HOW MUCH WILL A NATIONAL HEALTH INSURANCE PROGRAM COST? SOME ISSUES, QUESTIONS, AND ESTIMATES*

Orville Solon Joseph J. Capuno**

I. INTRODUCTION

The political will to ensure adequate financing for health care has been expressed through a number of proposed legislation on national health insurance (NHI), the latest of which is the National Health Care Act of 1994 (Senate Bill No. 1605). In most versions, the expressed goals include:

(1) adequate financing to reduce unmet needs for health care;

(2) equitable access to health care services, especially by the disadvantaged;

(3) efficient and effective production and delivery of health services; and

(4) more efficient and equitable pooling of financial resources for health.

Thus far, the discussions have focused on whether a national health insurance program is the most appropriate solution

^{*}This paper was written in 1994 as part of the University of the Philippines School of Economics Health Policy Development Program (UPEcon-HPDP) funded research project which was undertaken to provide technical support to the national health insurance project of the Department of Health.

^{**}Assistant Professor and Lecturer, respectively, University of the Philippines School of Economics. The writers would like to acknowledge comments and suggestions from Rhais Gamboa, Alex Herrin, Jim Jeffers, Mario Taguiwalo, and other researchers working under the Health Finance Development Project of the University of the Philippines School of Economics.

to the problem of financing health care services. For example, we have yet to ascertain whether or not NHI which shall basically fund personal health care services will compromise public health programs supported through central and local government budgets. Specifically, both public health programs and NHI proposals consider and compete for local government budgets as a funding source. While this phase of the debate is far from over, we enter yet another phase and begin to debate which proposal will be the most effective in delivering the desired goals of national health insurance.

In choosing among proposed NHI programs, we confront a number of questions concerning political, economic and organizational viability. This paper begins to examine a subset of questions concerning the economic viability of NHI programs. We begin by raising two questions:

- (1) How much will an NHI program cost?
- (2) How well might such a program perform relative to some of the desired outcomes?

Obviously, the answer to the first question is that the cost of a program depends on three sets of parameters:

(1) Macroeconomic parameters including inflation and employment rates;

(2) Design parameters such as how many people the NHI program has to cover, what benefits it shall provide, how much contributions have to be collected and how these shall be pooled and managed, who shall provide the benefits, and how health care providers are to be compensated; and

(3) Behavioral parameters including enrollment rates, utilization rates, and pricing which define how consumers and health care providers respond to program design.

Proposed programs cannot be judged on the basis of costs alone; we have to consider effectiveness or performance. It is likely that more than one proposal will be considered affordable, so that explicit measures of performance like people's willingness and abilities to pay, cross-subsidization across income groups, fund viability, and so on will have to be developed.

This paper begins to explore issues related to the cost and performance by describing a method of costing out alternative program designs, and by presenting some measures of performance. Illustrative design packages are then costed out and evaluated. However, the costing simulations presented here are not intended to become the final basis for choosing among the current NHI proposals. As we shall see, existing data and information relevant to costing exercises are insufficient and In addition, present NHI legislation barely provide tentative. enough details on program design for costing to be undertaken. The figures presented here only serve to provide a rough sense of the magnitudes involved under a typical NHI proposal. Furthermore, we hope that by undertaking this exercise, we are able to highlight specific design issues related to the economic viability of a program that have yet to be addressed by current proposals.

II. BASIC STRUCTURE OF THE COSTING SIMULATION MODEL

The costing simulation model used in this paper develops around a simple accounting framework:

FUND BALANCE equals REVENUES less BENEFIT EXPENDITURES less ADMINISTRATIVE COSTS.

By focusing on fund balance, the model allows one to immediately confront the question of how much more resources, on top of regular revenue sources, need to be raised by government to keep a program financially viable. This relationship between program revenues and expenditures and costs is played out over an eighty-year period, at the end of which universal coverage is reached. It should be noted that the period length is arbitrarily chosen and can therefore be extended or shortened. The year-toyear dynamics involved in the costing model include expansion of population covered, population growth, accruals, and inflation. For those interested in magnitudes, perhaps the relevant figures will be the end-of-period amounts.

A. The revenue-side of the model

The components of program revenues include contributions or premium payments from program members and accruals of income from initial endowments. Government subsidies over and above payments in behalf of indigent groups are treated here as that amount needed to maintain fund balance.

Revenue from member contributions are accounted for in the model according to the following identity:

COLLECTIONS equals PREMIUM times NUMBER OF MEMBERS.

From the above relationship, the amount of premium collection depends on the number of paying members and the rate and structure of contributions. The number of paying members are determined by at least two factors. First, the dependency ratio or the number of members to other beneficiaries which require the support of a paying member. A higher dependency ratio increases the financial burden on the individual paying member. Second, the number of members considered as being unable to pay their contributions and would therefore require subsidy from central or local government. If local governments were to subsidize, partially or fully, the contributions of indigent population, an important equity issue arises. Local government units with greater proportion of indigents within their jurisdictions will likely to have lower abilities to provide the required premium subsidies.

The rate and structure of contributions determine not only the potential revenues but also the ability of the program to ensure cross-subsidization. Of course, the amounts that can be collected from members belonging to various income classes depend on the members' abilities to make such payments, the attractiveness of the package being offered, and the extent to which social solidarity objectives are to be pursued.

There are two important behavioral issues that need to be considered when estimating collections revenue. First, while under most NHI proposals contributions are compulsory, we still have to worry about remittance rates and the regularity of contributions. Those belonging to the wage and salaried sector will most likely continue to make their contributions via payroll deductions. While this is relatively less difficult, the Medicare experience suggests that a 100% remittance rate remains ideal. Door-to-door collections from the self-employed population will be more difficult and can be expected to produce lower payment rates. To maximize collections, one small suggestion is to attach premium payments as a rider to a number of tax collection efforts including income taxes, residence taxes, and on fees on business permits.

The second most important revenue component would be other income including accruals from surplus funds. Income from this source is handled by the costing simulation model according to the following relationship:

ACCRUALS equals SURPLUS FUND times INTEREST RATE.

Clearly, the amount of revenue from this source depends upon the size of initial fund endowment ass well as on the rate of return on such funds. As the SSS and GSIS experience suggests, an NHI program will have to have sound investment portfolio management.

B. Expenditure-side of the model

Expenditures on health care benefits used by program beneficiaries are defined here as the cost of services (net of copayment and deductibles) times the number of services being utilized. Here, we assume a one-to-one correspondence between the number of services used and the number of users. Hence, benefit spending is estimated here using the following relation:

BENEFIT EXPENDITURES	equals	SERVICE COSTS
	net of	COPAYMENT
	times	UTILIZATION RATE
	times	NUMBER OF
		BENEFICIARIES.

The above expression suggests that total health care spending depends upon the following: (1) the type of services offered; (2) the cost of these services; (3) cost sharing arrangements between the fund, on one hand, and providers and beneficiaries on the other; (4) utilization rates for the types of services offered; and (5) the number of beneficiaries.

At this point, available data only allows us to specify benefits in terms of the average costs of in-patient and out-patient care. Clearly, there is a need for further specification of the different types and components of hospital and clinic care.

Two sets of behavioral issues are relevant to estimating total health care spending. First, we need to have a good description of the expenditures, utilization and provider choice patterns of beneficiaries. The specific behavioral issue is how such behavior is affected by various levels of insurance coverage. The concern is to have a measure of the extent to which out-patient and in-patient service utilization rates will increase with insurance.

The other behavioral issue concerns how costs and the prices charged by health care providers will be affected by insurance. Cross-country experience and some of the currently available data suggest that with insurance health care costs are expected to increase. Now, whether such increases reflect quality changes or pure *rents* is the subject of a number of ongoing research.

C. Administrative costs

The costs incurred as the program is set up, as premiums are collected, and as benefit payments are made, are all lumped under administrative costs. The cost components are summarized in the following relation:

TOTAL)	equals COLLECTION COST
ADMINISTRATIVE)	plus PAYMENTS RELATED COSTS
COST)	plus RECURRENT ADMINISTRATIVE OVERHEAD
)	plus ANNUALIZED SET-UP COSTS.

Collection costs are those which the program incurs in recruiting members and in collecting their contributions. Payments related costs include a whole range of activities including fee-setting, monitoring, claims review and processing, and similar activities. Recurrent administrative overhead costs include the maintenance of management and information systems of the program. Annualized set-up costs refer to the initial expenditures associated with establishing or organizing an NHI program.

An important issue related to administrative costs has to do with the organizational set-up of the program. A number of proposals include a centralized system, a two-track system for the employed and self-employed, and a system of local federations. Each structure will have different implications for the various cost components considered here.

III. UNDERLYING ASSUMPTIONS OF THE SIMULATION MODEL

There are two sets of assumptions and parameters used in the model. The first set are those related to program design. The model allows these parameters to be changed easily in the process of undertaking costing simulation exercises. The second set of parameters and assumptions are those that define and drive the structure of the model.

.

382

For the base year 1993, the data used and assumptions made regarding the parameters follow closely the data, observations, and findings from recent research on the Medicare program. This serves as a test for model reliability, at least for the latest year data are available. The design and other structural parameters are input into the model beginning in 1994. The following discussion mainly focuses on the assumptions made for 1994 onwards.

A. Program design parameters and assumptions

To test the sensitivity of the results to variations in the parameter estimates, a range of values is usually considered. The range will be shown in the summary tables attached for the different insurance packages. The model described here allows one to specify different values for the parameters introduced below.

1. Average in-patient services cost

A range of estimates of the average cost of in-patient services are used in the simulation exercises. The low cost estimate of P2,000 is based on the average value of claims under Medicare. The high value of P8,000 is based on the Department of Health-Philippine Institute for Development Studies (DOH-PIDS) survey data based on actual billings. The medium estimate of P5,000 takes out the estimated mark-up given to Medicare members. Costs are allowed to increase by 10% per year.

The estimated range applies for services offered by both the public and private providers. We take note of the fact that under the current system public providers are heavily subsidized.

2. Average out-patient service cost

The range of OP average cost estimates of P100, P130, and P150 per visit are based on the DOH-PIDS survey of hospital based

and free-standing clinics and their users. OP prices are inflated by 10% per year.

3. Utilization rate of in-patient services

The range of utilization rates are based on the DOH-PIDS survey of households, hospitals, and hospital users. Middle to high utilization rates factor in the possible insurance effects on utilization patterns. The UPecon-HPDP project on moral hazard effects of insurance shows that insurance and income effects combine for 2% of the total variations in utilization.

4. Utilization rate of out-patient services

The rates used are likewise based on the DOH-PIDS survey of households, hospitals and hospital users, clinics and clinic users. The middle to high rates used are adjusted for both income and insurance effects on utilization.

5. Contributions

For equity considerations, premium rates or contributions per member are graduated by the ability to pay of target population groups. The contributions are determined as a percentage of household income, and the premium rates considered in the exercises done in this paper range from 1% to 7% of income. These exercises give a sense of how the rates might affect the households. As a reference, it is estimated, based on the 1985 FIES, that the average family spent up to 2% of total household expenditures on health. The contributions are increased by 10% annually to catch up with inflation.

6. Copayment rates

The default rate used in the model is 30%. This means that the beneficiary pays 30% of the cost of services.

B. Structural parameters and assumptions

The structural parameters of the model include demographic factors, the socioeconomic characteristics of members, and the underlying institutional environment.

1. Revenue side: collections

Projected population size, population growth rate, employment status and dependency rate are taken from NSO data and NEDA statistical yearbook (1991). Projected population by per capita income quartile is equal to the population shares of each quartile (based on the 1985 FIES) times the projected total population. Income range by income quartile, based on the DOH-PIDS survey are as follows:

First Quartile:	γ≤	₽1,980
Second Quartile:	₽1,980 <γ≤	₽3,500
Third Quartile:	₽3,500<γ≤	₽6,980
Fourth Quartile:	₽6,980 <γ	

Collections remittance rate is 100% (that is, all enrollers pay their dues diligently). No income ceilings are applied in computing contributions.

2. Revenue side: investment and other income

Initial endowment is equal to 8.4 billion pesos (from Philippine Health Insurance data as of June 1993.) Interest rate is pegged at 16% per annum. Other income is zero.

3. Expenditure side: beneficiaries

The average household size is five. One household member is enrolled in the program with the four other household members listed as designated dependents. Data sources on and assumptions regarding the demographic and economic characteristics of the population (*e.g.*, average family size, population growth rate) are the same in the revenue side (discussed above).

4. Expenditure side: service costs

Service costs are inflated by 10% annually. Indirect costs borne by beneficiaries due to illness are not included (*e.g.*, foregone earnings, transportation costs). Uniform costs, equal access, and uniform quality of services are assumed throughout the country.

5. Administrative costs: collections and payments related

Collections and payments-related costs are assumed to start at P90 but subsequently increase following an "S" curve reflecting the increasing marginal cost of enrollment and other activities. Payments-related costs possibly include disbursement, claims processing, and provide payment systems costs (negotiations, feesetting, monitoring of service quality, etc.). Furthermore, all institutions and systems needed to facilitate collections and payments related activities are assumed to exist.

6. Administrative costs: recurrent overhead

No provisions are made to capture such current overhead costs. No published data are available that factor out total administrative costs into the different cost components outlined here. Where some cost items are included in the model, these are calibrated to compensate for the other cost items not included due to unavailability of reliable estimates.

7. Annualized set-up costs

While institutions, systems, organizations, etc. needed to run a NHI program are all assumed to exist, no provisions are made to cost these out.

C. Additional notes

Hence, estimated surpluses (deficits) in this model will tend to be higher (lower) than what might be with all administrative activities fully costed out. Although some cost items are not included in the estimates, the models are designed to incorporate any additional new cost figures. The model can also accommodate more realistic estimates of interest rate and other income figures. Furthermore, all institutions and systems needed are all assumed in place. The organizational structure of the program underlying the model is a centralized health fund.

IV. SOME MEASURES OF PERFORMANCE

Some indicators of program performance with respect to beneficiary, provider, and fund management issues are presented to help describe the simulation results. The present discussion will focus on four indicators, namely: the members' willingness to pay or contribute to the program, cross-subsidization among members belonging to different income groups, fund viability, and the possible fee under a capitation system of compensating providers.

A. Willingness to pay for insurance

Under a compulsory program, an indicator of willingness to pay will be useful in anticipating premium remittance rates. This is an important concern even under a system based on payroll deductions; in the current Medicare program it is estimated that only 62% of members regularly remit their contributions. Under a system where contributions are to be collected directly from members, willingness to pay will provide an indicator of how difficult it will be to collect premiums.

The willingness to pay index used here is also a measure of how attractive a set of benefits and their corresponding premium. The index is simply the ratio between the expected value of benefits that might be used by the member and designated beneficiaries, and the premium to be paid by the member. However, the index does not indicate in any way the ability of members to make premium payments. In interpreting the index, note the following:

WTP >	1	implies that a proposed package is attractive,
WTP =	1	implies that the member is indifferent between
WTP <	1	a proposed package and not being insured, implies that the member finds the package unattractive.

B. Cross-subsidization rate

In recognizing that members have different abilities to pay for insurance, it is in the interest of a program that a progressive structure of contributions is maintained. The indicator of how well financing equity is maintained is the cross-subsidization rate across income groups.

The rate measures how much a member belonging to an income group receives from others in addition to own contributions. As used here, a positive value indicates that a member is a receiver while a negative value indicates that a member is a source of crosssubsidization. Schematically,

> Cross-subsidy rate > 0 member receives subsidy, Cross-subsidy rate < 0 member is a source of subsidy.

In interpreting the index, the following examples may be useful. On the one hand, an index of 1.29 implies that for every peso of own contribution, an additional 1.29 pesos are received from other groups. On the other hand, a value of -0.68 implies that for every peso contribution by the member, 68 centavos are used to subsidize others.

C. Fund viability

Fund viability is used here to indicate whether a fund will be able to sustain, through its various revenue sources, program benefit expenditures. The measure used here is simply the ratio between total program revenues and total program benefit expenditures. Hence,

Fund viability < 1</th>the fund is unable to support program benefitsFund viability = 1the fund merely breaks evenFund viability > 1the fund covers program benefits and other
costs.

D. Capitation equivalent

An important issue concerning the ability of a fund to control excessive benefit expenditures is the choice of a payment system. Admittedly, the underlying payment system in the model is that of cost-based reimbursement. This method is considered ineffective since providers can easily raise costs, and determining whether the cost increases are appropriate and legitimate is difficult. An alternative means of payment being entertained by some of NHI proposals is for providers to be compensated on a capitation basis.

The capitation equivalent presented here is simply the expected revenue by providers under the NHI program adjusted for some cost-sharing ratio. For example, a cap equivalent of P382 implies that providers shall receive this amount for each beneficiary enrolled. The caps presented here may be what it would take to maintain the assumed distribution of service costs under a capitation arrangement.

V. ALTERNATIVE DESIGN PACKAGES AND THEIR IMPLICATIONS

The simulations presented and their implications do not refer to any specific NHI proposal. However, the simulations should help inform these proposals of the possible range of costs and implications once they provide the specifics of the NHI program. It is unfortunate that, at this point, the merits of actual NHI proposals cannot be evaluated on specific design elements. Good intentions and sound general principles are necessary but not sufficient for an NHI program to be judged effective.

A. Definition of a program design package

As used in the simulations, a program design package refers to the following elements:

> 1. benefits described in terms of the type of services offered, average service costs, service utilization rates, and beneficiary copayment rates; and

> 2. premium contributions described in terms as a percentage of estimated household income, and the average contribution of members belonging to a particular income group (or quartile); the average premiums computed here exceed what might be considered as the actuarially fair premium.

The costing implications of two basic packages are simulated here: (1) a package of in-patient services; and (2) a package including both in-patient and out-patient services. The costing simulations for each package is based on two important parameters: (1) average cost of services; and (2) service utilization rates. The "experimental design" used in generating the various costing exercises is show in Table 1 below:

	Pac	kage 1: In-Pa Only	atient	Pac	kage 2: In-an Patients	id-Out
	Ū	Itilization Ra	ates	U	tilization R	ates
Estimated average service cost	Low	Medium	High	Low	Medium	High
Low	T2	T2	T2	T5	T5	T5
Medium	T3	T3	T3	T6	T6	T6
High	T4	T4	T4	T7	T7	<u>T</u> 7

Table 1. Guide to Simulation Exercises

390

<u>ر</u> م کے	l'abl Simu	le 2. In-patient services only pac ulations based on low average cc	kage st of services		
			Low utilization	Med utilization	High utilization
	Н	ackage design elements			
		 Average cost of in-patient service Service utilization rate 	P2,000 3% per individual	P2,000 5% per individual	P2,000 8% per individual
	67 A 60	 Copayment rate Premium contribution rate Premium contribution by quartile 	30% copay 1% of HH income (175,254 ,436,792)	30% copay 1% of HH income (175,254,436,792)	30% copay 1.6% of HH income (279,406,697,1267)
		Financing implications			
		1 End of period revenues 2. End of period expenditures	15,256,269,910 5,585,320,324	12,566,127,215 9,308,867,215	19,156,274,851 14,894,187,531
	677 D 6	 End of period surplus End of period admin costs End of period indigent subsidy 	1,805,364,999 1,865,364,999 937,263,840	1,391,399,009 1,865,364,999 937,263,840	2,399,722,320 1,865,364,999 1,557,222,144
	Ļ1	Performance indicators			
	н с с ц с	 Willingness to pay by quartile Cross-subsidization by quartile Fund viability Capitation equivalent (pesos) 	(1.20, 0.83, 0.48, 0.27) 1.29, 0.27, -0.37, -0.68) 2.00 72	(2.00, 1.38, 0.80, 0.44) (1.29, 0.27, -0.37, -0.68) 1.19 120	 (2.00, 1.38, 0.80, 0.44) (1.29, 0.27, -0.37, -0.68) 1.18 192

1996] NATIONAL HEALTH INSURANCE ISSUES

391

Table 3. In-patient services only Simulations based on medium average cost of se	of services		
Low utili2	utilization	Med utilization	High utilization
A. Package design elements			
1. Average cost of in-patient services P5,000 2. Service utilization rate 3% per ind 3. Copayment rate 30% copay 4. Premium contribution rate 1.5% of HE 5. Premium contribution by quartile (262, 380,) r individual pay f HH income 180, 653, 1188) (P5,000 5% per individual 30% copay 2.5% of HH income (437, 634, 1089,1979)	P5,000 8% per individual 30% copay 3.7% of HH income (646, 939, 1612, 2930)
B. Financing implications			
1. End of period revenue18,057,9162. End of period expenditures13,963,3003. End of period surplus2,229,2514. End of period admin costs1,865,3645. End of period indigent subsidy1,459,895	,916,912 ,300,811 ,251,102 ,364,999 ,895,760	29,041,496,305 23,272,168,018 3,903,963,287 1,865,364,999 2,433,159,600	40,204,184,554 57,235,468,828 1,103,350,727 1,865,364,999 3,601,076,208
C. Performance indicators			
 Willingness to pay by quartile (2.0, 1.38, 2. Cross-subsidization by quartile (1.29, 0.27, -(3. Fund viability Capitation equivalent (pesos) 	.38, 0.80, 0.44) 27, -0.37, -0.68) 1.18 180	(2.00, 1.38, 0.80, 0.44) (1.29, 0.27, -0.37, -0.68) 1.18 300	(2.17, 1.49, 0.87, 0.48) (1.29, 0.27, -0.37, -0.68) 1.14 576

392

PHILIPPINE LAW JOURNAL

[VOL 70

<u>н сл сл н</u>	<u>c</u>		в. F		A. F		Tab Sim
	Per	накана накана	fina	5.4.3.2 HHOSA	ack		le 4. ulat
Villin ross- und apita	form	nd o nd o	lcing	vera ervic opay remi remi	lge d		In- ions
ngnes -sub: viab atior	ance	f per f per	imp	ge oc ium i ium i	lesig		pati bas
ss to sidiz ility ility	ind	iod i	licat	ost of iliza it rat conti conti	n ele		ent :
pay ation uval	icato	ever surp admi ndig	ions	f in- tion te ribut ribut	men		serv on h
by q a by ent (rs	nditu lus ent :		patic rate sion 1	ts		ices igh
uart quar peso		ıres sts subs:		nt s ate			onl avei
ile tile s)		idy		ervic			y rage
(1.) (1.2				le			Cos
92, 1 9, 0.2				PE 30 2		۲	t of
.33, 27, -(),714 2,341 5,507 1,865 2,433		3,000 % per 1% cc 37, 6		w u	serv
0.77,).37,		,031 ,281 ,385 ,364		opay of HI 34,		tiliza	rices
-0.6 1.2 28		,978 ,297 ,682 ,600		ividu 1 inc		tion	
6 8 8 6				al ome			
(2. (1.2				õ			
17, 1 9, 0.		37,5 3,6 3,6		P8, 5% 30% 3.7% (64)		Med	
1.49, 27, -		204,1 235,4 365,3		000 6 cop 7, 93		l util	
0.87 0.37,		184,5 168,8 164,9 176,2		ndivi ay HIH j 8, 16		lizati	
-0.6 1.0		099784 089784		dual incor i12, :		ion	
0788				ne 2930)			
(2.) (1.2		5 10 5 5 5 11 5 5 5 5) 6 10 10 10 10		H	
10, 1, 9, 0.2		,610 ,932		6 pe 6 pe 1% c 1% o		gh u	
,45, (?7, -0		,865 ,115 ,364		opay f HH 1548		tiliz	
0.84, 1.37,		,417 ,125 ,999 ,104		lividı incc ;, 26		ation	
0.46 -0.68 1.1 76				ual 56, 4		-	
8033				826)			•

.

NATIONAL HEALTH INSURANCE ISSUES

1996]

393

Ta	ble 5. In-patient with out-patient sei nulations based on low average cost	vices package of services		
		Low utilization	Med utilization	High utilization
A.	Package design elements			
	 Average cost of in-patient services Average cost of out-patient services IP service utilization rate OP service utilization rate IP copayment rate OP copayment, rate Premium contribution rate Premium contribution by quartile 	P2,000 P100 3% per individual 17% per individual 30% copay 30% copay 1% of HH income (174, 254, 436, 792)	P2,000 P100 5% per individual 22% per individual 30% copay 1.4% of HH income (245, 356, 610, 1108)	P2,000 P100 8% per individual 50% per individual 30% copay 30% copay 2.5% of HH income (437, 634, 1089, 1979)
ä	Financing implications			
•	 End of period revenue End of period expenditures End of period surplus End of period admin costs End of period indigent subsidy 	14,112,959,265 7,167,827,749 5,079,766,516 1,865,364,999 937,263,840	18,170,123,185 11,356,817,993 4,947,940,193 1,865,364,999 1,362,569,376	31,731,638,999 19,548,521,135 10,317,652,865 1,865,364,999 2,433,159,600
ri D	Performance Indicators			
	 Willingness to pay by quartile Cross-subsidization by quartile Fund viability Capitation equivalent (pesos) 	(1.54, 1.06, 0.32, 0.34) (1.29, 0.27, -0.37, -0.68) 1.59 92	(1.75. 1.20, 0.70, 0.39) (1.29, 0.27,-0.37, -0.68) 1.38 146	(1.68, 1.16, 0.67, 0.37) (1.29, 0.27, -0.37, -0.68) 1.43 303

 Table 6. In-patient with out-patient se Simulations based on medium average	ervices package e cost of services		
 A. Package design elements	Low utilization	Med utilization	High utilization
 Average cost of in-patient services Average cost of out-patient services IP service utilization rate OP service utilization rate IP copayment rate 	£5,000 £130 9% per individual 17% per individual 17% copay 30% copay 30% copay	¥ 5,000 ¥ 5,000 P130 5% per individual 22% per individual 30% copay 30% copay	0 8% per individual 50% per individual 30% copay 30% copay
 OF copayment rate Premium contribution rate Premium contribution by quartile 	30 % copay 1.8% of HH income (314, 456, 797, 1449)	30% copay 2.9% of HH income (524,735, 1263, 2296)	30% copay 4.8% of HH income (839, 1217, 2091, 3800)
B. Financing Implications			
1.End of period revenue 2. End of period expenditures 3. End of period sumplus	22,415,561,996 16,020,560,463 4 529 636 533	34,201,618,729 25,934,504,039 6.401.749.691	55,312,532,418 43,286,232,513 10,160,934,906
 End of period admin costs End of period indigent subsidy 	1,865,364,999 1,781,072,827	1,865,364,999 2,822,465,136	1,865,364,999 4,671,666,432
C. Performance indicator			
 Willingness to pay by quartil'e Cross-subsidization by quartile Fund viability Capitation equivalent (pesos) 	(1.88, 1.30, 0.76, 0.42) (1.29, 0.27, -0.37, -0.68) 1.26 207	(1.92, 1.33, 0.77, 0.42) (1.29, 0.27, -0.37, -0.68) 1.23 334	(1.94, 1.34, 0.78, 0.43) (1.29, 0.27, -0.37, 0.68) 1.22 558

1996] NATIONAL HEALTH INSURANCE ISSUES 395

. ,

[VOL 70

ient with out-patient servised on high average cost	ices package of services		
ų	w utilization	Medium utilization	High utilization
services nt services e te quartile	P8,000 P150 3% per individual 17% per individual 30% copay 2.7% of HH income (476, 691, 1187, 2157)	P8,000 P150 5% per individual 22% per individual 30% copay 4.3% of HH income (766, 1112, 1910, 3470)	P8,000 P150 8% per individual 50% per individual 30% copay 7.2% of HH income (1258, 1826, 3136, 5700)
es s bsidy	31,945,857,703 24,715,042,435 5,385,460,435 1,865,364,999 2,651,170,700	50,097,729,144 40,307,395,007 7,924,969,138 1,865,364,999 4,266,788,674	81,000,587,287 66,558,400,531 12,576,821,757 1,865,364,999 7,007,499,648
artile (1 os)	1.95, 1.35, 0.78, 0.43) .29, 0.27, -0.37, -0.68) 1.21 319	(1.98,1.36, 0.79, 0.44) (1.29, 0.27, -0.37, -0.68) 1.19 520	(1.99, 1.37, 0.80, 0.44) (1.29, 0.27, -0.37, -0,68) 1.18 858

396

.

.

The range of estimated cost of in-patient services are P2,000 based on the Medicare experience; P5,000 based on data from the DOH-PIDS survey which is adjusted downwards for the average mark-up charged to Medicare patients; and P8,000 from the same survey but unadjusted for the insurance mark-up. Average outpatient costs are similarly determined from the DOH-PIDS survey data: P100, P130, and P140.

The in-patient utilization rates used in the simulations vary from 3% (unadjusted for the insurance effect), 5% (adjusted for insurance effect), to 8% (adjusted for insurance effect and possible moral hazard).

Table 1 also serves as a guide to various tables where simulation results are shown: the entries refer to the table showing the results corresponding to a particular experiment. For each package three rates of service utilization and three levels of average service cost estimates are simulated. A total of 18 simulations are shown in Tables 2 to 7.

B. General costing pattern

The general costing patterns that emerge from the simulation exercises simply reflect the internal structure of the model. The results are determined by the relationships modeled. the parameters used, and the data fed into it. What may be more interesting to the policymaker are the range of magnitudes the simulation offers. For example, depending on the package design elements used, total health care spending will range from a low of about 6 billion pesos using the low cost low utilization in-patient only package to 67 billion pesos for the high cost high utilization package providing both in-patient and out-patient services. In order to fund this range of benefit spending, a program will have to raise revenues from as low as 15 billion pesos to a high of about 81 billion pesos from premium collections and other sources. Government subsidies for indigent groups will range from about a billion pesos to 7 billion pesos. It should be noted that the

simulations presented here do not show any package that results in program deficits (expenditures being greater than revenues) since contribution rates were determined to produce, at least, a breakeven position (fund viability ratings were maintained at around 1.10). However, by setting collection rates at less than 100% or as the realized service costs and utilization rates exceed the expected amounts, program deficits will be incurred.

1. Choosing between packages

The inclusion of out-patient services significantly raises program benefit spending. For example, under the low cost low utilization simulations, total health spending increases from 5.5 Consequently, higher levels of billion to 7.1 billion pesos. contributions need to be collected to support the inclusion of outpatient benefits. The difference in costs are due to the following factors: (1) while the cost of out-patient services are lower, the utilization rates are substantially higher and; (2) with higher utilization rates of out-patient care, administrative costs related to benefit payment activities will also tend to be higher. This makes out-patient services difficult to cover under purely insurance principles (some insurers mandate at least one out-patient visit to ascertain the risk-profile of enrollees). However, determining whether spending will substantially improve health status is beyond the model. The cost-effectiveness of out-patient services under Philippine conditions have yet to be determined.

2. The effects of changes in the rate of utilization

Service utilization rates are expected to increase with insurance coverage for the following reasons: (1) people who previously were unable to access care due to lack of financial resources will be able to do so with insurance; (2) people will now seek care under more costly institutional settings from providers perceived to be of greater quality; and (3) providers may begin using more expensive service inputs. It is unlikely that the entire increase in utilization rates due to insurance will imply improvements in health status.

The impact of this insurance effect on total benefit spending can be substantial. Under the low cost in-patient only package, the marginal increase in spending can reach up to 9 billion pesos (6 billion at 3% utilization to 15 billion at 8% utilization). To support this, contributions will have to substantially increase. For example, under the low cost in-patient only package, premiums will have to increase by up to 60% as utilization rates change from low to high estimates.

3. Effects of changes in estimated average cost of services

By considering a range of possible average cost estimates of the various services offered by a given program, we are able to anticipate the financing implications of the insurance effects on provider cost and price. Using high utilization rates for the inpatient only package, total health care spending is expected to increase from 15 to 60 billion pesos as the estimated average cost of services increase from 2,000 to 8,000 pesos. To support this increase in spending, the premium rates will have to increase. Otherwise fund viability drops.

4. Estimated program surplus funds

Under the various simulations presented, program surplus funds range from 1.3 to 12.5 billion pesos. For several reasons, however, it cannot be safely inferred from the estimates that the NHI can do without any government subsidy. First, if the collection remittance rate falls below the assumed rate of 100% (which is likely), the estimated surplus can easily turn into deficits. Second, recall that the estimates here did not impute for the cost of settingup the program; surplus funds will easily decrease once these are imputed. Third, recall that at the beginning of the period the fund started out with 8.4 billion pesos; it would be prudent to at least maintain the same level of reserves once universal coverage is reached. Finally, there is the matter of having to support partially or full the premium contributions of indigent population groups.

C. Cost and implications of a Medicare-like package

Suppose we replicate the Medicare program with some modification so that universal coverage is reached, how much will it cost? With a Medicare-like program with similar contribution structure (but no income ceilings), payment system, and organizational structure, the most likely scenario will be that under the low cost with medium utilization rates simulations using the two packages. The results are shown in Table 8 (for the inpatient only package) and in Table 9 (for the package with both inpatient and out-patient services).

It should be noted, however, that the Medicare-like program considered here does not distinguish between those employed in the wage and salaried sector and those who are self-employed. A key assumption here is that an effective method for determining the income of self-employed members exists as well as the means of collecting premium contributions from them.

As shown in Table 8, suppose that the Medicare-like program will maintain a distribution of service cost with a mean equal to P2,000. The average member will contribute P399annually and shall be charged a copayment rate of 30% on services used.

By the time universal coverage is reached, total revenues required will be 12.6 billion pesos. This will be needed to support 9.3 billion pesos in benefit spending and 1.9 billion pesos for administrative costs. If the contributions of indigents, those belonging to the first income quartile, were to be fully subsidized, up to 1 billion pesos will have to be raised. Of course, as income levels increase, it may no longer be safe to assume that those belonging to the lowest income quartile are indigent. But within a 5 to 10 year horizon, this may not be forthcoming.

Package 1:	Results of medium cost and	
In-patient services only	utilization rates	
A. Package design elements		
1. Average cost of in-patient services	₽ 2,000	
2. Service utilization rate	5% per individual per year	
3. Copayment rate	30% of service cost	
4. Premium contribution rate	1% of household income	
5. Premiums by quartile	₽ 175; ₽ 254; ₽ 436; ₽ 729	
B. Financing implications		
1. End of period revenue	₽ 2,566,127,215	
2. End of period expenditures	₽ 9,308,867,207	
3. End of period surplus	₽ 1,391,895,009	
4. End of period administrative costs	₽ 1,865,364,999	
5. End of period indigent subsidy	₽ 973,263,840	
C. Performance indicators		
1. Willingness to pay by quartile	2.00 1.38 0.80 0.44	
2. Cross-subsidy rate by quartile	1.29 0.27 -0.37 -0.68	
3. Fund viability	1.19	
4. Capitation equivalent	₽ 120	

Table 8. Medicare-like program with in-patient services only

While the same cross-subsidization structure is maintained, willingness to pay looks reassuring. The package seems to be attractive considering that only 1% of household income is required as premium contribution. Fund viability is at 1.19 (revenues are 19% greater than program expenditures). Cap equivalent is P120per year.

Supposing the Medicare-like program were to introduce outpatient services to its members, the costing implications are presented in Table 9. The average cost of in-patient and out-patient services is assumed to be P2,000 and P100 respectively. We expect utilization rates to be 5% and 22% for in-patient and out-patient services respectively. Copayment rates for both in-patient and outpatient services are set at 30%.

Package 2: In-patient and out-patient	Results of medium cost and
services	utilization rates
A. Package design elements	
1. Average cost of in-patient services	₽ 2,000
2. Average cost of out-patient services	₽ 100
3. IP service utilization rate	5% per individual per year
4. OP service utilization rate	22% per indívidual per year
5. IP copayment rate	30% of service cost
6. OP copayment rate	30% of service cost
7. Premium contribution rate	1.45% of household income
8. Premiums by quartile	₽ 244; ₽ 354; ₽ 610; ₽ 1,109
B. Financing implications	
1. End of period revenue	₽ 18,316,112,769
2. End of period expenditures	₽ 11,356,817,993
3. End of period surplus	₽ 5,093,929,777
4. End of period administrative costs	₽ 1,865,364,999
5. End of period indigent subsidy	₽ 1,415,125,628
C. Performance indicators	
1. Willingness to pay by quartile	1.68 1.20 0.70 0.41
2. Cross-subsidy rate by quartile	1.29 0.27 -0.37 -0.68
3. Fund viability	1.39
4. Capitation equivalent	₽ 146

Table 9. Medicare-like program with in-patientand out-patient services

In order to support the benefit package, members will have to pay 1.4% of their incomes as premium contributions (but with no income ceilings). Members belonging to the first, second, third, and fourth quartiles will contribute an average of P244, P354, P610, and P1,109, respectively. Contributions plus other income is expected to raise around 18 billion pesos. After paying for an expected benefit spending of about 11 billion pesos and program costs amounting to 2 billion pesos, a surplus of about 5 billion is available to help build up program reserves.

VI. SOME CONCLUDING REMARKS

A. Summary of simulation results

The simulation exercises presented here offer a range of possible cost estimates for a generic NHI proposal. The range of estimates are shown in Table 10 below. Depending on what benefits are to be provided, the cost of these services, the rate at which they are used, how much and how well contributions are to be collected from members, how providers are to be compensated for services delivered, and how the program will be organized, total health care spending under an NHI could be as low as 6 billion pesos or as high as 66.5 billion pesos. Costs are determined by program design and how providers and consumers respond to it.

Range of average contributions from members	P 415 to P2,980
Range of total benefit expenditure	5.6 to 66.5 billion pesos
Total administrative costs	2 billion pesos
Range of fund surplus	1.3 to 12.5 billion pesos
Range of required (full) subsidy for indigent groups	0.9 to 7 billion pesos

Table 10. Range of cost implications of NHI programs

The outcomes of the Medicare-like program presented in Tables 8 and 9 illustrate how a costing simulation model can be useful in program design. While the simulation results indicate that such a program seems feasible (after all, this is the scenario for which the data has some bias), better information regarding the behavioral responses of consumers and providers need to be determined.

B. On costing exercises

There are three sets of factors that will drive the accuracy of the cost estimate of any proposed national health insurance

1996]

program. As we proceed to further refine our proposals and as we examine their implications, we have to make sure these factors are appropriately considered. This way we can become more confident that our choices will be fair.

The first set of factors refers to the soundness of the structure and construction of the costing simulation models used. In a way, models are simply tools of measurement. Therefore, cost estimates are only as good as the logical structures, relationships and assumptions used to generate them. While we shall continue working on providing better tools for measurement, other researchers should also be encouraged to develop their own. Healthy competition will work wonders in research as it will in health care delivery.

The second set of factors refers to the data that enter our models. Remember the modeler's quip: "garbage in, garbage out." The kind of information we have today simply maps out the surface that describes the workings of the health system. Available data has allowed us to identify its strengths and its weakness. But to prescribe how the weaknesses can be treated and how the strengths can be further enhanced requires not only more but better data especially those generated by well designed experimental or demonstration projects.

The third set of factors refers to the thing which is the subject of measurement. As mentioned earlier, current NHI proposals are more like statements of intent and of principles rather than actual plans or programs. This makes the proposals very difficult to cost out and evaluate. A lot of the issues raised here and in previous discussions on health care financing policy have been relegated to a black box called "implementing rules and guidelines." But since all proposals present similar intentions and guidelines. Unfortunately, most proposals are lacking in this respect. If the political imperatives of the day should still allow for some time to develop better specified proposals, costing simulation models can take on a different role. Alternative specifications of NHI programs can be tested out during the design process using the simulation models.

Finally we hope that this environment where policy makers, stakeholders, and researchers freely, openly, and critically interact among each other shall continue. A consultative and transparent process may be slower in arriving at decisions or choices, and while the choices made may not be wiser, its consequences may become clearer.

- 000 -