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COUNTRY RISK: ECONOMIC ASPECTS

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1. Introduction

From an American or European perspective investment abroad in the Second and Third Worlds looks very much riskier than investment at home. Recent events in Iran and Poland, among other places, seem to provide dramatic confirmation that these feelings are well founded. There is a lot to worry about: the increased internationalization of investment in the last decade has enormously raised the exposure of investors to risks associated with events in many different countries.

As a consequence of this situation, institutional investors and public organizations concerned with international investment are devoting substantial resources to analyzing the risks of investment abroad. There have been significant improvements in the collection and dissemination of data on foreign investment. Some investors have developed statistical models that attempt to evaluate the safety of loans to particular countries.

We believe, however, that this activity is unfortunately taking place without an adequately articulated conceptual framework that identifies the fundamental sources of country risk. This analysis is unlikely to be very robust if it is not based on appropriate theoretical notions. Without a good specification of what motivates borrowers and lenders it is difficult to identify which data are important for analyzing country risk. In addition, there is no reason to believe that apparent regularities derived from past data using econometric models will continue in the future unless these models are specified using an appropriate theory.

To make these points more concrete, consider the conceptual underpinnings of the debt-service ratio, a widely used indicator of the

safety of loans to LDC's. Other things equal it seems reasonable that a country has more to gain from default if the ratio of its debt service to its exports is high. Yet countries with the highest ratios may instead be the best risks. A high ratio may merely reflect other factors perceived by lenders as lowering risk and justifying high debt service. We cannot make a meaningful judgment without both a model of borrower characteristics enhancing the probability of default given a particular debt structure and a model of lender behavior. Later in the paper we provide a more detailed criticism of indicators of expropriation risk.

The purpose of this paper is therefore to present a microeconomic framework for analyzing equilibrium in international capital markets when the riskiness of foreign investment derives from the maximizing behavior of borrowers and lenders. Without attempting to specify a complete model of these markets we present some important considerations that we believe have been neglected in the literature on country risk. We hope that our discussion will stimulate a more rigorous and analytic approach to this area of study.

In principle every conceivable investment (both real and financial) is unique in terms of characteristics such as expected profitability, safety and liquidity. Whenever an investor can invest in more than one country, however, the issue of country risk arises. The choice of an investment in one country rather than another affects the prospects for the investment in many ways. Thus, for analytic purposes, it makes sense

to group investments by the country in which they are made. Imperfect knowledge of a country's characteristics that may affect investment outcomes is a major component of country risk. This uncertainty can usually be reduced somewhat by research, which explains the resources allocated to country risk analysis by private banks, multinational corporations and international organizations such as the IMF. Nevertheless even if an investor could gather and assimilate every datum relevant to an investment much of the uncertainty associated with the nation in which an investment is made would remain.

These are at least two broad reasons why the country in which an investment is made may be of interest to an investor. First, classifying investments by country is useful in identifying a group of investments that are likely to have similar characteristics because the investments are subject to common sources of uncertainty. For instance, a country's climatic conditions may affect the productivity of a large number of agricultural investments. Or, different rates of population growth may alter labor market conditions. Learning about the country then reduces the investor's subjective uncertainty about a large number of investments. This first form of country risk analysis provides information on risks which are perceived as exogenous to the investor's behavior.[1]

A second reason for classifying investments by the receipient country derives from the existence of nation states. All investments within a single country share the characteristic of falling within the

same government's jurisdiction. The government's policies can be decisive in determining the return on these investments. Country risk associated with government policies and political events such as war and revolution is called sovereign risk. Much country risk analysis thus involves forecasting policies and political developments. To some extent the policies of foreign governments and political changes abroad constitute additional forms of exogenous risk in that they are affected by factors beyond the investor's control. A major component of sovereign risk, however, is endogenous in that it derives from the strategic behavior of the recipient country's government toward investors. We view a government contemplating hostile acts against a foreign investor as evaluating the economic costs and benefits of its actions.[2] The behavior of investors will affect these costs and benefits, and the strategies that are optimal for the government to pursue, thus indirectly affecting the return on investments. Our analysis in this paper focuses primarily on this second endogenous form of country risk.

In focusing on the economic aspects of country risk we treat political and cultural factors as given. In particular, we assume that recipient countries have governments that pursue a consistent set of objectives and that the populace of these countries has an observable and stable attitude toward foreigners, private property and contracts.[3] In reality these factors are hard for an investor to evaluate and are

subject to unpredictable changes. They thus represent important components of country risk. To some extent we believe that the economic factors we discuss help explain changes in government and social attitudes that have consequences for foreign investments, but we will not argue a position of economic determinism. Instead, we restrict ourselves to a consideration of the economic costs and benefits associated with hostile acts because this is a natural boundary for a single inquiry.

One important distinction among investments is between direct investment implying controlling ownership of a physical investment or business abroad and indirect or portfolio investment usually taking the form of a loan to an agent in the country, perhaps to the government itself. In the case of direct foreign investment the investor faces the possibility that the tax system or other aspects of the legal environment will change. He may, for instance, find that the host country government requires the transfer of equity to its own nationals without full compensation (indigenization programs). In the extreme, the investor may lose all control of the investment, suffering uncompensated expropriation. Indirect investments can be threatened by rescheduling, default or outright repudiation. In the cases of direct investments or a loan denominated in the currency of the debtor, the investor also faces the risk that exchange controls imposed by the host country may prevent the conversion of foreign assets into the investor's own (or indeed a third) currency.[4]

We believe that country risk, as it applies to direct and indirect investments, involves some rather separate considerations. Nevertheless, both forms of investment can be analyzed within the same general framework. In the next section, we present a general methodology applicable

to both types of investment. Part 3 discusses issues that are relevant to portfolio investment while Part 4 treats direct investment. The last section draws implications from our analysis for the design of public policy.

2. A Framework for Analyzing Government Policies Toward Foreign Investment

A crucial aspect of country risk is that a country's government is a sovereign actor. Within its own territory a government, especially if it is relatively unconstrained by constitutional safeguards, has great latitude in determining the legal structure surrounding economic agreements. Governments are much more able to break contracts than are individuals operating within a given legal system. Even outside their own territories governments may have various sorts of immunity in the courts of other countries (Lillich 1965, Delupis, 1973 and Levine, 1977). Finally, even if a favorable judgment is secured by investors, there may be little that can be obtained from one country in the jurisdiction of another, although exceptions exist.[5]

Contrast this situation to the position of a private agent experiencing bankruptcy within a domestic legal context. Legal proceedings typically strip the agent of some or all of his assets if he does not meet the obligations imposed by his liabilities. In international investment, the legal penalties incumbent on an agent failing to fulfill his contracted obligations are relatively poorly defined, and the ones that do exist are much more difficult to enforce.

Without a legal system to enforce contracts, investors must find other mechanisms to ensure that the profitability of their investments is not infringed by hostile governments of the recipient countries. Without any such mechanism the government would always want to assume

ownership of all foreign assets. Rational foreign investors, foreseeing the absence of an adequate mechanism for repayment, will avoid the investment. Only by convincing potential investors that it will have a motive to honor contractual obligations after their assets are in place can a country attract investment.

From the perspective of a period before an investment has been made, a country is likely to prefer a situation where the investment is made and contracts are respected to a situation of no investment. The problem is that the country may most prefer a third situation: the foreign investment takes place but the country, rather than the investor, receives its proceeds. Since the recipient's decision to honor contractual obligations is subsequent to the investment decision, a situation of perfect capital mobility, in which the real return on capital is equal in all countries and in which investment contracts are honored, could be time inconsistent (Kydland and Prescott, 1977): it will seem optimal to the country before the investment is made (given the need to attract investors) but not after. Rational investors perceiving this problem will not invest and the country is left in the situation it least prefers - no foreign investment at all.

Occasionally, investors may invest knowing that time consistent behavior on the part of the recipient will lead to a loss of control over the asset. This situation can be explained by appealing to the concept of an obsolescing bargain[6]: both parties enter into an agreement anticipating that a shift in their relative strengths will lead to a subsequent renegotiation. Such situations often arise and do not imply irrational behavior. For instance, an investor building a factory abroad may realize that the only protection against expropriation is his monopoly over special knowledge. It may be that as time passes this knowledge becomes available to the country, making expropriation the

time consistent strategy of the host country (i.e.,the optimal strategy from that period's perspective). The investor may therefore construct a smaller plant, employing a more labor-intensive technology than otherwise to recoup costs more quickly. This behavior occurs in anticipation of the takeover and ensures that the investment is still worthwhile to the investor. Any renegotiations (in this case leading to expropriation) are fully anticipated by both sides and any rhetoric merely veils this fact. We will use the term obsolescing bargain to denote a change over time in the shares of the country and the investor in the proceeds of an investment. We assume that both sides act from the outset with full knowledge of this characteristic of the investment and that all behavior is time consistent.

A country can attract foreign investment only to the extent that it can convince potential investors that it will have an incentive to allow them to extract from the country a return that is competitive with what can be earned elsewhere. Unless investors are convinced that these incentives will be strong enough to allow a transfer of capital that equates rates of return across borders, the strength of the recipient's incentives to repay will constrain the movement of capital. The weakness of a country's incentive to abstain from hostile acts against foreign investments is a distortion in the world economy in that it creates a deviation from a situation of perfect capital mobility.

Establishing mechanisms to ensure that investments are unharmed may yield further deviations from a world in which all contracts could be enforced costlessly. The recipient country has an incentive to take visible actions that would reduce its welfare should it fail to abide by contracts. (In Schelling's (1959) terminology the country may wish to provide foreign investors with a "hostage".) These actions may be

costly in themselves. At the same time investors have an incentive to modify the form of their investment to make any assets they place in the foreign country less profitable to other owners. The opportunity to modify investments is greatest in the case of direct investments, but modifications also impose costs. We provide some examples below.

Within this extralegal context of international investment there are therefore incentives for a recipient country to avoid hostile acts. Otherwise no international investments would take place. Different types of investments are defended in different ways. Thus country risk cannot be strictly defined except with regard to a particular investment. Nevertheless, broad classes of investments naturally share common attributes that allow them to be analyzed as a group. One important partition of investments is between financial and physical investments threatened at the extreme by acts of repudiation and expropriation respectively. While there are similarities in the situations of these two types of investments, sufficient differences exist to justify separate treatments of each.

One particularly important factor protecting both types of investments is the recipient's incentive to maintain a reputation as a good place for future investments. This incentive may seem weak or nebulous compared to the threat of bankruptcy proceedings. As Arrow (1975) has argued, however, the desire to maintain a reputation provides the basis of much economic behavior outside the sphere we consider here. Our previous work suggests that such an incentive may allow some capital transfer but not necessarily enough to equate the marginal productivity of capital among countries.

3. Country Risk: Default and Repudiation[7]

By far the most important recent trend in private investing abroad is the rapid growth in financial lending, much of it associated with the activities of banking syndicates. Long-term debt to private creditors owed by the governments of 98 LDC's, or with repayment guaranteed by them, rose from 36 billion dollars in 1971 to 269 billion in 1979.[8] Two other categories of loans, the short-term debt owed by governments or guaranteed by them and all maturities of unguaranteed debt owed by private borrowers in LDC's have also grown rapidly. Data on these amounts are less easily available, however (BIS, 1979).

It is because very little of this debt consists of publicly issued bonds that information on these quantities is difficult to obtain.[9] This problem becomes more serious with regard to the terms of the loan. Even when information is available on the rate of interest, various commissions and charges are concealed (Wellons, 1977).

The most difficult informational problem arises for an outside observer in ascertaining if the borrower is complying with the loan contract. Here again the fact that lending is in forms other than publicly issued bonds is crucial. Thus for the 1930's when widespread defaults on bonds occured considerable information exists (Eaton and Gersovitz, 1981b). In the 1970's, however, one must rely on press reports and vague rumors. Banks may roll-over loans to avoid public admission of a default. Except perhaps for North Korea, however, nothing like an outright repudiation has occured in the 1970's. Costa Rica, Gabon, Jamaica, Indonesia, Iran, Nicaragua, Peru, Poland, Romania, Sudan, Togo, Turkey and Zaire and others have all posed problems of varying seriousness.[10]

3.1 Credit Constraints and Potential Default: A Conceptual Framework

An understanding of what prevents defaults and repudiations and how these deterrents break down is the central goal of risk analysis applied to financial lending. Without coercion or legal sanctions available

to them, private lenders might find governments eager to borrow so long as net flows are positive, but if net repayments are required governments will repudiate their debts. The only retaliation open to lenders is to refuse future loans to repudiating borrowers and, in the case of banks, to refuse to process their trade related transactions.

On first consideration, a refusal to lend in the future is a rather weak penalty for a lender trying to realize a non-negative present value from a loan. The country already has possession of a certain amount of funds, and can be assured of a gain if it refuses repayment. How can the lender both offer the borrower an even larger gain and still ensure that its activities are profitable to itself? A promise of a larger future loan in return for present repayment, if kept, would seem only to push the problem out further in time (Hellwig, 1977)

In fact, the inability to borrow in the future is likely to impose hardship on a potential defaulter for a number of reasons that we discuss below. The costs of default will vary, of course, across countries while the benefit is the ability to absorb as domestic consumption or investment what otherwise would be transferred to foreigners as debt service payments. The lenders must ascertain the level of debt service obligations at which the benefits of non-payment are likely to exceed the costs of future exclusion from credit markets. Lenders will not lend to the point where debt-service obligations reach this level, at least with high probability. This debt ceiling (or "country limit") provides a formal definition of the "capacity" of international capital markets to finance a country's current account deficit, a notion frequently arising in discussions of the recycling of OPEC surpluses.

Elsewhere (Eaton and Gersovitz, 1981b) we identify four reasons why a country may want to borrow in financial markets on a repeated basis; each points to a cost to defaulting. First of all, borrowing allows a

country to divorce its level of consumption from its level of income at any moment, given its level of savings. A country whose income level varies widely is most likely to borrow for this purpose. We identify it as the consumption motive. By defaulting and thereby losing access to future opportunities to borrow a country increases the variability in its consumption, which is costly as long as the marginal utility of income is decreasing.

The following example, based on Eaton and Gersovitz (1981a), illustrates how the consumption motive for borrowing can sustain an equilibrium in which there is international lending with repayment. Consider a country with an income that alternates between a low and a high value indefinitely. This type of country will want to borrow in poor years. It may then be willing to repay in good years to keep open the option of borrowing yet again in future poor years when additional resources are especially valuable to it.

If the borrower's income varies in a regular and perfectly predictable way rational and fully informed lenders will always set the credit ceiling so that it is never to a debtor's advantage to default. Although defaults will never be observed under these assumed circumstances, the threat of default will limit the amount that any country can be lent. If the amount a country wishes to borrow, even if it has to repay, exceeds this ceiling, the country will be credit constrained. In this case, its inability to guarantee repayment (because to repay would be time inconsistent) reduces its welfare. An increase in the variability of the country's income will increase its credit ceiling and, if it is constrained, its welfare.

If more is lent than the credit ceiling, it will always be in the country's interest to refuse repayment. Only if lenders misperceive a borrower's characteristics, for instance the amount it has borrowed or the future path of its income, will default occur. This points to an important role for the country risk analyst - understanding the resource base of a country, the sources of fluctuation in output (e.g. weather), the future productivity

of public sector investments such as irrigation dams, and the sources of fluctuation in international prices for the country's output.

In actuality since a country's income varies in an uncertain fashion, the possibility of default must be considered. Under conditions of uncertainty, a country may experience sequences of poor income performance. Debt contracted at the beginning of the sequence may then come due while low incomes persist. Other things equal, a country will be most tempted to default when income is low and the marginal utility of income is high.

If a country experiences a series of low incomes, lenders can adopt one of several responses. They can set the credit ceiling so low that the country will always choose to repay regardless of its income performance in the years when net repayment is due. In this case, it is possible that very little can be lent.

Alternatively, creditors can demand repayment after a certain number of periods, regardless of income performance and with the knowledge that a default will occur if income happens to be low on the due date. In this case, a risk premium will be charged so that the lender is indifferent between a loan to a country that may refuse repayment and a safe domestic loan. This type of arrangement characterizes the contract embodied in a publicly issued bond, where no provision is made for postponing the service of the debt if the debtor experiences a low income.

A third option for lenders is to refinance the debt if the country experiences low income, without future exclusion from borrowing. Rescheduling postpones repayment to periods when income has returned to normal levels. This policy requires that lenders have enough information to distinguish between the occurrence of low and high incomes, and between exogenous shortfalls in income and chronic economic mismanagement or other factors within the country's control that impair long-run performance. In the latter case, lenders will want to threaten an end to refinancing (roll-over) of the debt

and permanent exclusion from credit markets in order to force the government to change its policies and to repay its debt. This situation suggests a role for the IMF as an architect of the policy reorganization or "stabilization plan" (Srodes, 1977). If lenders are unable to threaten any sanctions, the situation effectively becomes one where the country refuses to pay but is not penalized. In this case, lending becomes impossible. Thus there is a cost to making loans in these markets associated with monitoring economic conditions in borrowing countries and the economic performance of their governments. Economies of scale in developing this type of expertise provide one justification for an IMF role.

A second reason for borrowing arises when there is a large differential between the domestic marginal product of capital and the world cost of capital. Borrowing to increase the capital stock will thus raise income above the level of debt service obligations imposed by the debt. We call this the productive or investment motive to borrow. Countries that anticipate lucrative investment opportunities into the indefinite future, especially ones that will require increasing levels of investment, will find it desirable to retain access to international financial markets.

In the appendix to this paper we develop a model to illustrate how the production motive for borrowing provides a mechanism to enforce repayment and establishes a debt ceiling. Many of the considerations that apply to the consumption motive are relevant here as well. Furthermore, this analysis suggests that countries with good investment opportunities and meager sources of domestic savings are likely to sustain greater levels of indebtedness. This result points to a role for the country risk analyst in evaluating the future productivity of potential capital investment projects.

We identify a third motive for borrowing as the adjustment motive. A country may experience sudden, unanticipated reductions in output supply. While these may require changes in the permanent level of absorption,

adjustment is likely to be less painful when it can be made slowly. Borrowing permits a smoother transition. An example of a cost imposed by a sudden adjustment of absorption is the need to abondon a project in progress. Through borrowing, a country may complete these projects even though income may have fallen drastically.

Finally, borrowing can provide liquidity to facilitate international transactions. Recent growth in the use of credit cards by individuals illustrates how a medium of exchange can take the form of a liability rather than an asset of the buyer. An individual may find it more convenient to borrow rather than to run down cash reserves even if he has no desire to increase current consumption at the cost of future consumption. In a very similar way suppliers' credits serve as a medium of exchange in international markets. This reason for borrowing we call the transactions motive.

Countries that are excluded from international financial markets have difficulty effecting international transactions. If banks and other creditors refuse to process transfers of funds or extend credit for the imports or exports of a defaulter, the debtor may be reduced to combersome transaction methods and, in the extreme, to the inefficiencies of international barter. Iran in the autumn of 1979 was reported to be having this type of difficulty after banks declared its revolutionary government in default. Other factors the same, therefore, a borrower that benefits greatly from trade and that would suffer a corresponding loss from trade disruption will be allowed a high credit ceiling. This type of country is likely to have a high ratio of imports to income.[11]

As a final point we emphasize that punishing a defaulter by allowing it to borrow only at a higher interest rate afterwards cannot be an adequate deterrent to default and may simply invite the country to obtain

additional principal on which to default again. The higher interest, not being paid, is irrelevant. A higher interest rate on the initial loan can, however, play a role when penalties ensure that repayment will occur in at least some situations. In this case, risk-neutral lenders will set the interest rate so that the probability of repayment times the amount to be repaid just equals the gross return that can be made on a safe loan. If lenders are risk-averse, of course, the interest rate will be set at a higher rate.[12]

3.2 The Effectiveness of Incentives to Repay: The Case of Peru

While space prohibits an analysis of the recent history of all problem borrowers, much can be learnt from one case, that of Peru. This country has figured prominently during the last fifteen or so years in both disputes over expropriation and fears of default. We begin by considering Peru's more recent borrowing experience and turn in the next section to aspects of the earlier expropriation story. Both episodes illustrate the interplay between economic and political/legal aspects of country risk.[13]

Peru's long-term government guaranteed debt to private lenders increased slowly from about 675 million dollars in 1967 to about 725 million dollars in 1971. In the next four years this debt more than tripled to roughly 2.3 billion by end 1975 (World Bank, vol. 2, 1976, p. 121 and vol. 1, 1979 p. 47). These changes occured under a radical reformist military government in power from 1968. By 1976 Peru was in an economic crisis leading to the first of several negotiations on rescheduling.

A major cause of this situation was a series of negative shocks to Peru's trade position: fish meal output dropped because the anchovies disappeared, widely held expectations of oil discoveries were disappointed, leaving Peru dependent on imports just as prices rose steeply and the price of Peru's copper exports dropped. Cline (1981, p. 304) estimates that these shocks accounted for 37 percent of the average current account deficit during 1974-77. Imports of military equipment, a clearly political factor, accounted for an additional ten percent of the deficit.

Several large projects proved poor investments. An 800 million dollar pipeline was a bad choice since oil reserves were lower than expected. A one billion dollar irrigation project was judged ill-conceived by the World Bank and as subsequently unsuccessful by several observers, yet private bank loans were used to finance it.

The resultant economic crisis caused a new, more moderate military government to seek additional loans which the banks agreed to only after negotiating the promise of policy changes. Cline (1981, p. 306) concludes: "for reasons of data availability, technical capacity and political sensitivity, it proved impossible for the banks to enforce their lending conditions, and adverse publicity for the intervention (plus its ineffectiveness) caused the leading bankers involved to resolve that they would not become entangled in the future but would rely on the IMF as the monitoring authority." Beginning in early 1977 a series of negotiations with the IMF led to a policy package implemented in mid-1978. The next year or so saw: the application of this package, a drastic fall in real incomes, political strife, and the reversal of several of the negative trade shocks. By late 1979 the government could think about prepaying some of the rescheduled debt

and banks were again making medium term loans.

Some of the important lessons from this experience are:

(1) Economic shocks and poorly chosen projects were important in precipitating the crisis.

(2) Even a relatively radical regime under considerable economic stress had no desire to repudiate its debts. Indeed, it was ultimately willing to adopt an economic program proposed by outsiders rather than to forego the opportunity for an orderly rescheduling.

(3) Repayment was renegotiated between the Peruvian government and its creditors as a group, who acted more or less in concert.

(4) The IMF has an advantage over the private banks in negotiating a change in economic policy.

We offer no judgment on which economic consequences followed from the particular provisions of the plan nor whether it was appropriately designed, issues of some controversy.

4. Country Risk: Expropriation[14]

The UN (1978, p. 277) estimates the stock of foreign direct investment in the LDC's at 33 billion dollars in 1967 and 71 billion in 1975. Although this stock has been growing much less rapidly than the stock of debt, it still represents a very significant quantity of resources. Further, it is this type of investment rather than financial lending that is accompanied by a transfer of technology, so that it represents a contribution to host-country resources beyond an increase in real capital.

In contrast to the recent experience with private debt, direct foreign investments have been subject to hostile actions by the governments of most countries. For a large sample of LDC's, Williams (1975, p. 265) estimates that about twenty percent of the value of foreign investments carried into or made during 1956-72 was expropriated without compensation in this period. Some countries (Algeria, Bangladesh, Burma, Chile, Cuba, Egypt, Iraq and Syria) expropriated all or nearly all foreign investments paying almost no compensation. Cuba is a striking example, expropriating 1.25 billion dollars in assets and paying 50 million in compensation. As of 1972 it had no foreign investments at all. This case is clearly one where political factors were uppermost; small changes in the economic costs and benefits of these actions could hardly have made any difference at all. A contrasting case is that of Peru, where a radical military government took power from a civilian government precisely because the civilians were judged too lenient in their position on the expropriation of an American company. Even under the new government, however, there was no policy of wholesale expropriation. The Peruvian case provides many examples where differences in the positions of individual companies led to very different fates for their investments.

4.1 Expropriation: Some Conceptual Issues

Physical investments provide more opportunities than financial investments to alter the cost benefit calculation of hostile governments. Perhaps as a result the prospects for an embargo of direct investments following expropriation are less. If their particular investment is very different from those that have been confiscated, potential investors may feel that the past record of a country is not relevant to their own situation. This observation is more likely to be true when expropriations have been selective rather than across-the-board. In this case, a vulnerable investor has little hope that his own fate will alter the host's reputation and cause the host to demur. Certainly the acrimonious expropriations undertaken by Peru did not lead private banks to withhold large loans in the early 1970's. Whatever the ability of banks to act as a cohesive group in responding to threatened defaults, they show little inclination to respond to selective expropriations. Finally, direct investment is ill-suited in comparison to loans as a method of smoothing short-run variations in income or to facilitate transactions. As a consequence, investors in physical assets cannot offer a country these benefits in exchange for continued access to an investment's income.

A broad class of defenses available to the direct investor involve a cut-off of managerial expertise and skills. For instance, production may be conceived as using inputs of unskilled labor, managerially and technically-skilled labor, and capital. The host may lack skilled labor and capital relative to the rest of the world. Skilled labor can be withdrawn in the event of an investment dispute; fixed capital cannot be. If the skilled labor cannot be replaced by the country its income from the investment earned, say, by unskilled labor or collected in taxes when the

investment is operated by the investor may exceed the income from seizing the plant and running it without enough skilled labor. Only as much capital as can be protected in this way will be invested if this is the sole defense. In this case the amount of foreign capital can be less than what the country would want even if it had to foreswear expropriation in a binding way.

In this situation, an increase in the skill of the country's citizens makes the threat of a withdrawal of skilled labor by foreign investors less meaningful. Less foreign investment will be undertaken by investors who protect themselves with this threat. Indeed, this effect can be so strong that the contribution to the host's income of an increase in its citizens' skills could be negative. In any case the social return is almost certain to be below what is indicated by the wage differential obtained by a skilled worker. India is a country that may be an example of this phenomenon. With little capital but a large number of skilled workers, India has a great need for foreign investment but poses a particular danger to investors relying on a withdrawal of skilled labor as a defense against expropriation. These considerations also make clear that the threat of expropriation will cause foreign firms to avoid skill transfer to local nationals.

So far we have identified a defense of foreign investment as a threat to reduce factor supplies after expropriation. This is analogous to the allocative inefficiency discussed in the production efficiency literature (Forsund et al, 1980). Another type of defense could involve the choice of a technically inefficient method of production, one which would never be efficient at <u>any</u> set of factor prices except for its use as a defense against expropriation.

To be useful as a defense, this type of distortion would have to be more damaging to a potential expropriator than to the investor. An example from a similar problem, that of firms trying to protect the products of their research and development, has been mentioned to us by Professor Stephen Magee. Firms consciously design redundant circuits into micro-electronic components. The purpose is to confuse competitors trying to steal the firm's innovations, but it is not a costless strategy to implement and therefore is not socially optimal. Similar options are open to foreign investors trying to ensure that an expropriating host will obtain as little as possible from possession of the investment.

There is little evidence on the exact importance of these defenses. Bradley (1977, p. 81) observes that "Third World countries are notoriously adept at locating mercenary technicians to manage expropriated properties". He concludes on the basis of a large sample of expropriations that "the company's technology must be advanced and proprietary before it can be considered a significant deterrent."But characterizing a company's technology empirically is notoriously difficult. Micallef (1981, p. 127) discusses one example of an oil company that pursued a strategy of continuously upgrading its plant even before the return on the investment justified it. By doing so the firm stayed ahead of the expertise of local engineers,however, at some cost to itself. Examination of foreign investments using the techniques discussed by Forsund et al. may be useful in providing evidence on the existence of various types of technological distortions. The incidence of these distortions could then be related to the expropriation environment.

Another important defensive strategy is to locate different aspects of the production process in different countries. In the case of manufacturing investments, one option is to produce different components in different locations. This strategy will be particularly effective when the output of the industry exhibits considerable product differentiation so that components cannot easily be interchanged. Bradley (1977, p. 81) attributes the survival of Chyrsler's Peruvian subsidiary to the fact that only fifty percent of the parts used in its plants were manufactured domestically, making it of little value if expropriated.

A similar but much weaker strategy involves undertaking different stages of a production process in different countries. For instance, sugar cane may be grown in one country but refined elsewhere. This strategy presupposes that there is no easily available market for the output of the early stages. The investor is in the strongest position when he is a monopsonist in the next stage of production and can locate the production facilities for this stage abroad. However, this situation is rare and it will probably be possible for an expropriating host to find a market for most raw materials even if only after some initial difficulties.

Finally we wish to emphasize that many of these distortions cannot be overcome by a management contract. This type of contract, in its purest form, is an arrangement whereby managerially or technically skilled labor is hired from abroad. It avoids the threat of expropriation by the simple solution of only providing inputs that can be withdrawn easily in the event of a dispute. This type of arrangement may overcome certain bottlenecks associated with skill shortages. It cannot, however, mitigate what we believe to be the main distinction between rich and poor countries - a large difference in the amount of physical capital per worker.

4.2 Expropriation: The Case of Extractive Industries[15]

Investment in extractive industries may be especially vulnerable to expropriation because it requires much expenditure in prospecting before any output takes place. Information about the findings of this activity is difficult to keep secret, especially after production is started. At this point there is very little an investor can do to prevent a host with the technical capability from taking over the find. As a consequence, companies whose technical advantage lies at the discovery stage may be reluctant to prospect widely, preferring to produce less and to protect current operations by threatening to embargo future exploration.

These difficulties in defending investments in the extractive industries suggest that an increase in the potential for expropriation can reduce the rate of extraction. This conclusion conflicts with that of Long (1975) who assumes that the probability of expropriation is exogenous. His model, however, does not incorporate the exploration process, since the investor starts with a fixed stock of the resource that is available to him to use as he pleases until expropriation occurs. Furthermore, the cost of extraction in any period is determined only by the absolute amount extracted in that period. In this context an investor has an incentive to get as much out of the ground as fast as possible. The longer he waits, the greater the chance that he will lose control of the resource. If, however, the threat of expropriation lowers investment in exploration or capital used in extraction the rate of extraction may fall. Furthermore, the rate of expropriation may rise if more is invested in these two activities. Long's results depend partially upon his assumption that country behavior is exogenous. Clearly, additional theoretical research is needed to incorporate the other effects we have mentioned in a dynamic model of the type developed by Long.

These arguments suggest that the threat of expropriation may be more acute in the extractive industries than in manufacturing. If investors are rational, however, any increased vulnerability will be manifested in decreased investment and the adoption of more costly defenses. These effects are, however, very difficult to measure since one must infer the situation that would exist if expropriation could not occur. Without the ability to perform this experiment, very little can be said about the sectoral incidence of the distortions caused by a host's having the option of expropriation. The actual incidence of acts of expropriation cannot be a substitute for this type of calculation. For instance, the potential for expropriation may be so great that no investments are made. Everyone would agree that resource allocation is greatly affected yet no acts of expropriation would be observed.

Only if some event occurs which was judged unlikely at the time investments were made can the actual incidence of expropriations be an appropriate index of the inherent vulnerability of different sectors. Perhaps decolonization and the general post-War weakening of the OECD members as political and military actors is an experiment where expropriation is first viewed as impossible and then becomes possible. This type of conjecture is, however, unlikely to ever be susceptible of meaningful testing.

Frequent expropriations are likely to occur in industries that are either subject to randomness in the factors influencing the host's decision or are characterized by the obsolescing bargain. Both cases can be illustrated using the example of a three-input production process. With regard to uncertainty, it may be unclear whether the host can acquire the specialized knowledge to run the investment. A risk-neutral investor will assess the relevant probabilities and only invest if the expected value of its profits is non-negative. If it turns out that knowledge acquisition is easy for the host then it chooses expropriation and the investor loses; otherwise the investor earns profits above the risk-free rate.

For the case of the obsolescing bargain, however, the investor knows that the requisite expertise will be acquired by the host but that it will take time to do so. The investment is undertaken only if profits during the period of investor control provide the normal rate of return and repay capital costs. In both situations, therefore, the option of expropriation causes the high rate of return. If expropriation were impossible and the investor's industry competitive, further investments would drive down the rate of profit. Thus high rates of return should not be interpreted as monopolistic exploitation justifying expropriation.

We do not see any particular characteristic of extractive industries leading to an expectation of frequent expropriations based either on considerations of uncertainty or the obsolescing bargain. In any case, there does not seem to be any very strong evidence for an assertion that investors in the extractive industries have suffered most from hostile acts. The imperfect evidence that exists is subject to easy misinterpretation and more documentation is clearly necessary. Using data presented by Williams (1975, Table VI) we calculate that mining and smelting and oil production and refining, taken together, had a ratio of nationalized assets from 1956-72 to all assets in 1967 of .26. All sectors other than these two had an even higher ratio of .32, while manufacturing had a lower ratio of .17. The same calculation using uncompensated nationalized assets in the numerator yield even more striking results of .11, .22 and .13 respectively. This second ratio is the more appropriate index of expropriation damage and it clearly contradicts the usual assertion that extractive investments have been the most vulnerable. Especially noteworthy are the differences in the sectoral ratios of compensation paid to assets seized implicit in these ratios.

These findings must be qualified in a number of ways. First, there are difficulties involved in calculating the true value to an investor of

the amount lost. There may be systematic biases across sectors in the way asset values are determined. Second, only 1967 rather than 1972 asset stock figures are available. Finally, it may be that the period since 1972 has witnessed a reversal of these findings although Kobrin's opinion (1980, fn.36) implies that they would actually be strengthened.

Despite these difficulties in using Williams' data, other studies present even more serious problems. Bradley (1977) who shows a very high relative incidence of expropriation in the extractive industries uses the percent of U.S. companies in the sector subjected to hostile acts as his index. The primary shortcoming of this measure is its failure to allow for intersectoral differences in compensation. As remarked above, Williams' data show that these differences can be very important. Further, there is the possibility that expropriated investments are of a different average size than those that are untouched and that the average size of investments differs by sector. Both these problems are inherent in an act measure rather than an assets measure of the incidence of hostile behavior by hosts.

Other problems arise with the index used by Jodice (1980, p. 182). Jodice uses the share of a sector in all acts of expropriation divided by its share in total foreign direct investment as his "vulnerability coefficient". Kobrin (1980, pp. 76-77) makes reference to this same concept. The major objection to this index can be illustrated by considering an industry with one very large investment abroad. If this investment is seized, the industry's coefficient will have a very low numerator and a high denominator yielding a low value of the coefficient. This situation is, however, hardly one of low vulnerability.

5. Public Policy and Country Risk[16]

The system we have described is characterized by an absence of enforceable contracts, by threats and by defensive actions all resulting in impediments to capital mobility. Unable to forswear repudiation and expropriation, capital-importing countries receive less private capital than otherwise. The presumption is that capital is cheap in the rest of the world relative to its productivity in these countries. Further the LDC's can absorb very large quantities of foreign capital relative to what they now use without appreciably affecting the stock of capital in the rest of the world or raising its cost. If this view is correct, it follows that it is the capital-importing countries and not the capital owners who lose most by the current situation. In this regard we are in disagreement with such authors as Hirschman (1969) who believes that foreign investment stifles domestic capabilities and that divestment is desirable.

One exception to our general conclusion involves situations of monopoly. If a host confronts a monopolistic investor, the option of expropriation helps strengthen the host's position. In extreme cases,it is only through threatening expropriation that the host can get anything at all from a foreign investor. A similar situation would occur with respect to repudiation if one viewed foreign lenders as effectively cartelized.

A second area of exception occurs in certain narrowly defined industries where LDC's may be important exporters. In this case, the lack of capital may limit the supply of output available to the developed countries, significantly raising prices. Indeed, these price increases may offset the decreased sales sufficiently that these LDC producers are better off. The inability of each LDC to forswear expropriation substitutes for a cartel which the LDC's may find difficult to organize.

While exceptions may exist to the position that the capital importers bear the brunt of the present system, we believe that this view serves as the best overall conclusion on the incidence issue. It thus follows that public policies that discourage repudiations and expropriations, and encourage foreign investments, primarily benefit the LDC's. Most public policies in this area can be classified under information provision, retaliation or insurance.

5.1 Information Provision

Because the cost of providing information is independent of the number of individuals using it, information should be provided freely. Such a rule presupposes that the cost of generating information should be publicly borne. In the international context, the natural organizations to provide information are the international institutions: the BIS, IMF, World Bank and the UN.

There are two broad types of information that are required. First is information on the dependent variables of our discussion (amount of debt and foreign direct investment, their characteristics and the incidence of expropriations, repudiations, defaults and other hostile acts). The information on the financial side is extensive but could be improved (BIS, 1979). It is, however, far in advance of the available information on foreign direct investments. No international organization concerns itself in a comprehensive way with this subject, which represents a pressing priority. [For a survey of some data sources in this area see Kobrin, (1980, Appendix 2)].

The second category of information concerns the independent variables of the system - country characteristics relevant to decisions on financial and physical investments. Basic data on the situations of individual countries are disseminated by the international organizations although more work on making this information consistent across time and countries would be useful to both the country analyst and academic researcher. The World Bank

performs a very valuable service by publishing many country studies. An important deficiency is in knowledge about the IMF's stabilization programs which are largely kept secret. Reasons for some confidentiality are clear given the sensitivity of these negotiations but additional openess should be possible.

5.2 Retaliation

Legislation in the U.S. penalizes countries taking hostile actions against American companies in several ways: prohibitions of bilateral foreign aid, exclusion from the generalized system of trade preferences, and opposition by U.S. representatives to multilateral aid.

The existence of penalties activated automatically by hostile acts can play a valuable role in stabilizing international investment. If capital importers know that retaliation will occur and if the penalties are sufficiently severe, hostile acts can be deterred. In this situation investors may be better off, since they have an opportunity to invest not otherwise available. Capital importers may also be better off, since they can obtain capital that investors would not otherwise be willing to provide. In effect, the potential penalty serves as a form of collateral for an LDC that it cannot otherwise give. It may well be that the larger the penalty, the better off is the capital importer.

On the other hand, there may be situations in which the capital importer's expected welfare at the time of the loan deteriorates with higher penalties. For instance, the country may be required to repay regardless of future economic conditions, which it can neither control nor foresee. In this case the option of default will have an insurance aspect, providing as it does an opportunity to lessen obligations under very bad circumstances. An increase in the penalty, therefore, may lower the country's welfare even though its credit ceiling is raised, because the probability of a large penalty curtails this insurance aspect of lending. We believe that this

situation is likely to be the exception.

Penalties in this system are only as important as the resolve of the governments of rich countries to invoke them. If the welfare of both capital-importers and investors actually can be improved by the existence of penalties, it is crucial that both groups perceive investor-country governments as committed to retaliation. Decision makers must realize that the failure to impose penalties may jeopardize the development prospects of poorer countries by discouraging private investment. Most analysts believe that the threat of a cutoff of foreign aid, for instance, has been generally ineffective (Kuhn, 1977, Lipson, 1976 and Olson, 1975). It seems that this penalty has not been consistently applied and in any case requires that aid to the particular country be large. If this threat were viable, however, it suggests a multiplier role for aid since it can facilitate private capital flows.

One possibility is to let individual LDCs agree in advance to the imposition of penalties in the event of hostile acts. In this way, they can legitimize such a mechanism and at the same time reveal the penalty level they think best for their own welfare. The Overseas Private Investment Corporation, which is discussed below, embodies the spirit of this suggestion by requiring that host governments agree to conditions for resolving disputes if they wish to be eligible for insured investments.

The international institutions can also play a role by organizing embargoes and enforcing cohesion among private investors as well as by using their political influence with the governments of investors. The IMF, for instance, has been a prominent actor in several reschedulings of bank loans.

5.3 Insurance

The Overseas Private Investment Corporation (OPIC) provides insurance to eligible private investors against various hostile acts (see Lipson, 1978).

The insurance is limited to a maximum of 75 percent of the investment. The Export-Import Bank provides similar coverage to American exporters of tangible goods. This insurance extends to cover financial obligations for which exports constitute security.

One difficulty with insurance schemes of this type is that the capital importer has discretion over the hostile acts. This problem of moral hazard undermines the usefulness of these institutions, encouraging hostile acts without discouraging private investment. Private investors may be less determined to embargo loans to defaulting governments or to defend themselves by other actions. Proposals to make the IMF an international lender of last resort also suffer from these same problems. These drawbacks are not as severe if the insurance is confined to unexpected and uncontrollable events such as war, revolution, or insurrection, and -- more difficult to classify -- natural or international events leading to poor economic performance.

The fact that OPIC offers protection only up to 75 percent of an investment provides some brake on any tendency of private investors to neglect the possibility of hostile acts. And there are administrative and transactions costs involved in obtaining compensation. Finally, and most importantly, OPIC can provide insurance only for investments in countries that are unlikely to act against investments and can forbid future insured investments in any country precipitating claims, a potential penalty. For an investment in a country to be eligible for OPIC coverage, that country's government must formally agree to a number of conditions, including the recognition of OPIC as a successive claimant. Thus OPIC provides an example of a mechanism whereby LDC governments can voluntarily increase the likelihood of a confrontation with the United States in the event that they interfere with private investments. It should be noted that OPIC concentrates on physical investments

and is not at present an important insurer of financial investments.

Insurance schemes may not be a substitute for penalties, but they can complement retaliatory provisions by functioning as tripwires. For instance, by transferring the burden of default from private investors to their governments, these arrangements can strengthen the resolve of these governments to impose sanctions.

Technical Appendix

Time Consistent Taxation and Expropriation of Foreign Capital

In this appendix we present a simple model illustrating how time consistent behavior on the part of borrowers interacts with the defensive strategies of investors to produce capital market imperfections. At any moment the stock of foreign physical capital invested in a host country is given. The host can, in principle, tax the income from this capital at any rate and in the extreme confiscate it entirely. Regardless of the host's actions, the current supply of capital is unaffected since it is determined by past investments. The factor constraining the host's behavior is the effect on the expectations of potential investors about the host's future behavior. This impact on its reputation may be sufficient to make favorable treatment of already invested foreign capital in the host's own interest.

In developing these ideas we make the following assumptions:

(1) Domestic product in period t is a function $f(k_t)$ where k_t is the stock of capital in the country in period t. The function $f(\cdot)$ is increasing and concave.

(2) The stock of capital at time t is given in that period, and consists of foreign-owned capital, k_t^F, and domestic capital k_t^D so that

$$k_t = k_t^F + k_t^D \qquad \text{(A.1)}$$

Capital is assumed to depreciate completely after one period.

(3) The stock of domestic capital k_t^D is a constant $\bar{k}^D$, i.e., $k_t^D = \bar{k}^D \; \forall \; t$.

This assumption can be interpreted as meaning that the supply of domestic savings is fixed at $\bar{k}^D$ each period. For our purposes an equivalent assumption would be that the installation of capital requires managerial services in fixed proportion to the amount invested, and that the national capacity to install capital is $\bar{k}^D$. Expropriation leads to the loss of future access to the installation capability of foreign firms, which otherwise would be in infinitely elastic supply to a small country. In principle, the supply of national capital need not equal the capacity to install capital, as we have assumed here for the sake of simplicity.

(4) Capital can earn an after-tax rate of return r in the rest of the world.

(5) In the absence of foreign investment, the marginal product of capital in the host country exceeds the rest-of-world after-tax interest rate, i.e.

$$f'(\bar{k}^D) > r.$$

(6) Competition in domestic factor markets ensures that foreign capital earns its marginal product, $f'(k_t)$, before tax.

(7) In each period t the host chooses a tax rate τ_t on foreign capital. Given k_t^F, national income in period t is

$$y_t = f(k_t) - (1-\tau_t)\, f'(k_t)\, k_t^F. \qquad \text{(A.2)}$$

(8) In any period t, the objective of the host country's taxation authority is the maximization of the present discounted utility of income, W,

$$W = \sum_{s=t}^{\infty} \beta^{s-t}\, u(y_s) \qquad \beta<1 \qquad \text{(A.3)}$$

where β is a discount factor and $u(\cdot)$ is an increasing concave function.

(9) Foreign investors behave atomistically.

That is, there are a large number of foreign investors, each of whom makes a small contribution to k_{t+1} in period t in anticipation of earning an after-tax rate of return in period t+1 of $(1-\tau^{e}_{t+1})\ f'(k_{t+1})$. Each investor's contribution to k_{t+1} is sufficiently small to allow him to ignore the effect of his own contribution on the aggregate level of k_{t+1}, and hence on $f'(k_{t+1})$, and on the tax rate expected to prevail in the repayment period, τ^{e}_{t+1}. Thus each investor makes his investment taking the expected after tax rate of return in the host country as given.

In competitive equilibrium, then, assumptions 1 and 9 together imply that

$$(1-\tau^{e}_{t+1})\ f'(k_{t+1}) = r. \qquad (A.4)$$

(10) In some initial period 0, the host announces that the tax rate in each period $t \geq 0$ will be $\hat{\tau}_t$. If the host deviates from taxing at this rate in any period $s \geq 0$ investors will anticipate full expropriation ($\tau=1$) in periods $s+i$, $i=1 \ldots \infty$.

If the host deviates from its announced taxing sequence it can no longer credibly maintain a reputation. Having deviated from its announced policy a host has no incentive <u>not</u> to tax all capital in place fully, since to do otherwise will not increase its ability to attract capital in the future. If the host does decide to deviate from its announced strategy $\{\hat{\tau}_t\}$ in some period s, then it will optimally set $\tau_v=1$, $v \geq s$; i.e. it will expropriate the current capital stock and any future investment. Foreign investors, observing $\tau_s \neq \hat{\tau}_s$, will then anticipate $\tau^{e}_{v} = 1$, $v>s$; and will not invest. Thus $k^{F}_{v} = 0$, $v > s$.[17] The present discounted utility

in period s of deviating from the announced strategy, which amounts to expropriating capital in place in that period and becoming financially autarkic thereafter, is defined as W_s^x where

$$W_s^x = u[f(k_s)] + [\beta/(1-\beta)]\, u[f(\bar{k}^D)] \qquad (A.5)$$

For the sequence $\{\hat{\tau}_t\}$ to be credible it must satisfy the time consistency requirement that, at each period t,

$$u[f(k_t) - (1-\hat{\tau}_t)\, f'(k_t)\, k_t^F] + \sum_{s=t+1}^{\infty} \beta^{s-t}\{u[f(\hat{k}_s) - (1-\hat{\tau}_s)\, f'(\hat{k}_s)\hat{k}_s^F]\} \geq W_t^x$$

$$t=0,\ldots,\infty. \qquad (A.6)$$

where $\hat{k}_s^F$ is defined implicitly by the equating of the world and anticipated domestic after-tax rates of return, i.e.,

$$(1-\hat{\tau}_s)\, f'(\bar{k}^D + \hat{k}_s^F) \equiv r. \qquad (A.7)$$

and

$$\hat{k}_s \equiv \bar{k}^D + \hat{k}_s^F \qquad (A.8)$$

That is, it must be optimal in each period for the host to maintain the announced tax rate sequence rather than to expropriate the capital in place in that period, and ruin its reputation as a host.

In period 0, then, the host chooses a tax rate sequence $\{\hat{\tau}_i\}$ to maximize its present discounted utility in period 0, W_0, where

$$W_0 = u[f(k_0) - (1-\tau_0)\, f'(k_0)\, k_0^F] + \sum_{t=1}^{\infty} \beta^t\{u[f(\hat{k}_t) - (1-\tau_t)\, f'(\hat{k}_t)\, \hat{k}_t^F\} \qquad (A.9)$$

subject to the constraints (A.6). In period 0, k_0^F is exogenous. For $t > 0$ $\hat{k}_t^F$ is given by (A.7).

Differentiating W_0 with respect to τ_t, $i = 0,\ldots,\infty$, we obtain

$$\frac{dW_0}{d\tau_0} = u'(y_0)\, f'(k_0)\, k_0^F > 0 \qquad (A.10\ a)$$

$$\frac{dW_0}{d\tau_t} = \beta^t u'(y_t) \{[\tau_t f'(\hat{k}_t) - (1 - \tau_t) f''(\hat{k}_t) \hat{k}^F_t]$$

$$\frac{d\hat{k}^F_t}{d\tau_t} + f'(\hat{k}_t) \} \quad t = 1, 2, \ldots \qquad \text{(A.10b)}$$

To determine the effect of a change in the tax rate τ_t on k^f_t differentiate (A.7) to obtain

$$\frac{d\hat{k}^F_t}{d\tau_t} = \frac{f'(\hat{k}_t)}{(1 - \tau_t) f''(k_t)} \qquad \text{(A.7')}$$

which, of course, is negative whenever $1 > \tau_t \geq 0$

Substituting (A.7') into (A.10b) yields

$$\frac{dW_0}{d\tau_t} = u'(y_t) \frac{\beta^t \tau_t [f'(k_t)]^2}{(1-\tau_t) f''(k_t)} \qquad t = 1,2,\ldots \qquad \text{(A.10b')}$$

which is negative whenever $1 > \tau_t > 0$.

Ignoring the time-consistency constraints (A.6), then, optimal policy will involve taxing initial capital fully (setting $\hat{\tau}_0 = 1$) and taxing subsequent investment not at all (setting $\hat{\tau}_t = 0$; $t = 1,2\ldots$); thus a zero tax on foreign capital is optimal for a small country facing a given world cost of capital r. We denote the zero-tax capital stock as k^*, determined implicitly by:

$$f'(k^*) = r \qquad \text{(A.11)}$$

Having committed itself to a zero-tax policy, if the host country decides to tax capital in any later period t it will have a national income of $f(\bar{k}^D)$ in subsequent periods while obtaining up to $f(k^*)$ in period t. For a policy of not taxing capital at all to be time consistent requires, then, from (A.6), that

$$u(y^*)/(1-\beta) \geq u[f(k^*)] + [\beta/(1-\beta)]\, u[f(\bar{k}^D)] \qquad \text{(A.13)}$$

If the host country is risk neutral then we may set $u(y) = y$. Multiplying (A.13) by $(1-\beta)$ and rearranging gives

$$f(k^*)\,(k^* - \bar{k}^D) \leq \beta[f(k^*) - f(\bar{k}^D)] \qquad \text{(A.13')}$$

Approximating $f(\bar{k}^D)$ by a second-order Taylor-series around k^* and substituting the resulting expression into (A.13') yields the condition that zero taxation of capital is time consistent if and only if:

$$\frac{2(1-\beta)}{\beta} \leq (k^* - \bar{k}^D)\left[-\frac{f''(k^*)}{f'(k^*)}\right] \qquad \text{(A.13'')}$$

A host country is more likely to be capable of sustaining zero taxation of foreign capital if (i) its discount factor β is near 1; (ii) the difference between the zero tax and autarkic capital stock $(k^* - \bar{k}^D)$ is large, (iii) the production function is highly concave. Since, from (A.7), k^* rises as r falls; zero taxation of foreign capital is easier to sustain when the world interest rate is low.

If condition (A.13") does not obtain then zero taxation of foreign capital is not time consistent. The constraints (A.6) are then binding. Since the constraint (A.6) takes the identical form for all periods $t > 0$ we may restrict ourselves to considering a taxation strategy that replicates itself each period, i.e., in which the host announces a tax rate $\tilde{\tau}$ that will apply for all periods except the initial one. To be time consistent, $\tilde{\tau}$ must satisfy

$$u[f(\tilde{k}) - (1-\tilde{\tau})\, f'(\tilde{k})\, (\tilde{k} - \bar{k}^D)]/(1-\beta) \geq u[f(\tilde{k})] + [\beta/(1-\beta)]\, u[f(\bar{k}^D)] \qquad (A.14)$$

where $\tilde{k}$ is defined by

$$(1-\tilde{\tau})\, f'(\tilde{k}) = r \qquad (A.15)$$

Consider again the case of risk neutrality where $u(y)=y$. Multiplying (A.14) by $(1-\beta)$ and rearranging gives

$$\beta[f(\tilde{k}) - f(\bar{k}^D)] \geq (1-\tilde{\tau})\, f'(\tilde{k})\, (\tilde{k}-\bar{k}^D) \qquad (A.14')$$

Substituting (A.15) makes (A.14') become

$$\beta[f(\tilde{k}) - f(\bar{k}^D)] - r(\tilde{k}-\bar{k}^D) \geq 0 \qquad (A.14'')$$

Define the function

$$X(k) \equiv \beta[f(k) - f(\bar{k}^D)] - r(k-\bar{k}^D).$$

If $X(k^*) \geq 0$ then zero taxation of capital is time consistent. Otherwise, the condition $X(k) \geq 0$ restricts the set of credible policies.

Since $\chi(\bar{k}^D) = 0$ and since $\chi''(k) < 0$ there is at most one level of capital greater than $\bar{k}^D$ that satisfies $\chi(k) = 0$. If

$$\beta f'(\bar{k}^D) - r \leq 0 \qquad \text{(A.17)}$$

then foreign investment at any positive level is not sustainable by a time consistent policy. Otherwise, some positive level of foreign investment can be sustained.

If the constraint $\chi(k) = 0$ is binding note that: (i) an increase in the discount factor β raises the maximum sustainable capital stock; (ii) an increase in the world interest rate reduces the maximum sustainable capital stock; (iii) an increase in the domestic capital stock $\bar{k}^D$ also lowers the maximum sustainable capital stock[18] (iv) an increase in the domestic capital stock crowds out foreign capital on a more than one-for-one basis. The reason is that an increase in $\bar{k}^D$ increases the welfare of the host country should it expropriate, reducing its incentive to abide by a given, preannounced tax rate.

Combining these results with those reported above leads to the conclusion that countries with relatively low discount rates and limited supplies of national capital are likely to treat foreign capital more favorably. Countries in which these magnitudes are <u>very</u> low will not want to tax foreign capital at all, since sustaining perfect capital mobility represents not only an optimal but a time consistent policy for them. Other countries, where discount rates are very high and other sources of capital are readily available, may find that full expropriation of all foreign assets is the only time consistent policy. These countries will find themselves shut out of private international capital markets.

Countries with intermediate values of β and $\bar{k}^D$ will sustain some capital mobility, but they will tax foreign capital and the domestic marginal product of capital will exceed the cost of capital to the country.

We have assumed that the production technology f(k) is the same in all countries. There are, of course, differences in the endowments of other factors and in technologies. Country characteristics that augment the future marginal product of capital in the country, other things equal, make future access to foreign capital more desirable. Such characteristics will increase the country's ability to borrow in the present. We predict that countries that can benefit greatly in the future from foreign capital, e.g. because of vast natural resources and little national ability to exploit them, can sustain larger levels of foreign investment currently.

We have treated policy toward direct foreign investment as the outcome of the maximization of a social utility function. In fact, policy is conducted by governments with objectives that can differ from those of its citizens. A new governments, for example, may consider its reputation as independent of that of its predecessor. It may consequently reformulate policy toward foreign investment upon assuming power. Such a reformulation could involve treating existing foreign-owned assets as a legacy of the past, and taxing them at high levels. The same government might then pursue a policy of attracting and treating favorably new foreign investment. Alternatively, a new government with an uncertain future may have a higher discount rate than the representative individual, and thus tax foreign assets more heavily than would be desirable from a national perspective. The bad reputation that this policy

creates would, with some probability, be inherited by another government and hence be of less concern to the one currently in power.

Finally, we have calculated the level of foreign investment that a country can sustain by comparing its current and future investment opportunities with its national capital resources. There is, however, more than one international source of capital. Some countries may continue to have access to one source even if they treat assets obtained from another source unfavorably. For example, countries that are already or willing to become members of the East Bloc may be less fearful of the consequences of acting against foreign investors because they can turn to other bloc members. This phenomenon reduces the equilibrium amount of investment such countries can obtain from private capital markets.

NOTES

1. Country risk that is solely exogenous can be analysed within the confines of Markowitz's (1959) portfolio analysis. Country risk analysis of this form will involve identifying the means, variances and covariances of returns on investments in different countries, which investors will then treat as parametric. Goodman (1981) provides a recent example of this approach. When an endogenous component is recognized, however, the parameters of the asset returns can be identified only by a game- theoretic analysis of the relationship between investors and recipient country governments.
2. A number of earlier authors (Bardhan, 1966, Breton, 1964 and Johnson, 1965) view foreign investment as inherently offensive to domestic nationalists. This psychic commodity approach may have some validity but becomes little more than a tautology when stretched to explain why certain industries or firms and not others are objects of country actions. As we will argue throughout, economic costs do seem to affect the behavior of countries in many instances.
3. Two departures from this viewpoint are particularly important. First, decisions may reflect the wishes of the representative citizen, but this citizen may be irrational. Dror (1971) uses the concept of a "crazy state" to characterize this situation. The case of Iran provides a partial example where the analyst's main problem is anticipating the goals of the country's behavior. Second, decisions may be the outcome of conflict or compromise among citizens with quite different goals and positions. For instance, some states may have political processes favoring owners of capital while others may be oriented to urban workers or agriculturalists. Of particular concern are situations where the weight of different groups in decision-making may shift, or give rise to "voting paradoxes".

4. In focusing on country risk we shall not discuss the closely related but analytically distinct issue of currency risk which arises when indirect investments are denominated in the currencies of different countries. In the absence of exact purchasing power parity currency risk and country risk both act to reduce the mobility of funds across borders.

5. Despite these difficulties there are various cases where investors have been able to impose considerable costs on countries ruled in violation of contracts by another country's judicial system. Recent actions against the revolutionary regime in Iran certainly caused that country considerable trouble (Field and Adam, 1980). Moran (1973, especially p. 286) describes a number of cases where he feels successful legal action was taken against expropriating countries. In many of these cases action could be taken to prevent other businesses from purchasing raw materials from nationalized mines. He reports that Kennecott even used an unconditional guarantee embodied in its Chilean contracts to obtain writs of attachment against the jets of Lanchile when they landed in New York.

6. Much of the management literature on this subject has as its goal acquainting managers with this aspect of investment. See Vernon (1967 and 1968), Smith and Wells (1975) and Wells (1977).

7. This section draws heavily on our previous work (Eaton and Gersovitz, 1980, 1981a and 1981b).

8. The World Bank in its publication World Debt Tables (1981, p. xv) 1980, p. 29) reports this information on a country by country basis. These figures include debt outstanding and disbursed.

9. On contrasts between bond and bank lending, see Eaton and Gersovitz (1981b, p. 14 and pp. 22-26).

10. See, for instance, various issues of Euromoney, and the Economist Intelligence Unit's (EIU) Quarterly Economic Reviews of individual countries.

11. Creditors may also be able to interfere directly with a borrower's trade by harassing importers or exporters in the creditors' country through the court system (Delupis, 1973), but this is probably not a generally effective strategy. Creditor-country governments may retaliate through trade embargoes.

12. Formal empirical evidence on the existence of credit ceilings, the determinants of default probabilities and interest rate spreads is discussed elsewhere by us (Eaton and Gersovitz, 1981b, pp. 16-24 and 27-31).

13. This account draws on Cline (1982), Derecho (1978), Downer (1980), Kuczynski (1977), Nevans (1978) and EIU (1975-1981).

14. In Eaton and Gersovitz (1982) we present a number of formal models illustrating some of the points discussed in this section. Other theoretical work on this topic include Cauas and Selowsky (1977) and Tobin (1974). These authors put special emphasis on aspects of income distribution among groups within the host country as a result of expropriation. This type of issue, discussed also by us in Eaton and Gersovitz (1982), is very important but has been pushed into the background in this paper by our assumption of the representative citizen.

15. Cobbe (1979) provides a detailed discussion of relations between governments and foreign investors focussed entirely on the mining sector.

16. We rely on parts of our previous work (Eaton and Gersovitz, 1981b, pp. 32-36) for many of the arguments presented here. This earlier work contains citations to the exact sources of legislative acts.

17. We have earlier used this type of equilibrium concept in Eaton and Gersovitz (1981a). Examples of more recent work on related topics include that by Dybvig and Spatt (1980) who apply this same equilibrium concept to examine a firm's incentive to maintain a reputation for product quality. Selten (1975) discusses this concept under the

name subgame perfect equilibrium. The equilibrium is one in which an agent makes a precommitment to a certain course of action. This precommitment is an equilibrium one only if it is then always in that agent's interest to pursue the announced course of action. Subject to this constraint the announced course of action maximizes that agent's objective function.

18. These results follow from the fact that an increase in r and decrease in β shift the locus $\psi(k)$ downward, as does an increase in $\bar{k}^D$ if (A.17) does not obtain, so that $\hat{\tilde{k}} > \bar{k}^D$.

REFERENCES

Arrow, Kenneth J., The Limits of Organization (New York: Norton, 1974).

Bank for International Settlements (BIS), Manual on Statistics Compiled by International Organizations on Countries' External Indebtedness (Basel:1979).

Bardhan, Pranab, 'Optimum Foreign Borrowing' in Karl Shell (ed.) Essays on the Theory of Optimal Economic Growth (Cambridge: MIT Press, 1967).

Bradley, David G., 'Managing against Expropriation', Harvard Business Review, (1977), pp. 75-83.

Breton, Albert, 'The Economics of Nationalism', Journal of Political Economy, vol. 74, no. 4 (1964), pp. 376-386.

Cauas, Jorge and Selowsky, Marcelo, 'Potential Distributive Effects of Nationalization Policies: The Economic Aspects' in Charles R. Frank and Richard C. Webb (eds.), Income Distribution and Growth in Less-Developed Countries (Washington: Brookings Institution, 1977).

Cline, William R., 'Economic Stabilization in Peru, 1975-78' in William R. Cline and Sidney Weintraub (eds.), Economic Stabilization in Developing Countries (Washington: Brookings Institution, 1981).

Cobbe, James H. Governments and Mining Companies in Developing Countries (Boulder: Westview, 1979).

Delupis, Ingrid, Finance and Protection of Investments in Developing Countries (Epping, Essex: Gower, 1973).

Derecho, Stefan D., 'Peru's Crisis: One Mistake after Another', Euromoney (June, 1978), pp. 95-96.

Downer, Steve, 'Even the Anchovetas are Returning to Peru', Euromoney (April, 1980), pp. xi-xvi.

Dror, Yehezkel, Crazy States: A Counterconventional Strategic Problem (Lexington: Heath Lexington, 1971).

Dybvig, Philip H. and Spatt, C.S., 'Does it Pay to Maintain a Reputation?', Financial Research Center Memorandum No. 32, Princeton University (August, 1980).

Economist Intelligence Unit (EIU), Quarterly Economic Review of Peru, Bolivia (London, various dates).

Eaton, Jonathan and Gersovitz, Mark, 'LDC Participation in International Financial Markets: Debt and Reserves', Journal of Development Economies, vol. 7, no. 1 (1980), pp. 3-21.

Eaton, Jonathan and Gersovitz, Mark, 'Debt with Potential Repudiation: Theoretical and Empirical Analysis' Review of Economic Studies, vol. 48, no. 152 (1981), pp. 289-309.

Eaton, Jonathan and Gersovitz, Mark, Poor-Country Borrowing in Private Financial Markets and the Repudiation Issue (Princeton: International Finance Section, 1981b).

Eaton, Jonathan and Gersovitz, Mark, 'A Theory of Expropriation and Deviations from Perfect Capital Mobility' Economic Growth Center Discussion Paper No. 391, New Haven: Yale University, January, 1982.

Forsund, Finn R., Lovell, C.A. Knox and Schmidt, Peter, 'A Survey of Frontier Production Functions and of their Relationship to Efficiency Measurement', Journal of Econometrics vol. 13, no. 1 (1980), pp. 5-25.

Goodman, Laurie S., "Bank Lending to Non-Opec LDC's: Are Risks Diversifiable?", Federal Reserve Bank of New York Bulletin, Vol. 6, no. 2 (1981), pp. 10-20.

Hellwig, Martin F., "A Model of Borrowing and Lending with Bankruptcy", Econometrica, vol. 45 (1977), pp. 1879-1906.

Hirschman, Albert O., How to Divest in Latin America and Why (Princeton: International Finance Section, 1969).

Jodice, David A., 'Sources of Change in Third World Regimes for Foreign Direct Investment, 1968-1976', International Organization vol. 34, no. 2 (1980), pp. 177-206.

Johnson, Harry G., 'A Theoretical Model of Economic Nationalism in New and Developing Countries' Political Science Quarterly vol. 80, no. 2 (1965), pp. 169-185.

Kobrin, Stephen J., 'Foreign Enterprise and Forced Divestment in LDC's', International Organization, vol. 34, no. 1 (1980), pp. 65-88.

Kuczynski, Pedro-Pablo, 'Peru needs Truth more than Sympathy', Euromoney (December, 1977), pp. 73-75.

Kuhn, W.E., 'The Hickenlooper Amendment as a Determinant of the Outcome of Expropriation Disputes', The Social Science Journal vol. 14, no. 1 (1977), pp. 71-81.

Kydland, Richard E. and Prescott, Edward C., 'Rules Rather Than Discretion: The Inconsistency of Optimal Plans', Journal of Political Economy, vol. 85, vol. 3 (1977), pp. 513-548.

Levine, David I., 'The Growing Problem of Sovereign Immunity',Euromoney (May, 1977), pp. 74-84.

Lillich, Richard B., The Protection of Foreign Investment (Syracuse: Syracuse University Press, 1965).

Lipson, Charles H., 'Corporate Preferences and Public Policies: Foreign Aid Sanctions and Investment Protection', World Politics, vol. 28, no. 3 (1976), pp. 306-421.

Lipson, Charles, 'The Development of Expropriation Insurance: The Role of Corporate Preferences and State Initiatives', International Organization vol. 32, no. 3 (1978), pp. 351-375.

Long, Ngo Van 'Resource Extraction under the Uncertainty about Possible Nationalization',Journal of Economic Theory vol. 10, no. 1 (1975), pp. 42-53.

Micallef, Joseph V., 'Political Risk Assessment and the Multinational' in Richard Ensor (ed.), Assessing Country Risk (London: Euromoney Publications, 1981).

Moran, Theodore H., 'Transnational Strategies of Protection and Defense by Multinational Corporations: Spreading the Risk and Raising the Cost for Nationalization in Natural Resources', International Organization, vol. 27, no. 2 (1973), pp. 273-287.

Nevans, Ronald, 'Peru Crisis: Rescheduling is on the Way', Euromoney (March, 1978), pp. 25-26.

Olson, Richard S., 'Economic Coercion in International Disputes: The United States and Peru in the IPC Expropriation Dispute of 1968-1971', Journal of the Developing Areas, vol. 9, no. 3 (1975), pp. 395-414.

Schelling, Thomas C., The Strategy of Conflict (Cambridge: Harvard University, 1960).

Selten, R., 'Reexaminiation of the Perfect Concept for Equilibrium Points in Extensive Games', International Journal of Game Theory vol. 4, no. 1 (1975), pp. 25-55.

Srodes, James, 'Governor Wallich Wants the IMF to Advise LDC Lenders', Euromoney (April, 1977).

Tobin, James 'Notes on the Economic Theory of Expulsion and Expropriation', Journal of Development Economics, vol. 1, no. 1 (1974), pp. 7-18.

U.N. Economic and Social Council, Commission on Transnational Corporations, Transnational Corporation in World Development (New York: United Nations, March 20, 1978), E/C. 10/38.

Vernon, Raymond, 'Foreign Enterprises and Developing Nations in the Raw Materials Industries', American Economic Review, vol. 60, no. 2 (1970), pp. 122-126.

Vernon, Raymond, 'Conflict and Resolution Between Foreign Direct Investors, and Less Developed Countries, Public Policy vol. 18, (1968), pp. 333-351.

Wellons, P.A., Borrowing by Developing Countries on the Euro-Currency Market (Paris: OECD, 1979)

Wells, Louis T., 'Negotiating with Third World Governments' Harvard Business Review, vol. , no. (1979) pp.

Williams, M.L., 'The Extent and Significance of the Nationalization of Foreign-Owned Assets in Developing Countries, 1956-1972', Oxford Economic Papers vol. 27, no. 2 (1975), pp. 260-273.

World Bank, World Debt Tables (Washington, annual numbers).