
Financial Challenges of Health Care Reform in Nicaragua

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Abstract

One of the main challenges in the implementation of health care reform in developing countries has been the development of catastrophic insurance schemes. However, there is no evidence that this feature is socially desirable and whether it is feasible given the unavoidably 'normative' definition of catastrophic risk. This paper aims at contributing to the examination of the content, measurement and policy implications of health care reform tackling catastrophic risks. We undertake a theoretical and empirical analysis on the magnitude of catastrophic expenditures drawing upon data from Nicaragua and we use indirect measurement techniques as well as direct revelation methods. Our literature review leads us to conclude that there is no single meaning catastrophic risk insurance. Our empirical analysis indicates that indirect measures of estimating the exposure to catastrophic risks are highly dependent on restrictions associated with the measurement of wealth and income, while direct measurement approaches might underestimate the magnitude of such risks. Finally, the paper reveals significant differences between total versus drug-related catastrophic expenditures.

Introduction

Delimiting basic health care is a central issue in health policy reform debate in developing countries. Indeed, while containing health expenditures is at the top of the discussion in the developed world, developing countries are much more concerned with improving the accessibility to basic health care given the very limited health insurance coverage that exists in most countries (Murray *et al*, 1994). A way to define the extent of basic health coverage in developing countries is to relate the extent that health expenditure becomes a disproportionate financial burden for a given household. This holds because a large part of the health expenditures are borne either by individuals themselves or by the private health insurer. As Table 1 reveals, per capita expenditure on health varies greatly, from US\$ 36 for sub-Saharan Africa to nearly US\$ 1675 per capita in established market economies. Furthermore, the share of the private sector seems to increase with the extent of underdevelopment.

Table 1 Health Expenditures by Region (1990)

Region (N)	N	Health expenditures			Drug expenditures		
		% Private	Total per capita (US\$)	As % of GDP	% Private	Total per capita (US\$)	As % of GDP
Established market economies	25	23.0	1675.2	7.73	39.6	137.5	0.6
Middle Eastern Crescent	32	42.9	189.1	4.27	74.0	26.8	0.7
Economies in transition	19	27.3	150.3	4.27	-	19.5	-

Latin America and Caribbean	33	37.4	118.1	5.30	71.5	26.4	0.9
Asia and Pacific islands	33	48.1	60.2	4.01	81.4	11.8	0.6
Sub-Saharan Africa	47	37.6	35.7	4.86	66.8	7.8	0.9

The Commission for Macroeconomics and Health (CMH, WHO 2001) estimated that out of pocket expenditure stands as a significant contribution to health expenditure in low-income countries and recommended that this should not finance the basic package but that should be channelled instead through health insurance for basic health care services. Among other types of health care, drugs represent the major out-of-pocket expenditure on health in developed countries. A survey from Mali found that 80% of household expenditure on health was devoted to modern drugs, 13% to traditional medicine, 5% to provider fees, and 2% resulted from transportation costs (Diarra and Coulibaly, 1990). Among 14 countries of Latin America and the Caribbean, drugs represented 35% of direct private expenditures on health although figures ranged from slightly under 15% in Uruguay to 47% in El Salvador (PAHO, 1994).

In developing countries it is common feature that when a health care need arise, even when it refers to highly prevalent illnesses, some families might find themselves having a hard time coping with the economic sacrifices to finance basic health care. In that case, an illness might lead to a significant reduction of household income, wealth and standards of living. World Health Organization (WHO) data indicates that by 2020, cardiovascular heart diseases

and stroke will be the leading causes of death in Africa joint with HIV/AIDS and associated anti-retroviral drug costs. The treatment for many non-communicable diseases entails a lifelong commitment, and the cost of medicines can drive households into poverty. Untreated hypertension can lead to heart failure, chronic renal failure, stroke, and coronary heart disease. However, the distribution of health expenditure is highly skewed towards the top¹ and it is precisely at this high end that expenditures may become catastrophic from an individual's perspective albeit the definition of catastrophic expenditure is debatable both at the individual and collective level².

Regardless of a country's economic development, the design of health care packages is one of the main objectives of health care reform. However, whilst in developed countries, the coverage of catastrophic risks stands as a design issue of certain insurance funds, in developing countries; catastrophic risks are mainly covered in publicly funded health care packages. However, the fact that these are funded exclusively unveils an implicit prioritization of financial security over other health care objectives, such as cost-effectiveness, and in general efficiency (Soderlund, 1998). On the other hand, health system reform could potentially benefit from prioritizing coverage for those expenditures in designing health care packages. Yet, little evidence has been encountered on the suitability of these policy options.

¹ The factors that explain the skewness of the health expenditure distribution refer mainly to differences in the average risks and in the dispersion of risks to health (e.g., AIDS). Thus, one might expect a large individual and group heterogeneity in health expenditures in any country.

² As noted by Bovbjerg (2001) for an individual, 10% of income may be considered a catastrophic loss whilst for an insurer, a similar share of capital or of total premiums for one line of business may be a benchmark.

Most of the evidence on the coverage of catastrophic risks comes in developed countries focus on health insurance coverage of long-term care, especially in those systems where insurance is not universally provided. Some examples refer to health insurance reform in the Netherlands to cover long-term care (van Barneveld et al, 1997) and catastrophic risks insurance for either poor families in the US (Philipp and Biordi, 1990) or referred to certain specific illnesses (Songer, 1997). However, the economic policy debate in developing countries focuses on providing basic coverage to the population rather than extending the existing one to certain contingencies. Pradhan and Prescott, (2002) explore a database from Indonesia for the magnitude of catastrophic risks and using simulation analysis, tests the extent to which subsidizing prices for health care reduces family exposure to health related catastrophic risks. Other Another study by Ranson, (2002) aims at evaluating a female self-employed health insurance system in Gujarat, India and a more recent study explores extensively the estimation methods and undertakes an empirical application for Vietnam (Wagstaff & van Doorslaer, 2003). Empirical evidence using data from household surveys in 59 countries (Xu, 2003) has demonstrated that a combination of factors, such as health services requiring payment, low capacity to pay and a lack of prepayment or health insurance often lead to individual health spending which exceeds 30%-40% of household income. However, further research is needed in order to clarify the impact of the design of specific catastrophic health care insurance in Latin American countries. Furthermore, in dealing with catastrophic risks no study has previously examined the issue of catastrophic drug expenditures. Finally, measurement of catastrophic expenditures is shown to be problematic and often is not clear-cut how to transfer the results of those studies into

policy making.

This paper aims at examining the meaning and limitations of measuring catastrophic health and drug expenditures in developing countries. In particular, it explores the distinct nature of ‘catastrophic expenditures’ in developed countries. It undertakes empirical analysis using data from Nicaragua. Its main contributions are the following: 1) it provides a critical examination of the methods of examining catastrophic expenditures; 2) it examines total out-of-pocket drug expenditures which are normally excluded from measurement; and 3) it reports evidence on a direct revelation mechanism to estimate the exposure to catastrophic health expenditures.

The article begins by characterizing catastrophic risks; section three deals with measurement issues; section four provides an empirical illustration and the paper concludes with a discussion section.

Characterizing and Defining Catastrophic Health Care Expenditures

A definition of catastrophic risks is necessarily somewhat arbitrary. One issue is to classify each intervention as catastrophic or not. Indeed, one could define them in terms of those expenditures which normally lead to large expenses, which at the individual level would be expected to impoverish individuals significantly. However, due to technology innovation, certain treatments might become cheaper over time, thus if catastrophic risks are defined on the basis of an illness catalogue, the list might have to be systematically updated. On the other hand, heterogeneity of health care needs could potentially complicate the specification of which health care expenditure is catastrophic, or alternatively, could have

been avoided by consuming cheaper drugs or treatments. Thus, for an expenditure to be catastrophic one might argue that it should be the cheapest health care option, although, even if individuals fail to choose the cheapest health care options, e.g., people receiving CT scans for headaches – remarkably common in developing countries with unscrupulous health care practitioners. Catastrophic risks are traditionally very expensive and unfrequent events (Soderlund, 1997). As Table 2 shows, catastrophic risks are less predictable and private health insurance schemes are less suitable schemes³.

A specific characteristic of catastrophic risks is that they might lead to impoverishment not only limited to an occasional reduction of wealth but would have a permanent nature. Alternatively, catastrophic risks might be identified according to the individual's payment capacity, or, to specific health care risks catastrophic for some individuals and not for others. Wyszewianski (1987) establishes an expenditure threshold for catastrophic risks at \$10,000 annually (\$14,550 in 1999). Chollet and Betley (1987) distinguish catastrophic risks as those that overcome a certain frontier of non-insurable risks, or those that overcome a certain share of individual's income, e.g., 10%. However, defining the numerical share that defined a payment as catastrophic is unavoidably arbitrary and might vary from country to country. According to Stiglith (1987) catastrophic illness implies a reduction in a family's wealth affecting both current and the near future standard of living.

³ They are normally uninsured risks as long term care risks in the US and normally have to do with certain well known illness with expensive technologies such as AIDS, cancer etc.

One way of defining catastrophic events is to detail with precision and clarity, based on a list of specific high-cost illnesses that occur rarely, those that are very expensive and are, in general, not covered sufficiently by insurance plans. As Table 1 reveals, while catastrophic risks mainly refer to chronic illnesses, non-catastrophic risks would primarily refer to acute illnesses. While catastrophic risks would tend to be low probability and costly events, non-insurable at the individual level and difficult to predict, non-catastrophic risks normally would be highly predictable so that people could easily find insurance and even self-insure. Furthermore, the probability of occurrence would be relatively high - as far as they normally refer to common risks - and the loss would be manageable at the individual level.

Kawabata et al (2002) defines a catastrophic risks as those affecting even 'basic life expenditures'. Nevertheless, WHO arbitrary defines a medical expenditure to be catastrophic if it is greater or equal to 40% of the capacity of the household member to pay. Off course, the capacity to pay varies among countries based on the shared risk of the household member and the nature of the expenditure, though given the uncertain distribution of the illness prevalence, the uncertain social response to the existence of a disease as well as frequent lack of knowledge of the existing health care coverage, certain health care expenditures are more prone to drive individuals to poverty and social exclusion. Finally, Ranson (2002) defines catastrophic risks as those that lead to a reduction of individuals quality of life to that of subsistence or lower - defining subsistence at 1 US\$ a day.

Table 2. Characterization of Catastrophic Risks

Catastrophic risk	Non-catastrophic risks
Chronic illness	Acute illness
Low probability and high cost events	High probability and low cost events
Non self-insurable	Insurable
Small predictability	High predictability

Drug expenditure is an important share of health expenditure (10-20%), and given the existing innovation normally prices tend to be higher than that of other health care components, although given its global public good nature and individuals' heterogeneous capacity to face such costs some policy proposals might lead to the design of co-payments for drugs whereby the catastrophic nature of such costs might be captured by the co-payment rate. Rogowsky *et al* (1997) examines in the US context the extent to which drug expenditure is potentially catastrophic and finds that 7% of the elderly spends about 10% of their household income in drugs uncovered by Medicare and 1% spend one quarter of their household income or more.

Increasing the access of African populations to essential drugs is one of the challenges facing the global community. It is estimated that about one-third of the global population lacks reliable access to essential drugs according to estimates by WHO (WHO, 2003). In developing countries 50% of the population has no 'essential drugs'⁴. Drugs are the second highest public

⁴ That is "...those that satisfy the priority health needs of the population. They are selected with due regard to disease prevalence, evidence on efficacy and safety, comparative cost-effectiveness. Essential drugs are intended to be available within the context of functioning health systems, at all times, in adequate amounts, in the appropriate dosage forms, with assured quality, and at a price the individual can afford..."(WHO, 2003)

health expenditures, after personnel, and can represent from 25% to 65% of total public and private spending on health in developing countries (WHO, 2000). At the time of illness, households in Africa do not have sufficient mechanisms that will protect their financial resources for basic needs such as food, education and transport. Indeed, up to 90% of the population in developing countries has to buy drugs through out-of pocket expenditures as opposed to 20% in developed countries (WHO, 2000). The unpredictable health care costs during an illness and the low income make it almost impossible for households to save money for illness-related expenditures. Vogel (1990) and others argue that even the most functional health insurance schemes effectively cover only members of the relatively small upper and middle classes and that less than 10% of the population of Africa is protected by social insurance.

Country Experience with Catastrophic Payments

The need of designing catastrophic health insurance schemes is prevalent in countries where coverage for health care is significantly inadequate. However, the definition of what catastrophic risks are varies from country to country, typically in accordance with the extent of health care coverage existing in that country. While in developed countries, catastrophic risk coverage refers to long-term care, e.g., Netherlands and the US, in developed countries, they refer to basic health care and drugs. In China, the definition is part of the system based on medical savings accounts. Indeed, a risk is catastrophic if an individual expends all the medical savings and 5% of the annual salary, and therefore social insurance intervenes as a substitute. Interestingly, in 1995, 17% of the Zhenjiang population was exposed to catastrophic risks. In Singapore, the Medishield plan is a catastrophic risks insurance

scheme in place since 1990. Other countries that have catastrophic risks insurance for health care are Israel and South Africa.

Measuring Catastrophic Health Care Expenditures

One of the health equity conceptions relies on comparing across different families the share of income that they devote to paying health care (including drugs). Yet, if such expenditure share surpasses a certain threshold, following Wagstaff & van Doorslaer (2003), those expenditures might be broadly classified as ‘catastrophic’. Therefore, the catastrophic nature of a health care costs will be determined not only by absolute amount of certain expenditures but by whether the expenditure magnitude compares to the individual payment capacity – which might decline as well as a result of productivity declines accruing from certain illnesses. The importance of the context is such that depending on the existence of liquidity restrictions to obtain funds for health care, one might argue that certain expenditures might become catastrophic or not (Gertner & Gruber, 2002). Moreover, in developing countries, one might expect difficulties in measuring an individual’s capacity to pay due to the significant reliance on the informal sector, which in turn might affect the magnitude of catastrophic risks. Finally, a further restriction is that of quantifying wealth, and the value of housing, which might be sold to pay for certain health care expenses.

Let us assume that utility is described as $U_t = U(c_t, h_t)$ where c_t denotes consumption and h_t health status measured from 0 to 1. The existence of illness results in an equivalent consumption loss of L , and the individuals maximizes the inter-temporal utility of his consumption. Insurance, if voluntary would result in a comparison of two

future states of nature, with and without insurance (and thus facing the expected utility of such as financial loss). If the utility function is concave and increasing in their arguments, then there is a certain financial loss, which acts as a threshold in determining whether certain expenditures would be catastrophic (L^*). Thus, the objective of empirical studies is to determine – notwithstanding the non-observability of L^* - the share of the population that is exposed to catastrophic payments, and this that experiences a utility loss resulting from the non-existence of a catastrophic insurance, or in other words, that would rationally purchase insurance or would be publicly subsidized.

From an empirical perspective, the objective of the study will consist of estimating the distribution of health and drug expenditures according to income distribution. The magnitude of health care expenditure is (T) and individual income is (Y), which given the magnitude to informal economy, is normally measured as the addition of individual expenditures as follows: $y = \sum E(x)$ (where $E(x)$ refers to each expenditure component). Other studies use household income once based on total household expenditures are substrate expenditure on essential or living expenditures as follows: $y = x - D(x)$, (where $D(x)$ refers to the living expenditures). Accordingly, if the expenditure threshold is Z , the share of the population exposed to catastrophic risks is the share whereby T/Y surpasses Z , being Z an arbitrary cut-off between 20%-10% of individual income. The only problem from a purely empirical perspective is that of individual's non-response to the use of health care. Following (Wagstaff & van Doorslaer, 2003) if we define a variable G_i as taking the value of 1 when an individual exceeds the threshold, the share of the population facing catastrophic health care costs

is:

$$H = \frac{1}{N} \sum_{i=1}^N G_i$$

where N is the sample size. However, given that this information does not allow comparison, we define an intensity of measure of exposure to catastrophic needs so – called catastrophic risks gap and defined as:

$$V = \frac{1}{N} \sum_{i=1}^N G_i ((T_i / Y_i) - z).$$

An Empirical Illustration

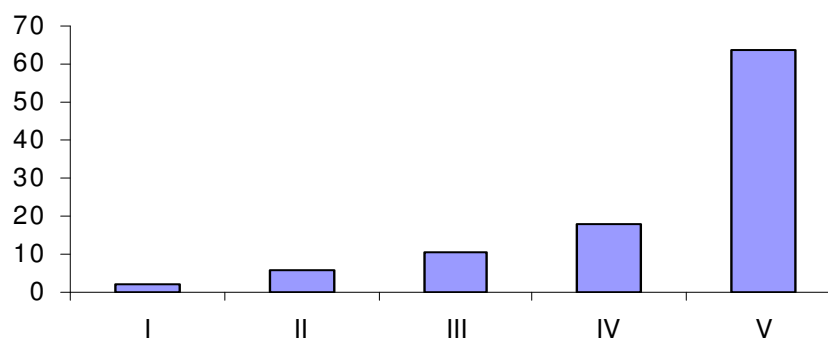
Catastrophic Risks in Developing Countries: The Case of Nicaragua

Insurance based systems and those that have implemented the alternative of medical savings accounts (Singapore and China) tend to specify specific coverage for catastrophic risks explicitly under certain circumstances. However, health insurance systems in Latin-American countries remain poorly developed. In Nicaragua, only a small share of the (most affluent) population has voluntary health insurance and the poorest population has no insurance coverage. The latter receives public hospital care, often of low quality. As far as the classification of catastrophic illnesses is concerned, it should be noted that certain transport costs or drugs might become catastrophic whilst the costs of some chronic illnesses could be borne by the household. In Nicaragua, 64% of the country income is in the hands of the richest 20% of the population.

Nicaragua is a relatively small country with a

population of 4,357,099 (1995 Census). The per capita GNP was estimated at US\$430 in 1999 in the World Bank Development Report. Overall, 15.1% of the population lives in extreme poverty (27.4% in rural areas). In the Pacific region, 54.4% of the population lives in urban areas (2001 Nicaragua Living Standards Measurement Survey). As in other developing countries, the public health systems coverage is limited and only covers health care while more

Figure 1. Income distribution in Nicaragua



Source: **Encuesta Nacional de Hogares, 1998.**

than 60% is privately funded – from which 50% refers to out-of-pocket payments- and the remaining is brought by international non-for profit organizations. Per capita public expenditure accounts for about US\$27.3 in 1999 (PAHO, 2004) and health care accounts about 8% of public expenditure which is distributed at 31% to primary care, 61% to inpatient care, and the remaining to the rest. (Cuentas Nacionales de Salud MINSA, Dirección General de Planificación y Desarrollo MINSA, 2003).

The system is tax funded and organized in 17 local primary care bodies, 28 acute care hospitals and 4

hospitals for chronic patients joined with 176 primary care centres. Social insurance (Instituto Nicaragüense de Seguro Social) provides health care to 5% of the population and the rest is funded by private insurance companies both for profit and not-for-profit. Recent reforms include the set up of public-private partnerships and administrative decentralization structures. Insurance coverage is subject to co-payments and access to health care is geographically restricted. Although according to the ENDESA 2001,⁵ only 29% of patients are fully paid for their health care.

The Data

This study uses the 2001 National Household Survey on Measuring the Standard of Living (Encuesta Nacional de Hogares sobre Medición de Nivel de Vida, 1998). This survey was carried out as part of the MECOVI project of the National Institute of Statistics and Censuses (INEC). It compiles national representative individual data on educational achievement, economic activities, children and women's health, household consumption measured through spending, as well as sources of income and/or reception of benefits in cash or kind. The sampling methodology followed a two-step cluster process based on primary sampling units selected on the basis of a proportional representation so that for urban segments, 12 dwellings were selected, while two clusters of 5 houses were selected for rural segment, amounting overall a total of 4,676 households.

⁵ INEC, MINSA (2002) "Encuesta Nicaragüense de Demografía y Salud 2001" Nicaragua, Octubre 2002.

Indirect Estimation of Catastrophic Risks

Drawing from the data collected from the Encuesta Nacional de Hogares sobre Medición de Niveles de Vida de 2001 and applying the methods described before, we have estimated the ratio of the population exposed to catastrophic risks using two different income thresholds – 10% and 20% of the population income. Catastrophic risks were measured as the ratio between net income and expenditure on health care for those who suffered some health condition. Our results suggest that 70% of the population needing health care is subjected to catastrophic risks if the threshold is established at 10% of income and 64% of the threshold is set at 20%. If we only take into account drug expenditure, this share declines to 64 and 62% indicating that drug related expenditure are a significant share of the catastrophic risks to which the population is exposed.

Table 3. Population Needing Health Care and Catastrophic Risk Gap, Nicaragua (1998)

Total Health Care	10%	20%
% Population	70%	64%
Gap	0.6	0.53
Drug related health care		
% Population	64%	62%
Gap	0.43	0.42

However, looking at the gap as suggested before– that is the different between the threshold income and the share of individual income devoted to health care- we find that accrues about 0.6-0.53 for total health care and 0.42-0.43 for drug related health care, indicating the there is significantly smaller dispersion in drugs expenditures.

Direct Imputation of Catastrophic Risk Prevalence

An alternative way to estimate the magnitude of catastrophic risks is to ask the population about them indirectly. In particular, the survey contained a question on ‘whether the household requested a loan, used their savings or sold any of their assets to pay for health care’. Interestingly, as Table 2 reveals, 28.5% of those that ever consumed health care did so. Among these, 47% used their own savings although they frequently made use of their relative’s income to pay for health care. Yet, if we compare these estimates with prior studies, we can conclude that our estimates might under estimate the magnitude of catastrophic risks as far as some share of the population might not have either family or savings to bear their health care costs. However, the magnitude is relevant as an inferior limit of the individual’s exposure to catastrophic risks.

Table 4 Savings, Lendings, and Credit Used to Pay for Health Care

	N	%	% Cumulated
Savings	344	47.91	47.91
Instructional lending	26	3.62	51.53
Family lending	112	15.6	67.13
Credit	35	4.87	72.01
Assets selling	63	8.77	80.78
Other	135	18.8	182.31

Discussion

Prioritizing coverage for catastrophic illness implies dealing with specific trade-off emerging in health policy decision-making, namely, security versus efficiency. Our findings show that about 29-70% of the population are

subject to catastrophic health related risks in Colombia. However, we found that different methodologies provide significant differences in how to deal with catastrophic risks, and possibly, the use of direct and indirect methods are likely to improve the precision of catastrophic risk estimates. This study indicates that the measurement of catastrophic risks is subject to significant arbitrariness in setting the income threshold that might limit the economic policy interpretation of the results. On the other hand, the definition of catastrophic risks that delimits what illnesses are catastrophic, does not look an acceptable solution, given that for certain households even transport costs, e.g., in an ambulance, might become catastrophic. Thus, the 'catastrophic' nature of a specific health care need should take into account the specific content and time of the implementation of a health insurance system.

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