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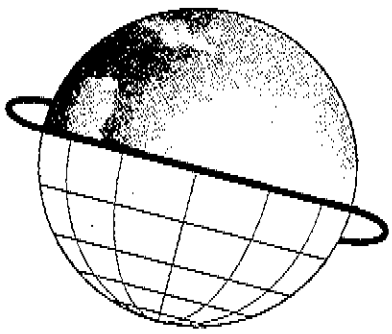

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Macroeconomic Adjustment and Health: A survey

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I.INTRODUCTION.

The purpose of this paper is to provide an overview of the existing literature concerning the impact of macro-economic adjustment measures on health outcomes. A primary goal of the undertaking is to make it possible to evaluate the claim that stabilization and structural adjustment programs followed in many developing countries have adverse consequences for the health status of their populations.

To set the stage of the analysis, Section II starts by recalling some fundamental notions about the purpose and reasons for 'adjustment'. It then goes on to describe the ingredients of what might be called the standard adjustment program. The consequences of adjustment policies for variables that are likely to influence health outcomes are then analyzed, both theoretically and with reference to the empirical literature. The section ends with a discussion of some issues involved in the evaluation of alternative adjustment programs.

Section III of the paper focuses directly on the literature dealing with the impact of economic factors on health. A major task of this section is to identify 'structural' models that explain the transmission mechanism linking health outcomes to economic shocks. The section also contains extensive references to existing empirical studies and suggestions for further research.

A concluding section contains a brief discussion of the roles of the WHO, governments in individual countries, the IMF, and the World Bank in the process of protecting the health sector in times of general macroeconomic adversity.

II. MACROECONOMIC ADJUSTMENT.

1. The Fundamentals.

When we speak of macroeconomic adjustment we usually refer to the correction of conditions that give rise to phenomena such as inflation, unemployment, and external trade disequilibria to mention only three of the most common signs of macroeconomic imbalance. In the case of internal imbalances (inflation and unemployment), the reason for the need to adopt corrective measures is usually that not doing so is unacceptable for domestic political or other reasons. External disequilibria on the other hand often **require** adjustment because foreign financing is not forthcoming.

Although it is almost always the case that external and internal imbalances occur together so that policy responses should take both into account, the following discussion will for simplicity focus mainly on the consequences of external deficits. The reason is the obvious one that external payments problems are the most representative of the adjustment difficulties facing most developing countries.

To understand why external deficits occur and how policies can correct them, it is useful to consider three different ways to express a deficit in the current account of the balance of payments. Without getting in to unnecessary detail we can write:

Current account deficit =

(imports + debt service payments) - (export + remittances) (1)

aggregate domestic spending - gross domestic product (2)

Private sector Investment - Saving + Govt. Budget Deficit (3)

While the first of these definitions is the most common, the other two often provide more insight into the effects of policies on the current account. According to (2), a deficit is the result either of "excessive" domestic (including government) spending or of too low domestic income. It follows that correcting a deficit can be accomplished fundamentally only in two ways; reducing spending or increasing income. The third expression emphasizes the role of the government's budgetary position in determining current account imbalances. An increase in the budget deficit tends to deteriorate the current account. It should be noted however that there is not necessarily a one-for-one relationships between these two variables since private sector savings and investment decisions also matter.

We shall investigate how typical adjustment policies influence the determinants of the current account in a country (as well as their side effects) after considering briefly some of the most common reasons why a current account imbalance comes about.

It is useful first of all to distinguish between domestic and foreign shocks that lead to current account deficits. Among the most common domestic disturbances one might mention a sudden fall in income (perhaps due to a draught) which results

in a fall in private sector savings as residents attempt to maintain previous consumption levels. Another recurrent domestic reason for external deficits is large government expenditures financed by borrowing or money creation (i.e. not by taxes).

Foreign disturbances are frequently the source of current account problems of developing countries. Interest rate increases on the international capital market have a direct impact on the debt-service payments of a debtor country. Similarly, deteriorations of the terms-of-trade or reductions in international demand for the country's exportable can also have powerful effects on a country's external payments position. All three disturbances reduce the level of gross domestic product of the economy. Unless aggregate domestic spending falls by the same amount, a current account deficit will emerge. The reaction of domestic spending in turn depends, on the one hand, on whether the disturbance is perceived to be of a temporary nature or more permanent, and, on the other hand, on the capacity of the private sector to alter spending patterns.

The distinction between permanent and temporary disturbances is important also for the attitude one should take towards adjustment to a given current account deficit. If the source of the deficit is a temporary change in internal or external economic conditions, then a good case can be made for not adjusting the domestic economy in response but to finance the deficit either by using owned international reserves or by borrowing in the international credit market.[1] If, on the contrary, the disturbance is viewed to be permanent, then some adjustment is imperative since complete financing would only lead to an unsustainable evolution of foreign debt.

2. Policies for external adjustment.

As we have seen, policy makers may need to take action in response to a current account deficit either because there has been a permanent change in economic conditions rendering full-scale financing unsustainable, or because international borrowing possibilities are depleted. A situation of the latter type may come about because of the practice of commercial bank creditors to set quantitative limits on their lending to individual countries. In other words, a country may not be able to borrow additional amounts even if it were willing to agree to a higher interest rate.

It is convenient to divide policies that influence the current account into those that do so primarily through changing aggregate spending in the economy and those that operate via variations in aggregate income.[2] General monetary and fiscal policies fall into the first of these categories. A restrictive monetary policy is likely to reduce spending in the economy for several reasons. First of all, a reduction in the supply of credit of the central bank to the private sector is likely to increase interest rates which in turn will bring about a reduction in interest-rate

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[1] The latter option presumes that the country has not exhausted its international borrowing possibilities. We shall return shortly to the case when borrowing limits are effectively reached.

[2] It is not of cause possible always to make a clear distinctions between these two categories. Some policies, devaluation is a case in point, are going to influence both spending and income.

sensitive spending categories. Secondly, even if interest rates are administratively controlled so that they do not respond to market forces, a reduction in the availability of credit will reduce spending. Furthermore, to the extent that the government relies on the central bank to finance its expenditures, a restrictive monetary policy may lead to a reduction in spending by the public sector.

Restrictive fiscal policies, either in the form of reduced expenditures or of increased taxes, will also diminish total spending in the economy and hence improve the current account. The extent of the improvement will depend on the exact nature of the change in policy. For example, if the government reduces spending on a good which is a good substitute for privately purchased goods, then the private sector may simply increase its spending proportionately so that total spending, and hence the current account will be unchanged. A case in point may be the provision of free school lunches to children whose parents would otherwise do it. On the other hand, reduction in government spending on goods which are not typically purchased by the private sector will not alter private savings directly and therefore the current account balance will show a greater improvement.[3]

Policies which aim to improve the current account by influencing mainly the level of aggregate income in the country generally do so by attempting to improve the efficiency of the economy through the removal of bottlenecks, reduction of distortions, and generally through improvement of incentives for employment and production. One often-cited example of such a policy is the advice given to many African countries to increase prices paid to producers of agricultural products to levels determined in world markets. Another example would be the redirection of government expenditures from consumption-like items to investments in infrastructure which would increase the productive potential of the economy.

One of the policies often associated with external adjustment packages is a currency devaluation. In terms of our classification of policies that exert their influence either on aggregate spending or on aggregate income, a devaluation falls somewhere in between. On the one hand, devaluation is likely to reduce spending by decreasing private sector wealth. On the other hand, there is a presumed positive influence on output through either a reduction in real wages which increases employment or an increase in the demand for exportables which, if there is unused capacity in that sector, will increase output.

There are, however, arguments according to which the conventional analysis of the consequences of a devaluation on output and income is incorrect. A recent paper by Lizondo and Montiel (1989) discusses a number of reasons why a devaluation could have a contractionary influence on the economy. Edwards (1989) presents empirical evidence supporting the assertion that devaluations typically provoke a short-run fall in GDP, but he argues that the current-account effects conform to the standard analysis.

Contrasting the types of policies that exert their influence through spending and those that work through income, one is led to the suspicion that the former are likely to have their impact more rapidly. The reason is the presumption that the

[3] The import content of government spending will also matter for the impact on the current account if domestic income is influenced by the spending cut as it will if the economy is operating in a position of less than full employment.

required movements of factors of production to the sector(s) of the economy which account for the increase in output takes time, whereas changes in demand brought about by contractionary policies operates rather more quickly. On this basis one can make the distinction between **stabilization programs** which focus mainly on changes in the total value of spending in the economy and **structural adjustment programs** which put more emphasis on output supply effects. The former are typically associated with situations where countries are facing external borrowing constraints which make it necessary to reduce external deficits rapidly while the latter refer to circumstances in which longer term policy plans are determined.[4]

The primary purpose of the discussion so far has been to explain the main policies that are used to correct external disequilibria. Although one can be quite confident that these policies do have the desired impact on these disequilibria, problems may arise because of their side effects on other important sector of the economy. In the remainder of this section we are specifically interested in the impact on the health sector.

3. Effects of stabilization and structural adjustment measures on the health sector.

In order to evaluate the likely impact of macroeconomic policies on the health sector it is of course necessary to have a reasonably accurate idea about how indicators of health status are affected by macroeconomic events. As we emphasize in Section III, however, current knowledge does not allow us to be very precise in this respect. Theoretical reasoning does not allow us to identify one unique transmission mechanism linking macroeconomic variables and health status. But although the exact connection cannot be determined with confidence, it is possible to list a number of intermediate variables that are almost certain to be relevant for the evolution of the health status in a society. These variables include:

- government expenditures on health services
- the level of education of the population (esp. female literacy)
- the level of income
- the number of people living in poverty
- the cost of health services

In the remainder of this section we will examine how macroeconomic policies in general, and stabilization/adjustment programs in particular, influence these intermediate variables. Later we will consider in some more detail the impact on health-related variables themselves.

a. Adjustment and government expenditures on the health sector.

The most direct potential link between stabilization policies and public health operates via government expenditures. As we have seen, a common elements of stabilization programs is a cut in public spending. Although there is no theoretical

[4] Stabilization programs have traditionally been the main focus of policy advice and conditionality of the International Monetary Fund while structural adjustment programs have mainly been associated with the World Bank. This division of labor has become somewhat blurred in recent years.

reason why these spending cuts should be heavily concentrated on social sectors (including health and education) if the aim is to reduce an external deficit, it is often asserted that these sectors do in fact have to shoulder a disproportionately large share.[5] If this is actually true, then health performance may be deteriorating.

Even if health expenditures are in fact cut in a stabilization program, the impact on health will depend on the exact nature on these cuts. A temporary reduction in spending of an investment nature may have smaller immediate impact on health status than an equal decline in expenditures on salaries and drugs which might reduce health services drastically. In addition, the distribution of the decrease in spending between urban and rural areas is likely to be important since other aspects of stabilization programs may affect the population in these two areas differentially.

b. The level of education.

Since economic stabilization programs are, almost by definition, temporary, the level of education of the population is not likely to suffer from them even if expenditures on education is curtailed. The reason is that education is like capital that is built up over several years and that depreciates only relatively slowly. Structural adjustment measures, on the other hand, may have a much greater impact if they influence government expenditures on educational programs. The effects are unlikely to be felt rapidly, however, which makes it important for governments to take into account long-term consequences of their policies when spending priorities are determined.

c. The level of income and its distribution.

Restrictive policies adopted to deal with external or internal economic imbalances are almost certain to lead to at least a temporary reduction in aggregate real income in the economy. Fiscal or monetary policies that reduce overall demand usually bring about also a reduction in economic activity with a concomitant decrease in employment and income. Reduction in income in turn is likely to influence health outcomes through at least two separate channels. First of all, households may have to divert some income from health-related items such as drugs, fees for medical attention, etc. to other needs. Secondly, to the extent that income is reduced substantially or that the spending unit was already virtually at the subsistence level, a further reduction in income may lead to cutbacks in expenditures on food and thereby increase the susceptibility to disease. Against these channels, which point towards a deterioration of health as a result of contractionary policies, one should mention one influence that may go in the opposite direction. It has been suggested that reduced employment opportunities may lead to a withdrawal of females from the labor force. More time is therefore available to look after infants and young children which in turn may reduce infant and child mortality rates.[6]

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[5] See section II.4 for a brief review of the empirical evidence bearing on this assertion.

[6] Depending on the opportunities available, another scenario is conceivable in which loss of employment in the formal sector of the economy is compensated for by recourse to the informal sector. If incomes in this sector are lower, then a greater time spent at work would be necessary in order to earn the same amount as before. Less time would as a consequence be available for child rearing for example.

While the above discussion emphasizes the overall level of income and employment in the economy, it should be evident that the personal **distribution of income** is of equal or even greater importance. The reason is that individuals in higher income brackets are generally able to maintain expenditures on basic necessities even when faced with a reduction in income, whereas for families living at or close to the subsistence level the possibilities for belt-tightening are more limited.

The effects of stabilization and adjustment programs on the distribution of income has been discussed at great length in the literaure.[7] A general conclusion that has emerged is that one must be quite specific both about exactly what policy is being examined and about the structure of the economy in order to predict the impact on income distribution. To illustrate this point, we shall look at the consequences of two types of policies: a currency devaluation and a change in prices of agricultural products.

A **devaluation** increases the price of traded goods relative to that on non-traded goods and services. Production in the sectors of the economy which produce for export and compete with imports will be more profitable and factors of production will be attracted to these sectors. More employment and higher incomes will thus be generated for that part of the labor force which has the appropriate qualifications. Consider now two types of countries; one which is semi-industrialized and where export- and import-competing manufacturing industries are located in urban areas and where agricultural production is mainly for domestic use, and another in which agriculture is the main export sector and where urban areas contain a large informal sector catering principally to the domestic market. The impact of a devaluation on the distribution of income in these two economies is likely to be very different. Urban manufacturing wage earners in the semi-industrial country will gain from the devaluation whereas rural agricultural workers may be hurt. Conversely, in the agricultural country a devaluation benefits rural labor to the possible detriment of urban dwellers. Whether or not the incidence of poverty is amplified or reduced depends in each case on where the poor segments of the population was located before the devaluation.

An **decrease in food subsidies** and/or an **increase in producer prices of agricultural products**, two policies that are often part of stabilization- and structural adjustment programs, have equally ambiguous effect on the distribution of income and the degree of poverty. Higher food prices clearly reduces real income of urban dwellers, both those who work in the formal and the informal sectors of the economy. Rural labor, on the other hand, are quite likely to gain from the same policy. Wage increases due to higher profitability in the agricultural sector will compensate for the increased cost of food. Furthermore, to the extent that rural residents also have access to land, higher prices of cash corps which may be sold in urban markets will provide additional benefits.

As these examples make clear, the influence of stabilization policies and structural adjustment programs on poverty and therefore on health developments must be ascertained on a case by case basis since no globally valid conclusions are available. It follows that policies to counteract potentially adverse effects must also be conceived on a case by case basis.

[7] See, for example, Adelman and Robinson (1988), Bourguignon, Branson, and de Melo (1989), Demery and Addison (1987), Helleiner (1987), International Monetary Fund (1986), Johnson and Salop (1980).

d. The cost of health services.

The cost of health services may be influenced by adjustment policies through at least two channels. First of all, in an effort to reduce public sector deficits and to introduce elements of market mechanisms into health distribution, user fees may be introduced for government-provided services. This reduces the demand for these services and may lead to a deterioration in health outcomes. How the health status of different groups of society is affected depends of course on exactly what type of service the user fees are introduced, for instance whether it is on high-technology urban hospital services or on the provision of basic drugs and immunization in rural areas. A well-designed policy may indeed not alter health outcomes a great deal even though it provides significant additional revenues for the goverment.[8]

4. Some empirical evidence on the consequences of adjustment programs.

Theoretical reasoning alone cannot settle the question of the effects of macroeconomic fluctuations on variables likely to be important for health outcomes in a country. As we have seen, much depends on particular circumstances prevailing in the economy. The following brief review shows that the existing empirical evidence points in the same direction in that very few generally valid findings can be identified.

a. The structure of government expenditures.

In an attempt to determine how cuts in spending is distributed between different sectors in the economy, Hicks and Kubisch (1984) studied a sample of 37 instances of real reductions in government spending in 32 developing countries during the period 1972-80. While sometimes considerable differences between countries could be observed, the authors found that on average defence spending and spending on social sectors was relatively well protected from budget cuts. Infrastructure investment and production were found to absorb disproportionately large reductions.

In a more recent study using data until 1984 and focusing exclusively on the health sector, Abel-Smith (1986a) brings out the great diversity that exists between countries in the evolution of health expenditures. In a group of thirteen Latin American countries for which the necessary data were available, about half experienced a fall and the other half a rise in real expenditures of the ministry of health.[9] Similarly the author found a great diversity among African countries although the proportion of countries where expenditures fell was larger. Furthermore, in many countries which experienced cutbacks, the size of the cutbacks were substantial.

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[8] It is important to note in this context that the introduction of user fees on health services will have income distribution effects. Depending on which segment of the population gains and loses, such policies may be more or less difficult to introduce for political reasons.

[9] This measure is of course a very approximate indicator of the amount of health services provided since this also depends on the structure and effectiveness of the amounts spent.

Pinstrup-Andersen, Jaramillo, and Stewart (1987) corroborate certain of the results obtained by Hicks and Kubisch. Using data until 1984 they found, for instance, that defence spending again were most protected from government expenditure cuts, and that investments expenditures were more heavily affected than current expenditures. They also argue, however, that looking at real levels of health expenditures, rather than the share of government expenditures that is devoted to health (as did Hicks and Kubisch), the data show a tendency towards reduction in the early eighties.[10]

b. Income distribution and poverty.

In contrast to the voluminous theoretical literature on this topic, relatively little empirical work has been devoted to trying to identify the income distribution effects of adjustment policies. This may in part be the consequence of two fundamental difficulties encountered in such studies; (i) obtaining reliable time series data on the distribution of income, and (ii) identifying the effects of particular policies which involves separating out the influences of other disturbances, external shocks for instance.

Where detailed country studies have nevertheless been undertaken, Glewwe and De Tray (1988) for the Ivory Coast and Sahn (1987) for Sri Lanka, the results are essentially inconclusive in that both improving and deteriorating influences on the distribution of income of a given adjustment program can be identified.

Some studies have focused particularly on the effects of IMF stabilization programs, or components thereof. [Blejer and Guerrero (1988), Edwards (1989)] Conclusions are again not conclusive with some countries experiencing improvements and others deterioration in income distribution subsequent to stabilization programs.

c. Devaluation and output.

A recent study by Edwards (1989) uses regression analysis to assess the effects of devaluation on output and employment. Using a combination of time series data an cross-country data from 12 developing countries, the author finds a statistically significant negative influence. However, "the results presented ... go beyond the narrow question of the effects of devaluation [on] output, suggesting that the policies usually recommended as alternatives to devaluations and Fund-type programs also exert significant negative effects on output. Moreover, since these policies usually fail to bring around an improvement in the external account, this evidence suggests that the exchange-rate adjustment route is a more effective tool." [Edwards (1989), p. 47]

The quote from Edwards suggests that it is necessary to investigate also the alternatives to standard adjustment policies when these are evaluated. This is an issue to which we now turn.

[10] Note however that by focusing on the real level of expenditures rather than the share of government expenditures devoted to health one no longer tries to answer the question of how governments distribute expenditure cuts between sectors of the economy.

5. Evaluating adjustment programs.

We have seen that conventional stabilization and adjustment programs may induce undesirable side effects for certain sectors of the economy. Does this mean that these programs should be suppressed or altered in significant ways? Not necessarily. In order to pass judgement on currently pursued policies it is essential first to answer another question, namely, what is the proposed alternative.[11] Two possibilities may be envisaged. First of all it may be argued that there is no need to stabilize or to adjust. This implicitly implies not only that existing disequilibria are temporary and self-correcting, but also (in the context of external imbalances) that financing is available on easy terms.[12] While this would be an attractive scenario for any country, and developing ones in particular, there is no particular reason to believe that it is realistic.

The second possibility is that other adjustment programs exist that have less onerous side effects than current ones. It is then only by actually considering the specific aspects of these alternatives, and by analyzing their effects on the economy, that one can evaluate the relative merits of each program. This is not an easy task. Even if one could agree on the factual aspects of each alternative adjustment program, i.e. their effects on output, employment, the distribution of income, relative prices, etc., it would still not be obvious how to choose between them. The reason is that one would have to pass judgement on issues such as what constitutes the most desirable distribution of income. Finally it should be recognized that even if one could objectively agree that a particular stabilization/ adjustment strategy is preferable, it is not a foregone conclusion that it will be adopted, since vested interests may have the possibility, through the domestic political process, to prevent it from being adopted.[13]

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[11] We are proceeding with this discussion under the assumption that it is indeed possible to speak about the standard adjustment package. Although this may in fact involve an excessive caricature of current practice, we assume for the sake of the argument that it is not too far from the truth. At the level of generality we are proceeding, it is not essential to specify what the standard adjustment package actually consists of.

[12] If financing is available only on very costly terms, it may well be in the interest of a country to adjust even when faced with a relatively temporary disequilibrium.

[13] An interesting issue in this connection is whether institutions like the International Monetary Fund and the World Bank should use their influence to push for particular patterns of adjustment in variables that may be considered to be the domain of local decision makers only (for instance the appropriate share of expenditures on health and education in the government's budget). See, for instance, Dell (1982) and Guitian (1987).

III. MACROECONOMICS AND HEALTH: TOWARDS A FRAMEWORK FOR ANALYSIS

1. Macroeconomics and Health - a first look at the literature

A number of recent works have highlighted the possible impact of macroeconomic policy on health, particularly of vulnerable groups [Cornia et al. (1987), Musgrove (1987), Chen (1987)]. These studies frequently use infant- or child mortality rates as indicators of health status and attempt to link macroeconomic performance to the evolution of these indicators.

The channels of transmission identified in the above works suggest plausible mechanisms that link economic shocks of the kind experienced in developing countries in the 1980s and changes in health indicators. The detailed relationships between macroeconomic change and health outcomes are not clearcut, however, and one is often left with a set of associations relating the two sets of phenomena but no strong evidence of causality. To obtain such evidence (and to evaluate claims of either direct or indirect effects on health), an agreed theoretical model is critically needed. This is not yet in place and should therefore be one of the urgent areas for further research.

As a first step towards building such a theoretical model this section of the paper reviews what is known regarding the broad relationships between economic development and health outcomes in both developed and developing countries. Using these results, a sketch of a model is drawn aimed to establish a framework in which economic adjustments and health may be analyzed. Within this model, we then examine how economic shocks and policy initiatives may affect health outcomes. This leads up to an assessment of the evidence currently available on the main linkages between macroeconomics and health.

What are then the characteristics of an ideal model? In principle, it should capture the underlying relationships between economic status and health, and specify the intermediate variables that might transmit the influences from external economic disturbances and from economic policy. This is clearly not a straightforward task. Since health is like a capital good, its determinants include not only present but also past values of variables like income and access to entitlements ranging from the most basic of foods to access and use of health services and education. Furthermore, cultural norms and practices overlie purely economic considerations so that health outcomes reflect individual and community characteristics in addition to a series of intervening or 'proximate' economic variables [Mosely and Chen (1984)] which reflect economic constraints and opportunities.

For economic analysis however it is important to be able to cut through nonessential detail and to concentrate on more general propositions relating changes in economic conditions and health. If we maintain for the moment the infant mortality rate as the only indicator of health status, a useful starting point for this purpose would be to consider both the conclusions of and the outstanding issues in the demographic literature that has analyzed changes in mortality across and within countries at different stages of development. These include:

(a) The relationship between economic development and declining infant mortality rates is well established. The relationship may not be linear, and it may change over time, but higher levels of national income, other things being equal, does lead to better health. [Preston (1986)]

(b) Much of the observed non-linearity can be explained by looking at a number of key additional variables. Studies of those countries or regions that were able to achieve low infant mortality rates despite low levels of GNP per capita (Sri Lanka, Peoples' Republic of China, Kerala, and Costa Rica) attribute special importance to 'non-health' factors such as the spread of education (and particularly female literacy) and the drive to provide wide access to other basic needs in addition to low cost health services. [Halstead et. al. (1985)] Factors highlighted in countries having a poor health record in relation to their overall economic progress include imbalances in income distribution and once again the barrier that high levels of female illiteracy may pose to progress in health. [Caldwell (1979)]

(c) Within individual countries, there is a marked diversity of rates of mortality between groups or regions. Most striking are those between socio-economic classes (with higher socio-economic groups often sharing mortality patterns characteristic of developed countries, and low income groups facing a mortality risk five to six times higher. [United Nations (1982)] Urban and rural differences are also considerable.

(d) The choice of indicator is itself important. Infant mortality rates may reflect the effects of both health service delivery (or its absence) socio-economic factors. Child mortality rates (usually denoted q(5)), the probability of dying in the first five years of life), for instance, is known to reflect the availability of health services as well as economic conditions operating via of malnutrition in young children. [United Nations (1988)]

(e) Declines in infant mortality rates are more sensitive to economic change over a certain range. Particularly as lower mortality rates are approached it is increasingly difficult to show the same rate of improvement as per capita income rises.

There are at least three continuing 'puzzles' in this literature relating economic change to mortality indicators:

i. Periods of economic difficulty have not always been associated with slowdowns in the general trend of improvement in mortality rates. Examples include the recent experience of Chile (where infant mortality rates continued to decline despite sharp falls in per capita income in the 1970s) [Macedo (1984)], and of the United Kingdom between 1940-51 [Sen (1989)];

ii. A number of countries have displayed spurts of progress in mortality decline that appear to be poorly explained in terms of economic variables alone {viz. infant mortality rates in the UK between 1900-1910 [Woods et al. (1988, 1989)], in China after 1949 [Banister and Preston (1981)] and in Sri Lanka in the 1950s [Grey (1968)]}.

iii. Patterns of childhood mortality in Sub-Saharan Africa are still poorly understood. With a few exceptions the trend is towards a decline in child mortality rates but considerable variation exists by level and rates between countries and between regions that is not well explained by differences in income or educational variables. [Hill (1987)]

This brief review of the literature suggests a number of important features of the relationship between macroeconomic change and health:

- long-term evidence suggests that trends in income and mortality rates (infant and child) are negatively related
- cross-section evidence from developing countries sustains the same conclusion
- it is not clear, however, from the evidence exactly for which reason(s) the level of income and these mortality indicators are related. It may be because other variables are related to both. Higher income may, for instance, lead to higher levels of literacy leading to lower mortality rates. Higher income may alternatively lead to more expenditures on health related investments (private or public) leading to lower mortality. Higher income may finally operate through improved nutrition or other consumption-related variables resulting in lower mortality.

The fact that many different channels of transmission are operating may account for the variety of national experiences and achievements in moving towards improved health. They may also explain why the contribution of health services and socio-economic development is not constant at different stages in that process. Notwithstanding the difficulties involved, however, understanding of transmission mechanisms is essential for policy analysis of the effects of economic adjustment on health. If income is important in its own right, then countries may have to give special attention to income distribution effects of stabilization and adjustment policies. If it is the income-education-health linkage that is critical, then they will want to safeguard/improve this channel. If the channel of transmission differs according to the level of 'health achievement' in a country, then it is important this is incorporated into the analysis.

2. Modelling the linkages.

Establishing the linkages between changes in the level of national income and health outcomes poses a special set of problems. First of all, it is not obvious how best to measure 'health outcomes'. Secondly, for each indicator of health status, there is likely to exist a particular set of intermediate variables which can be considered as the proximate determinants of the indicator. Finally, the intermediate variables must be modelled as functions of externally and internally generated economic disturbances.

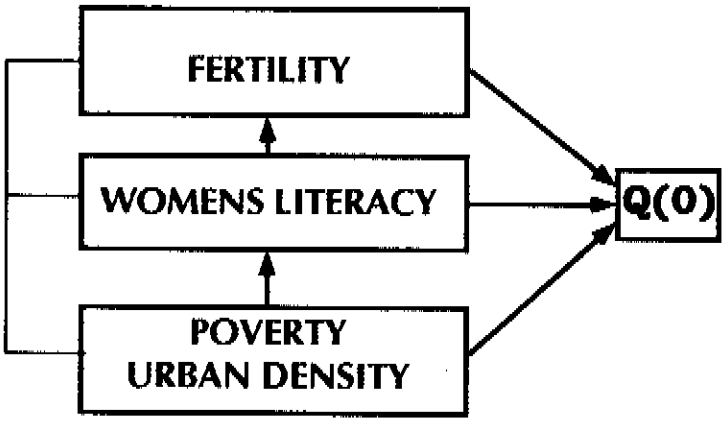
As a starting point it is useful to borrow from developments in the demography literature which has modelled with some success the decline in infant mortality as a function of social and economic factors. From the basic model we then make extensions to more general settings which provide a richer set of linkages and testable implications.

a. The basic model.

Here we draw on recent work analyzing an early but crucial stage in the decline of infant mortality in a developed country - that of England and Wales between 1861-1921 [Woods et.al. (1988,1989)]. This decline in infant mortality has already been extensively researched by demographers. In a well known study McKeown et.al. (1975) analyzed disaggregated infant mortality data over two periods for England and Wales (1850-1900 and 1901-1971). By tracing changing patterns of disease-specific mortality, the authors found that improved nutrition and standards of living were relatively important factors in the decline in mortality rates, and that medical technology was relatively unimportant (at least until the second quarter of the twentieth century).

The study by Woods et.al. is an interesting re-examination of the early phase of this mortality decline. Their work shifts the emphasis away from cause-specific mortality to give insight into the possibly more fundamental contribution of social and economic variables (in particular, patterns of fertility change, female literacy and poverty). By controlling for environmental conditions, the authors are able to separate out two effects operating on infant mortality. An 'urban effect' which accounted for the unusually high diarrhoeal-related deaths in the first period of the 1890s, and a combination of factors influencing the remaining (non-diarrhoeal) deaths which showed a secular decline dating from an earlier period. Demographic and economic variables such as fertility, female literacy, and levels of income were the key determinants of this latter decline.

The relationships considered in the above-mentioned studies are illustrated in the following diagram:



In this version of their simplified model, infant mortality [q(0), the probability of death in the first year after birth] is affected directly by fertility, by levels of female literacy and by poverty. Fertility however is itself a function of poverty and literacy levels while literacy is a function of the level of income. The model is thus recursive.[14]

[14] Later we shall see an example of a related model in which the fertility level depends on the mortality rate through a relationship defining a desired number of children. This introduces an element of simultaneity into the model which complicates statistical testing.

Using data from vital registration and other sources, the authors were able to operationalise this model, and with multivariate statistical analysis quantify the relationships between individual independent variables and the dependent variable, the rate of infant mortality.

From our point of view, the main attraction of this preliminary model that it highlights how proximate variables work jointly to determine a health outcome such as infant mortality. As the proximate variables are more clearly influenced by economic events, it suggests that it may well be possible also to model successfully the linkages between economic factors and other health outcomes over time. But to do so we first need to broaden the model to make it applicable in other settings and more recent periods.

b. A more general model.

The above model is developed within one country and implicitly holds the economic and political structure constant (England at the end of the nineteenth century). It also minimises the role of health services in affecting mortality at that time. Neither of these assumptions may hold if we wish to build a more general model applicable in other settings in the more recent period when more effective health technologies have become available.

Furthermore if we are considering the impact of economic change on health more broadly, then we also need a wider range of health outcome indicators.

(i) The indicators

Infant and child mortality are useful summary indicators of a nations health conditions. To capture health effects of economic change we would want to include indicators of nutritional status as well as morbidity/mortality patterns of selected diseases. These are the child-oriented indicators that are most discussed in the recent literature on economic adjustment (Cornia et al.). For broader effects of macroeconomic factors on health, it may also be important to be less restrictive in this initial choice and include indicators of adult morbidity. A preliminary listing becomes:

q(o)
The probability of death between birth and the first birthday. This variable is closely related to the infant mortality rate which is at present the single most widely monitored national level health indicator.

q(5)
The probability of death between birth and the age of 5 (or Under 5 mortality as it has been widely called) has different characteristics from q(o) which it incorporates. By allowing for effects on the age group 0-4yrs, the q(5) indicator is now considered as an indicator that is both more sensitive to economic change (via effects of malnutrition among children between 1-4 years) and having advantages in there being alternative means of deriving such measures. [United Nations [1988)]

Prevalence of low birth weight
The percentage of births below 2.5 kgs. Low birth weight is a significant influence on infant (and perhaps later) mortality.

Nutritional status among children less than five years old
This may be one of the most sensitive of the indicators to changes in economic circumstance.

Morbidity and/or mortality of selected diseases
This might include incidence of infectious disease of early childhood (diarrhoea, measles, respiratory tract infections) and extend to selected adult morbidity reflecting employment conditions/prevalence of stress-related morbidity (recent interest has focussed on road accidents etc.)

(ii) The determinants.

The intermediate variables that determine the evolution of the health indicators remain broadly the same as in the basic model. The structure of health services and political/social structures become two additional variables.

Here we consider the basic rationale for including each of the intermediate variables in turn. We then examine briefly the effects on these variables of changes in economic circumstances.

Public sector health expenditures.
The impact of health services on health indicators is not straightforward since it varies considerably across settings. The provision of health services in terms of access and quality is obviously shaped by resource availability, but the model of healthcare adopted in the country and the existing political and economic structure also matter a great deal. For instance, the ability of a population group to avail itself of existing health service facilities depends, inter alia, on variables such as the level of household income and the literacy rate. Nevertheless, the relationship between expenditures on health services and health outcomes is likely to be positive (but of variable strength). [Krishnan (1975)]

Fertility.
The relationship between fertility levels and infant mortality is both direct and indirect. Fertility has been shown to be an important influence on infant mortality in developing countries via child-spacing and maternal health channels. The closer the birth interval the higher the risk of mortality for existing young children and the newly-born [Hobcraft et.al. (1984), Bongaarts (1987)]. Indirectly there may also be lagged effects through changes in desired family size and availability of more health resources for fewer children. In either case, higher fertility, especially in conditions of low income and illiteracy, should be associated with a deterioration in health outcomes.

Female Education.
This variable has repeatedly been shown to be associated with improvements in infant and child mortality in cross sectional studies [Hobcraft et al. (1987), Caldwell (1987)]. A number of channels have been suggested why female literacy translates into better health, notably through improved childcare, and through

possible reduction of fatalistic attitudes towards disease and a greater willingness to use available health services. But the main ones may operate within families in terms of changed status and ability to take decisions in health and other concerns. Female literacy in this sense is a proxy for the position of women in society as much as its functional purpose of enabling women to gain access to knowledge through written media. Finally it has recently been suggested that the 'literacy effect' on health may be a reflection of unobservable variables such as family upbringing and intergenerational transfers of attitudes that themselves are income dependent. [Cleland (1987), Behrman and Wolfe (1987)]

Income.

This is clearly one of the principal channels through which economic factors affect health. Increased resources at the national level allow development of services either through infrastructure or improved facilities in health and non health sectors. At the household level income is the active constraint both for the level of nutrition and other health-related expenditures and for utilization of those health services that may be available.[15] The constraint is most binding for groups closest to minimum levels of income needed to survive. These groups are in addition those for whom health effects may be quickest to emerge.

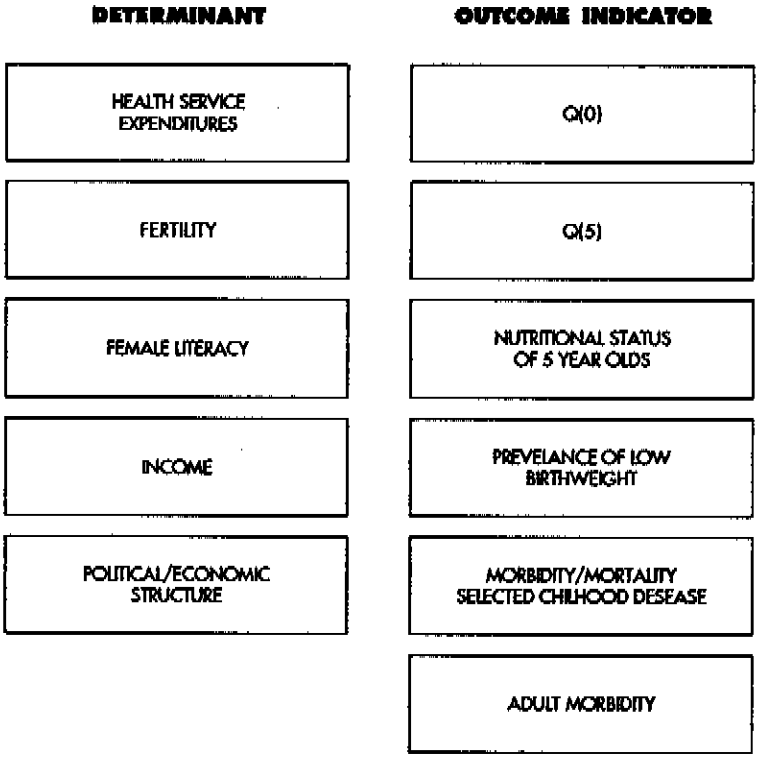
Political/economic structures.

Changes in specific aspects of the structure of their economies (including the pattern of government fiscal expenditures) have been shown to be important in the success of certain countries in achieving improved health indicators. Political structures such as the ability to provide effective administrative structures in rural or geographically remote areas have also been major factors in particular cases. [Halstead et.al. (1985)] It is clear that studies of the economics-health nexus (cross-country studies in particular) will have to take substantial structural differences of this kind into account.

[15] It has however been argued that increases in income may not necessarily lead to improved nutrition. [Behrman and Deolalikar (1987)] It has also been pointed out that over a certain range higher income may be associated with detrimental changes in health behaviour, for example with declines in breastfeeding. [DeVanzo and Habicht (1986)]

(iii) The impact of economic factors in the extended model.

The extended model now has the following configuration:



Since each of the outcome variables are likely to depend on the each of the determinants, the arrows indicating a causal relationship have been omitted. In addition it is quite possible that feedback from the outcome variables to the determinants will exist in certain instances. In the following discussion these complexities will be ignored in order to provide indications as to how, and by what mechanism(s), typical economic shocks will influence health outcomes.

Interpreting **health service expenditures** broadly to include both private and public expenditures, it is possible to identify a number of channels through which economic factors may operate. The most obvious is the influence of government spending cuts. While such cuts will certainly have *some* negative impact on health outcomes, the size of this effect is uncertain since it depends on the structure of existing services as well as on policy choices about where spending cuts will be implemented. Particularly important here is the distinction between reductions in capital expenditures on the one hand and current expenditures on salaries, drugs, and immunization schemes on the other. The short run effects of the latter type of cuts are likely to be much stronger, whereas the consequences of reductions in capital equipment will be felt only with a certain time lag.

Private expenditures on health care are also likely to be influenced by economic factors, especially income and price variables. A reduction in income will certainly have some repercussions on health-related spending, although the size of the effect may differ depending on the absolute income level of the spending unit. Increases in prices of medical services, either through the introduction of user charges or increases in the price of drugs, have similar effects.

If the availability of foreign exchange is a serious constraint, imports of pharmaceuticals may be affected [Abel Smith (1986)] with negative consequences for health service delivery.

Finally it should be recalled that actual health outcomes depend on the efficiency of the healthcare system in place. In most countries there exist opportunities improve service delivery and structure, but an economic crisis may not be the most opportune moment to introduce such reforms. [Nelson(1989)]

Fertility responds to economic factors in a number of ways. Behavioral patterns that determine the demand for children are likely to depend on the long run expected level of income and the 'opportunity cost' of children.[16] Long-run income trends may also influence the labor force participation rate of women and hence the fertility rate. [Crimmins et al. (1984)] The role of trends in economic factors in transforming the traditional family structure has also been emphasized. [Caldwell (1978)]. Fertility is likely to change much less in the short run, although even here employment opportunities (or the lack thereof) of both men and women may influence the time use of females and hence the fertility rate. In this context, an important distinction may be made between higher income countries and urban areas (where female employment levels and hence fertility may fluctuate significantly with economic activity) on the one hand and traditional rural areas where fertility levels may not register noticeable short-term change on the other.

The level of literacy is unlikely to respond much in the short run to macro-economic fluctuations. Literacy is clearly built up over time via a society's attitude to education as well as the stock of primary schools, teachers and non-formal programmes to provide basic skills in literacy. In other words, literacy has the characteristic of an investment good, of capital built up from past investment which provides current benefits. The potential impact of changes in economic circumstance is thus likely to be felt with quite long lags. The structure of the existing educational system is again apt to be important, however. For instance, countries that have established broad-based mass education may effectively have created a stock of human capital that does not deteriorate quickly. On the other hand, countries whose female literacy levels have not reached that threshold, so that literacy skills are contingent on continued support activities, may find that short-term cuts in financial resources devoted to education will have important negative impacts.

The level of income has already been emphasized as being a critical factor for many transmission mechanisms. The influence of stabilization and structural adjustment programs on this variable has already been discussed at length in Section II.3. Here we only wish to recall that it is the distribution as much as the aggregate level of income that is important for health outcomes, and that the impact of economic policies on the distribution of income is highly dependent on the structure of the economy and the exact nature of the policy change.

[16] The mechanism is one in which the 'quality' of children is substituted for 'quantity'. Higher income thus leads to both a reduction in fertility and an increase in spending (on health, education, etc.) per child.

Political or social structures not only influence the functioning of an economy but may themselves be affected by economic change. It is possible to argue that recent economic hardships has lead to radical changes in economic organization and in the nature of the state in many countries. For example, disillusion with the consequences of heavy state intervention in economic matters has lead many countries to adopt more market-oriented approaches to economic management.[17]

3. The evidence re-considered.

The empirical literature on the relationship between economic change and health has two broad strands. The first includes studies in developed as well as developing countries on longer-term trends in mortality and fertility. Reference has already been made to some of this literature. Additional studies are: [United Nations (1982), Hobcraft et al. (1984), Jain (1985), Davanzo and Habicht (1986), Preston (1986), Hill (1987), United Nations (1988) etc.] Take together these constitute a considerable body of knowledge of structural or longer term influences on these variables.

The second category of studies are those which have examined the relationship between shorter-run economic fluctuations in macroeconomic variables and changes in a range of health indicators. This is a much smaller set. Early studies included developed countries [Brenner (1973), Stern (1983)] but more recently interest has been focused mainly on developing countries, especially the effects of their deteriorating external position in the world economy in the 1980s on health. [Macedo (1984), Foxley and Raczynski (1984), Abel-Smith (1986a and b), Musgrove (1987), Sahn (1987), Mata and Rosero (1988), Sanders and Davies (1988)]. A number of these articles were commissioned by UNICEF for the study entitled 'Adjustment with a Human Face' [Cornia et al. (1987)] which contains an evaluation and critique of adjustment policies followed in developing countries.

Our focus here is not so much on the demographic literature but on the second group of studies relating shorter run macroeconomic change to health outcomes.[18] These studies vary considerably in scope and analytical methods employed.

Taken as a group, the UNICEF studies give a very strong perception of the (negative) changes in economic fortunes experienced by developing countries during the 1980s. They also document the difficulties encountered in the social sectors (including the health sector) in the face of reduced government expenditure and, for low income groups, the reduced income in comparison with the 1970s. Their policy recommendations concentrate on means to buffer the negative effects on those groups that are most affected in the short run but also on intensifying efforts at long-term poverty alleviation via restructuring and extension of existing social services such as primary health care and primary education (Cornia et al.)

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[17] External pressure to move in this direction may also have played a role of course, but such pressure alone is unlikely to have been sufficient.

[18] See Table III.1 for a listing of some of the recent contributions to this literature.

The policy critique is predicated on the observation that key health indicators have been seriously affected coincident with the economic decline. Examples are presented of increases in infant mortality rates (Sao Paulo, Brazil), reduction in rates of decline in infant mortality (Chile), and increases in malnutrition (Ghana).

Because this coincidence underpins the strong policy critique which UNICEF makes, it is important to examine the evidence more carefully. Unfortunately it is in this area, despite recognition of the difficulties involved, that the studies are least convincing. Most of them review trends in macroeconomic indicators including real wages and patterns of government expenditure and subsidies. They also bring together the available data on infant mortality rates, nutritional status, and, occasionally, morbidity. Although there is a substantial effort to provide explanations of these trends, the studies do not carry the analysis of the data beyond this preliminary stage of comparison of indices. In particular, no statistical tests are employed.

There are also some basic problems that confront testing the hypothesis that the negative health effects highlighted in the studies can be directly attributed to the observed economic decline. The absence of a carefully articulated model linking health outcomes and economic factors constitutes one of the main shortcomings. The quality of the data is another problem that is recognized in almost all the studies. Interpretations and conclusions are in other words often drawn from partial models and sometimes contradictory data. Their validity may thus legitimately be questioned.

To illustrate these points consider some examples from the literature. In a well documented review of Sao Paulo data, Macedo presents evidence of an abrupt increase in the infant mortality rate in 1984. The main suggested reasons for this reversal of earlier downward trends is a measles outbreak that is itself attributed to a deterioration in either the immunization coverage in the city or an underlying deterioration of nutritional status in young children due to economic hardship (via increased unemployment and declining real wages). The connection is possible but not documented since no further evidence is given.

The likelihood of a measles outbreak may furthermore not be primarily related to drops in immunization coverage; it could also be due to high coverage and declining natural immunity in different age-cohorts (or incomplete efficacy of measles vaccine). The conclusion in the study cannot be sustained without further epidemiologic data.

Chile has for some time been regarded as anomalous with regard to its pattern of infant mortality rate over time. At a time of marked declines in real wages (in the 1970s and the 1980s) the infant mortality rate continued to decline. The study by Raczynski highlights the compensating role of targeted government expenditures as a buffering mechanism. Again however the explanation is incomplete without further statistical evidence.

Data on nutritional status are often presented as supportive of the proposition that health outcomes are negatively affected by short term stabilization/adjustment programs.(See the studies on Ghana, Phillipines, and Zimbabwe listed in Table III.1) But in the absence of a model of the transmission mechanism, such cross-

sectional data are often difficult to interpret. As the Zimbabwe study itself suggests, the findings may reflect as much long-term structural features of poverty as short term fluctuations.

Our discussion of the 'Extended Model' in the previous section suggests reasons for the difficulty in obtaining entirely persuasive results. Although the studies do try to capture the linkages through which economic disturbances affects health outcomes, they are limited by the absence of explicit theoretical models against which the data may be weighed. Our analysis also suggested that changes in indicators such as infant mortality need to be appraised very carefully. Apart from recognized difficulties in constructing representative data over time, inter-year changes are very hard to interpret.

In addition to the UNICEF studies there is a small number of works on issues related to the impact of economic factors. Certain of these concentrate on specific aspects of economic change and the structure of health services as well as more generally on health [Abel-Smith (1986), Musgrove (1987), Chen (1987)]. Surprisingly few [Sahn (1987), Mata and Romero (1988, 1989)] have examined in more detail the relationship between exogenous economic change/policy shifts and health consequences in the populations concerned.

The work by Abel-Smith does not directly deal with the health impact of macroeconomic change. Its emphasis is on models of healthcare provision and the need to rethink manpower planning for effective implementation of primary healthcare. Chen's comparative study of India and China shows the effect of the political and economic structure.

The study by Sahn on Sri Lanka is important not only because it takes on the difficult task of tracing a number of macroeconomic changes through to nutritional and health status, but also because it has been widely quoted as indicating the negative distributional effects of economic policy on degrees of malnutrition in low income groups [Pinstrup Anderson (1988)]. Once again however the connections between a real distributional shift and nutritional status is subject to serious qualifications brought out by the author himself.

Mata and Romero's study of health trends in Costa Rica goes further than many others in attempting statistical analysis of trends in mortality decline over a longer period. As part of a broad study of social and economic change since the 1930s the authors are able to show lagged effects of economic recession on infant mortality.

Finally, a very recent study [Hojman (1989)] looks again at Chile's mortality decline, this time using a simultaneous equation system to model both changes in fertility and infant mortality. This is much closer to the spirit of the kind analysis we have advocated in this paper. The result are also more nuanced concerning the effect of economic recession on health as predicted my our discussion.

Table III.1

A partial list of country studies

Country	Period	Analysis/tests employed
Botswana (UNICEF)	1980-1984	Trends in food availability/nutritional status No statistical tests.
Brazil	1980-1984	Macroeconomic data. Comparative trends in mortality rates. No tests.
Chile	1974-85	Macroeconomic data. Comparison of trends in household expenditure data and infant mortality/ nutritional status. No tests.
Costa Rica		Trends in macroeconomic and health indicators. Multiple regression analysis.
Ghana (UNICEF)	1974-85	Macroeconomic data. Trends in real wages Nutritional status (1980-84). No tests.
Jamaica (UNICEF)	1973-85	Selected macroeconomic data. Income distribution, nutritional status. No tests.
Peru (UNICEF)	1977-84	Macroeconomic data. Government expenditures, morbidity data. nutritional status. No tests.
Philippines (UNICEF)	1973-83	Macroeconomic data. Cross-sectional survey of poverty, real wage trends. Infant mortality, nutrition data. No tests.
Sri Lanka (UNICEF)	1978-84	Macroeconomic data. Government expenditures (including subsidies). Distribution of Income. Nutritional status/per capita, calorie intake. No tests.
Zimbabwe (Sanders, and Davies/UNICEF)	1980-85	Macroeconomic data. Government expenditures/subsidies. Nutritional status/ infant mortality rates. No tests.

4. Some suggestions for research.

One of the implications of the model set out in section 2 is that each variable measuring health outcome may respond differently to changes in economic circumstances and to their country- and political setting. Ideally, therefore, one should model the evolution of each indicator separately and for each country. This is clearly an unrealistically ambitious task, so some compromise would seem necessary. The WHO could play an important role in this respect by defining what is the most relevant indicators to monitor in each country.

Once the appropriate indicator has been identified, a second major area of research is to develop explicit models that link economic (and other) factors with that indicator. As we have indicated, a distinct transmission mechanism (model) may be relevant for each health indicator. Since inferences from data about causal realtionships can easily be erroneous if seriously incomplete models are used, it is important that this second research area be given appropriate priority, both in terms of financial resources and scope. It would, for instance, be particularly useful if epidemiologists, demographers, and economists could collaborate on such projects.

Finally it should be kept in mind that until more adequate, theoretically based models are available, interpretation of cause and effect concerning economic factors and health will remain ad hoc and intuitive rather than demonstrated on the basis of accepted methods of testing. This in turn will limit the policy implications which justifiably can be infered and proposed.

IV. CONCLUDING REMARKS.

Rather than attempting to summarize the main conclusions that emerge from the analysis, we use this last section to offer some brief general remarks about the role of different official actors in the drive to strengthen health outcomes in individual countries.

The primary responsibility would seem to rest on governments in the countries involved. Political decisions need to be taken to devote an amount of resources to the health sector that is necessary for achieving the desired results. Since this partly involves redirecting scarce government resources from other uses, such decisions are of course not easily made, especially in times of economic hardship. But our analysis suggests that there may exist ways to limit the costs of maintaining a strong health sector by increasing the efficiency of public provision of health services and by making sure that the economic environment is not excessively detrimental to private sector pursuit of health objectives. In both cases, however, more must be learned about exactly how economic factors fit into the process of health determination in a country.

It is in this domain that the WHO could play an important catalyzing role. We have suggested that it would be extremely useful to identify the most appropriate indicator of health status on a country-by-country basis, or at least by categories of countries. The expertise of the WHO staff is needed for such a task. Once the most relevant indicators have been identified, an equally important undertaking is to construct models of the evolution of that indicator that incorporate economic factors, policy variables in particular. Once again, the staff of the WHO, perhaps with the input from outside experts in relevant disciplines, would seen particularly well placed to conduct such studies.

Ideally, one of the outputs of further research on the determinants of health indicators would be the identification of a set of early-warning intermediate variables that could be monitored and used to signal the need for policy interventions.

Other international organizations, the International Monetary Fund and the World Bank in particular, could play a supportive role in the process just described by conducting their own studies on aspects of the problem that are most closely related to the principal operations of these organizations.[19] Valuable input into such studies might be provided by the proposed WHO-sponsored research on the determinants of health indicators.

[19] Such studies are in fact apparently already underway.

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