ANALYSIS OF INTERNATIONAL HEALTH-RELATED EXPENDITURE: LESSONS FOR FRANCE

*Carine Bouthevillain and Karine Hervé**

> *"Health may have no price but it does have a cost"*
> Georgina Dufoix (1986)

The amount of economic literature on the health-care sector has expanded steadily since the Sixties and recent budget concerns, shared by the entire industrialised world, have only amplified the trend. Although many different health-care systems exist worldwide, none seems to have found the perfect balance between the conflicting goals of effective care, equity, freedom of choice (for doctors and patients) and the control of public spending. Failure to achieve any of these goals produces specific problems, such as poorer health in the population as a whole, exclusion of some of the population from the system, waiting lists and public-sector deficits. The only consequence of frenetic reform in the Eighties and Nineties was to make the different systems more similar in organisational terms, generally by introducing competition and facilitating decentralisation. No reform has yet managed to achieve the stable and socially endorsed equilibrium of any one health system.

Clearly, the organisational reform of a health-care system depends first on how society answers a number of questions:

- how is public spending to be shared out between health care, education, housing and other public services?
- according to what implicit hierarchy does society rank the objectives of a health-care system?
- how much is the community willing to pay to maintain the current system? Who should pay for the rising cost of health care?

In France, society seems particularly attached to the existing system, which favours equity, high-quality health care and freedom of choice, but at the price of an uncontrolled rise in public spending. An effective reform should aim to do away with the rents that increase the overall cost of health care, rationalise the organisation of health care so that spending is effective, spread the costs appropriately between the community and the private sector and establish the conditions for enforceable regulation.

The remedy may be familiar but implementing it is more difficult. The sole purpose of the many instruments introduced in previous reforms was to lastingly

---

* Banque de France.

The views expressed in the paper are those of the authors and do not necessary reflect those of the Banque de France.

reverse the rise in health-care spending. Governments are now aware that higher health-care spending is unavoidable and can even be a plus from an economic standpoint (potential for jobs, new leading-edge industrial sector and health care as a component of overall demand) and are seeking to *control* the rise and ensure that the system is sustainable.

In order to understand the issues at stake in the public debate, it is essential to understand how and why health-care spending has increased, in the light of experience in France and elsewhere. In this paper we shall give a summary and non-exhaustive overview of the different health-care systems and look at some aspects of insurance theory that apply to health care. Through an econometric study of the main determinants of the growth in health-care spending, we shall then try to identify the explanatory factors at work in various countries and compare our results with those of earlier studies. In conclusion, we shall consider the objectives of the recent reform of the French health-care system and, through complementary proposals available in the literature, describe the measures capable of addressing the foreseeable increase in health-care spending as a proportion of GDP in the medium term.

1.   Some stylised facts about health-care systems worldwide

A comparison of trends in health-care spending in the OECD countries reveals a common point: it is increasing as a proportion of GDP. In the OECD countries in 2001, it represented 8.4 per cent of GDP compared with 5.3 per cent in 1970. In 2002, the US tops the ranking with 13.9 per cent (6.9 in 1970), followed by Switzerland with 11.2 per cent (5.6 in 1970) and Germany with 10.9 per cent (6.2 in 1970). France is in fifth place behind Canada with 9.7 per cent (5.4 in 1970), significantly higher than the eurozone average of 8.5 per cent (Figure 1). Health care as a proportion of GDP has risen relatively rapidly in most industrialised countries since 1997 after remaining flat between 1992 and 1997, mainly due to spending controls.

Generally speaking, real growth in health-care spending has outstripped GDP growth (Table 1 and Appendix 1). In the OECD countries on average, the variation between 1990 and the early 2000s was around one percentage point (3.3 per cent as against 2.2). France and Germany are within this average even though their economies have grown more slowly than those of countries in the English-speaking world.

The rise is not a problem in itself since its origins lie in economic growth, demographic factors, advances in medical science and a shift towards health-care spending in the structure of consumption in industrialised countries. Health care is generally regarded as a superior good, meaning that consumption of the good rises faster than increases in income. Taking a positive view, health care may therefore be regarded as a strategic sector for innovation and research & development, and a rise in health-care spending as merely reflecting better general welfare and living standards.
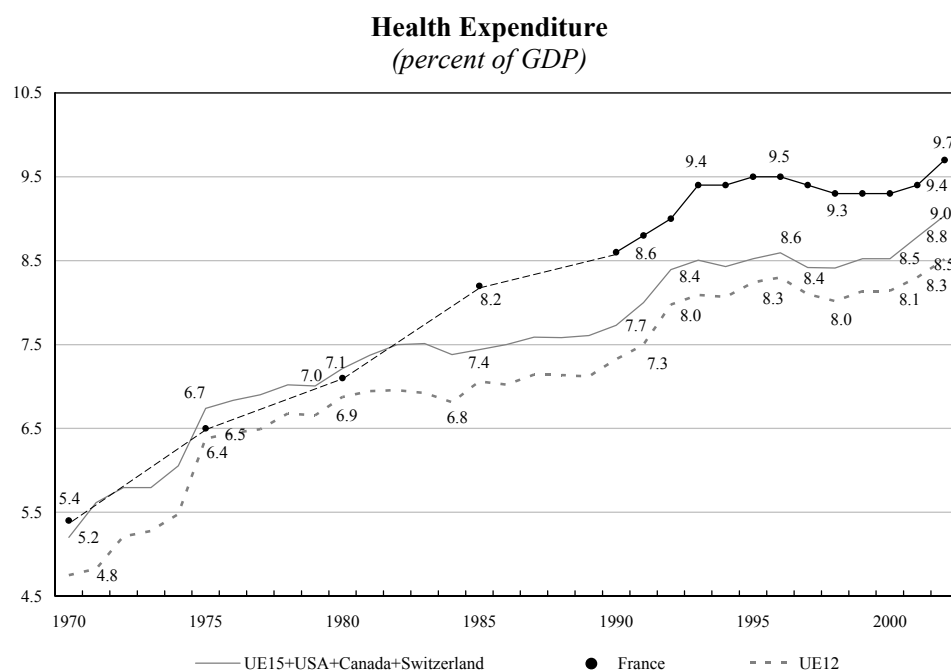
Figure 1

Health Expenditure
(percent of GDP)

Table 1

Growth of Health Care Expenditure Compared to GDP Growth

	1990-2000			Years 2000's		
	GDP	Health expenditure	Ratio	GDP	Health expenditure	Ratio
	(1)	(2)	(2)/(1)	(1)	(2)	(2)/(1)
Austria	1.9	2.8	1.5	1.9	n.a.	n.a.
Belgium	1.9	3.4	1.8	1.7	n.a.	n.a.
Canada	1.8	1.9	1.1	3.5	5.5	1.6
Denmark	1.9	1.8	0.9	2.2	3.2	1.5
Finland	1.7	0.1	0.1	2.8	3.4	1.2
France	1.5	2.4	1.6	2.4	4.7	2.0
Germany	1.2	2.1	1.8	1.3	0.5	0.4
Ireland	6.4	6.8	1.1	4.1	12.9	3.1
Italy	1.4	1.6	1.1	7.7	4.2	0.5
Luxembourg	3.9	3.0	0.8	1.7	n.a.	n.a.
Netherlands	5.1	2.6	0.5	3.9	n.a.	n.a.
Portugal	2.5	6.4	2.6	1.6	n.a.	n.a.
Spain	2.4	3.5	1.5	1.8	n.a.	n.a.
Sweden	1.6	1.8	1.1	3.0	3.2	1.1
Switzerland	0.2	2.5	12.5	2.4	4.4	1.8
United Kingdom	2.1	4.0	1.9	1.6	5.0	3.1
United States	2.0	3.0	1.5	2.5	4.3	1.7

Both components are expressed in per capita and in real terms using GDP deflator.
n.a. = not available.

Figure 2

**Health Care Expenditure Sources of Funding in 2002**
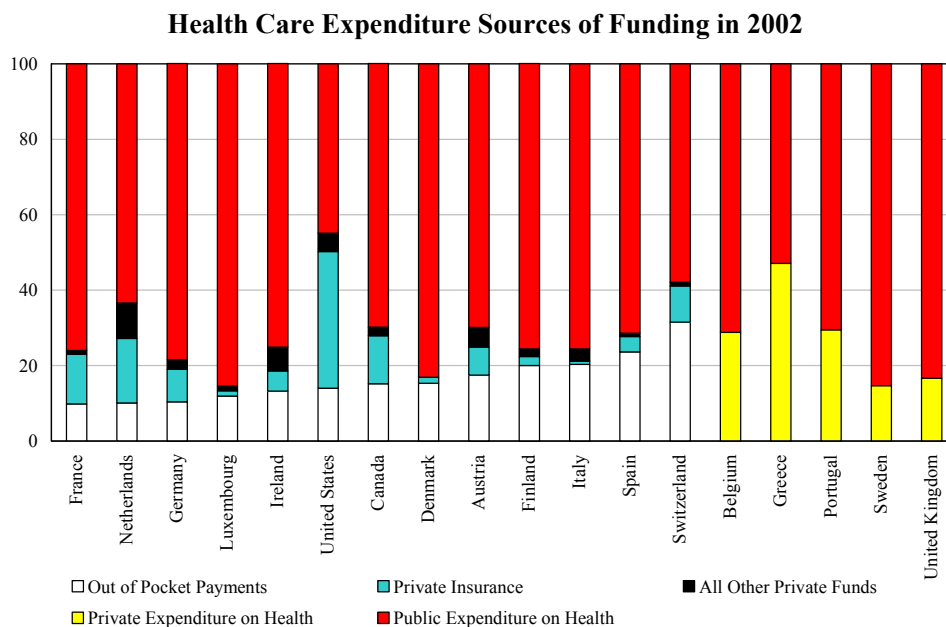
In most countries, however, the proportion of spending funded by the public sector is greater than the proportion funded by private insurance and households. The public-sector share is close to 72 per cent on average in the OECD countries, though it tended to fall back slightly during the Nineties. In contrast, the share of private spending not covered by private or mutual insurance has tended to rise in all countries with the exception of France, Denmark and the United States (Figure 2).

The problem of the funding and sustainability of health-care systems is therefore crucial. In the European countries covered by the Stability and Growth Pact, the pressure on government budgets caused by the uncontrolled rise in public spending on health care has given rise to many reforms. Some countries, like France and Germany, initially opted to increase fiscal pressure to finance the system but were forced to change track because of the pressure of social contributions on wage costs. Likewise, the countries that chose to restrict supply (Australia, Canada, UK) found themselves facing shortages of medical staff and also had to rethink. The common approach finally adopted by the OECD countries consists in limiting public spending by the introduction of co-payment systems and structural reforms that change the way health-care systems are organised (Oxley, 2003; Imai, 2002).

Despite these similarities, health-care spending in some countries (United States, Switzerland, France, Germany) is both higher and rising faster than in others (Sweden, Italy, UK). Total health-care spending per capita in US$ 1996 was almost 5000 in the United States in 2001, compared with 3800 in second-placed

Figure 3

Per Capita Total Expenditure on Health and GDP, 2001
(US dollars, 1996 exchange rate)
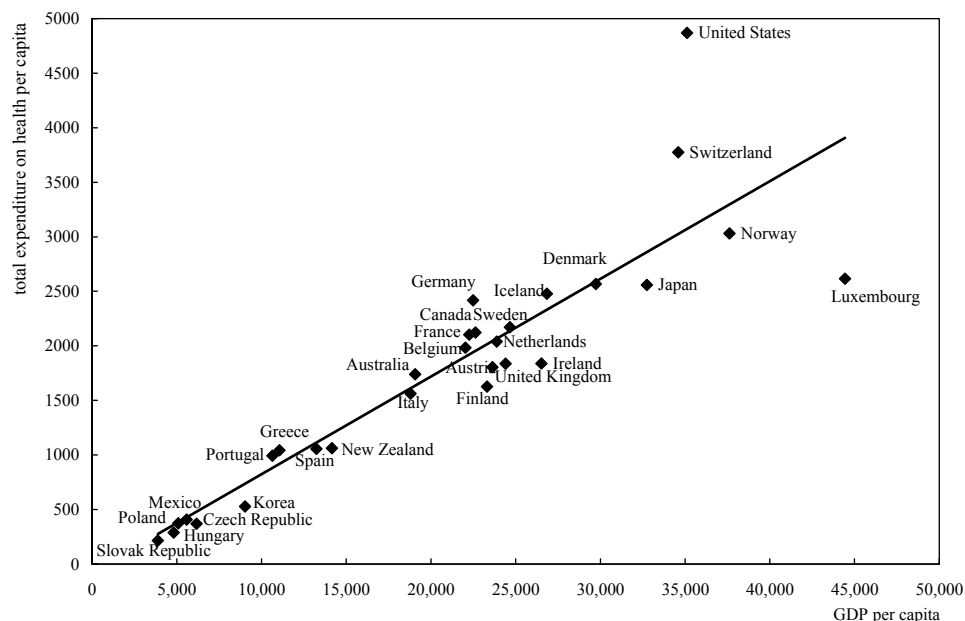
Switzerland (Figure 3). The figure for France, in tenth position and close to the average in the OECD countries, was approx. 2100, compared with less than 2000 in the UK (Huber and Orosz, 2003). The explanations for these differences can be found in the ways the various health-care systems operate and the reforms that have shaped them. Institutional choices (the way practitioners are paid, the amount of choice given to patients and health care providers, the proportion of the population covered) and responses to the consequences of technological and demographic change are at the origin of the different situations that exist today.

Three types of health-care system are traditionally identified (Palier, 2004).[1]

1) National health systems (countries of northern Europe, the UK in the Eighties, Ireland, Italy, Spain, Portugal to some extent, Greece, Canada) offer all citizens

---

[1] Docteur and Oxley (2003) adopt this classification but use the customary OECD terms for each of the three categories. The breakdown of countries can be different from the one given in the original article by Oxley and McFarlan (1994). In it, the OECD classifies organisational models for health-care systems according to three categories: the "public-integrated model", which is similar to national health systems, the "public-contract model", which mainly concerns Germany and the Netherlands, where public insurers enter into contracts with private health care providers, and the "reimbursement model" which applies to France for ambulatory health care and to the United States, where health care providers are private and aim to make a profit.

access to health care virtually free of charge. Health-care provision is organised mainly by the government and paid for out of tax revenue. The system may be highly centralised (UK) or not (Nordic countries). These systems guarantee equal access to health care and relatively low levels of expenditure but their main problem is how to regulate flows of patients who are insensitive to budget restrictions, leading to long waiting lists for specialist treatment and care of debatable quality. Patients are limited in their choice of doctor and GPs have a gate-keeping and flow control role, which helps to stem spending inflation while offering better monitoring of patients and better coordination of treatment. Health care providers are paid according to set principles (doctors by capitation or flat fee, hospitals in the form of block grants) out of a predefined and limited budget. Such systems are directly inspired by the Beveridge model, based on universal social protection through coverage of the entire population and all social risk, uniform treatment based more on needs than on income, and equality through state management of the entire social protection system.

2) Health insurance systems (Germany, France, Austria, Japan, the Netherlands before the Dekker reform and, more recently, the UK), in which health-care provision is partly private (ambulatory care, some hospitals and clinics) and partly public (hospitals). The costs are assumed by health insurance funds and financed from social security contributions. The system may be centralised, as in France, or decentralised, as in the German Länder. These health insurance systems guarantee freedom of choice for both patient (choice of GP or specialist, possibility of direct access to a hospital) and practitioner (freedom of establishment and prescription), and the convenience and in many cases the quality of treatment. Their drawbacks are high expenditure (doctor-shopping, over-consumption) and sometimes unequal access to care. Ambulatory doctors, most of them in private practice, are generally paid on a fee-for-service basis, *i.e.,* after the treatment has been dispensed. These systems are inspired by the "Bismarckian" model in which social protection is granted in return for professional activity. However, insurance systems are now "mixed", in that they combine features of the Beveridge model (especially in guaranteeing a minimum level of social protection to the population) and the Bismarckian model (funding method, importance of the practitioner's role).

3) In liberal health-care systems (United States, Ireland), public provision of health insurance is extremely limited (the very poor, emergency treatment, the elderly and disabled). The system is mostly private and generally funded by employers. Providers of ambulatory and hospital care, drugs and medical testing are in competition with each other, mainly on a market basis. Some of the population has no health cover. The US system is technologically very advanced and gives the wealthy access to the best health care, but there are great inequalities in access to health care and in the health of the population as a whole. In addition, the overall level of health-care spending is very high.

The thrust of reform has differed from one OECD country to another as governments have sought to remedy the prime defect of their particular system. Although no country has found a best – or even a satisfactory – solution, a trend

Box 1
The place of the French health-care system[2]

The French system has a number of advantages, such as easy access to health care, no waiting lists and high-quality treatment. It is also relatively fair, since there are few restrictions on health-care spending and reimbursement rates are high. Patients are entirely free to choose their health care provider, while practitioners enjoy complete freedom of establishment and prescription. The downside, however, is a heavy and increasing burden on the public purse. It is also difficult to assess the system's efficiency, in terms of both the ratio of health-care spending to the population's state of health and the extent to which it supports the growth of the industrial sector associated with it. The allocation of resources is probably not optimal, a problem which recent and future demographic changes will amplify.

Under the French system, the government funds approximately 80 per cent of health-care spending, private insurers 10 per cent and patients the remainder. The compulsory public share of the system covers just about all the population: there are some twenty health insurance funds for wage-earners and their families, depending on their type of occupation. Those excluded from the system are covered by the CMU (universal health coverage) scheme which, since 1 January 2000, has provided basic coverage to the most needy and additional coverage to those on low incomes. Three-quarters of beds are in public hospitals, which account for two-thirds of hospital spending, and public hospital staff have civil servant status. In the ambulatory sector, about three-quarters of GPs are under contract and practice in Sector I (*i.e.*, their fees are determined by official schedules); non-contract practitioners (Sector II) can charge higher fees, but they have declined as a proportion of the total since the conditions for access to Sector II were tightened up in 1990. In contrast, 34 per cent of specialists are in Sector II. Until the 2004 reform, GPs were neither required nor expected to act as gate-keepers for access to specialists, a factor which encouraged specialists to compete with GPs or with each other according to their equipment level. The government sets the price of reimbursable drugs on expert advice and the recommendations of drug companies, though the trend in recent reforms has been towards a gradual liberalisation of drug prices. The coverage of spending on dental or eye care is generally capped, including under the CMU. The system is broadly fair though some inequalities remain (eg, for those on low incomes who nevertheless earn more than the CMU maximum, geographical inequalities linked to practitioners' freedom of establishment). Practitioners are paid on a fee-for-service basis and patients are partially reimbursed by public health insurance funds (*ticket modérateur*). The balance may be paid by complementary private insurance, which limits the effect of co-payment on consumption. Certain categories of patients (the elderly, the indigent, those with long-term illnesses,

_____

[2]   For further details, see the very full description of the French health-care system in Imai *et al.* (2000).

etc.) are exempted from co-payment. The combination of almost complete reimbursement and unrestricted and potentially diversified access to health care has been held responsible for the rapid rise in health-care spending.

The main drawback of the system is its cost to the public sector. An imbalance between income and expenditure emerged during the Eighties, giving rise to many reforms (see Appendix 2 and Figure 4). They can be divided into three phases: 1975-91: attempts to control demand for health care, mostly by increasing compulsory contributions; 1992-2001: attempts to control the supply of health care by contractual means; 2002-05: current attempts to restructure the health-care system by redefining the scope of public coverage and encouraging the players in the system to behave more responsibly.

Figure 4

General Social Insurance Scheme, Annual Balance
(percent of GDP)
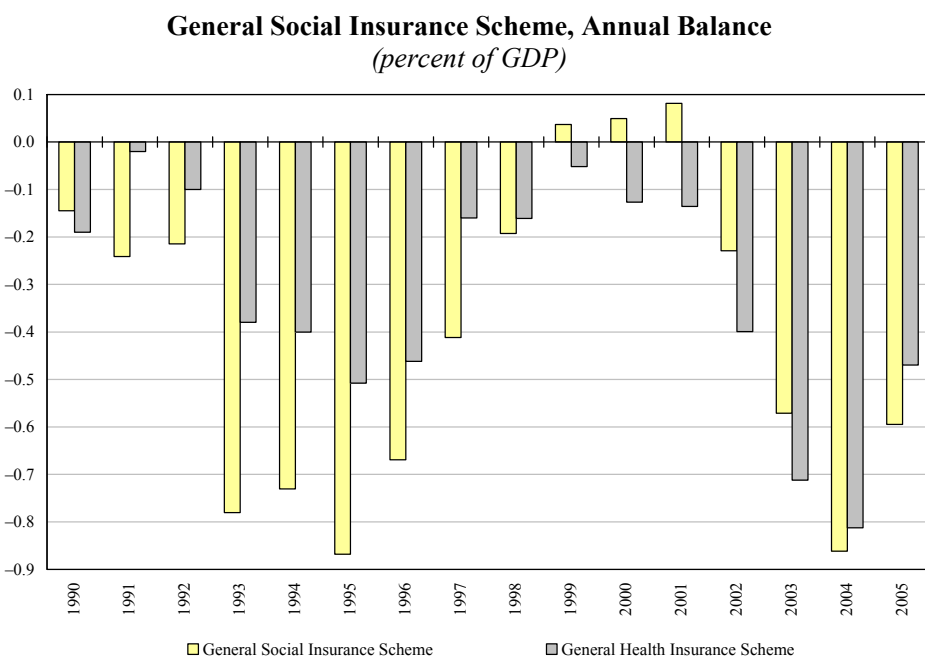
Early corrective measures sought to bring the budget back into balance *ex post* by increasing revenue through higher compulsory contributions and the introduction of co-payment (*ticket modérateur* and *per diem* charges for hospital stays). Until the early Nineties, the only budget restrictions were on the block grants to public hospitals. In the ambulatory sector, the government sought merely to limit the rise in practitioners' fees and to reduce drug prices and reimbursement rates. However, these measures were insufficient: practitioners increased the number of surgery visits to maintain their incomes (successfully in real terms between 1985

and 1995), while patients with supplementary insurance remained unaffected. Hospital budgets were kept at artificially high levels due to rigidities and historic budget bases. As a result, health insurance deficits continued to worsen despite the creation of the CSG (a compulsory contribution) in 1991. In 1996, the Juppé Plan undertook a comprehensive reform of the system, introducing more microeconomic measures and wide-ranging budgetary reforms through amendments to the Constitution. It created annual Social Security Financing Acts and national targets for health insurance expenditure (ONDAM). The ONDAM, not being mandatory, is not a cap on expenditure, but it does help to set priorities in the public funding of health care. Health-care spending as a proportion of GDP fell back slightly following the Juppé Plan only to rise again after 1998, partly for cyclical reasons. The lack of credibility of the financial sanctions against practitioners, clinics and drug companies contained in the Juppé Plan is a further factor. Thus, attempts to reform the system with the aim of curbing the growth of health-care spending have failed, achieving only temporary slowdowns followed by a catching-up phase and a return to the previous growth rate.

towards greater alignment of the systems seems to be emerging, since the objectives pursued (potentially contradictory) are the same in all countries: to guarantee universal health care coverage through national solidarity, to ensure high-quality and effective health care, to guarantee a high level of freedom for patients and health care providers, and to keep the public cost of the system under control. As each system prioritises some of these objectives and neglects others, it is not surprising that reforms have varied according to the type of system in place. The 1990 New Public Management reform in the UK introduced competition between health care providers; the Dekker reform in the Netherlands and the Seehofer reform in Germany introduced competition between health insurance funds; in the US, Health Maintenance Organisations (HMOs) have been introduced to encourage insurers and health care networks to integrate.

Policy choices designed to keep the system in equilibrium have also changed over time. The revenue-increasing policies preferred by most European countries in the Seventies and Eighties had the advantage of keeping the structure of health-care systems intact. But they can only go so far, partly because fiscal pressure cannot be stepped up indefinitely and partly because higher social contributions increase labour costs in an economic environment that has become highly international and competitive. In the late Eighties policies started to focus on rationing expenditure. Countries with national health systems (UK and Sweden) showed the way to countries with health insurance systems which, under pressure from European budget rules (first the Maastricht criteria, then the Stability and Growth Pact), sought in their turn to control expenditure growth (1994 Simons Plan in the Netherlands, 1995 Juppé Plan in France, 1992 Seehofer reform in Germany). More recently, Germany has embarked on a wide-ranging structural reform designed

simultaneously to reduce contribution rates and public benefits and to increase co-payment and the assumption of certain expenditure by private supplementary insurance schemes (Schröder, 2003).

Drawing on international experience (Lequet-Slama, 2004), some broad conclusions can be drawn about these reforms. Problems of sustainability exist, whether financial or of a public health nature, whatever the type of health-care system. The mainly macroeconomic reforms of the last twenty years have liberalised most systems by introducing competition (UK, Netherlands) and have achieved greater decentralisation (Sweden, Spain, Italy). However, they have proved insufficient to secure the long-term future of health-care systems. Microeconomic reforms that focus on giving the players involved (patients, insurers, medical staff and drug companies) incentives to change their behaviour are essential in order to improve the way health-care systems currently operate and enable them to face up to the inevitable increase in spending in the years to come. However, government intervention is also essential in order to regulate the system and prevent undesirable effects specific to the health-care sector.

2.   The theoretical context of health care economics

The health-care sector does not work like a normal economic sector. Government intervention is very frequent to make up for the existence of many uncertainties and negative externalities (propagation of disease, links between state of health and poverty, need for an implicit choice between different public spending priorities like education and other categories of social protection, etc.). Health, as both an individual and a collective good, is also at the intersection between a microeconomic and a macroeconomic approach.

In the health-care sector, the many information asymmetries mean that the market does not guarantee the optimum allocation of resources. Moreover, relations in the medical sphere involve three parties (patient, care provider, third-party payer/insurer), making the underlying theoretical model more complex than the dual relation customary in the principal/agent model (Ventelou, 1999). Arrow (1963) points out that the specific features of the health-care sector impede insurance mechanisms, allowing for the emergence of dysfunctions, namely adverse selection, moral hazard and information asymmetry between principal and agent, even though insurance is necessary to cover medical expenditure (Drèze, 1997). Because they have insufficient medical information, patients have to delegate treatment choices to health care providers. This information asymmetry makes demand dependent on supply. If health care providers are paid on a fee-for-service basis and therefore have an incentive to provide as many services as possible, the problem of demand inducement appears (see for example Cutler and Zeckauser, 1999). The information asymmetry between patient and insurer also causes moral hazard (patient's choice of behaviour not disclosed) and adverse selection (information about state of health not shared).

Moral hazard exists when the risk borne by the seller of insurance may be aggravated by the buyer's behaviour. In other words, the hazard appears when people with generous insurance cover spend more than those with no insurance.[3] A risk of over-consumption exists when insurance covers the cost of the chosen tests and treatment without reserve. As a result, they seem to be free of charge *ex post* to both patients and practitioners. The existence of moral hazard has little effect on demand except in cases of doctor-shopping. In contrast, on the supply side Newhouse (1996) shows that doctors tend to choose a larger quantity of care or more expensive treatment when a patient has insurance.

The usual counter to moral hazard is co-payment (*ticket modérateur*, limits on coverage or reimbursement, etc.), but it mainly affects the demand side and generally results in less insurance (Newhouse, 1993). It must therefore be accompanied by regulating mechanisms like exemption from co-payment for certain illnesses or conditions or categories of patient. The key parameter on the supply side is remuneration. Mechanisms designed to make providers more aware of the costs incurred presuppose *ex ante* methods of payment, such as block per-case or capitation payments. In a system where real expenditure is reimbursed *ex post*, providers have no incentive to make an optimal cost/effectiveness trade-off. On the contrary, a fee-for-service system can lead to preference being given to the most expensive technologies and treatments (since they can give the impression of being more effective), without the patient or insurer being able to make a judgment, which aggravates over-consumption. However, while flat-rate salaries may not trigger induced demand, they encourage practitioners to limit the number of their patients or the quality of treatment. Conversely, a fee-for-service system encourages practitioners to maximise their income and to benefit from the rent that their information advantage confers on them (Pauly, 1974). They increase their clientele and the quality of their services since they are in competition, but they also increase the total expenditure funded by the community. The same trade-off between block grant and activity-based payment exists in hospitals. Thus, some countries require the insurer's prior consent before a patient embarks on costly treatment or have introduced *ex ante* funding agreements (fee-for-service payment on the basis of real expenditure is replaced by *ex ante* flat-rate pricing, as in the case of diagnostic-related groups – DRGs – in the US). The development of systems in which care providers and insurers come together in the same organisations is also used to help reduce over-consumption, through health maintenance organisations (HMOs) in the US, health insurance funds in Switzerland and competition between funds in Germany. Practitioners, who have a financial interest in the insurer's profits, have to provide the best possible treatment at the lowest cost. Unnecessary or excessively expensive treatments penalise in the short term, while insufficient or inappropriate treatments penalise in the medium term since they increase the risk of further and potentially greater expenditure. The other side of the coin is that measures to control over-consumption curtail patient freedom, since their choice of

---

[3] Moral hazard also exists when less use is made of prevention. However, several studies show that, on the contrary, the fact of having insurance tends to encourage preventive behaviour with regard to health.

practitioner is limited, and impose greater restrictions on practitioners, who have to comply with treatment guidelines.

Adverse selection has its origins in uncertainty about the future health of any individual and asymmetrical information about that state of health. Buyers of health insurance are better placed to assess their individual risk than insurers. When insurance is optional, insurees have a greater incentive to obtain cover as their risk level rises, causing them to mask their true state of health. Low-risk individuals do not take out insurance because the premiums are too high. As states of health differ throughout the population, private insurers cannot offer the same guarantees in an equitable manner without regulation. They will try to sign up and keep the most healthy and hence low-risk individuals, for example by offering policies to large firms, or specialise in well-reimbursed specialities to the detriment of other, less profitable ones (adverse selection highlighted by Akerlof, 1971). Consequently, they leave the highest-risk individuals to the public system or without insurance, whence the need for regulation (Hsiao, 2000). The market imbalance can even lead to creaming-off. In such cases, government intervention is needed to restore balance. To solve this problem, Rothschild and Steglitz (1976) propose diversified insurance policies with the possibility of an excess for those paying the lowest premiums. However, adverse selection continues to cause a loss of welfare to low-risk individuals, who are unable to find full coverage at a truly attractive price (though Newhouse (1976) is less categorical on this point with reference to the US).

To overcome these difficulties, countries have emphasised universal access to insurance under conditions (premium and coverage) that are independent of the insuree's state of health (though they may depend on other characteristics such as income). But some of this insurance has to be compulsory, at least for a first layer of risk, especially in market-based systems like the one in the US.

3.   The determinants of health-care spending

Although demand is the most important factor explaining the level of health-care spending in both theory and practice, the residue in econometric models is nonetheless still substantial. Other factors not captured by demand variables must therefore be involved. Two of them may be supply factors and institutional factors. This section is in two parts. The first rapidly outlines all the factors that may explain the level and trend of health-care spending. Their relevance will be empirically tested in the second part on a panel of height countries.

3.1   *The determinants of health-care spending in economic literature*

The literature distinguishes three types of explanatory variable among the medium-term determinants of health-care spending, relating to demand, supply and institutional factors. Most existing empirical research takes a macroeconomic approach, looking principally at demand factors. These studies generally focus on

the impact of income, price and demographic effects on the volume of health-care spending. Most of the time, the two other types of determinants are treated residually. The results obtained in all the studies mentioned in this section are reported in Tables 2 and 3 (see below).

Demand factors

• *The income or standard of living effect*

The income effect is measured by GDP per capita and is the principal explanatory variable for health-care spending, whatever the study. However, researchers are not unanimous about the value of the elasticity between health-care spending and income, since estimates do not converge on a single value (Tables 2 and 3). In some studies (Newhouse, 1977; Murillo *et al.*, 1993; Gerdtham and Jönsson, 2000), the elasticity is greater than 1. This property means that health is a luxury good since its expenditure grow faster than the GDP. In other studies (OECD, 1995; L'Horty *et al.*, 1997; Mahieu, 2000), this value is less than 1. The value seems to be sensitive to the modelling method (time series or cross-section between countries) and to the unit of measurement of the variable (PPP or current exchange rates). In all events, demand remains the essential determinant of the growth of health-care spending.

• *The price effect*

In theory, an increase in the price of health-care spending is expected to have a negative impact on demand. Some recent empirical research (Mahieu, 2000; Bac and Cornilleau, 2002) supports this hypothesis. However, several factors related to the health sector economic features, may affect this ratio. First, consumers do not always control their consumption decisions, most of which are taken by the medical profession. Second, insofar as health-care spending can be covered by public and private insurance, consumers do not always face the real price. Third, in some countries like France, prices are not truly fixed by the market since they are at least partially regulated by the government. One way of measuring the price effect in such cases is to take public-sector coverage of health-care spending into account. At given prices, an extension of social coverage entails an increase in health-care spending (L'Horty *et al.*, 1997). All in all, these conflicting effects could cancel out and be reflected in an inelasticity of health-care spending to prices.

• *The demographic effect*

There is a widespread belief that ageing could have an alarming medium-term effect on public spending. Yet a mechanical calculation of what health-care spending would be if the shape of the demographic pyramid were changed (structure effect) shows a moderate impact: it explains only 0.5 to 1 point of the annual rise in spending. However, this approach (all other things assumed to be equal) neglects changes in the structure of consumption by age and changes in

morbidity[4] at a given age. First, there is a positive link between age and medical consumption (the age effect). But the link changes over time: that is the generation effect (differences of behaviour). The sum of both effects gives the period effect, which generates J-curves: recent generations consume more overall than previous generations and not in the same proportions at a given age. From one generation to another, medical consumption increases more and more rapidly with age (Grignon, 2003). These factors confirm that ageing increases expenditure. On the other hand, other factors put into perspective this relation. Ageing is at once a cause and a consequence of rising health care expenditure, making any measurement of its effect on expenditure artificial. If life expectancy increases due to improved survival techniques and technological progress in a given state of health, average expenditure per capita will rise faster than in the mechanical scenario. In contrast, if increased life expectancy is due to improved quality of life linked to fundamental economic and social factors such as nourishment, the labour law, anti-pollution measures, etc., the rise in expenditure per capita will be lower than in the central scenario. Given that studies of morbidity by age tend to show improved health at a given age (Robine *et al.*, 1998; ESPS surveys,[5] 1998), the optimistic scenario could be the dominant one in the medium term.

Population ageing, measured by the number of over-65s as a proportion of the total population, is often included in studies of health-care spending. Nevertheless, its explanatory power is both moderated and likely to disappear in the next coming years. Thus, Hourriez (1993) shows that in France, ageing had an effect between 1980 and 1990. The effect was marginal, however, explaining only one-tenth of the rise in health-care spending over the period, a result confirmed by most recent research (Gerdtham *et al.*, 1995; L'Horty *et al.*, 1997; Blomqvist and Carter, 1997). However, this indicator might in fact capture only the impact of greater life expectancy or the generational effects referred to as "cohort effects". According to the empirical research (L'Horty *et al.*, 1997; Mahieu, 2000), these two effects could fade away in the future. Greater life expectancy could diminish the impact of ageing insofar as the care received by over-80s in the last year of their life is less expensive than the care that people who die younger receive in the last year of their life.[6] And while cohort effects have been marked on post-war generations, which had easier access to health care than previous generations, they are likely to be attenuated because cohorts' behaviour is now becoming more homogeneous. Lastly, in cross-sectional studies, ageing either cannot explain country-by-country differences in health-care spending trends or can do so only marginally (Patkin *et al.*, 1987; Mahieu, 2000).

---

[4]   Morbidity is the set of causes which can produce disease. The morbidity of a population is defined as "the number of the sick or the number of the cases of illness in a defined population at a given time".

[5]   Surveys of an ongoing sample of social insures (EPAS) conducted by public health insurance funds in tandem with the CREDES health and social protection survey (SPS).

[6]   Medical consumption before death declines sharply as the age of death rises (almost 17,000 euros in the last year if death occurs between the ages of 45 and 54, compared with 9,000 euros after the age of 85. Annual expenditure begins to accelerate one year before death.

Supply factors

a) "Exogenous" supply factors

- *Medical density* – The labour factor (measured by medical density or, even more concretely, by the number of practitioners per 1,000 inhabitants) has increased considerably in most countries since 1980 even if levels are not identical (Appendix 3). This sustained growth in supply, parallel with the increase in health-care spending, might suggest that supply creates demand or, to put it another way, that demand is induced by supply. If an agency relationship is assumed to exist between practitioners and patients, this phenomenon should be even more prominent in countries where practitioners are paid on a fee-for-service basis. However, empirical studies, whether cross-sectional or transverse (Gerdtham, 1992; Rochaix, 1997; Jacobzone, 1997), find it very hard to confirm the hypothesis of induced demand. First, a comparison of levels of health-care spending with the number of practitioners shows that countries with a high medical density, like Italy, do not have the highest expenditure. Second, it is apparently not so much an increase in the number of those employed in the sector that affects health-care spending as the organisation of the health-care system. Lastly, medical density may capture directly demand effects. The causal link between health care supply and demand can be reversed. In this configuration, the increase in the labour factor would be due to growing demand from patients, demographic change (an ageing population) or catch-up effects between countries. On this basis, medical density would be correlated with other demand variables and the rise in health-care spending would therefore be only the expression of a consumption need already captured by the income term. Medical density can be measured by other variables like the number of beds per 1000 inhabitants. In theory, a rise in this variable would lead to higher health spending. However, the number of beds declined in most countries without lower health-care spending. This result can be accounted for by the way in which hospitals were funded in the Eighties, *i.e.* with block grants, hence the weak sensitivity of health-care spending to a better allocation of resources.

- *Relative prices* – Relative prices could be both a demand and a supply factor. In the latter case, their effect on health-care spending is ambiguous. Higher prices can encourage practitioners to produce more, causing the volume of expenditure to rise. In a context where practitioners are exposed to competition, it may be in their interest to offer patients higher quality care that may lead to the use of more effective but more expensive drugs, greater prescription and more tests, etc., ultimately causing expenditure to rise. This is all the more plausible in health-care systems where the patient bears little of the funding burden and where the practitioners' degree of freedom is high. But higher prices can also allow the practitioners to work less for the same income, which would in fact cause the volume of expenditure to fall.

b) "Endogenous" supply factors

The hypothesis that technological progress has an impact on health-care spending dates back to Manning *et al.* (1987) and Newhouse (1992) and has since been borne out by many other studies (L'Horty *et al.,* 1997; Mahieu, 2000; Jones, 2002; Okunade and Murthy, 2002). However, it is difficult to determine from first principles whether the elasticity between health-care spending and the advance and spread of technological progress in the health sector is positive or negative. First, technological progress is difficult to measure and is badly represented by the available proxies. Besides, most of the time, the impact of technological progress is generally measured by difference, once the effects of other determinants have been identified. Second, it is not always clear whether technological progress is a supply factor or a demand factor, making it difficult to say whether elasticity will be positive or negative.

• Considering health care to be a service not a good, and insofar as technological progress spreads less rapidly in the tertiary sector, a higher volume of jobs will be needed in the sector. Assuming that remuneration is homogeneous between sectors, this higher volume of jobs implies a higher relative cost. This is an application to the health-care sector of Baumol's model of unbalanced growth (Baumol, 1967). If the model is validated in practice, the elasticity between health-care spending and technological progress will be positive.

• Another effect of technological progress is to identify and treat more diseases. The appearance, diagnosis and treatment of new or hitherto unknown diseases could increase health-care spending. In that case, the elasticity will also be positive.

• Technological progress can also be reflected in greater efficiency and productivity (prevention through vaccination, more effective treatment). In that case, the elasticity between health-care spending and technological progress will be negative.

As a general rule, when the technological progress variable is significant in a model, it produces a demand effect with a positive but relatively low-value elasticity, much smaller than that of income per capita (L'Horty *et al.,* 1997; Mahieu, 2000). Another question is who will benefit from the innovations generated by technological progress. If it is young people, and if such innovations mean that long-term illnesses are prevented, their cost will be moderate in the short term and remain so in the longer term. But if, as is the case today, they continue to be concentrated on the oldest people, who make up a growing proportion of the population, the trends observed over the last 10 years will be amplified and health-care spending will continue to accelerate (Grignon, 2003).

Institutional factors

Institutional factors include not only the structure of the health-care system, which mainly concerns coverage of the population, and the way in which

practitioners are paid but also the way in which health-care spending is funded as between government, private insurance and the patients themselves. Empirical estimates highlight three stylised facts:

• extending social coverage increases expenditure. L'Horty *et al.* (1997) show that extending social coverage by one point induces a 2 per cent rise in the volume of expenditure;

• in countries where practitioners are paid on a fee-for-service basis, health-care spending is higher than in countries that use the capitation system (Mahieu, 2000; Bac, 2004);

• health-care spending falls as the share of spending borne by the private sector rises. Bac (2004) shows for example that a one-point increase in the share of health-care spending borne by households induces a 1.4 per cent drop in health-care spending.

Table 2

Panel and Pooled Estimations

	GDP	Relative price	Demography	Financing	Technical progress	Beds
Hitiris (2004)						
1960-1990	1.070		0.590	0.270		
1960-1994	1.100		1.030	1.010		
Bac and le Pen (2002)						
OLS	1.210	–0.001				
Adjusted OLS	1.210	0.001				
FMOLS	0.940	–0.460				
DOLS	1.140	0.146				
Atella and Marini (2004)						
Static model (1)						
OLS	1.262	–0.452	0.027	0.342	–0.006	
Within	1.017	–0.834	0.640	0.770	0.013	
GLS	1.030	–0.819	0.327	0.745	0.012	
Static model (2)						
no distinction	0.878	–0.091	0.207	0.361	0.017	
NHS	0.858	0.099	–0.761	0.458	0.017	
non-NHS	0.895	0.174	0.606	0.069	0.021	
Dynamic model						
OLS	0.392	0.150	0.394	0.395		
Within	0.395	0.197	0.581	0.333		
FD-2SLS	0.272	0.125	0.996	0.349		
Within 2SLS	0.366	0.237	0.636	0.372		
2SLS	0.363	0.225	0.543	0.399		
Gerdtham and Jönsson (2000)						
General model	1.217	–0.463	0.341			0.003
Reduced model	1.222	–0.448	0.356			
Mahieu (2000)						
	0.66	–0.630			0.05	
Bac and Cornilleau (2002)						
	0.98	–0.770				

Table 3

Time Series Estimations

	GDP	Relative price	Financing	Technical progress	Medical density	
					Practicians	Beds
Murillo *et al.* (1993)						
Germany	1.41	−0.51				
Belgium	1.36	−0.59				
Denmark	1.13	0.06				
Spain	1.95	−0.60				
France	1.36	−0.64				
Ireland	2.17	−0.78				
Italy	1.34	−0.29				
Netherlands	1.23	−0.55				
UK	1.61	−2.21				
Mahieu (2000)						
France		−0.40		0.35	1.03	
Germany		−0.28		0.59	0.30	
Netherlands		0.07		0.23	0.15	
United States		−0.19		0.08	1.45	
Italy		0.32		0.48	0.83	
Denmark		0.03		0.24	0.64	
L'Horty *et al.* (1997)						
France	1.51	−1.48	0.009		0.14	
	1.04	−1.24	0.02			0.21

3.2 The results of econometric estimates for eight industrialised countries

Method and data

This section aims to contribute to the debate on the short- and medium-term determinants of health-care spending by proposing estimates for eight industrialised countries (France, Germany, Italy, Netherlands, Sweden, United Kingdom, United States and Canada). The econometric method used is thoroughly traditional except for the fact that it is based on time series, less common where health-care spending is concerned than a cross-sectional approach. The choice is not an arbitrary one. It was motivated in particular by the results of a previous cross-sectional study (Hervé and Maréchal, 2004), which proved to be rather unconvincing. Disparities between countries are such that, in the model used, after GDP per capita it is country fixed effects that do most to explain health-care spending trends in each one. Moreover, using time series makes it possible to estimate a specific relation for each country and to consider a greater number of explanatory variables. The data are annual and taken from the OECD 2004 health economics database (See Appendix 4). As long-period data are not available, it was not possible to carry out a satisfactory multivariate estimate. The estimates were therefore carried out in two stages in the manner of Engle and Granger over the period 1980-2002. The first stage was to

estimate a level relation between volume health-care spending per capita and the explanatory variables, using ordinary least squares. The stationarity of the residuals of the long-term relation was then tested using a Dickey-Fuller cointegration test. The results of this first step estimation are reported in Table 4. In the second stage, if the unit root null hypothesis was rejected and the residuals were stationary, they were introduced into an error correction model to determine the short-term dynamic (Table 5).

In the medium term, demand factors explain most of the level of health-care spending

Income per capita is unarguably the chief determinant of the level of health-care spending in the medium and long term. The variable is significant for the eight countries studied. In the US and in Canada, the estimated elasticities are less than one and lower than those of the European countries in the sample, respectively 0.76 and 0.58. In Europe, the elasticity is close to 1 and actually exceeds 1 for the UK (1.03) and Germany (1.17). This result bears out the hypothesis that health is a superior good. However, the elasticities estimated in our study are slightly lower than those of Murillo *et al.* (1993), who found elasticities significantly greater than 1 for all the countries in their study. But the comparison is tricky because our estimates concern a more recent period. Indeed, the variance in income per capita may be supposed to be smaller in our sample than in that of Murillo *et al.* (1993) because of the catching-up in living standards that occurred in the Eighties and Nineties. Our results are borne out by those of Herwartz and Theilen (2003), who show that the elasticity between health-care spending and income per capita has decreased substantially since the early Eighties. In contrast, they explain this phenomenon by the fact that demand came up against restrictive supply policies in the Eighties and Nineties. A more recent study (Mahieu, 2000), using cross-sectional data, produces similar results and concludes that the elasticity between health-care spending and income per capita is approx. 0.9 and hence less than 1.

Relative prices, when significant, have negative elasticity, reflecting a demand effect. In France and in Sweden, the elasticity between health-care spending and relative prices is respectively –0.43 and –0.55. Murillo *et al.* (1993) obtain a similar elasticity for France. The number of surgery visits per capita has an impact in three of the eight countries studied namely Italy (0.23), France (0.49) and Sweden (1.05). In the case of France, in a context that facilitates access to health care, the increase in the number of surgery visits seems to bear on health-care spending. In Italy, the number of surgery visits has fallen over time, but as the initial level was the highest at the beginning of the period, that can explain the high level of health-care spending (base effect). The ageing variable appears to have little significance, a result consistent with all the empirical studies in the literature, except in the Netherlands, where its impact is minimal. A one-point increase in the proportion of the total population represented by the over-65s appears to cause a 0.5 per cent rise in health-care spending. Ageing also seems to have an effect in France, with a relatively low elasticity of 0.3, though only if the measurement is based on the proportion of the population aged over 80 (and not over 65).

<div style="text-align: right">**Table 4**</div>

Long-term Regressions
Long-term Relation

Explanatory variables	France	Germany	Italy	Netherlands	Sweden	UK	US	Canada
Revenue per capita	0.92	1.16	0.93	0.79	0.88	1.03	0.76	0.58
	(6.31)	*(17.65)*	*(4.73)*	*(8.00)*	*(5.34)*	*(7.46)*	*(13.69)*	*(13.99)*
Medical Consultation	0.49		0.23		1.05			
	(2.78)		*(5.83)*		*(3.64)*			
Aged	0.32			0.52				
	(2.55)			*(2.09)*				
Relative Price	−0.45				−0.56			
	(−1.69)				*(−3.88)*			
Practicians					0.58	0.35		
					(2.76)	*(3.46)*		
R&D	0.03						0.07	0.03
	(1.85)						*(1.69)*	*(1.49)*
Scanners			0.12					
			(4.72)					
Priv		−0.62	−0.29			−0.27		−0.55
		(−7.86)	*(−4.35)*			*(−4.08)*		*(−4.18)*
Cover				0.46			0.7	
				(4.12)			*(6.04)*	
Cointegration test								
t-stat	−3.76	−3.08	−5.01	−4.99	−4.37	−3.78	−4.54	−2.63
Critical values								
1% level	*−3.77*	*−3.77*	*−3.81*	*−3.83*	*−3.79*	*−3.77*	*−3.79*	*−3.79*
5% level	*−3.00*	*−3.00*	*−3.02*	*−3.03*	*−3.01*	*−3.00*	*−3.01*	*−3.01*
10% level	*−2.64*	*−2.64*	*−2.65*	*−2.66*	*−2.65*	*−2.64*	*−2.65*	*−2.65*
Adjusted R squared	0.995	0.947	0.985	0.987	0.963	0.982	0.978	0.977
Standard error	1.67%	2.31%	2.27%	1.72%	3.75%	2.32%	2.00%	2.05%
Durbin-Watson stat	1.59	1.28	1.36	1.34	1.70	1.39	0.95	0.95

Supply factors have little significance

The number of practitioners appears to have little or no significance in the majority of empirical studies. This finding is borne out in our study, insofar as the variable is significant for only two countries, Sweden and the United Kingdom. There was a substantial increase in the number of practitioners in these two countries between 1990 and 2000, making up for previously imposed restrictions. Technological progress, as we have already said, is not easy to measure. We have used two variables in this study: the share of GDP allocated to research and development (R&D) in the health-care sector and the number of scanners. In France, the United

States and Canada, R&D appears to have played a part in the rise in health-care spending, though the effect remains marginal. Higher R&D spending appears to have caused a rise in health-care spending of 0.03 per cent in France and Canada and 0.07 per cent in the US. This result is close to that of Mahieu (2000) for the United States (0.08), though less so for France (0.35). In Italy, it is the number of scanners that appears to be significant. The figures (Appendix 3) show that Italy had about the same number of scanners as other countries in 1980 but that the number has increased considerably over 20 years and was substantially higher than in other European countries in 2002.

Table 5

Short-term Dynamic
Error Correction Model

	France	**Germany**	**Italy**	**Netherlands**	**Sweden**	**Canada**
Short term coefficients						
Revenue per capita	0.31	0.41	0.81	0.38		0.15
	(1,42)	*(2,62)*	*(1,93)*	*(1,78)*		*(1,39)*
Medical Consultation	0.36		0.14		0.7	
	(3,41)		*(1,79)*		*(3,51)*	
Aged		0.15				
		(1,29)				
Relative Price	−0.27	−0.73		−0.23	−0.32	
	(−1,42)	*(−1,59)*		*(−0,92)*	*(−2,23)*	
Practicians	0.09				0.33	
	(1,52)				*(1,89)*	
Beds					*0.37*	
					(1,58)	
R&D	0.02					
	(1,69)					
Scanners			0.07			
			(1,19)			
Priv			−0.14			−0.47
			(−1,45)			*(−2,91)*
Cover				0.31		
				(2,72)		
ECM coefficient	−0.75	−0.79	−0.75	−0.63	−0.72	−0.48
	(−3,95)	*(−2,88)*	*(−2,13)*	*(−2,90)*	*(−3,79)*	*(−3,22)*
Adjusted R squared	0.55	0.37	0.44	0.41	0.51	0.52
Standard error	1.03%	2.29%	2.02%	1.43%	2.08%	1.18%
Durbin-Watson stat	1.63	1.59	1.59	1.55	1.82	0.93

Institutional factors are more or less significant in the different countries

In the United States and the Netherlands, the extension of social coverage could cause an increase in health-care spending. In the United States, where social coverage is low, a one-point extension would cause a 0.7 per cent increase in health-care spending. In the Netherlands, the increase would appear to be only 0.46 per cent. In the other countries studied, social coverage is not a significant factor. This can be explained by the fact that the social coverage rate in those countries was already over 90 per cent in 1980, whereas in 2002 it was only 70 per cent in the Netherlands and 20 per cent in the United States. The proportion of health care expenditure covered by the private sector is significant in estimations for Italy, Germany, the UK and Canada. In these countries, the increase in private funding appears to have contributed to limit the rise in health-care spending between 1980 and 2002. A 1 per cent increase in the health-care spending assumed by the private sector appears to curb expenditure by 0.27 per cent in the UK and 0.29 per cent in Italy. The impact in Canada and Germany is double that, with respective elasticities of –0.55 and –0.62.

The short-term results are relatively similar to the medium-term results: increases in health-care spending are mainly attributable to demand factors

Growth in income per capita or GDP explains change in health-care spending in five out of eight countries (France, Italy, Germany, Netherlands and Canada). With the exception of Italy, however, the elasticity between expenditure and income growth is much lower than in the long term. Relative prices have a short-term impact in France and Sweden, the Netherlands and Germany. For the first three countries, the elasticity between health-care spending and relative prices ranges between 0.2 and 0.4, a result consistent with those of other studies (Mahieu, 2000). For Germany, in contrast, the elasticity is greater than 0.7. Whereas ageing is a significant factor for France and the Netherlands in the medium and long term, it is not in the short term. In contrast, it seems to have an impact, albeit rather small, on the rise in health-care spending in Germany. A one-point increase in the proportion of the population aged over 65 appears to cause a 0.15 per cent rise in health-care spending. Results for the other variables (number of practitioners and surgery visits, R&D, number of scanners, institutional factors) are almost identical to medium- and long-term results.

Health-care spending mainly reflects variables that represent economic development (income per capita, technological progress) and structural patterns (demography). It is hardly conceivable to run counter to these determinants. In fact, the reforms that have been implemented in a number of countries have focused on other factors. Yet, as already shown in this paper, these factors have hardly affected the level and change in health-care spending. These results make it possible to understand why past macroeconomic reforms failed to yield satisfactory results and why policies have been shifting towards microeconomic measures which focus on the behaviour of health care actors.

4. What could be the characteristics of an effective reform in France?

The French health-care system has undergone many transformations as a result of the numerous reforms to which it has given rise. Now, almost the entire population has health insurance cover for a minimum basket of health care services. Equal access to health care for all seems guaranteed. In contrast, the level of public coverage has diminished over time, especially for ambulatory care, with some of the cost of routine treatment being transferred to the private sector. This privatisation has generated a new problem of inequality that universal coverage does not entirely solve. The way in which the system is funded has changed since social security contributions from wages were replaced by the CSG, a tax on all income. There has been a switch from a system based on insurance to a system based on national solidarity at least for the first layer. The central government has been much more involved in regulation since the 1995 Juppé Plan. That set of reforms successfully initiated a change in the way health care providers are funded by introducing market mechanisms. Thus, hospitals benefit from activity-based pricing (via PMSI, the French equivalent of DRG) and drug prices have been gradually freed in the hope that higher prices will result in less consumption. Overall, the French health system has converged on those of other countries, with a first layer approximating to the public-integrated model (universal entitlement, funding out of tax revenue) and a

Figure 5

Per Capita Pharmaceutical Expenditures and GDP, 2001
*(US dollars, 1996 exchange rate)*
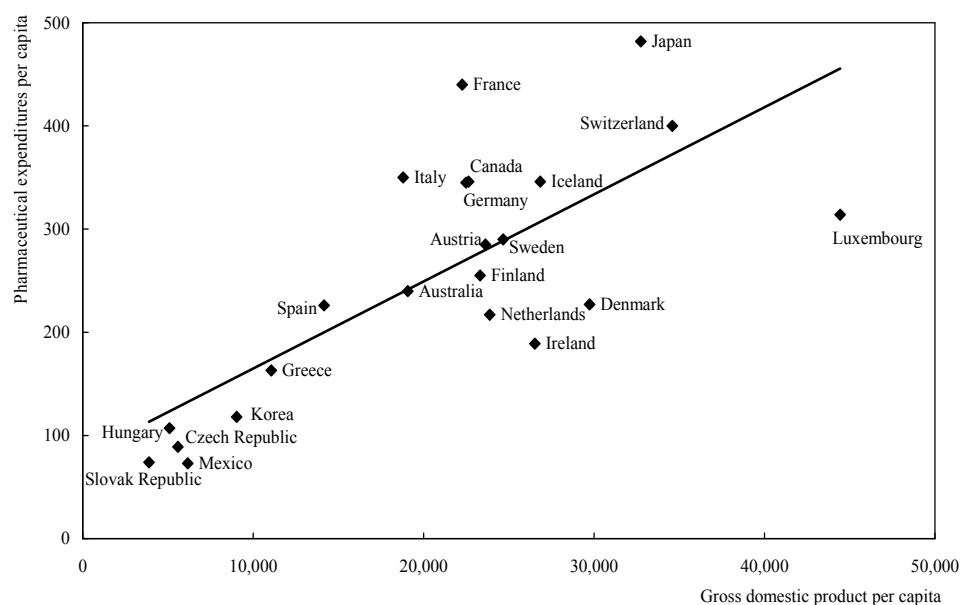
second, partly privatised layer in a context of regulation by performance and competition between health care providers.

But even these far-reaching changes have not managed to curb the surge in health-care spending, on the contrary, a situation which most studies attribute to a set of factors. Although government involvement in regulation has increased (creation of ONDAM and of social security finance acts), there is no *a priori* means of limiting the budget or ensuring that players in the health-care sector comply with it. Resistance or non-cooperation by the medical professions and drug companies is holding back the success of structural reform. More specifically, it seems difficult to call into question the method of payment for ambulatory care and the freedom of patients and practitioners. Lastly, in France, drug spending to GDP ratio is one of the highest (Figure 5). Moreover, drug spending is also one of the fastest-rising items of expenditure (Figure 6) and great changes have taken place in the pharmaceutical sector recently, with the advent of globalisation and consolidation.

Several avenues of reform have been proposed in the literature, some of them already included in the Douste-Blazy reform of 2004. Patient monitoring through personalised medical records and the choice of a primary practitioner coupled with better quality health care can help to rationalise health-care spending and achieve greater cost-effectiveness. However, some specialists on the subject (Cercle des

Figure 6

Pharmaceutical Expenditures
(percent of total health-care expenditures)

□ 1980   ▨ 1990   ▨ 1995   ■ 2002
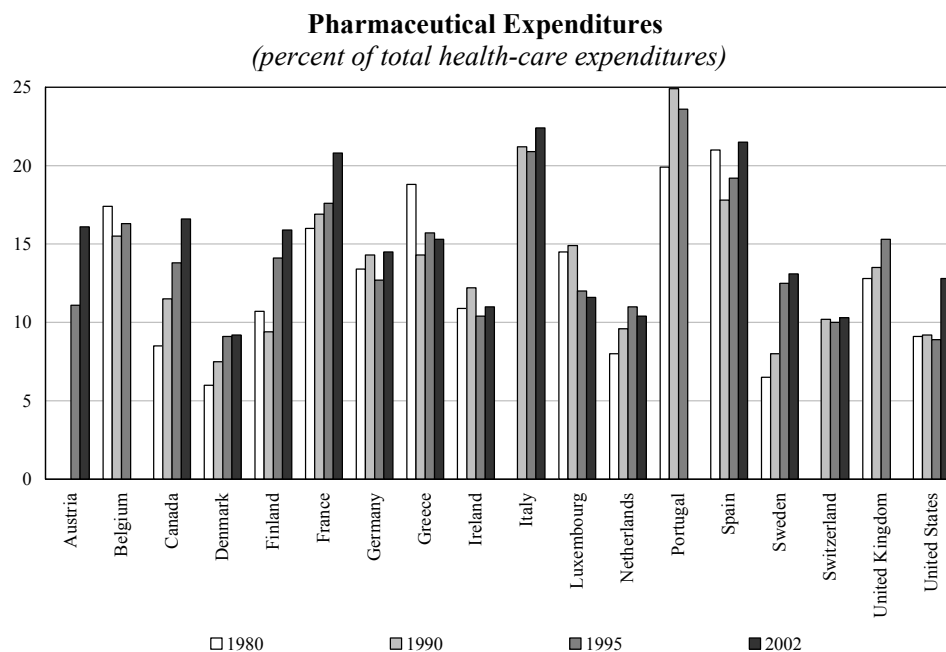
Economistes, 2004) do not believe that these measures are sufficient to bring the system under lasting control. The 2004 reform, which some regard as incomplete, would arguably bring about only a temporary restoration of health care finances. A short-term improvement linked to a cyclical upturn and the hoped-for savings could occur. But the trend towards a steady rise in health-care spending would not be reversed and the difficulties of funding the system would reappear in the medium term (Cornilleau and Ventelou, 2004).

The main thrust of reform should be to revise the current principles of ambulatory medicine by changing the way in which practitioners are paid, adapting their freedom of establishment and proposing closer links between insurers and health care providers. In addition, the scope of national solidarity should be strictly defined, especially as population ageing is likely to increase the proportion of treatments that the market is not willing to insure (long-term illnesses, geriatric ailments, etc.).

The proposals put forward in the literature (Cercle des Economistes, 2004; Artus, 2004; Imai *et al.*, 2000; Ulman, 2004) draw on the experience of other countries:

•   create health care centres where surgery visits can take place, treatment can be dispensed and tests and small operations performed, so as to optimise costs;

•   develop groupings of health care providers and insurers so as to raise practitioners' awareness of health care costs, or even link their pay to the cost-effectiveness of the service they provide;

•   support innovation and R&D for drugs and bio-technologies by encouraging the creation of industrial centres (European "bio-clusters" along the lines of those in the United States, meaning the concentration of independent firms in the health-care sector);

•   develop tools to assess the performance of practitioners, hospitals and drugs;

•   define more precisely the role of players in the system (insurers, health care professionals, government) so as to get away from a "co-irresponsibility" mindset (Mougeot, 1999);

•   promote prevention (vaccination, campaigns against tobacco and other narcotics, cancer screening, regular check-ups, etc.);

•   introduce incentives to limit expenditure in private insurance (bonus-malus schemes, excess payable by the insuree, etc.).

This list, which does not of course pretend to be exhaustive, shows that current thinking is clearly heading in the direction of microeconomic solutions. However, it is unlikely that a miracle solution can be found that will lead in the short term to any significant modification of trends that twenty years of assiduous reform have been unable to reverse for more than a few months. Other countries' experiences may be a source of inspiration but they confirm that fundamental changes resulting from structural reform of a health-care system take a long time to come about and that their effectiveness does not become apparent for many years.

APPENDIX 1

Figure 7

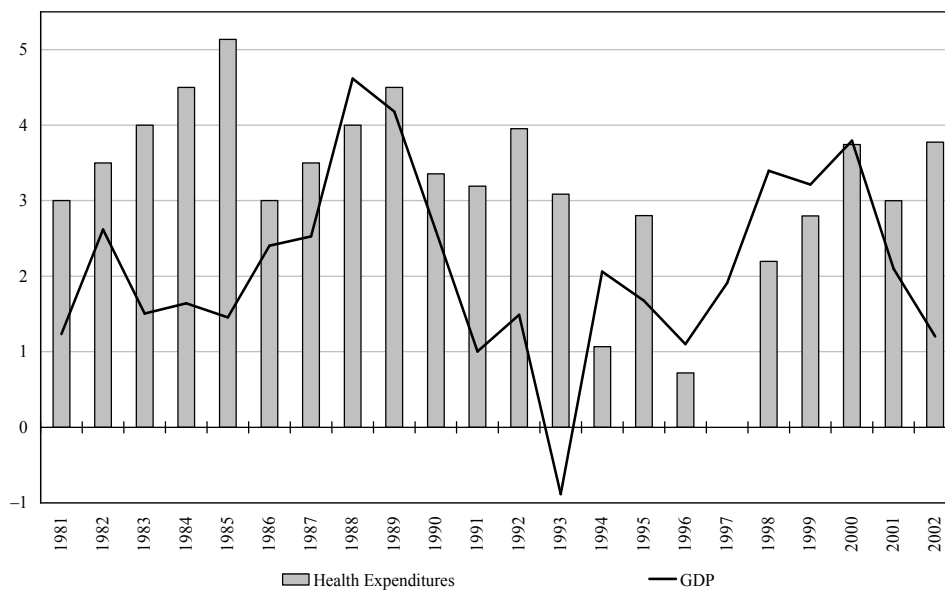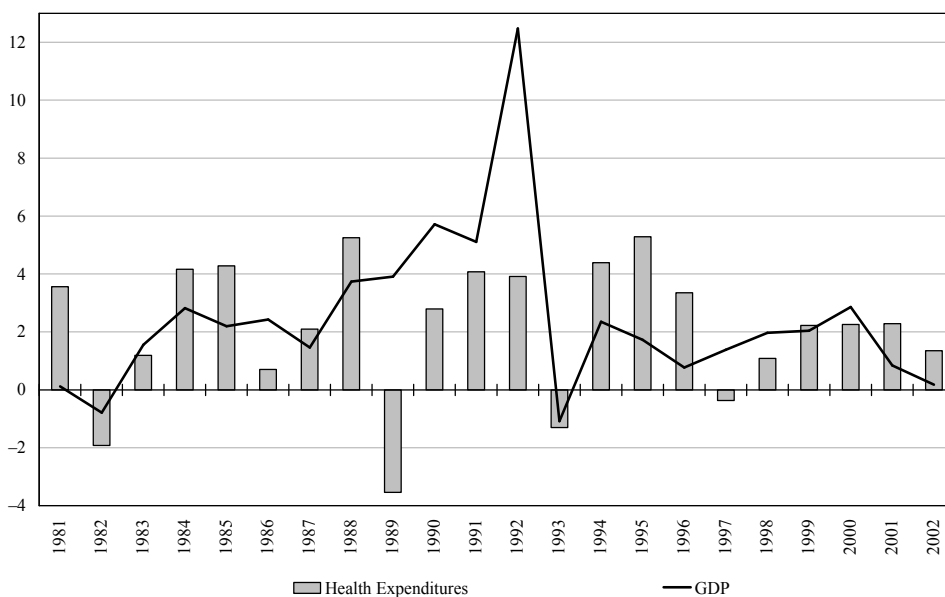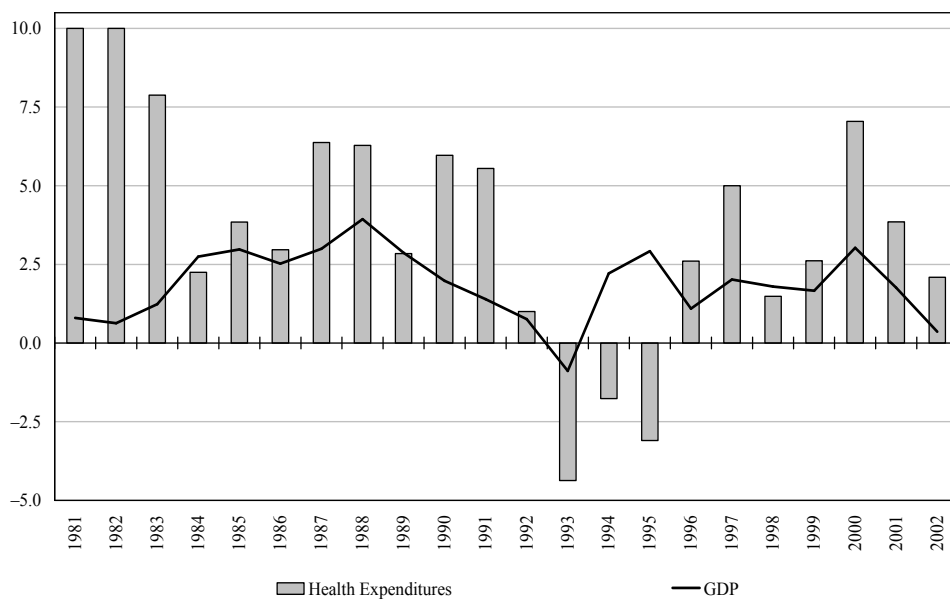**Total Real Health Expenditure and Real GDP Growth**
France

Germany

Figure 7 (continued)

Total Real Health Expenditure and Real GDP Growth
Italy

☐ Health Expenditures ——GDP

Sweden

☐ Health Expenditures ——GDP

Total Real Health Expenditure and Real GDP Growth
Netherlands

Canada

Total Real Health Expenditure and Real GDP Growth
United Kingdom
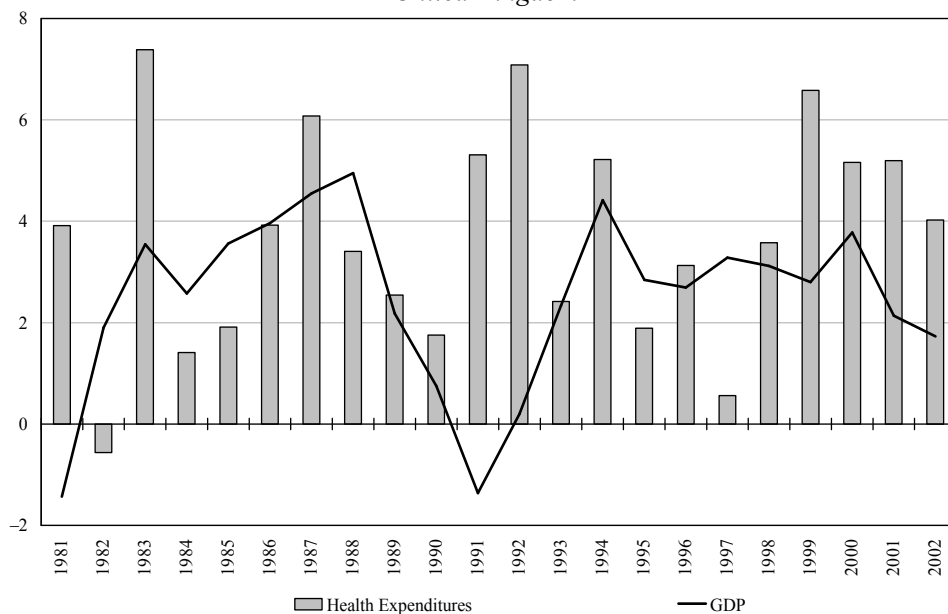
United States

APPENDIX 2
HISTORY OF HEALTH SERVICE REFORMS IN FRANCE SINCE 1975[7]

In the early Seventies, a freeze on health care prices (bed-day prices in hospitals, practitioners' fees that rose more slowly than wages, drug prices aligned on the lowest) caused players in the health-care sector to adapt their behaviour. Hospital stays became longer, drug prescriptions increased and priority was given to the newest treatments, while the number of surgery visits increased so that practitioners could maintain their income. These habits are at the origin of the successive reforms and current rigidities of the health-care system.

First Period: Demand-centred Actions	
Plan Durafour (December 1975)	Reduction in VAT on drugs
Plan Barre (September 1976)	Increase in co-payment (*ticket modérateur*)
Plan Veil (April 1977 - December 1978)	Increase in contributions and reduction in the rate of refund on certain non-essential drugs
Plan Barrot (July 1979)	
Plan Questiaux (November 1981)	Increase in compulsory contributions through social security charges and earmarked taxes like those on alcohol and tobacco
Plan Bérégovoy (November 1982 - March 1983)	Introduction of the *per diem* fixed charge for hospital stays (*forfait hospitalier*), increase in co-payment, introduction of contribution on unemployment benefits
1984	Introduction of block grants for hospitals
Plan Dufoix (June 1985)	
Plan Séguin (June 1986 - May 1987)	Some "convenience" drugs no longer reimbursed, restrictive revision of the list of illnesses giving exemption from co-payment, exceptional contributions, plan to rationalise expenditure
Plan Evin (September 1988)	Regulation of alcohol and tobacco advertising, tighter conditions for access to Sector II (unregulated fees)
Plan Rocard-Evin (December 1990 -1991)	Some drugs no longer reimbursed, introduction of the CSG, tax on pharmaceutical advertising
Plan Bianco (June 1991)	Increase in wage-based contributions and the hospital *per diem* charge, some drugs no longer reimbursed, introduction of National Quantified Targets (agreements between public health insurance funds and ambulatory doctors to control expenditure)

---

[7]   This list draws in particular on Ventelou (1999), Imai *et al.* (2000) and Sandier *et al.* (2004).

Second Period: **Strategies for Controlling Health-care Provision by Contractual Means**	
Loi Teulade (December 1992)	Introduction of mandatory medical guidelines (RMO) setting out recommended treatments for certain illnesses
Plan Veil (August 1993)	Conclusion of the first price-volume regulation agreements with drug companies, increases in hospital *per diem* charge, co-payment and CSG
Plan Juppé (November 1995 and 1996 ordinances)	Government given a greater role through the introduction of ONDAM (national health spending targets covering ambulatory doctors, private clinics and cash benefits) and parliamentary control over social security via the annual voting of a Social Security Finance Act, creation of personal medical record, computerisation, care groups, policy of penalising ambulatory practitioners in the event of budget overruns (from 1997), creation of supervisory agencies (ANAES, under the aegis of the Health Ministry), redeployment of hospitals, RDS levy and exceptional contribution for practitioners, increase in *per diem* hospital charge, *ex ante* funding of hospitals based on performance and activity via PMSI (French equivalent of DRG)
Aubry measures (Social Security Finance Act for 1998)	Authorisation for pharmacists to replace practitioner-prescribed drugs by generics, incentives for patients to choose primary practitioners, computerisation of doctors' surgeries, introduction of the VITALE card, shift of employee health insurance contributions to CSG, mandatory regional spending targets, mandatory reduction of radiologists' fees confirmed in the Social Security Finance Act for 1999
Aubry measures (1999)	Hospitals managed by the state, ambulatory care by the CNAMTS, introduction of regional hospitalisation agencies (created by the Juppé Plan) responsible for relations with private hospitals, DRG payments encouraged, exceptional contribution levied on drug companies' sales
1999	Legislation introducing universal coverage (effective from 1 January 2000), meeting of all the players in the health-care sector called by the government
2001 (Secretary of State for Health: D. Gillot)	Meeting of all the players in the health-care sector called by the government

Third Period: Redefinition of the Scope of Public Coverage and Incentives for Responsible Behaviour	
2002	"Hospital 2007" plan: activity-based pricing, greater autonomy in HR management, greater investment, simplified planning
Plan Mattéi (2003)	Reduction in rate of refund for many drugs, acknowledgment of the failure of cost control policies and consequent relaxation of ONDAM, increase in practitioners' fees (20 euros for a surgery visit), gradual freeing of drug prices
Social Security Finance Act for 2004 (September 2003)	Creation of the high council for the future of health insurance, increase in tobacco taxes, increase in *per diem* hospital charge (13 euros instead of 70 FF since 1995), reduction in the rate of refund for certain drugs deemed to be of insufficient medical value, tighter definition of long-term illnesses exempt from co-payment and exclusion of pre- and post-operatory care
Douste-Blazy reform (August 2004)	Greater coherence of health-care provision (personalised medical record, coordination of treatment around a primary practitioner, best practice guidelines, higher charges for several types of medical consultation), promotion of generic drugs, gradual introduction of flat fees, modernisation of hospital purchasing, tighter controls on doctor's certificates, out-of-pocket payment by patients of a non-reimbursable 1 euro fee, annual 1 euro increase in *per diem* hospital charge for three years, new revenue (extension of the tax base for the CSG, increase in the corporate social security levy)

APPENDIX 3
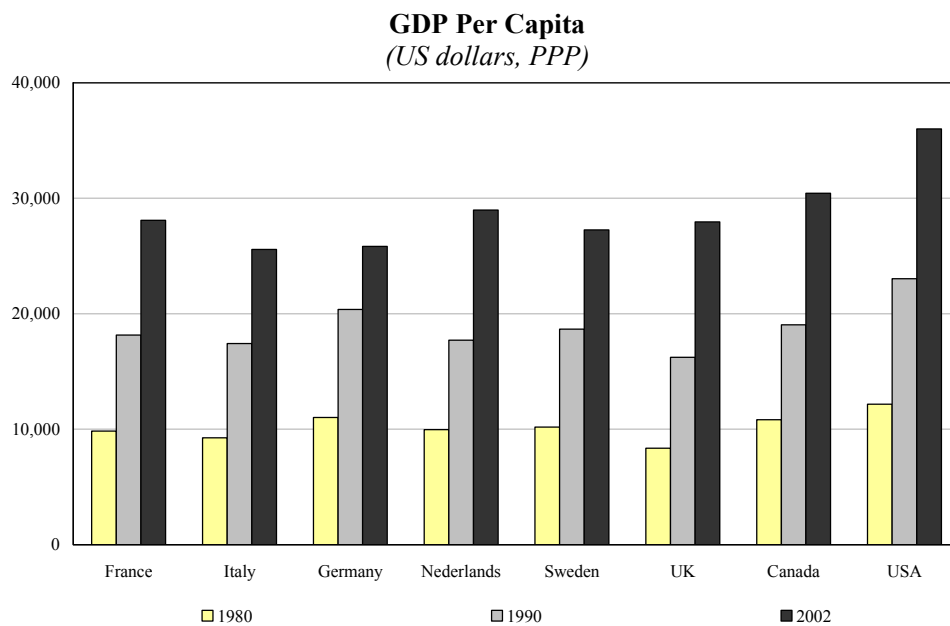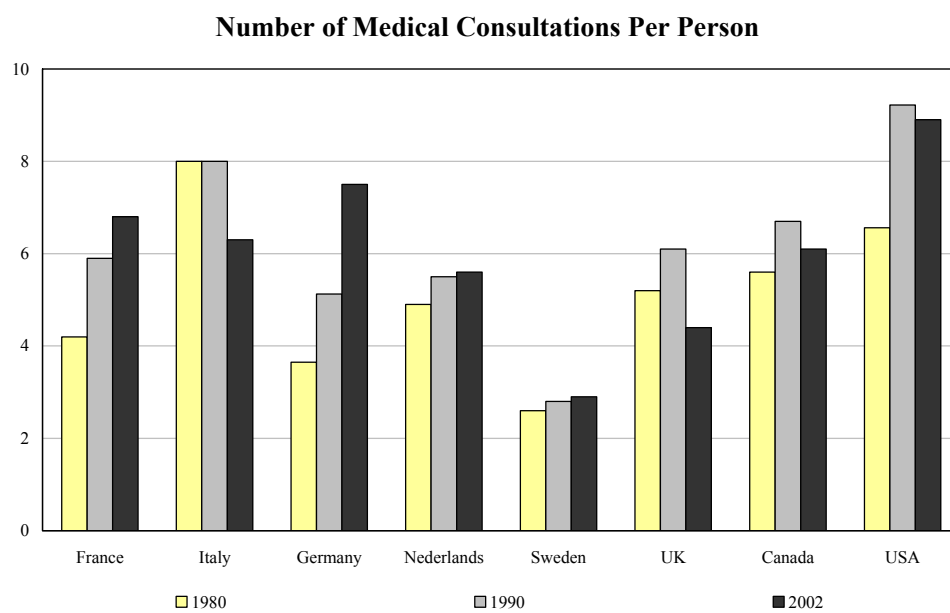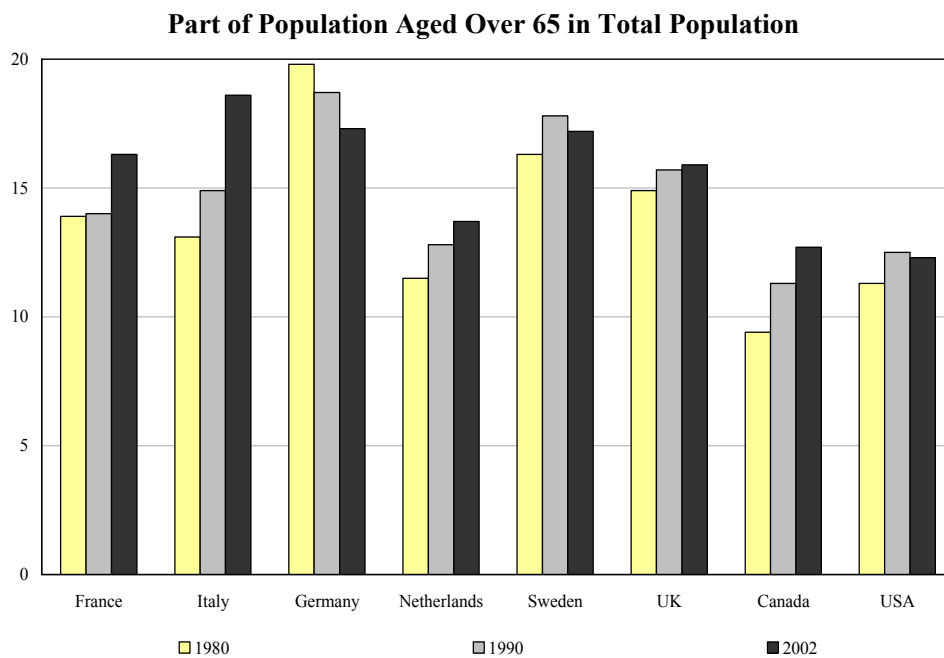## EVOLUTION OF THE MAIN DETERMINANTS OF HEALTH EXPENDITURE

Figure 8

GDP Per Capita
(US dollars, PPP)

□ 1980   □ 1990   ■ 2002

Figure 9

Number of Medical Consultations Per Person

□ 1980   □ 1990   ■ 2002

Figure 10

Part of Population Aged Over 65 in Total Population

☐ 1980   ☐ 1990   ■ 2002

Figure 11

Part of Population Aged Over 80 in Total Population

☐ 1980   ☐ 1990   ■ 2002
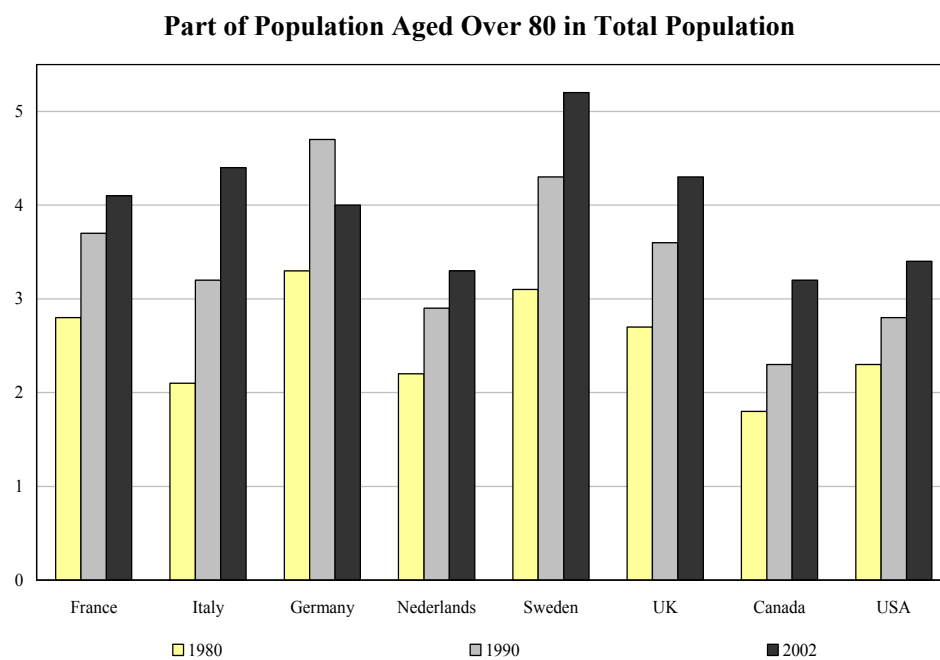
Figure 12

Relative Prices (Health Expenditure on Consumers' Prices)
(1995 = 100)

| □ 1980 | □ 1990 | ■ 2002 |
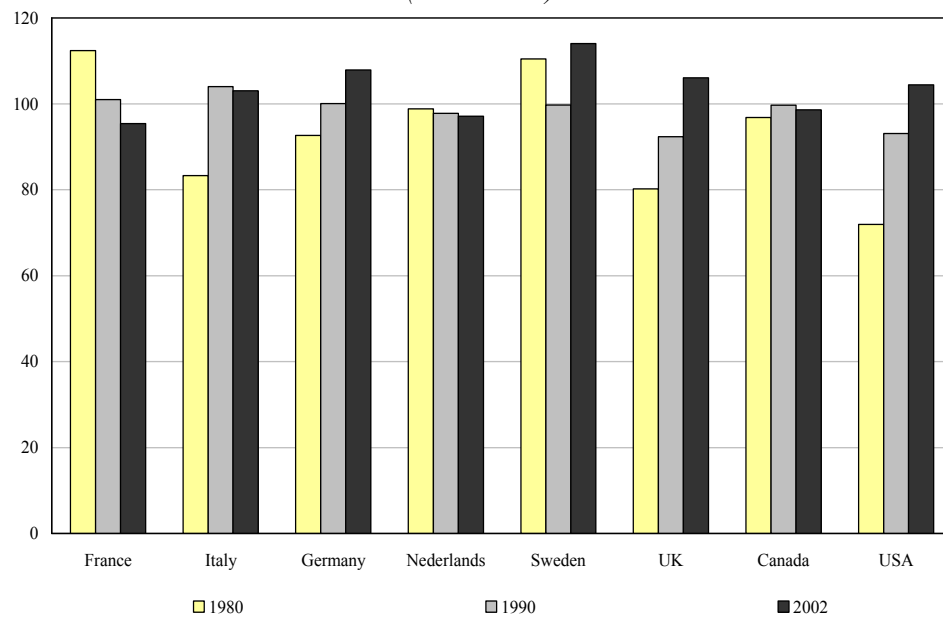
Figure 13

Number of Practitioners for 1,000 Persons

| □ 1980 | □ 1990 | ■ 2002 |

Figure 14

Part of RD Devoted to Health
(percent of GDP)

France   Italy   Germany   Nederlands   Sweden   UK   Canada   USA

☐ 1980   ☐ 1990   ■ 2002

Figure 15

Number of Scanners

France   Italy   Germany   Sweden   UK   Canada   USA

☐ 1980   ☐ 1990   ■ 2002

Figure 16

Part of Total Population Covered by Social Security Insurance

France Italy Germany Nederlands Sweden UK Canada USA

☐ 1980 ☐ 1990 ■ 2002

Figure 17

Part of Private Funding in Total Expenditures

France Italy Germany Nederlands Sweden UK Canada USA

☐ 1980 ☐ 1990 ■ 2002

APPENDIX 4
DESCRIPTION OF THE VARIABLES RETAINED FOR THE ESTIMATIONS

Variables	Definitions
EXP	Total expenditure on health *per capita NCU 95 TEH PRICE*
REVENU	GDP per capita US$*95 PPP*
GDP	GDP NCU 95 GDP PRICE
YOUTH	percent of population aged 0 to 14
AGED	percent of population aged 80 and over
AGED65	percent of population aged 65 and over
CONSULT	Visits to practitioners per capita
RELPRICE	TEH Price on CPI, 1995 = 100
PRACTICIANS	Practitioners for 1,000 persons
R&D	Total expenditure on health R&D, *percent of GDP*
SCANS	Number of scanners
BEDS	Acute care beds for 1,000 persons
TURNOVER	Acute care turnover rate-cases per available bed
COV	Public expenditure on health, *percent of total expenditure on health*
PRIV	Private expenditure on health, *percent of total expenditure on health*

REFERENCES

Arrow, K. (1963), "Uncertainty and the Welfare Economics of Medical Care", *American Economic Review*, Vol. 53, pp. 941-73.

Artus, P. (2003), "Quelques pistes pour aider à analyser la réforme de la protection maladie", CDC ixis, September.

———————— (2004), "Fausses pistes et techniques bien connues en assurance", *Les cahiers du cercle des économistes*, No. 6, June.

Bac, C. and D. Balsan (2001), "Modélisation des dépenses d'assurance maladie", DREES, Working Paper, No. 19, October.

———————— (2004), "Les déterminants macroéconomiques des dépenses de santé: comparaison entre quelques pays développés", annexe du rapport Vasselle, Sénat.

Bac, C. and G. Cornilleau (2002), "Comparaison internationale des dépenses de santé: une analyse des évolutions dans sept pays depuis 1970", *Études et résultats*, No. 175, DREES, June.

Besley, T. and M. Gouveia (1994), "Alternative Systems of Health-care Provision", *Economic Policy*, No. 19, pp. 199-258.

Cercle des Économistes (2004), "Économie de la santé: une réforme? Non, une révolution!", *Les cahiers du cercle des économistes*, No. 6, June.

Chambaretaud, S. and L. Hartmann (2004), "Économie de la santé: avancées théoriques et opérationnelles", *Revue de l'OFCE*, No. 91, pp. 237-68, October.

Chronique Internationale de l'IRES (2004), "Réformes des systèmes d'assurance maladie et débats sociaux", No. 91, November.

CNAMTS (2003), "Le vieillissement de la population et son incidence sur l'évolution des dépenses de santé", *Point de conjoncture,* No. 15, July.

Cornilleau, G., C. Hagneré and B. Ventelou (2004), "Assurance maladie: soins de court terme et traitement à long terme", *Revue de l'OFCE*, No. 91, pp. 269-332, October.

Cornilleau, G. and B. Ventelou (2004), "La réforme de l'assurance maladie", *Lettre de l'OFCE*, No. 251, July.

Cutler, D.M. and R.J. Zeckhauser (1999), "The Anatomy of Health Insurance", NBER, Working Paper, No. 7176, June.

Docteur, E. and H. Oxley (2003), "Health-Care Systems: Lessons From the Reform Experience", OECD, Health, Working Paper, No. 9.

Dormont, B. and H. Huber (2005), "Ageing and Changes in Medical Practices: Reassessing Influence of Demography", mimeo, presented at the *Seminar Fourgeaud* of the Direction de la Prévision, 9 February 2005.

Drèze, J. (1997), "Sur la spécificité économique des soins de santé", *Économie et prévision*, No. 129-130, pp. 1-9.

Gerdtham, U. and B. Jönsson (1997), "Les déterminants des dépenses de santé dans les pays de l'OCDE", in S. Jacobzone (ed.), *Économie de la santé, trajectoires du futur*, INSEE, Economica.

Gerdtham, U., B. Jönsson, M. MacFerlan and H. Oxley (1997), "Les déterminants des dépenses de santé dans les pays de l'OCDE", in S. Jacobzone (ed.), *Économie de la santé, trajectoires du futur*, INSEE, Méthode, No. 64-65, March.

Grignon, M. (2002), "Impact macroéconomique du vieillissement de la population sur les dépenses d'assurance maladie en France", *Santé, société et solidarité*, No. 2, pp. 135-53.

————— (2003), "Les conséquences du vieillissement de la population sur les dépenses de santé", *Questions d'économie de la santé*, No. 66, CREDES, March.

Haut Conseil pour l'Avenir de l'Assurance Maladie (2004), rapport, *La Documentation Française*, January.

Hervé, K. and G. Maréchal (2004), "Etudes des déterminants de moyen terme des dépenses de santé: une comparaison internationale", Banque de France, internal document.

Hitiris, T. (1999), "Health Care Expenditure and Cost Containment in the G7 Countries", University of York, Discussion Paper, No. 15.

Hsiao, W. (2000), "What Should IMF Macroeconomists Know About Health Care Policy: A Primer", IMF, Working Paper, No. 00/136.

Huber, M. (1999), "Health Expenditure Trends in OECD Countries 1970-1997", *Health Care Financing Review*, Vol. 21, No. 2, pp. 1-19, Winter.

Huber, M. and E. Orosz (2003), "Health Expenditure Trends in OECD Countries 1990-2001", *Health Care Financing Review*, Vol. 25, No. 1, pp. 1-22, Autumn.

Imai, Y., S. Jacobzone and P. Lenain (2000), "The Changing Health System in France", OECD, Working Paper, No. 269, October.

Jacobzone, S. (1997), "Systèmes mixtes d'assurance maladie, équité, gestion du risque et maîtrise des coûts", *Économie et prévision*, No. 129-130, pp. 189-205.

Kirman, A. (2000), "L'état de santé de la Nation", Royal Economic Society Newsletter, January.

L'Horty, Y., A. Quinet and F. Rupprecht (1997), "Expliquer la croissance des dépenses de santé: le rôle du niveau de vie et du progrès technique", *Économie et prévision*, No. 129-30, pp. 255-65.

Lequet-Slama, D. (2004), "Régulation des systèmes de santé: quelques expériences étrangères de réformes en Europe", *Revue d'économie financière*, No. 76, November.

Mahieu, R. (2000), "Les déterminants des dépenses de santé: une approche macro-économique", INSEE, Working Paper, No. G2000/01, January.

Mougeot, M. (1999), "Régulation du système de santé", CAE Report, No. 13.

Newhouse, J.P. (1977), "Medical Care Expenditure, A Cross-national Survey", *The Journal of Human Resources*, Vol. 12, No. 1, pp. 115-25.

—————— (1992), "Medical Care Costs: How Much Welfare Loss?", *Journal of Economic Perspectives*, Vol. 6, No. 3, pp.3-21.

Oxley, H. and M. Mc Farlan (1994), "Health Care Reform: Controlling Spending and Increasing Efficiency", OECD, Economics Department, Working Paper, No. 149.

Palier, B. (2004), *La réforme des systèmes de santé*, Que sais-je?, No. 3710, PUF.

Polton, D. (2005), "Les systèmes de santé dans les pays occidentaux", *Les cahiers français*, No. 324, February.

Robine, J.M., E. Cambois and I. Romieu (1998), "Construction de différents scénarios de l'évolution de l'état de santé de la population française à l'horizon 2020", study carried out by the Ministère de l'emploi et de la solidarité.

Rochaix, L. (2004), "Les modes de rémunération des médecins", *Revue d'économie financière*, No. 76, November.

Rothschild, M. and J. Stiglitz (1976), "Equilibrium in Competitive Insurance Markets: An Essay on the Economics of Imperfect Information", *Quarterly Journal of Economics*, Vol. 90, pp. 629-50.

Sandier, S., V. Paris and D. Polton (2004), "Profil sur les systèmes de santé en transition: France", Observatoire européen des systèmes et des politiques de santé.

Ulmann, P. (2004), "Est-il possible (souhaitable) de maîtriser les dépenses de santé?", *Revue d'économie financière*, No. 76, November.

Vasselle, A. (2004), *Rapport du sénat sur l'assurance maladie*, No. 424, July.

Ventelou, B. (1999), "Les dépenses de santé des Français: une maladie d'amour?", *Revue de l'OFCE*, No. 71, pp. 247-80, October.