end of the 1980s (the exceptions were the United States, Austria, Luxembourg and Switzerland[46]), although with varying degrees of success.

-- There were efforts to control the number of new hospitals and the spread of costly medical equipment. "Certificate of need" regulations for new hospitals and central controls on capital spending were widespread. These were often accompanied by measures to decrease excess beds: all countries except Japan reduced bed numbers per capita over the 1980s, with particularly sharp drops in Italy, the United Kingdom, Denmark and Ireland (Tables 8 and 14). However, these reductions have proved more difficult to realise in the social security systems and private insurance systems where there is less central control.

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44. In both Canada and Australia, where a large part of the funds are provided by federal governments, some rigour was imposed by changing the transfer to the provincial/state governments to a block grant indexed to GDP (Canada), making the lower levels of government responsible for cost over-runs. In Finland, a large share of spending at the local level was paid for by the central government, encouraging an increase in supply (OECD, 1989), but this has been replaced by block grants. In Sweden, where the regions finance the bulk of spending through local taxes, there had been little capacity for overall control until Parliament voted in 1990 to limit tax rates at the county level of government through 1992 (extended to 1993).

45. For example, in Germany the "Concerted Action", which brings together stakeholders in the health-care system, acts as a forum for resolving differences. While the conference recommendations are not binding, they have considerable influence on outcomes. Regional sickness funds then negotiate budget caps with the providers. For Japan the Ministry of Health and Welfare has maintained an objective of keeping the growth in health costs in line with the growth of national income.

46. For Switzerland, the statement does not apply to the canton of the Vaud which has been experimenting with global budgeting for more than a decade.

-- In a few countries there were also direct controls on manpower, service volumes, or pay rates. Input controls were, in fact, the main mechanism of cost control in Italy, while in Germany and Belgium bed-day quotas were introduced.

58. With continued growth in other components of health spending, reforms have also been introduced or tightened in the ambulatory sector and for pharmaceuticals. To restrain overall spending:

-- Fees for ambulatory care services are centrally-negotiated in many countries. A few countries have placed an overall budget cap on physicians' or other health professionals' income -- such that increases in volumes of care are compensated by reductions in the average fee paid to the doctor for services (Germany and Canada), and for laboratory tests and nurses in private practice (in France)[47].

-- The relative prices of different medical services (tests versus treatment) have been readjusted, and direct limits placed on out-of-hospital pathology tests (France and Belgium).

-- Pharmaceutical products have been restricted through the use of "negative" and "positive" lists[48]. Prices or profits in this sector have been tightly controlled, incentives to use cheaper generic products increased (Germany, Norway and Sweden), and attempts made to change the prescribing practices of doctors (France and the United Kingdom).

4.2.1. Effectiveness and sustainability of controls

59. The marked slowdown in the growth of health spending -- particularly the public component -- in the 1980s has been attributed generally to the efforts of government macro-controls on spending. While there is still no consensus on their impact, tests based on cross-section data (Gerdtham *et al.*, 1992, and the estimates presented in the Annex) suggest that the presence of macro-controls does not explain the cross-country differences in levels of spending. This is perhaps not surprising. Aside from the data problems which hamper comparability, spending controls are probably most likely in countries with high levels of spending, and it may take considerable time before they show up in differences in relative spending levels across countries. Furthermore, there are considerable difficulties in assessing when budgetary controls begin to bite[49].

60. Several factors reduce the effectiveness of budgetary controls or undermine their sustainability. These are grouped here in three categories, covering the comprehensiveness of controls, effects on access, and effects on efficiency.

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47. A similar system for office-based specialists was proposed for the Netherlands but not implemented because of lack of co-operation in collecting the necessary information to make it operational.

48. Such lists determine which pharmaceutical products are to be sold or, at least, which can be reimbursed by insurers.

49. For example, as noted, attempts at aggregate control on health spending in Sweden were to some degree delayed because the central authorities had only limited influence over the decisions at lower levels of government.

4.2.2. Comprehensiveness

61. Partial controls tend to produce spill-over effects of demand and spending into less-controlled areas. In general, the share of ambulatory care in total spending rose over the 1980s, partly in response to controls on hospital spending (Abel-Smith, 1992); increases were particularly marked in countries with fee-for-service systems (e.g. France and Canada). In other cases, where budget controls have constrained the public system, some demand has shifted to private hospitals or "private" beds in public hospitals often because of (variously) dissatisfaction with waiting times, concern over the quality of care and lack of responsiveness to patient needs[50]. This process has often been accompanied by an expansion of private insurance markets. Furthermore, price controls in fee-for-service systems may be partly or fully offset by volume increases (France and Canada).

4.2.3. Effects on access

62. A second set of problems concerns the equality of access to health care, particularly in connection with apparent limitations on the availability of public health services. Problems associated with waiting lists have been noted in Italy, the United Kingdom, Canada, Australia, Denmark, Greece, Iceland, Ireland, New Zealand, Norway, Portugal, Spain and Sweden (OECD, 1994*e*). In this situation, less-constrained private-sector health services tend to flourish relative to public-sector services, and patients with access to the former may then be seen to receive superior access and treatment. Moreover, particularly in the public sector, some services may be eliminated, waiting times may increase for "less-urgent" treatments and "lower-priority" patients, and seemingly arbitrary methods may at times be used to allocate health resources. Sharp reductions in spending, lower services and longer waiting times for elective surgery or visits to hospital specialists can be followed by a strong negative reaction from the electorate -- cf. the United Kingdom and Ireland -- leading to pressures for increases in spending[51].

4.2.4. Effects on micro-efficiency

63. Finally, macro-budget constraints alone rarely appear to have encouraged greater efficiency and effectiveness of providers, and in some cases may have weakened the achievement of those objectives[52]. Hospital budgets are most often based on historical costs, penalising efficient producers and placing little pressure on inefficient providers to improve. When accompanied by budget-line restrictions or limitations on hiring, aggregate controls can reduce flexibility in allocating resources more effectively within individual

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50. This has resulted in budget ceilings being set for private hospitals in France from 1990.

51. An example of the difficulty in balancing spending control and micro-efficiency against consumer preferences for physical access is found in the area of emergency services. Even where there are adequate urban transport arrangements, local populations resist their closure. This has led to an excess in the number of hospitals. As an illustration, in the Ile-de-France (greater Paris), a catchment area of 12 million people, there are some 110 services of this kind whereas expert opinion evaluates the need at around 35.

52. In some countries, budget ceilings did reduce the supply of beds, thereby reducing overall costs. However, because these reductions were often unselective, they reduced overall costs but did not improve the efficiency with which the remaining resources were employed.

hospitals. Where unspent funds are clawed back at the end of the budget period and future budget allocations are based on previous years' spending, there are definite disincentives to save on resources.

64. The above considerations therefore suggest three elements that may contribute to the success of macro-level controls. Where possible, such controls should:

-- have broad coverage over the health-care industry rather than focusing on just one sector;

-- aim at total spending rather than just on prices or volumes;

-- be accompanied by micro-level reforms to improve efficiency.

4.3. Micro-efficiency and supply

65. Increasing efficiency would release resources to reduce waiting times where they exist, and lower cost pressures more generally. The role of health funders and their relationship with providers of health care in this process is discussed first, focusing on the provision of secondary care (in hospitals, clinics, etc.), which on average absorbs nearly half of total health spending in OECD countries. Reforms primarily affecting the patient/doctor relation in the primary care environment are presented next, followed by a discussion of issues specific to pharmaceutical spending. Issues relating to the accountability of purchasers are explored subsequently.

4.3.1. Efficiency problems in the hospital sector

66. There are several factors affecting hospital efficiency. First, as noted, the medical profession has had a strong hand in resource allocation decisions and, partly guided by ethical concerns, the main objective has been to provide the best care for the patient regardless of cost.

67. Second, the management capacity and information necessary for effective decision-making has been weak; not only has there been little information on the costs of different procedures, where such information has been available there has often been considerable resistance to its use (OECD, 1993d). Change has taken place in the past half decade (OECD, 1994*e*), but still too little is known about the relative costs of different medical treatments, their effectiveness or the costs of caring for individual patients. While providers bear much of the responsibility, the payers (insurers) and regulators are also to blame because they have failed to motivate and adequately oversee suppliers.

68. Much of management inefficiency, however, has little to do with medical care -- relating more to poor control and organisation of labour and physical resources[53]. In some cases, services which could be more effectively organised by out-sourcing have been produced in-house, and these can represent up to half of per patient costs. The internal flexibility of labour has been limited -- many tasks which could be

53. The scope for gains is found in Stockholm, where a reorganisation of services permitted, in 1992, increases of 70 per cent in cataract operations, 50 per cent in coronary bypass, 42 per cent in ambulatory surgery and 8 per cent in conventional surgery without a budget increase.

carried out by less skilled workers have been restricted to medical staff[54]. Control of stocks of material has been weak. Capital spending has often been allocated separately from current spending and written-off immediately. With capital virtually free to the hospital operator, capital intensity has tended to be too high with incentives to expand. Even where hospitals are independent and under contract, the payment methods have not encouraged greater cost efficiency, in most cases encouraging longer stays or additional and possibly unnecessary treatment. Further, increased management capacity may not in itself achieve desired results -- for example, where there are inadequate accountability systems to ensure that managers focus on reaching the desired goals[55].

69. Pricing arrangements can also be highly distorting. In many countries -- particularly those with contract or fee-for-service arrangements -- prices for individual medical procedures often have little relation with the relative resource costs or with the cost-effectiveness of treatments. International comparisons of fee structures indicate a wide variation in both the price levels and in relative prices for similar medical acts across countries (OECD, 1987). Furthermore, price levels and, most importantly, relative price structures, can remain fixed over long periods even where technological change affects costs[56]. This can lead hospitals or doctors to focus on, or promote, procedures where the price offered relative to the cost is the highest, leading to a misallocation of resources within the health sector, an impact on overall system costs and, potentially, detrimental effects on patient health.

4.3.2. Approaches to improving micro-efficiency

70. A number of countries have recently experimented with more wide-ranging reforms in the hospital sector. Reforms along the lines of those outlined below have been introduced in the United Kingdom, the Netherlands, New Zealand, Norway and Sweden, and are being considered in Germany, France, Belgium, Denmark, Finland, Ireland, Sweden and Spain. The details of each system differ, depending in part on the

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54. Studies of health manpower regulation in the United States suggest that just two restrictions -- on the number of auxiliaries a dentist can hire and the functions a dental auxiliary may perform -- cost consumers an extra $700 million in 1982. The quiltwork of restrictions across 45 medical specialities could increase this figure by many times (Begun and Feldman, 1990).

55. For example, in France where considerable efforts have been made to increase management capacity, collusion between doctors and managers has, on many occasions, led to an emphasis on prestigious and expensive services to maximise the income and reputation of the hospitals (OECD, 1993*d*).

56. The last major revision of the French medical nomenclature and associated price structure was in 1972, despite the fact that technological change has had a major but unequal impact on costs. The use of endoscopy in intestinal medicine in France provides a case in point of the effects of inappropriate price structures. As the new procedure became more widely employed and the cost of equipment fell, the unit costs per examination declined relative to the price of the examination paid by the insurer. Increasing profits from the use of endoscopy examinations has progressively pushed out cheaper procedures such as X-ray imaging, even though the additional information obtained is marginal. Such problems can be accentuated where doctors "self-prescribe". For example, in the United States, ecographies were prescribed four times more frequently by doctors with equipment than those who sent patients to a radiologist (see Commissariat Général du Plan, 1993 and sources cited therein).

particular pressures facing governments at the time they were introduced. The rate of progress has also varied as the plans have been contentious in all of these countries. In many respects, the United Kingdom has progressed furthest along this road; as the U.K. reforms include many of the elements described below, the major outlines are presented in Box D[57].

4.3.2.1. Strengthening the role of payers

71. The central requirement for improving efficiency is to clarify and strengthen the role of health funders. Funders -- whether public authorities, sickness funds, or private insurers -- have often been (and still are in some cases) relatively passive intermediaries between health consumers and providers. Their function has been to allocate available funds amongst an established group of health-care institutions, usually employing payment methods such as block grants, per-diem payments or fee-for-service systems which paid little attention to issues of resource allocation or value for money and, in the case of the latter, permitted supplier-driven spending increases to go unchallenged. Instead, the role of health funders -- in public systems at least -- needs to be defined such that they are both accountable to the state for cost control, and agents for health consumers with respect to assessing and purchasing health care. These functions are discussed below.

4.3.2.2. Increasing accountability of purchasers for cost control

72. Under these reforms, health funders are generally given an overall prospective budget cap. They are responsible for choosing contracting arrangements with providers (including incentives and sanctions) such that total spending remains within this limit. These arrangements may, for example, require that cost over-runs by providers are paid back in following years (rather than funders being forced to finance deficits, as has happened in Italy).

73. How the budgetary cap is best achieved will depend on the health system concerned; however, many of the existing approaches towards macro-control (as discussed in Part 4, Section 4.2.) continue to be relevant. For example, mechanisms for setting overall public health spending already exist in countries where health care is financed through national budgets or monitored by the state (e.g. the United Kingdom, New Zealand and the Nordic countries); in these cases, the emphasis is on finding the appropriate capitation-based formulae for distributing this global budget amongst regional health purchasers. In systems with a number of social security funds, setting a ceiling on contribution rates (as in Germany) may achieve the same results. Similar methods may need to be employed where the responsibility for health care is handled by lower levels of government[58]. In private-sector systems (the United States), such arrangements are difficult to achieve (although the Administration's health reform proposals include a mechanism to limit expenditure in the case of failure to achieve the targeted slowdown).

4.3.2.3. Better purchasing agents

74. A second main element in these reforms is that funders should become more effective purchasing agents for health consumers. This means that funders are in a position to be much more active in assessing

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57. For a fuller description see OECD 1992*c* and OECD, 1994*c*.

58. See the example of Sweden described in footnote 44.

BOX D. United Kingdom's Health System Reform

The NHS before reform

Nearly the entire British population relies on the National Health Service for its health care. Though private health insurance is also permitted, it is small relative to the total. The NHS is paid for almost exclusively out of general taxation -- only 11 per cent of the population has some form of private health coverage. Regional budgets were passed on to the hospitals and other facilities via District Health Authorities (DHAs), who then used the money to finance and operate the hospital and community health services. Prior to 1991, hospitals in the United Kingdom received a budget from central government and had to keep within it. The primary care sector of the U.K. system is organised around the family doctor or GP "gatekeeper". GPs are paid a fixed amount per patient (depending on age), together with certain allowances and fee for a certain number of services of a preventive nature. Patients have a right to choose their GP. Tight budget control under the National Health Service, however, was obtained through an inflexible system for allocating funds to hospitals and was frequently associated with long queues and with a lack of sensitivity to patients' needs and tastes.

The command-and-control system of the NHS lacked flexibility, incentives for efficiency, financial information (and hence accountability) and choice of providers of secondary care. Consultants (senior hospital doctors) with lifetime positions in hospitals had little incentive to improve the efficiency of their service. There was also little incentive to use buildings economically as they had always been paid for by the government or for managers to identify more efficient ways of using resources. The flexibility of work practices and pay was limited by national pay settlements. Patients could not choose other providers of specialist services.

The reforms

The motivation for the reforms centred on the belief that an alternative system could be devised that retained the advantages of the NHS -- universal coverage, virtually free care and effective cost control -- while expanding consumer choice and reducing supply-side inefficiencies through competition between providers of both hospital and clinical services.

The central idea that underpins the new NHS is the distinction between the purchaser and the provider of hospital and community health services (that is, of specialist services usually provided by hospitals). The providers compete with one another to provide such services by means of contracts with purchasers of health services. There are two kinds of purchaser. First and largest are the District Health Commissions (DHCs) who operate under a budget. The reforms recast their role from one of organising and providing hospital care to selecting the services required to meet those needs and then contracting with various service providers. A greater role than formerly is attached to identifying the health needs of the district's population. DHCs are monopsonists in contracting for many hospital services (such as emergency services and other care not contracted for by GP fundholders; see below).

The second type of purchaser is the fundholder; self-employed primary care doctors (normally in group practices with at least 7 000 patients) who manage a budget which they must use to secure a defined range of hospital and primary care services for their patients. The fundholder's practice receives a transfer of roughly one-fifth of the per-capita costs of hospital and community health services to purchase a variety of services and products, including some surgical treatments, diagnoses, prescriptions and community nursing services. Since GP fundholders "compete" with DHCs and private insurers in purchasing certain services (with the areas of competition being defined by health-care regulation), the purchasing side of market is now also subject to some competitive pressures.

The GP fundholders can attract more patients by pushing secondary providers to improve the quality of services for their patients, and using surpluses to purchase or supply further services. GP fundholders can employ staff to undertake income generating activities, such as immunisations and health promotion. About 34 per cent of the population was covered by fundholders in mid-1994.

For hospitals, the reforms centre on the creation of "trust" status and competition between all hospitals and community services (and in some cases even with private hospitals) for contracts with health authorities, GP fundholders and private insurers in order to earn their incomes. The trusts are public-sector organisations enjoying a high degree of autonomy in providing secondary and community health care. Trusts are expected to break even with a required return on assets of 6 per cent. They may employ their staff on their own contracts and terms of service. Trusts may retain unplanned surpluses and are free to borrow within the External Financing Limit (EFL), which is a form of cash limit set by the Treasury on total borrowing for the sector as a whole. By mid-1994 around 90 per cent of hospitals had achieved trust status.

Other changes introduced as part of the reforms were aimed at ensuring that health service managers were no longer able to view capital expenditure as a "free good". The previous lack of any incentive structure in the management of the NHS estate had led to under-use and neglect of valuable capital assets. The capital charging system was designed to rectify these problems and to encourage managers to make the most efficient use of their physical resources by recognising that the continuing use of those resources has a cost. The capital charging system is now a major input into business planning and ensures that the revenue affordability of any capital investment is carefully considered in respect of its likely impact on contract prices.

the relative merits and cost-effectiveness of different treatment strategies, and in selectively buying health services from potential suppliers. Funders, in their new role, are then accountable to consumers for the quantity and quality of medical services provided.

75. There are some advantages to systems where there is a single purchaser responsible for the health needs of its local population. Scale considerations may make the purchaser better able to pay for the needed information to set appropriate contracts. The purchaser can use its monopsonistic powers to obtain increased information from providers, initiate studies on the desirability and effectiveness of alternative treatment strategies, and put pressure on providers through contestability and yardstick competition[59]. Given the comprehensive and long-term relationship with health consumers, there is scope in single-payer systems for the purchaser to take a broader view of health care: this can incorporate an integrated strategy covering primary, secondary, and community care, and can take into account the wider range of elements contributing to overall health status[60]. Purchasers may also be in a stronger position to limit unnecessary care, although distinguishing between unnecessary and necessary care can be difficult in practice.

76. Beyond this, there is much that can be done to address the implications of practice variation by comparing the practice styles of doctors and hospitals. This can follow from increased information on treatments supplied, something that has often been resisted by the medical profession under the guise of patient confidentiality.

77. While, strictly speaking, volume controls and audits have existed all along[61], the impetus provided by the reform process is resulting in their systemisation and more widespread use in a range of different institutional environments. In 1994, France began implementing a law concerning a set of some thirty *références médicales opposable* which set out "best practice" procedures and treatments for a range of illnesses and provides for sanctions in case of abuse. Similarly, in the United Kingdom, purchasers (District Health Authorities) are specifying not only the type of care to be purchased, but the procedures and techniques to be followed, and are beginning to check on hospitals with high levels of certain types of surgery. In Germany, the sickness funds have been required to audit 2 per cent of all medical bills per quarter since 1989. In the United States, insurers have been taking an increasingly active role in the process of patient diagnosis and treatment: by 1990, 80 per cent of conventional group insurance used case managers to monitor the treatment of high-cost or chronically-ill patients, and approximately 45 per cent required pre-admission certificates and hospital review. The general consensus is that such controls have constrained the volume of health care, but these savings have been partly offset by increased administration costs. Overall, the Congressional Budget Office (CBO) has estimated that these methods might reduce national health-care spending by only 1 per cent (CBO, 1992*b*). However, the scope for larger savings is suggested by the main French insurer (CNAMTS), which has found one-fifth of some components of

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59. Contestability refers to the competitive pressures created by the potential entry of other market participants (cf. Baumol, 1982); yardstick competition involves comparisons of performance with other producers who are not directly competing in the same market area.

60. For example, district health authorities in the United Kingdom can now provide an additional "voice" in calls for improved housing, accident prevention, road safety, etc.

61. Many social security funds require prior agreement before they agree to cover certain procedures and in some cases have demanded doctors in their employ to examine the patient. However, the effectiveness of this on practice patterns or over-spending has been weak.

medical care is clinically not justified and may even be against the best interests of the patient (Béraud, 1992; CNAMTS, 1992).

4.3.2.4. More competition and better pricing behaviour in the hospital sector

78. The effectiveness of moving health insurers from simply a funding role towards a purchasing role would be enhanced if there were actual or potential competition between health providers. This argument applies whether health providers are publicly or privately owned[62]. The ability (or at least the threat) of health purchasers moving funding for some or all services is likely to provide a strong inducement for providers to seek improvements in quality, efficiency, cost control, and other elements which may be needed to win health funding. Such an approach is being used in the United Kingdom, where the funders are no longer restricted to purchasing from local public hospitals, and in Denmark and Sweden, where consumers now have free choice over the hospitals where they seek treatment[63].

79. Effective competition will, for most countries, reveal actual hospital over-supply. This has already been the case in the United Kingdom and in Sweden, where the over-supply of beds in core city areas and their implications in terms of costs have become clearer[64]. Despite this, decisions to close hospital beds are almost always difficult and politically sensitive, and result in local resistance wherever they are proposed. Thus, increased competition needs to be accompanied by rules of exit for loss-making hospitals or arrangements to ensure a more balanced regional supply. A key consideration will be the need to do this in a way that sustains adequate competition among providers (OECD 1994*c*).

80. Competition will also permit more realistic pricing practices to develop. Where providers have to compete for custom on the basis of price, there will be a greater incentive to cost individual procedures and to cut costs where possible. With prices closer in line with marginal costs, the distorting effects of current relative price structures (see Section 4.3.1) will be reduced and resource allocation improved. Competition may be difficult to sustain in rural areas where there may be only one hospital serving an area. Nonetheless, where competition exists elsewhere -- for example, in major urban areas -- the pricing and other contract arrangements can serve as a benchmark. Purchasers can then evaluate how health-care funds can be spent most effectively while hospitals are subject to imposed incentives through purchaser-provider contracts. Recent experience in the United Kingdom suggests that, where there is contestability even at the margins of health services, suppliers in an essentially monopolistic setting face pressure to seek improvements along the various service dimensions sought by funders (OECD, 1994*c*).

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62. As discussed in OECD (1993*a*), an important source of efficiency gains arises with competitive arrangements allowing public-sector suppliers to compete with each other and with private-sector suppliers. The fact that most private suppliers are of a non-profit nature also weakens this distinction between private and public providers.

63. However, in the Swedish case, the funders do not yet act as purchasing agents to the same degree as in the United Kingdom. For this to be the case, the payers must be able to restrain choice to those hospitals where they have contracts (Anders and Svarvar, 1993).

64. The over-supply of beds in central London has been recognised since the last century. However, the impact of the internal market in the United Kingdom has made this clear and increased pressure for rationalisation.

BOX E. Hospital Funding Systems

With block grants (or global budgets), hospitals receive an annual budget to cover all their services (usually apart from major capital spending). During the 1980s, this approach became the main payment method used in many "integrated" health systems, where the government is the main provider as well as funder of health services. It is found, for example, in the United Kingdom (until recent reforms), Canada, Australia, Denmark, Finland (with some direct billing of municipalities), Ireland, New Zealand, Norway and Sweden, and is also commonly used in the public hospital sectors of other systems (e.g. France and Spain (social security hospitals)). In Denmark and Sweden, block grants are provided at the level of clinical departments in hospitals.

Block funding provides a direct means of containing hospital spending, provided enforcement mechanisms are adequate. However, this approach provides few incentives on producers to improve the efficiency of their operations, as funding is not contingent on the quantity and quality of output, and little information on relative prices of treatments is generated or used. Perverse incentives for efficiency may arise -- for example, if funding levels are set according to historical costs, or if budget savings are clawed back by the funder.

Bed-day payments provide hospitals with a flat-rate fee per occupied bed. This approach was found mainly in systems with public funding and a mixture of public and private providers (e.g. Germany, France (private hospitals), Austria, Belgium and Spain (private and some public hospitals)). Overall hospital spending is capped, in effect, by total hospital capacity; however, suppliers face incentives to lower patient turnover and prolong lengths of stay so that the more expensive early days (when treatment usually occurs) are offset by lower-cost days later on during recuperation. As with block grants, funding decisions do not incorporate information on relative costs across treatment methods.

Fee-for-service methods pay hospitals according to individual services provided. These are the principal means of paying for hospital services in Japan, some cantons in Switzerland, and until very recently, the United States -- i.e., systems with mainly private providers and multiple insurers. Specialists are usually paid on a fee-for-service basis, particularly when working outside hospitals, but also for their services in public hospitals in some cases (e.g. Belgium).

Under this system, macro-control is weaker (requiring spending to be contained by other means), with suppliers facing incentives to raise the quantity, quality and prices of services provided. In the United States, this system may have contributed to competition between suppliers on the basis of higher quality rather than lower price, and excessive diffusion of expensive medical technologies (Weisbrod, 1991).

Payments-per-case set fees prospectively according to diagnosed medical conditions and standardised treatment costs. The best-known system is the Diagnostic Related Groups approach (DRGs) introduced into the U.S. Medicare programme in 1983. DRG-based systems have since spread to other parts of the U.S. medical system, and are being implemented or considered by other countries, including Germany, France, the United Kingdom, Canada, Australia, Austria, Belgium, Denmark, Finland, Ireland, Norway, Portugal, Spain, Sweden and Switzerland. These methods come closer than those above to being output-based payments, hence facilitating competitive contracting for treatments, and constraining suppliers' incentives to increase service volumes. They provide incentives on hospitals to increase turnover (i.e. reducing lengths of stay), but may lead to some "unbundling" of hospital services, and there is a risk that hospitals may, where possible, "bump" patients into more highly-remunerated diagnostic groups.

4.3.2.5. Better contracting methods (the role of risk-sharing)

81. Competition is likely to imply the increased use of various contract-based approaches for hospital services. In contrast to bulk funding of all the outputs of a supplier, or to the passive reimbursement by insurers of bills submitted by providers, contracts provide the scope for competitive bidding for particular services sought by the purchasers and the transfer of resources to alternative providers. Contracts can also help to bring prices closer in line with costs in cases where the two have diverged over time or were inappropriate in the first place. Moreover, contracts provide a formal mechanism for performance indicators (such as quality, quantity and cost dimensions of services) to be specified and monitored. This is important, for example, where the funder wants to build a long-term relationship with particular providers.

82. The main features of methods used to pay providers and their implications (particularly for overall budget control and micro-efficiency) are set out in Box E. Under the widely-used system of block grants or bulk funding, the risks associated with the uncertain demands, intensity and costs of hospital treatments are borne by providers (and their clients) rather than by payers: for example, unexpectedly high resource use and costs in one area have to be offset by reductions in services elsewhere if overall spending is to be kept within budget. In contrast, fee-for-service systems place all the risks on funders, in the sense that providers are able to bill insurers for all the services needed to treat individual cases (and providers have an incentive to expand these services). Prospective, payment-by-case systems using Diagnostic Related Group (DRG) or similar approaches provide a means of sharing risks: the funder recognises and pays for differences in costs across a limited range of diagnostic categories, while the provider bears the risks of variations in treatment costs within these categories.

83. The choice of which contractual forms to use may best be left to health purchasers[65]: it may be the case that each purchaser would make use of a variety of approaches. With services for which competitive bidding and purchasing is used, the DRG approach appears to have relatively favourable characteristics -- giving purchasers some control over treatment intensity and costs, while encouraging suppliers to seek efficiency gains in the provision of treatment -- and this system is being introduced in a number of countries (e.g. the United Kingdom, Ireland and Sweden).

84. It may also be useful to explore mixed systems of paying for particular services[66]. These could involve, for example, a combination of a partial DRG-type payment and partial fee-for-service, or a DRG payment coupled with a stop-loss (i.e. with the balance of costs above a pre-set ceiling paid by the funder)[67]. These arrangements reduce the risk exposure of providers when faced with very high-cost patients. They may, as a result, increase the willingness and ability of health-care providers to bargain with purchasers, and may moderate the overall level of treatment prices that are negotiated.

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65. For example, regional health purchasers in New Zealand, and to an increasing degree the DHCs in the United Kingdom, now have discretion over how (and with whom) they contract.

66. Mixed systems of paying for hospital and/or doctor services are proposed by Diamond (1992), Ellis and McGuire (1986, 1990 and 1993) and Newhouse (1992*b*).

67. This stop-loss approach has been introduced in payment arrangements under the U.S. Medicare programme.

85. Mixed payment methods may also be needed in areas such as emergency services, which may require more complex contracting approaches. The essential, but unpredictable, nature of emergency services is likely to mean that contracts for the supply of particular services cannot easily be specified in advance, and may also mean that funders need to bear some portion of risk to ensure that services are always available.

4.3.2.6. Greater autonomy of hospital decision-making

86. At the provider level, competitive contracting for health services requires that providers improve their management capacity and face appropriate accountability arrangements (including relevant objectives and goals, and information systems which permit the measurement of their achievement). At the same time, greater management autonomy is necessary, particularly in countries where providers are public, if they are to be encouraged and made able to seek and effect efficiency improvements. For example, individual institutions may need the scope to negotiate directly with their staff over pay and conditions, rather than being bound by centralised agreements.

87. Providers also need to recognise the cost of capital (including buildings and equipment) in their information systems and budgeting practices, to ensure that the full price of inputs is taken into account in production and purchasing decisions. At the same time, purchasers are likely to be closely involved in major capital investment decisions by health providers -- for example, through contractual commitments to purchase services made available by new technologies. In entering into such commitments, purchasers would need to take into account the scope for economies of scale, and overall capacity requirements, in their purchasing areas.

4.3.2.7. Competing mini-integrated systems (PPOs and HMOs)

88. The role of the funder as purchasing agent becomes more difficult in a fragmented insurance market, and where there is greater freedom of consumer choice over health care. In these circumstances, insurers have generally been limited to paying bills presented by patients or health-care providers. However, recent developments have allowed insurers to take on a stronger purchasing role but, at the same time, have restricted consumer choice. Under preferred provider organisation arrangements (PPOs), the insurer contracts with suppliers at preferential rates. Patients can choose other providers but are obliged to cover the difference in cost.

89. Health Maintenance Organisations (HMOs) represent a somewhat different contractual response of health funders compared with the promotion of competition between providers, and is equivalent to having competing "mini-integrated" health-care systems (see Box B). Under HMO arrangements -- which cover about 21 per cent of the population in the United States -- the individual pays a flat-rate annual fee for all health care needed over the period. There are strong incentives in this case to minimise on unnecessary care (as well as incentives to under-provide care if there is not adequate competition among HMOs). Within HMOs, the funding division is likely to be linked to the provider divisions by various explicit (and also implicit) contractual arrangements which resemble those described earlier; as above, the

funders are able through these means to set priorities, reallocate resources, and monitor the results of provider divisions[68].

90. Most research suggests that HMOs have lower spending than fee-for-service insurance arrangements: the CBO has estimated, on this basis, that if the entire population of the United States were insured under HMO arrangements, then overall health spending might be reduced by 10 per cent (1 to 1 1/2 per cent of GDP) and health outcomes would not suffer. However, there is evidence that health spending in HMOs grows at much the same pace as that under other institutional arrangements, suggesting that the benefits from such a shift are likely to be a once-and-for-all effect concentrated in hospital services (CBO, 1991 and 1992*a*).

4.3.3. Improving the agency role of ambulatory care doctors

91. The ambulatory sector, while generally smaller in terms of expenditure, is extremely important in controlling costs and increasing effectiveness. Normally, the first contact with the health-care sector is with the primary doctor or nurse and they resolve a wide range of health difficulties. Indeed, in the United Kingdom, it is estimated that 90 per cent of health-care episodes start and finish with the primary care doctor. Where further care is needed, primary doctors are usually the patients' main agents for information and decisions regarding medical treatment; and they are often formal or informal gatekeepers for secondary services. Thus, the key objectives centre on ensuring a high "quality" of primary care and providing the proper incentives on doctors to act in the patients' true interest. These functions and objectives should therefore be recognised in the systems used to contract with doctors in general practice (GPs).

92. The principal payment methods used to fund GPs, and some of their advantages and disadvantages, are summarised in Box F. For example, under fee-for-service arrangements, doctors have a financial interest to over-service. In contrast, where doctors are remunerated on a wage and salary basis, they can reduce their effort at no financial cost and there is an incentive to "off-load" patients on to secondary providers (specialists or hospitals). Capitation systems fall in between. There is an incentive to attract patients and to provide adequate care under normal circumstances. However, they may still try to avoid accepting difficult patients or off-load high-cost patients on to secondary level carers.

93. Under fee-for-service systems, it is difficult to control overall costs. In most countries, some of the increases have been limited by holding down the contract price for care. However, evidence from France and Canada indicates that doctors have generally been able to compensate for lost income by increased volumes of service. Such problems are exacerbated in countries where there are rapid increases in the number of doctors. One approach used in Germany and a number of Canadian provinces, and being implemented in France, is to set a ceiling on overall ambulatory spending with mechanisms to reduce doctors' income if spending exceeds the targeted amount[69].

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68. The HMO arrangement represents one, potentially efficient, approach to contracting in an uncertain environment -- an approach which, in effect, "internalises" the risks of contracting between funders and providers (see also OECD, 1994*e*). As already discussed, other contractual forms, with other means of handling and allocating risk, are needed for the single and multiple payer systems outlined earlier where scope to contract with a variety of providers is desirable.

69. For example, a reduction may be pro-rated on the basis of the medical activity of each doctor. Such systems can, however, penalise efficient/effective doctors.

BOX F. Paying Doctors in Primary Care

GPs are employed on salaries in Greece, Finland, Iceland, Norway (mixed salary and fees), Portugal, Spain (with some capitation), Sweden (some capitation), and Turkey -- countries with integrated health systems. Salaries are generally negotiated centrally (e.g. between physicians' associations and the government), with individual-based adjustments sometimes included to allow for experience, location, and other reward and/or incentive considerations.

Salary arrangements allow funders to control primary care costs directly; however, they may lead to under-provision of services (to ease workloads), excessive referrals to secondary providers, and lack of attention to the preferences of patients.

Capitation payment systems provide GPs with a fixed payment, usually with adjustments for factors such as age and gender, for each patient on their "list". These systems are used in Italy (with some fees), the United Kingdom (with some fees and allowances for specific services), Austria (with fees for designated services), Denmark, Ireland (since 1989), the Netherlands (fee-for-service for privately insured patients and public employees) and Sweden (from 1994).

Capitation systems allow funders to control the overall level of primary health expenditures, and the allocation of funding between GPs is determined by patient registrations. There are risks under this approach of GPs registering too many patients and under-serving them, selecting the better risks, and referring-on too quickly patients who could have been treated by the GP directly. Moderating these risks, however, is freedom of consumer choice over doctors, coupled with the principle of "money following the patient".

Fee-for-service arrangements are used to pay GPs in the remaining OECD countries, and are even more widely used for specialists. Fee levels are either negotiated centrally (as in Japan, Germany, Canada, and Sector 1 in France) or set by the individual practitioner. Some countries (e.g. Australia and New Zealand) allow "extra billing" by GPs on top of standard patient reimbursement rates.

The fee-for-service approach gives physicians full discretion over the level and mix of services, referrals, and other treatment options. However, doctors face incentives to expand the volumes and prices of services they provide, including an increase in services provided "in-house" even if there would be advantages -- e.g. through economies of scale -- in making more use of secondary suppliers.

94. As in the case of hospital contracts discussed above, there is growing interest in mixed systems of paying general practitioners. In Denmark, for example, GPs are paid in most counties on both a capitation basis (around one-quarter of income) and fee-for-service basis (around three-quarters) (Abel-Smith, 1992). As part of moves towards a family doctor system in Finland (i.e. away from a health centre approach), doctors' income is made up of a basic salary (60 per cent), capitation (20 per cent), fee-for-service (15 per cent), and local allowances (5 per cent) (OECD, 1994*e*). Mixed payment systems offer a means of reducing some of the potential difficulties noted in Box F that can arise under a capitation-based system. For example, the incentive for cream-skimming would be reduced if the risks of high-cost patients are shared with the central funding authority. Similarly, mixed systems moderate the tendency towards excessive treatments that occur under pure fee-for-service approaches[70].

95. Transition from one contract approach to another may prove difficult. Capitation-type contracts, which are often combined with gatekeeper functions (see next sub-section), rely on well-qualified general practitioners (GPs) as the focus of health services outside the hospital system. The pattern of medical skills may not always be appropriate in all countries. For example, in the United States and France, specialists make up a large share of ambulatory doctors and there is competition between them and the GPs for patients. There is also concern that the skills of certain GPs may not be adequate to the task, particularly where there have been no requirements or pressures for keeping up to date. Finally, in countries where the number of ambulatory care doctors relative to population is high, setting the level of the capitation fee may be difficult if cost control is to be maintained[71].

4.3.3.1. Role of primary level doctor as first contact with the system -- gatekeeping

96. Family doctor arrangements can provide for better continuity in medical care while also acting as a barrier to moral hazard. In some countries -- for example France and Belgium -- patients can see general practitioners or specialists virtually at will. This raises the risk of multiple visits for the same sickness episode, and may lead to excess care -- particularly where there is an over-supply of doctors, strong competition between them for market share, and payment on a fee-for-service basis. The use of a family doctor as a gatekeeper (i.e. provider of a compulsory letter of referral for non-emergency access to secondary care or a specialist) reduces this risk and allows, in addition, a more coherent medical history to be established in the hands of one person. Some separation between contracting arrangements for

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70. Newhouse (1992*b*) argues that mixed systems outperform pure capitation and fee-for-service systems, by reducing the expected welfare losses that arise when, under administered price arrangements, prices are set at the "wrong" level -- i.e. away from the points where the marginal costs and benefits of services are equal.

71. In the United Kingdom, where the doctor-to-population ratio is low, the capitation fee is set to bring the income of the "average doctor" (with 2 000 patients) up to levels which are in line with professionals with similar education and skill levels. Thus, setting the fee entails agreeing on the expected average income and the number of patients which the "average doctor" can be expected to attract. In countries where the ratio of doctors to population is high, doctors may feel particularly uncertain about their future income (and hence the capitation payment). Doctors, to be willing to risk the change, may demand that the income of the "average doctor" be set high enough to reduce the risks in the shift from one system to another. Recent reform proposals in Sweden have been blocked because of such difficulties.

ambulatory and hospital doctors may therefore be required[72]. Estimates reported in the Annex suggest that countries with gatekeeper/referral systems tend to have lower overall health costs. To reduce the impact on consumer choice, some countries allow patients to seek second opinions, but with substantial cost-sharing[73]; or the insurance system has been set up to allow consumers the choice between either a gatekeeper arrangement but with no cost-sharing for primary visits, or free choice of the primary doctor with cost-sharing (Denmark).

97. The gatekeeper approach may not suit all countries, however. This method, and capitation systems more generally, give rise to concerns about under-provision of services to some or all patients, and cream-skimming or excessive referrals, by doctors to avoid potentially high-cost patients. These concerns may be eased if there is effective consumer choice over primary practitioner and/or a stop-loss provision. In any case, data do not suggest that countries with capitation systems exhibit higher acute hospital admission rates.

4.3.3.2. Fundholding systems

98. In this context, the reforms adopted in the United Kingdom (Box D) are of particular interest. Individual practices that choose to become fundholders are given budgets with which to provide primary services and purchase both pharmaceutical drugs and a range of secondary services. These practices therefore have an incentive to assess the efficiency and effectiveness of alternative treatment options, including surgery or office-based rather than hospital-based treatments, and have some degree of bargaining power to improve the health services supplied to their patients by secondary providers. Their incentive to be effective agents for consumers is enhanced by the greater professional satisfaction that results from increased bargaining power *vis-à-vis* specialist doctors as well as by certain pecuniary motives[74].

4.3.4. Pharmaceuticals: a special case

99. The pharmaceutical sector presents some unique issues and problems when improvements in efficiency and overall control of spending are sought. Nevertheless, some of the approaches to reform suggested for the hospital and primary health sectors may also be suitable for pharmaceutical spending.

100. A core concern is how to strike a balance between providing pharmaceutical companies with adequate incentives to undertake research and development in an inherently costly and uncertain environment; and handling the monopolistic situation that is created when successful drugs under patent protection are introduced. In this situation, macro-control may be difficult to ensure without the use either of regulatory controls (such as the widespread controls on drug prices or company profit levels currently

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72. For example, in the United States, doctors with admitting rights can continue to treat their patients in hospital, so that they may have an incentive to send patients on to secondary care.

73. In the case of potentially high-cost treatments, however, there may be a case for encouraging doctors and patients to seek second opinions.

74. These issues are discussed in more detail in OECD (1994*c*). One problem, however, with doctors' office-based treatments is the incentive for supplier-induced demand in marginal cases. Practice evaluations combined with appropriate pricing (to ensure that prices are line with marginal costs of providers) may need to be introduced at the same time to limit this risk.

used in OECD countries); or of strong -- probably monopsonistic -- buying power. The latter may be relatively straightforward to introduce in systems with single purchasing agents for health services, or with co-ordination between multiple purchasers.

101. More broadly, there are various means of increasing the incentives for doctors and patients to make better choices regarding pharmaceutical spending -- in particular, choices which improve spending control and efficiency, while not adversely affecting health outcomes. Most countries have some degree of consumer cost-sharing of prescription charges to improve demand-side spending restraint (Annex Table 2). Reimbursement rates from health funders can be based on the prices of lower-cost generic substitutes where these are available (the system used in Germany, particularly since 1989, and in Norway, Spain and Sweden). Removing the financial return to doctors from selling drugs (as occurs in Japan) would reduce their incentive to over-prescribe.

102. Large inter-country variations in prescription practices remain, suggesting that much prescribing behaviour lacks rigorous evaluation (OECD, 1993*e*). Several countries (e.g. France, the United Kingdom and New Zealand) have introduced practice reviews whereby doctors are informed how their prescribing record compares with that of other practices, and similar systems to encourage more rational prescribing are making headway in the United States, Germany, Italy and Sweden[75]. This approach, combined with effective enforcement mechanisms, can identify and restrain outliers, and encourage greater standardisation in prescribing habits. Under fundholding (see Box D) and other capitation approaches to paying doctors (see Box F), drug spending can be included (on a prospective basis) in the capitation payment -- as occurs in the United Kingdom. This approach provides a means of controlling pharmaceutical spending in ambulatory care, and gives doctors an incentive to prescribe prudently. In the United Kingdom, for example, there is evidence that prescription cost increases are significantly lower for fundholding compared with non-fundholding GPs (OECD, 1994*c*).

103. Overall costs of dispensing drugs could also be reduced by selective deregulation of the retail segment of the market. Certain European countries highly regulate this market: retail price maintenance is often enforced, competition between pharmacies is limited (no advertising of prescription drug prices), competition is also often limited between pharmacies and other retail outlets for over-the-counter drugs (e.g. aspirin and vitamins), and there are restrictions on the number of pharmacies in a particular area. This has led to significant differences in the number of pharmacies between countries, and to large variations in the number of pharmacists per capita[76].

4.3.5. Ensuring better accountability of purchasers

4.3.5.1. Single-payer versus multiple-payer systems

104. As noted earlier, there are advantages in having a single purchaser responsible for the health needs of its local population. However, single-payer systems may be felt to reduce consumer choice, hence

75. However, there is some concern that short-run cost control can over-ride appropriate clinical practices and quality assurance criteria (Walker, 1994).

76. In the mid-1980s, the number of practising pharmacists per capita averaged 6.4 per 1 000 persons for OECD countries, but varied from 1.4 in the Netherlands, 2.1 in Denmark and 3.1 in Ireland to 13.7 in Finland, 11.2 in Belgium, 9.6 in Portugal and 8.6 in France.

BOX G. Insurance Market Competition

Perhaps the most difficult issue to resolve regarding health sector reform is whether introducing (or increasing) competition between health insurers would help to control overall costs of health care, increase the efficiency of providers, and maintain equity of access. Recent reforms in the Netherlands and Germany have included increasing competition between sickness funds; New Zealand considered -- but, as with the Netherlands, has subsequently put on hold -- a proposal allowing individuals to opt out of the public insurance system and take their funding voucher to the private insurer of their choice. Only Portugal is proposing to implement a similar opt-out clause. Meanwhile, much of the debate surrounding United States health reforms has focused on the relative merits of maintaining competitive, but more heavily regulated, private insurers, or moving more towards a single-payer approach.

How to combine insurance market competition with equity of access is a major question these reforms have to deal with. As noted in Part I, key dimensions of equity to which almost all countries subscribe are that all individuals should have access to insurance coverage, and the premium should be based on income rather than personal risk. As regards coverage, one approach is for insurers to all offer a basic health-care package and accept all comers; cream skimming (i.e. refusing those with higher health risks) would be illegal. The problem of combining competition and income-related premiums would be overcome by risk adjustment between funds -- i.e. those with a higher risks receiving a cross-subsidy from funds with lower risks -- although the mechanism differs across countries. In the Netherlands, this is to be achieved through a central fund which would pool income related insurance premiums. Each insurer would receive a risk adjusted lump-sum to allow for the expected differences in health spending of its members. Insurers could then make a profit by bargaining for lower prices for services from health providers and minimising their own administrative costs. The pressure on insurers to search for lower costs is encouraged in these proposals by greater price competition between insurers for clients.

There are, however, a number of uncertainties and potential difficulties with this approach.

Risk adjustment

Risk adjustment is not straightforward. In the initial Dutch proposals, risk adjustment was to be based on age, sex and region, factors which, according to some studies, would explain less than 5 per cent of annual health-care cost variability (Newhouse *et al.,* 1989; Van de Ven and van Vliet, 1992). Adding health status, prior health-care use and some background variables would increase this to around 10 per cent. Moreover, the information may not be available for all of these variables and may be costly to collect. Even if insurers have to accept all applicants, they nevertheless face strong incentives to attract and retain the better risks and may find ways of doing so -- for example, through their marketing and promotion activities, and through selective contracting with providers (e.g. according to their locations and reputations in particular specialities) in order to "attract the healthy and repel the sick" (Van de Ven and van Vliet, 1992). On the other hand, if there is no risk to the insurer -- either because the state bails out failing insurers (e.g. on the basis that these insurers have been "unlucky" in receiving an unexpectedly poor risk pool), or pays the full cost of medical care *ex post* (as in Belgium) -- then the pressures to lower the costs of health care will be eliminated. An appropriate balance of risk between a central fund and the individual insurer must be found if the market is to be sustained.

Administrative costs

Competition between insurers could help contain administrative costs, even if all or most health-care costs were covered by a central fund. Against this, however, systems with a large number of insurers, a diversity of insurance plans, and a complex network of contracts with providers are likely to be more expensive than systems with single payers and a single set of reimbursement rates. For example, lower administrative costs in the United Kingdom and Canada have been attributed to single-payer arrangements, and a similar result holds in Japan, where payments and control are consolidated in the Social Insurance Medical Reimbursement Fund. As a result, multiple insurance systems would need to realise substantial cost savings elsewhere -- particularly through production efficiency -- to offset the higher administrative elements.

Equity

In cases where insurers compete over a flat-rate fee component of the premium, the share of this fee in the overall premium has to be sufficiently high to encourage consumers to "shop around". However, too high a fee would erode the progressive nature of health-care financing. This concern has been presented as the reason for lowering the flat-rate portion in the proposed Netherlands reforms from 15 per cent as originally proposed to 5 per cent at present.

Cost control

Increased insurance market competition may not lead to overall reductions in costs. Where premia can be set freely, premia may in the end be bid up rather than down. This may occur if there is a large enough share of the population convinced that the level of spending is inadequate, or if producers are able to resist insurers attempts to improve efficiency and supplier-induced demand effects are strong. For example, collusive behaviour on the part of providers may have contributed to problems of cost control in the Netherlands, where the insurance market is highly fragmented. Insurers may compete to provide more selective overall care (access to the best specialists, etc.) driving up the prices where supply is inelastic. This, in turn, could have implications for equity of access. Recent experience in private markets indicates a propensity for rising premia (for example, private insurance in the United Kingdom and Finland).

Health outcomes

Finally, competition amongst private insurers may create risks of a continued emphasis on health care rather than health outcomes. The current focus of health systems is on curative care rather than prevention. There will be little incentive to shift towards preventive care unless the insurer faces a high probability of realising savings through lower health-care costs later on. In a competitive environment, the chances of this occurring seem small. Long-term contracting between consumers and insurers could help in this regard, but might also weaken the competitive pressures arising from free consumer choice between insurers.

A more limited approach

While doubt has been cast above on the merits of a fully competitive insurance system, there may be fewer concerns about having optional, competitively-provided insurance on the margins of predominantly single-payer systems. Such plans could, for example, cover benefits specifically excluded from public schemes (e.g. dental care, eye-glasses and lenses, cosmetic surgery or other procedures), or fund higher quality accommodation (e.g. single rooms). The form and price of coverage would be left to the market to decide, and premia based on individual or small-group risk may be the norm.

Such schemes should, however, be barred from covering patient part-charges, to prevent the effects of these in restraining health demand from being weakened. Competitive schemes may also have to be prevented from covering major health risks, if a single-payer approach is judged to be the best way to hold down costs and maintain equity of access. This restriction need not be onerous: if the efficiency of provision of health services can be improved through the sorts of measures outlined in Part 4, this would substantially reduce the pressures that have produced recent growth in competitive private arrangements for funding and delivering health services.

weakening their accountability to the population covered. In view of such concerns, there may be a preference for sub-national (regional or local) purchasers, with policy emphasis on making systematic comparisons of treatment approaches and results across regions. In cases where there are already multiple, but largely non-competing, funders (e.g. sickness funds in Japan and Germany), their effectiveness as purchasers may be enhanced by encouraging coalitions or mergers between small sub-units that serve the same region[77].

4.3.5.2. Increased competition between insurers

105. There may be some pressure to introduce competition between purchasers, and a number of reform proposals have gone in this direction (Japan, Germany and New Zealand). In principle, the right of the individuals to change purchasers would increase pressures on the latter to provide an appropriate package of health-care services. Consumer choice may also increase the pressure on purchasers to improve administration (particularly where competition is based on the insurance premium) and to search for more cost-effective care from providers. However, setting up and sustaining such competition is not easy in systems where the insurance premium is based on income rather than risk, as it requires some form of risk adjustment across funds. Furthermore, there is no assurance that increased competition among insurers will necessarily lead to lower health expenditures. These issues are dealt with in greater detail in Box G.

4.4. Micro-efficiency and demand

4.4.1. Policy issues

106. Policies should also attempt to minimise moral hazard arising from health-care insurance and low user charges, particularly where the resulting increase in health-care services is unlikely to improve health outcomes. To be efficient and effective in this regard, policies regarding user charges need to be clear and readily understood; to be administratively simple; to allow for different degrees of moral hazard and risks to health outcomes; and to be politically acceptable. Not all of these requirements can be achieved simultaneously. For example, to make policies clear and administratively simple, the number of exemptions needs to be minimised. However, allowing for different degrees of moral hazard (i.e. between in-patient and out-patient care) and avoiding potentially negative effects on health outcomes of low-income groups, suggest more complex systems; these would probably include exemptions and prices that differentiate by type of risk and by the income of the recipient. The lessons of the past two decades are that distributional considerations are important in gaining broad public acceptance. Nevertheless, where reforms are introduced, exemptions weaken their impact and are administratively costly.

4.4.2. Effects on health demand and overall spending of "cost-sharing"

107. While improved primary care incentives (see Section 4.3.3. above) and monitoring of providers can help reduce unnecessary health spending, the effect of moral hazard on expenditure can be countered

77. Indeed, this appears to be the trend in the Netherlands where cartels of funders and hospitals have been constructed. However, unless there is appropriate accountability to some higher authority through established rules of behaviour and targets/goals, this may not have the desired effect on increasing system efficiency and effectiveness.

by increasing patients' out-of-pocket share of a range of health expenses. This is discussed below, in the context of the trade-off between cost-sharing and "access" to health insurance.

108. There is only limited international information, and considerable uncertainty, over the size of the price elasticity of demand for health care. After an extensive review of the U.S. literature, Morrisey (1992) has recently concluded that the price elasticity is around -0.2 (for the United States) but the estimates are open to wide margins of error[78]. Very partial information for a few other OECD countries is not of a form which permits confirmation of the U.S. estimates[79]. But as increases in cost-sharing could imply a considerable proportionate rise in the "price" paid by patients, the effect on demand could be substantial, even with relatively small price elasticities[80]. On the other hand, although the results of a number of national studies appear to support the view that cost-sharing could be effective in restraining health spending, there is little evidence (apart from pharmaceuticals) that those countries with higher cost-sharing have lower expenditure or have increased spending more slowly (see Annex).

109. While increased cost-sharing under public schemes may reduce the cost to the government and possibly in the volume of health care, total spending may not necessarily fall. For this to happen the following conditions must be met (Barer *et al.*, 1979 and Commissariat Général du Plan, 1993): first, the

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78. To the degree that these results are largely based on the RAND "Health Expenditure Experiment", they rely on extrapolating the outcome of an experiment with a not-totally-representative sample of 2 000 persons under a specific set of incentives (generally differing rates of co-insurance up to a ceiling, after which there was full coverage) to national aggregates and to other OECD countries. The price elasticity might well have been less in the RAND Study if older age groups and the chronically ill had been included in this experiment.

79. In the United Kingdom, where there have been frequent and continued increases in the real value of prescriptions since 1979, elasticities -- largely based on time-series data -- have been estimated to be in the range of 0.1 to 0.65 (Addy, 1993), although a consensus number seems likely to be considerably lower than the upper limit. In Ireland, Tussig (1985) found that lower-income groups having access to free care were significantly more prone to go to the doctor than higher-income groups which paid fees themselves, even after controlling for some confounding variables. Unadjusted data indicated that those exempt from fees went to the doctor 2.5 times more than those paying fees. This effect was somewhat attenuated once other variables were accounted for (i.e. social class, occupation and age). Nolan (1991) finds somewhat weaker effects after including a variable on health status but the effect is still positive. For France, there are considerable differences between visits to doctors by those covered and not covered by complementary insurance (which covers part of the social insurance co-payment) (Bocognagno *et al.*, 1992), but this does not allow for adverse selection (i.e. the fact that those who are ill or expect to be so take out additional insurance). In this context, Caussat and Glaude (1993) find evidence of moral hazard on the one hand and a tendency for high-risk individuals to choose more insurance (adverse selection).

80. For example, public insurance covers around 85 per cent of the total health-care costs on average in the OECD (see Table 7). A 10 percentage point increase in the patients' cost share (i.e. from 15 percentage points to 25 percentage points) implies a 13 per cent fall in demand if the price elasticity is -0.2. Estimates reported in Manning *et al.*, (1987) and Newhouse (1992*a*) suggest even larger effects (see footnote 4 to Table 5).

increase in the co-payment must be significant enough to affect behaviour. Countries have generally introduced only token payments for acute hospital care, with larger proportionate amounts for other spending components. Increases have been intermittent and by small amounts over time[81], so that cost-shifting (from public to private financing) may have predominated over volume effects.

110. Second, private insurance must not replace the cover removed through cost-sharing under the public scheme. For example, Medi-gap insurance in the United States covers co-payments and picks up risks not covered by Medicare. In France, the *assurances complémentaires* (now held by 85 per cent of the population) pay a significant part of shared costs and increases in cost-sharing under the public insurance scheme have been picked up by these institutions[82]. Third, providers must not adjust prices to offset any volume effects. For example, while there was a decline in the volume of health care in the United States in the early 1980s, corresponding to increases in cost-sharing (Manning *et al.*, 1987), this was partly offset by rapid increases in the price of health care and doctors' incomes in subsequent years such that total health spending continued to rise (OECD, 1993*e*). Finally, the cost of collection must not be superior to the increase in cost-sharing. Significant increases in user charges for in-patient care introduced in New Zealand in 1992 were withdrawn: political opposition was high and patients simply refused to pay their bills, raising collection costs substantially.

4.4.3. Effects of cost-sharing on other policy objectives

111. Increased cost-sharing shifts the balance of financing in health systems, tending to make financing more regressive in countries with income-related premia (van Doorslaer *et al.*, 1993). At the same time, health status -- and hence health-care needs -- are strongly correlated with income (Evans *et al.*, 1993). Thus, user charges risk transferring income from the sick and less well-off to those who are healthy and better-off. The impact of higher user charges appears to be relatively greater at lower levels of income: the RAND Experiment in the United States showed a more marked reduction in contacts with the health-care system and in demand for acute and preventive care for lower-income groups, and similar results were

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81. The most sizable increases in cost-sharing over the past decade have been in the ambulatory sector and for pharmaceuticals. Increases in ambulatory care cost-sharing have been introduced or increased in Finland (1993), Greece (1992) (for visits to out-patient departments without referral), and Iceland (1993). Its level remains relatively high in Ireland (for Category II), New Zealand (income-related), Norway and Sweden, although percentage shares are high in some others (Japan, France and Australia). In general, cost-sharing for pharmaceuticals is higher or excluded from coverage. Increases have recently occurred in Denmark, Finland (from 1989 to 1991), Italy, Iceland, New Zealand, Portugal. The level of charges tends to be high in the United States, Japan, France, Belgium, Spain and Sweden. Pharmaceuticals are excluded from cover in a number of Canadian provinces. Cost-sharing for hospital care is generally less than for ambulatory care but the extent of cost-sharing is high in France, Japan and Sector II in Ireland and the initial deductibles can be high in the United States (OECD, 1992*c* and 1994*e*). (See Annex Table 2.)

82. To avoid this some countries, such as Australia and Japan, have prohibited the insuring of the co-payment.

found in two Canadian provinces (Stoddart *et al.*, 1993)[83]. The impact was even greater for children from low-income families, where cost-sharing reduced the probability of seeking care by 40 per cent (Lohr *et al.*, 1986).

112. In the light of this trade-off between cost-sharing and equity of access, most countries with large co-payments in practice attempt to protect lower-income groups or those who are chronically sick. Since lower-income groups tend to have greater health needs, this can reduce significantly the regressive impact of cost-sharing.[84]. Greater targeting tends to reduce the transparency of pricing, to increase the cost of administration relative to revenues collected, and to raise the risk of fraud[85].

113. A further concern is that people will forego necessary health care. An often unstated assumption underlying arguments in favour of higher cost-sharing is that low prices lead to demands of a "secondary" nature rather than simply to "too much" health care. In this context, the RAND Study in the United States suggests that user charges were as likely to reduce contacts with health-care providers which clinicians would regard as "needed", as those which were judged "un-needed" (Lohr *et al.*, 1986; Siu *et al.*, 1986). However, the importance of such behaviour partly turns on the impact on health outcomes. The RAND Study also found that, over the period studied, health outcomes were not affected except for low-income individuals with hypertension, vision or dental problems. These latter effects, and the fact that the elderly and the chronically ill were excluded from this experiment, suggest the need for some caution in drawing broader inferences from the result (OECD, 1994*e*).

4.4.4. The extent and forms of cost-sharing

114. The degree of cost-sharing need not be the same for all areas of health care. In general, user charges should be lower where the risk of moral hazard is less, where the impact on demand of user charges is the weakest and where the welfare gains from insurance are greatest. This is often the case in the hospital services for persons with certain chronic conditions. In these cases, the patient can be exposed to discomfort or risks from medical treatment; demand elasticities tend to be weaker than for other

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83. The ability to judge health needs is probably increasing with income (to the degree that this is likely to be related to education level). This increases the likelihood that the potential adverse effects are likely to be highest in low-income groups.

84. In France, around 12 per cent of the population who are chronically ill and who consume roughly half of health expenditure are exempt. In the United Kingdom and certain Canadian provinces, pharmaceutical expenses are covered for certain vulnerable groups. Under the recent reforms in Portugal, pensioners below the minimum wage (90 per cent of the total), those with certain chronic diseases and pregnant women and children up to the age of 12 do not pay. In New Zealand, the lower-income groups have sharply reduced user charges.

85. In France, there are 16 different cases which distinguish who is liable for the *forfait hospitalier* (Commissariat Général du Plan, 1993). As regards fraud, income-related exemptions from prescription charges in Italy led to a large increase in exempt prescriptions. While some of this was *bona fide*, the growth of selective exemptions from payment of pharmaceuticals grew from 18 to 25 per cent in the year following the introduction of further restrictions in 1988 and the share of prescriptions issued to those with exemptions rose from 45 to 75 per cent of the total (Ferrera, 1991).

components of care; and because the hospital treatment tends to have a low probability and to be costly when it does occur, the demand for insurance is likely to be high[86]. This suggests that cost-sharing, insofar as it is implemented, should be higher in ambulatory care, pharmaceuticals for non-chronic cases, dental treatment or eyeglasses where the costs are lower, the predictability higher and the discomfort is less.

115. Distinctions may also be made between the type of care received. In the in-patient setting at least, it may be possible to distinguish between "care" and "cure" aspects of provision. Thus, insurance will cover the same quality of care but may charge for the "hotel" component and for more agreeable surroundings (private rooms, increased ancillary staff or better meals). The introduction of token charges for hospital care has sometimes been justified on this basis (Germany and France) and most countries also make extra charges for "luxury" which are often combined with greater choice of doctor[87]. Alternatively, certain procedures which are not related to physical illness -- such as non-therapeutic abortions, in-vitro fertilization, aesthetic surgery, etc. -- may also be excluded. Some countries distinguish between common medical practices to which all insured persons are entitled and medical research procedures which only gradually enter the list of covered risks (e.g. the Netherlands for organ transplants).

116. Insurers can also limit coverage for those medical procedures which objectively do not appear to have a significant impact on health outcomes. This is explicit in reform proposals for the state of Oregon in the United States where it has been proposed to "pay" for increased Medicaid coverage by explicit rationing of procedures. More than 700 medical procedures and services have been ranked according to their cost effectiveness and at least the first 568 services are expected to be covered on the list. If spending exceeds budgeted amounts the number of procedures will be reduced[88]. Appropriate ranking requires a clear definition of choice criteria and a method of evaluating the benefits -- in an environment where individual rankings may well be different from social rankings -- and some method of assessing the marginal benefits from particular treatments. As a consequence, the plan has proved controversial and court

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86. Pauly (1968) argues that moral hazard is related to the degree of psychic discomfort. The optimal insurance literature (Arrow, 1963; Zeckhauser, 1970) suggests that the degree of cost-sharing should rise with the price elasticity of demand, and Manning et al., (1987) amongst others find that the price elasticity is lower for hospital care (Morrisey, 1992). Maximum welfare gain from insurance is associated with illnesses that have a low probability but a high cost when they do occur: saving to cover such risks individually would be highly inefficient. The welfare gains are less clear for risks which have a greater probability of occurring regularly and have a lower cost per episode (e.g. some dental treatment).

87. For example, in Denmark there is some choice over the insurance package. Either one can have free care with a family care doctor, or have free choice with a share of the doctors' billing reimbursed by the insurer. Alternatively, Ireland has free basic hospital care for all, but has a system of extra insurance for those wishing to obtain cover for private beds, free choice of doctor and more rapid hospital treatment.

88. Procedures have been ranked on the basis of expected costs and benefits to the overall public with different priorities established for different age groups. High priorities were given to pre-natal care, childhood immunisations, family planning, and the treatment of acute illness. Low priority items include routine dental care for adults, plastic surgery and most transplants.

decisions (initially on the basis that it discriminated against the disabled) have delayed its introduction[89]. But it does raise the issue that not all medical improvements and treatments have the same expected benefit in terms of the costs and a number of countries are restricting access to care at the margin -- for example, treatments at spas.

117. Alternatively, cost-sharing can be used to achieve more specific goals. First, it can ensure that appropriate use is being made of health services. In a number of countries, free (but costly) emergency services at hospitals are over-used where there are significant user charges in the ambulatory sector. While this has often been a way for the very poor to get access to health care, it has also created abuse. Thus, some countries have introduced charges for non-emergency use of these services (e.g. New Zealand). Second, cost-sharing or other incentives can be used to encourage prevention or to avoid negative effects on care for the poor. This can take on a variety of forms:

-- in the Netherlands, high-cost dental treatment (crowns or dentures) is reimbursed at a higher rate for individuals who have taken preventive measures (regular checkups);

-- in France, family allowances are made conditional on parents undertaking regular checkups of children by a paediatrician;

-- "stop-loss" arrangements may be used to set annual ceilings on cost-sharing with income-related ceilings (New Zealand and Norway);

-- alternatively, individuals could operate health savings accounts or be credited with bonuses for restrained use of health services (Box H).

89. Although the plan was granted a waiver allowing experiment, there is continuing debate about its essence as it applies only to Medicaid patients (certain groups of the poor) and is thus considered discriminatory. Further, ethical problems increase as the budget limit tightens: for example, it is well known that many treatments for cancer have only a low probability of success. On this basis should treatment be denied to patients, particularly the poor?

BOX H. The "Stay-well" Health Plan

A "stay-well" health plan was introduced for county employees in Mendocino, California in 1979. The previous scheme, which provided coverage from the "first dollar" of care, was replaced with one with a premium nearly $500 lower, and a $500 deductible per person. The premium savings were retained by the county in an interest-bearing self-insurance fund to cover the deductible portion of employees' health spending. However, employees who did not use their full $500 annual allotment were able to receive each year's unused portion as a future bonus. The benefits of this scheme is that it combines full coverage with direct financial incentives on individuals to contain utilisation of health services and adopt healthier lifestyles. A risk is that some individuals might forego earlier (and often cheaper) care, leading to higher costs later on. To avoid this the plan has increased efforts to make participants aware when it is wise to go to the doctor.

5. Some Main Messages

5.1. Rising health expenditure and steps toward reform

118. Problems specific to the health-care "market" and the institutional responses to them have created an environment conducive to increases in spending. Since the marginal cost to the patient is low and virtually all decisions of the health-care providers are financed by the insurance funds, there is every incentive to extend care where it is judged to have some positive marginal benefit for the patient; moreover, in the light of societal values and the Hippocratic approach to medicine espoused by doctors and by society more generally, it has been ethically correct to do so. Such effects on health spending have been magnified by several influences. These include: the growing use of sophisticated technology, with little analysis of whether the net benefit of a given technique is sufficient to warrant the expenditure on it; more doctors who are increasingly trained to use these high-cost methods; and rising hospital capacity. At the same time, there has been little incentive to develop or introduce cost-reducing technologies.

119. In this environment, where payers (who are for the most part the insurers) are largely absent from the medical decision and where market forces are unlikely to be able to play much of a role in sorting out the most appropriate medical strategy even in the best of circumstances, incentives to brake unwarranted increase in health spending have been few. In the United States, where private sector insurance takes up a large share of the market and where the potential for competition should be large, spending increases have been much higher than elsewhere and been channelled back on to higher insurance premia, despite increased concern about the cost to firms and to family budgets.

120. Some evidence of the wide range of cost, price and patterns of resource use in health sectors between countries is provided in Part 3 of this paper. While the comparability of the data is still questionable and some of the differences may reflect alternative approaches to the supply of health care,

the size of inter-country variation suggests that there is considerable scope for increased efficiency in many countries. Indeed, one of the underlying themes of analysis presented here is that it may be possible, by focusing on the way health care is delivered, to provide the same amount of health care but more efficiently. Furthermore, a better quality of health care could follow from stronger efforts to define and implement "best practice" medicine. The very weak association between overall health-care spending and available indicators of health outcomes raises two additional issues. First, health-care spending at the margin may have only limited effects on overall health status. Second, since health outcomes are dominated by a range of additional factors besides health care, government may be able to achieve health goals more effectively via other channels.

5.1.1. Major reforms

121. An overview of major reforms in the area of health-care financing and provision is presented in Part 4. Notwithstanding important features of convergence across the spectrum of reforms, OECD countries have not all followed the same path or chosen the same instruments. Initial efforts to control expenditure through budgetary caps appear to have had some success to the degree that health-care spending, and particularly the public component, grew more slowly in most countries during the 1980s. However, these measures have often been limited to the hospital sector and pressures have spilled over into less-controlled areas. Some types of measures may, in addition, have reduced the efficiency of provision. A major concern is whether this slower growth in spending can be sustained.

122. The focus is now shifting towards improving micro-efficiency in health care. Most countries have introduced partial measures aimed at attenuating the most egregious problems and a few are now aiming at more wide-ranging reforms to improve efficiency and effectiveness, while at the same time trying to minimise any adverse effects on equity. The assessment of reforms -- both implemented and proposed -- suggests that a key to improving efficiency -- at least in the hospital sector -- lies in improving incentives through a better market structure and contract relations between payers (insurers) and providers. The following main elements are likely to be involved:

- -- Payers taking on the role of purchasers, acting as the patients' agent in ensuring availability of high-quality, cost-effective health care. It has been suggested that single purchasers by area may have some advantages.

- -- Competitive -- or more likely contestable -- markets for health-care provision with contracts which contain incentives for providers to improve efficiency.

- -- Greater independence of hospital management (along with appropriate accountability arrangements) in many countries to encourage the search for both efficiency gains and lower-cost options for care.

- -- Contract monitoring by the purchasers to place ongoing pressure on health-care providers to improve the quantity and the quality of care while reducing costs.

123. These changes will often increase the costs of administering the system. Hospital management systems are in their infancy in most countries, as reflected in inadequate information for decision making. For such investments in reform to pay their way, there must be sustained pressure to ensure that providers respond.

124. Similar principles can be used in the ambulatory sector in designing more appropriate payment arrangements for primary care doctors. Each of the alternative contractual forms has its advantages and disadvantages, but there is some evidence to support the view that capitation payments, combined with a gatekeeping role for family doctors, may be the least costly. It can be argued that, where generalists are of a high quality, this approach may even lead to better -- or, at the very least, more coherent -- care. These incentives can be enhanced by systems such as fundholding. However, free choice of generalist, open enrolment, and a stop-loss provision may be necessary to limit risks of under-treatment and cream-skimming.

125. The approaches sketched here, which draw on experiments and developments already underway, raise an important question: how can the health purchaser be made accountable to the patients. Having competing insurers is one approach and some countries are moving in this direction, on the grounds that this system may also provide insurers with an incentive for placing pressure on providers to reduce costs and be responsive to patient needs. However, maintaining a competitive insurance market with income-related premia requires complex systems of risk adjustment between purchasers. This suggests that there may be some trade-off compared with single purchaser systems regarding regulatory complexity, administrative costs, and market power *vis-à-vis* the providers. Various responses can be found to these difficulties: for example, collaboration exists between insurers in Germany to increase their bargaining strength with hospitals; and, in the United States, Health Maintenance and Preferred Provider Organisations offer a lower insurance premium in return for reduced consumer choice over providers.

126. Under single purchaser systems -- where consumers are likely to be restricted to providers with which their purchasers have contracted -- emphasis would need to be placed on monitoring the performance of purchasers by consumer organisations and health ministries. This process could be aided, as suggested in Part 4, by having purchasers organised at a sub-national level, with comparisons of approaches and results across regions.

127. While inconclusively supported by international cross-section data, it seems nonetheless plausible that a significant and across-the-board increase in cost-sharing can have an important effect on demand for health care. As such increases can have undesirable effects on access of lower-income groups, most countries have limited cost-sharing to ambulatory and pharmaceutical care, or have excluded the very sick who are often the group consuming the bulk of health-care services. This increases the administrative complexity and cost of such systems and reduces transparency to the general public. In these circumstances, action on the provider side may be an alternative avenue to achieve the same outcome -- for example, using doctors as gatekeepers for the bulk of secondary care, coupled with purchaser oversight via an evaluation of practice patterns.

5.2. Some specific issues

5.2.1. Better evaluation of new technologies

128. One of the elements placing upward pressure on medical costs over the past three decades has been technological change. Much technology has been accepted without appropriate evaluation and greater coherence is needed in this area. To ensure that technological change does not place unnecessary upward pressure on costs, purchasers can make clear that new technologies will be purchased only where there are clear therapeutic and/or cost advantages. In this context, governments need to ensure that appropriate tests of a cost-benefit nature are carried out. While part of the technology-related expenditure increases is

associated with machines or drugs, new medical and surgical procedures in hospitals -- which may prove more difficult to evaluate and control -- probably constitute the largest cause of that growth. However, purchasers do have a better chance of imposing greater clarity in this area through the contracting process and by sponsoring studies and evaluations of alternatives where necessary. The problem here is that there may be reduced incentives to undertake research on a commercial basis, posing the question as to whether there is a role for government in steering research efforts and absorbing a greater part of research costs than it already does[90].

5.2.2. Better control of the supply of doctors and hospital beds

129. A second issue is the supply of doctors which, along with a significant rise in hospital beds, seems to have been one factor (of many) affecting the increase in expenditure. Over-supply has been apparent in hospital beds for some time. Competition among hospitals makes such over-supply more apparent, but it does not necessarily lead to market exit if the costs of excess capacity can be passed on into prices (as appears to be the case in some countries, notably in the United States). As noted in Part 4, closing beds and hospitals, even if vindicated on cost grounds, has to contend with serious political difficulties.

130. Over-supply of doctors is also occurring in some countries. An increased number of doctors does not appear to have reduced overall expenditure through increased price competition. Indeed, it has been argued (Evans and Stoddart, 1991) that supply growth has simply increased the scope for further medicalisation of a progressively wider range of phenomena with smaller and smaller effects on health outcomes. This argues in favour of restrictions on access to medical education, or at least clear signals that those undertaking the study of medicine are not assured of receiving contracts from health-care purchasers on graduation[91].

5.2.3. Dealing with ageing populations

131. As populations age, the types of health care demanded will change. Improvements in surgical and anaesthetic methods will reduce the need for acute-care beds, while there will be an increasing demand for long-term care for many older persons (OECD, 1994*a*). Countries have taken very different approaches to the care of frail elderly people: for example, Sweden has tended to use institutional care, while in Canada and Denmark there has been greater emphasis on home-care arrangements or intermediate housing arrangements which are less costly. Policy-making in this area has been complicated in many countries by the fact that hospital and community care is organised and financed at different levels of government (health at the central, provincial or county level and social support at the municipal level). This fragmentation has led to some cost shifting -- e.g. keeping those in need of low-intensity, long-term care in high-cost hospital beds. Such problems can be eased by appropriate incentives: for example in Denmark

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90. For example, while the share of spending on older persons is set to increase, research on chronic conditions or diseases associated with ageing has received relatively little research attention (Commissariat Général du Plan, 1993). Since cost savings from keeping persons out of health-care institutions are large, there may be need for clear government signals.

91. For many countries, the effects of the numerous restrictions on entry into medical schools may be long in coming, partly reflecting the age structure of doctors. In France, there will be an increase in the number of doctors of 40 000 (from the current 140 000) by 2010 before declining thereafter.

and progressively in Sweden, municipalities have been made financially responsible for the costs of keeping older patients no longer needing acute care in hospital, producing strong incentives to find cheaper alternatives.

5.3. Consumer choice versus control of overall expenditure

132. An issue which has been largely sidestepped in this analysis concerns the degree to which decisions on the amount the government allocates to health spending should impinge on individual choices regarding supplementary health-care spending. In principle, consumers should be able to purchase additional services if they wish. However, as stressed above, health-care choices are affected by intermediaries who counsel, provide and pay for the care. Consumers may be poorly placed to judge the marginal benefits of health care and where there is excess supply, the financial incentives towards supplier-driven demand can be strong.

133. OECD country experience suggests that there is no single model. In the United States there is considerable attachment to individual choice in these matters. However, health spending is now absorbing one-seventh of GDP, with further increases in prospect even if reforms are enacted. This, in turn, has contributed to significant cost pressures on firms, a widening federal deficit and a large drain on family budgets (OECD, 1992*b*; CBO, 1992*a*).

134. On the other hand, there has been dissatisfaction with systems providing little consumer choice over health care. There may then be a case for allowing purchase of additional health services and insurance cover for private services; this alternative exists, for example, in the United Kingdom and Ireland. But this creates risks of another kind. Recent experience in the United Kingdom suggests that doctors operating in the private sector have been able to obtain a considerable "rent" which has been reflected in large increases in the average price of insurance polices over the past decade (Monopolies and Mergers Commission, 1993). That rent, in turn, creates considerable pressure on the National Health Service to raise doctors' salaries.

5.4. From health-care policy to health policy

135. The demand for health care is a derived demand arising from the demand for good health. An accumulating body of information suggests that health is affected by a wide range of factors, including the genetic endowment of each individual and the social and physical environment. Health care, while providing the necessary infrastructure when individuals do fall ill, is not the only influence in improving health outcomes. One criticism has been that attention and funding has been concentrated on the health-care sector, allowing the broader factors affecting health to be neglected.

136. In the light of this, most countries have World Health Organisation, "Health for All" policies aimed, in principle, at bridging this gap. But the implications have rarely been followed through into concrete actions. More recently, a few countries (e.g. the United Kingdom, Iceland, Ireland, New Zealand and some Canadian provinces) have established more wide-ranging policies about health, aimed at a) setting measurable goals regarding health outcomes (e.g. reduced heart disease or cancer); b) better co-ordination both between health-care providers at different levels (primary vs. secondary), and between funders (municipalities and central levels); and c) searching for alternative ways of reaching health goals with an emphasis on prevention. The approach has been progressive, with initial emphasis on establishing what

seem to be reasonable goals for intermediate indicators (for example, in Ireland goals have been set for lower blood pressure and cholesterol, reduced smoking and alcohol consumption, reduced road accidents, etc.). Health-care policy can be integrated into this broader frame, where purchasers include these goals in their purchasing policies (as do District Health Authorities in the United Kingdom).

137. As a result, purchasers are required to examine other policy instruments for achieving health goals, comparing the costs of these with further increases in "mainstream" health-care spending. In this regard, they face an important drawback -- lack of information on the cost of alternative policies or their impact on health outcomes. Information on these matters is important, as there is no assurance that alternative policies will prove more cost effective: for example, prevention is not costless -- and often produces medical risks as well (e.g. vaccination) (Russell, 1986). But, purchasers do have a clear mandate to address these uncertainties and examine the trade-offs. This approach contrasts with the past fragmentation of health policy: prevention, for example, has been a separate responsibility (often in the hands of health ministries), poorly integrated and, some would argue, underfunded.

138. In summary, this analysis -- like many recent policy briefs -- has argued for a comprehensive approach to health provision. The key feature is a more consistent approach, in which "purchasers" are responsible for improving the overall health status of their populations. Through their purchasing decisions, and through more effective involvement in broader policy issues (such as education, housing and social policy), they can have greater influence on how resources are distributed between the traditional health-care sector, prevention activities, community-based care, and the range of other areas that can influence the enhancement of health outcomes.

Table 1. **Total expenditure on health care in GDP, 1960-1992**

Per cent of GDP

	1960	1970	1975	1980	1985	1990	1992[1]
United States	5.3	7.4	8.4	9.2	10.5	12.4	14.0
Japan	3.0	4.6	5.6	6.6	6.5	6.6	6.9
Germany	4.8	5.9	8.1	8.4	8.7	8.3	8.7
France	4.2	5.8	7.0	7.6	8.5	8.9	9.4
Italy	3.6	5.2	6.1	6.9	7.0	8.1	8.5
United Kingdom	3.9	4.5	5.5	5.8	6.0	6.2	7.1
Canada	5.5	7.1	7.2	7.4	8.5	9.4	10.2
Average of above countries	4.3	5.8	6.8	7.4	8.0	8.5	9.3
Australia	4.9	5.7	7.5	7.3	7.7	8.2	8.8
Austria	4.4	5.4	7.3	7.9	8.1	8.4	8.8
Belgium	3.4	4.1	5.9	6.6	7.4	7.6	8.2
Denmark	3.6	6.1	6.5	6.8	6.3	6.3	6.5
Finland	3.9	5.7	6.4	6.5	7.3	8.0	9.4
Greece	2.9	4.0	4.1	4.3	4.9	5.3	5.4
Iceland	3.5	5.2	6.2	6.4	7.0	8.2	8.5
Ireland	4.0	5.6	8.0	9.2	8.2	7.0	7.1
Luxembourg	..	4.1	5.6	6.8	6.8	7.2	7.4
Netherlands	3.9	6.0	7.6	8.0	8.0	8.2	8.6
New Zealand	4.3	5.2	6.7	7.2	6.5	7.3	7.7
Norway	3.3	5.0	6.7	6.6	6.4	7.5	8.3
Portugal	..	3.1	6.4	5.9	7.0	5.4	7.0
Spain	1.5	3.7	4.9	5.6	5.7	6.6	7.0
Sweden	4.7	7.2	7.9	9.4	8.9	8.6	7.9
Switzerland	3.3	5.2	7.0	7.3	8.1	8.4	9.3
Turkey	..	..	3.5	4.0	2.8	4.0	4.1
OECD Europe[2]	3.8	5.3	6.6	7.1	7.3	7.6	8.0
Total OECD[2]	3.9	5.5	6.7	7.2	7.4	7.9	8.4

1. The provisional 1992 ratios partly reflect a generally weak cyclical position of GDP (see Table 2).
2. Unweighted arithmetic average. Excluding Luxembourg, Portugal and Turkey.

Sources: 1960-1990 OECD Health Data; 1992 Secretariat estimates.

Table 2. **Total expenditure on health care in trend GDP, 1970-1992**
Change in percentage points

	1970 to 1980	1980 to 1990	1990 to 1992
United States	2.1	3.1	1.1
Japan	2.1	0.2	0.1
Germany	2.7	0.0	-0.3
France	1.8	1.2	0.2
Italy	1.8	1.1	0.2
United Kingdom	1.5	0.5	0.4
Canada	0.5	1.9	0.3
Total of above countries	1.8	1.1	0.3
Australia	1.7	0.4	0.1
Austria	2.8	0.3	0.3
Belgium	2.8	1.0	0.5
Denmark	0.8	-0.6	0.1
Finland	0.8	2.0	0.2
Greece	0.3	0.9	0.2
Iceland[1]	1.2	1.9	-0.3
Ireland	3.6	-2.0	0.1
Luxembourg[1]	2.7	0.4	0.2
Netherlands	2.2	0.1	0.4
New Zealand[1]	1.6	0.8	0.5
Norway	1.6	0.9	0.6
Portugal	3.0	-0.7	1.4
Spain	2.1	1.1	0.2
Sweden	2.3	-0.5	-1.2
Switzerland[1]	2.1	1.1	1.2
Turkey[1]	..	-0.1	0.1
OECD Europe[2]	2.0	0.5	0.2
Total OECD[2]	1.9	0.6	0.2

1. Changes in health share of nominal GDP. Series for trend GDP were unavailable.
2. Unweighted arithmetic average.

Sources: 1960-1990 OECD Health Data; 1990-1992 Secretariat estimates.

Table 3. **Public share in total spending on health, 1960-1992**

Per cent

	1960	1970	1975	1980	1985	1990	1992
United States[1]	24.5	37.2	41.5	42.0	41.4	42.2	45.7
Japan	60.4	69.8	72.0	70.8	72.7	70.8	71.2
Germany	66.1	69.6	77.2	75.0	73.6	71.8	71.5
France	57.8	74.7	77.2	78.8	76.9	74.5	74.7
Italy	83.1	86.4	86.1	81.1	77.1	77.8	75.2
United Kingdom	85.2	87.0	91.1	89.6	86.3	84.4	84.4
Canada	42.7	70.2	76.4	74.7	74.7	73.1	72.2
Australia	47.6	56.7	72.8	62.9	71.5	68.1	67.6
Austria	69.4	63.0	69.6	68.8	66.7	66.1	65.2
Belgium	61.6	87.0	79.6	83.4	81.8	88.9	88.9
Denmark	88.7	86.3	91.9	85.2	84.4	83.6	82.0
Finland	54.1	73.8	78.6	79.0	78.6	80.9	79.3
Greece	64.2	53.4	60.2	82.2	81.0	84.2	76.1
Iceland	76.7	81.7	87.2	88.2	86.4	86.8	85.2
Ireland	76.0	81.7	79.0	82.2	77.4	74.7	..
Luxembourg	..	..	91.8	92.8	89.2	91.4	..
Netherlands	33.3	84.3	73.4	74.7	75.1	71.4	76.6
New Zealand	80.6	80.3	83.9	83.6	85.2	82.2	79.0
Norway	77.8	91.6	96.2	98.4	96.5	94.5	94.8
Portugal	..	59.0	58.9	72.4	56.3	69.4	69.8
Spain	58.7	65.4	77.4	79.9	80.9	80.5	80.5
Sweden	72.6	86.0	90.2	92.5	90.3	89.7	85.6
Switzerland	61.3	63.9	68.9	67.5	66.1	68.4	72.5
Turkey	..	..	49.0	27.3	50.2	35.6	..
OECD Europe[2]	67.9	77.2	80.2	81.7	79.9	79.9	79.2
Total OECD[2]	63.9	73.8	77.6	78.1	77.4	76.9	76.2

1. Values are under-estimated in the United States to the degree that the expenditures associated with the tax exemption of employer contributions to employee health plans are not included. This might raise the estimate of the share of spending in GDP in recent years by 8-9 percentage points of GDP.
2. Unweighted arithmetic average. Excluding Luxembourg, Portugal and Turkey.

Sources: 1960-1990 OECD Health Data; 1992 Secretariat estimates.

Table 4. **Employment in health care, 1970 to most recent year**

Per cent of total employment

	1970	1980	1990	Last available year
United States	3.7	5.3	..	6.2[1]
Japan	1.4	..	2.4	2.4[2]
Germany	2.9	4.5	..	5.5[1]
France	..	..	..	6.8[3]
Italy	1.6	3.9	4.3	4.4[4]
United Kingdom	3.1	4.7	4.6	4.8[4]
Canada	..	4.3	5.3	5.5[5]
Australia	..	6.5	6.8	6.9[4]
Austria	..	..	..	..
Belgium	2.5	4.3	..	4.6[6]
Denmark	3.1	4.8	4.7	4.7[2]
Finland	3.6	5.1	6.8	8.3[4]
Greece	1.4	2.0	3.3	3.3[2]
Iceland	4.0	5.8	6.9	6.0[5]
Ireland	..	4.8	5.3	5.4[4]
Luxembourg	..	..	..	..
Netherlands	0.4	6.4	6.4	6.6[4]
New Zealand	..	..	4.3	4.3[2]
Norway	4.2	8.0	..	9.1[1]
Portugal	1.7	2.2	2.9	2.9[2]
Spain	..	2.6	3.4	3.4[2]
Sweden	6.2	9.9	9.9	10.0[4]
Switzerland	2.8	4.4	..	9.9[5]
Turkey	0.4	0.7	0.9	0.9[2]
Total OECD[7]	2.8	5.0	5.2	5.8

1. 1989. 2. 1990. 3. 1987. 4. 1992. 5. 1991. 6. 1981.

7. Where data are available, and excluding Turkey.

Source: OECD Health Data File.

Table 5. **Determinants of health spending increases, 1960-1990**[1]

Per cent increase over period and shares

Country	Total increase	Income effect[2]	Cost-sharing effect[3]	Ageing effect[4]	Total demand effect	Residual[5]
			Income elasticity of 1.0			
United States	319	79	36	11	169	149
Japan	977	383	32	22	674	303
Average Europe	436	144	30	12	252	184
Average EC	452	147	31	11	260	192
Major European	347	130	13	11	190	157
Smaller European	465	148	35	12	273	192
OECD average	425	144	30	12	256	169
			Shares			
United States	100	25	11	3	53	47
Japan	100	39	3	2	69	31
Average Europe	100	33	7	3	58	42
Average EC	100	33	7	2	58	42
Major European	100	37	4	3	55	45
Smaller European	100	32	7	2	59	41
OECD average	100	34	7	3	60	40
			Income elasticity of 0.7			
United States	319	55	36	11	134	185
Japan	977	268	32	22	490	487
Average Europe	436	101	30	12	190	246
Average EC	452	103	31	11	195	256
Major European	347	91	13	11	141	206
Smaller European	465	104	35	12	207	259
OECD average	425	101	30	12	193	232
			Shares			
United States	100	17	11	3	42	58
Japan	100	27	33	2	50	50
Average Europe	100	23	7	3	44	56
Average EC	100	23	7	2	43	57
Major European	100	26	4	3	41	59
Smaller European	100	22	7	2	44	56
OECD average	100	24	7	3	45	55

Table 5 (continued)

Country	Total increase	Income effect[2]	Cost-sharing effect[3]	Ageing effect[4]	Total demand effect	Residual[5]
			Income elasticity of 0.2			
United States	319	16	36	11	74	244
Japan	977	77	32	22	183	794
Average Europe	436	29	30	12	86	350
Average EC	452	29	31	11	88	363
Major European	347	26	13	11	59	288
Smaller European	465	30	35	12	95	370
OECD average	425	29	30	12	88	337
			Shares			
United States	100	5	18	3	23	77
Japan	100	8	3	2	19	81
Average Europe	100	7	7	3	20	80
Average EC	100	7	7	2	20	80
Major European	100	7	4	3	17	83
Smaller European	100	6	7	2	20	80
OECD average	100	7	7	3	21	79

1. This table attempts to present an impression of the potential importance of factors thought to affect health spending. Given the uncertainty over the size of elasticities, they should be considered as providing only broad orders of magnitude, particularly as most estimates are based on U.S. data.
2. Estimated using GDP growth over period multiplied by the elasticities indicated. Income elasticities of demand vary substantially: cross-section data probably do not exceed 0.2 (Manning *et al.*, 1987); estimates of up to 1.5 are found using international cross-section data, but they are affected by country-specific differences (Gerdtham *et al.*, 1992). For time-series data, elasticities appear to be in the range of 1.0 (Schieber and Poullier, 1989). Estimates presented in the Annex using pooled cross-section time-series data suggest that with country and time dummies introduced (two-way fixed effects model) the income elasticity might be in the range of 0.7.
3. Estimated using a price elasticity and the change in the average coverage ratio in column C (1990) less C (1960) of Table 7. Most studies on the importance of cost-sharing or price effects are for the United States (see McGuire *et al.*, 1988, Table 9) with the most widely accepted values for elasticities in the range of -0.2 (Morrisey, 1992). The calculation of these elasticities from, for example, cross-section studies such as the RAND Health Experiment, can be open to error and may not be applicable to systems with other institutional arrangements. Nonetheless, the calculations here are based on the results found in Manning *et al.* (1987) and restated in Newhouse (1992*b*). They find that a shift in the average co-insurance rate from near zero (i.e. no user charge) to one of 33 per cent would decrease health-care spending by about 40 to 50 per cent. This large impact appears to result from the large per cent increase in the user charge in their study (from near-zero to one-third). For most countries where the average user charge was, at the beginning of the period, considerably greater than zero, this probably over-estimates the effect of widening coverage. However, this "rule of thumb" is used here to illustrate what the largest possible impact might be.
4. See Table 6 for method.
5. Total per cent change (first column) less the combined (multiplicative) effect of the demand components in columns 2-4 expressed in percentage points.

Source: OECD.

Table 6. **Effects on health spending of changes in population structure 1980-90 to 2020-40**[1]

	1980-1990	1990-2000	2000-2020	2020-2040
United States	0.26	0.12	0.48	0.46
Japan	0.69	1.03	0.77	0.18
Germany	..	0.38	0.60	0.51
France	..	0.38	0.47	0.48
Italy	..	0.69	0.51	0.68
United Kingdom	0.16	-0.02	0.25	0.30
Canada	0.33	0.51	0.70	0.45
Australia	0.22	0.27	0.57	0.38
Austria	-0.08	..	..	..
Belgium	0.03	0.62	0.29	0.60
Denmark	0.35	-0.06	0.48	..
Finland	-0.11	0.78	0.46	0.21
Greece	..	0.83	0.41	0.46
Iceland	..	0.25	0.38	..
Ireland	..	0.08	0.37	0.50
Netherlands	..	0.22	0.70	0.59
New Zealand	-0.16	-0.28	0.62	0.23
Norway	0.34	..	..	..
Portugal	0.29	0.15	0.65	0.30
Spain	0.52	0.56	0.23	0.88
Sweden	0.34	-0.38	0.34	..
Switzerland	0.17	0.22	0.37	0.28
Turkey	-0.22	..	..	..

1. Table shows possible effects on health spending in each period (expressed as an annual average percentage change) due to changes in the proportion of those aged over 65 to those under 65. The simulation assumes that average health spending on the 65+ age group is four times as much as on those under 65. The projections exhibit the mechanical incidence of demographic changes and do not take account of possible behaviour and policy adjustments.

Table 7. **Coverage of insurance programmes and public share of medical-care billing, 1960-1990**[1]

	1960			1970			1980			1990		
	A	B	C	A	B	C	A	B	C	A	B	C
United States[2]	..	..	50.8	..	..	65.6	..	..	76.2	..	..	79.6
Japan	88.0	70.0	61.6	100.0	80.7	80.7	100.0	88.7	88.7	100.0	87.0	87.0
Germany	85.0	90.0	76.5	88.0	92.0	81.0	91.0	95.0	86.5	92.2	92.0	84.8
France	76.3	61.0	46.5	95.7	70.0	67.0	99.3	75.0	74.5	99.5	75.1	74.7
Italy	87.0	80.0	69.6	93.0	80.0	74.4	100.0	81.2	81.2	100.0	75.9	75.9
United Kingdom	100.0	93.0	93.0	100.0	93.0	93.0	100.0	93.0	93.0	100.0	93.0	93.0
Canada	68.0	52.1	35.4	100.0	75.0	75.0	100.0	86.2	86.2	100.0	82.0	82.0
Australia	77.0	50.0	38.5	79.0	50.0	39.5	100.0	62.2	62.2	100.0	70.0	70.0
Austria	78.0	85.0	66.3	91.0	85.0	77.4	99.0	84.0	83.2	99.0	84.0	83.2
Belgium	58.0	72.0	41.8	85.0	75.0	63.8	99.0	88.0	87.1	98.0	87.0	85.3
Denmark	95.0	80.0	76.0	100.0	85.0	85.0	100.0	85.0	85.0	100.0	85.0	85.0
Finland	55.0	57.5	31.6	100.0	78.3	78.3	100.0	83.7	83.7	100.0	82.0	82.0
Greece	30.0	70.0	21.0	55.0	70.0	38.5	88.0	80.0	70.4	100.0	85.0	85.0
Iceland	100.0	80.0	80.0	100.0	85.0	85.0	100.0	93.0	93.0	100.0	93.0	93.0
Ireland	85.0	75.0	63.8	85.0	80.0	68.0	100.0	93.0	93.0	100.0	90.0	90.0
Luxembourg	90.0	..	..	100.0	..	..	100.0	91.0	91.0	100.0	91.0	91.0
Netherlands	71.0	57.0	40.5	86.0	75.0	64.5	74.6	75.3	56.2	69.2	71.4	49.4
New Zealand	100.0	..	..	100.0	..	..	100.0	..	..	100.0	..	..
Norway	100.0	80.0	80.0	100.0	80.0	80.0	100.0	90.0	90.0	100.0	90.0	90.0
Portugal	18.0	..	..	40.0	..	..	100.0	..	..	100.0	..	..
Spain	54.0	70.0	37.8	61.0	70.0	42.7	83.0	90.0	74.7	99.0	90.0	89.1
Sweden	100.0	80.0	80.0	100.0	92.0	92.0	100.0	95.8	95.8	100.0	94.0	94.0
Switzerland	74.0	85.0	62.9	89.0	..	..	96.5	91.9	88.7	99.5	91.0	90.5
Turkey	5.8	..	..	26.9	..	..	38.4	..	..	55.1	..	..
OECD average[3]	..	..	57.7	..	..	71.1	..	..	82.9	..	..	83.5

1. A = per cent coverage of public insurance schemes over total population.
   B = per cent of medical bills normally paid for by public insurance schemes.
   C = A*B.
2. Value for the United States represents the share of total health spending covered by public and private insurers.
3. For countries with values.

Sources: *OECD Health Data;* for the United States CBO (1992a).

Table 8. **Selected trends in health-care facilities and manpower, 1960-1990**[1]

Annual per cent growth and levels

	Total beds per 1 000 inhabitants				Practising physicians per 1 000 inhabitants			
	1960-70	1970-80	1980-90	Levels 1990	1960-70	1970-80	1980-90	Levels 1990
United States	-1.5	-2.6	-2.1	4.7	1.1	2.5	1.6	2.3
Japan	3.3	0.8	1.4	15.8	0.6	1.6	2.6	1.6
Germany	0.7	0.2	-1.0	10.4	1.4	3.3	3.1	3.1
France	-0.4	1.6	-1.3	9.7	2.8	4.6	2.9	2.7
Italy	1.7	-0.8	-3.1	7.1	4.0	4.4	2.4	1.5
United Kingdom	-1.1	-1.5	-3.1	5.9	..	..	1.5	1.4
Canada	1.2	-0.4	-0.7	6.3	2.5	2.1	1.7	2.1
Australia	1.8	1.7	-0.9	9.8	1.7	3.7	2.3	2.2
Austria	0.0	0.4	-0.9	10.2	0.0	1.6	2.9	2.1
Belgium	..	1.2	1.6	8.0	1.9	4.1	4.1	3.4
Denmark	0.1	0.0	-3.7	5.6	1.5	4.5	2.5	2.8
Finland	2.7	0.3	-2.2	12.5	5.1	6.4	3.4	2.4
Greece	0.7	0.0	-2.0	5.1	2.6	4.1	3.4	3.4
Iceland	2.8	1.4	1.1	16.7	2.0	4.1	2.9	2.8
Ireland	..	-2.7	-5.1	5.7	..	1.1	1.8	1.5
Luxembourg	0.6	0.1	-0.8	11.8	1.1	4.2	1.7	2.0
Netherlands	0.4	0.7	-0.6	11.5	1.1	4.3	2.8	2.5
New Zealand	-0.8	-0.5	-1.8	8.5	-0.1	3.7	2.0	1.9
Norway	..	..	-1.3	14.5	1.5	3.6	4.7	3.1
Portugal	1.2	-2.1	-1.3	4.6	1.4	7.4	3.7	2.8
Spain	..	1.5	-2.3	4.3	1.4	5.6	5.2	3.8
Sweden	0.8	-0.1	-1.9	12.4	3.3	5.3	2.7	2.9
Switzerland	..	..	..	..	0.6	5.1	2.2	2.9
Turkey	1.9	1.0	-0.4	2.1	2.8	4.6	3.9	0.9

1. For some countries, dates may not correspond perfectly with those indicated.

Sources: *OECD Health Data*.

Table 9. **Trends in medical-specific inflation, 1960-1990**[1]

Annual average growth rates

	Total spending			Hospital spending			Ambulatory spending			Pharmaceutical spending		
	1960-70	1970-80	1980-90	1960-70	1970-80	1980-90	1960-70	1970-80	1980-90	1960-70	1970-80	1980-90
United States	0.8	0.4	2.2	1.7	0.9	1.7	1.4	0.5	2.7	-3.1	-2.2	3.2
Japan	1.3	-0.6	0.7	-1.7	-1.8	0.5	-1.7	-1.8	0.5	-4.1	-2.4	1.2
Germany	1.4	0.5	0.5	..	6.7	1.4	..	2.6	-0.2	-0.2	-1.3	1.9
France	0.2	-1.1	-1.1	1.7	0.6	0.0	0.8	-0.9	-1.7	-2.8	-5.1	-3.5
Italy	1.0	0.0	0.5	5.8	1.3	2.2	7.0	-3.4	4.0	-3.7	-8.8	-4.3
United Kingdom	-0.8	-0.5	1.2	1.3	3.2	..	..	0.9	..	-4.4	-1.7	-1.0
Canada	1.3	0.3	1.2	3.1	2.4	1.8	0.8	-2.2	1.1	-3.5	-3.5	4.5
Australia	3.3	1.2	0.0	1.3	1.6	-0.3	2.2	-0.2	..	-0.3	-4.1	-1.0
Austria	3.2	2.7	1.5	7.8	5.5	3.6	3.3	4.0	-0.4	-2.7	-1.8	-0.9
Belgium	1.5	0.3	0.5	5.8	1.9	2.0	3.4	1.8	-0.6	-1.5	-4.5	0.0
Denmark	0.6	-0.8	0.3	7.2	2.0	0.5	..	-0.5	0.3	..	-2.0	0.7
Finland	-2.3	-0.5	1.6	1.0	0.1	1.0	..	1.1	4.7	-3.3	-1.9	1.4
Greece	-0.7	0.5	-1.1	0.4	4.3	..	..	..	..	-2.9	-2.2	-3.4
Iceland	0.4	1.4	0.0	0.8	1.6	-0.7	..	..	..	0.8	-0.8	1.0
Ireland	-0.9	-0.6	2.1	8.7	-0.1	..	..	..	..	..	-2.2	1.1
Luxembourg	..	0.4	0.6	..	..	..	..	6.2	..	..	-4.1	1.4
Netherlands	1.2	3.7	0.1	1.4	6.9	0.8	..	2.2	-0.9	..	-3.4	-0.3
New Zealand	..	3.1	1.1	2.2	2.7	..	..	..	..	..	..	..
Norway	2.6	0.8	0.8	3.1	0.4	1.0	..	1.4	0.5	..	0.1	1.9
Portugal	..	1.7	-0.3	..	1.6	..	..	1.4	..	..	-4.7	..
Spain	1.2	0.0	-0.2	..	..	2.0	..	..	-0.6	..	-8.4	..
Sweden	-0.5	1.3	-0.5	..	..	-1.3	..	-2.9	2.0	..	-0.8	-2.3
Switzerland	1.4	2.3	-0.1	..	..	2.5	..	1.1	-0.8	..	-1.5	-1.8
Turkey	..	..	4.2	..	..	..	..	..	..	..	..	..
Europe[2]	0.6	0.7	0.6	..	2.6	1.1	..	1.1	0.5	..	-3.1	-0.5
Total OECD[2]	0.8	0.7	0.7	..	2.2	1.1	..	0.6	0.7	..	-3.1	0.0

1. Growth in deflators for health care relative to the GDP deflator.
2. Unweighted arithmetic average for available countries.

Sources: *OECD Health Data.*

Table 10. **Health-care spending and selected determinants, average 1970-1990**[1]

	Health-care expenditure per capita[2] (ranking order)	Factors increasing health-care spending			Factors reducing health-care spending	
		Income per capita[2] (ranking order)	Tobacco consumption per capita (ranking order)	Share of in-patient care[3] (ranking order)	Gatekeeper	Capitation
United States	1	2	2	14		
Switzerland	2	1	7	16		
Canada	3	3	1	9	+	
Sweden	4	6	20	4		
Germany	5	5	12	18		
France	6	7	19	15		
Australia	7	8	13	12		
Netherlands	8	11	3	5	+	+
Austria	9	14	14	21	+	
Luxembourg	10	4	6	22		
Iceland	11	10	10	8	+	
Norway	12	12	21	1	+	
Denmark	13	9	9	3	+	+
Belgium	14	13	4	19		
Finland	15	19	22	13		
Italy	16	17	15	10	+	+
New Zealand	17	18	11	2	+	
Japan	18	15	16	20		
United Kingdom	19	16	18	7	+	+
Ireland	20	21	8	6	+	
Spain	21	20	17	17	+	+
Greece	22	22	5	11		

1. Some main determinants of health spending which are presented in the Annex.
2. In U.S. dollars, converted at general PPPs, expressed in 1985 prices, average 1970 to 1991.
3. Proportion of in-patient expenditure in total health-care expenditure.

Table 11. **Health status and outcome indicators, 1992**[1]

	Female life expectancy	Male life expectancy	Female life expectancy at age 60	Male life expectancy at age 60	Female life expectancy at age 80	Male life expectancy at age 80	Perinatal mortality[2]	Infant mortality[3]	Female potential years of life lost[4]	Male potential years of life lost[4]
United States	79.0	72.3	22.9	18.7	9.1	7.2	0.87	0.85	3876.9	6960.6
Japan	82.2	76.1	24.7	20.1	8.9	6.9	0.53	0.45	2092.2	3704.1
Germany	79.3	72.9	22.4	18.0	7.8	6.2	0.56	0.60	2837.8	5048.9
France	81.3	73.1	24.4	19.2	8.6	6.8	0.82	0.68	2766.8	5904.5
Italy	80.4	74.0	23.1	18.6	8.0	6.4	1.04	0.83	2763.5	5081.1
United Kingdom	79.0	74.0	22.0	17.7	8.3	6.3	0.81	0.66	3054.2	4819.9
Canada	80.4	73.8	23.7	18.9	9.3	7.1	0.77	0.68	2938.8	4974.0
Australia	80.4	74.5	23.4	19.1	8.7	6.9	0.94	0.70	3129.7	5298.2
Austria	79.4	72.9	22.5	18.4	7.8	6.7	0.68	0.75	2848.6	5473.3
Belgium	79.5	73.1	23.0	18.1	7.9	6.1	0.91	0.82	3422.3	5943.0
Denmark	77.8	72.4	21.5	17.7	8.1	6.6	0.81	0.66	3321.4	5155.1
Finland	79.4	71.7	22.3	17.4	7.7	6.2	0.59	0.52	2693.5	5625.0
Greece	79.4	74.0	21.6	18.4	7.6	6.7	1.00	0.84	2893.9	5223.5
Iceland	80.9	75.7	23.3	20.0	9.0	7.4	0.67	0.48	2495.5	4149.0
Ireland	77.7	71.0	21.2	17.1	6.7	5.4	0.99	0.66	3101.9	5213.5
Luxembourg	78.5	71.9	22.9	17.8	6.8	5.3	0.77	0.85	2840.7	5784.9
Netherlands	80.3	74.3	22.8	17.8	8.1	6.2	0.92	0.63	2713.0	4269.3
New Zealand	78.7	72.8	22.5	18.4	8.6	6.8	0.74	0.73	3080.4	5311.9
Norway	80.3	74.2	22.9	18.3	8.1	6.4	0.72	0.58	2866.2	4269.3
Portugal	78.2	70.8	21.8	17.9	7.1	6.1	1.08	0.93	3990.1	7974.8
Spain	80.5	73.4	23.5	19.2	8.2	6.9	0.72	0.76	2937.9	5767.7
Sweden	80.8	75.4	23.5	19.3	8.5	6.7	0.56	0.53	2388.0	3964.8
Switzerland	81.2	74.3	24.2	19.4	8.7	6.9	0.70	0.64	2619.5	4815.7
Turkey	68.4	64.1	18.1	15.8	5.9	5.2	..	5.65	..	..
Total OECD[5]	79.2	72.9	22.5	18.3	8.0	6.5	0.80	0.91	2942.3	5139.6

1. Or latest year available.
2. Deaths in the first week of life as a per cent of live and stillbirths.
3. Deaths of children aged 1 year or less as per cent of live births.
4. Deaths from all causes (excluding suicides) between ages 0 and 64 weighted in each case by the number of years until age 65 would have been reached; per 100 000 population; 1990 or last year available.
5. Unweighted arithmetic average.

Source: OECD health data.

Table 12. **Relation between health outcome indicators and health spending, 1990**

	Correlation coefficients	
	Using GDP PPPs	Using Health PPPs
Female life expectancy at birth	0.50	0.64
Male life expectancy at birth	0.39	0.54
Female life expectancy at age 60	0.60	0.74
Male life expectancy at age 60	0.43	0.54
Female life expectancy at age 80	0.64	0.64
Male life expectancy at age 80	0.49	0.44
Female potential years of life lost	-0.07	-0.30
Male potential years of life lost	-0.05	-0.26
Perinatal mortality	-0.17	-0.37
Infant mortality	-0.45	-0.50

Note: Table shows correlations across OECD countries between health outcome indicators and health spending per capita. In Column 1, health spending is adjusted using purchasing power parities for GDP; Column 2 uses purchasing power parities for health services.

Source: OECD.

Table 13. **The structure of expenditure on health, 1960-1990**[1]
Share of the major functions in total expenditure, in percentages

	1960			1970			1980			1990		
	Hospital	Ambul.	Pharm.	Hospital	Ambul.	Pharm.	Hospital	Ambul.	Pharm.	Hospital	Ambul.	Pharm.
United States	37.8	29.1	15.7	44.1	26.8	11.8	48.9	26.5	8.6	46.2	29.4	8.1
Japan	34.1	..	..	26.4	48.4	..	30.7	44.3	22.1	30.2	40.5	17.3
Germany	..	..	..	36.7	29.0	19.5	36.1	26.6	18.7	36.6	28.0	21.3
France	34.7	27.6	22.1	38.0	26.6	23.2	48.1	24.8	15.9	44.2	28.4	16.8
Italy	43.2	35.8	19.8	47.6	36.2	15.5	54.0	29.5	19.9	46.7	27.3	18.4
United Kingdom[2]	44.5	..	..	49.0	..	..	56.1	..	11.2	44.0	..	10.7
Canada	43.6	23.9	12.9	52.2	22.4	11.2	52.6	22.1	8.9	49.1	21.9	13.3
Australia	..	..	..	29.1	..	..	52.9	22.3	7.9	48.1	25.5	8.8
Austria	23.8	24.8	17.2	28.8	23.9	16.2	28.3	20.2	12.0	29.2	21.2	11.3
Belgium	38.4	41.3	24.3	25.7	42.5	28.1	32.9	38.0	17.3	32.8	40.0	15.5
Denmark	50.3	..	..	55.8	38.4	9.1	65.1	30.1	9.1	62.2	31.3	9.2
Finland	41.2	21.7	16.2	50.4	21.5	12.6	49.2	27.2	10.7	44.7	33.9	9.4
Greece	63.0	..	35.2	46.4	..	43.3	48.9	..	34.8	57.5	..	24.4
Iceland	33.3	..	..	47.8	..	17.4	62.1	17.0	15.9	56.7	22.5	15.3
Ireland[2]	..	..	..	..	..	22.2	46.1	..	14.7	51.1	..	18.3
Luxembourg	..	..	..	..	22.4	19.7	31.3	49.5	14.5	27.7	52.1	15.6
Netherlands	..	30.9	9.5	55.1	..	7.5	57.3	27.7	7.9	51.8	26.9	9.9
New Zealand	52.4	..	..	55.7	..	..	55.3	..	..	56.3	16.5	9.8
Norway	38.1	..	9.7	68.2	..	7.8	73.8	21.3	10.0	70.4	23.8	10.4
Portugal[2]	..	..	..	27.5	..	15.6	29.9	16.3	22.4	25.5	..	17.6
Spain	..	..	..	52.5	..	23.5	54.1	12.6	21.0	47.2	..	18.0
Sweden[2]	69.0	..	3.5	59.7	..	4.2	68.5	..	6.5	51.3	..	8.2
Switzerland	44.6	..	..	41.7	..	19.1	42.6	46.5	15.2	42.8	..	12.3
Turkey	..	..	..	..	..	..	11.5	..	..	19.1	..	..
Europe[3]	..	..	..	43.9	..	17.6	49.1	..	15.1	46.1	..	14.4
OECD total[3]	..	..	..	43.3	..	18.4	49.7	..	14.3	46.1	..	13.8

1. Nearest year available when a ratio for the year indicated is not available. The ratios are only orders of magnitude in the absence of internationally agreed-on definitions. Hospital refers to in-patient care; Ambul. to all out-patient medical and paramedical services; Pharm. to the purchase of medicines including OTC (over-the-counter or self-prescribed medicines). Columns do not add to 100 because a number of elements are excluded, including therapeutic appliances, services provided at a central level, administrative costs, R&D and investment.
2. The in-patient care ratios refer to publicly funded care only.
3. The European and OECD averages are arithmetic. Both exclude Turkey and, in 1970, Luxembourg and Portugal.

Sources: OECD, 1993*e*.

Table 14. **Trends in acute hospital care, 1960-1992**

	Beds per 1 000 inhabitants					Admission rates[1]					Length of stay[2]					Occupancy rates[3]				
	Start year	1970	1980	1990	Last year	Start year	1970	1980	1990	Last year	Start year	1970	1980	1990	Last year	Start year	1970	1980	1990	Last year
United States	3.4	3.9	4.2	3.6	3.5	12.7	14.3	15.9	12.4	12.1	7.6	8.2	7.6	7.3	7.2	74.7	78.0	75.4	66.8	66.2
Japan	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Germany	7.2	7.5	7.7	7.5	..	11.9	13.4	16.3	18.5	..	21.6	18.3	14.9	13.4	13.8	92.2	86.8	83.3	86.4	85.6
France	6.2	..	6.2	5.2	..	..	..	17.5	20.7	21.4	20.0	16.0	9.9	7.0	6.6	..	..	..	77.3	75.7
Italy	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
United Kingdom	3.0	..	2.9	2.6	..	9.7	..	11.1	13.2	14.4	9.8	..	8.5	6.1	6.0	74.5	..	75.1	..	76.2
Canada	5.4	..	5.3	..	4.8	16.0	..	14.6	..	13.8	9.4	..	10.2	..	10.5	77.5	..	80.4	..	82.7
Australia	6.1	5.9	6.4	..	4.8	12.5	17.6	20.4	..	22.4	9.8	9.1	7.7	..	5.2	74.0	..	66.2	..	71.1
Austria	6.7	..	..	6.0	5.6	17.3	..	..	20.5	23.5	14.5	..	14.5	10.5	9.6	80.8	..	..	80.2	78.9
Belgium	6.1	4.8	5.5	4.9	4.8	14.2	..	..	16.8	17.6	14.4	15.6	10.0	8.7	8.2	76.7	..	77.7	81.9	82.0
Denmark	5.5	..	5.6	4.6	4.2	..	14.3	17.6	20.6	20.8	..	12.5	9.1	6.6	6.3	77.7	..	75.8	81.6	84.9
Finland[4]	3.9	4.8	4.9	4.3	6.0	16.4	..	..	16.3	19.0	12.5	12.8	8.8	7.0	8.0	76.9	..	..	74.2	65.6
Greece	..	..	..	4.0	3.9	..	..	..	..	..	..	..	..	..	..	..	..	..		..
Iceland[5]	..	..	..	..	4.8	..	..	..	..	19.6	..	..	..	..	6.3	..	..	..	..	70.3
Ireland	5.9	..	5.6	3.4	3.4	12.2	15.6	17.2	14.9	14.2	..	13.3	9.7	6.9	6.7	79.2	..	..	85.1	83.4
Luxembourg	7.4	..	..	7.0	6.9	11.8	..	15.3	18.4	19.0	13.6	..	13.0	11.0	10.3	..	..	..	..	..
Netherlands	5.0	5.5	5.2	4.3	4.2	8.0	9.7	11.2	10.3	10.0	20.1	18.8	14.0	11.2	10.6	..	89.8	83.5	73.3	72.0
New Zealand	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Norway	5.6	..	5.4	3.8	3.5	..	12.3	14.3	..	13.3	..	14.8	10.9	7.8	6.9	..	..	79.3	77.1	..
Portugal	3.8	4.3	..	3.6	3.7	5.0	6.7	..	10.6	11.1	19.0	15.3	..	8.4	7.9	73.1	68.7	..	66.7	67.4
Spain	3.5	..	..	3.4	3.3	9.1	..	..	9.6	9.9	8.9	..	..	9.4	9.2	71.3	..	..	73.5	75.0
Sweden	5.1	..	4.8	3.9	3.7	..	14.4	15.5	16.3	17.0	..	11.0	8.6	6.6	6.0	76.6	..	75.7	75.9	78.0
Switzerland	8.2	7.1	7.1	6.5	6.2	..	..	13.0	13.9	14.9	15.0	..	15.5	13.4	12.1	..	..	77.9	79.0	78.7
Turkey	1.0	1.3	1.5	1.8	1.9	..	..	..	..	..	7.0	..	7.0	..	..	49.0	..	40.0	..	57.0

1. Ratio of the number of patients admitted to hospital per year to total population.
2. Average number of days in hospital per sickness episode.
3. Ratio of beds filled to beds available.
4. From 1991, new definition.
5. Provisionally 1989.

Sources: *1960-1990 OECD Health Data;* 1991-92 Secretariat estimates.

Table 15. **Hospital staff ratios, 1970-1992**

Personnel per available bed

	Total staff			Nurses		
	1970	1980	Latest year	1970	1980	Latest year
United States	1.6	2.6	3.5	..	..	..
Japan	0.6	0.8	0.8	0.3	0.4	0.4
Germany	0.8	1.1	1.3	0.2	0.4	0.5
France	0.8	1.3	1.1	0.1	0.2	0.4
Italy	0.6	1.0	1.6	0.2	0.4	0.7
United Kingdom	..	2.1	2.6	..	0.5	0.7
Canada	..	2.1	2.4	..	0.8	0.9
Australia	..	..	3.9	..	1.8	1.8
Austria	0.4	0.6	0.8	0.3	0.4	0.6
Belgium	..	..	1.5	..	..	0.8
Denmark	1.6	2.1	2.8	0.4	0.4	0.8
Finland	1.4	1.8	2.1	0.3	0.4	0.7
Greece	0.6	0.9	1.4	0.3	0.3	0.7
Iceland	..	..	..	..	..	..
Ireland	..	..	1.8	..	0.8	1.4
Luxembourg	..	..	..	..	..	..
Netherlands	1.5	1.8	2.2	..	0.8	0.9
New Zealand	1.8	1.7	2.0	0.4	0.6	1.2
Norway	..	2.0	2.8	0.4	0.6	0.9
Portugal	0.7	1.2	2.0	0.2	0.3	0.5
Spain	..	1.4	2.2	..	0.3	0.6
Sweden	1.0	1.6	1.9	..	..	..
Switzerland	..	..	2.0	..	..	1.0
Turkey	..	..	1.5	0.1	0.3	0.3
Total OECD average[1]	1.0	1.5	2.0	0.3	0.5	0.8

1. Unweighted arithmetic average.

Sources: OECD Health Data.

Table 16. **Health-related administrative costs, 1970-1992**[1]

	Total expenditure on health administration as % of total expenditure on health				Public expenditure on health administration as % of public expenditure on health			
	1970	1980	1985	1992 or last year	1970	1980	1985	1992 or last year
United States	3.7	4.9	6.0	5.8	3.9	3.7	2.7	2.5
Japan[2]	..	..	..	..	..	0.7	0.3	0.3
Germany	..	5.9	6.6	6.8	..	6.1	6.5	7.2
France[3]	1.3	1.4	1.5	1.5	0.3	0.2	0.3	0.2
Italy	..	..	..	..	..	6.6	6.3	6.1
United	..	..	..	..	..	3.0	2.4	2.5
Canada	1.6	1.4	1.4	1.3	1.7	1.2	0.9	0.9
Australia	..	4.0	3.0	3.2	..	3.2	2.5	2.8
Austria	..	..	..	..	..	..	..	..
Belgium	..	..	..	..	..	..	..	4.6
Denmark	..	..	..	..	..	0.7	0.9	1.2
Finland	..	..	..	..	2.7	2.4	2.5	2.5
Greece	..	..	..	..	..	..	..	..
Iceland	..	..	..	..	..	1.5	1.8	1.6
Ireland	..	..	..	..	..	2.5	3.7	3.5
Luxembourg	..	..	..	..	..	5.4	5.2	4.8
Netherlands	..	4.3	5.1	5.1	..	3.3	4.4	4.4
New Zealand	..	..	..	..	..	..	..	5.1
Norway	..	..	..	..	..	..	..	..
Portugal	..	0.7	1.0	1.3	..	..	..	..
Spain	..	..	..	..	3.3	2.2	2.4	2.8
Sweden	1.8	..	..	4.1	..	..	..	0.4
Switzerland	..	..	5.7	5.1	..	..	7.7	5.6
Turkey	..	..	..	..	..	..	..	..

1. The concepts are not identical. The levels provide only rough orders of magnitude. The trends are consistent for each country.
2. The Japanese estimates refer to social security council data, a central government monitoring body, and exclude, as for France, the administration costs of health insurance. For 1990, administrative outlays are estimated to be 2.5 per cent of public expenditure.
3. The French estimates do not include the administrative costs of the sickness insurance schemes. These may be estimated at 5.3 percentage points in 1992, a total estimate of 6.8 per cent of total health spending. For the public sector, overall administration costs represent 7.3 per cent of aggregate public expenditure. Note that these data also include administrative costs associated with worker compensation schemes.

Sources: 1960-1990 OECD Health Data; 1992 Secretariat estimates.

Annex Table 1. **Exclusions in coverage by social insurance for health care** [1]

	Exclusions
United States	Medicare (Parts A and B) excludes long-term home care, out-patient pharmaceuticals, routine eye care and dental treatment; for private schemes, exclusions depend on insurance policy held.
Japan	Inoculations, health check-ups, private rooms, eyeglasses, and health promotion activities for the elderly.
Germany	Virtually none.
France	Eyeglasses, dentures and replacement dental treatment (low rate of reimbursement).
Italy	Virtually none.
United Kingdom	Dental care and optical care (except for low income groups), low cost pharmaceuticals.
Canada	Sanatoria, out of hospital dental treatment, non-hospital pharmaceuticals (some exceptions for older persons), varying degrees for protheses, spectacles and hearing aids and treatment in privately owned hospitals.
Australia	Dental care (limited for specific groups), pharmaceuticals (some subsidies).
Austria	Dental protheses, glasses etc. (low rates of reimbursement) depending on rules of particular sickness fund.
Belgium	Virtually none.
Denmark	Virtually none.
Finland	Virtually none.
Greece	Virtually none.
Iceland	Virtually none.
Ireland	Virtually none for lower income groups.
Luxembourg	Virtually none
Netherlands	Spectacles.
New Zealand	Ambulatory care for higher income groups, dental care, glasses.
Norway	Virtually none.
Portugal	Protheses, some pharmaceuticals (low rates of reimbursement).
Spain	Virtually none.
Sweden	Low-cost medicines.
Switzerland	Spa hotel charges and fees; dental treatment, protheses, glasses and hearing aids.
Turkey	Virtually none (but low share of population covered).

1. This information, which has been drawn largely from Council of Europe (1993) and CEC (1993) reflects the general coverage of health insurance and may not take into account some exemptions for groups at risk. In some cases mention is made of items for which the reimbursement levels are particularly low (less than 25 per cent). Over the counter medicines are generally not reimbursed.

Annex Table 2. **Cost-sharing in OECD countries, 1993**[1]

U.S. dollars

	General Practitioner	Specialist	Drugs	In-patient care	X-ray and pathology
United States[2]	20% in excess of the $100 deductible		100 per cent	$676 deductible first 60 days	Same as doctors
Japan	Employees, 10% of all costs; dependents, 20%; self-employed 30%.				
Germany	None	None	Charge of $1.25 per medicine prescribed (many exemptions)	$3 for the first 14 days (many exemptions)	
France	25%[3]	25%[3]	30%, 60% for "comfort" drugs and 100%	$5-$6 per day plus 20% of total cost for first 30 days	35%
Italy	None	$7-$8	$3 plus 50%, or $0	--	30%
United Kingdom	None	None	$4-$5 per prescription or free with a "season ticket" of $65. Many persons exempt.	None	None
Canada	None	None	Discretion of Provinces	None	None
Australia	For 25% of bills average of $5	For 71% of bills average of $8	Maximum $11 per prescription	None	Included in specialists' bills
Austria	20% of the population pay 10% or 20%		$2.50	$6	Same as doctors
Belgium	25% reduced to 10% for vulnerable groups	Same as for GPs	100/75/50/40% but with ceilings. 0% for drugs on negative list	$5-$6 per day, $2-$3 for vulnerable groups. Increased after 90 days	
Denmark	None except for under 3% of the population		0/25/50%	None	None
Finland	$17	$17	60% in excess of $8	$22	None
Greece	None	None	10/25%	--	--
Iceland[4]	$9	$17 plus 40% of the rest of the cost	0, 12.5%, 25%	None	$13
Ireland	None for Category I, variable for Categories II & III[5]	Same as for GPs	Free for Category I and over a ceiling for Category II, none for Category III	Free for Category I and min. $15 per day for first 10 days	None for Category I
Luxembourg	5%	5%	20%	Flat rate	
Netherlands	None for publicly covered patients. Private patients variable depending on policy[6]	As for GPs	Only drugs with prices higher than those set by the authorities	As for GPs	
New Zealand	Extra billing	Out-patients $3-$17	$2-$8 with stop loss	None	Out-patients $3-$17
Norway	$11	$16	25% if on blue ticket, maximum $43 per prescription	None	X-ray $11
Portugal		$91-$213	0/30/60%	$30	

Annex Table 2 (continued)

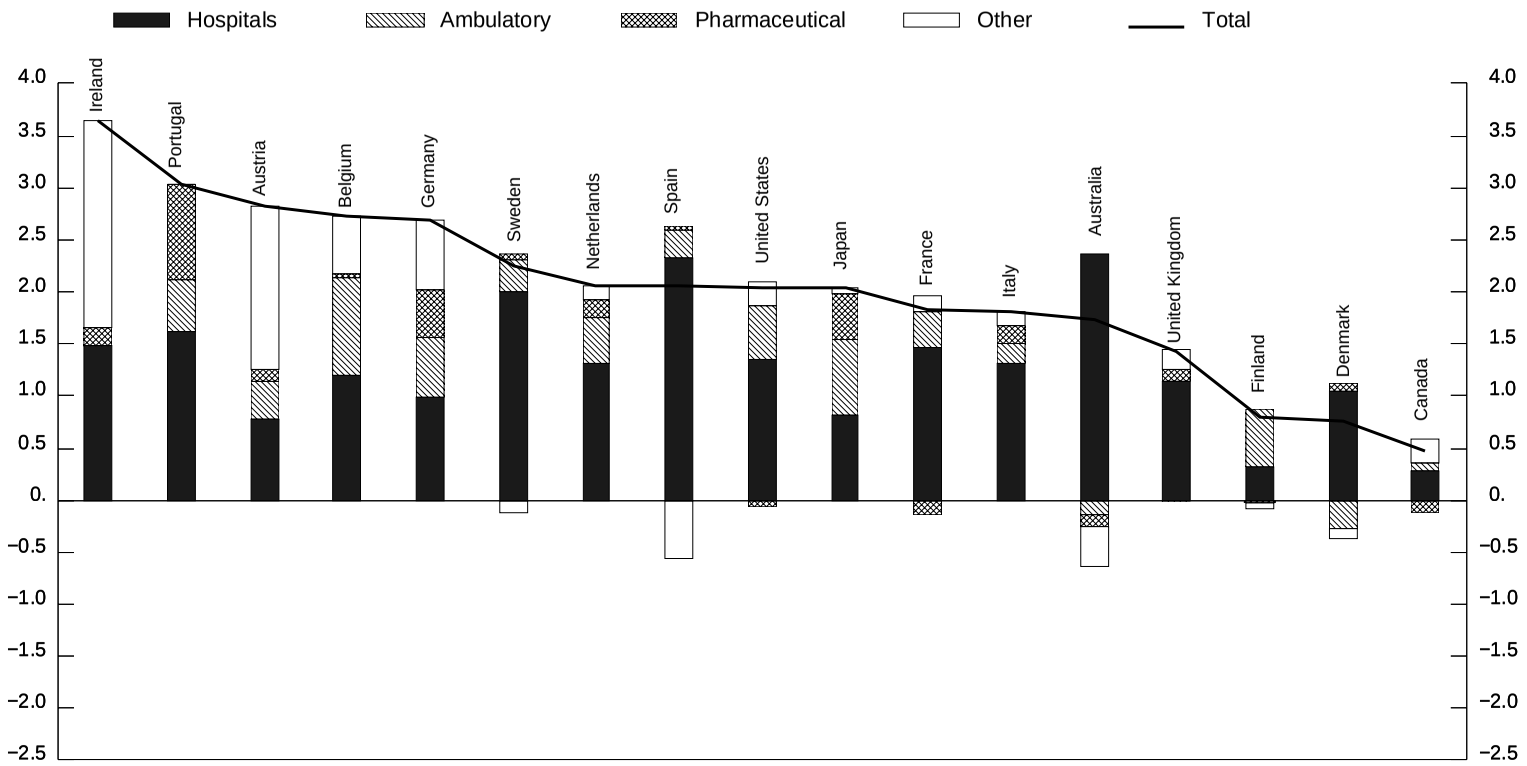
	General Practitioner	Specialist	Drugs	In-patient care	X-ray and pathology
Spain	None	None	40%. Pensioners and long-term ill largely exempt.	None	None
Sweden[4]	$6-$19		First drug $15 then $1 each	$8	--
Switzerland[7]	10%	10%	$7	$7	10%
Turkey	None	None	20%	$10 a day	None

1. Approximate amounts in U.S. dollars, converted at nominal exchange rates. Some changes arising from most recent reforms may not have been included for countries covered in OECD (1992*c*).
2. Lower deductibles if in HMOs.
3. 25% of the agreed fee schedule (*docteur conventionné*) and more if there is overbilling. Copayment may be less if covered by complementary insurance which normally covers part of the co-payment including the overbilling. Complementary insurance covers over 80% of the population. Vulnerable groups and long-term ill may have zero co-payment.
4. Maximum for the year in the charging scheme.
5. Category I are lower-income groups (35-40% of the population) who receive basically free care. Categories II and III (collapsed into a single Category II in 1991) pay $30 per day of hospital care up to a ceiling of $300. Categories II and III most often have additional cover. The most common Voluntary Health Insurance Board policy covers GP fees over a certain threshold, consultants/specialists' fees and private or semi-private hospital accommodation. These have changed somewhat with the 1991 reforms.
6. Whole population covered for chronic care. 70% of the population is compulsorily insured and 30% by private for acute care. Privately insured patients can choose the deductible and co-payment policy they wish.
7. Yearly deductible of SF 150. From 1986 higher deductibles can be chosen.

Sources: OECD (1992*c*), OECD (1994*e*) and NERA (1993).

Figure 1. **Contribution of the components of health care spending to total health spending**
(Change in percentage points of trend GDP over period)

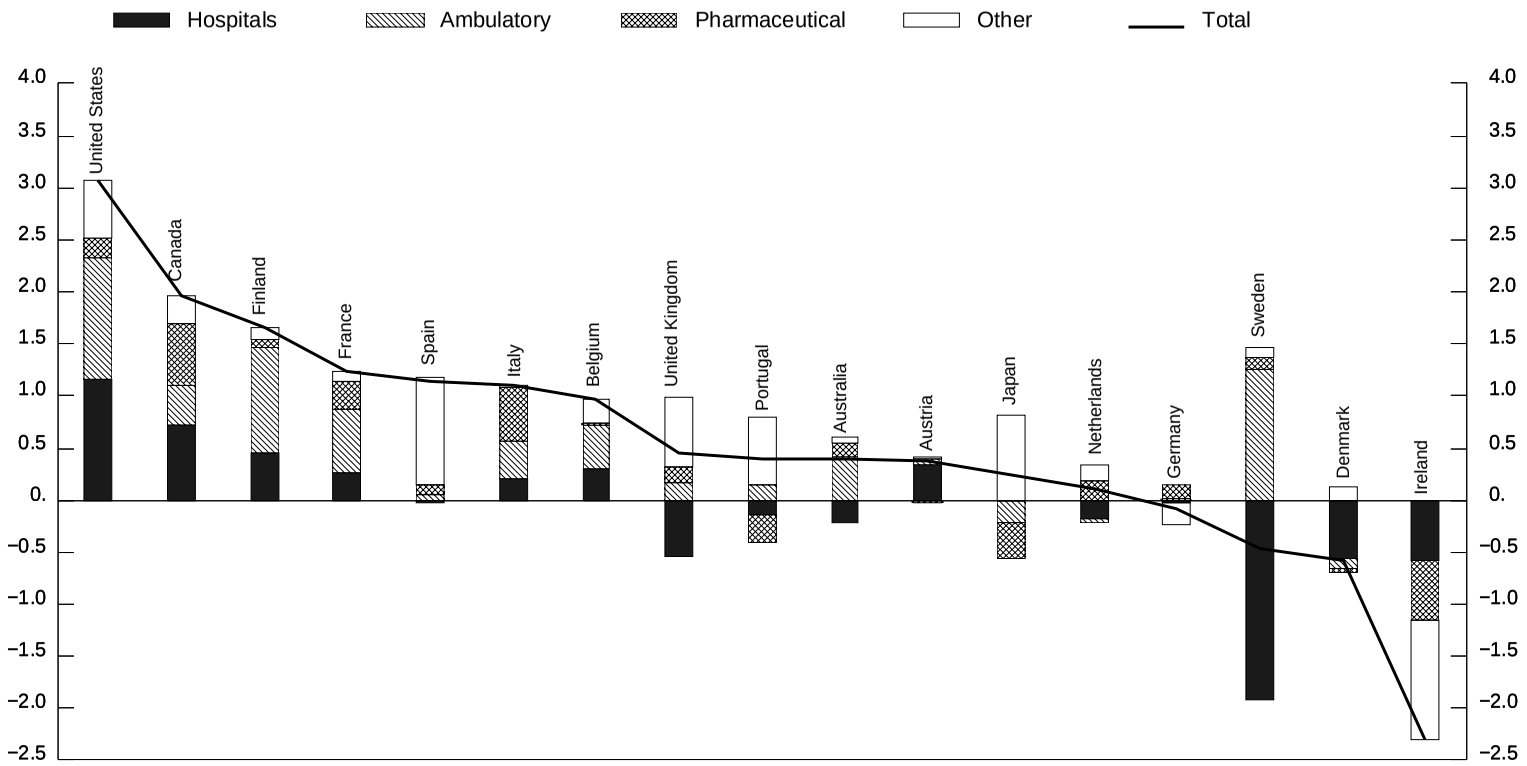
1970−1980



Source: OECD Health Data.

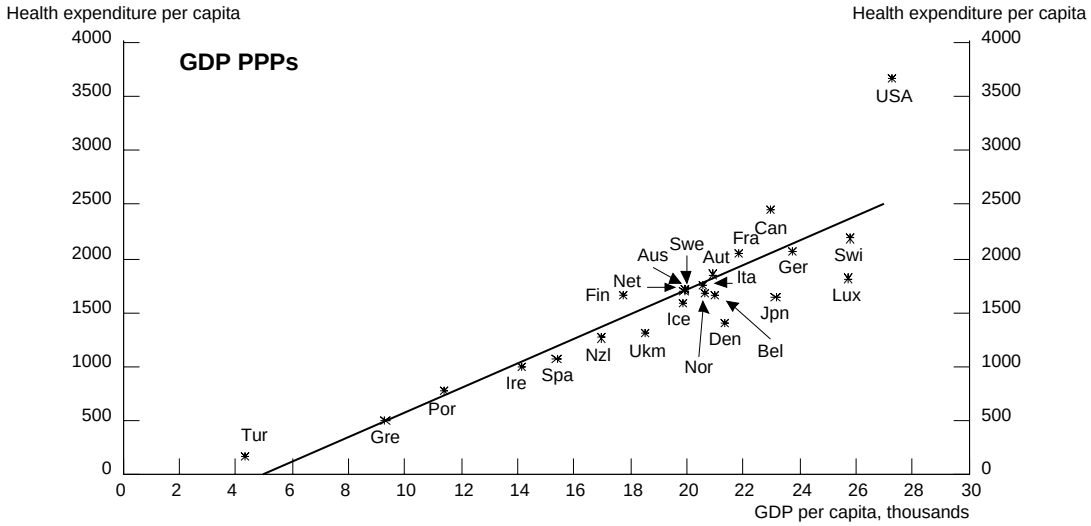
Figure 1 (cont.) **Contribution of the components of health care spending to total health spending**
(Change in percentage points of trend GDP over period)

1980−1990

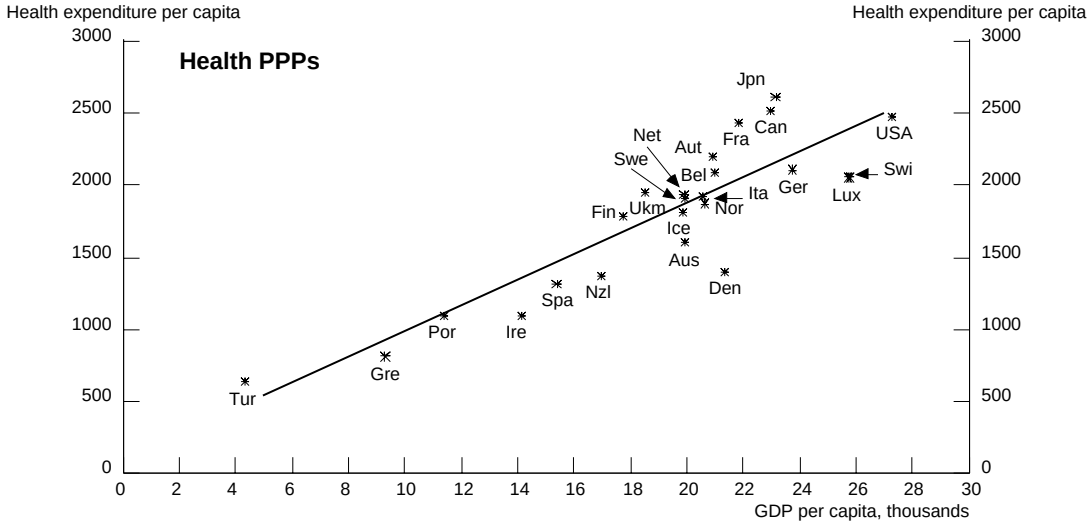


Source: OECD Health Data.

Figure 2. **Health spending versus GDP, 1992**



Regression: Health exp./cap. = −553 + 0.11(GDP/cap.) (R2=0.77)



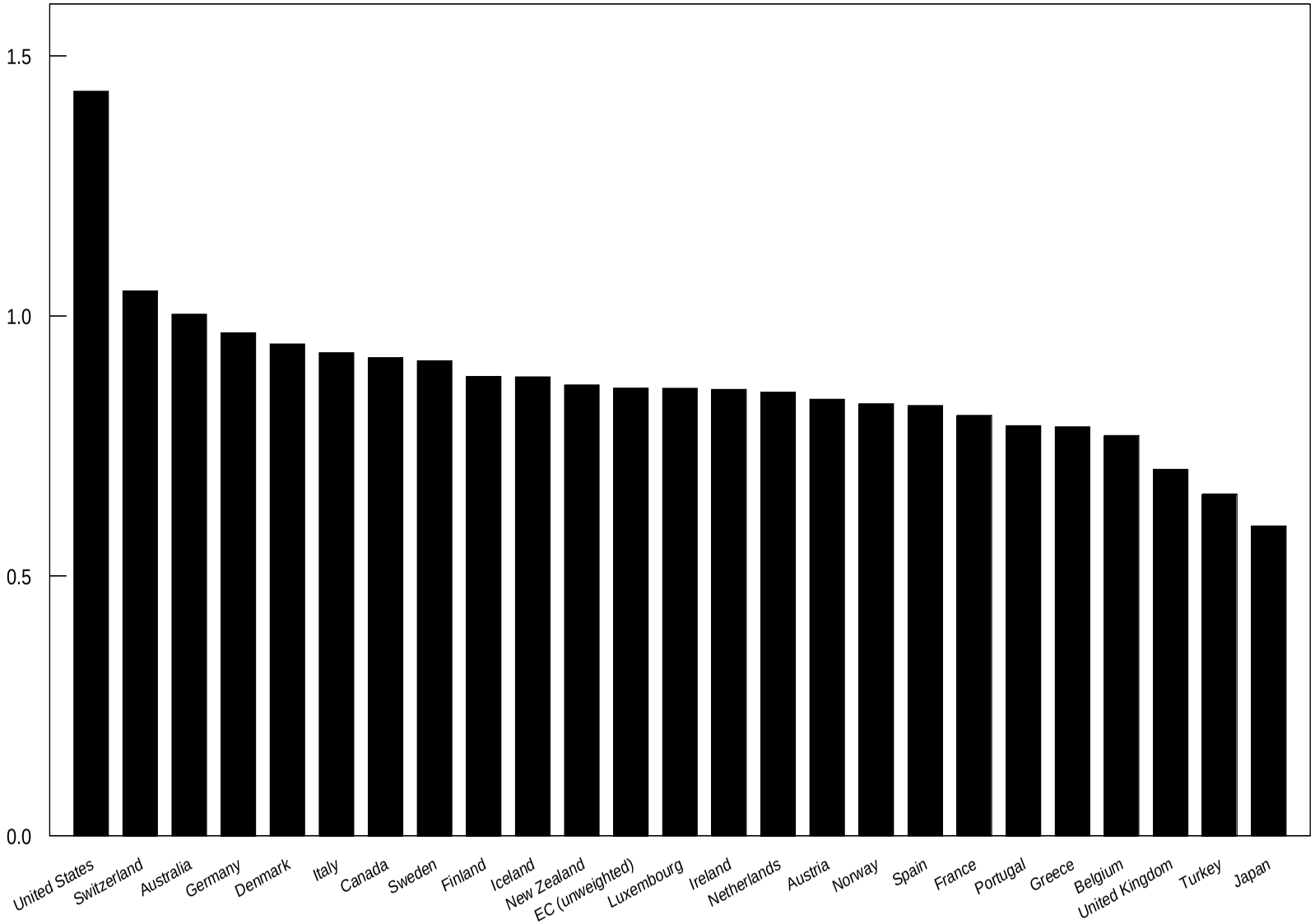
Regression: Health exp./cap. = 104 + 0.09(GDP/cap.) (R2=0.77)

Note: In both figures, national levels of GDP per capita are compared using GDP purshasing power parities based on US dollar exchange rates and with price level OECD =100. In the top figure, national health expenditures are also compared using GDP PPPs. In the bottom figure, health expenditures are compared using PPPs for medical services.

Sources: OECD, 1990 b; OECD, 1993 e; Secretariat estimates.

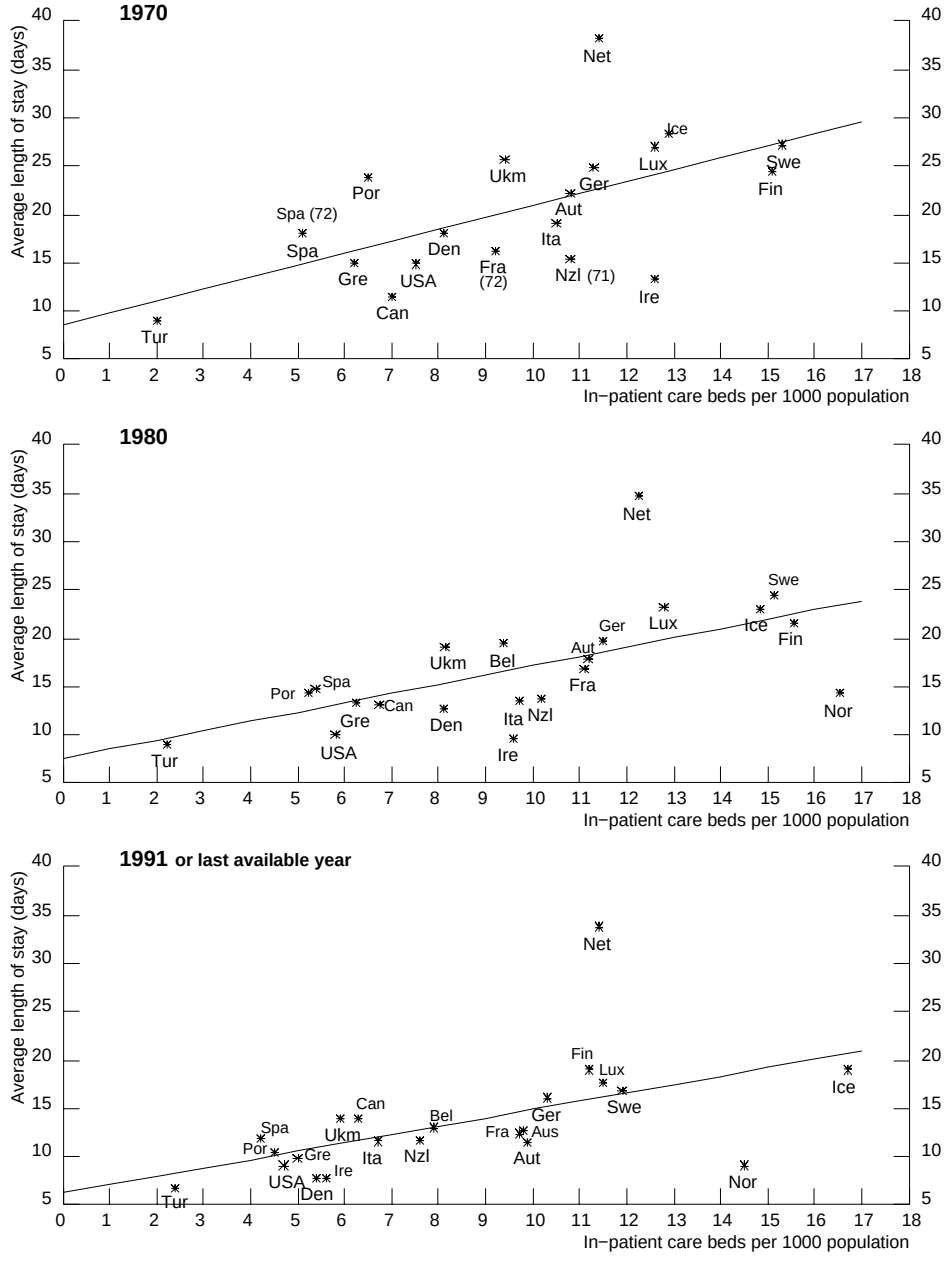
Figure 3. **Health PPP's relative to GDP PPP's,** 1990

(Ratio, OECD=1)



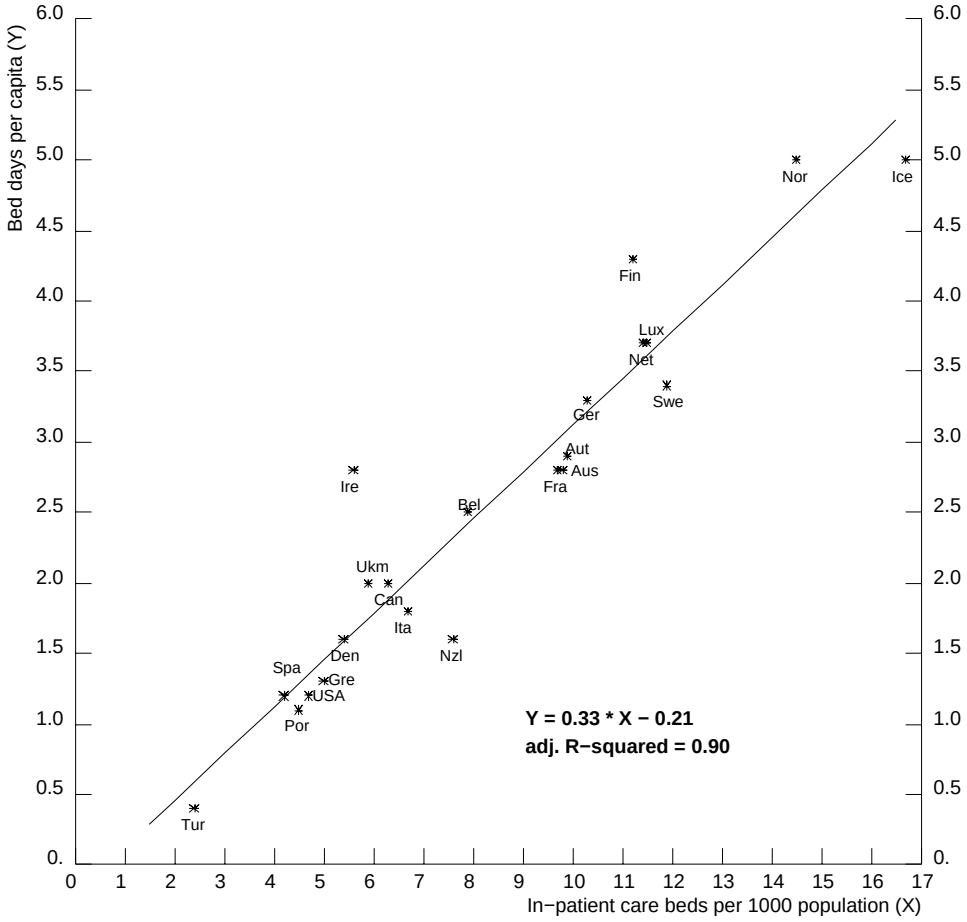
Source: OECD.

Figure 4. **Hospital capacity and bed utilisation**



Source: OECD Health Data.

Figure 5. **Relation between hospital bed numbers and bed use, 1991 (1)**



1. Data are for 1991 or 1990 when 1991 not available. Excuding Japan and Switzerland.
Source: OECD Health Data.

Annex

Factors Affecting Health Spending: a Cross-country Econometric Analysis

by

Ulf-G. Gerdtham, Bengt Jönsson, Maitland MacFarlan and Howard Oxley[1]

1. Introduction

1. Comparisons of aggregate health-care expenditure across different countries have become popular over the last two decades as they permit an examination of the impact of different sorts of institutional arrangements on health-care spending[2].

2. This paper continues this line of research but differs from previous studies in three principal ways. First, it uses a somewhat larger sample for estimation -- with a pooled time-series, cross-section data base for around 20 OECD countries for a 20-year period. Most previous work has used a purely cross-section approach; in this case, the small sample size reduced the statistical reliability of results and limited the number of hypotheses that can be tested simultaneously. Second, and following from this, a more extensive range of hypotheses are tested, with particular emphasis on those relating to the contractual relations between payers, providers, and patients. Third, the study provides estimates using ambulatory, in-patient and pharmaceutical spending as well as total spending.

3. Despite the attractiveness of this approach, there are a number of important problems. First, the data are not always comparable across countries, and this mismeasurement may not be constant over time (Poullier, 1989; OECD, 1993). Second, there are probably additional variables which are correlated with the explanatory variables but not included. Finally, it is very difficult to characterise Member country health systems in ways that are tractable to econometric analysis, as these systems often combine many differing forms of provision and finance. Statistical techniques have been used to mitigate some of these problems but important difficulties remain. Thus, the results found in this Annex need to be treated with considerable caution.

4. The paper has five sections. Section 2 briefly surveys the literature. Section 3 sets out the hypotheses and explanatory models linking the four endogenous variables (aggregate health-care expenditure, in-patient care expenditure, ambulatory care expenditure and pharmaceutical expenditure) to about 20 exogenous variables, and discusses data, measurement, the estimation procedure and associated problems. Section 4 reports the results. Section 5 summarizes and concludes the paper.

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1. The first two authors are from Stockholm School of Economics.

2. See, for example: Newhouse 1977, 1987; Leu 1986; OECD 1987; Culyer 1988, 1989; Jönsson 1989; Gerdtham 1991, 1992; Gerdtham *et al.* 1988, 1992*a*, *b*; McGuire *et al.* 1993.

5. A wide range of tests was carried out on the data, not all of which could be reported here. A full listing of our data and additional results are available on request.

2. Previous Works

6. The analysis of international health-care expenditure has to some extent been based on "standard" demand theory, typically focusing on the income elasticity of health-care expenditure estimated in equations linking per capita health spending to per capita GDP. The seminal article by Newhouse (1977) attempted to identify factors determining the quantity of health-care services in 13 different countries using 1971 data. Two principal results were: first, aggregate income explains almost all, about 92 per cent, of the variance in the level of health-care expenditure between countries and, second, the income elasticity of health care exceeds one. On the basis of these findings, Newhouse made two strong inferences. The first was that factors other than income, for example the price paid by the consumer and the method of reimbursing the physician, are of marginal significance. The second conclusion was that health care, technically, is a "luxury good", possibly arising from the fact that, at the margin, the demand for health care may relate more to "caring" (or subjective components of health) than to "curing" (or physiological health).

7. Most research using international cross-section data have subsequently confirmed Newhouse's empirical results concerning the income elasticity and the high explanatory power of the relationship between aggregate income and per capita health-care expenditure across countries. However, these results contrast with the evidence obtained from national micro data (for example, household surveys), where numerous studies have revealed a low income elasticity for the utilization of health care across households (Andersen and Benham, 1970; Grossman, 1972; Newhouse and Phelps, 1974; Muurinen, 1982; Wagstaff, 1986).

8. Several different hypotheses have been put forward to explain this difference:

-- Since insured individuals or households pay only a minor fraction of the health-care costs as direct out-of-pocket payments, income may be less of a constraint on spending. In contrast, whereas the nation as a whole faces the full costs of health-care consumption, and where much is financed by government, the income constraint may be more compelling at the aggregate level, particularly where there is non-price rationing. If non-price rationing is relaxed with increasing income, then the income effect at the aggregate level will be greater than at the individual level (Newhouse 1977; Culyer, 1988).

-- Cross-section estimates may have been mis-specified: the high income elasticity at the aggregate level may reflect omitted variables, for example differences in levels of supplier-induced demand; thus the income coefficient may not be a measure of the income elasticity in an Engel curve sense (Parkin *et al*., 1987).

-- There may be an inadequate distinction between prices and quantities. Parkin *et al.* (1987), after adjusting for health-care PPPs to put the health spending in real terms, find that the income elasticity associated with real spending is less than the spending in current terms. They conclude that while real spending is less elastic to income than found by Newhouse, richer countries pay more for it. However, Gerdtham and Jönsson (1991*a*, 1991*b*) using more

recent data were unable to replicate the result; they found that the income elasticity from the cross-section data was the same whether specified in GDP or health PPPs[3].

9. In the light of possible bias in the income coefficient due to un-observed or omitted variables, some researchers have explored whether other variables have any significant independent impact on national health-care spending. Leu (1986) -- using national data for 1974 for 19 OECD countries -- used the following regressors:

-- A set of "relevant exogenous variables". This included the share of persons under 15 and over 65 (these groups tend to use more health care than those with ages in between); and urbanisation (the risk of contagion is higher (Kleiman, 1974), and time and travel costs are lower in cities).

-- A variable to reflect the extent of public sector provision of health services. On the basis of "some well-known results in the public choice literature", Leu argued that an increase in the size of the public share in supply would increase total spending[4]. Leu also suggested that health-care spending should increase where the public finance of health care was high as this reduced the "price" to the consumer.

-- Dummies for the "National Health Services" (the United Kingdom and New Zealand), where centralised budgetary control might have a restraining effect); and for direct democracy (Switzerland), on the grounds that controlling spending would be easier if voters had greater direct control over government choice and tax levels.

10. Leu confirmed the predominant effect of the income variable. He also found that a number of additional variables were significant and with the expected signs -- albeit with small coefficients in most cases. Two stronger effects were: a 10 per cent increase in the public to total bed ratio would increase overall spending by 8-9 per cent; and the NHS dummy suggested that this system lowered spending by 20 to 25 per cent in the two countries concerned (*ceteris paribus*).

11. These conclusions have remained controversial, particularly as regards the institutional variables. Despite the reference to public choice theory, the sign of the variables proposed by Leu remain in doubt and Gerdtham *et al.*, (1988, 1992*a*) in subsequent tests on more recent data were not able to reproduce these results.

12. Gerdtham and associates have carried on this line of research using cross-section, pooled cross-section (over selected years), and pooled cross-section time-series data bases. For the first two data sets, they specified a model in which per capita health-care expenditure depended on per capita income and

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3. The issue as to whether one should use PPPs for GDP (hence measuring the opportunity cost of health spending in terms of economy-wide goods and services) or PPPs for health care (measuring the real resources devoted to health care) is explored further in Appendix 1.

4. This could occur via two channels: bureaucrats in public or private non-profit hospitals would maximise budgets to maximise their own utility (status, better pay, promotion possibilities etc.); and unit costs at each level of activity would be higher due to less intensive competition in the public sector.

relative prices[5], institutional variables (the ratio of in-patient to total spending; ratio of government to total health-care spending; the number of doctors[6], dummies for the fee-for-service payment of doctors and for global budgeting caps) and demographic variables (urbanisation, the ratio of population 65 years of age and over to population aged 15 to 64, and the female participation rate[7]).

13. Strict cross-section estimates based on 1987 data for 19 OECD countries were reported in Gerdtham *et al.*, (1992*a*). After careful testing, the final model was reduced to five variables (per capita GDP, urbanisation, proportion of public finance, share of institutional care, and a dummy variable for fee-for-service) accounting for about 95 per cent of the variance, and with nearly all having the expected sign (Column GTH1 in Table A1). They also tested the most appropriate functional form and found that a logarithmic transformation was superior to linear and exponential specifications.

14. GDP per capita continued to be the most important variable in "explaining" health spending, with an elasticity of 1.33 (significantly different from 1). In contrast to Leu, an increase in the share of public financing by ten per cent was associated with 5 per cent lower spending, while a 10 per cent increase in the share of in-patient care would have a positive impact on spending of around 2 per cent. The fee for service dummy variable indicated that spending was about 11 per cent higher in countries where the fee for service arrangements dominated. None of the demographic variables except urbanisation was significant, and this had an unexpected (negative) sign.

15. To increase the number of observations and confidence in the statistical results, Gerdtham *et al.*, (1992*b*) pooled data for 1974, 1980 and 1987. Two variables in addition to the previous five were found to be statistically significant (Column GHT2 in Table A1): a 10 per cent increase in the share of those aged above 64[8] would increase health care by about 2 per cent; an increase in the number of physicians per capita by 10 per cent would reduce spending by 10 per cent. The latter result remains difficult to explain. The remaining variables had broadly the same orders of magnitude as in strict cross-section estimates.

16. Finally, Gerdtham (1991, 1992) experimented with pooled cross-section time-series data (22 OECD countries for the period 1972-87), exploring different pooling techniques and issues of lags and dynamic adjustment of health-care spending to movements in exogenous variables. A reduced number of explanatory variables was specified (per capita GDP, inflation, share of public financing, and the share of the aged in the population). Both static and error correction models were specified and tests were carried out using five different pooling techniques.

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5. PPPs for health relative to PPPs for GDP.

6. The term provides a measure of supplier-induced demand or target income hypothesis -- e.g. as the number of doctors increase, workload held constant, doctors may try to induce patients to use more services (Evans, 1974).

7. The participation term represents the possible substitution of informal care in the home for more formal institutional care as women increasingly go out to work (Fuchs, 1972; Maxwell, 1981; Stahl, 1986).

8. Relative to those in the 15 to 64 age group.

17. An important conclusion with implications for the present study was that the choice of pooling technique -- i.e. whether dummy variables for countries or time periods are entered and whether these are treated as fixed or random variables -- had important implications for the results. Indeed, permanent non-identified country specific and time period effects were found to influence per capita health expenditure and had an important impact on the income elasticity of demand. These effects appeared to be fixed, as random effects models were clearly rejected by the data[9].

18. Major statistical results regarding the influence of variables were: first, the estimated elasticity of health care with respect to GDP was 0.74 in static models (using both country and time period dummies) (Column GTH3) but the remaining variables were not significant. In dynamic specifications (Column GTH4), the short-run effect of income on health-care spending was 0.18 and a unitary long term elasticity with respect to health care of 1.0 was not rejected. Second, the short run elasticity for inflation was -0.17, suggesting that when inflation increased, per capita health spending grew less rapidly. As regards the share of public financing, there was a short-run elasticity of -0.21 but there appeared to be no long-term impact.

19. Søgaard (1992) also found that the two-way fixed-effect model reduced the income elasticity by one-half of the usual estimate (0.7 compared with 1.4), and that these country specific factors are systematically related to "permanent" income levels.

20. OECD (1993) used pooled cross-section time-series data for the period 1985-1990. Data for health expenditure and GDP were specified as totals rather than in per capita terms. Other explanatory variables were relative prices, total population, the share of the old and young, unemployment and the public expenditure share of total spending. The pooling technique did not allow for country or time period dummies. On this basis, the income elasticity was over 1.5. Coefficients for the young and old were significant, the elderly consuming about four times as much as the rest of the population. Relative prices had a negative elasticity of around 1 suggesting that higher prices were offset by lower real spending on health care. Finally, a higher public share of total spending appeared to be associated with lower rather than higher health spending.

3. Outline of the Analysis

3.1. Variables and hypotheses

21. A major problem, always present in empirical research, concerns how a number of different hypotheses should be combined into a regression equation. This problem is obvious here: several hypotheses, which sometimes overlap, are being tested; and there is little guidance from theory concerning how the variables are related to each other and to the endogenous variables. As a starting point, the exogenous variables are divided into two groups, although the boundary may not be clear. The first group includes common, non-institutional (or "background") factors that account for some of the cross-country and cross-time differences in aggregate expenditure: age structure of population; GDP per capita; the female participation rate (proxying substitution from home to institutional care); and the unemployment

9. See Appendix 2 for a more detailed discussion of pooling techniques.

rate, tobacco consumption and alcohol consumption (proxying the health "environment"). These variables comprise what is termed the "basic model".

22. The second group of explanatory variables focuses on the institutional arrangements affecting the demand, funding and delivery of health services in different countries. The specific questions and hypotheses tested in this study, and the corresponding regressors, are as follows:

-- Does the overall organisation of the health-care system have any impact on total health expenditure? Following the framework of Hurst (OECD, 1992), health systems are classified as either public reimbursement (PUBREIMB), public contract (PUBCONTR) or integrated models (PUBINTEG)[10]. Hurst found for seven OECD countries that the success in controlling costs was weakest for the first system and greatest for the third system, with the contract model falling in between.

-- Have countries with prospective budget ceilings on health-care spending had lower spending? Dummy variables (BUDCEIL) were set to 1 beginning in the year ceilings were introduced.

-- Do countries with larger shares of government or social security financing have higher or lower health-care expenditure than those where private sector financing plays a greater role? It is possible that countries having a large share of spending in the hands of the government or near-government bodies have a tighter control of costs. As a proxy for this influence, the proportion of public in-patient care beds to total in-patient care beds is used (PUSH)[11].

-- Do increases in insurance or health system coverage result in higher health-care expenditure? There are two dimensions here: population covered and the share of individual medical bills covered. For the first, the proxy is OECD Secretariat estimates for the share of the population covered by public insurers (COVER) (total insured population for the United States); for the second, Secretariat estimates of the share of a beneficiary's health bills normally paid by a public insurer or fund (COPAY) are used. While these may be some improvement over previous measures[12], in some countries private insurance exists to cover the remaining co-payment or some part of it (e.g. "gap" insurance in the United States or complementary insurance from friendly societies in France). Thus the figures may not always measure accurately the cost facing the consumer.

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10. The following classification is used: (public) reimbursement: the United States, Switzerland, France, Belgium, Australia, Luxembourg, Japan and Italy (up to 1978). Public contract: Austria, Canada, Germany, Greece (until 1983), Netherlands, Turkey, Portugal (until 1977) and Spain (until 1983). Public integrated: Denmark, Finland, Greece (from 1983), Iceland, Ireland, Italy (from 1979), Norway, New Zealand, Portugal (from 1978), Spain (from 1984), Sweden and the United Kingdom. The classification for the sub-components of health-care spending can vary.

11. It would be preferable to use data for "for-profit" hospitals since the majority of "private" beds in most countries are probably in the voluntary sector. However, this variable is virtually non-existent in the OECD data file.

12. For example, in most studies, the usual measure of (the public sector's) co-payment is the share of public expenditure to overall expenditure.

-- Do the ways of remunerating doctors in the ambulatory sector make a difference in health-care expenditure? The countries have been categorized (by the OECD Secretariat) as either fee-for-service (i.e. doctors are paid on the basis of services provided) (FFSA); capitation (i.e. doctors are primarily paid a fee for a certain period for each patient registered with them, and this covers all primary care received) (CAPITA); or wage and salary (i.e. doctors are employed by the state or the insurer to serve the insured population) (WAG+SAL)[13] [14]. A dummy variable is also included to try to capture the influence of "overbilling" in countries where there are no "official" or agreed price schedules set (OVERBILL).[15]

-- Does the use of an ambulatory "gatekeeper" result in lower overall expenditure? Here, a dummy variable representing gatekeeping systems was used (GATEKEEP)[16].

-- Do increases in the supply of doctors result in increases in overall expenditure? As in Gerdtham *et al.* (1992*a*, 1992*b*), the number of physicians per 1 000 population is used as a proxy for supplier-induced demand (DOCTA). However, this measure may be weak, as an increase in the number of doctors is likely to have more impact in a fee-for-service environment than under a capitation system. Hence, as an additional test of supplier-induced demand, a multiplicative dummy variable is used which allows for the effect of the number of doctors within a fee-for-service system (DOCTA*FFSA).

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13. Countries are classified as follows: fee for service: United States, Japan, Germany, France, Italy (up to 1977), Canada, Australia, Austria, Belgium, Greece, Ireland (up to March 1989), Luxembourg, Norway, Switzerland and New Zealand. Capitation: Italy (1978 on); United Kingdom, Denmark, Iceland, Ireland (from March 1989 on for the publicly financed system) Netherlands and Spain (up to 1983 and then falls gradually). Wage and salary: Finland, Sweden and Portugal, Spain (gradually increasing after 1984) and Turkey.

14. This does not exhaust all contractual relations. In some countries (for example, the United Kingdom), the payment system is mixed -- for example, a fixed amount, a capitation component, and fees for services which the government wishes to ensure are carried out, such as vaccinations.

15. There are no official price schedules in the United States, Italy (up to 1978), Greece, and New Zealand. However in each one of these cases there are either limits on price setting (for example, under Medicare and managed care arrangements in the United States) or indicative prices (New Zealand). In another group of countries, a group of physicians, often specialists, are allowed to set their rates freely. Here the share of doctors in this group was used: France (the level here was initially very low but has increased with the opening of the "Secteur 2" to more doctors in 1982), Belgium, Luxembourg. In some countries there is supplementary private insurance within a widely-based state system, usually aimed at providing better or faster treatment on a fee-for-service basis. In these cases, rough numbers on the share of the population with private insurance was used: the United Kingdom, Ireland, Australia and New Zealand.

16. Countries with primary physicians as gatekeepers: Germany, Italy, United Kingdom, Canada, Austria, Denmark, Iceland, Ireland, Netherlands, Norway, Portugal, Spain, New Zealand. Countries where this does not appear to be the case: United States, Japan, France, Australia, Belgium, Finland, Greece, Luxembourg, Sweden, Switzerland and Turkey.

-- Do countries with a larger share of (usually more expensive) in-patient care have higher health-care expenditure? The share of in-patient spending in total spending (TEXMC) was included to test this hypothesis (as discussed in the next section, this variable was also used in the disaggregated equations -- for ambulatory spending etc. -- as a measure of substitution between different forms of care).

-- Does the level of high-cost procedures (transplants, dialyses, etc.) have any impact on overall health-care expenditure? The renal dialysis rate (REND) was used as a proxy for such procedures.

23. The variables set out above, and hence results obtained with them, must be treated with considerable caution. Many of the variables -- such as those representing the public share in health financing, overbilling, and the use of high-cost procedures -- are at best rough approximations of the underlying influences of interest. Moreover, the distinctions between institutional arrangements of different countries are not usually as simple and clear-cut as implied by the use of dummy variables (and particularly "all or nothing" (0,1) dummies). For example, no country fits perfectly into just one of the categories representing public reimbursement, contract, and integrated systems, even though such a classification is made here.

24. However, the trade-off here is whether to omit variables for which only crude proxies are available or to include them, and in the statistical analysis this is equivalent to a trade-off between a bias due to measurement errors and an omitted variable bias. With respect to the coefficients of regressor variables without measurement errors, the bias induced by measurement errors in proxy regressors is under fairly general assumptions smaller than the bias induced by omitting the proxy regressor (McCallum, 1972; Kinal and Lahiri, 1983).

3.2. Estimation

25. Health-care expenditure for a given country is approximately the sum of in-patient care expenditure, ambulatory care expenditure and pharmaceutical expenditure. Institutional arrangements often differ across countries in each of these segments of the health-care market. Thus, tests were carried out independently for each component. In this context, in-patient care, ambulatory care and pharmaceutical expenditure can be seen as endogenous variables which may be determined simultaneously -- i.e. with ambulatory and pharmaceutical spending included as explanatory variables in the in-patient equation, and so on with the other two subfunctions[17]. However, as will be explained below, testing with a full simultaneous system did not prove to be possible.

26. The OECD Health Data File (1993*f*) provided much of the data for estimating the models of aggregate health expenditure and its sub-components. The starting data set was the list of 24 OECD

17. Other "explanatory" variables may also in fact be endogenous -- for example, those reflecting institutional characteristics. For example, Newhouse suggested that the organisational form and financing of health care are endogenous and do not exert independent effects on health-care expenditure. He suggested that centralized control of, or influence over, health-care budgets is itself a response to low aggregate income and a desire to control costs. However, this possibility has not been tested.

countries covering 1970-1991. Portugal and Turkey are excluded from all regression models while Ireland and Spain are excluded from ambulatory care expenditure. The data set therefore has 22x22=484 observations for overall, in-patient care expenditure and pharmaceutical expenditure, and 20x22=440 observations for ambulatory care expenditure. It should be kept in mind that the sample of countries is not identical for ambulatory care relative to the other subfunctions and overall expenditure. The variables are defined in Table A2. More detailed descriptions of some of these terms are found in Poullier (1989) and OECD (1993*e*)[18]. Note that all monetary variables are measured at constant 1985 international prices as calculated by Ward (1985), i.e. the national GDP price index (100=1985) is used as a deflator, and then PPPs for the base year (1985)[19].

27. The model is also estimated using three additional samples: the 17 European countries for which data is available; all 22 countries in the sample, but only for the years 1981-1991; and the 17 European countries for the years 1981-1991. These results are discussed where they influence the overall conclusions.

28. The econometric strategy used in the paper is, first, to regress total health spending and its three main sub-components on all of the variables discussed in Section 3.1 simultaneously. Non-significant variables are then excluded one by one and the model re-estimated. The reason for using individual non-significance as an exclusion criterion is to assess a) whether a set of individually non-significant coefficients is also jointly non-significant, and b) whether the other parameter estimates are sensitive to zero restrictions on the non-significant ones. In addition, to check on the robustness of these findings, regressions are estimated in which various sub-groups of the variables representing institutional arrangements are added to the basic model, including the case where these institutional variables are added one at a time[20]. Such checks are important in view of the likely overlap between the institutional variables: for example, the dummy for public integrated systems (PUBINTEG) represents to a large extent the same group of countries as the dummy for global budgeting (BUDCEILI and BUDCEILA). Thus it is not clear whether a non-significant impact of BUDCEILI indicates that BUDCEILI is not important, or if the impact of BUDCEILI has already been captured by PUBINTEG. By viewing the potential influences on health spending from

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18. Rigorous assessment of the quality (accuracy and reliability) of such aggregate data is difficult. Poullier (1989) describes the prevailing data compiling approach as: "An analysts attempts to 'massage' data from various countries, using as closely comparable units as can be obtained from the readily accessible information.", (p.111). There is ample scope for imperfect reliability with respect to cross-section comparisons due to differential classification, especially in the borderline of health services such as care for the aged. The differences, for instance, between Denmark and Sweden are well-known (see Gerdtham and Jönsson 1991*a*, 1994). As a further illustration of these data difficulties, the in-patient, ambulatory and pharmaceutical shares of total health spending sum to as low as 60 per cent in the case of Austria, to over 100 per cent in Japan, Denmark, Greece and Switzerland.

19. Another strategy to measure health-care expenditure at constant international prices is to translate to PPPs yearly and to use a weighted price index of all countries in the sample. It is likely that measured health-care expenditure will differ between these two strategies. However, the impact of this approach is not examined in this paper.

20. Detailed regression results from these additional tests are not provided in this paper, but are available from the authors on request.

these different angles, it may be possible to draw some tentative conclusions regarding the hypotheses outlined earlier.

29. As noted in Part 2, several alternative estimation techniques are available in the case of cross-section, time-series data. These techniques differ, in part, according to whether country-specific and/or time-specific influences are taken into account, and whether these factors are held constant (for each country and time period respectively), or are viewed as random variables (see Appendix 2). In testing these alternative approaches, the main conclusion is that in almost every case a two-way fixed effects model (i.e. a model which includes dummy variables which are fixed constants for each country and each time period) is superior to the alternative specifications[21]. Hence, Part 4 presents the results obtained using this approach.

30. However, a risk in using the fixed effects model is that "too much" of the variation in the sample may be attributed to the dummy variables representing specific countries and/or time periods, rather than to the regressors which attempt to capture the influences of economic and institutional factors[22]. For example, the relatively high health spending in the United States, or the relatively low spending in Japan (even after controlling for GDP), may appear to be "explained" by the dummy variable for these two countries rather than by their particular mix of institutional arrangements. Such findings may to some extent be valid: influences which are unique to particular countries (such as social and cultural factors) or particular time periods (e.g. cyclical downturns) may well account for some of the variations observed in health spending. Nevertheless, the concern is that this estimation method may weaken further the scope to find significant differences in health spending as a result of institutional factors[23].

31. As is common in much demand analysis, a multiplicative relationship among the variables is specified. The equation may then be written in double-logarithmic linear form, implying that the coefficients of the variables are to be interpreted as constant elasticities (see equation below). The model is restricted to the double logarithmic form because this has been shown to be the most appropriate empirically (Gerdtham *et al*., 1988; 1992*a*, 1992*b*; Gerdtham, 1992).

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21. The alternatives that were tested were the one-way fixed effects model (with either country or time-period dummy variables), the random effects model (where the country and/or time terms are random variables), and the OLS model (with no country- and time-specific terms).

22. This risk needs to be balanced against that arising from specification errors if relevant dummy variables are *not* included.

23. This concern also needs to be seen in a context where the variables for institutional factors are already very rough proxies for more complex arrangements, and where GDP by itself "explains" a high proportion of the variation in health spending.

$$\ln(TEXP)_{it}^{gr} = \alpha_0 + \alpha_1 \ln(GDP)_{it}^{gr} + \alpha_2 \ln(POP75\%)_{it} + \alpha_3 \ln(POP04\%)_{it}$$

$$+ \alpha_4 \ln(FPR)_{it} + \alpha_5 \ln(UNR)_{it} + \alpha_6 \ln(ALCC) + \alpha_7 \ln(TOBC) + \alpha_8 \ln(PSMCB\%)_{it}$$

$$+ \alpha_9 \ln(TEXMC\%)_{it} + \alpha_{10} \ln(PUSH)_{it} + \alpha_{11} \ln(COVERO)_{it} + \alpha_{12} \ln(REND)_{it}$$

$$+ \alpha_{13} (PUBREIMB)_{it} + \alpha_{14} (PUBINTEG)_{it} + \alpha_{15} (BUDCEILA)_{it} + \alpha_{16}(BUDCEILI)_{it}$$

$$+ \alpha_{17} (GATEKEEP)_{it} + \alpha_{18} (REIMBMOD)_{it} + \alpha_{19} (CAPITA)_{it} + \alpha_{20}(WAG + SALA)_{it}$$

$$+ \alpha_{21} (OVERBILL)_{it} + \alpha_{22} (FFSI)_{it} + \alpha_{23} \ln(DOCTCA)_{it} + \alpha_{24} \ln(DOCTCA * FFSA_{it}) + \varepsilon_{it}$$

32. The subfunctions for ambulatory care, in-patient care and pharmaceutical expenditure are not estimated as simultaneous equation systems as described in Part 3[24]. Instead, the in-patient share of total health spending (TEXMC) is used as a measure of the substitutional relationship between in-patient care and other forms of care: i.e. if the share of in-patient care expenditure to overall expenditure is high then ambulatory care expenditure is expected to be low and in-patient care expenditure should be high. If the elasticity of TEXMC on in-patient care expenditure is higher than zero, then in-patient care and other forms of care are assumed to be substitutes: if the share of in-patient care increase then in-patient care must increase and other forms of care should decrease. If the elasticity of the share of in-patient care to overall

24. Two problems emerge in estimating these subfunctions using two-stage least squares. The first is that the sample for ambulatory care expenditure is not identical to the sample for in-patient care and pharmaceutical expenditure. The second problem is that the three endogenous variables are predicted by about the same exogenous variables. A model including GDP per capita, country dummies and time dummies explained over 90% of the variations in ambulatory care, in-patient care and pharmaceutical expenditure (same sample of countries). This means that other exogenous variables specific to each subfunction, respectively, add marginally to that model. However, ambulatory care expenditure is estimated by use of the basic model (BM) variables which were statistically significant, and the same was done for in-patient care expenditure and pharmaceutical expenditure. These three BM models are then re-estimated for each of the three endogenous variables, including also the predicted values of the other endogenous variables as instruments, i.e. for ambulatory care, a two-way fixed effect model is estimated including GDP per capita, POP75%, POP04%, UNR, TOBC and the predicted values for in-patient care and pharmaceutical expenditure. The results showed, for all three endogenous variables, that the predicted values included in the models were always non-significant individually and jointly, as well. However, this result is not viewed as evidence that there are no substitutional or/and complementary effects between ambulatory care, in-patient care and pharmaceutical expenditure, but just that it is hard to find appropriate instruments for the endogenous variables.

expenditure on in-patient care is less than zero, then there is assumed to be complementarity between in-patient care and other forms of care: if the share of in-patient care increases, then both in-patient care and other forms of care should decrease.

33. Taking natural logarithms of the variables, and adding an error term (ε), the reduced-form equation of aggregate health-care expenditure per capita of the ith OECD country in year t is obtained (see Table A2 for variable definitions)[25].

34. The subfunctions for in-patient care, ambulatory care and pharmaceutical expenditure are specified similarly. The public contract term (PUBCONTR) is excluded to avoid perfect multicollinearity between the public integrated, reimbursement, and contract variables (as each country must be in one of these categories). By the same argument, the ambulatory fee-for-service term (FFSA) is excluded.

4. Results

4.1. Overall expenditure

35. Table A3, column 1 shows the estimated impact of the background factors and all the "institutional" variables on total health spending; column 2 shows the results after the elimination of insignificant variables.

36. Amongst the background factors, only GDP and tobacco consumption (TOBC) have a significant effect on health spending; it appears that the estimated parameters on these terms are rather stable over the variables excluded. The income elasticity is lower than unity (0.74). The elasticity on tobacco consumption indicates that overall expenditure would increase by about 1.3 per cent if tobacco consumption increased by 10 per cent[26].

37. Considering next the institutional variables, unexpected results were found for the dummy variables representing the dominant type of institutional arrangement. In contrast to evidence by Hurst (OECD, 1992), public reimbursement systems (PUBREIMB) appeared as the least expensive with public integrated arrangements (PUBINT) about as costly as under public contract. At the same time, countries with budget ceilings on in-patient care (BUDCEILI) appeared to have higher spending, while higher numbers of doctors (DOCTA) appeared related to lower spending. As noted in Part 3, a number of model

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25. As discussed in the main paper, a number of factors makes the usual separation of demand from supply influences in market analyses difficult in the case of the health market. These factors include: the role of the physician both as the patient's agent in advising on health care needs, and as the key supplier of health services; the fact that health services are usually provided on the basis of "need" rather than of "willingness and ability to pay"; and the public provision of most health services, coupled with various forms of non-price rationing (such as waiting times).

26. Tobacco consumption may, in part, be a proxy for other behaviour that leads to higher health-care expenditure. Some studies have shown that smoking does not increase health spending over the life cycle (e.g. Leu and Schaub, 1983).

specifications were tested in order to evaluate whether these results reflected inter-relationships between various institutional variables and to assess the robustness of the results more generally.

38. Some additional information on the robustness of the coefficients for public integrated (PUBINT) and public reimbursement (PUBREIM) systems is obtained by examining the interaction of these variables with in-patient share variable (TEXMC) and the dummy for gatekeeping (GATEKEEP). In general, in-patient spending is more costly than ambulatory and pharmaceutical care and countries with integrated systems appear to have higher shares of in-patient care. Furthermore, additional tests (unreported) indicate that fewer countries with integrated systems have gatekeeper arrangements than in public reimbursement and public contract set-ups. On both these grounds, one might expect that public integrated systems could show up as being more expensive, on balance, than public contract systems. In equations with the basic model and these two system dummies alone (PUBINT and PUBREIMB), this appears to be the case[27]. However, once the in-patient share variable (TEXMC) or the gatekeeper dummy (GATEKEEP) are introduced, the positive coefficient of the integrated model disappears; including these factors therefore appears to control for influences tending to make integrated systems more expensive.

39. The results for public reimbursement systems are more difficult to explain. In the equation reported in the preceding paragraph (including the basic model and only the two dummies) public reimbursement systems are more expensive than public contract systems. However, once the additional variables (including the in-patient share and the gatekeeper dummy) are introduced (as in Table A3) such systems appear to be the least expensive of the three -- even though one would expect an even larger positive coefficient on PUBREIMB once the influences of their lower share of in-patient care and the (possible) tendency to have more gatekeeping are controlled for[28]. In this context, the approximate nature of the dummies for the three systems -- as noted in Part 3 -- needs to be stressed. In addition it remains difficult to judge to what degree country dummies, for example for the United States, may be picking up part of the variance which should be attributed to institutional differences. In any case, PUBREIMB was not robustly significant in different samples of countries and time periods, although the estimated coefficient is always negative.

40. Further investigations suggest that:

-- The term representing insurance coverage of the population (COVERO) does not add anything to the explanatory power of the model if the reimbursement and integrated system terms (PUBREIMB and PUBINTEG) are included in the regression.

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27. The equation is as follows (insignificant variables in the base model not included):

$$\underset{}{TEXPgr} = \underset{}{-0.97} + \underset{(a)}{0.74}\ GDPgr + \underset{(b)}{0.1}\ POP04\% + \underset{(a)}{0.09}\ TOBC + \underset{(b)}{0.07}\ PUBREIMB + \underset{(a)}{0.11}\ PUBINT \qquad R^2 = 0.98$$

(a) and (b) are 1% and 5% levels of significance.

28. i.e. once the influences tending to hold down spending in reimbursement systems are controlled for.

-- The term for budget ceilings on in-patient care (BUDCEILI) captures the possible impact of budget ceilings on ambulatory care (BUDCEILA) on overall expenditure.

-- The negative impact of the number of doctors per capita (DOCTCA) on health spending appears to result from the interaction between several terms, including those in the basic model, the gatekeeping dummy, and the interactive term for doctor numbers and fee-for-service payment arrangements (DOCTCA*FFSA). In our three alternative samples of countries and time periods, DOCTCA, remaining negative, is not significant.

41. Bringing the results together, it seems to be the case that:

-- The share of in-patient care expenditure (TEXMC) tends to be positively related to overall expenditure.

-- A higher share of public coverage of medical care billing (PSMCB), and of public beds to total beds (PUSH), generates lower overall expenditure -- contrary to hypotheses in some of the previous work noted in Part 2. This impact was, however, not robust to the sample.

-- Public reimbursement systems (PUBREIMB) tend to be less expensive than public contract systems although the significance was not robust over different country groups and time periods. There is no evidence which supports the hypothesis that public integrated systems (PUBINT) are less expensive than public contract systems, once the effects of the share of in-patient care and gatekeeping arrangements are allowed for.

-- Systems with budget ceilings in ambulatory care (BUDCEILA) do not appear to be less expensive than systems without budget ceilings and, similarly, budget ceilings in in-patient care (BUDCEILI) do not seem to lower overall expenditure. Using the European sample of countries over 1970-1991, it was found that the budget ceiling variable in ambulatory care has a positive, significant effect on overall expenditure, while the impact of a budget ceiling for in-patient care is negatively significant. This result did not hold with the European sample over the 1981-1991 period. These results may reflect selection effects: countries with high expenditure may be more inclined to introduce budget ceilings or introduce them earlier.

-- Countries with primary physicians as gatekeepers for in-patient care (GATEKEEP) have consistently lower overall expenditure, a finding that was robust in different samples.

-- Countries with more doctors per capita have lower overall expenditure (DOCTA). This result was sensitive to the variables included in the equation. Although unexpected (given the hypotheses outlined in Part 3), this result is consistent with earlier studies (see, for example, Gerdtham, 1992). However, it seems that the number of doctors increases overall expenditure in systems which reimburse their physicians by fee-for-service (DOCTA*FFSI). This latter finding was robust to the sample. One possible explanation may be that an increase in doctor numbers generally drives down salary levels (as appears to be the case, for example, in Belgium).

-- Countries which reimburse their physicians by capitation (CAPITA) appear to have lower overall expenditure, but there was no evidence in favour of the hypothesis that countries

reimbursing physicians by means of salaries (WAG+SALA) have lower overall expenditure than those using a fee-for-service approach. This finding was robust to the sample.

-- Overall expenditure does not appear to be higher in countries with payments by bed-day or fee-for-service in in-patient care (FFSI). In the European sample, these payment methods appear to be associated with lower overall expenditure.

-- Countries where the patient pays the provider and then seeks reimbursement (REIMBMOD) tend to have lower overall expenditure. This result was fairly robust to the sample of countries, since this variable was negatively significant in the 17 European sample as well. However, though negative, it was not significant during 1981-1991, irrespective of the sample of countries.

4.2. Ambulatory care expenditure

42. Results for the ambulatory care model are presented in Table A3, columns 3 and 4. Considering the background variables first, the coefficients for female participation and alcohol intake are individually (and also jointly) insignificant (column 1), and are eliminated. Three variables from the basic model were significant; GDP, population aged 4 and under (POP04), and tobacco consumption (TOBC). The elasticity of GDP was below unity, as it was in the function for overall expenditure.

43. In the final regression (column 4), the signs of the coefficients are broadly in line with expectations although, in cases such as fee for service payment arrangements in the in-patient care (FFSI), it is sometimes difficult to judge *a priori* what the appropriate sign should be.

44. Additional experiments to test the robustness of these results found that:

-- The significance of the renal dialysis variable (REND) was sensitive to the particular combination of variables included in the model (for example, this term is insignificant if just the two budget ceiling variables, or the terms representing reimbursement and integrated systems, are added along with REND to the basic model). However, given the model in column 2, the positive impact of the renal dialysis rate was robust to the sample of countries and also to the sample of time periods.

-- The significance of the public integrated term (PUBINT) was also sensitive to the specific variables that were included, and to the sample period: for example, the impact of PUBINTEG is positive and significant in the European country sample and if 1970-1980 is excluded from the sample.

-- The positive impact of the number of doctors per capita (DOCTCA) is robust to the sample of countries and also to the sample of time periods. The impact tended to be higher during 1981-1991 than 1970-1991.

45. Taken together, the results are as follows:

-- No impact was found for co-payments on ambulatory care expenditure (COPAYA)[29].

-- As expected, a higher share of in-patient care to overall expenditure (TEXMC) was negatively related to ambulatory care. This could be seen as a substitutional relationship between in-patient care and ambulatory care.

-- The share of public beds to total beds (PUSH) appears to be negatively related to ambulatory spending. This link may simply reflect the fact that many countries where public supply predominates are also integrated systems with a high share of in-patient and lower share of ambulatory care.

-- Some evidence was found that public reimbursement systems (PUBREIMB) have higher ambulatory care expenditure per capita. This result was generally robust to the sample of countries and time periods. There was no significant impact from public integrated systems (PUBINT) on ambulatory spending; however, this system has a positive and significant impact in the three alternative samples. These findings suggest that public contract systems may, on average, have lower ambulatory care expenditure -- at least compared with reimbursement systems.

-- No significant impact appeared to arise from the budget ceilings on ambulatory care (BUDCEILA), or from ceilings on in-patient expenditure (BUDCEILI).

-- Gatekeeper systems (GATEKEEP) did not affect the level of ambulatory care expenditure.

-- As expected, an increase in the number of doctors (DOCTCA) is associated with an increase in ambulatory spending. However, no evidence was found of an additional influence on spending coming from the number of doctors in fee-for-service systems (DOCTCA*FFSA).

-- Countries which pay their physicians by capitation or salary (CAPITA + WAG+SALA)[30] appear to have lower ambulatory care expenditure.

-- No evidence was found that countries where there is payment by bed day or fee-for-service (FFSI) have higher ambulatory care expenditure and if anything the opposite seems to be the case.

-- Systems where the patient pays the provider and then seeks reimbursement (REIMBMOD) appear, on average, to have lower ambulatory care expenditure.

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29. Note that the co-payment term is defined as the share of medical billing normally paid by the state insurer. A positive sign could be interpreted as higher spending as a result of a smaller out-of-pocket payment by the patient.

30. The terms are combined in the ambulatory care equation to avoid multicollinearity with the country dummies.

-- There appears to be a positive relationship between the "technique" factor -- the renal dialysis rate per million (REND) -- and ambulatory care expenditure.

4.3. In-patient care expenditure

46. Table A3, columns 5 and 6, presents the results for the regression explaining in-patient spending per capita. With the background variables, the proportion of the population aged 4 and under, the female participation rate, and alcohol intake were individually and jointly insignificant, and these terms are eliminated in column 6. The GDP and tobacco consumption (TOBC) terms remain, each with significantly positive impacts on in-patient spending. The elasticity of GDP was lower than unity (0.7), as was also the case for overall expenditure and ambulatory care expenditure. The results suggest that a 10 per cent increase in tobacco consumption increases in-patient spending by around 1.4 per cent.

47. Turning to the institutional variables, a number of unexpected results appeared. First budgetary ceilings (BUDCEILI) are again significantly positive. Second, for the overall system dummies (PUBREIMB and PUBINT), there are similar results to those found in the equation for overall spending. For example, both of these variables are (again) positive if they are the only terms added to the basic model. Furthermore, the negative sign on the reimbursement term in the model in column 6 is not robust to the sample of countries or time periods. Third the co-payment term (COPAYA) was positive, suggesting that an increase in the share of billing paid by the state would lead to lower spending[31]. Again it was difficult to attribute a sign or interpret some of the variables, this being particularly the case for the share of in-patient care in the total (TEXMC)[32].

48. Bringing these results together:

-- As was the case with overall and ambulatory care, there is no evidence that co-payments (COPAYI) have a positive impact on in-patient care expenditure. In fact, a significant negative impact was obtained. This result was robust to the sample of countries, but not to the sample of time periods.

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31. See footnote 29.

32. There remains some doubt about how results regarding the in-patient share term (TEXMC) should be interpreted, particularly when this variable is included in the in-patient equation. This in-patient equation relates the level of in-patient spending per capita to the share of in-patient spending in total spending. There is a risk that the other control and institutional variables included as regressors in this equation -- and particularly the GDP term -- are, in effect, controlling for the level of total health spending (per capita). In this case, variations in the share term would correspond closely to variations in the level of in-patient spending. Hence, the equation would be little more than a regression of in-patient spending on itself. The coefficient of around 1 found for TEXMC (and the very high t-value on this term) would then be meaningless. On the other hand, if the regressors in the in-patient equation still leave sufficient room for variation in the level of total health spending, then the use of TEXMC and its interpretation as a measure of substitution might still be valid.

-- As expected, a positive impact is found for the share of in-patient care in overall expenditure (TEXMC) on the level of in-patient care expenditure, which may indicate that there is a substitutional relationship between in-patient care and ambulatory care, or at least between in-patient care and other forms of care.

-- The share of public beds in total beds (PUSH) is negatively related to the level of in-patient expenditure (as was the case with overall and ambulatory spending). However, this result was not robust to the sample either of countries or of time periods.

-- In contrast with ambulatory care, it appears that the insurance coverage ratio in in-patient care (COVERI) has a positive impact on in-patient care expenditure. But this result was not robust to the sample of countries or time periods.

-- Public reimbursement systems (PUBREIMB) appear to be associated with lower in-patient expenditure. However, this result is robust neither to the sample of countries nor to time periods. Public integrated systems (PUBINT) did not appear to influence the level of in-patient spending.

-- Ceilings on in-patient care (BUDCEILI) were associated with significantly higher in-patient spending. Further investigations indicated that the two budget ceiling terms (BUDCEILI and BUDGEILA) appear to explain the same thing.

-- Ambulatory care gatekeepers (GATEKEEP) appear, as expected, to have a significant, negative impact on in-patient expenditure. This result was also robust to the sample of countries and time periods. Therefore, it appears that gatekeeping can lower overall expenditure (as described in Section 4.1) through its influence on the level of in-patient spending.

-- The number of doctors per capita (DOCTCA) did not appear to influence in-patient expenditure. However, doctor numbers did have a robust, positive impact on in-patient spending in countries which reimburse their physicians by the fee-for-service method (DOCTCA*FFSA) (which is again consistent with the finding for overall spending). Again, results were sensitive to the variables included.

-- Capitation arrangements in primary care (CAPITA) also appear to lower in-patient spending, although this result is not robust to the sample of time periods.

-- Fee-for-service arrangements in in-patient care (FFSI) do not appear to affect in-patient spending, nor do systems where patients seek reimbursement from insurers for in-patient expenses they have incurred (REIMBMOD).

-- The renal dialysis rate per million (the technique factor) (REND) is associated with a significantly higher level of in-patient expenditure. This result was robust to the sample of time periods, but not of countries.

4.4. Pharmaceutical expenditure

49. Table A3, columns 7 and 8 presents results for pharmaceutical spending. Of the background terms, GDP and the female participation rate (FPR) appear to have significantly positive effects on pharmaceutical spending, while alcohol intake (ALCC) has a negative effect; the remaining terms are insignificant (and hence are eliminated in column 8). The income elasticity is lower than unity and about the same as the corresponding elasticity for overall, ambulatory, and in-patient expenditure. Unexpected results appeared for the coverage variable (COVERP), the overall system variables (PUBREIMB and PUBINT), budget ceilings (BUDCEILI), and the number of doctors (DOCTCA).

50. Considering the institutional terms:

-- As expected, a higher co-payment (COPAYP) in health spending is associated with an increase in pharmaceutical expenditure[33]. This impact is robust to the sample of countries but not of time periods.

-- In contrast, our measure representing the insurance coverage of the population (COVERP) is (unexpectedly) negative, significant and remarkably robust.

-- The renal dialysis rate per million (REND) seems to be negatively related to pharmaceutical spending, but this result is not robust to the sample of countries or time periods.

-- Reimbursement (PUBREIMB) and integrated (PUBINT) systems appear to have significantly higher pharmaceutical expenditures (implying lower spending in contract-based systems). However, this result is also not robust to the sample of countries or time periods.

-- Ceilings on overall ambulatory spending (BUDCEILA) do not appear to affect pharmaceutical expenditure, whereas in-patient ceilings (BUDCEILI) seem to have a positive impact. This result was robust to the sample of time periods, but not to the sample of countries.

-- Primary care gatekeepers (GATEKEEP) do not appear to influence the level of pharmaceutical expenditure.

-- As expected, systems where the patient pays the provider and then seeks reimbursement (REIMBMOD) seem to have lower pharmaceutical spending (although this result was not robust to the sample of time periods).

-- Capitation systems (CAPITA) in primary care tend to have lower pharmaceutical expenditure (but this finding was again not robust to the sample of time periods), while salary systems do not have a discernible influence (WAG+SALA).

-- Pharmaceutical spending appears to be lower in systems where physicians are free to set their own prices or overbill (OVERBILL), but this result was not robust to the sample of countries or time periods.

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33. See footnote 29.

-- Where in-patient care is paid for on a bed-day or fee-for-service basis (FFSI), pharmaceutical spending tends to be higher. This result was robust with respect to the sample of countries, but not of time periods.

-- The number of doctors tends to be negatively related to pharmaceutical expenditure (DOCTCA) (the same surprising result as in the overall expenditure model), although this result is not robust to the sample of time periods. No impact is found for the interactive term representing the number of doctors in fee for service systems (DOCTCA*FFSA).

5. Conclusions

51. There are benefits but also hazards in inferring policy implications from empirical results such as those presented here. The greatest problem, apart from measurement errors in the variables, is how the impacts of individual parameter estimates should be interpreted. As discussed earlier, does the finding that budget ceilings on in-patient care are associated with *higher* in-patient expenditure reflect cause and effect (which appears counter-intuitive); or does this suggest that countries faced with higher expenditure are more motivated to introduce spending caps? Another problem is that several variables appear to be closely related, such as the two budget ceiling variables, and also the dummies for gatekeeping, the share of in-patient care, and public integrated systems. It is possible in these circumstances that one variable may turn out to be insignificant, even if it has contributed to a significant effect found for a related variable. Multicollinearity is likely to be severe in this study -- tending to confound the measurement of separate effects of individual regressor variables on expenditure and making it harder to obtain significant results, and render the parameter estimates highly sensitive to the addition or deletion of other regressor variables.

52. The summary results of the study are presented in Table A4. The more significant and robust findings are discussed below, beginning with those that are consistent with previous studies and/or expectations, and then considering those that appear to be inconsistent. The results which are weaker and less conclusive -- either because they have little robustness across the samples of countries or time period, or are inconsistent with regard to the direction or significance of their impact in the different models that were estimated -- are then briefly reviewed.

53. In accordance with earlier studies, it was found that Gross Domestic Product (GDP) per capita is highly significant in all regressions, i.e. the models explaining overall expenditure and disaggregated on ambulatory care, in-patient care and pharmaceutical expenditure. The income elasticities are about the same for overall expenditure and its sub-components, about 0.7-0.8. The size of this elasticity does not correspond with earlier cross section studies, but does correspond with earlier pooled cross section, time-series studies where the two-way fixed effect estimator has been used. It was also found that the level of tobacco consumption had a positive and significant effect on overall health spending, through its impact on ambulatory care and in-patient care expenditure. The elasticity on this term implies that a 10 per cent increase in tobacco consumption leads to around a 1.3 per cent in overall expenditure. The elasticity was higher for ambulatory care than for in-patient care. The remaining "background" factors -- i.e. terms representing the population age structure, female labour force participation, the unemployment rate, and alcohol consumption -- were generally insignificant.

54. Amongst the variables representing "institutional" aspects of OECD health systems, six results appeared to be reasonably strong and in the "expected" directions. First, the use of primary care "gatekeepers" seems to result in lower overall expenditure[34] through their impact on in-patient spending. These results are robust to the sample of countries and time periods. Second, significantly lower levels of overall, ambulatory, and pharmaceutical spending appear to occur in systems where the patient first pays the provider and then seeks reimbursement[35]. Although robust across country samples in the overall time period, this result was however not significant in the 1981-1991 period.

55. Third, the way of remunerating physicians in the ambulatory care sector appears to influence health expenditure. Capitation systems tend to lead to lower overall expenditure on average[36] than fee-for-service systems, through their impact on in-patient care and pharmaceutical expenditure. In the ambulatory care equation, the terms representing payment by capitation and by wage and salary were combined in order to avoid multicollinearity. This combined term then appeared to have a significant negative effect on ambulatory spending. Taken separately, wage and salary payments in ambulatory care seem to be associated with significantly lower in-patient spending, but this variable was not significant (although negative) in the total spending model.

56. Fourth, as in previous studies reported in Part 2, there are indications that in-patient care is more expensive than ambulatory care. The share of in-patient spending to total spending is positively related to overall expenditure (although not always robust in the different country- and time-samples). A higher in-patient share is also associated with lower ambulatory care expenditure per capita, and higher in-patient spending per capita. The elasticity on the in-patient share term in the in-patient spending model is higher then zero, suggesting some substitution between in-patient and other forms of care.

57. Fifth, there is some evidence (although not particularly robust) that public sector provision of health services (proxied by the share of public beds to total beds) is associated with lower overall health expenditure, through its (negative) impact on in-patient and ambulatory care expenditure. This result is consistent with the earlier Gerdtham *et al.* studies reported in Part 2, and inconsistent with the findings of Leu (1986).

58. Finally the total supply of doctors may be having a positive effect on ambulatory spending and, at the level of total and in-patient care spending, this also appeared to be the case for countries where doctors practice under fee-for-service arrangements. However, this needs to be balanced against the finding of a negative impact of the supply of doctors in the equation for total spending and pharmaceuticals and no impact in the equation for in-patient care -- although further tests suggested that these last results were often sensitive to the sample and to the variables included in the equations.

59. Turning to results which differed from expectations, there were indications that budget ceilings on in-patient care are associated with higher in-patient, pharmaceutical, and overall spending. As noted

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34. The coefficient suggests that countries with gatekeepers have total spending which is around 18 per cent lower than those without gatekeeper. Clearly, this result cannot be viewed as any sort of 'guarantee' that the introduction of gatekeepers would automatically generate such savings.

35. Total spending is about 9 per cent lower in systems with patient reimbursement.

36. By around 17 to 21 per cent.

above, this finding may reflect some form of reverse causality. Ceilings on ambulatory care did not appear to have any significant effect, but there is evidence that these two budgetary control terms may capture the same influence.

60. Contrary to the evidence of Hurst (OECD 1992), health systems characterised by the public reimbursement model systems appeared to have lower overall expenditure on average than public contract systems and spending in public integrated systems were broadly the same as in public contract arrangements. Further tests suggested that public integrated systems might be even more costly than public contract systems, possibly because countries in this group also tend to have higher shares of high cost in-patient care and fewer gatekeeping arrangements. It remains difficult to explain the result for public reimbursement systems, although estimated parameters were generally not stable to the sample.

61. Furthermore, there was some evidence that the public integrated approach had a positive impact on ambulatory spending if one focused just on the European countries; and there was somewhat stronger and more robust evidence that integrated systems had higher pharmaceutical expenditure.

62. The remaining institutional variables were generally insignificant, particularly with respect to total health spending. Some appeared to have a significant impact on one or more spending sub-components, but often with opposite (i.e. conflicting) effects on different components (usually in ways that were difficult to explain). For example, the size of the public sector co-payment appeared to be negatively related to in-patient spending, but (more as expected) positively related to pharmaceutical spending (although not robust in either case to the sample of time periods). The renal dialysis rate (the proxy for high-cost procedures) tended as expected to increase ambulatory and in-patient spending, but reduce pharmaceutical spending (and as noted have no impact on total expenditure). Finally, increases in the insurance coverage of the population appeared to increase in-patient expenditure (although this result was not robust to the sample of countries), and decrease spending on pharmaceuticals.

Appendix 1

Purchasing Power Parities

1. If one is using Purchasing Power Parities (PPPs) (rather than, for example, market exchange rates) to convert national currencies to a common currency, should one use PPPs for GDP or PPPs for health care? This question is discussed in Gerdtham and Jönsson (1992*a*, 1992*b*). PPPs for GDP convert health-care expenditures to constant general price levels, but not necessarily constant health-care prices, while PPPs for health care convert health-care expenditure to constant health service prices. Parkin *et al.* (1988, 1989) argued in favour of using PPPs for health care to convert health-care expenditure in national currencies. This conversion method provides a measure much closer to Newhouse's "quantity of resources a country devotes to medical care". Gerdtham and Jönsson (1991*b*) noted that the choice between PPPs for GDP and PPPs for health care depends on what one wants to measure, whether it is the financing burden to the country (suggesting use of PPPs for GDP) or the quantity of resources spent by a country on health care (PPPs for health care).

2. The empirical evidence in this matter seem ambiguous. Parkin *et al.* (1987, 1989) found that the (simple) income elasticity of health-care expenditure dropped when they used PPPs for health care instead of PPPs for GDP, and the elasticity was not significantly different from unity. They used cross-section data and the PPPs estimated for that year. They claimed, therefore, that countries spend resources for health care in proportion to their income, but richer countries pay more for the services. Using 1985 cross-section data and 1985 PPPs for health care, Gerdtham and Jönsson (1991*b*, 1991*c*) could not replicate this result, and reported that the (simple) income elasticity is the same, and above unity, both when PPPs for health care and PPPs for GDP are used. This result implies that health expenditure is insensitive to the relative price of health care (compared with the general price level), because increases in spending that result from increases in relative health prices are offset by a corresponding fall in the quantity of health care. The income elasticity is therefore above 1 in both health expenditure and in the quantity of care (i.e. health expenditure in constant health-care prices). Contributing to these divergent findings of Parkin *et al.* and Gerdtham *et al.* are probably differences between the 1980 and 1985 PPPs for health care.[1]

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1. There are two main technical problems with PPP adjustments of health spending. The first is that the number of products in the health "basket" was limited. In a sector with complex outputs and significant variations across countries in the types of output produced, this can be a serious problem. The second concerns the weighting method. The deflators should in principle reflect the health-care expenditure item in the general government consumption and private consumption components of the national accounts. There were only 6 countries which provided the expenditure breakdown (i.e. the weights) and the prices for that part of health-care expenditure included in general government consumption. In practice, statisticians at Eurostat used only the private sector weights in calculating PPPs for health-care expenditure, even in those countries where a breakdown for the general government component of health-care expenditure was available. For a country like the UK, the PPPs are therefore based on weights and prices for only 15% of the total. It may be possible in future to use better PPPs, in part by using general government weights for the countries where they are available and more appropriate weights for countries where the private sector weights do not appear to be an appropriate representation of the structure of health-care expenditure.

Appendix 2

Econometric Estimation Using Cross-section Time-series Data

1. The longitudinal pooled structure of the data allows investigation of possible unmodelled country- and period-specific factors. Following Greene (1993), and using the associated procedures in the LIMDEP 6.0 econometrics package, one is able to test for country- and period-specific effects and carry out appropriate estimation in their presence. For each equation the "error" term is of the form $e_{it} + u_i + v_t$, where "i" refers to the country and "t" refers to the period; "u" is the country-specific term and "v" is the period-specific term. Running a simple pooled OLS regression assumes that $u_i = 0$ and $v_t = 0$. A fixed-effects model assumes that u_i and/or v_t are fixed constants for each country and time period respectively, in which case an appropriate estimation technique is least squares with country-specific and/or time-specific dummies. If $u_i \neq 0$ is the correct specification, but a simple pooled OLS regression is estimated, the coefficient vector will be biased if u_i is correlated with other regressors. The third possibility is that u (or v) is itself a random variable. In this case, there is an error components model -- referred to as a "random-effects" model -- that can be estimated using generalized least squares (GLS). The random-effects models is estimated by two-stage GLS in the following manner: a) the variance components are estimated using the residuals from OLS regressions and b) GLS estimates are calculated using these estimated variances. Conventional F-type tests are used (for the joint significance of the country dummy variables) to determine whether the OLS model is rejected in favour of the fixed-effects model. A Lagrange multiplier test for the random-effects models devised by Breusch and Pagan (1980), based on the OLS residuals, can be used to examine whether the panel GLS model is more appropriate than the zero factor OLS model. The Hausman test of the fixed-effects model against the random-effects model is also carried out in order to test the independence assumption of the random-effects models.

2. All models are estimated by these seven different pooling techniques, i.e. two-way country and period fixed and random-effects models (2-FEM and 2-REM), one-way fixed and random country-effects models (1-FEM,C and 1-REM,C), one-way fixed and random period-effects models (1-FEM,P) and a zero factor model (OLS) without country and time dummies as well. All models are then compared using the above-mentioned tests, i.e. F-tests, Lagrange multiplier test and the Hausman tests.

3. In addition to using statistical tests to choose between fixed effects, random effects, and OLS, there are important conceptual issues that bear on this choice. First, the fixed-effects model may be more appropriate when the sample constitutes all or most of the population of interest. Random effects would be more appropriate if the sample is drawn from a substantially larger population. This factor would seem to favour the fixed-effects model in this case. Greene (1990, p. 85) states that the fixed-effects model is a reasonable approach when one can be confident that the differences between units (countries) can be viewed as parametric shifts of the regression function. If differences between countries are not due to parametric shifts, but are more related to variation across countries in the regressors, then fixed-effects models are less attractive. As a pragmatic matter, fixed-effects models may attribute too much of the cross-sectional variation to country-specific effects. In the extreme case of a single cross-sectional to country-specific effects, including fixed effects would "use up" all the degrees of freedom. Random effects models have the advantage of allowing some country-specific effects, but also allow cross-sectional variation to contribute to the value and significance of coefficient estimates.

Table A1. **Results from previous works in comparisons of health-care expenditure across the OECD countries**

Study	Newhouse	Leu 1	Leu 2	Leu 3	GTH 1	GTH 2	GTH 3	GTH 4	OECD (1993)[3]
Design	Cross-section	Cross-section			Cross-section	Pooled 3 Year	Pooled 16 year		
Sample	13 countries	19 countries			19 countries	19 countries	22 countries		
Year	1971	1974			1987	1974, 1980,	1982-1987		
Estimation	OLS	OLS			OLS	OLS	WLS		
Regressor variable									
GDPpc(i,t)	0.078[a] (1.31)[2]	1.18[a]	1.36[a]	1.21[a]	1.33[a]	1.27[a]	0.74	-	1.6[a]
GDPpc(i,t)/GDPpc(i,t-l)	-	-	-	-	-	-	-	0.17	-
HEXTpc(i,t-l)/GDPpc(i,t-l)/GDPpc(i,t-l)	-	-	-	-	-	-	-	-0.22[b]	-
Inflation(i,t)	-	-	-	-	-	-	-0.16	-0.17[b]	-
Inflation(i,t-l)	-	-	-	-	-	-	-	-0.00	-
Relative prices[4]	-	-	-	-	-	-	-	-	-1.03[a]
Population	-	-	-	-	-	-	-	-	0.97[a]
Population<15year/15-64years(i,t)	-	0.56[b]	1.10[a]	0.69[a]	-	-	-0.11	-	0.02[b]
Population 65+/15-64 years(i,t)	-	-	-	-	-	-	-	0.21	0.03[b]
Population 65+/15-64 years (i,t-l)	-	-	-	-	-	-	-	-0.16	-
Unemployment rate		-	-	-	-	-	-	-	0.0084[b]
Urbanisation(i,t)	-	0.11	0.28[a]	-	-0.17[b]	-0.23[b]	-	-	-
Public financing(i,t)	-	-	0.34[b]	0.16	-0.52[a]	-0.48[a]	-0.12	--0.21b	0.0087[b]
Public financing(i,t-l)	-	-	-	-	-	-	-	0.24b	-
Public beds(i,t)	-	0.90[a]	-	0.85[a]	-	-	-	-	-
Share of in-patient spending in total%	-	-	-	-	0.22[c]	0.31[a]	-	-	-
Physicians/pop(i,t)	-	-	-	-	-	-0.17[c]	-	-	-
NHS(i,t)	-	-0.21[a]	-0.24[b]	-0.23[a]	-	-	-	-	-
Direct democracy(i,t)	-	-0.31[a]	-0.20	- 0.29[a]	-	-	-	-	-
Fee/service(i,t)	-	-	-	-	1.12[b]	1.13	-	-	-
GDP*TIME i,t	-	-	-	-	-	-	-	-	0.0086
Constant	-60	-12.41[a]	-9.65[a]	-10.06[a]	25.10[a]	-4.35[a]	-0.03	-0.67	3.94[a]
Country dummies	-	-	-	-	-	No	Yes	Yes	No
Time dummies	-	-	-	-	-	Yes	Yes	Yes	No
R^2	0.92	0.97	0.96	0.97	0.94	0.92	0.97	0.31	.99

1. a, b, c represent 1%, 5% and 10% levels of significance.
2. Linear regression; elasticity estimated at the mean.
3. Equation in level rather than per capita terms with population as an explanatory variable; GDP is defined in real terms with a relative price term added.
4. Relative prices in the PPP for health services relative to the PPP for GDP.

Table A2. **Variable names and definitions**

	Measure	Definition
Endogenous variables	TEXPgr	Health-care expenditure per capita in US dollars, converted at economy-wide PPPs, expressed in 1985 prices.
	TEXPICgr	Health-care expenditure per capita in US dollars, converted at economy-wide PPPs, expressed in 1985 prices.
	TEXPAMSgr	Health-care expenditure per capita in US dollars, converted at economy-wide PPPs, expressed in 1985 prices.
	TEXPPHgr	Health-care expenditure per capita in US dollars, converted at economy-wide PPPs, expressed in 1985 prices.
Exogenous variables Socio-demographic factors	GDPgr	Gross domestic product per capita in US dollars, converted at economy-wide PPPs, expressed in 1985 prices.
	POP75	The proportion of population 75 years and over (%).
	POP04	The proportion of population 4 years and under (%).
	FPR	Female labour force participation ratio, % of active population.
	ALCC	Alcohol intake, litres per person.
	TOBC	Tobacco consumption, grams per capita.
Exogenous variables Institutional factors	CAPITA	Dummy variable, one for countries with capitation as the dominant means of remuneration in primary care, zero otherwise. Values between 0 and 1 represents the proportion of ambulatory spending which are paid on a CAPITA basis.
	WAG+SALA	Dummy variable, one for countries with wage and salary as the dominant means of remuneration in primary care, zero otherwise. Values between 0 and 1 represents the proportion of ambulatory spending which are paid on a WAG+SALA basis.
	FFSA	Dummy variable, one for countries with fee-for-services as the dominant means of remuneration in primary care, zero otherwise. Values between 0 and 1 represents the proportion of ambulatory spending which are paid on a FFSA basis.
	FFSI	Dummy variable, one for countries with fee-for-service or payment by bed days in in-patient care, zero otherwise. Values between 0 and 1 represents the proportion of in-patient spending which are paid on a FFS basis.
	BUDCEILA	Dummy variable, one for countries with direct budgetary controls in the ambulatory sector, zero otherwise.
	BUDCEILI	Dummy variable, one for countries with global prospective budgets in hospital spending, i.e. countries having hospital spending either on budget or established levels which should not be exceeded, zero otherwise.
	PUBREIMB	Dummy variable, one for countries with public reimbursement as the dominant means of remuneration in the in-patient care, zero otherwise.
	PUBCONTR	Dummy variable, one for countries with public contract as the dominant means of remuneration in the in-patient care, zero otherwise.
	PUBINTEG	Dummy variable, one for countries with public integrated systems, zero otherwise.
	OVERBILL	Dummy variable, one for countries with potential for free setting of medical care prices and overbilling, zero otherwise. In some countries the share of doctors who can practice overbilling are shown.

Table A2. (continued)

	Measure	Definition
Institutional factors (cont'd)	GATEKEEP	Dummy variable, one for countries with physicians as gatekeepers, zero otherwise.
	REIMBMOD	Dummy variable, one for countries with direct payment by patient before reimbursement by insurer, zero otherwise. Where values are not 0-1, this indicates share of spending where direct payment by patient exists.
	PSMCB	The proportion of average medical billing paid for by public insurers or paid by public funds.
	DOCTCA	The stock of practising physicians per 1 000 population.
	DOCTCA*FFSA	The stock of practising physicians per capita in countries with fee-for-service payments.
	TEXMC	The proportion of in-patient expenditure of total health-care expenditure (%).
	PUSH	The proportion of public in-patient care beds of total in-patient care beds (%).
	COVERO	Insurance coverage of the population[1].
	COVERA	The proportion of coverage for ambulatory care of state and social security schemes[1] (%).
	COVERI	The proportion of coverage for in-patient care of state and social security schemes[1] (%).
	COVERP	The proportion of coverage for pharmaceuticals of state and social security schemes (%).
	COPAYA	The average share of medical care billing paid for by public insurers in ambulatory care sector. (%)
	COPAYI	The average share of medical care billing paid for by public insurers in in-patient care. (%)
	COPAYP	The average share of medical care billing paid for by public insurers in pharmaceuticals. (%)
Exogenous variables Technological factors	Rend	Renal dialyses, rate per million population.

1. Total population covered by insurance (public and private) for the United States.

Table A3. **Estimated coefficients in health expenditure models**

Dependant Variables:	Overall Expenditure		Ambulatory Expenditure		In-patient Expenditure		Pharmaceutical Expenditure	
Independent Variables	1	2	3	4	5	6	7	8
GDPgr	0.76[a]	0.74[a]	0.78[a]	0.82[a]	0.71[a]	0.73[a]	0.79[a]	0.80[a]
POP75%			0.00		-0.03			
POP04%			0.79[a]	0.81[a]				
FPR							0.39[a]	0.43[a]
UNR			0.00		0.00		0.00	
ALCC							-0.13[a]	-0.13[a]
TOBC	0.12[a]	0.13[a]	0.42[a]	0.43[a]	0.15[a]	0.14[a]	-0.03	
PSMCB%	-0.08							
COPAYP							0.25[a]	0.26[a]
COPAYI					-0.37[a]	-0.37[a]		
COPAYA			-0.02					
TEXMC%	0.05[c]	0.06[b]	-0.78[a]	-0.76[a]	1.01[a]	1.02[a]	-0.02	
PUSH	-0.34[a]	-0.32[a]	-0.53[a]	-0.54[a]	-0.44[a]	-0.44[a]	-0.09	
COVERA			0.07					
COVERO	0.05							
COVERP							-0.47[a]	-0.47[a]
COVERI					0.25[b]	0.19[c]		
REND	0.01		0.08[a]	0.08[a]	0.03[a]	0.03[b]	-0.04[b]	-0.03[b]
PUBREIMB	-0.11[a]	-0.7[b]	0.29[c]	0.14[c]	-0.16[b]	-0.11[a]	0.23[b]	0.28[a]
PUBINTEG	-0.03		0.15		-0.05		0.13[c]	0.12[b]
BUDCEILA	-0.01		0.07		-0.02		-0.08	
BUDCEILI	0.03	0.04[a]	-0.06		0.04[c]	0.04[b]	0.16[a]	0.11[a]
GATEKEEP	-0.19[a]	-0.18[a]	0.04		-0.19[a]	-0.18[a]	0.03	
REIMBMOD	-0.10[c]	-0.08[c]	-0.34[b]	-0.23[b]	-0.08		-0.30[a]	-0.26[a]
CAPITA	-0.21[a]	-0.17[a]			-0.21[a]	-0.18[a]	-0.13[c]	-0.15[b]
WAG+SALA	-0.10				-0.17	-0.21[b]	0.20	
CAPITA + WAG+SALA			-0.23[a]	-0.25[a]				
OVERBILL	0.03		0.15		0.05		-0.30[a]	-0.36[a]
FFSI	-0.02		-0.08[c]	-0.08[a]	-0.02		0.18[a]	0.17[a]
DOCTCA	-0.10[c]	-0.14[a]	0.54[a]	0.54[a]	0.00		-0.51[a]	-0.56[a]
DOCTCA*FFSA	0.18[a]	0.20[a]	-0.03		0.16[a]	0.15[a]	0.09	
Constant	0.07	0.02	-2.41	-2.67[c]	-3.32[a]	-3.29[a]	-1.94	-2.79[a]
R2	0.985	0.984	0.974	0.974	0.989	0.989	0.946	0.945

a. Represents a 1% level of significance.
b. Represents a 5% level of significance.
c. Represents a 10% level of significance.

Table A4. **Summary of the results**

Independent variables	Dependent variables			
	Overall Expenditure	Ambulatory Care	In-patient Care Expenditure	Pharmaceutical
GDPgr	0.74-0.76	0.78-0.82	0.71-0.73	0.79-0.80
POP75	0	0	0	0
POP04	0	0.79-0.81	0	0
FPR	0	0	0	0.39-0.43
UNR	0	0	0	0
ALCC	0	0	0	-0.13
TOBC	1.3	0.42-0.43	0.14-0.15	0
COPAY	0	0	-0.37	0.25-0.26
TEXMC	0.05-0.06	-0.76--0.78	0.01-1.02	0
PUSH	-0.32--0.34	-0.53--0.54	-0.44	0
COVER	0/+?	0	0.19-0.25	-0.47
REND	0/+?	0.08	0.03	-0.03--0.04
PUBREIMB	-0.11[1]	0.14-0.29[1]	-0.11--0.16[1]	0.23-0.28[2]
PUBINTEG	0/+?	0/+?	0/+?	0.12-0.13
BUDCEILA	0	0	0	0
BUDCEILI-	0.03-0.04	0	0.04	0.11-0.16
GATEKEEP	-0.18--0.19	0	-0.18--0.19	0
REIMBMOD	-0.08--0.09	-0.23--0.34	0	-0.26--0.30
CAPITA	-0.17--0.21	-	-0.18--0.21	-0.13--0.15
WAG+SALA	0	-	-0.17--0.21	0
CAPITA + WAG+SALA	-	-0.23--0.25	-	-
OVERBILL	0	0	0	-0.30--0.36
FFSI	0	-0.08	0	0.17-0.18?
DOCTCA	-0.10--0.14	0.54	0	-0.56--0.56
DOCTCA*FFSA	0.18-0.20	0	0.15-0.16	0

1. The variable is positive if COPAY, TEXMC%, PUSH, COVER and REND are excluded.
2. The variable is not significant if COPAY, TEXMC%, PUSH, COVER and REND are excluded.

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