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WHY SHOULD DEVELOPING COUNTRIES WORRY ABOUT 2050 AND BEYOND?

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Abstract: This paper analyses the inter-generational bargain in terms of how people seek to invest for the wellbeing of future generations, relating the inter-generational bargain to the concept of sustainable development. We consider aspects of wellbeing that are not marketed, such as environmental and social goods, as well as consumption goods. The paper begins by considering how people might form targets for the quality of life of their children and grandchildren. We then consider to what extent individuals can effect their desires for their descendants and how, for some factors, government action can be necessary.

The paper argues that developing country governments ought to be concerned about long-term issues for the democratic reason that their citizens are concerned about the wellbeing of their immediate descendants. Certain aspects of sustainable development cannot be dealt with at the individual or the community level; these require government or in some cases international action. Copyright © 2000 John Wiley & Sons, Ltd.

1 INTRODUCTION

1.1 What Are the Issues?

This paper is motivated by the scepticism often expressed against devoting time and resources to problems such as climate change and biodiversity loss in developing countries. Those who take this position argue that there are surely more pressing problems for such countries. Government policy should focus on improving health care and education, not on, for example, reducing carbon emissions, which will have an impact, if at all, only in the middle of the next century. In this paper we argue that governments in such countries *should* worry about longer-term problems, mainly because the citizens of these countries have concerns about the welfare of their children

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and grandchildren, and the only effective way to address many of these concerns is to introduce policies at the national and international level.

The paper is structured as follows. This section discusses the nature of the inter-generation bargain in terms that encompass not only consumer goods, but also social goods and environmental goods. The next section relates the inter-generational bargain to the concept of sustainable development. Section 3 analyses the implications of fulfilling the bargain for the production of consumer goods and services; Section 4 looks at its implications for the provision of natural or environmental goods and Section 5 for the provision of social goods. Section 6 discusses the possibility that, despite the desire of the majority of people to invest for increased wellbeing in the future, this may not be achieved through a system of unco-ordinated investment decisions. Section 7 concludes, arguing that the power of the market and technical progress to deliver increased wellbeing over time may be limited, and therefore the governments of developing countries ought to account explicitly for these factors in their spending and regulatory decisions.

1.2 What is the Nature of the Inter-generational Bargain?

For the citizens of almost all countries, life has changed immensely in the last 50 years. A relatively broad approach to measuring their utility is to treat it as a function of the following: personal consumer goods and services, social goods and services and environmental goods and services. National accounts do not report on all these dimensions, but rather focus on the first. It is clear that people of all classes have access to more personal consumption goods and services including food, but especially electronic goods such as radios, televisions and so on. It is less clear how the other dimensions have changed. By social goods we mean hours of non work-time, as well as access to, and ease of communication with, family and communication networks. In the absence of firm data, we would argue that in some respects access to social goods has declined for some groups and communities. Environmental goods have also changed in a mixed way. Surveys, such as the WDR (1992) and others show an improvement in environmental quality for some indicators in OECD countries, but generally show a deterioration for most indicators in developing countries. There are exceptions, but indicators of air and water quality, as well as measures of biodiversity and ground contamination all show negative trends.

In this changing scene, how do individuals view their inter-generational commitments? Again this is a fascinating area for research, as there is little evidence on how individuals feel about what they have inherited, and what they should pass on to future generations. Our reasoning, drawing on the broad economic and sociological literature on inter-generation links, proceeds as follows.

- (i) The present generation has a view about each of these components of welfare, both as it was during their parents' and grandparents' generation and how it is today.
- (ii) As well as looking two generations into the past, the present generation looks up to two generations ahead; that is people think directly about the welfare of their grandchildren. Thus, the model contains five generations in total. The reasoning behind the three-generation, forward-looking linkage, rather than a simpler two

generations overlapping model, draws on similar arguments to those elaborated by Collard (2000). The present generation also has a view of how the future levels of these goods are related to variables over which it has some control. These include 'private' variables, such as the amount of education paid for, the bequest handed over etc.; 'community' variables, such as customs, traditions etc., and social variables, such as the level of provision of public protection to the environment, security of employment, protection against natural disasters etc.

- (iii) Although individuals will accept a certain degree of 'trade-off' between the different components of welfare (e.g. they might accept more personal goods in return for less security of employment) the extent of such a trade-off is very limited.

The basic framework is the following. Define the present generation as 'generation 2', its parents as 'generation 1', its grandparents as 'generation 0', its children as 'generation 3' and its grandchildren as 'generation 4'. Generation 2 takes a view of the components of welfare and the values it feels it has a responsibility for ensuring in generations 3 and 4. These values are related to how the present values relate to those of generations 1 and 0 and can be thought of as *targets*. For personal goods, the desire may be to ensure the same values in generations 3 and 4 as exist presently, or it may be for an increase in consumption reflecting the increase experienced since generations 0 and 1. Consumption is here an index of all consumer goods, with weights based on relative values, which are often expressed through prices. For social goods, the desire is to pass on key aspects of culture and tradition, as well as to ensure that the time needed for important social activities is made available. For environmental goods, there are also key components that the present generation would like to see passed on in at least as good a state as at present. These may include wilderness areas, clean rivers and forests, which also have important religious connotations in some societies. In some cases the present generation may wish to see a revision of the quality of the environment to a better state; perhaps one which existed in generations 0 or 1.

To achieve these targets, there are a number of control variables. We group them into the private, the community and the governmental or public. Private variables are those under the control of individuals in the present generation. They include bequests, support for education, transfer of knowledge and social skills at the household level. These are determined by individuals and are chosen so that generations 3 and 4 come as close as possible to hitting the target values for the welfare components. In making such choices, individuals are aware that increases in one component of the welfare function have implications for other components—e.g. increased consumption goods may be obtained at the expense of increased environmental damage. To the extent that personal decisions have such a trade-off, individuals take this into account when they are in control of the relevant resources (e.g. farmers will be aware of the impact of increasing production through land clearance when the land cleared is their own). Many individual decisions, however, do not have such a link. Often, private decisions regarding consumption goods damage the environment in general, or cause social disintegration. It is the role of the community and government to ensure that the correct incentives for internalizing the effects of private decisions on components of welfare are in place.

Community variables consist of community education, religious instruction and

the provision of local public goods, such as recreational facilities, factors that determine the quality of the local environment, schools etc. Governmental variables include the macroeconomic, such as interest rates, tax rates, public investment etc., as well as national public goods, such as national environmental quality, publicly-owned industries, defence, etc. The choice of these variables has to respect the targets in the individual inter-generational bargains level, as well as providing the right incentives for individuals to make decisions that result in the targets being met at the aggregate level.

2 WHAT IS SUSTAINABLE DEVELOPMENT?

The concept of Sustainable Development can be related to investment in social and economic improvements over time. An individual or society can follow a development path that involves improvements in wellbeing over time; this path can be thought of as sustainable if it is based on genuine investment in the overall capital stock that produces wellbeing. An unsustainable development path might involve consuming part of the capital stock and achieving short-term improvements that may later be reversed. This concept can be applied to any economy. For instance, Norway is a developed country, and yet the fact that a significant portion of its national income derives from the depletion of non-renewable resource stocks means that it must invest in alternative assets in order to sustain the consumption that this asset currently provides. Thus, the concept of sustainability is relevant to Norway's economy. A developing country such as Nigeria, which also depletes and exports its non-renewable resource stocks, can be thought of as having relatively low stocks of invested capital. According to the inter-generational bargain outlined above, a desirable policy for such an economy would be to limit consumption and to invest to meet growth and development targets. In fact, according to recent World Bank calculations, it would appear that Nigeria invests less than the value of its depleted natural resource stocks, and may therefore be following an unsustainable development path.

In terms of the inter-generational bargain, sustainable development can be thought of as representing a certain set of bargains at the national level. A sustainable development path must recognize the links between consumption growth and changes in the other components of welfare. As far as environmental goods are concerned, there are two things to consider in the link between increases in consumption and changes in the environment. First, since the environment is an input into the production of private (and public) goods, some increases in consumption may be 'bought' at the expense of a decline in the resource base and therefore a decline in future consumption. Second, some of the decline in the environment may itself represent a deviation from the targets set in the inter-generational bargain. For both these reasons, links between the environment and the production of private and public goods have to be looked at with some care. Likewise, social goods are clearly important in any vision of sustainability and the trade-offs/complementarities between these and private goods have to be understood and taken into account.

In what follows we think about sustainable development in terms of the amounts that individuals and societies may wish to provide for their descendants in each different category of welfare. In each case, we suggest ways in which individuals and society, at the level of both community and government, can invest for the future.

This can be thought of in terms of investing to maintain and increase different types of capital stock. We note that some variables cannot be influenced by individual decisions, but must involve local, national or international policy.

3 THE INTER-GENERATIONAL BARGAIN AND MARKETED GOODS AND SERVICES

We start our discussion of the inter-generational bargain with marketed goods and services. This section discusses the factors that affect the amount people can consume, and the actions people and governments take to maintain and increase this over time. Levels of measured consumption have, in many countries, increased markedly over the last century. Standards of living in developed countries have far outstripped those of two generations ago, while many formerly developing countries have likewise enjoyed vastly increased consumption. Some developing countries, however, such as Zaire, have lower standards of living today than they did earlier this century. Our hypothesis, in the absence of data on attitudes to sustainability, is that in countries where standards of living have increased, people hope to be able to provide the same level of increase for their grandchildren. Likewise, in countries in which standards of living have fallen, people wish to return at least to the levels enjoyed by their grandparents. In general, then, people are assumed to wish to at least maintain, and ideally to increase levels of material consumption.

It is difficult to know which formulation is the appropriate one without some direct elicitation of preferences on these matters. Given the current lack of such data, we have taken data from Maddison's (1995) report on actual growth rates over the last 100 years. These can be used to illustrate how, if the century is split into generations and the targets of each generation are assumed to be formulated as outlined above, actual growth rates would relate to targeted rates. This analysis is shown in Table 1.

For the countries shown, per-capita GDP levels have been indexed with 1900 as the base year. The table illustrates how the index has grown over the century, which is divided into generations as shown. The framework for the inter-generational bargain assumes that the target of generation 2, born in 1950, is for its grandchildren's generation, generation 4, to enjoy an increase in material wellbeing similar to the increase that generation 2 has enjoyed over generation 0. For the case of India, the framework assumes that generation 2 wishes generation 4 to regain the material standards of generation 0.

The table shows the target GDP levels implied by these assumptions, and how the actual growth rates in the second half of the century compare with those implied by this target. This allows us to make some general observations. Firstly, countries that have been high income countries since the beginning of the century, i.e. the UK, USA, France and New Zealand, have experienced growth rates similar to those predicted under the inter-generational bargain. Countries that were relatively low-income at the beginning of the century, i.e. India, Indonesia, Taiwan and Japan, have experienced growth in the second half of the century that is significantly greater than would be predicted under the inter-generational bargain. Thus, while the hypothesized growth rates are a reasonably good predictor of the actual growth rates, and provide a basis for using the framework of target-setting assumed in this paper, the fact that

Table 1. Actual and hypothetical target growth rates in the 20th century.

| Year of birth | 1900 | 1925 | 1950 | 1975 | 1992 | G2's target for G4 | Implied target growth rate 1950–2000 | Actual growth rate 1950–1992 | Difference between actual and target growth rates 1950 |
|---------------|------|------|------|------|-------|-----------------------|--|------------------------------------|--|
| Generation | 0 | 1 | 2 | 3 | 4 | | | | |
| India | 1.00 | 1.05 | 0.96 | 1.44 | 2.16 | 1.00 | 0.09% | 1.96% | 1.87% |
| Indonesia | 1.00 | 1.42 | 1.17 | 2.06 | 3.69 | 1.38 | 0.32% | 2.77% | 2.45% |
| Taiwan | 1.00 | 1.37 | 1.21 | 4.95 | 15.27 | 1.48 | 0.39% | 6.21% | 5.82% |
| Japan | 1.00 | 1.60 | 1.65 | 9.67 | 17.11 | 2.72 | 1.01% | 5.73% | 4.72% |
| UK | 1.00 | 1.07 | 1.49 | 2.55 | 3.43 | 2.22 | 0.80% | 2.00% | 1.20% |
| USA | 1.00 | 1.54 | 2.38 | 3.92 | 5.26 | 5.67 | 1.75% | 1.91% | 0.16% |
| France | 1.00 | 1.45 | 1.83 | 4.60 | 6.30 | 3.36 | 1.22% | 2.99% | 1.77% |
| New Zealand | 1.00 | 1.23 | 1.97 | 2.93 | 3.23 | 3.87 | 1.36% | 1.19% | -0.17% |

they follow this pattern illustrates the need for further research to identify a more accurate and forward-looking way to estimate target growth rates.¹

Income and consumption are determined largely by labour income and the return to capital. An individual's income is determined by his wage or salary, and the interest on his savings, or invested capital. Thus there are two distinct ways in which individuals can invest to increase the earning capacity of their children; they can invest in capital stocks, which earn interest and they can invest in their children's education, which will increase their earning capacity.

Both of these actions to increase material wellbeing can also be effected at the level of society. To increase the productive capital stock governments can levy taxes to invest in productive capital stocks on behalf of their citizens, or to reduce levels of government debt and future tax burdens. Alternatively they can subsidize investment in capital stock accumulated by firms and individuals. They can increase the level of human capital, by investing in education and training. These policy actions can also be taken at the community, or local government, level.

Growth in production can be thought of broadly as limiting present consumption to invest in productive capital stock and human capital, in order to increase future consumption possibilities. The capital stock in which individuals and society invest is a combination of human-made capital, such as factories and equipment, and natural capital, such as forests and land. These investments can feasibly be undertaken at the level of the household, the community, or the national government.

4 THE INTER-GENERATIONAL BARGAIN AND NATURAL GOODS

The economic growth data analyzed in Section 3 refers only to marketed goods and services. In this section we extend the discussion of the inter-generational bargain to include natural goods. We can divide the discussion of natural goods into three separate, but overlapping categories. The first is the direct enjoyment and benefits obtained from the natural environment. The second is the provision by the environment of inputs to production. The third and most fundamental is the provision of the life support system necessary for our survival.

4.1 Natural Goods as a Direct Source of Wellbeing

Many natural goods are useful to humans on the level of welfare provision. That is, people derive wellbeing from living in a pleasant and unpolluted natural environment. They also use natural goods, such as forests, mountains and lakes, for recreational purposes such as walking, swimming and sailing. This enjoyment is, in many cases, a significant part of overall wellbeing.

How does the direct contribution of natural goods to human wellbeing enter into the inter-generational bargain? In the vast majority of countries, the natural environment has been significantly depleted over the last century. One of the indicators

¹ It can also be noted that the implied target growth rates of generation 3 for their grandchildren's generation (which can be calculated using this table) are by no means unrealistic, most being below 2 per cent and Japan's being above 3 per cent.

of this is the rate at which the number of species populating the earth has declined. The aspirations that people have for levels of natural goods for their children and grandchildren will often depend on current levels of environmental quality. In general we assume that, if the level of environmental loss over the last two generations has been significant, then people will wish to stabilize or reverse this trend. If, however, there is a plentiful supply of natural goods and low levels of consumption, people may consider the preservation of all of these goods to have low priority. Once material consumption reaches a certain level, however, we assume that they will aspire to at least maintain the current levels of wellbeing derived directly from the environment.

It is apparent that individuals' power to ensure that their descendants have sufficient access to natural goods is very limited. This is because natural goods, are quasi-public goods. People derive enjoyment from the national and even the global environment, not simply from the natural goods in their vicinity. The ownership of these natural goods is often private, and one cannot necessarily expect individual owners to account for their social benefits. The implication of this is that the decisions as to how much of the natural environment to preserve for current and future generations must be taken at the level of society.

4.2 Natural Goods as Sources of Inputs to Production

Stocks of natural resources and the land on which many of them are found are the source of many material inputs to production and consumption. This ranges from basic necessities such as food and fabrics, to building materials. Some of these material inputs, such as food, natural fabrics and timber, can be produced in a sustainable way. However, these stocks can be depleted over time, and many natural inputs to production are extracted from non-renewable resource stocks. The question for sustainability of provision of these inputs is whether sufficient investment is being undertaken to compensate for the depletion of natural resource stocks.

This aspect of natural resource services in the inter-generational bargain is related to the targets for improvement of levels of consumption goods. That is, an implication of targets for consumption is that that required stocks of natural goods must be maintained. A potential problem is that for some resources, the value to the owner is maximized by depleting stocks. This is not necessarily incompatible with the fulfilment of the inter-generational bargain. However, as argued in Section 6, it is conceivable that current market signals do not reflect the full long-term value of natural resources. This could have implications for the sustainability of production.

4.3 Natural Goods and Global Life Support Systems

Sustaining welfare clearly involves maintaining the global environment's capacity to support human life. This requirement, often referred to as environmental sustainability, includes maintaining the atmospheric, climatic and soil productivity services necessary to support human life. The environment's capacity as a life-support system is a stock resource, which may be depleted. The service provided by global life support systems is, many would argue, not merely a global public good but a global public necessity. The international price system often gives the owners of natural resources, be they

individuals or countries, financial incentives to deplete those resources and invest in manmade capital that yields a higher rate of return. The life-support services that these resources provide are not reflected by the price system, and therefore any owner that preserves natural resources is not compensated for the services they provide.

The role of the inter-generational bargain of global life support services is clearly crucial. The assumptions already made regarding targets for the wellbeing of future generations imply that environmental life support services must be maintained at safe levels. It is not within the power of the individual, the community, or even the national government to determine whether or not global environment depletion remains within the best estimates of safe minimum standards. This, rather, must be effected at the international level. In the absence of international government, this relies upon international negotiation.

5 THE INTER-GENERATIONAL BARGAIN AND SOCIAL GOODS

There is a large literature on the contribution of social factors to wellbeing (see e.g. Easterlin (1974), Hirsch (1976)). In most developed countries, social and family networks are thought to be weaker now than they were at the beginning of the 20th century, while in many developing countries, these networks remain relatively strong. This is an important factor in the inter-generational bargain, surveys having shown that inter-personal relationships are one of the most important determinants of happiness. The World Health Organization (WHO) also projects that depression is likely to become the second largest cause of disease by 2020, after heart disease. Already, according to the WHO, around 6 per cent of the world's population suffer from a major depressive disorder.²

We assume that in developed countries, people wish their children and grandchildren to have access to social networks that are at least as well developed as those currently existing, and that in general people are not willing to accept increased consumption at the expense of a further decline in social goods. For developing countries, in which social networks remain strong, it is difficult to make assumptions regarding willingness to trade off increased consumer goods for reduced social goods. However, based on personal experience we would argue that this willingness is limited.

Individuals have little or no control of social goods. Maintenance of what can be thought of as 'social capital' must be undertaken at the community or national level. Policies that maintain social capital include expenditure on education, and in particular education on citizenship, place limits on legal working hours so that workers have time to maintain relationships and other activities that may be important to their quality of life. Policies to sustain regional economies and limit the extent to which migration is required to find employment would also help to maintain social and family networks. For each of these policies, it is clear that there is a certain trade-off between maintaining and investing in social goods on the one hand, and diverting resources to increase the output of consumption goods, on the other. It is likewise clear that these resource allocation decisions must, to a large extent, be taken at the level of society rather than at the level of the individual.

²This corresponds to an estimate on the WHO's website that in April 1999, 340 million people were suffering from major depressive disorders.

6 WHY MIGHT THE OUTCOMES OF UNCO-ORDINATED ACTIONS NOT REFLECT ASPIRATIONS?

This section outlines the concern of many economists, and others, that the market may not send the profit signals required for the deletion of natural resources to remain within economically and environmentally sustainable levels. International trade means that an economy can run down its own stocks of natural resources and remain sustainable, as long as its natural resource needs can be substituted from elsewhere in the world. The development paths of most currently developed economies, such as the UK, involved depleting natural resources and subsequently importing substitutes. The question for global economic sustainability is to what extent can this strategy be repeated by the currently developing economies, and whether the market will cause prices to rise quickly enough to make it profitable to preserve the required stocks of environmental resources?

One of the most common arguments against governments imposing a sustainability policy is that it is superfluous, since economic history shows that the market system will always stimulate the technical progress required to provide an inexorably rising standard of living. Weitzman (1997) argues that any crisis in resource availability would manifest itself now, in 'astronomical' resource prices. It is difficult to argue conclusively for or against this position. It is underpinned both by a firm empirical belief in the power of technological progress to supersede natural resource constraints, and also in the power of markets to accurately reflect resource scarcity, and the availability of substitutes for natural resources, over very long time-horizons. If one does not accept that the market is sufficiently long-sighted to achieve this, then the fact that natural resource prices are currently low does not necessarily mean that they will never constitute a constraint to economic growth. Norgaard (1990) argues that the failure of resource prices to rise could well result from the market's failure to reflect scarcity rather than from an absence of scarcity.

Thus, the question as to whether the market will ensure sustainability of the environmental services required to produce consumption goods is largely a question of whether markets can fully reflect the long-term scarcity of environmental resources. If they can, then the market should provide the correct incentives to preserve scarce stocks of renewable resources, to develop alternatives for non-renewable resources, and to invest in these alternatives, although government and international action will still be required to preserve the life support services and the other non-marketed values of the environment. If they do not reflect future scarcity, then it is possible that natural resources are currently underpriced relative to the return on investments in manmade capital and that policies such as subsidies to holding natural resource stocks, or government purchase of environmental resources, are required.

7 CONCLUSION: SHOULD DEVELOPING COUNTRIES CARE ABOUT THE INTER-GENERATIONAL BARGAIN?

There are two aspects to the question as to whether or not developing countries should worry about sustainability, and thus the inter-generational bargain. The first is whether sustainability is a problem that any country need worry about, and the second is whether, even if sustainability can be shown to be a valid concern, developing

countries can be expected to worry about investing for the future when their immediate problems are so pressing. Our analysis is based on the assumption that, in general, individuals wish to take decisions so as to at least maintain standards of wellbeing for their children and grandchildren, and ideally to raise them and that there are a variety of control variables, including the private, the community and the public, by means of which these decisions can be taken. These assumptions, in the absence of data on preferences regarding the inter-generational bargain are intended at this stage to be illustrative of the implications of target growth rates.

An answer to the first part of the question can be attempted by considering the various factors that contribute to wellbeing on an individual and a social level, and the extent to which individual investment decisions can affect the availability of these factors to future generations. There are various types of capital stock in which investment can be made including manmade capital stocks, human capital stocks, natural and social capital stocks. We noted in Section 3 that investment to maintain or improve standards of material wellbeing can be taken at the individual, the community or the public level, although Section 6 highlights the possibility that net investments involving the depletion of natural resource stocks may not be sustainable. Section 4 noted that neither the maintenance of the direct wellbeing from the environment, nor the essential environmental life-support services, can be left to private, or even community decisions, since these goods are, to at least some extent, national and international public goods. Section 5 noted again that investments to maintain or improve the availability of social goods such as community networks and security of employment etc. can only be undertaken at the community or public level, and that private individuals can do little to affect these factors. Finally, Section 6 noted that maintaining the natural resource stocks required to sustain production of material goods may require public intervention if it is thought that the market cannot reflect the long-term value of the resource stocks.

These observations lead to the conclusion that economic, environmental and social sustainability, and thus the inter-generational bargain, are relevant problems for all types of economy. This still begs the question of whether, and to what extent, developing countries can be expected to limit their already low levels of consumption in order to undertake investment to ensure sustainable development. However, we would argue that if the hypothesis that most individuals wish their children and grandchildren to be at least as well off as they are is accepted, then governments have a democratic responsibility to undertake the types of investment and restrictions on environmental depletion that are required for sustainability of the different aspects of wellbeing, but that are not within the power of individuals.

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