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Towards a Framework for Health Insurance Development in Hai Phong, Viet Nam

with a tool to simulate cost-sharing and health insurance premiums

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Introduction

Health insurance has been established in Viet Nam since early 1990 in the form of pilot schemes. A recent decree reveals that Viet Nam has embarked on a gradual nation-wide application of health insurance. This law should be understood in the context of a Government that, alone, does not seem to be able to meet the population's demand for health services of a minimum quality. Health insurance, with insurance premiums paid by the citizens, would provide an additional means of financing an adequate level of care.

In Section 1 of this paper, we give an overview of the economy and the health sector in Viet Nam. The purpose is to inform the reader about the recent economic developments in Viet Nam, including the situation of the government budget. In the brief survey of the health sector, emphasis is put on the need for health service improvement. In view of the current fragile financial position of the government, it is difficult to fund this improvement solely via taxation. Hence, health insurance is perceived as a mechanism to complement public finance.

In Section 2, we expand on one of the first health insurance pilot schemes in Viet Nam, i.e. the Hai Phong Health Insurance Company (HHIC). A preliminary evaluation is given, followed by a proposal for a plan to develop health insurance in Hai Phong.

A model to simulate alternative options for financing health services via health insurance is presented in Section 3. The purpose of this software tool is to assist in the establishment of the proposed health insurance development plan. It basically analyzes the linkages between costs of upgraded health services, insurance membership and health insurance contributions.

We provide two provisional simulation analyses for the HHIC in Section 4. The first is related to the year 1993 and studies the financial implications of the announced membership targets and health insurance premiums. The second presents a projection for the period 1993-1997 and illustrates how the simulation model can best be used to evaluate alternative options for health insurance financing.

1. The Economy and the Health Sector in Viet Nam : A Brief Overview

1.1 The economy

In 1990, Viet Nam had a population of 66.7 million; the average population growth rate between 1960 and 1990 was 2.2 %. In 1992, the population, distributed over 53 provinces, 550 districts and 10,046 communes, is reported to be 69.3 million[1]. The population is distributed over 53 provinces, 550 districts and 10,046 communes[2]. About 78 % of the population lives in rural areas[3]. In 1991, the labour force accounted for 46 % of the total population[4]. The education level of the work force is known to be very high; the literacy rate among the population above 10 years old[5] is 87.7 %.

The Vietnamese economy ranks among the low-income economies of the Asian region. After the establishment of the Socialist Republic of Viet Nam in 1976, the government instituted a state control of industry and trade. Agricultural production was organized through collective farms. Domestic saving was so low that investment had to be financed via external assistance, mainly from the former Soviet Union. As population growth exceeded the economic growth during the period 1976-1985, per capita incomes were virtually stagnant[6].

The Vietnamese economy has, however, been undergoing rapid changes since the policy of economic reform that was established in 1986. This policy, that is known as Doi Moi[7], involves a shift from a centrally planned economy to a market economy, subject to government regulation. As a result, household-based agriculture has increased. Farming households have turned into economic units and have the right to sell products at market prices. Cooperatives still exist but are only responsible for irrigation services and the supply of material and equipment. Following this policy

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[1] Ministry of Health (1993, p.2).

[2] Valdelin et al. (1992, p. 17).

[3] UNDP (1992).

[4] Tran Hoang Kim (1992, p.87).

[5] Tran Hoang Kim (1992, p.50).

[6] World Bank (1992, p. 561).

[7] The policy "Doi Moi" means renovation or renewal and was launched after the Sixth Communist Party Congress in 1986. A good overview of the reform process can be found in SR Vietnam (1993, p.1).

change, farmers' incomes are reported to have, on average, increased 2 to 3 times, depending on the locality[8]. Restrictions on other private commerce and industry have also been eased[9]. Private investment has been stimulated in the sectors of export, tourism, light industry and infrastructure[10].

In 1989, measures were taken to cut down hyper-inflation and to reduce the balance of payment deficit. These measures included a devaluation of the official exchange rate (to reflect the market value of the VND[11]), an increase in interest rates, a reduction of credit growth, enhanced trade liberalization and a extensive decontrol of prices.

Since the economic reform programme, the government has also decreased the monetary financing of deficits: the deficit (excluding external financing) dropped from 7% in 1989 to less than 3% of Gross Domestic Product (GDP) in 1991[12]. The latter has contributed to a decline in inflation rates. Lower food prices, in response to improved supply, have also dampened inflation. The annual inflation rate was 67.5% and 67% in 1990 and 1991, respectively. However, it fell rather drastically to 18% in 1992[13].

The trade liberalization measures in the economic reform programme have also led to an opening in the Vietnamese economy to the world economy. Exports have increased rapidly. Whereas the ratio of exports of goods and services in Gross Domestic Product (GDP) was 7.74% in 1986, it was 29.04% in 1990[14]. The growth of exports in 1989 and 1990 was mainly due to the exports of crude oil, rice and seafood. Viet Nam became the third largest exporter of rice in 1989, leaving its position of rice importer in 1988.

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[8] Le Dang Doanh (1991, p.84).

[9] Feuerstein (1993,p.4).

[10] Beresford (1993, p.1).

[11] VND= Vietnamese Dong.

[12] In 1992, resumed government expenditure for social and economic infrastructure brought about a small increase in the deficit relative to GDP, however; see SR Vietnam (1993, p.7).

[13] ESCAP (1993, p.40).

[14] Le Van Toan (1992, p.56).

Compared to the period 1976-1985, economic growth for the period 1986-1991 has substantially improved; the average annual real growth rate of GDP has been 5.2%, resulting in an average annual real growth of GDP per capita of 3%. In 1990, the per capita Gross National Product (GNP) at market prices was estimated at US$ 200[15]. The main economic sector is agriculture, accounting for 40% of GDP. In 1992, the estimated real rate of growth of GDP varieds between 7%[16] and 8.3%[17].

Despite the overall economic growth and the rise of private sector activities, the level of government taxation has remained low, due to difficulties in tapping the new sources of activity. It is, in fact, recognized by the Vietnamese Government that further improvements in the tax administration are required in order to broaden the tax base[18]. There is also a problem in collecting existing taxes. For instance, in 1989, 30% of the taxes for turnover, interest and special consumption were not collected[19]. In 1989, the ratio of taxes to GDP was 11.2% only (government economic activities were taxed at a rate of 22.9%, but non-government economic activities at 4.5%). In 1990, this tax ratio rose to 12.1%, in part as a result of better tax collection.

It is evident that the overall low level of government taxation has hampered the financing of social expenditures, such as those on health services. For the coming years, it remains to be seen whether economic growth will have a beneficial impact on higher government revenues and expenditures. In addition, increased revenues will depend upon the effective collection of a whole series of newly prepared taxes, including taxes on natural resources, capital, income and housing[20].

1.2 The health sector

1.2.1 Organization and performance

Viet Nam has been traditionally committed to the health sector. More especially from 1954 onwards, when efforts were made to extend

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[15] It is interesting to note that the UNDP (1992, p.128) values the GDP per capita (thereby using Purchasing Power Parity to convert the Vietnamese Dong into US$) at US$ 1,000.

[16] ESCAP (1993, p.36).

[17] Le Van Chan (1993, p.17).

[18] SR Vietnam (1993, p.7).

[19] Le Dang Doanh (1992, p.88).

[20] Le Dang Doanh (1993, p. 87).

basic health services to the communal level whereby 80% of the rural and urban population came to have access to this basic health network. These efforts were accompanied by national health movements in the areas of hygiene, nutrition and eradication of vectors of disease.

The structure of health delivery in Viet Nam follows the general administrative structure, that of central or national level through the provincial, district and commune level. At central level, the government is responsible for policy-design and implementation and controls medical training and specialized hospitals. Eighty-two general and 92 specialized hospitals give health services at provincial and city level. The district health service oversees one or two hospitals with a polyclinic, laboratory and pharmacy. This service covers an average of 122,000 people. Inter-commune polyclinics are also operating under the districts; each polyclinic delivers outpatient services to the population of about five communes. Finally there are commune health centres that supply primary health care activities for about 5,000 to 7,000 people. It is important to note that at each level the delivery facilities are subject to strong supervision by the People's Committees[21] .

Concerning health manpower, the population per medical doctor, assistant doctor, nurse and midwife in 1992 was 2,569; 1,537; 1,344; and 4,989, respectively[22]. In 1988-1990, the reported percentage of one-year olds immunized was 88%, the population with access to safe water was 46%, and the population with access to sanitation was 53%. Advances were also made in other social sectors such as that of education. In 1988-1989 the primary and secondary enrolment ratio amounted to 88% and 44%, respectively. Most of those indicators compare favourably not only with those of the least developed countries but also with many middle-income countries[23].

Health status indicators also reveal that, on average, the Vietnamese health system has performed better than those in many other developing countries. In fact, life expectancy has progressed from 44.2 in 1960 to 62.7 years in 1990, and under-five mortality has dropped from 232 per 1,000 in 1960 to 65 per 1,000 in 1990[24]. Infant mortality has reduced from 156 per 1,000 live births in 1960 to 53 in 1992[25]. There seems to be some inconsistency though with the malnutrition situation showing a high

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[21] ESCAP (1993, p.115).

[22] Calculated from data of Ministry of Health (1993, p.15).

[23] UNDP (1992).

[24] WHO-WPRO (1992).

[25] World Bank (1993, p.159).

proportion of stunted and underweight children[26]; the number of malnourished children under five is estimated at 3.9 million in 1990[27]. It should also be noted that officially reported maternal mortality was still 120 per 100,000 live births.

1.2.2 **Health sector financing**

During the period of economic reform, the proportion of the national government budget for current health expenditure has increased from 2.76% in 1986 to 4% in 1990[28]. Total government health expenditure[29] in current prices per capita in 1989, 1990 and 1991 amounted to 3,263 VND, 5,406 VND and 8,138 VND, respectively[30]. Converted into US dollars, we obtain the following expenditure per capita: $1.11, $1.17 and $ 1.13 in 1989, 1990 and 1991, respectively[31]. When taking account of inflation, it can be concluded that real expenditure per capita[32] decreased by 1.2% and 9.9% in 1990 and 1991, respectively.

External assistance for health seems to have declined during the period 1986-1990. However, in 1991 foreign aid still financed 20,4 % of the total government health budget. Note, in addition, that in 1991, local government (communes) financed 8.8% of the total health budget. Valdelin et al. (1992, p.27) also present an estimate of the total government health budget for 1990, including household expenditure on user fees; it is, however, figured that less than 5% of this overall expenditure is from user fees.

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[26] Valdelin et al. (1992, p.13). UNDP (1992, p.149) reports the following figures concerning malnutrition in the period 1980-1990: The proportion of children, under 5 years of age, that are underweight is 42%. The proportion of children, between 12 and 23 months old, that are wasting is 12%. The proportion of children, between 24 and 54 months old, that are wasting is 49%.

[27] UNDP (1992). The malnutrition situation in some regions is confirmed by a survey in 1992 in Ninh Binh Province: 43.6% of families surveyed claim they lack food (Kot et al, 1993).

[28] Total government expenditure in 1990 is reported to amount to 9,186,370 million VND; see Le Van Toan (1992, p.103).

[29] This includes expenditure by central, provincial, district and local government as well as by external donors.

[30] Ministry of Health (1993, p.23).

[31] The following exchange rates of VND per US$ were used: 3,884, 6,513 and 8,138 in 1989, 1990 and 1991, respectively.

[32] Real expenditure per capita in 1989 prices amounted to 3,227 VND and 2,909 VND in 1990 and 1991, respectively.

Over the past years, the quality and quantity of publicly provided health care services has deteriorated. The annual per capita rates of contact health services, as calculated from routine reports, vary between 0.3 and 0.5, with considerable differences between provinces and regions. An important proportion of the rural population is hardly able to use the health care system[33]. Use of publicly provided health services has decreased in favour of the private sector. It is also reported that a large proportion of patients now seek and purchase drugs directly at the market, without first seeking help at a health station or hospital. In fact, the economic reform programme has encouraged a supply of privately provided health services, through licensed medical clinics and the opening of private practices of physicians[34]. The importance of the private sector is confirmed via the results of two household surveys in 1989 and 1990[35]. It was calculated that private health expenditure amounts to 59-69 % of total national expenditure on health; 97.5 % of this private household expenditure is for drugs and medicine.

Among the reasons cited for this recent development are the poor health infrastructure, emigration of skilled health manpower, a reduction in external assistance and macroeconomic instability[36]. Real salaries of health workers have also declined, contributing to dissatisfaction among health personnel. In January 1989, although the government restructured and substantially increased the wages of civil servants (and thus of health personnel), real salaries declined substantially due to high inflation between 1985 and 1988.

Surveys that deal with the performance of public health facilities have been carried out. The following problems were identified by health workers in a health survey undertaken in two mountainous provinces[37]: (i) lack of instruments and drugs; (ii) low salaries for health workers and bad living conditions; (iii) the health network is well established but the quality of the service is poor; (iv) there is only a limited amount of health education as part of health services; (v) there is a a shift from publicly provided health services to privately provided modern care and traditional practitioners. In another survey in three other provinces[38], similar complaints of very low salaries and inadequate supply of drugs and medical equipment were voiced by those health workers interviewed.

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[33] Valdelin et al. (1992,p.15).

[34] Valdelin et al.(1992. p.15).

[35] World Bank (1993, p. 168).

[36] Feuerstein (1993, p.3).

[37] MoH - World Bank (1991a).

[38] MoH - World Bank (1991b).

It is now recognized that in the face of such problems, the government health budget is insufficient. It is estimated that this budget can only cover about 50% of total health care demand and health care costs[39]. In 1989, a system of user fees for district, provincial and national level hospitals was established in order to increase resources for health[40]. At one district hospital, for instance, a consultation costs 500 VND (US $ 0.05) and a large operation costs 50,000 VND (US $ 5)[41]. However, it is recognized that these fees generally remain insufficient to cover the costs of minimum quality care and that major shortages of pharmaceuticals still arise at health infrastructure level. Improvement of health care financing through user fees has not been forthcoming due to the many exemptions that are granted as well as the reduced attendance at public health care facilities[42].

1.2.3 Health insurance

Up until 1989 all health services in Viet Nam were free to patients. All doctors were salaried without the right of private practice and all hospitals were totally funded by the government. In 1989 the State allowed the health sector to charge patients so as to recover some of the operating costs and allowed some rights of private practice. As part of the efforts to bring more resources into the health sector, health insurance schemes that are managed at provincial level have been advocated for a number of years. However, the feasibility of health insurance should be investigated at all administrative levels, including the commune level. Communes are now required to supplement the funds from the government health budget[43] by their own initiatives to raise funds among the commune's population. Health insurance could well be a potential source of funds at the commune level, if communes were able to mobilise a high proportion of membership in a provincial scheme. A commune may be able to secure direct funding from the health insurer in proportion to the number of insured people in the commune.

Several provincial health insurance schemes have been operating since 1989. In those schemes, industrial workers, constituting a minority in the population, were in principle insured on a compulsory basis. Other citizens could join on a voluntary basis. The initial emphasis was also on health insurance coverage for the costs of hospital services.

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[39] Bui Duc Khanh (1993).

[40] Consultations at commune health stations were to remain free of charge.

[41] Dung and Hien (1992).

[42] Valdelin et al. (1992,p.26).

[43] From April 1993 on, salaries of selected commune health workers are paid by the Government; see World Bank (1993, p.171).

In the fall of 1992, the Council of Ministers also approved the principle of health insurance at the national level[44]. It is now declared that government administrative workers (civil servants) and industrial workers[45] need to take part in health insurance on a compulsory basis. Other citizens can join on a voluntary basis. In practice, health insurance is expected to be gradually expanded. Indeed, due to different socioeconomic conditions in various regions, this implementation is likely to be carried out at a different pace in various regions. Moreover, much will have to be assimilated and improved about the functioning and management of health insurance. One has to realize that even the schemes, now two to three years old, are still at an early stage of development. Some of the main issues and bottlenecks in health insurance development in Viet Nam will be illustrated via a preliminary evaluation of the health insurance scheme in Hai Phong.

2. The Hai Phong Health Insurance Company : 1990-1993

2.1 Recent status[46]

2.1.1 General background

Hai Phong is one of the three largest cities of Viet Nam and has the status of a province. It had a population of 1,447,649 in 1992. It has 339,982 households, and 31.5% live in an urban and sub-urban setting. It has 21 hospitals of which there are 8 city and specialized hospitals and 13 district hospitals[47]. There is a total of 2,940 hospital beds (2,100 beds in city and specialized hospitals and 840 beds in hospitals at district level) or 1 bed for about 500 of population. The number of patients admitted in city and district hospitals is 62,380 and 40,795, respectively; the overall admission rate is therefore 7.13% of the population at large. Note that the 204 commune health stations in Hai Phong Province also have a total of 1,610 beds[48].

In 1992, total health care expenditure for publicly provided care amounted to 18,325 million VND[49] or US$ 1.2 per capita. Financing of this expenditure comes from government (50.9%), hospital fees (9.8%),

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[44] Resolution dated August 15, 1992.

[45] In principle, only industrial workers in enterprises with more than 10 workers are subject to compulsory insurance.

[46] Based on Bui Thanh Chi (1993) and information acquired during technical visits of by the authors to the HHIC in January and June 1993.

[47] Hai Phong itself has 7 districts.

[48] Ministry of Health (1993, p. 11).

[49] Equivalent to US $1.8 million.

health insurance payments (6.5%) and international aid (32.74%). Until now, the government contribution to hospitals has been based on a fixed amount per bed per annum. Hai Phong is reported to receive VND 3.5 million per city hospital bed and VND 2.5 million per district hospital bed. It is announced that in the future hospital funding by the government will be on a per capita population basis.

Hai Phong, in September 1989, was the first city to start health insurance via the establishment of the Hai Phong Health Insurance Company (HHIC). The HHIC basically insures against the costs of health services at government-run health facilities. These health services include ambulatory and inpatient services. From the start, insurance was in principle compulsory for industrial workers[50]. As from 1993, government administrative workers are also insured on a compulsory basis. Compulsory health insurance contributions are defined by law. For other population groups insurance remains voluntary, and their health insurance premiums are established at provincial level.

2.1.2 Management structure

The HHIC is run by a Director who is responsible to a Board of Management. The Chairman of the Board of Management is the Vice Chairman of the People's Committee. The other members are the Director of the Provincial Health Services Bureau, the Director of the Provincial Finance Department, the Director of the Provincial Labour Department, the Chairman of the Labour Union, the Chairman of the Peasantry, the Director of the Hai Phong Port Authority, the Director of Hai Phong Shipyard and the Director of the Hai Phong Health Insurance Company.

The Director of the HHIC is appointed by the vote of the Board of Management. He presents quarterly reports on the operations of the health insurance scheme to the Board.

In turn, this Board is accountable to the Provincial People's Committee. Premiums for the voluntary insured require the approval of the Chairman of the People's Committee on recommendation from the Board of Management. The financial operations of the HHIC are subject to inspection by the City Financial Inspectors.

2.1.3 Categories of insured and insurance premiums

There are basically five categories of insured: government administrative workers (including retired), industrial workers, agricultural workers and other self-employed, spouses and other adult citizens, and children between 5 and 16 years old.

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[50] It is known that compliance with this rule was not complete. In addition, several factories have bargained for contribution rates different from the official ones.

The HHIC offers two types of health insurance: for both inpatient and outpatient care, and for inpatient care only. Three different health insurance cards are issued. One for workers who are insured on a compulsory basis; these are covered for both inpatient and outpatient care. Another card for those who insure on a voluntary basis against the costs of inpatient and outpatient care, and a third card for those who only require coverage for hospital care. The official qualifying period is one month. It is to be noted that health insurance excludes payment for injuries resulting from accidents, fights, drunkenness, social disease (which includes tuberculosis and sexually transmitted disease), suicide and the use of narcotics.

Coverage for outpatient care has been available since 1993. The move to insurance for outpatient care was initially for treatment at a polyclinic established by the HHIC itsef. Recently, the HHIC has also signed contracts with outpatient departments at all hospitals in the province. Payment covers examination and tests but not yet all necessary drugs itemized in the essential drugs list adopted by the Ministry of Health. It should be noted that, as yet, children cannot obtain insurance coverage for outpatient care.

Citizens other than industrial workers and government administrative workers are not compelled to purchase health insurance. If they do not and yet receive health care, they are required to pay fees and other costs such as prescribed drugs that are to be bought outside the public health facility. Children under the age of 5 are, in principle, entitled to free care at all levels of the system. Poor people can receive free care as well, but the decision as to who is a poor person appears to rest with the management of the public health facility.

The structure of health insurance premiums for the years 1991 to 1993 is summarized in Table 1. The premiums are defined on a per-person basis, implying for instance that a worker would have to pay extra health insurance contributions if he wants his spouse and children to be insured as well.

2.1.4 Membership

Over the period 1990-1993 the HHIC has issued 318,700 health insurance cards of which 161,521 were bought by workers belonging to the compulsory insurance and 153,179 belonging to voluntary health insurance. About 8% of the insured have received treatment at hospitals of all levels in Hai Phong. Membership has varied over the years. For instance, in 1990, 80,000 people withdrew from the insurance scheme, but 170,000 joined.

It is difficult to determine the exact number of people insured at any one time but the authors were advised that in the first six months of 1993, 120,000 cards have been sold; this is thought to comprise 87,000 compulsory and 33,000 voluntary cards. Given that there will be some carry over (i.e. people who bought health insurance in the last half of the

calender 1992) the total level of insurance is probably around the 150,000 to 180,000 mark. Using an estimated[51] population size of 1,580,000 in 1993, the membership rate varies between 7.6% and 11.4%.

It is also important to note that the membership rate is different between urban and suburban areas; for instance, membership in the suburban District of An Hai has been 3.4% (= 6,464/190,000).

Table 1 : Health Insurance Premiums per person/per year

Population category	1991	1992	1993[1]
Industrial Workers	Insurance premium = 1.5 % of salary (1% paid by employer; 0.5 % by employee). The average premium amounts to 10,000 VND[3].	Insurance premium = 1.5 % of salary (1% paid by employer; 0.5 % by employee). The average premium amounts to 14,000 VND.	Insurance premium = 3 % of salary[2] (2% paid by employer; 1 % by employee). The average premium amounts to 35,000 VND.
Agricultural workers, and other self-employed	5,000 VND	8,000 VND	10,000 VND (inpatient care only) 25,000 VND (in- and out-patient care)
Government administrative workers (including retired)	na[4]	na	Insurance premium = 10 % of salary (paid by the government). The average contribution amounts to 35,000 VND.
Spouses and other adult citizens	5,000 VND	8,000 VND	10,000 VND (inpatient care only) 25,000 VND (in- and out-patient care)
Children 5-16 yrs	3,000 VND	5,000 VND	5,000 VND (inpatient care only)

Notes:
[1] Information as of June 1993.
[2] The yearly worker's salary in Hai Phong is estimated at 1,800,000 VND at the beginning of 1993.
[3] The average exchange rates are 13,500 VND= 1 US$ in 1991 and 10,500 VND= 1 US$ in 1992 and 1st quarter of 1993.
[4] na= not available

[51] Bui Thanh Chi (1993, p.7).

2.2 Recommendations concerning the management of health insurance in Hai Phong

2.2.1 Introduction : The concept of health insurance[52]

Health insurance is a means of providing members of a defined community with some protection against the cost of curative and/or preventive health services at all levels of the health system.

Health insurance is based on the principles of pooling of risks and therefore of the redistribution of financial resources: from that portion of the insured community who does not incur high health costs to that portion of the insured community which does. Consequently, a health insurance scheme needs to attract a large cross section of the community if it is to be viable. Viable means that over the long term the scheme is able to earn sufficient income to cover the amounts it has contracted to reimburse its members or the health care providers[53].

Health insurance arrangements are usually established in a pluralistic way, ie., with several partners involved in the financing of health care delivery. The partners would normally include the government, the insurer, the providers and the patients.

Within the conceptual framework depicted so far, the management of a successful health insurance scheme must:

(i) decide what types of health insurance will be worthwhile to the members of the community;

(ii) reach clear and binding agreements with the providers of the services (that is the physicians and the hospitals) as to what standards of care they will deliver, which user fees (co-payments) insured people will be required to pay, what the health insurer will reimburse[54];

(iii) make careful and detailed assumptions regarding the cost elements of each of the insurance types it is to offer;

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[52] We refer to Ron (1993) for a comprehensive treatment of the potential for health insurance in developing countries. Based upon the experiences in several developing countries, she provides an extensive set of guidelines regarding the tasks in the preparatory stage of health insurance development. See Normand and Weber (1993) for a general guidebook on social health insurance.

[53] Note that in a 'third-party payment system', the health care provider may directly bill the health insurance institution, whereupon the latter reimburses the provider.

[54] We will use 'reimbursements' and 'payments' by the health insurer interchangeably.

(iv) determine which premium structure and which premium levels will be acceptable to the community and to reconcile that value with the health insurance payments for each type of insurance;

(v) prepare a detailed plan of what is expected to be achieved in health insurance in terms of the level of membership, premium income, reimbursements, management expenses, desired level of surplus for the health insurance scheme and intentions regarding the utilisation of that surplus.

Up until now only industrial workers workers and government administrative workers are insured on a compulsory basis in Viet Nam - this still leaves the majority of the population uncovered. However, later in the paper, it is suggested that a health insurance development plan be established. In such a plan, the extension of health insurance to uncovered population groups is analyzed. Most modern health insurance systems, that presently cover the entire population, underwent a gradual transition from a mixed to a universal social health insurance system.

In many instances, the type of health insurance offered at the start of a health insurance scheme is directed first to high cost events such as hospitalization. In view of the expected high cost implications of hospital services, the latter is also rational from a patient's point of view. Insurance provided initially through the HHIC is, in fact, only covered for inpatient care.

In the meantime, outpatient care has been added to the insurance package of those workers that are subject to compulsory insurance. However, it should be clear that any health insurance development plan should address the extension of insurance for primary care to the other insured. From a public health point of view, health insurance of primary health care is to be encouraged, since it contributes to greater access to basic care and preventive activities such as immunization. In addition, increased access to primary care can decrease the risk of hospitalization and can, therefore, reduce or avert hospital costs.

2.2.2 The components of the health financing system

Partners in financing health care delivery

In discussing the management of a health insurance scheme, it is important to identify those parties which have a role or interest in the financing of health care services and to define that role. In the context of health insurance in Hai Phong, there are basically four parties interested in the financing of health services: the government; the patients; the providers of care (physicians and hospitals); and the HHIC.

The Government

The government's major aim is to ensure that health services of a minimum basic standard are available to all citizens at a reasonable cost. The government must decide how much financial assistance it is prepared to contribute towards achieving this aim. If it is prepared to totally fund the health care delivery via a universal tax- based system, there is no place in the financing equation for the patient or the insurer. The situation in Viet Nam, like many other countries, is that the government cannot afford such a high cost and seeks some further contribution from its citizens. The decision by the government, as to how much it is prepared to pay is paramount. It must be made first as it is the major influence on the behaviour and financing of the other parties and, ultimately, on the availability and quality of health care.

The government must also decide how much it wishes to control or regulate the delivery system. Will it set a ceiling on amounts payable by patients either directly or in the form of user fees or via health insurance premiums? To what extent will the government specify what are health services of a basic minimum standard? To what extent will the government require providers to meet efficiency and effectiveness targets? In addition, what will be the government's role in establishing the accreditation mechanism for providers?

What is meant by Government? In Viet Nam, there are several policy-making government institutions. First there is the National Health Insurance Board that was established, by the government, on 1 October 1992. Its Director is appointed by the Ministry of Health. This Board consists of four departments: enrolling and card issue; contracting; administration; and accounts. The central office of the National Health Insurance Board services Ha Noi and provides guidelines to the provincial offices. Up to now guidelines were directed mostly at the compulsory part of health insurance[55]. Other departments at the Ministry of Health are also involved in the development of health insurance, viz. the departments of Finance and Health Management.

Secondly, the Ministry of Finance funds those health services at the central level that are directly supervised by the Ministry of Health. At provincial level, the Provincial Health Bureau has responsibility for management and funding of health services. The Provincial Financial Service[56] funds the health services at provincial level and therefore transfers a budget to the Provincial Health Bureau. In turn, the latter will allocate the budget to the District Health Bureau, that again transfers funds to the communes.

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[55] Abel-Smith (1993).

[56] This is the provincial branch of the Ministry of Finance.

Thirdly, the People's Committees as local government authorities, although not directly involved in funding as such, maintain an important say in the organizational set-up of the health care system. For instance the Provincial People's Committee is implicated not only in the allocation of funds between sectors but also within the health sector. As explained above, the Provincial People's Committee also has to approve the premium structure proposed by the HHIC. In addition the District People's Committees and the Commune's People's Committees take part in decisions about the management of health services at district and commune level, respectively.

Frequent discussions are held about the most appropriate model for the structure of the health system and for health insurance management. Whatever the final structure selected, the questions raised above need to be tackled.

The providers

From a public health point of view, it is expected that health providers act in the best interest of their patients, and have quality of that care as their primary purpose. However, the provider must also operate in a way that ensures its continued existence. In the longer term, this can only be so if the total service that they deliver is regarded as satisfactory by both patients and financiers. In other words, it must operate in a way that is acceptable to both the people it serves and to those who provide the finance.

Providers may be either hospitals or physicians working within those hospitals. The role of the physician within a hospital is theoretically not part of the financing equation. However, in many cases hospitals provide the facilities which allow a physician to provide the actual service to the patient. Thus, the physician has a major impact on the performance of a hospital; the physician has great influence on the extent of equipment installed in a hospital; and the morbidity/mortality statistics and the length of time patients spend in hospital are recorded. All of these factors will affect how the patients and the financiers regard the hospital. How the physicians' influence is managed is a major consideration for the hospital.

The patients

The patient's aim in the health equation is to receive the best possible care, whenever it is required, at the lowest possible cost. The patient is best able to evaluate cost and less able to objectively assess the care received. If the patient acquires health insurance, he expects to have no further unexpected expenses (co-payments are acceptable providing the quantum is known to the patient at the time insurance is purchased). In such circumstance the patient is unlikely to be interested in the cost of the health care he receives.

In a voluntary scheme, the patient is unlikely to be interested in purchasing health insurance if it is perceived that either the care received is not adequate or there is no additional advantage in being insured. On the one hand, the additional advantage may be perceived as either better protection against unexpected health care costs or better quality of care. On the other hand, there has to be a financial benefit from insuring. Health service charges to a non-insured must be so high that the cost of an average episode in hospital is so expensive that a farmer or self-employed individual would be concerned at the impact of such an episode on the ability to feed, clothe and accomodate himself and his family. Indeed, it will be difficult to sell the concept of insurance if the financial loss, as a result of not insuring, is seen as insignificant.

Hai Phong Health Insurance Company

As an individual patient, it may be difficult to exercise sufficient control over the cost of health care, certainly when provided at hospital level. However, the government may take policy steps to control costs. Apart from the government, a right to financial control can be given to the HHIC in order to exert influence over the hospitals. In fact, on the assumption that the health insurance scheme exists only for the advantage of its members, the insurer has a vested interest in developing efficiency within the operations of hospitals.

To properly and most effectively exercise influence on hospital costs, the HHIC must have access to hospital cost data. Hospital costs reimbursed via the insurer must reflect these cost levels and be structured in such a way as to encourage the hospital to meet efficiency and effectiveness targets rather than have a hospital concentrating on the maximization of revenue or simply having all of its costs reimbursed, without question, by the insurer.

In the Vietnamese environment, one of the basic issues in health services delivery is the need for qualitative improvement of health services. In practice, this means increasing the availability of drugs and improving the service of health personnel. One of the ways to improve the services of health personnel is to enhance their work motivation, for instance via monetary incentives. In order to reach such targets, costs of publicly provided health services are likely to increase in the short run. The HHIC would have to verify whether any future rise in costs announced by providers does not surpass the rise in costs that is needed to reach the target of quality improvement.

2.2.3 Setting health insurance premiums

This section considers the process necessary to establish appropriate premiums, once the characteristics of the health care services to be covered by insurance have been determined. The Hai Phong Health Insurance Company (HHIC) offers to cover the citizens of the Province for the costs of both outpatient and inpatient care at any district or provincial hospital. Citizens without insurance will have to pay user fees directly to the hospital.

At present, the premiums charged for health insurance vary according to the employment category of the individual. In Table 1, we already stated the official premiums as of June 1993. However, it is not clear whether, in practice, the HHIC adheres to this structure of contributions. It needs to be ascertained whether the premiums actually paid are indeed a fixed and uniform proportion of each individual's wages, or whether they are different according to the industry or enterprise in which insured employees work.

It must be emphasized here that delivery of health care should not be isolated from the financing of health care. At present the premium levels do not necessarily have any direct relationship with health care costs. Yet, the move to health insurance was prompted by the realization that the funds devoted to health care were insufficient to provide an adequate level of care. It is important that the partners in health insurance come to define precisely which kind of targets they intend to achieve by the new financing arrangement. Adequate information on those targets will permit one to estimate total health care costs and to set premium levels accordingly.

Understanding of the concept of total cost to the insurer is essential to the successful management of health insurance. The overriding constraint, while setting premium levels, must be that the average premium of all classes of insured persons must be equal to the average health care expenditure per person plus the average administrative costs per person[57]. Of course, for purposes of social policy, certain categories of the population, such as children, low premiums could be established that do not cover "their" average health care expenditure. Such categories could also be exempted from paying health insurance contributions. However, in these cases, one must ensure that these internal subsidies are properly financed: either the premiums of other categories of insured need to be adjusted upwards, or another financier, such as the government, could make a special financial contribution to the HHIC.

2.2.4 Payment of Providers

Fee-for-service

Premiums must be set in anticipation of estimated health expenditures. The health insurer must, therefore, have an agreement with the providers of insured health services as to which services will be covered and how the payment for these services will be arranged.

At present, the HHIC uses a fee-for-service system for its payment to providers. For instance, regarding hospital services, the HHIC receives a hospital bill (via the patient) where fees for various types of services are itemized: accomodation charges; operating theatre fees; cost of

[57] The costs of administration could include any surplus which the HHIC wishes to build up. This surplus could be established in order to finance future investments, for instance.

pharmaceuticals; etc. Each claim from the provider of insured services must state the quantity of each type of health service for which payment by the HHIC is being claimed.

From the point of view of the provider, the fee-for-service system is a way to ensure that the costs per service, or per input into a service, are reimbursed. However, this system provides a monetary incentive to hospitalize too quickly and then to use hospital services excessively: indeed, the larger the quantity of hospital bed-days and the more extensive the treatment, the larger the reimbursement and gross provider income will be.

From a public health point of view, it is necessary to establish a quality control of hospital treatment. Some quality control is instituted by the HHIC. Three full-time medical doctors appointed by the HHIC office visit insured patients during their treatment at the hospital, in order to supervise medical treatment by the hospital's physicians. Small incentive payments are given to the collaborating hospital physicians. For the execution of the supervisory tasks, use is made of standard treatment schedules[58] developed by the Ministry of Health as a quality assurance measure. This quality control also includes signalling and preventing "excessive" treatment, for the purpose of cost-containment. However, it is emphasized here that the objective of this monitoring by the HHIC should not be confined to a mere lowering of costs. Monitoring should be in the best interests of patients, and therefore make sure that the extent of care provided is adequate.

Note that the remarks made above also apply to the reimbursement of outpatient services on a fee-for-service basis. Finally, warning must be taken, that quality control enhances administrative costs. In addition, the administration of a fee-for-service system by the HHIC is likely to be especially costly in view of the amount of registration, control and processing of itemized bills.

Alternative options

One alternative option regarding provider payment is the establishment of a schedule of flat payments or reimbursements per health service that vary according to the type of treatment. For instance, such a method is applied in the Bwamanda health insurance scheme (Zaire) where 15 types of hospital treatment are specified[59] for the purpose of reimbursement.

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[58] Containing about 400 types of treatment, using 700 types of drugs.

[59] See Moens and Carrin (1993). One can think of this particular method as a much simplified version of the method of "Diagnostic Related Groupings" (DRG). Within each DRG, a certain medical resource use is linked to a patient's treatment, whereas the use of these resources is made to vary according to factors such as the age of the patient, sex, primary and secondary diagnoses, and discharge status. In the American health care system for the aged (Medicare), one distinguished 473 groupings in 1988; see Feldstein (1988, ch.11).

The advantage of this approach is that the reimbursement per admission is defined, in a prospective way, and agreed between the providers and health insurance. This system produces an incentive for greater cost-efficiency on the part of the provider. Cost-efficiency is stimulated because costs above the agreed flat amount will not be reimbursed. There is a further stimulus if the provider is able to keep the difference (or a part thereof) between the flat payment per admission and the true cost of that admission.

Flat payments per type of consultation can also be established along the same lines. This particular system is also relatively simple to administer, in that an itemized bill is replaced by a bill showing a flat amount according to the type of service. However without some quality control mechanism providers could take advantage of this system. Indeed, it has to be verified regularly whether some providers give insufficient care in order to realize unjustified profits.

It is also worth mentioning a second alternative option for paying for health services, viz. the establishment of a capitation system[60]. Applied to the present Hai Phong environment, this would mean that the HHIC pays a fixed amount per insured person to the health facility. The capitation amount could be based upon the average health expenditure per capita of the insured. Note that the National Health Insurance Board uses this method for reimbursing ambulatory services at polyclinics in central Ha Noi; the capitation amounts to 6,000 VND per year and is paid in advance to polyclinics that are chosen by the insured[61].

As was the case with the first option, one of the main advantages of this system is that one gives an incentive to health facilities to manage its revenues in a more cost-effective way. The advantages and disadvantages of this method are similar to that of the first option. The fact that a flat payment is made per insured person is an advantage, when cost-containment is among the objectives of the health policy-makers. Another main advantage is that administrative costs are likely to be much less, since there are no longer any reimbursement procedures. The risk that the providers will be providing insufficient care to patients in order to make unjustified profits is, however, one of the main disadvantages.

The current provider payment method selected in Hai Phong is the fee-for-service method. It is necessary to investigate the feasibility and acceptability of alternative payment systems such as the ones just described. It should be emphasized that, in the case of the alternative options discussed, one avoids the system whereby whatever level of cost is incurred by the provider of health services be automatically refunded by the insurer. Indeed, in the case of a fee-for-service payment system, the insurer could

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[60] The latter is especially associated with the notion of a 'health maintenance organization'. See Feldstein (1988, ch.12). Note that in the USA, the capitation system is used in the government-regulated health care programme for the aged.

[61] Abel-Smith (1993, p.5).

be faced with an ever-increasing level of liability without any ability to control it. Consequently, health insurance premiums would tend to increase.

In any case, it is necessary for both the health insurer and the providers to reach agreement as to the structure and level of reimbursement. The level of reimbursement or payment by the insurer must be based on the reasonable costs incurred by the provider and must be agreed in the context of improving provider effectiveness and efficiency. In Viet Nam, improvement of quantity and quality of health services figures among the most important health policy issues. The work done on cost analysis at Dong Anh Hospital is important in this regard[62]. Indeed, it is shown how the financial implications of such improvement can be integrated in a hospital cost analysis. This work thus provides the basis for establishing "prospective" budgets per hospital department, and thus for the establishment of flat payments per type of treatment that are consistent with the targeted improvement in health services[63]. In addition, this type of cost analysis can also be applied to analyze the level of capitation amounts for a health insurance scheme that would operate on the basis of a capitation system.

2.2.5 The impact of membership profile on cost calculation

When a new health insurance scheme is introduced it is quite appropriate to use the observed utilization of health services of the total population as a basis for calculating premiums. This is based on the assumption that the expected membership of the health insurance scheme will have the same hospital utilization as the general community.

However, once a scheme is established it is imperative that it monitor the utilization of its own membership (and the expected utilization of future members) as the basis for setting future premium levels. The fact is that, in a health insurance arrangement that is not universal, the health services utilization rate of the insured may be different from the utilization rate of the community at large. There is the prospect that the members of a health insurance scheme are more likely to seek health care than the non-insured member of the community. In other words because of the benefits offered, the health insurance scheme would attract the citizens with greater

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[62] See Dung and Hien (1992).

[63] It is worth making the observation in regard to capital equipment costs that it may be possible to borrow funds to allow and upgrading of equipment and to include the costs of borrowing in the operating costs of the hospital. However, it must be said that such an approach is unlikely to be successful unless the true costs of running the particular hospital are known and the sources of financing those costs are understood. In other words, transparency in cost-accounting and cost-sharing is an important prerequisite.

health risks and greater demand for health care[64]. Of course, the greater the proportion of the community that is insured, the less will the utilization patterns differ.

The characteristics which may influence utilization patterns and which should be monitored include: age, sex, geographic location, employment category, family/marital status, access to health delivery facilities, etc. With information on the characteristics of its membership related to the utilization patterns of the membership, a health insurance scheme is able to more accurately predict its future expenditure. Information about the determinants of utilization also helps policy-makers in defining strategies aiming at a target utilization rate. Indeed, some of the utilization rates observed initially may be considered to be too low, inducing policy-makers to establish targets above those rates.

It is advised to investigate how both providers and the HHIC can set up a joint mechanism to monitor utilization and cost. On the one hand, the HHIC is interested in adequate health services and needs to know whether the cost of health services is justified. It is also interested in monitoring the quantity of services in order to spot any excess utilization. On the other hand, the providers are keen on receiving an adequate reimbursement of their services. They have to show, therefore, that treatments and their cost levels are warranted. A joint monitoring board may be a workable mechanism to agree upon quantity and quality of treatment and upon the structure and level of reimbursement payments.

2.2.6 Accounting and reporting[65]

Critical to the successful management of a health insurance scheme is the existence of sound accounting practices and of regular reporting. This reporting should be in the context of advising both the Board of Management as well as external parties such as the Ministry of Health, the Provincial People's Committee and the Provincial Health Bureau of what has happened and how that compares with budget or plan. Quarterly reports are currently prepared and this practice should be developed. In addition, the concept of preparing budgets, development plans and historical financial statements should be expanded on an annual basis.

The accounting must be on an accrual basis. This means that the income figure must reflect what is "earned" in a period as distinct from what may have been "received" in the period. Similarly, the expenditure figure must show the liability "incurred" in the period rather than only that which was "paid".

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[64] This is referred to in the insurance literature as the problem of "adverse selection".

[65] For a discussion of the organisation and administration of health insurance, see Ron et al. (1990).

For example, if a number of people paid health insurance premiums of 1,400,000 VND on 1 April 1993, they would be covered until 31 March 1994. It can be reasonably assumed that 1/12 of this premium relates to each month of the year. If a financial report for the period 1 April 1993 to 30 June 1993 were to be prepared, only 3/12 of the annual premium or 350,000 VND would be shown as income. The balance of the amount actually received would be regarded as premiums for insurance cover in the future. Similarly, if in the same period of 3 months 200,000 VND had actually been disbursed but it was expected that a further 100,000 VND would be paid for services which were rendered in the period, a total of 300,000 VND must be recorded as expenditure. In such an example, the scheme would be stated to have earned a surplus of 50,000 VND for the 3 month period although it would have a cash surplus of 1,200,000 VND.

Financial reporting on this basis can then be supported by reporting of membership numbers and profile, utilization rates, average payments per service[66] etc. It is unlikely that such detailed reporting and analysis can be done without computer resources (both hardware and software) in the HHIC offices.

2.2.7 Operations : Receipt of premiums and payment of claims

Premiums for the HHIC are payable annually and provide 12 months cover. Details of each member (name, year of birth, sex) are recorded. Membership records are manually based and therefore not kept in a manner which would facilitate the collection of the type of management information referred to above.

Details of cash received are registered in a cash receipts book which is used to control banking and recording of income. As each health insurance card is issued, it is allocated a number. For those that are insured on a compulsory basis, the number is recorded on a special form submitted by the employer. At present, the card itself is only signed by the insured member. However, the cards ought to carry this number as well.

The claims payment process involves each hospital receiving a monthly advance from the HHIC which is an estimate of 50% of what the hospital expects to claim. The method of preparing this estimate is not clear but involves negotiation between the HHIC and the hospital. This process is quite sound but would be improved if the calculation of the advance were based on the budget of the HHIC. In this way, the management of the HHIC could be sure that the payments are consistent with its membership and utilization forecasts.

As each patient is discharged, the claim is submitted to the local representative of the health insurance scheme who verifies with the patient that the services have been provided and checks the patient's entitlement to

[66] This is worthwhile in the case of the current fee-for-service system, in order to monitor the prescribed treatment and the ensuing costs.

health insurance. At the end of each month, the amount of the advance made to the hospital is deducted from the sum of the claims approved for that hospital and the balance paid. Again the records are manually kept and it is therefore not possible to maintain a claims history in a manner which would allow the type of analysis discussed in this paper.

It would be highly advantageous for the HHIC if data for both premium collection and reimbursements were able to be collected in a computer system. This information is fundamental to the good management of a health insurance scheme.

2.2.8 Summary

The main points of sections 2.2.1 to 2.2.7 may be summarized as follows:

(i) Health insurance is a means of pooling risks among the insured population and operates on the principle of redistribution of financial resources. Simultaneously, health insurance helps to finance the health care delivery system.

(ii) Management of a health insurance scheme must be clear as to which services it will cover and what it will reimburse. It needs to work closely with other parties, particularly health facilities.

(iii) The total amount of premiums must be based on the expected health care expenditures incurred by the insured. The costs are tied to the costs of operating health facilities. The health insurer must have access to that cost data.

(iv) The payments by the health insurer must be structured in a way that encourages the health facilities to meet efficiency and effectiveness targets. The health insurer should not be required to simply reimburse the health facility for whatever costs it incurs. In this respect, the feasibility of adopting other payment mechanisms needs to be investigated.

(v) The components of the costs of a health insurer are the membership size, the utilization rate of the membership, the costs of health services, and the administrative costs related to the management of the health insurance scheme.

(vi) Utilization rates will vary with the membership profile. It is part of the management of a health insurance scheme to develop an appropriate membership profile.

(vii) If hospitals and health insurers have well-constructed development plans, it may be possible to borrow money to buy equipment for health facilities.

(viii) Accrual accounting, annual budgets, the preparation of annual financial statements and regular (at least quarterly) reporting to management and government is an essential part of good management.

2.2.9 The need for a Health Insurance Development Plan

What is required at the present stage of health insurance in Hai Phong is the establishment of a Health Insurance Development Plan. This plan should reflect the necessity to control and manage the type and size of membership aspired for the scheme and the structure and level of health insurance payments to be met from the income of the scheme.

It is proposed that the plan has three components. First, it should start by providing a description of the health services that are currently covered by health insurance, of the provider payment system and of the premium structure.

Secondly, the plan needs to discuss the principal objectives regarding health insurance established by the Board of Management of the HHIC. What is the objective regarding the population's participation in health insurance? Will one move from a mixed compulsory-voluntary health insurance scheme to a true compulsory scheme, and with which speed? Will other options concerning the payment of providers be envisaged, apart from a fee-for-service reimbursement? And, if the HHIC intends to develop a surplus, what is the level of the planned surplus and its utilization?

Thirdly, the plan should address the measures to be taken in order to reach the objectives set. An important question is how to foster the participation of the population? The measures could include changes in the premiums to attract certain categories of the population and, together with the collaborating hospitals, improvements in the quality of health care. In turn, to what extent will quality of health care be improved via an increase in the availability of pharmaceuticals or extra financial incentives for health personnel?

In June 1993, the HHIC had started to reflect upon some of the components of such a plan. It had set targets for the memberhip of the various classifications of people. The overall aim is to sell 300,000 health insurance cards in 1993 which is equivalent to 20% of the total population. A dissection has been derived from various data in presentations by HHIC staff and is presented in Table 2.

The figures presented in Table 2 are quite uncertain, however. For example, it is not explained why only 30% of industrial workers are expected to be insured when it is obligatory for them to be insured; one assumption though is that the total size of the industrial workers comprises workers and their families. It should also be recognized that the target of 300,000 memberships for 1993 is not supported by details of how it is intended to achieve this target. For instance, it is known that only 33,000

voluntary memberships have been sold from January to June 1993. It is difficult to see how the remaining voluntary memberships targeted are going to be sold. It is obvious that further and more coherent work will need to be done for the elaboration of the proposed Health Insurance Development Plan.

Table 2 : Target Membership of Health Insurance, 1993

Classification	Estimated Population	Target Membership[a]
Government administrative workers	90,000	90,000 (100%)
Industrial workers	233,000	70,000 (30%)
Voluntary insured - Self employed	317,000	54,000 (17%)
- Farmers	860,000	86,000 (10%)
Total:	1,500,000	300,000 (20%)

Note: [a] Figures in brackets indicate membership rates in the relevant population category.

3. A Tool to Simulate Cost-Sharing and Health Insurance Premiums

3.1 Introduction : The purpose of the simulation model

As shown in the previous chapter, the different building blocks of the health insurance system in Hai Phong have to be better specified within the framework of a health insurance development plan. The model presented here proposes to assist in better understanding and analyzing the impact of targets (concerning health insurance membership, the level of quality of health services) on the level and structure of health financing.

The simulation model is given two particular functions. First, it analyzes cost-sharing of health care expenditure, thereby introducing, from the start, health insurance as an additional financing method. It is important to stress that the issue of health financing via health insurance is analyzed within the global framework of health policy objectives. In this model therefore, special attention is paid to issues of improvement of quality of health care, of general access to health care, and of cost-sharing between the government and other financing partners.

Secondly, it focuses on the basic mechanism of health insurance financing. On the one hand, there are the health care costs incurred by the insured that need be paid to health facilities via health insurance. On the other hand, there are the revenues that the health insurance scheme needs to collect in order to reimburse those costs. These revenues result from the payment of premiums by the insured; premiums can be either nominally fixed or can be calculated as fixed percentages of incomes. The model can analyze the level and structure of premiums required to ensure financial equilibrium in a health insurance scheme.

The simulation model does not require the user to assume compulsory health insurance from the start. It allows for scenarii whereby one gradually expands a voluntary insurance scheme, covering an ever growing part of the population. In the model it is assumed, as is now the case in Viet Nam, that the non-insured pay for health services via a fee-for-service system. The government, however, remains an important financier of health care. It will also be seen that the level of payments by patients themselves, either via health insurance premiums or via user fees, depends upon the level of co-financing of health services committed by government. It is evident that, cet. par., the greater the contributions by government (for example for salaries, equipment etc.), the lower the insurance premiums and the user fees will be.

At the outset, we point at some important caveats. First, the model is basically a simulation and calculation tool. The calculated outputs always reflect the initial hypotheses about the inputs formulated by the user. There is thus no intrinsic truth in any of the simulated results. The model only provides assistance in understanding the problem of health care financing and in designing financing alternatives. It also ensures a coherent set of results, given the users' inputs. This model is certainly not a substitute for policy decisions, but rather a tool to formulate these and to understand their implications.

3.2 Basic structure of the simulation model

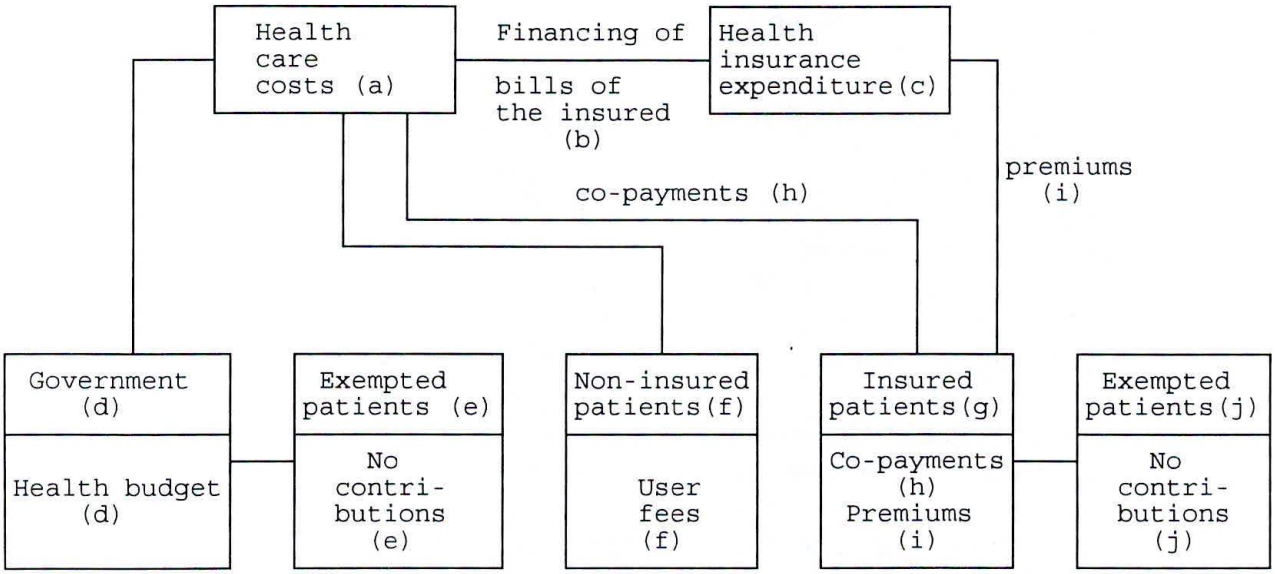
As can be seen from Figure 1, the basic reasoning in the simulation model is as follows. First, health care costs (a[67]) are determined. Subsequently, one defines the insured and the non-insured population (f and g). The government co-finances health services via its health budget (d). Health care costs of children under 5 are paid via the government budget; hence, children are exempted (e) from paying any user charges. The non-insured (and non-exempted) population pays user fees (f) to the hospital.

The insured population (g) pays a premium (i) to the health insurance scheme. A co-payment (h) to be paid by the insured directly to the health facility can also be introduced. Health insurance expenditure (c) consists of

[67] Each time this letter refers to the relevant item in Figure 1.

the payments of the health care bills (b) incurred by the insured (net of co-payments). A category of insured patients that is exempted (j) from paying contributions can also be specified. The costs incurred by these exempted patients will, however, have to be covered by the other insured (and non-exempted) patients.

Figure 1



3.3 Software requirements

The model runs on a LOTUS spreadsheet-version 3.1 that allows for a multi-sheet segmentation of a file. It is the latter feature that the model uses. In fact it uses three worksheets: the first (Sheet A) is the **input section** and must be completed by the user; the second (Sheet B) contains the **intermediate calculations**; the third (Sheet C) presents the final **results** together with basic **graphs**. Users can scroll through the simulation model and move from sheet to sheet if so desired in order to read specific information. They are also able to print any part of the simulation model.

3.4 Inputs into the simulation model

3.4.1 Types of health services

It is possible to enter a maximum of 15 different types of health services. Health services can comprise inpatient as well as outpatient services. The first eight types are reserved for inpatient services at city and/or provincial hospitals. The next four types are retained for inpatient services at district hospitals. The last three types of services are kept for outpatient services at city or provincial hospitals, district hospitals and commune health stations, respectively.

For example inpatient services can be defined, as admissions or as inpatient days in particular hospital departments. Outpatient services can be defined, for instance, as consultations.

3.4.2 Categories of population

The user can identify up to a maximum of six categories of population. The names of the categories already entered are dependants and farmers. The purpose of specifying the population categories is to enable the management of the health insurance scheme to estimate the membership rate, exemption status and to set the premium according to population category.

3.4.3 Base year of the simulation

The user states the base year of the simulation. A forecasting period of ten years is built in automatically in the simulation model. For instance, if the user quotes 1992 as the base year of the simulation, the model will provide projected results on a yearly basis up to the year 2002. However, it is not compulsory for users to analyze the whole ten-year projection period. They can restrict themselves to the analysis of results related to a three or five-year projection period, for instance, if there are too many uncertainties involved in the projection of a full ten-year period.

3.4.4 Demography

Required inputs

(i) Total population of the base year
(ii) Population growth rate
(iii) Percentage of dependants in the total population.

First, the total population in the base year is given. Secondly, one states the annual population growth rate for the ten-year period. Thirdly, the percentage of dependants in the total population is estimated for a ten-year period as well.

3.4.5 Economic environment

Required inputs

(i) Domestic inflation rate
(ii) External inflation rate
(iii) Exchange rate of the local currency vis-à-vis the US$

First, the domestic inflation rate is needed to estimate future costs of inputs for health services, such as pharmaceuticals, water, electricity etc. As soon as inputs are known in "constant" prices (in other words, if the quantities of those inputs are estimated), the input costs in "current" prices can be computed using the domestic inflation rate.

Secondly, the external inflation rate and the exchange rate are used to estimate the future cost of imported inputs such as pharmaceuticals and equipment. Note that the external inflation rate is to be understood as the average inflation[68] in countries exporting to Viet Nam.

Thirdly, concerning the exchange rate, the user can choose between two alternatives: (i) his own estimation of future exchange rates; or (ii) the Purchasing Power Parity (PPP) calculation[69]. The PPP calculation takes account of the evolution of domestic as well as external inflation, according to the following formula:

$$EXR_t = EXR_{t-1} * [1+DP\%_t]/[1+EP\%_t)$$

where:

EXR = exchange rate
DP% = domestic inflation rate
EP% = external inflation rate
t = time period.

3.4.6 Labour force and income

The simulation model identifies two age groups, viz. the "dependants" and "adults"[70]. At present the model enables the user to select up to 5 adult population categories; the category of farmers is the only class imposed by the model. For the four other categories, the users can choose the population categories according to the population groups they wish to distinguish in a health insurance development plan. In the context of Hai Phong health insurance, it is possible, for example, to distinguish the categories of active and retired government administrative workers, industrial workers, the self-employed, and spouses and other citizens.

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[68] The external price inflation rate is estimated, by expressing price levels in the exporting countries in dollar terms.

[69] A special parameter in the simulation model can be set at either 1 (PPP method) or 0 (own estimation).

[70] If it is decided to include mothers not participating in the labour market in the category of 'dependants', they will be excluded from the adult categories.

Required inputs

(i) **Share of each population category in total adult population**
(ii) **Average annual income in the base year**
(iii) **Nominal income growth per population category.**

First, one enters the share of each population category in total adult population throughout the projection period. Secondly, one gives the average annual income of each category in the base year. Thirdly, one gives the nominal income growth per adult population category throughout the projection period.

Information about composition of the adult population and incomes is necessary for the model to calculate the health insurance contributions and, hence, the total revenue of the health insurance scheme. In addition, note that each category of the adult population represents a specific target group for the health insurance scheme. One therefore has to estimate the possible extension or reduction of this target group as a proportion of total adult population. For example, as economic development continues, one can expect that the share of salaried workers in the adult population will increase to the detriment of the share of farmers.

3.4.7 Health insurance contributions and health insurance membership

Required inputs

(i) **Health insurance contribution rates (as a % of income)**
(ii) **Premium for dependants**
(iii) **Premium for farmers**
(iv) **Insured population as a percentage of each population group**
(v) **Indicator per population category whether the insurance contract covers outpatient care**
(iv) **Percentage of insured, in each population group, with**

First, health insurance contribution rates are determined for the non-farm adult population. The user is free to change the level and structure of contribution rates throughout the projection period.

Secondly, for dependants and farmers, a flat health insurance premium is to be determined from the start. The latter feature corresponds to the current practice in many health insurance schemes in developing countries.

Thirdly, users need to specify the health insurance membership of the various population groups (the dependant population and the categories of adult population), as a percentage of the population in each category. Via this feature, a gradual transition towards compulsory health insurance can be simulated.

Fourthly, one needs to specify whether the insurance contracts for the various population groups cover outpatient care in addition to inpatient care.

Finally, for each population category, it is possible to define a percentage of the insured that is exempted from paying health insurance contributions. This feature is probably more applicable in the case of compulsory insurance, whereby one insures the whole population, all the while granting exemption status to targeted population groups such as the poor and the old.

3.4.8 Level of co-payments

Required inputs

Co-payment rates per health service.

Apart from the payment of premiums to the health insurance scheme (see 3.4.7), insured patients may also be required to share directly in the cost of health services via co-payments. A co-payment rate is defined as a fraction of the average patient cost that is paid directly by the patient to the health faciltiy. The user can establish co-payment rates, for instance, if he judges that this is an efficient method to dampen any existing excess utilization of services. The insured with exemption status do not have to pay this co-payment.

3.4.9 Health care costs and health services

Health care costs and health services in the base year

Required inputs

(i) Cost by health service and by type of cost
(ii) Government's share in the financing of health care costs
(iii) Number of health services per type of serice
(iv) Number of health services per type of service, by

First, the model introduces four categories of costs per health service: health personnel's salaries; maintenance of equipment and buildings; pharmaceuticals and other recurrent costs such as electricity and water. Depreciation allowances can be included in the maintenance cost item. We remind the reader that 15 different health services can be defined. Categorizing costs per health service is justified by the fact that shares of the cost items are likely to vary according to the health service.

Secondly, the model addresses the issue of cost-sharing between government and patients (insured as well as non-insured). The user needs to specify the government's share in the financing of the various cost components, for each health service. This is done for the base year only. The patients' share is then simply calculated as 100% minus the government's share.

Thirdly, the user needs to provide the number of services per type of health service. The average cost per health service in the base year will then be computed by the simulation model. In addition, using the data on cost-sharing between government and patients, the model will compute the average **government cost** and the average **patient cost** per health service in the base year. It is understood that the government cost should reflect the willingness of the government to co-finance health services. The patient cost is to be financed, either via health insurance arrangements, or via direct payment of user fees by the non-insured.

Fourthly, the number of health services is broken down into health services consumed by the various population categories.

Required inputs

(i) **Unit cost targets for health service**
(ii) **Share of the cost of imported inputs in patient cost**
(iii) **Share of the cost of imported inputs in government cost.**

So far, the average costs reflected the level of quality of health care provided in the base year only. The user can now set **targets** for the average costs per health service. In the context of Viet Nam, the targets are likely to exceed the initial costs in view of the need to improve the quantity and quality of health care. These targets are set for both the patient and the government cost. For example, assume that the initial patient cost per admission in the internal medicine department is 17,000 VND and that it covers the average cost of drugs prescribed. If it is judged that the real input of drugs should double, in order to ensure a minimum quality of care, the target will be set at 34,000 VND. We emphasize that these targets are expressed in constant prices.

For each target, the user must select an **arrival year** (the year in which the target is to be achieved) and the **years of delay** (the number of years one waits before starting to move towards the target). The **starting year** can then be defined as the base year plus the years of delay. Between the starting year and the arrival year, average costs will move in a gradual (and linear) way towards the target. For example, suppose that due to budgetary constraints on the part of the government and the population, one can only start to finance an improvement in health care two years after the base year 1992. Furthermore, suppose one expects that the target should be reached five years after the initial year. In this particular example then, the starting year and arrival year are 1995 and 1997, respectively. Between those years, the average patient cost and the average government cost move towards the target according to a linear formula: between 1995 and 1997, the yearly absolute increase of the average costs amounts to 1/3rd of the difference between the initial values and the targets. We refer to Annex I, item 1, for the algebra.

Subsequently, the user needs to determine the share of imported inputs in patient and government cost. The shares of domestic inputs in those costs are then calculated as residuals. Earlier on (see 3.4.5) the user was already requested to put in estimates of the domestic and external inflation rate, and the exchange rate. Hence at this point, the simulation model will have all the information to compute the costs of health services in current prices. The main objective of this cost information in current prices is to analyze expected payments by health insurance, on the one hand,

and the level and structure of premiums that can ensure a financial equilibrium in health insurance, on the other.

Targets for health services

Required inputs

Targets for health service rates per population group and per health service.

For each population group, the simulation model will calculate the "observed" health service rates. These can be compared, for instance, with "expected" health service rate that reflects the population-based morbidity pattern. It stands to reason that the observed health service rates could well be lower than the expected rates. The differences could reflect, for instance, problems of access due to poverty and low demand due to an inadequate quality of health care. However, the observed health service rates could also be considered as excessive. For example, there may be too many hospitalized children as a result of a lack of primary health care. In those cases, public health policy-makers may want to set targets for health service rates that better reflect the needs of the population. It is important to note that it is assumed that these targets will apply to both the insured and the non-insured.

The model permits the user to set such targets. The same methodology outlined above in this section is applied. In other words, the user defines the years of delay and the arrival year. And the yearly increase (or decrease) of the health service rates between the starting and arrival year is computed in a linear fashion.

3.4.10 Administrative expenditure

Required inputs

(i) Total amount of salaries of administrative personnel
(ii) Expenditures for maintenance of equipment and buildings
(iii) Other expenditures
(iv) Real growth rates of administrative expenditure items.

The model distinguishes three categories of administrative expenditures : salaries, expenditures for maintenance of equipment and buildings (including depreciation allowances), and "other" expenditures. The latter category can be used to plan a surplus, for instance. The user defines the

initial costs related to those categories, as well as the estimated annual real growth rates of these expenditures.

Administrative costs are an essential component of the operating costs of any health insurance scheme. The model permits the user to simulate the impact of alternative levels of administration on the overall costs of health insurance. In practice, the level of administrative costs depends in part on the magnitude of membership of the health insurance scheme. The user may therefore wish to establish a link between health insurance membership and the level of administrative inputs.

3.4.11 Financial equilibrium of health insurance scheme

The simulation model does not guarantee a financial equilibrium of health insurance. With given levels for health services and premiums, a positive or negative balance may well arise. However, the simulation model is so built that the user can analyze the necessary adjustments to be made in order to achieve a financial equilibrium.

Adjustments can be made in the following variables: health insurance premiums, co-payments, health service costs, government financing of health service costs and the health service rates. The choice of variables to adjust as well as the level of adjustments do not have to be final after one round of adjustments. Several iterations may be needed in order to find a pattern of adjustments that is feasible. For example, suppose that in a first simulation the health insurance scheme is projected to run a deficit. In a second simulation run one may then hypothesize that health care costs for patients will be reduced as a result of additional government financing. However, this hypothesis is unrealistic should the government announce that there is an absolute constraint on its budget for health. The response of the user could then be to review the current level of health care costs and to inspect whether there exist inefficiencies that enhance costs. A reduction in these inefficiencies can decrease the cost level. The latter simulated policy could then result in a financial equilibrium.

3.4.12 Advice on the determination of targets

We saw above that targets about insurance membership, health service rates and/or average government and patient costs per health service can be set by the user. The insurance membership rates can be determined on a yearly basis. In the case of health service rates and average goverme-nt and patient costs, one can define the years of delay before moving towards the target and the year of arrival at the target (arrival year).

When defining the targets, the user should, however, be concerned about their coherence. For example, suppose that in a mixed compulsory-voluntary health insurance arrangement, one defines increasing health insurance membership rates over time. These targets should not be treated in an isolated way. In fact, membership is not likely to increase if the insured do not receive value for money. In other words, an improvement

of health services may well be needed in order to accept the presumed increase in insurance membership as a plausible assumption. Hence, in such a case, it is advisable to increase average patient and government cost in the simulation run.

The plausibility of the targets concerning patient and government cost per health service, and the capacity to pay by government and households for any likely increase in those costs, can also not be verified within the model itself. The overall government budget for health and the level and distribution of household income should be checked before one can qualify the targets as realistic.

3.5 Simulation results

The results are presented in Sheet C of the simulation model. They consist of the following:

(i) Economic Environment
- domestic price index
- external price index
- exchange rate

(ii) Demography
- population
- number of dependants
- number of farmers

(iii) Health services - all patients
- inpatient services at city/provincial hospitals
- inpatient services at district hospitals
- outpatient services at city/provincial hospitals
- outpatient services at district hospitals
- outpatient services at commune health stations

(iv) Health service costs - all patients
- patient cost (current prices)
- government cost (current prices)
- total cost (current prices)
- total cost (constant prices)

(v) Health insurance membership
- total membership
  (among which members belonging to the various population categories)
- members exempted
- (and as a percentage of the insured population)

(vi) Structure of health insurance premiums

(vi) Structure of health insurance premiums
- health insurance premiums by category of insured

(vii) Expenditure and revenue of the health insurance scheme
- total expenditure
  (of which administrative expenditures and health care payments)
- total revenue from premiums
- memorandum items: health care payments per capita in VND and administrative expenditures as a percentage of revenue from premiums

(viii) Direct payments by patients to health facilities
- total co-payments by the insured
- direct fees paid by the non-insured

(ix) Structure of health care financing
- user fees
- co-payments
- health insurance payments
- government financing.

3.6 A final counsel for the user

First, this simulation model does not produce "the" solution to the problem explored by the user. Surely, it illustrates the main effects of decisions taken, for instance, by the government, hospital management and the health insurance management. However, in no way is the model able to provide the best alternative set of decisions.

Second, the simulation model is particularly useful for the initiation of a health insurance scheme. With the data at hand about incomes, price levels, population and presumed membership, it is possible to give a good indication of the level of premiums needed to ensure a financial equilibrium. The results for the rest of the ten-year period are more speculative. In view of the uncertainty of the future values for several variables, the user may wish to inspect, say, only a period of two to three years.

Third, the simulation model is not a tool for day-to-day management of the health insurance scheme. The latter requires more detailed calculations, such as those related to the follow-up of bank accounts and the financial management of (temporary) surpluses (See sections 2.2.6 and 2.2.7).

Fourthly, in order to obtain useful simulation results, it is recommended to involve the various partners in hospital financing in the preparation of simulation scenarios. Crucial decision variables in the simulation model are the (i) cost-sharing between government and patients and/or households and (ii) the evolution of health services quality. It is obvious that the simulation

results will appeal to all concerned parties, if the inputs into the model reflect commonly acceptable and credible assumptions. The latter is also a way to avoid the excess formulation of alternative scenarios.

4. Provisional Simulation Analyses for the Health Insurance Scheme in Hai Phong Province.

In this section, we first use the simulation model to study the projected situation of health insurance in 1993. In particular we analyze the financial implications of the membership targets and health insurance premiums as announced by the HHIC in June 1993. We will evaluate whether the resulting scenario is feasible. In a second simulation analysis, we show how the model can be used to make alternative projections of revenue and expenditure of the health insurance scheme related to the period 1993-1997.

It must be said at the outset that all the necessary data to fully exploit the possibilities of the simulation model were not available. In fact, because of lack of detail about government financing of health services, the simulations below will focus exclusively on the "patient" costs of health services and on the financing of these costs.

Note that the population categories and the types of health services are common to both simulation analyses. The five population categories are:
(i) dependants (children below the age of 16); (ii) farmers, self-employed, spouses and other citizens[71]; (iii) government administrative workers; (iv) industrial workers; and (v) retired government workers. The five health service types are: (i) inpatient days at city/provincial hospitals; (ii) inpatient days at district hospitals; (iii) consultations at city/provincial hospitals; (iv) consultations at district hospitals; (v) and consultations at commune health stations.

4.1 Simulation for the year 1993 : Financial implications of the announced membership targets

Inputs

We refer to Table 3 for the inputs into this simulation analysis. Notice that the total membership assumed is 300,000 which is the target of the HHIC for 1993. Health insurance premiums and contributions correspond to the data presented to the authors by the HHIC (See also Table 1). The data entered for health service costs and health service rates are based upon information from the HHIC and the Department of Finance of the Ministry of Health. The inputs for administrative expenditure are also based on data from the HHIC. The category of other administrative expenditure is to be understood as a "surplus" that is apparently to be transferred from the HHIC to Central Government.

[71] Henceforth abbreviated as "farm-se-sp".

Table 3 : Inputs for the Simulation Analyses

Inputs	Financial Implications of the Announced Membership Targets for 1993	Simulation Analysis for the Period 1993-1997, Imposing Financial Equilibrium
1. Demography		
- total population of the base year	1,500,000	Idem
- population growth rate	na	2.2%
- percentage of dependants in the total population	39%	Idem
2. Economic Environment		
- domestic inflation	15%	Idem
- external inflation	5%	Idem
- exchange rate	10,500 VND=1$	Purchasing Power Parity-assumption used for the period 1993-1997
3. Labour Force and Income		
- share of each population category in total adult population:		
. farmers, self-employed, spouses, other citizens (farm-se-sp)	82.51%	Throughout the period 1993-1997: 82.51%
. government administrative workers	7.38%	7.38%
. industrial workers	7.65%	7.65%
. retired government workers	2.46%	2.46%
- average annual income in the base year (VND)		
. government administrative workers	350,000	800,000
. industrial workers	1,167,000	Idem
. retired government workers	200,000	400,000
- nominal income growth per population category		
. government administrative workers	}	Throughout the period 1993-1997: 15%
. industrial workers	}na	15%
. retired government workers	}	15%
4. Co-Payment Rates		
- Co-payment rates per health service	No co-payment	No co-payment

Inputs	Financial Implications of the Announced Membership Targets for 1993	Simulation Analysis for the Period 1993-1997, Imposing Financial Equilibrium
5. Health insurance insurance contributions and health insurance membership		
- health insurance contribution rates (as a % of income)		Throughout the period 1993-1997:
. government administrative workers	10%	3%
. industrial workers	3%	3%
. retired government workers	10%	3%
- premium for dependants (VND)	5,000	1993: 5,000 1994: 7,500 1995: 10,000 1996: 13,000 1997: 16,000
- premium for farm-se-sp (VND)	10,000	1993: 11,000 1994: 16,500 1995: 21,000 1996: 25,500 1997: 30,000
- insured population as a percentage of each population group		- 1993: same percentages as previous simulation
. dependants	10%	- 1994-1997:
. farmers, self-employed, spouses, other citizens (farm-se-sp)	10,79%	. for all workers (incl retired government workers): 100 % throughout the period 1993-1997
. government administrative workers	100%	
. industrial workers	100%	
. retired government workers	100%	. for dependants and farm-se-sp: 1994: 15% 1995: 20% 1996: 25% 1997: 30%
- indicator per population category whether insurance contract covers outpatient care (Yes=1; No=0)		
. dependants	0	1
. farmers, self-employed, spouses, other citizens (farm-se-sp)	0	1
. government administrative workers	1	1
. industrial workers	1	1
. retired government workers	1	1
- percentage of insured in each population group with exemption status	No exemption	No exemption throughout 1993-1997

Inputs	Financial Implications of the Announced Membership Targets for 1993	Simulation Analysis for the Period 1993-1997, Imposing Financial Equilibrium
6. Health care costs and health services in the base year		
- cost by health service and by type of cost (in VND)		
. cost per inpatient day at city/provincial hospitals	20,000	}
. cost per inpatient day at district hospitals	10,000	} Idem
. cost per consultation at city/provincial hospitals	7,000	}
. cost per consultation at district hospitals	5,000	}
. cost per consultation at commune health stations	1,000	
- government's share in financing of health care costs	Only the patient costs are considered	Idem
- number of health services per type of service		
. inpatient day at city/provincial hospitals . inpatient day at district hospitals	Inpatient days: It is assumed that the admission rate to hospitals is 7% of total population; 86% are admitted to district hospitals and 14% to city/provincial hospitals. The length of stay is 9 and 16 days in city/provincial hospitals and district hospitals, respectively.	*Inpatient days*: It is assumed that the admission rate to hospitals is 8% of total population; 86% are admitted to district hospitals and 14% to city/provincial hospitals. The length of stay is as in the previous simulation.
. consultations at city/provincial hospitals . consultations at district hospitals . consultations at commune health stations	*Consultations*: The estimated number of consultations per person is 1.5 per year, of which 0.23 consultations per person at commune health station level, 1.12 consultations per person at district hospital level and 0.15 consultations per person at city and provincial hospital level.	*Consultations*: } Idem
- number of health services per type of service by population category	Health services are allocated according to the share of each population category in total population.	Idem
7. Targets for health care costs		
- unit cost targets per health service	na	Unit costs per health service (in constant prices) remain constant throughout the period 1993-1997
- share of the cost of imported inputs in patient cost	No imports assumed	Idem
- share of the cost of imported inputs in government cost	na	na
8. Targets for health services		
- targets for health service rates per population group and per health service	na	Health service rates remain constant throughout the period 1993-1997

Inputs	Financial Implications of the Announced Membership Targets for 1993	Simulation Analysis for the Period 1993-1997, Imposing Financial Equilibrium
9. Administrative expenditure - total amount of salaries of administrative personnel - expenditure for maintenance of equipment and buildings	}Equal to 8% of health care }payments of the health insurance }scheme }	1993: all administrative expenditure as in previous simulation 1994-1997: all administrative expenditure (in constant prices) remains constant
- other (planned surplus)	Equal to 2% of health care payments by the health insurance scheme	

Note: na = not applicable

Results

Total expenditures by the HHIC would amount to 4,033.7 million VND. The latter amount consists of health care payments (3,667 million VND) and administrative expenditures (366.7 million VND). The total revenue from premiums amounts to 6,370.7 million VND. In other words, there would be an excess revenue of 2,337 million VND or 36.6% of total revenue from premiums. The latter result is puzzling as no such surplus appeared to have been planned by the HHIC. We attempt to clarify this result by addressing four main questions:

(i) Are health care costs underestimated?

(a) Minimum information about costs of health services is currently available at hospital level only. Closer scrutiny of available cost information on hospital services reveals the following. For instance in 1991, average cost[72] per inpatient day amounted to 13,922 VND at Dong-Anh District Hospital[73]. And in Viet Tiep Hospital (Hai Phong) the average cost per inpatient day was quoted to be 18,886 VND in 1992. It follows that the ratio of patient cost to average inpatient cost in the present simulation analysis is very high: 72 % (10,000/13,922) for district hospitals and 106% (=20,000/-18,886) for city and provincial hospitals. It is important to note that these ratios contrast with current practice. In fact, at Dong-Anh District Hospital patient contributions amounted to 10% of total costs. In Hai Phong, patients contributed 16.3% of the total cost of publicly provided health services.

[72] These costs include salaries and allowances, drugs and solutions, electricity and water and other recurrent expenses.

[73] Calculation based on Dung and Hien (1992, pp.6 and 10).

Two possible explanations for the announced levels of patient costs. Either government plans a reduction in its financing of hospitals and counts, henceforth, on health insurance financing to fill any shortfall. Or, government maintains its current level of financing but any additional revenues from health insurance will be used for quality improvement. The latter possibility seems to be the most reasonable. But then it is not certain that hospitals will be able to absorb such high additional revenues and effectively use these for the improvement of health services. Also in view of this uncertainty, we conclude that hospital costs to be borne by patients are more likely to be overestimated than underestimated.

(b) Adequate cost information concerning outpatient services is not available as yet. The announced level of the patient cost for consultations at commune health stations seems quite low, and constitutes only 1/5th and 1/7th of the patient cost for consultations at district level and city/provincial level, respectively. Is the low cost the reflection of a lower quality of outpatient services at commune level? If this is indeed the case, and if one wants to avoid substantial differences in quality, the cost level of the outpatient services at commune health stations needs to be adjusted upward. In other words, in the present simulation the costs of outpatient services at commune health services may be underestimated.

(ii) Are health service rates underestimated?

These rates are based upon observations related to the total population. Health service rates of the insured could well exceed those of the non-insured, however. In this sense, the forecasted health services by the insured could be underestimated. As mentioned earlier, the hospital admission rate of the insured amounted to 8%; the latter is to be compared to an average admission rate for the total population of 7.13%. Should we apply this higher admission rate for the insured, and keep the levels of all other variables as in the previous simulation, health care costs of the insured would increase by 12.2% (= [8%/7.13%]-1). The latter increase will only contribute partially to reducing the excess revenue: it can be verified that excess revenue would drop to 1,844.9 million VND.

(iii) Are premium levels overestimated?

It has be to remarked that some premiums have risen quite substantially from 1992 to 1993. Using an estimated inflation rate of 15%, we can calculate the real rise in premiums. The average premium for industrial workers rose by 117.4%. Premiums for farmers, self-employed, spouses and other adult citizens rose by 8.7%. The average premium for children decreased by 15% in real terms. The question remains whether such increases are warranted, and whether the resulting additional revenues will be effectively used for health service improvement. In the current

simulation analysis, the average premium per insured amounts to 21,236 VND; 90% of this amount (19,112 VND) should cover health care expenses and 10% the administrative expenses (2,124 VND). However, the average health care expenditure per insured is 12,223 VND. It does seem there is an over-estimation of the level of premiums.

4.2 Alternative simulation

The purpose of this simulation is to show how the simulation model can be used in the search for a scenario whereby financial equilibrium in health insurance is achieved. In this alternative simulation, we project revenues and expenditure of the health insurance scheme for a five year period, i.e. 1993-1997. It is obvious that adjustments in the levels of selected variables will need to be made in order to respect the constraint of financial equilibrium[74].

Inputs

We refer to Table 3 for a full account of the adjustments effected vis-à-vis the previous simulation. We highlight several important adjustments:

(i) membership among the population groups, that can insure on a voluntary basis, is assumed to expand gradually to reach 30% by the end of 1997;

(ii) health insurance premiums for government workers (including the retired) are lower; health insurance contribution rates drop from 10% to 3% of income;

(iii) the coverage of insurance for outpatient care is extended to all categories of insured;

(iv) the hospital admission rate increases from 7% to 8%[75].

Results

All results as they appear in Sheet C of the computer programme, are presented in Annex 2.

Apart from achieving financial equilibrium in health insurance, two other important results are worth reiterating:

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[74] We will accept that a financial equilibrium has been achieved if the absolute difference between revenue and expenditure of the health insurance scheme is less than 1% of total revenue.

[75] This is applied to the insured as well as the non-insured population.

(i) **Health insurance membership**

Total membership will more than double by the year 1997. This is the result of two factors. First, as a result of population growth, total membership rises in each population group. Secondly, this increase is also due to the assumption that 30% of the population groups, that can insure voluntarily, become members.

(ii) **Structure of health insurance premiums**

All premiums rise in order to be able to finance the increasing health care expenditure to be reimbursed by health insurance. The structure of premiums also shows that the initial structure is slightly modified: by 1997, the premium for retired government workers is less than that for the category of farmers, self-employed, spouses and other citizens.

Discussion

We repeat that there is no intrinsic truth in this particular simulation analysis. Much more work will need to be done on the elaboration of a workable health insurance development plan. The simulation tool presented can be of assistance in this task. However, the actual use of this tool needs to be preceded by a thorough deliberation by HHIC management about the basic elements of the health insurance equation. The most important elements are the types of health services covered, the costs charged to patients, the level and structure of health insurance premiums and health insurance membership.

Health insurance is more than just a mechanism to reimburse health service costs to health facilities. It is also a way to enhance the quality of health services and to improve access by the various socio-economic population categories to those services. In this sense, health insurance financing could be seen as an important complement to public financing. It follows that the level of public financing of services is also be to be considered in the health insurance development plan. Indeed, the question needs to be addressed as to what the government's share will be in the financing of health services and of quality improvements. Subsequently, it can be evaluated what the role of the HHIC would be in the general development of health services.

Conclusion

In Viet Nam, an endeavour is made to introduce health insurance at a national scale. This would not mean, however, that health insurance will be regulated and organized from one centre. It appears that districts and provinces will have a large say in the development of health insurance.

Already, some pilot health insurance schemes have been established since 1989. One is the Hai Phong Health Insurance Scheme. In this paper, we have provided a preliminary evaluation of this particular scheme. It is initially observed that this scheme has not been able to make a breakthrough, however. Membership rates are not increasing, due in part to inadequate quality of care that is being provided at provincial hospital level. It is then recommended that a health insurance development plan be established, that would outline the objectives of this scheme and the strategies to reach those objectives.

As a tool to assist in developing health insurance in Hai Phong, we presented a simulation model that concentrates on the projection of health care costs, the financing of those costs, and the analysis of the level and the structure of health insurance premiums. A first simulation addressed the financial implications for the HHIC of the announced membership targets and health insurance contributions for 1993. It appeared that, given certain levels of health service costs to be borne by patients, the scheme would realize excess revenues. Subsequently, we gave one example of how values of certain variables needed to be changed in the simulation model in order to achieve financial equilibrium. The latter simulation resulted in a projection for the period 1993-1997.

Significant efforts on the part of the HHIC are needed in the next stages in order to produce a complete framework to develop health insurance over the next five years. The simulation model could then be of greater use. Government authorities and the HHIC will need to clarify the targets concerning health care delivery and the ways of financing health services. The latter would already be a significant step forward. However, many more tasks await the HHIC. The search for an appropriate provider payment system will need further attention. In addition, and last but not least, ways to fostering the population's interest in health insurance need to be explored.

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Annex I

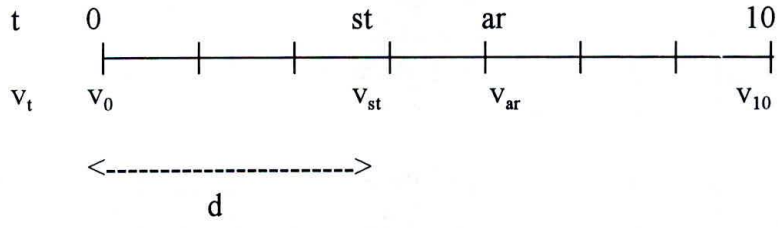
Calculation methodology[76]

1. Moving towards a target

As previously stated (see section 3.4.8), the calculation of the gradual move towards targets for admission rates as well as government and patient cost requires each time a "starting year" and an "arrival year". These data inputs are presented in Figure A.

Figure A

Years of delay, starting year and arrival year of target variables



Notes: t = year (st=starting year; ar=arrival year)
d = years of delay
v_t = value of the target variable in year t.

The simulation model computes the path of the target variables as follows:

(i) If $st < t \leq ar$
then $v_t = v_{t-1} + (v_{ar} - v_{st})/(ar-st)$

(ii) If $t \leq st$ or $t > ar$
then $v_t = v_{t-1}$.

[76] Only the main calculations are presented here. A complete overview of the equations in the model can be obtained from the authors upon request.

If condition (i) applies, a linear progression of the variable is calculated between the starting year (st) and the arrival year (ar). If condition (ii) is fulfilled, the value in t is set equal to the value in t-1. The latter implies that the variable takes on the value of the initial year for all years up to the starting year, whereas it takes the value of the target for the years beyond the arrival year.

2. Conversion into current prices[77]

Cost items with domestic inputs only

Conversion of a cost item measured in constant prices is straightforward, provided this variable only concerns domestic activities or inputs. In the present version of the simulation model, we assume that administrative costs of the health insurance scheme belong to this category of variables. For any administrative cost item, we can then define its value in current prices as follows:

$$AC_t = ac_t * DPI_t/100$$

where:

t	=	year[78]
AC	=	administrative cost in current prices
ac	=	administrative cost in constant prices
DPI	=	domestic price index (base year value= 100).

The growth rates of ac and DPI, that are defined by the user, will determine the evolution of those variables (see sections 3.4.10 and 3.4.5, respectively).

Cost items with imported inputs

If the cost item concerns imports, account needs to be taken of external inflation and the evolution of the exchange rate. In the model, the variables with import contents are the average patient cost (pc) and average government cost (gc) per health service.

In the previous section, it was outlined how the path of variables like pc_t and gc_t are computed. Previously, the user has also defined the shares of imported inputs in patient and government costs (see section 3.4.8). Using

---

[77] Henceforth all variables denoted by small letters and capital letters refer to variables expressed in constant and current prices, respectively.

[78] Henceforth, the subscript t indicates the year.

those data, one can then compute the imported and domestic components of those costs as follows:

$$mpc_t = \alpha_t * pc_t$$
$$dpc_t = (1-\alpha_t) * pc_t$$
$$mgc_t = \beta_t * gc_t$$
$$dgc_t = (1-\beta_t) * gc_t$$

where:

mpc = value of imported contents of patient cost
α = share of imported inputs into patient cost
dpc = value of domestic contents of patient cost
mgc = value of imported contents of government cost
β = share of imported inputs into government cost
dgc = value of domestic contents of government cost.

The values of the domestic contents of patient and government costs, in current prices, are simply defined as:

$$DPC_t = dpc_t * DPI_t/100$$
and
$$DGC_t = dgc_t * DPI_t/100$$

where DPI = domestic price index.

The values of the imported contents of costs, in current prices, are calculated as follows:

$$MPC_t = mpc_t * EPI_t/100 * EXRI_t/100$$
$$MGC_t = mgc_t * EPI_t/100 * EXRI_t/100$$

where:

EPI = external price index (base year value=100)
EXRI = exchange rate index (base year value=100).

It stands to reason that the cost of imported inputs, expressed in current prices of local currency, depends upon external inflation and on the evolution of the exchange rate. The evolution of the external price index is based upon the projected external price inflation (see section 3.4.5).

The exchange rate index is computed as follows:

$$EXRI_t = (EXR_t / EXR_{t-1}) * 100$$

where:

EXR = exchange rate.

The calculation of the exchange rates themselves have been discussed earlier (see section 3.4.5). The exchange rate index reflects the appreciation or depreciation of the local currency vis-à-vis the US$. Suppose that in the base year of the simulation (year 0), the exchange rate (EXR_0) was 10,000 VND ; this then corresponds to an exchange rate index $EXRI_0$=100. Imagine that a year (year 1) later the exchange rate EXR_1=11,000 VND. In this example, the exchange rate index in year 1 becomes $EXRI_1$=110[79]. This value would reflect that the exchange rate depreciated by 10% since year 0.

The values of total government cost and patient cost can now be computed as follows:

$$PC_t = DPC_t + MPC_t$$
$$GC_t = DGC_t + MGC_t,$$

where:

PC = patient cost
GC = government cost.

3. Total expenditure and revenue of the health insurance scheme

Expenditure

Premiums ought to be related to the costs of health services consumed by the insured population. These costs will have to be financed by the health insurance scheme and are therefore part of the scheme's expenditures. Those costs will be denoted as CHS_t. The latter are defined as follows:

$$CHS_t = \sum_i \sum_j PC_{t,j}[1-cop_j] . HS_{t,ij} . POP_{t,i} + \sum_i \sum_j PC_{t,j} . HS_{t,ij} . POPE_{t,i}$$

[79] 110 = (11,000/10,000)*100.

where:

$PC_{t,j}$ = Patient cost per health service j
cop_j = Co-payment rate per health service j
$HS_{t,ij}$ = Health service rate j of population category i
$POP_{t,i}$ = Number of non-exempted insured in population category i
$POPE_{t,i}$ = Number of exempted insured in population category i.

Note that only those health services that are covered by health insurance are part of this equation. The administrative expenditures (AC_t) of the health insurance scheme also need to be covered by the insurance contributions. Hence, the total expenditure of the health insurance scheme is as follows:

$$C_t = CHS_t + AC_t.$$

Revenue

The premium of dependants and farmers is predetermined. The insurance contributions for the non-farm adult population categories are calculated by multiplying the insurance contribution rates by the income of the latter population categories. The total revenue received by the health insurance scheme from the latter contributions, HIR, is as follows:

$$HIR_t = \sum_k hicr_{t,k}.INC_{t,k}.POPAD_{t,k} + PRF_t.POPF_t + PRDP_t.POPDP_t$$

where:

$hicr_k$ = health insurance contribution rate of adult non-exempted population category k
INC_k = average income of adult non-exempted population category k
$POPAD_k$ = size of adult non-exempted population category k.
PRF = farmers' premium
POPF = insured non-exempted farmer population
POPDP = dependant population
PRDP = dependant premium
HIR = total revenue from health insurance premiums.

The balance of the health insurance scheme in year t is then simply equal to (HIR_t - C_t).

Annex II

WORLD HEALTH ORGANIZATION
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Mr Do Duy HIEN

COST-SHARING AND HEALTH INSURANCE PREMIUM SIMULATION MODEL

Version 2.1-October 1993

MAIN RESULTS AND GRAPHS

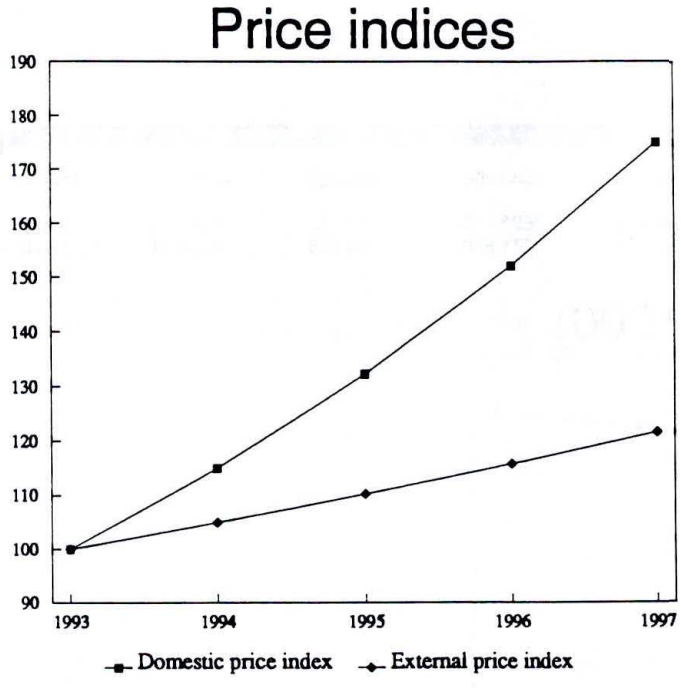
Scenario: Projection 1993-1997
Financial equilibrium health insurance

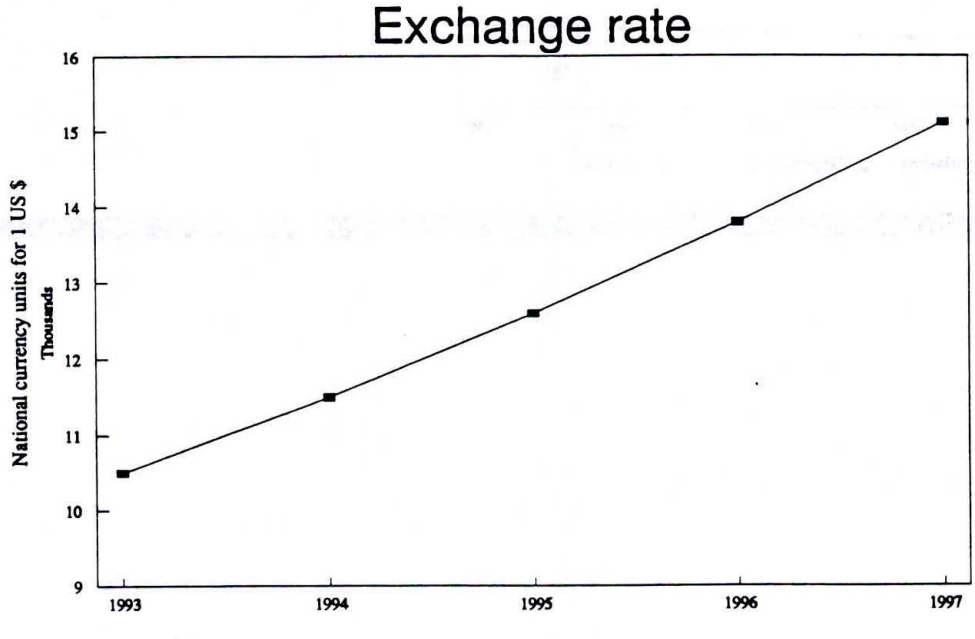
* ***Note: the figures only depict results pertaining to a 5-year period starting from the base year***

We refer to the following figures

Price indices
Exchange rate
Population
Health services - all patients
Health service costs - all patients
Health Insurance membership
Structure of health insurance premiums
Expenditure and revenue of the health insurance scheme
Direct payments by patients to health facilities
Structure of health care financing

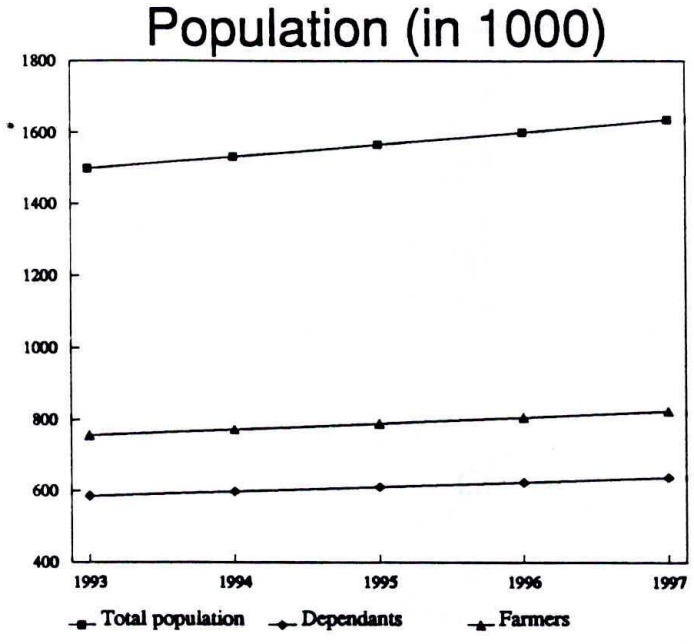
Domestic price index		100.00	115.00	132.25	152.09	174.90
External price index		100.00	105.00	110.25	115.76	121.55
Exchange rate / US$	***PPP selected***	$10,500.00	$11,500.00	$12,595.24	$13,794.78	$15,108.57





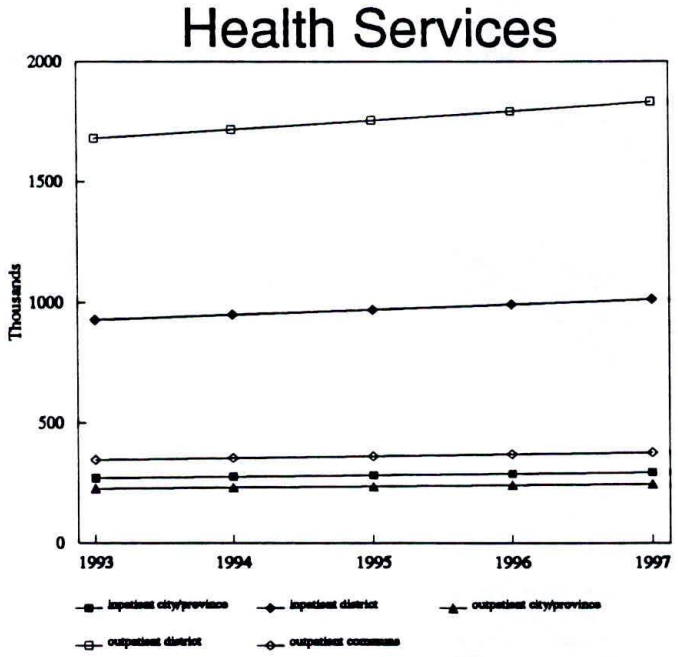
DEMOGRAPHY
(in thousands)

Population	1500.000	1533.000	1566.726	1601.194	1636.420
Number of Dependants	585.000	597.870	611.023	624.466	638.204
farm-se-ap	755.000	771.610	788.585	805.934	823.665



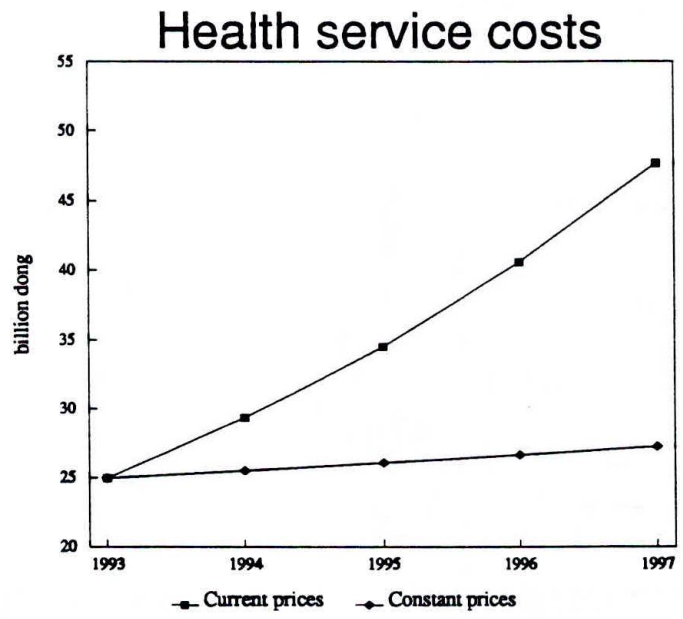
HEALTH SERVICES - all patients

Inpatient serv. at city/prov hospitals	268800	274714	280757	286934	293247
Inpatient serv. at district hospitals	928800	949234	970117	991459	1013271
Outpatient serv. at city/prov hospitals	225000	229950	235009	240179	245463
Outpatient serv. at district hospitals	1680000	1716960	1754733	1793337	1832791
Outpatient serv. at commune health st	345000	352590	360347	368275	376377



HEALTH SERVICE COSTS - all patients
(in thousands)

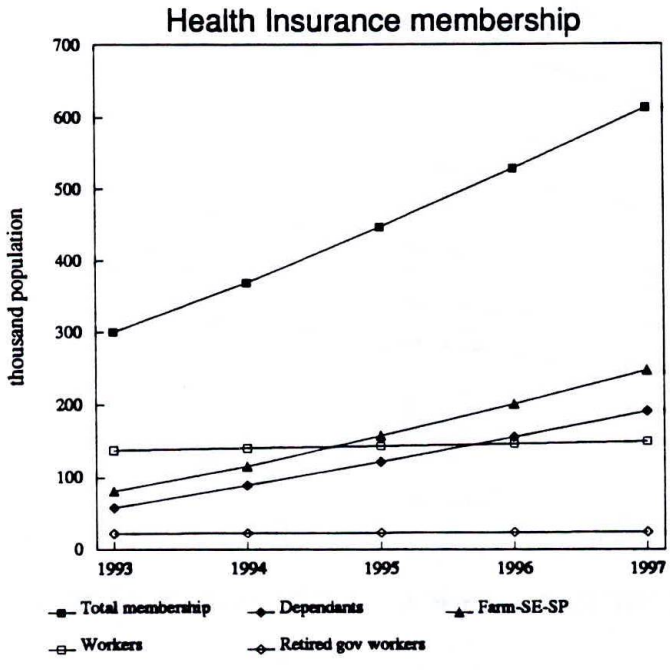
In current prices					
Patient cost	D24,984,000	D29,363,695	D34,511,151	D40,560,956	D47,671,291
Government cost	D0	D0	D0	D0	D0
Total Cost	D24,984,000	D29,363,695	D34,511,151	D40,560,956	D47,671,291
in constant prices					
Total cost	D24,984,000	D25,533,648	D26,095,388	D26,669,487	D27,256,216



HEALTH INSURANCE MEMBERSHIP

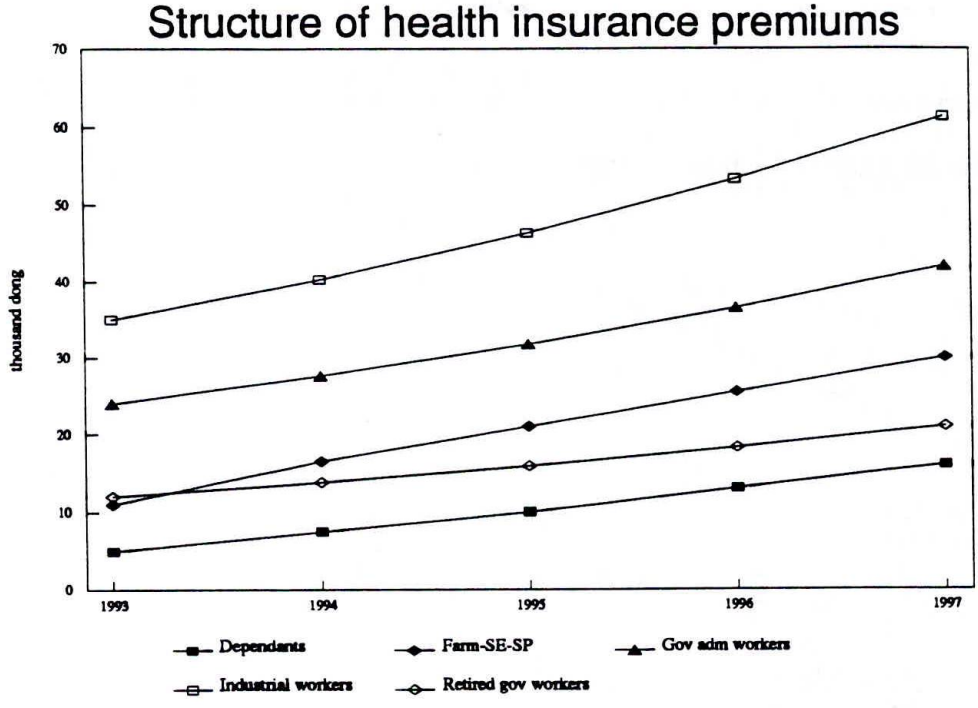
(in thousands)

Total membership		300.000	368.942	447.039	528.394	613.112
.....Of which						
	Dependants	58.500	89.681	122.205	156.116	191.461
	farm-se-ep	81.500	115.742	157.717	201.484	247.099
	Workers	137.500	140.525	143.617	146.776	150.005
	gov adm workers	67.500	68.985	70.503	72.054	73.639
	industrial workers	70.000	71.540	73.114	74.722	76.366
	**retired gov adm ' **	22.500	22.995	23.501	24.018	24.546
Members exempted		0.000	0.000	0.000	0.000	0.000
as a% of total population insured		0.00%	0.00%	0.00%	0.00%	0.00%



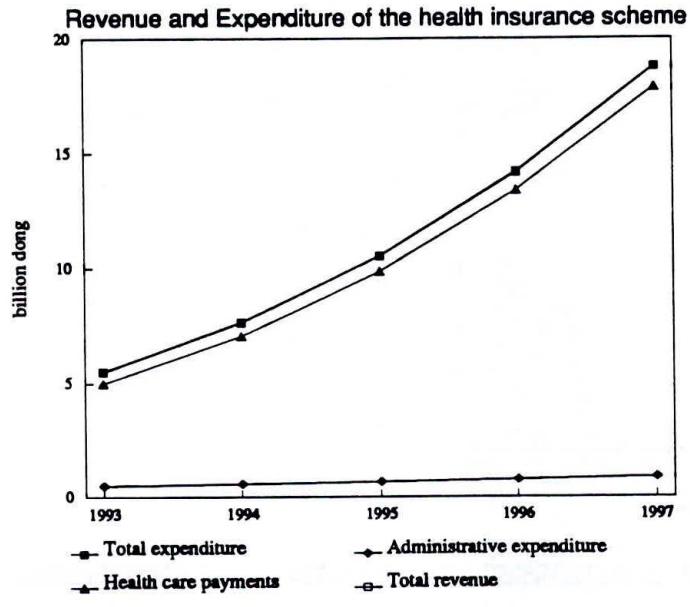
STRUCTURE OF HEALTH INSURANCE PREMIUMS
(in Dong)

Dependants	D5,000	D7,500	D10,000	D13,000	D16,000
farm-se-sp	D11,000	D16,500	D21,000	D25,500	D30,000
gov adm worker:	D24,000	D27,600	D31,740	D36,501	D41,976
industrial worke	D35,010	D40,262	D46,301	D53,246	D61,233
retired gov adm	D12,000	D13,800	D15,870	D18,251	D20,988



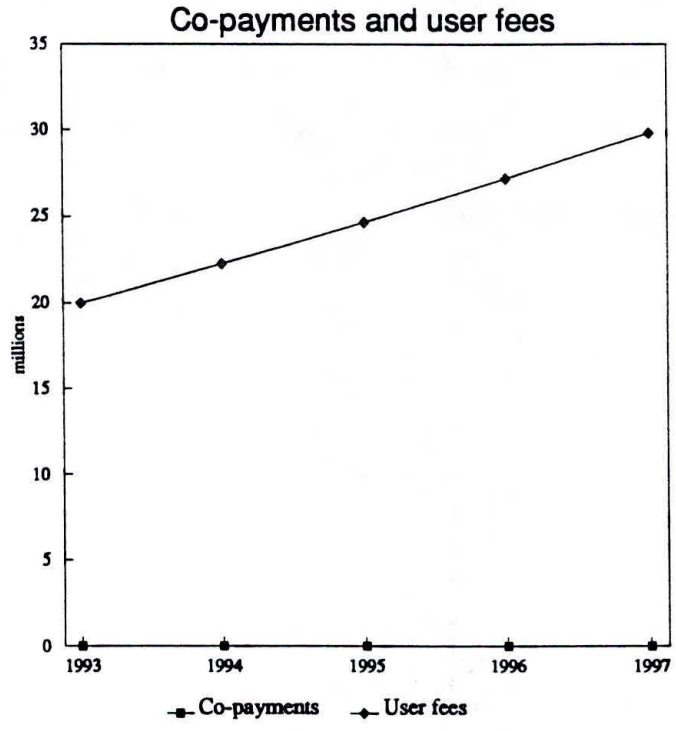
EXPENDITURE AND REVENUE OF THE HEALTH INSURANCE SCHEME
(in thousands)

Total Expenditure	D5,496,480	D7,641,495	D10,508,009	D14,145,066	D18,734,787
of which					
admin expenditure	D499,680	D574,632	D660,827	D759,951	D873,943
health care payments	D4,996,800	D7,066,863	D9,847,182	D13,385,115	D17,860,844
Total Revenue from premiums	D5,529,700	D7,683,963	D10,530,045	D14,214,372	D18,758,734
Balance of the insurance scheme	D33,220	D42,469	D22,036	D69,306	D23,947
Memorandum items:					
Health care payments per insured in D	16656	19154	22028	25332	29131
Administrative expenditures as a % of revenue from premiums	9.04%	7.48%	6.28%	5.35%	4.66%



DIRECT PAYMENTS BY PATIENTS TO HEALTH FACILITIES
(in thousands)

Total co-payments by the insured	D0	D0	D0	D0	D0
Direct fees paid by the non-insured	D19,987,200	D22,296,833	D24,663,969	D27,175,840	D29,810,447



STRUCTURE OF HEALTH CARE FINANCING

in thousands						
User fees		D19,987,200	D22,296,833	D24,663,969	D27,175,840	D29,810,447
Co-payments		D0	D0	D0	D0	D0
Insurance payments		D4,996,800	D7,066,863	D9,847,182	D13,385,115	D17,860,844
Government financing		D0	D0	D0	D0	D0
	Total	D24,984,000	D29,363,695	D34,511,151	D40,560,956	D47,671,291
shares in %						
User fees		80.0%	75.9%	71.5%	67.0%	62.5%
Co-payments		0.0%	0.0%	0.0%	0.0%	0.0%
Insurance payments		20.0%	24.1%	28.5%	33.0%	37.5%
Government financing		0.0%	0.0%	0.0%	0.0%	0.0%
	Total	100.0%	100.0%	100.0%	100.0%	100.0%