DISCUSSION PAPER

December 2005 ■ RFF DP 05-47

Macroeconomics and Forest Sustainability in the Developing World

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Abstract

Governments often use fiscal, exchange rate, monetary policy as well as export promotion tax increases, privatization, and land reform as part of comprehensive adjustments packages for addressing economic imbalances, balance of payments, and structural weaknesses. Such approaches, however, have come under heavy criticism for failing to recognize the social and environmental costs associated with them. Critics have argued that economic growth, trade liberalization, and increased primary product exports increase pressure on many sectors, including the agricultural and forestry land use sectors. This paper examines a number of these types of external shocks.

This paper makes two arguments. First, from a theoretical economic perspective, although in many cases structural adjustment programs can be expected to affect the domestic forest sector, in other cases they will not. Second, even when there is an impact on the forest, it need not be detrimental to environmental and ecosystem values. A sustainable forest system needs to provide wood, local environmental products and services, and global ecological services, but individual forests can specialize in some of these.

Key Words: forests, sustainability, macroeconomics, trade, exchange rates, structural adjustment

Acknowledgements: This paper was undertaken at the suggestion of Jeff Sayer of IUCN and has benefited from the suggestions of Josh Bishop. However, any errors that remain are those of the author.

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Roger A. Sedjo*

Introduction

Governments often use fiscal, exchange rate, monetary policy as well as export promotion tax increases, privatization, and land reform as part of comprehensive adjustments packages for addressing economic imbalances, balance of payments, and structural weaknesses in their economies. Such approaches, however, have come under heavy criticism for failing to recognize the social and environmental costs associated with them. Critics have argued that economic growth, trade liberalization, and increased primary product exports increase pressure on natural resources. Forest sustainability is part of that concern.

Forest sustainability is a complicated concept incorporating a variety of views but no clear consensus. Nevertheless, the concept of maintaining forests, forest cover, and biodiversity and minimizing overall forest destruction and conversion is well accepted.[1] As suggested above, many of the pressures on forests are believed to be generated by forces outside the forest sector, such as the set of macroeconomic policies sometimes used to address severe economic problems confronting a country. These problems often are in developing countries where large external debt has grown beyond a country's debt-servicing capacity. Such a situation usually is compounded by factors such as price inflation, exchange rate distortions, balance of payments difficulties, and capital flight, which exacerbate the country's difficulties in servicing its external debt. When these problems are severe, corrective policies often require a restructuring of the country's debt, including external debt assistance, as well as a structural adjustment, which requires major changes in the country's fiscal policies, public expenditures management, and, perhaps, trade and monetary policies. Nevertheless, controversy abounds about both the precise nature of the causes of the imbalances and the efficacy of the proposed cures.

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[1] See Kant and Barry (2004).

Background

In recent years, there has been widespread concern that macroeconomic policies oriented toward stabilization and structural adjustment in the developing world may have a negative effect on incomes, poverty, and the environment, including impacts on forests and forest sustainability. The World Bank and, in particular, the International Monetary Fund (IMF) have been criticized for their stabilization and structural adjustment policies, which require stringent macroeconomic policies in return for the external financing necessary to service the debt associated with large external borrowing that has grown out of the control of the particular country. The literature is beginning to address the question of the impact of these macroeconomic adjustment policies. For example, their effect on poverty within a country is raised by Easterly (2001) and their effect on the environment of a country is addressed by White (1992). Some studies (e.g., Reed 1996, 1992; Repetto and Cruz 1992; Kaimowitz et al. 1998; Sunderlin et al. 2000) have found that structural adjustment can result in negative outcomes, particularly in the developing world, by creating pressures on the environment and forests. However, other studies (e.g., Munasinghe 2001; Munasinghe and Cruz. 1995; Warford 1994) report ambiguous and sometimes positive results, with income and environmental benefits often accruing as the structural adjustments remove price distortions and market impediments and allow market incentives to work more effectively. Recently, an attempt has been made to statistically assess the impact of structural adjustment programs on forests across a large number of countries (Pandey and Wheeler 2001).

It has long been recognized that external economic factors can seriously impact an economy. As long ago as the end of the World War I, for example, it was recognized that large international capital transfers (e.g., war reparations) can generate economic disruptions among the participating countries (Keynes 1919).[2] This followed from a general equilibrium view of economic systems as having substantial sectoral interrelations within individual economies, as well as important external interactions among countries through international markets.

As part of this view, international trade and financial policies are recognized as having both implications for and impacts on the physical and biological environments, as well as on the

[2] World War I reparations payments from Germany and the former Austro-Hungarian countries to the allies resulted in the transfer of wealth out of these countries, causing downward pressure on exchange rates. With fixed exchange rates, the price adjustment was prevented and large-scale unemployment resulted.

economies, of various countries. Numerous studies have examined the implications of specific trade policies on the physical environments of the trading partners. For example, a number of estimates of the environmental effects of the North American Free Trade Agreement were made well in advance of the actual implementation of the agreement (e.g., Grossman and Kruger 1991). More recently, an examination was made of the impact of the Free Trade Area of the Americas on the forests of the countries of the region (American Lands Alliance 2001). Also, there is a well-developed literature on "Dutch disease," so named because it was first systematically addressed in the Netherlands when it was recognized that the large foreign exchange earnings and the resulting appreciation of real exchange rates that resulted from the development by the Dutch of natural gas off their coast generated changes and adjustments throughout the economy in the form of making many other industries less competitive in foreign markets by virtue of the highly valued exchange rate. This phenomenon has been examined in detail for resource-rich developing countries, and the implications for their economies have been detailed (e.g., Warr 1986).

In addition, some studies have examined the effects of Dutch disease on the environment of a developing country. Wunder (2003), in particular, has undertaken a number of case studies with a particular focus on forests and the forest environment of countries that have large foreign exchange earnings as a result of oil resource development and export. Interestingly, in the case of the development of a specific resource in resource-rich developing countries, the effects on forests generally have been positive.[3]

While appreciating that real exchange rates may serve to protect forests, the more immediate concern has been the effects on forests of various types of structural adjustment programs often undertaken by the IMF or the World Bank. In general, these situations are the reverse of the Dutch disease situation. In these cases, the improving macroeconomic performance of countries that have been experiencing serious economic problems, such as trade, balance of payments, and fiscal deficits, results in the deterioration of the environment and the

[3] The rationale for Wunder's findings is straightforward and will be developed further below under the section on "Resource-Rich Developing Countries." However, to anticipate, foreign exchange earnings from oil exports result in the appreciation of a country's exchange rate, thus making the export of forest products more expensive and thus less competitive. Furthermore, the very competitive oil sector may in some circumstances draw resources out of other industries, such as agriculture, thereby reducing the incentive of surplus agricultural resources (labor) to spill into the forest sector and contribute to the conversion of forest lands to agriculture.

forests. Over the longer term, economic growth, which is associated with higher domestic consumption levels, could offset some of the domestic effects to the appreciating exchange rate. A general concern is that although adjustment programs should be recognized as likely to have substantial environmental impacts, as well as anticipated economic impacts, these programs often have often been undertaken without consideration of their environmental effects, including those on forests and biodiversity.

Conceptual Economic Interrelationships

The fact that large, external macroeconomic shocks (whether caused strictly by market forces, such as resource discovery and exploitation, by policies that result in large capital outflows or inflows, or by longer term structural shifts and changes in fiscal/trade orientation) have a substantial impact on sectors of the domestic economy should not be surprising. Rather, the economic effects are a manifestation of the well-known realities of the operation of the general equilibrium adjustments to shocks that take place within and across economies. Large changes at the macroeconomic level precipitate repercussions and feedback within the domestic economy.

Therefore, some of the repercussions will have implications for the economic sectors that themselves have important interactions with the environment. Economic effects on the forest sector and other sectors, such as agricultural or industry, indirectly can influence land use and in turn forests and biodiversity. These environmental effects can be positive or negative, depending on how the forest sector is affected. Indeed, these effects are likely to vary and under some conditions, such as the oil development as examined by Wunder, can be positive. However, effects associated with the stabilization and structural adjustment policies undertaken by the IMF and the World Bank almost always have the potential to be negative to forests. These effects commonly are associated with macroeconomic changes (shocks) that affect income and often depreciate the exchange rate[4] and encourage exports of agricultural and forest products. In these cases, it seems sensible that a systematic assessment of the likely impact of a macroeconomic

[4] Mani, of the World Bank and formerly with the IMF, notes that in the 1980s, exchange rate depreciations were part of an adjustment program; however, this is less common today since exchange rates are commonly floating. However, there are many exceptions. The rescue plan in Argentina in the late 1990s and early 2000s involved very substantial exchange rate adjustments. He also notes that crises related to currency flight (as in the Asian crisis of the late 1990s) generated exchange rate depreciations but that the overall rescue package, which stabilizes currency flight, was viewed as beneficial to forests. Personal communication with Muthukumara Mani, July 27, 2004.

change should be made and some action to mitigate these damages should be considered when severely negative effects are likely to result.

Various Types of External Shocks

In this section, I examine briefly some major macroeconomic changes and their likely environmental and forest effects. Initially, I examine some economic shocks, such as trade liberalization and major resource exploitation, that although are not exactly the same as a structural adjustment policy, are similar in that there may be repercussions on the economy and, in turn, on the forest environment. In these cases, there is significant information on the effects provided by earlier studies.

Trade Liberalization Effects

A number of studies have been undertaken to address the question of the effects of various policies on global wood flows and on forests. Bourke and Leitch (1998) examine the effects of trade restrictions generally. Barbier (1999) estimates the effects of trade liberalization resulting from the Uruguay Round of tariff reductions on selected forest products exports, while Brown (1997) estimates the effects of trade liberalization on Asia-Pacific forest products trade. Sedjo and Simpson (1999) examine the question of the expected effects of tariff liberalization on forest products trade and global forests in the context of the proposed accelerated tariff liberalization proposed by the Asia-Pacific Economic Community (Office of the United States Trade Representative 1999). All of these studies look at the general effect on forest products trade from the liberalization of forest trade. The general approach in these studies is to assume that the exchange rate would not change since the macroeconomic impacts for individual countries were expected to be small. However, the studies did provide information as to the anticipated changes in forest products trade and the subsequent impact on the forest sector environment, including forest land use. These studies generally found that forest exports would be expected to increase in forest-rich countries (e.g., countries with a comparative advantage in forest products), both developed and developing, while forest exports would decrease in countries lacking a forest products comparative advantage; these are mostly forest-poor countries. Overall, wood production and trade should increase but only very modestly. For example, Barbier (1999) estimates the effect of the Uruguay Round tariff reductions on selected forest products exports would be to increase of exports by an average of 1.6–2.0 percent.

The forest and biodiversity implication of this finding for developing forested countries is that they would experience some increased pressure in commercial logging of their forests, while

developing countries that are marginal forest products producers might expect a very modest reduction in pressure for commercial logging of their forests. A negative consideration for the countries that are marginal forest products producers is that forestland that becomes nonviable for logging might become a target for conversion to other uses.[5]

Resource-Rich Developed Countries

As noted in the introduction, Dutch disease refers to the large foreign exchange earnings and appreciation of exchange rates resulting from the exploitation of natural resources that generates distortions throughout the economy. Similarly in the Dutch case, the appreciated exchange rate made imports less expensive, often creating new competition for domestic producers. Thus, various sectors of the Dutch economy found their competitive position compromised. This compromise in competitive position was exacerbated further by the drawing of domestic resources, such as labor, to the natural gas sector, thereby increasing labor costs in the domestic economy.

Resource-Rich Developing Countries

The argument here is the same as for the developed countries, with the effect being to reduce demand for developing-nation forest and agricultural products as the high exchange rate reduces the competitiveness of these products. The empirical information available for examining the effects of a dominant resource-export industry on countries in the developing world is substantial, including a number of detailed studies by Wunder (2003).[6] The methodological approach employed was to examine the performance of selected countries where the resource exports (e.g., oil) were large. This was found to generate appreciation pressure on the exchange rate. The appreciated exchange rate dampened foreign demand for both agricultural and forest exports, while encouraging their import. Also, expanding non-traded sectors (e.g., services, construction, etc.) drew domestic resources, including labor, away from forestry and agriculture. All of these factors should discourage forest activities. In addition, since these same factors also discouraged agricultural activities, there was little incentive to convert forestlands to agriculture.

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[5] Amelung (1991), among many others, argues that most deforestation is due to land use conversion, usually conversion to agriculture, and not due specifically to commercial logging.

[6] The countries examined by Wunder were Gabon, Venezuela, Cameroon, Ecuador, Papua New Guinea, Mexico, Nigeria, and Indonesia.

These studies provide an excellent example of the type of effects on forests that could result from the exploitation of a major underground (mineral) resource such as oil. While the results vary a bit by country, reflecting the wide diversity of individual conditions and circumstances, the studies suggest that the general outcomes are similar. The overall effect tended to reduce pressures for harvesting from the forest resource and therefore reduced forest damages and losses.

Structural Adjustment

As noted, structural adjustment programs are designed to improve the macroeconomic performance of countries experiencing serious trade, balance of payments, and fiscal deficit problems. Typical policies involve cuts in the government's budget, tax increases, trade and market liberalization, emergency loans from foreign sources (e.g., the IMF), and budget support.[7] These programs often have come under criticism for imposing excessive pain on the economy, particularly on low-income people, and for ignoring the environmental implications of such policies (Cruz and Repetto 1992; Reed 1992, 1996).

Pandey and Wheeler (2001)[8] undertook an empirical study of 112 countries to determine the relationship between structural adjustment and its impact on forests as measured by its effect on roundwood production. However, they found no significant statistical relationship between an adjustment and roundwood production. A possible explanation of these results may be that many of the countries included had no comparative advantage in forestry, and the features of the structural adjustment did not change that situation. Another explanation, not necessarily mutually exclusive with that above, is that "other factors" are not adequately specified in the analysis. Finally, perhaps not all deforestation need result from industrial roundwood production.

The point here is that the empirical evidence indicates that structural adjustment alone does not appear to be sufficient to generate increased forest products production for all countries, or even countries on the average. The empirical evidence suggests that results of such policies on forests could vary by country and perhaps could be related to the nature of their forest resource.

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[7] Where exchange rates are fixed, as was the case in Argentina in the 1990s with the peso tied to the U.S. dollar (even as the dollar was allowed to float), a depreciation peso-dollar exchange rate was undertaken.

[8] See Pandey and Wheeler (2001) for a more complete review of recent literature of macroeconomic structural adjustment impacts on forests.

A country with a comparative advantage in forestry (usually a forest-rich country) that already is exporting forest products could see increased forest products exports in response to a structural adjustment. However, this outcome would not occur for a country without a comparative advantage in timber production. Such a country may have limited forest resources and a comparative disadvantage that is not overcome by the effects of a structural adjustment, even if it includes an exchange rate depreciation.[9]

In the following section, I apply the same type of informal impact analysis on structural adjustment programs that are often undertaken by the IMF or the World Bank. The basic approach is to treat the adjustment as an external shock on the domestic economy and then, using our basic understanding of the interrelationships of the economy, trace the impact's effect on land use, for example, on the forest and agricultural sectors. In each case below, I assume that substantial income reductions and an exchange rate depreciation are part of the structural adjustment package.[10] In Case 1, conditions are present that result in a structural adjustment and associated exchange rate depreciation that result in increased pressures on the forest. In Case 2, the prerequisite conditions are not present.

Case 1: A Hypothetical Country with Negative Forestry Effect. A typical situation might involve a hypothetical country that is a net exporter of forest products, indicating a comparative advantage at the initial exchange rate. Suppose this country lost control of its balance of payments as it accumulated a large external debt. It is now unable to service that debt using its own net foreign exchange earnings. The medicine prescribed typically would be to eliminate exchange controls and thereby allow the country's exchange rate to adjust (depreciate) to market-determined levels; to dramatically reduce government spending (e.g., to reduce the government budget); and to undertake a large "emergency" loan from a multinational lending agency. The proceeds of the loan would be used to service the existing debt until the country was

[9] For countries without a comparative advantage, a structural adjustment even with an exchange rate depreciation might simply result in a decrease in their imports of wood, while not producing a significant increase in wood exports.

[10] Note that the effect of income reductions and currency depreciation operate in the same direction vis-a-vis their impact on forests. This is because currency depreciation is a de facto income reduction for a country that consumes some foreign good. Also, while both of these policies reduce domestic demand for forest resources, they would increase foreign demand. Finally, income reduction may increase pressure by locals on the domestic forest for livelihoods.

able to improve its public expenditures management and, through economic austerity, to restructure its foreign debt and regain sufficient earnings on its own to make the restructured debt-service payments.

The general reduction in domestic incomes leaves more wood for the export market while reducing imports. Where a depreciated exchange rate would apply, this would have the effect of making the country's exports even more competitive, while the higher price of imports would result in the diminution of all imports, including wood imports. Furthermore, the effect of reduced government spending would be expected to support the increased exports and decreased imports mentioned above in that it is likely to contribute to the reduction of overall economic activity (inducing a recession), thereby increasing national unemployment and poverty. Furthermore, some of these low-income people, many of whom are likely to be in the rural sector, are likely to try to scrape a living from the land through increased logging (perhaps illegal), forestland conversion to agriculture, and so forth. Thus, the effects on the domestic forest and biodiversity sectors likely would be adverse. A similar result could be expected in a situation where the external loan provided budget support, although the negative effects from reduced government spending might be somewhat reduced.

In a developing country with large agricultural and forest sectors, the structural adjustment policies would be intended to stimulate both of these sectors to increase their production for export or import substitution. More economic activity in these sectors could put increased pressure on the forest through increased commercial logging and, perhaps, could provide incentives for more forestland conversion to agriculture. Both of these efforts generally are viewed to have a negative impact on the forest and biodiversity sectors, although they would contribute to the overall economic restructuring.

Case 2: A Hypothetical Country with No Negative Forestry Effect. Not all countries, however, would be expected to respond to a structural adjustment currency depreciation by increasing production of timber. For countries with a comparative disadvantage in forest resource production (as a result, perhaps, of modest forest resources), the effect of the currency depreciation on forest production is likely to be negligible. An example of such a country is the Republic of Korea (South Korea). During the 1960s and early 1970s, Korea experienced major foreign assistance capital inflows, as well as a gradually depreciating exchange rate. That same period saw Korea increase its imports of logs for conversion to plywood. Although the cost of the logs was rising, the depreciation provided an increasing comparative advantage for Korea's

processing of the logs to plywood, which was produced in a labor-intensive manner and then exported. Thus, under these conditions, the capital inflows and depreciating exchange rate occurred without any serious impact on the harvesting of the meager domestic forest (Smith 1972).[11]

Forest Sustainability and Structural Adjustment

The above discussion treated an increase of timber harvesting that followed a structural adjustment as a negative impact on the forest sector. Of course, it is well recognized that a simple increase of timber harvest need not imply a deterioration of a forest. The argument of this section is that the common, poorly articulated concepts of sustainable forestry without regard to broader spatial and use considerations may be too simple a notion to be a useful indicator of overall social costs and benefits. There is much discussion of sustainable forest management (see Sedjo, Goetzl and Steverson 1998; Pandey and Wheeler 2001) and although the precise meaning of this term is often obscure, sustainability need not be inconsistent with timber harvesting. Indeed, there are substantial efforts underway to devise certification systems that provide for harvesting in a "sustainable" manner. More generally, one can think of forests being managed and maintained for a number of different purposes, ranging from timber to biodiversity, and including a host of environmental services, such as clean water, erosion control, wildlife, carbon sequestration, and naturalness.

Although we may not be sure of what characteristics are necessary for sustainability, there is pretty clear agreement as to what the final outcome should be. The Brundtland Commission (WCED 1987) defined a sustainable system as one that is capable of meeting current needs without compromising its ability to meet future needs. In effect, the system will have as many resources in the future as it had in the past. Taking a broad global view, this definition suggests that the relevant focus is on the global forest system (Sedjo 2004).

When applied to forestry, sustainability need not mean that every forest needs to continue producing its mix of services forever. I would argue that the only reasonable interpretation is not

[11] The absence of an effect of structure adjustment on roundwood production in Pandey and Wheeler's (2001) empirical estimate of 112 countries could be explained, in part, because many of these countries had no comparative advantage in forestry, and the features of the structural adjustment did not change that situation for many of these countries.

that a particular forest produces the entire range of outputs forever, but rather that the "system," broadly defined, is capable of producing the desired sets of outputs indefinitely. In forestry, the global forest system is the relevant one for humanity.

Any assessment of the effects of a structural adjustment program on forests and forest ecosystems needs to distinguish between essentially benign effects on the forest, such as those consistent with sustainability, and destructive effects on the forest, such as those that compromise the long-term productivity of the forest system.

It can be argued that forests have at least three distinct roles in contemporary society. One is to provide humans with an important commodity—wood. This commodity can be readily traded in very active local, national, and global markets and is quite mobile. Specialization, trade, and markets are an inherent part of this production system. Sustainability of an individual forest, however, is not critical for the sustainability of the wood market system. Production may move from one forest to another. Furthermore, due to trade, a country may enjoy the industrial wood commodity without producing a single stick of wood. A second and different role for the forests, however, is to provide humans with a host of useful, indeed essential, local environmental goods and services. These outputs are highly localized, some of them are not mobile, and many are not easily transacted in markets. The third role for forests is the provision of global environmental goods, such as biodiversity and carbon storage. The sustainability of forests that provide global environmental goods is important, not only as part of a global system, but also for their individual parts (forests). Unique biodiversity is highly site specific and does not, and indeed need not, be transported. Of course, carbon storage occurs with all forest biomass and carbon sequestration occurs with any net growth in a forest biomass.

It follows that at least three different but sustainable forest systems are needed. The first forest system is that which focuses on timber production, perhaps using the agricultural cropping model that relies on the specialization and intensive management that emerged from the industrial revolution and is so much a part of the technology in use today. Such a productive system can shift geographically and biologically (e.g., to preferred species and maturity) over the decades and centuries; in fact, we are seeing that shift today. In this case, while the overall productive system may need to be sustainable, the individual production forest need not be. The second forest system is that which provides important local environmental services, mostly non-market and highly localized services. This system is immobile, and tends to require forests that are stationary, persistent, and—indeed—sustainable. Such a forest also may provide industrial wood. The third sustainable forest system is that which provides for global, public environmental goods—for example, biodiversity and carbon sequestration services. Since carbon sequestration

is provided by most forests through their sequestration of carbon in the biomass, the focus here may be on biodiversity where the specific details are more binding. These three types of forests are not always, but may be, mutually exclusive. They may exist separately, but in many cases a single forest can provide all the outputs (Sedjo 2004). Society has an interest in producing all three sets of outputs and in sustaining a forest system that provides for all three. Nevertheless, society may not have an interest in sustaining each individual forest as long as the global forest system is functioning properly.

Thus, any assessment needs to recognize that sustainability does not require that each hectare need produce every output. It is also true that in a global or regional perspective, each forest need not produce every output.[12]

In this context, recognizing that not all forests need to produce every output, such as substantial biodiversity, the question of the likely macroeconomic effects on a forest and the environmental outputs of that forest probably should be assessed as part of the consideration of any macroeconomic policy package. It would be appropriate, for example, for increased harvests from working forests to be viewed differently from logging or incursions into parks or protected forests. In the first case, sustainability is not threatened; in the second case, it may be.

Summary and Conclusion

It has long been recognized that large external shocks can have major effects and repercussions on an economy, affecting many sectors, including the agricultural and forestry land use sectors. This paper has examined a number of these types of external shocks. The literature shows that in many cases, forests can be affected both positively and negatively, depending on the nature of the shock and other conditions. In the literature, however, it has been difficult to demonstrate empirically a connection between macroeconomic structural adjustment programs and the deterioration of forests.

This paper makes two arguments. First, from a theoretical economic perspective, it argues that while in many cases structural adjustment programs can be expected to affect the domestic forest sector, in some cases they will not. Second, even when there is an impact on the

[12] Messier et al. (2003) discuss the use of a triad of management types—protection, natural forest, and fast-growing plantation—to promote sustainability of the various parts and to provide forest ecosystem protection in the Canadian context.

forest, it need not be detrimental to environmental and ecosystem values. A sustainable forest system needs to provide wood, local environmental products and services, and global ecological services, but individual forests can specialize in some of these.

More specifically, on the first point: To negatively affect the forest as reflected in increased harvests and exports, the country experiencing the structural adjustment would need to have a comparative advantage or near-comparative advantage in forest resource production before the structural adjustment. Then, the structural adjustment would need to include an exchange rate depreciation sufficient to increase the country's existing comparative advantage or to push its near-comparative advantage into the actual-comparative advantage category. In addition, the resulting increased activity in the forest would have to be of a type to generate negative socioeconomic effects on the forest, including the loss of important biodiversity sites. The above conditions will be met in many cases but not in all.

In general, for a developing country with a large portion of the population in the rural sector, an emergency devaluation such as often accompanies structural adjustment likely will result in increased economic activity in the land use sector, which often will be accompanied by negative effects on the forest. To the extent that the agricultural sector is small, or disassociated with the forest sector, or both, we would expect the extent of the forest and biodiversity environmental damages to be reduced. Also, should the exchange rate depreciation be sufficient to stir a nascent resource or industrial sector, these damages may be avoided.

Regarding the second point: Increased timber harvest from working forests within the context of sustainable management need not be environmentally destructive. However, should the impact be sufficiently large to cause harvest in excess of sustainable management or should the impact cause human incursions into protected forest areas, threatening critical habitat or generating undesired land conversion, the effects of structural adjustment programs clearly would generate negative environmental externalities.

In concept, it appears sensible to recommend that the World Bank and IMF undertake a systematic assessment of the likely environmental effects of pending stabilization and structural adjustment programs. However, as a practical matter, these programs usually are enacted quickly under crises conditions, which typically does not allow time for a careful environmental and forest impact assessment. Furthermore, it is often impossible to predict the effects of structural adjustment due to lack of data and other uncertainties. Nevertheless, it may be possible to set up early warning systems and to try to ensure rapid reaction based on good upstream analysis. A sensible approach, however, may be to undertake some preparatory analytical work in countries

where forests are important resources from a macroeconomic or livelihood perspective. If negative effects are indicated, the elements of a broad country program could be developed in advance of any crisis.

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