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The European Social Model: Lessons for Developing Countries

ASSAR LINDBECK

Developing countries, in particular the least developed ones, probably have more to learn from social policies in Europe during the early 20th century than from the elaborate welfare-state arrangements after World War II. In addition to macroeconomic growth and stability, the main ambitions must be to fight human deprivation, including illiteracy, malnutrition, and poor access to water and sanitation; in some cases, also weak, incompetent, and/or corrupt governments. It is also important that informal systems in the fields of transfers and social services are not destroyed when developing countries embark on more formal systems in these fields in the future. The European experience also warns against the creation of social systems that are so generous that disincentives, moral hazard, and receding social norms seriously distort the national economy, including the labor market.

I. GENERAL LESSONS

In the early 20th century, many European countries still relied heavily on the family both for income protection and personal ("human") services, such as child care and care for the elderly, and, to some extent, also for health care. Civil society, including so-called "friendly societies", also contributed to income insurance, for instance in connection with sickness, old age, and unemployment (the latter often with the help of union-run insurance systems). Occupational pensions also played an important part for government employees. Besides this, government-created social arrangements consisted mainly of selective poverty relief (social assistance) and basic services in the fields of elementary education and health. In the late 19th and early 20th centuries, legislation was, however, also introduced for work injury compensation and basic, though quite modest (lump-sum or means-tested) pensions. In some countries, mainly on the European continent, the government was also involved in the organization of occupational pensions in the private sector, primarily in the case of large industrial firms.

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Comprehensive systems for income maintenance—in the case of childbirth, single motherhood, unemployment, sickness, old age, etc.—were not introduced in Western Europe (henceforth "Europe") until the first decades after World War II, however. Secondary and tertiary mass education and comprehensive health care for the entire population were built up at about the same time. It is thus only from the 1960s and 1970s that it makes sense to talk about a "welfare state" in Europe. In other words, Europe was already quite rich, as compared to most contemporary developing countries, when elaborate welfare-state arrangements were created.

Since welfare-state arrangements differ among European countries, talking about a common "European social model" is somewhat misleading. Naturally, this observation constitutes the background to the habit among scholars to classify European countries in terms of different "welfare regimes." The most important difference among countries probably concerns the relative role of the state, the family, and the market for the provision of income protection and social services. Countries also differ in terms of the relative roles of "universal" benefits tied to citizenship, occupational benefits tied to work, and selective means-tested income support. There is also a considerable difference in the generosity of benefits and welfare services.

As a result of the far-reaching social reforms after World War II, the social arrangements in Europe are today clearly more comprehensive than in other parts of the world. The *achievements* of these arrangements are well known: high-income security for the individual over the life cycle, considerably mitigated poverty, and ample provision of various types of social services. The *weaknesses* of these social arrangements are also well known today. It turned out that some of these arrangements were not very financially robust to various types of shocks, for instance, in terms of demography, productivity growth, and macroeconomic disturbances. The architects of the welfare state also neglected, or at least underestimated, undesirable behavior adjustments in response to changes in economic incentives, as a result of explicit and implicit marginal tax wedges and "moral hazard" in connection with various benefit systems.

What, then, are the general lessons for developing countries of social policies in Europe? These countries, in particular the least developed ones, probably have more to learn from social policies in Europe during the early 20th century than from the elaborate welfare-state arrangements after World War II. The reason is, of course, that economic resources, socioeconomic structures, and informal welfare arrangements in the earlier period were more similar to the situation in today's developing countries than contemporary conditions. In most developing countries, trying to imitate contemporary welfare-state arrangements in Europe would be a serious mistake. In particular, this would be the case for transfer payments designed to provide protection against income losses for the population as a whole, since such protection is very expensive and also requires a highly developed administration. Instead, it is reasonable to give priority to the creation of an

environment conducive to entrepreneurship, long-term economic growth, basic health and primary and (at least in some developing countries) secondary education—as was the case in Europe a century ago. The "fine tuning" of welfare-state arrangements in Europe today are often far from what is needed in developing countries. We have also learned how important macroeconomic stability is for social conditions. In addition to macroeconomic growth and stability, the main ambitions must be to fight human deprivation, including illiteracy, malnutrition, poor access to water and sanitation, and, in some cases, also weak, incompetent, and/or corrupt governments.

It is also important to look at social policies in a broad context, and then identify the interaction among different types of economic and social variables. Myrdal (1944, appendix 3) often emphasized processes of "cumulative causation", with vicious circles among various poverty-creating forces: malnutrition damaging health, which in turn results in social exclusion and reduces the possibilities of acquiring education, which further lowers productivity and political influence, which goes back to square one by exacerbating malnutrition and social exclusion, etc. Dynamic processes of this type are well understood today among professional observers of poverty in developing countries. It is equally important to understand such processes when we try to turn vicious circles into virtuous ones.

There are, of course, other important similarities among developing countries than their poverty. Most of these countries are also rural, and they have a young population. It is, however, also important to emphasize their *differences* in terms of socioeconomic conditions, administrative capacities, the role of informal welfare arrangements, and economic and social policies. Presumably, the most important difference is the level of development and the degree of "modernization" which, to a considerable extent, is a result of the governments' past emphasis on, or neglect of, long-term economic growth. For instance, governments and ethnic and social groups in some developing countries, not least in Africa, have clearly been more engaged in power struggles and rent seeking than in growth-enhancing policies. In several South East Asian countries, by contrast, it is fair to say that concern for economic growth has indeed dominated, also over issues of income security. As we know, this has been reflected in a heavy emphasis on capital formation. Some of these countries have, however, also succeeded in combining fast economic growth with a fairly even distribution of income and wealth, thanks to early land reform and widespread elementary education. The emphasis on economic growth also shows up in the composition of infrastructure investment, which has been heavily concentrated on production-oriented structures such as harbors and roads and railways, rather than facilities directly servicing households, such as housing, sanitation, and the environment in cities and the countryside. This emphasis on growth, of course, reflects an understanding among policymakers that mass poverty can never be replaced by mass affluence without sustained economic growth during many decades.

This said, we should not forget that some social arrangements, not just spending on primary education, might be conducive to long-term economic growth, the most important examples perhaps being policies improving the nutrition status and the general health conditions of the poor, in particular children. Safety nets and systems for income protection may also, up to a point, be conducive to economic efficiency, since they may enhance political and social stability (Alesina and Rodrik 1994). But, in particular, we have learned over the years that highly selective social policies can make a big difference in the living conditions among the poorest sections of a society, also at a given level of per capita GDP (Sen 1983).

I argued above that it is mainly the European experience of social policies before World War II, and even before World War I, that should be of interest for social policies in today's developing countries. For the more affluent ones, however, there are also lessons to be learned from the contemporary experience of social policies in developed countries. For other developing countries, the European experience after World War II is probably of interest mainly for contemporary *discussions* of social policies far ahead in the future. The latter observation is of some importance since it often takes a long time before social policy arrangements are in place and functioning properly. An extreme example is funded social insurance systems, including so-called provident funds à la Malaysia and Singapore, since such systems mature very slowly. However, the most important message of the paper for developing countries is probably to avoid destroying existing informal systems. Empirical research suggests that these risks are real (Townsend 1994, Udry 1994).

I will organize my discussion as a "sightseeing tour" in the welfare landscape, following the individual from the womb (and hence not just from the cradle) to the tomb.[1]

II. CHILDHOOD

Before World War II, the family and other relatives were in charge of most child care in Europe, though high- and middle-class families also hired helpers (usually girls) in the market. The main example of government intervention was mandatory and subsidized primary education. After World War II, three additional government interventions were launched, or greatly expanded: prenatal care, income transfers (or tax deductions) to families with children and, in some countries, also subsidized child care outside the family either in institutions (kindergarten) or in the homes of others (family daycare).

[1]For a more detailed account of the role of welfare state arrangements over the individual's life cycle, though without discussion of the lessons for developing countries, see Lindbeck (2001).

It is generally agreed that the sharp drop in birth rates during the last two decades threatens the financial viability of various welfare-state arrangements in the long run. An obvious policy response would be to stimulate child bearing by redistributing income to families with children, in particular those with many children. Somewhat surprisingly, this has, so far, not occurred to any large extent, perhaps because families with children are today a highly heterogeneous minority among voters.

There are, however, at least two arguments for more interventionist policy measures in the case of families with children. First, there is a second-best argument to subsidize child care outside the family, because of the existence of distortionary taxes favoring tax-free household work at the expense of taxed work in the labor market. Indeed, government policies in the Nordic countries have recently followed this second-best route through strong subsidies of child care outside the family, which is one important explanation for the high labor force participation of women in these countries.

The other argument for government intervention in the lives of families with small children is, of course, that schooling has important implications for economic efficiency and the future distribution of factor income. It is controversial whether the same argument is relevant for child care of preschool children. In the case of poor families with little education, in particular families with severe social problems, it is, however, widely believed that child care outside the family enhances human capital formation and hence the future factor income of such children. This, of course, is the traditional "head-start" argument.

Is any of this relevant for developing countries? The fertility problem is, of course, usually the reverse of the European one; about 40 percent of the population in many developing countries are children. It is, however, hazardous (to say the least) to use this observation as an argument for turning the policy recommendation for Europe upside down for developing countries, hence recommending redistributions of income to the disadvantage of families with (many) children! We probably have to rely on traditional birth control policies and compulsory education to convince families in developing countries to restrict their number of children.

As in Europe before World War II, it is natural to expect that child care in developing countries, for a long time to come, will be pursued by the family and other relatives—combined with privately hired helpers in the case of high- and middle-class families. The most urgent policy interventions in child raising in developing countries must be improved nutrition, fights against infective diseases for pregnant woman and small children, and primary education. The relevant methods are commonplace: information about high-nutrition food intake, subsidies of such food for the poorest section of the population, obstetric care, clean water, sanitation, immunization, and subsidized compulsory primary education. Indeed, studies in medicine and bio-demography have shown the importance of these factors for

the physical and intellectual development of children (Behrman 1993, Scrimshaw 1996, United Nations 1997). In particular, the *interaction* between infectious diseases and malnutrition for children has turned out to be highly damaging; deficiencies in these respects are even transmitted to grandchildren. Usually, such policies are not very expensive as compared to many other types of government spending, for example infrastructure investment and military spending. It is also an area where technical and economic assistance from the outside world may be particularly useful. The head-start argument for child care outside the biological family is probably relevant mainly for orphans and street children in developing countries.

What about education? In the poorest developing countries, there are both efficiency and distributional reasons to concentrate educational resources on primary schooling, as was the case in Europe during the first decades of the 20th century. There is, however, also an emerging consensus that a number of developing countries, for instance in Southeast Asia and Latin America, have reached a level of development where it is appropriate to allocate more resources to secondary and tertiary education. European experiences during the 20th century suggest that it then makes sense to put a strong emphasis on a *combination* of theoretical and vocational training—along the lines of the apprenticeship systems in Austria, Germany, and Switzerland. These countries have been successful both in creating a skillful labor force, at least in manufacturing, and in keeping down the level of youth unemployment.

III. INCOME AND JOB SECURITY DURING WORKING AGE

Only very few policy interventions directly designed to enhance income security and job security existed in Europe before the 1930s; modest unemployment benefits and limited public works programs during depressions being the main exceptions. Two reasonable explanations are perhaps that the main beneficiaries of such policies had little political power and that macroeconomic theories for rationalizing such policies did not exist before the "Keynesian revolution."

By contrast, macroeconomic policies have dominated the political agenda in Europe after World War II. Such policies were also quite successful for a while in the sense that the macroeconomic performance in Europe was excellent from the economic recovery during the early 1950s to the mid-1970s. The subsequent situation may be characterized as a continuation of good income security combined with dismal employment performance and hence, deteriorating job security for part of the labor force. An appropriate policy package to improve employment performance would have to include not only measures strengthening the attractiveness of outsiders in the labor market and activating their job search, but also measures reducing the market powers of insiders (Lindbeck 1996).

What are the lessons, if any, for developing countries from the experience of employment policies and income protection in Europe? In most developing countries, unemployment benefits hardly exist, simply because some 60-80 percent of the population are in informal sectors (largely agriculture). In some of the more affluent developing countries, certain unemployment benefits do exist, but these are usually neither comprehensive nor generous. In some of the most advanced developing countries, including some countries in East Asia, there is, however, a quite detailed labor market legislation, including both minimum wages and job security legislation. But the implementation of the laws is usually weak or even nonexistent, which is, of course, a disadvantage for employees who would keep their jobs also with stricter implementation. However, poor implementation is an advantage for workers who would not have been hired if minimum wages and job security legislation had been strictly enforced.

As a result of all this, European-type insider-outsider division has largely been avoided in developing countries, and highly persistent unemployment after negative macroeconomic shocks do not seem to be prevalent. There is, instead, often considerable segmentation between privileged employees in the public sector, and in some cases also in large firms, on the one hand, and less privileged employees in smaller firms, on the other hand.

Moreover, some of the more affluent developing countries seem to be strongly exposed to negative macroeconomic shocks. This problem can probably be mitigated to some extent by floating exchange rates or, in some case, by membership in a large monetary union where the country's trade is concentrated. Another macroeconomic problem is that both financial institutions and production firms have often neglected their balance sheets, which appears in low equity capital and much short-term borrowing (often also in the form of uncovered loans in foreign currencies). I understand this to have been an important factor behind the financial crisis in East Asia in the late 1990s. Tougher authorities in the field of financial inspection are thus called for. In view of the severe social problems in connection with recurring macroeconomic crises in developing countries, the first, and perhaps most important, line of defense for job and income security must be good macroeconomic institutions, well-consolidated firms, and a reasonably good macroeconomic policy, including an appropriate exchange rate system.

Sooner or later, the population in developing countries will certainly demand a second line of defense, in the form of income protection. It is well known that systems of unemployment insurance do not easily spontaneously emerge via voluntary market transactions due to problems of adverse selection. Either the state or unions must intervene to create comprehensive unemployment benefit systems. It is then, of course, important to realize that the generosity and the duration for the benefits must be kept within certain bounds to mitigate moral hazard problems.

In countries with a particularly low per capita income and quite a small formal production sector, ethical considerations probably point to a safety net

solution, rather than comprehensive unemployment insurance, designed to provide income protection in proportion to previous income. The purpose would be to secure elementary entitlements such as food, shelter, clothing, and basic health. Such safety nets could, of course, operate by quite different methods: public work programs; subsidized work in the private sector for unemployed workers; needs-based cash transfers ("social assistance" or "welfare") to poor people in general; selective transfers in kind (food programs such as food stamps); or subsidies to basic consumption. Administrative feasibility, including the precision of targeting, is presumably a crucial aspect in the choice of method.

The administrative difficulties in running such programs in developing countries are accentuated by the problem of knowing when the family is able and willing to provide income security to its members and when this is not the case. There may be some experiences from Southern Europe, for example Italy, on how to handle, or *not* handle, safety nets in societies with weak government administration and frequent cohabitation of parents and adult children.

Moreover, considering the dominating role of agriculture in most developing countries, crop insurance programs are often more important than unemployment insurance. Local, so-called "micro- and area-based", protection for small farmers is another example of income protection programs that should perhaps be relied on to a larger extent today and in the near future.

IV. SICK-PAY INSURANCE AND HEALTH CARE

In Europe before World War II, personal savings, support from relatives and friends, and individual insurance schemes dominated as methods for mitigating economic setbacks in connection with health problems. Mandatory sick-pay insurance, usually administrated by government agencies, is basically a post World War II phenomenon. Since these systems are quite generous today, with replacement rates often in the interval of 70-100 percent, governments in Europe have no doubt succeeded in reallocating income to periods when the individual is temporarily sick, and hence to protect consumption during such periods. In a considerable part of Europe, sick-pay benefits, like unemployment benefits, are, however, tied to previous earnings, which favors individuals with stable employment. This means that the insider-outsider division of the labor market is transmitted to periods of bad health.

In several European countries, the sick-pay insurance systems have recently run into serious financial difficulties. One reason is moral hazard, for instance, when an individual calls sick when feeling tired on a Monday morning. The consequences of moral hazard may be accentuated by receding social norms against exploiting the systems, when individuals observe that others do this. To the extent that these factors explain the rising costs of sick-pay insurance, more waiting days,

coinsurance, and stricter administration of the benefit system would be rational policy responses.

In some countries, including Sweden, higher costs for sick-pay insurance are, however, more related to long-term than to short-term sick leave. "Double work" by women is probably a reason, since they still do the bulk of household work, including child care in the home, simultaneously with work in the labor market. In this sense, women have paid a high psychological price for their increased labor market participation. There is also some speculation in the general discussion to the effect that reorganization of work, with increased requirements of efficiency and individual responsibility, has contributed to the stress at work.

If these are important explanations, the problems might be mitigated *both* by improvements in the work environment *and* by a greater responsibility for household work, including child care, among men. The first may be achieved by experience-rated insurance fees for firms (higher fees for firms with many sick days). It is more difficult to design policies that shift household work from women to men, since this would require that the government intervene in the lives of families. Such policies, however, already exist to some extent in Denmark and Sweden, since men are offered nontransferable rights to stay at home to take care of small children, without much loss of income.

What about developing countries? In most of these, sick leave is basically financed as in Europe during the first decades of the 20th century, i.e., via relatives and civil society. In countries with more formal systems of health insurance, i.e., mainly the most affluent among developing countries, these systems are usually highly fragmented, with separate arrangements for different industries, professions, and firms. If more elaborate sick-pay insurances are created in developing countries in the future, the European experience illustrates the importance of watching out for moral hazard and changes in social norms. For that reason, it is important to keep the generosity of the system within bounds, and make the administrative controls tight, not least to prevent physicians from being overly generous in certifying the needs for sick leave.

What, then, is the experience of *health care services* in Europe? In general terms, the basic problem is how to combine insurance, incentives, and freedom of choice. All health care systems are today exposed to serious cost problems, since the "third party pays." *Insurance schemes*, in particular when based on cost-plus financing, tend to generate particularly rapid increases in costs, which is strikingly illustrated by the experience in Germany and the United States. Canada has succeeded better in containing costs in its health care insurance systems by relying on fixed budgets for health providers and price control of services. *Tax-financed* health services of the United Kingdom's National Health Service (NHS) type have typically been better at containing health care costs. But this has been achieved by strict rationing, i.e., queues and waiting lists (which also is a problem in Canada), and high stress levels at work for the personnel.

Are there any lessons for developing countries from health care in developed countries? Most well informed observers probably agree that it makes sense for developing countries to emphasize fights against infectious diseases and malnutrition, not least for pregnant women and small children. This may mean that comprehensive treatments of heart disease, cancer, and other ailments characteristic of a rich and aging population, would have to be postponed. Concretely, this means information and subsidies in the field of sanitation and primary health care and probably also information about the importance of a healthy life style, including less smoking. The surveillance of public and private health care units, with very uneven qualities, is also of potential importance. In a somewhat longer perspective, there are also strong cases for mandatory health insurance for "catastrophic health care", co-payments, and the mobilization of more resources for health care in the private sector. In many countries, it is also important to increase the salaries of doctors and nurses.

Apart from this, it is important to allow and stimulate *experimentation*, which requires considerable freedom of entry of nongovernment health providers—for nonprofit as well as profit organizations. I then assume that it is better to allow decentralized experimentation, rather than keep existing systems intact or, as often occurs, have the government conduct full scale experiments for a whole country. It is also important to avoid destroying whatever nongovernment networks exist via families and civil society.[2]

V. PENSIONS AND OLD-AGE CARE

While mandatory pension systems in Europe have been instrumental for providing income security for the elderly, governments have played a much more modest role in the field of care for the elderly. As we know, both fields encounter serious problems today. To the extent that contemporary, and projected future, financial problems of the pension systems are caused by low birth rates in the past, conceivable remedies would be to boost nativity (with considerable time lag before the size of the labor force is influenced) and encourage the immigration of young individuals of working age. Unfortunately, it is not obvious that governments can do much about birth rates (except perhaps provide good child care outside the family), and there may be "social limits" to immigration because of the risks of ethnical tensions in the countries of immigration. To the extent that financial problems for pension systems are related to a higher longevity of individuals after retirement, raising the statutory pension age and removing subsidies to early retirement are instead natural remedies. But to avoid heavy unemployment among the elderly in connection with later retirement, it is also important to allow greater

[2] The role of such networks in developing countries is still an "under-researched" field.

flexibility in relative wages (for workers of different ages) and increase the possibilities for retirees to individually choose the length of their work week.

It is today also increasingly understood in Europe that the "pay-as-you-go" (PAYGO) pension systems create disincentive problems for work via implicit tax wedges. The reason is, of course, that the link between the contributions and the subsequent pension benefits for the individual is usually quite weak. An obvious way of mitigating this incentive problem is to tighten the link, hence making the pension systems more actuarial, or "quasi-actuarial" (since the return on mandatory pension saving would be lower than the return in financial markets). There is also a case for a *partial* shift to a funded pension system. The individual then would be able to enjoy a more diversified portfolio of pension claims than in *either* a pure PAYGO system, where the (risky) return depends on the growth rate of the tax base, *or* a pure funded system where the (risky) return depends on developments in financial markets. The reason is, of course, that these two types of returns are not fully correlated, in particular if the pension funds invest in international capital markets.

What is the relevance of all this for the financing of retirement in developing countries? In most such countries, informal systems, in particular via relatives, are likely to dominate for a long time to come. Sooner or later, there will, however, be a strong ethical case for government intervention to mitigate poverty among the elderly—an application of the safety net idea to the retirement period. A *basic* pension in the form of a lump sum payment, equal for all elderly, or means-tested pension benefits, are then obvious alternatives. This corresponds to the World Bank's (1993) recommendation for a "universal first-tier pension." An additional advantage of such a system, in principle, is that it is rather equitable if financed by tax payments that increase with income. But in many developing countries, only a few percent of the population pay income taxes, or can be exposed to payroll taxes, which, of course, means that the financing would be a serious administrative obstacle.

In the long run, the expanding middle class will, however, hardly be satisfied with either a basic pension or means-tested pension benefits. This group is likely to ask for income protection in some proportion to previous income, as in today's developed countries, partly in response to a gradually reduced importance of transfers within families. As we know, some developing countries have already started to build up mandatory pension systems of this type: funded systems in Chile and Malaysia and some other countries in Latin American; while Korea, Philippines, and Thailand have chosen social security systems. Advocates of mandatory, funded pension systems in developed countries have often referred to the importance of boosting aggregate national saving, which is easiest if a funded system is created "from scratch." While the argument for such a boost may be important for some developing countries, it hardly has much strength in developing countries with high national saving rates, such as some countries in East Asia.

In the future, when comprehensive pension systems probably will exist in today's developing countries, the same financial problems as in today's developed countries are likely to occur. Falling fertility and increased longevity seem to be inevitable developments in the modern world, and even the fastest growing countries will sooner or later experience slower productivity growth. In the few developing countries where formal pension systems already exist, the pension age is usually quite low (relative to life expectancy). Thus, there is great room for defending, or improving, the financial position of these systems by raising the retirement age, for instance, from 55 to 67 or even 70. Some developing countries may also find it easier than many countries in Europe to accommodate the elderly in the labor market, since they have had arrangements for work for the elderly for a long time, and since relative wages are often more flexible than in Europe. It remains to be seen whether these conditions will prevail.

Contemporary financial and organizational problems in the field of *old-age care* in developed countries are related to the demographic factors of the same type as those that have created problems for the pension system. The organizational difficulties are instead rather similar to the problems of health care: it is difficult to combine solidarity-oriented financing with production efficiency and freedom of choice. Old-age care is also hurt by Baumol's Law (Baumol 1967), which explains why costs and prices tend to increase particularly fast in the case of labor-intensive services like human care. Another issue concerns the freedom of choice of services for the elderly. Such freedom is, in principle, easy to bring about in the case of service in the elderly's homes—shopping, cooking, cleaning etc.—like in child care and care for the elderly. Service checks (vouchers) are an obvious tool. Vouchers are less useful in the case of institutionalized old-age care, since the needs for medical care vary enormously among patients. Still it would certainly be possible to offer considerable freedom of choice of service institution for the elderly.

It will take some time before most developing countries encounter similar problems, not only because the population is still young, but also because the family is likely to supply care services to the elderly for a long time to come. But it may be a good idea at least to start thinking, and perhaps also experimenting, with alternative systems of care for the elderly before there is an acute need to expand formal systems in this field. In the long run, it is not likely that family members and other relatives can be relied on to service the elderly any more in today's developing countries than in Europe.

VI. CONCLUSION

The experiences of social policies during the first decades of the 20th century in Europe underline the important role of informal systems for income security and personal services at low levels of economic development. It is crucial, however, that informal systems are not destroyed when developing countries embark on more formal systems in these fields in the future. I have also emphasized that the European experience warns against the creation of social systems that are so generous that disincentives, moral hazard, and receding social norms seriously distort the national economy, including the labor market. These risks seem to be particularly important in the case of unemployment benefits, support to single mothers, sick leave, disability pensions, and early retirement. If disincentives and moral hazard undermine the financial viability of government-operated systems, and these would therefore have to be cut back, many individuals may suddenly find themselves without both types of social systems.

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Capitalizing on Globalization

BARRY EICHENGREEN

This paper reviews the challenges facing Asia as it seeks to cope with and capitalize on globalization. It asks how the Asian model of economic development needs to be modified in order for the region's economies to grow and prosper in an increasingly integrated and intensely competitive global environment. Doing so, it argues, will entail modifying institutions for managing innovation, for managing poverty, and for managing volatility. The paper concludes by asking whether the capacity to adapt existing institutions is best developed at the national, regional, or global level and whether initiatives to address the challenge at these three levels are properly regarded as substitutes or complements.

I. INTRODUCTION

The world is growing smaller, as powerful forces, political and economic, speed the globalization of markets. Technology is one driver of this process: the relative cost of ocean, air, and road transportation continues to fall, removing an obstacle to cross-border merchandise transactions, while the revolution in information and communications has had an equally dramatic impact on trade in services. Improvements in the availability of information and declining transactions costs have further stimulated international flows of capital, labor, and technology. Of course, none of this would have been possible in the absence of political decisions to pursue policies consistent with globalization. Governments have removed overt and hidden barriers to trade. They have abolished exchange controls and liberalized capital account transactions. They have sought to promote the domestic capacity to produce for foreign markets and to make their economies attractive destinations for foreign investment.

Globalization has further to go. For example, while the United States (US) accounts for 25 percent of global gross domestic product (GDP), nearly 90 percent of the goods and services consumed by its residents continue to be produced at home. In a fully globalized world where the probability of purchasing goods and services from domestic and foreign suppliers was the same, the country's trade would average 75 percent of its income, since other countries account for

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75 percent of global production.[1] And for small countries, the import-to-income ratio in a fully globalized world would approach 100 percent. Clearly, we are still some way from this fully globalized benchmark. Similarly, savers continue to place a much higher proportion of their savings in domestic assets than global portfolio diversification would suggest. National savings and investment rates remain highly correlated, where in a world of perfect capital mobility one would expect their correlation to approach zero. Real interest rates and capital/labor ratios continue to diverge across countries, despite the incentive for capital to flow from where it is abundant to where it is cheap, and from where real rates are low to where they are high.

The point of these observations is to suggest that the process of globalization has considerably further to go. Technology marches only in one direction: forward. Technological progress will continue to reduce the cost of acquiring information and communicating and transacting across distance and borders. Politics similarly acquires its own momentum: trade and financial liberalization will continue to create domestic constituencies with a vested interest in open, globalization-friendly policies.[2]

If this logic is correct, then the challenge for emerging markets, including Asian markets, is not whether to prepare for globalization, but how to prepare for globalization. It is deciding what policies to pursue in order to capitalize on the opportunities afforded by a world of globalized markets.

One challenge that all Asian countries face to varying degrees is altering the basis for their economic growth from emulation to innovation, from accumulation to technical change, and "from perspiration to inspiration." A large literature

[1]The reality, of course, is that US purchases of foreign goods and services account for only about 12 percent of US gross national product.

[2]With the liberalization of the People's Republic of China's (PRC) coastal provinces, for example, millions of Chinese have moved to that part of the country in search of employment in export industries, and their presence there creates a powerful counterweight to any thought of rolling back the process of market opening. Admittedly, globalization has been reversed before, notably in the 1920s and 1930s. But there are grounds for arguing that this experience was sui generis and for doubting that it will happen again, at least in our lifetimes. The collapse of 19th-century globalization was due as much to World War I and to the profound economic and political dislocations it set on foot as to any policy decision taken in the 1920s and 1930s (Temin 1989). The additional dislocations starting in 1929 were largely due to the complete and total collapse of banking systems, made possible by the absence of deposit insurance, adequate portfolio diversification, and domestic lenders of last resort (Bernanke and James 1991), institutional gaps which have been largely ameliorated today. (To be sure, Japan suffered serious banking-sector distress at the beginning of the 1990s, and significant bank failures occurred in Asia following the outbreak of its 1997 crisis, but these were not allowed to jeopardize deposits or the functioning of the financial system; if anything the risks now run in the other direction, toward excessive intervention, official forbearance, and moral hazard.) And the very fact that the imposition of trade and capital controls in response to the macroeconomic dislocations of the 1930s consigned the world economy to a decade-long depression makes it less likely that the same policies will be tried again.

documents that Asian economic growth has, for four full decades, rested disproportionately on the accumulation of factor inputs and to more limited extent on increases in total factor productivity (TFP), compared to the experience of countries in other parts of the world. The Asian pattern is not atypical of the now high-income countries in earlier stages of their own development. But those high-income countries, which have sustained their economic growth over long periods, have done so by transforming the basis for their development from factor accumulation to factor productivity growth and by adapting their institutions accordingly. Institutions in Asian countries have been tailored to promoting emulation more than innovation and to encouraging the growth of factor supplies more than the growth of factor productivity. The challenge going forward is how to adapt Asia's institutions to accommodate these new imperatives. It is how to do so in a manner consistent with the opportunities and constraints of globalization.

Section II sets the stage by placing Asian growth in comparative perspective. It reviews evidence that the continent's growth has depended disproportionately on factor accumulation rather than increases in the efficiency of resource utilization, that this pattern is not unusual for countries at a relatively early stage of industrial development, and that Asian institutions have been designed to encourage factor accumulation and imports of technical knowhow. It argues that sustaining growth in the 21st century will require adapting these institutions in ways that place a greater premium on innovation and technical change. In particular, this will entail modifying institutions for managing innovation (Section III), for managing poverty (Section IV), and for managing volatility (Section V) in a manner consistent with the imperatives of globalization.

But answering these questions only poses another: how to develop the capacity to adapt existing institutions. Section VI asks whether this capacity is best developed at the national, regional, or global level and whether initiatives to address the challenge at these three levels are properly regarded as substitutes or complements. It examines the role of crisis in catalyzing the transformation of the institutions providing the framework for growth, stability, and equity in a world of globalized markets, both in Asia and in high-income countries like the US that have already undergone this transition. Section VII concludes.

II. POLICIES AND INSTITUTIONS FOR ASIAN GROWTH

Consensus on the relative importance of factor accumulation and increases in total factor productivity in the growth of the East Asian economies remains elusive. The data are imperfect: national accounts provide data on investment, not capital stocks, for example, and strong assumptions are required before they can be used as the basis for estimates of the latter. Translating the number of workers with different demographic and economic characteristics into an effective stock of labor inputs requires other, equally restrictive assumptions. That the dual and the

primal lead to different conclusions is less than reassuring (Hsieh 1998). And any attempt to distinguish the rate and direction of productivity growth from the elasticity of substitution between capital and labor requires the imposition of further assumptions regarding the form and stability of the aggregate production function.[3]

A. Contours of Asian Growth

The severity of these problems makes the actual breadth of agreement on what distinguishes East Asian growth from that in other regions striking. Over the last 40 years, most investigators agree, growth in East Asia has relied disproportionately on inputs of capital and labor and to a strikingly slight extent on increases in the efficiency with which those inputs are used. One need not adopt the extreme position of Young (1992) and Krugman (1994) that there was essentially no TFP growth in East Asia from the late 1960s to the early 1990s in order to reach this conclusion. Thus, Kim and Lau (1994) estimate translog production functions for Hong Kong, China; Republic of Korea (henceforth Korea); Singapore; and Taipei,China, which allow the data rather than the investigator's priors to determine the elasticity of substitution, and find that TFP accounted for only a third of the growth of real GDP. This contrasts with the US, where TFP accounted for 80 percent of the growth of real GDP between 1948 and 1990 (see Table 1). Apparently, East Asia initiated its high-growth "miracle" by boosting investment rates (capital being the factor input whose rate of accumulation is easiest to vary in the short run) and sustained its growth by maintaining those high rates of investment. Increases in the efficiency with which capital and other factors of production were used, while not negligible, made a relatively small contribution.

There is less agreement on the meaning of this pattern. Is it evidence of East Asia's singular success at promoting savings and investment, which are two of the keys to modern economic growth? Or does it reflect some peculiar failure to boost productivity? Is the pattern normal for economies at East Asia's stage of economic development, or does it reflect a distinctive Asian growth model and the region's pursuit of a unique development strategy?

B. International and Intertemporal Comparisons

Answers can only be obtained by placing East Asia in an international context.[4] Table 1 shows that the relative contribution of increases in TFP growth to

[3] A classic article by Diamond, McFadden, and Rodriguez (1978) shows that it is not in general possible to identify separately a time-varying elasticity of substitution and the bias of technical change.

[4] This discussion draws on the insights of Hayami (1998).

GDP growth is higher, while the relative contribution of factor accumulation is lower, in all of the now advanced industrial countries. The closer an economy is to the technological frontier (measured for present purposes by relative per capita output in the nonprimary sector and epitomized for purposes of 20th-century comparisons by the US), the larger appears to be the relative contribution of productivity growth. Thus, for the post-World War II period as a whole, France, Germany, and United Kingdom (UK) were closer to the US than Japan; and Japan was closer to France, Germany, and UK than the Newly Industrialized Economies (NIEs). When we restrict the comparison to the second half of the period, by which time Europe and Japan had closed much of the gap vis-à-vis the US, the relative contribution of TFP growth is greater. The proximate sources of growth in Europe and Japan resemble even more closely its proximate sources in the US.

Table 1. **Growth Rates of Labor Productivity and Total Factor Productivity in Newly Industrialized Economies and Developed Industrial Economies**

			Average Growth Rate per Year (%)			
		Output Elasticity of Capital ß	Labor Productivity G(Y/L)	Capital-Labor Ratio G(K/L)	TFP G(A)	Percentage Contribution of TFP (G(A)/G(Y/L))
NIEs						
Korea	1960-90	0.45	5.1	8.9	1.1	21
Taipei,China	1953-90	0.49	6.2	9.6	1.5	24
Hong Kong, China	1966-90	0.40	5.2	6.1	2.8	54
Singapore	1964-90	0.44	4.5	6.6	1.6	36
Average		0.45	5.3	7.8	1.8	34
Developed Economies						
France	1957-90	0.28	3.8	4.7	2.5	66
FRG	1960-90	0.25	3.6	4.9	2.4	67
UK	1957-90	0.27	2.3	3.0	1.5	65
US	1948-90	0.23	1.5	1.6	1.2	80
Japan	1957-90	0.30	6.0	9.7	3.1	52
Average		0.27	3.4	4.8	2.1	66

TFP means total factor productivity.

Notes: ß: Average estimates using the translog production function.
Y: Real GDP per work hour.
K: Reproducible capital (excluding residential buildings) adjusted for utilization rates.
L: Work hours.

Source: Kim and Lau (1994, tables 3-1, 6-3, and 7-1).

The obvious interpretation is that growth depends disproportionately on factor accumulation, capital accumulation in particular, in its initial stages.[5] When a late-developing economy develops the ability to utilize modern industrial tech-

[5]As emphasized in the 19th century context by Gerschenkron (1962).

nologies, the equilibrium capital/labor ratio shifts up. During this transition, the economy exhibits a relatively high level of investment and a correspondingly high rate of growth, subject to the availability of savings. The foreign technologies developed by previous industrializers are embodied in this capital equipment. This is evident in the fact that the elasticity of output with respect to capital is relatively high in economies as they begin to develop (typically, a third higher than in mature economies). Either because the capacity to innovate is late to develop or because the processes of importing technology and of innovating at home compete for the same limited domestic resources, absolute as well as relative rates of TFP growth are low at this early stage of economic development.

If this interpretation is correct, then we should observe similar patterns in the history of the now advanced-industrial economies. As already noted, there are hints of such patterns in Japan and Europe in the aftermath of World War II, since these economies were then far behind the US in terms of technical efficiency, and productive capital stocks were significantly below equilibrium levels due to wartime destruction. As a result of two decades of depression and war, Japan and Europe had done little to adapt and commercialize the new technologies pioneered by the US. They could grow quickly and close much of the gap vis-à-vis the technological leader simply by sustaining high levels of investment in capital that embodied this backlog of available technologies.

Indeed, we should see the same pattern in the earlier history of the US itself. Table 2 (following Hayami 1998) shows that the US looked remarkably like the high-growth Asian economies today when it began the process of catching up to the technological leader (in that case, Great Britain) in the 19th century.[6] The share of output growth accounted for by the growth of TFP was little more than a third (essentially identical to the averages of the estimates for East Asia in recent decades obtained by Kim and Lau). As the US closed the gap and assumed technological leadership after 1890, the relative contribution of TFP growth to the growth of GDP rose to now conventional levels. As it was no longer possible to rely on known technologies embodied in capital goods to the same extent, the elasticity of output with respect to capital declined to familiar 20th century levels. The bottom half of Table 2 shows that the same broad pattern is evident in Japan, although the transition to more heavily TFP-based growth and the decline in the

[6]Per capita incomes were already famously high prior to the initiation of industrialization and the emergence of the modern multidivisional corporation pioneered by the US, which might be taken to indicate that the country was the technological leader. So too might the country's singular success at machine building, as reflected in the Crystal Palace Exhibition in 1851. But this reflected an unusual abundance of productive land and natural resources, which put a floor under real wages, and the country's singular success at producing labor-saving machinery for a relatively small number of industries (see Temin 1966, and James and Skinner 1985).

elasticity of output with respect to capital occur later and although capital accumulation continues to play a disproportionate role, even in recent decades.[7]

Table 2. **Long-term Growth in Labor Productivity and Total Factor Productivity in the United States and Japan**

	Income Share of Capital ß	Average Growth Rate per Year (%)				Percentage Contribution of TFP (G(A)/G(Y/L))
		Labor Productivity G(Y/L)	Capital–Labor Ratio G(K/L)	Contribution of Capital ß(K/L)	TFP G(A)	
United States (Private Gross Domestic Product)						
1855-1890	0.45	1.1	1.5	0.7	0.4	36
1890-1927	0.46	2.0	1.3	0.6	1.4	70
1929-1966	0.35	2.7	1.7	0.6	2.1	78
1966-1989	0.35	1.4	1.8	0.6	0.8	57
Japan (Nonprimary Gross Domestic Product)						
1855-1890	0.39	2.7	6.1	2.4	0.3	11
1890-1927	0.43	2.3	2.8	1.2	1.1	48
1929-1966	0.33	8.2	11.6	3.8	4.4	54
1966-1989	0.28	3.8	7.4	2.1	1.7	45

TFP means total factor productivity.

Notes: Y: Defined in parentheses in the left column.
L: Work hours.
K: United States in total fixed capital. Japan in reproducible capital (adjusted for utilization rate).

Source: United States from Abramovitz (1993, table 1, p.223); Japan from Hayami and Ogasahara (1995, table 2).

Overall, the implication is that Asian growth is not unique, however different it looks from that of many high-income countries in the 1990s. Factor accumulation has mattered more, the growth of TFP less, because the region was relatively late to develop. And as Asia approaches the technological frontier, it will find it harder to sustain rapid growth with high investment, since it will already have in place many of the technologies embodied in new capital equipment. The elasticity of output with respect to capital will decline to more conventional levels.

[7]Two caveats are worth noting. First, the data for the US display a decline in the relative contribution of TFP growth in the period after 1965, reflecting the productivity slowdown of the 1970s and 1980s. Extending these estimates into the 1990s, the period of the "new economy", would of course strengthen the interpretation in the text. In contrast, extending the data for Japan into the 1990s would cast further doubt on the interpretation emphasizing a growing role for TFP growth, since this was a decade when output growth in Japan was depressed but domestic investment was sustained at high levels; as a matter of simple arithmetic, productivity growth was slow. But this plausibly was a cyclical aberration, reflecting the country's economic and financial crisis, rather than a change in the secular pattern of growth.

C. The Asian Model

To the extent that Asian growth is unique, its uniqueness lies in the arrangements developed to facilitate the process of closing the technological gap. This is where the debate over the nature of the Asian model comes in. Two views, both represented in World Bank (1993), are that Asia's success in catching up reflects its singular reliance on, alternatively, market forces and government guidance for achieving the requisite allocation of resources. From this thesis and antithesis have emerged a synthesis according to which market forces succeeded in sustaining a rapid rate of growth because of the institutions, constructed by government and society, which provided the structure needed for their operation. Governments pursued policies and nurtured institutions to promote saving, from postal savings systems to end-of-year bonuses. Financial systems organized around a relatively small number of large banks, which could be influenced and directed by the authorities, funneled these savings into investment. Subsidies for firms in strategic sectors and barriers to entry, by creating rents and solving coordination problems, ensured that the investment in question was profitable. Interest-rate controls made it more difficult for firms not favored by the authorities to bid for scarce finance. Land reform, public spending on rural infrastructure, deliberative councils, and tripartism provided the necessary reassurance that the returns to these high levels of saving and investment would be widely shared.

These policies and institutions were tailored to facilitate growth based on factor accumulation rather than growth based upon increases in TFP. Policies that encouraged capital accumulation delivered rapid growth so long as the elasticity of output with respect to capital was high. A relatively even distribution of income, implying that higher living standards would be widely shared, favored saving and investment.[8] A bank-based financial system, in which large financial institutions developed long-term relationships with leading industrial firms, was ideally suited to growth based on known technologies, where the problem was not to choose among competing techniques but rather to implement them with as much capital as necessary. A bureaucracy that attempted to "pick winners" was conducive to growth and efficiency when the potential winners, namely firms in those sectors best placed to adapt and implement foreign technologies, were straightforward to identify.

All this is by way of saying that as Asian economies close the gap vis-à-vis the technological leaders, they will have to "graduate" from a growth model based on accumulation to a growth model based on innovation. They will have to adapt their institutions accordingly. And they will have to do so in a manner consistent with the opportunities and constraints of globalization.

[8]Where greater inequality reflecting the operation of high-powered incentives would have been more conducive to innovation and risk taking.

III. MANAGING INNOVATION

The policies and institutions that a country uses for managing innovation are referred to as its "national innovation system" (Freeman 1987, Nelson 1992) or its "national system of economic learning" (Kim 1997, Mathews and Cho 2000). The national innovation system is defined as the network of public and private institutions that funds and performs research and development (R&D) and disseminates and commercializes the results, while the national system of economic learning can be understood as the institutional framework used to support R&D-led and market-mediated efforts to absorb, adapt, diffuse, disseminate, and improve new technology. International comparisons emphasize the diversity of such systems (see, e.g., Mowery and Oxley 1995). At the same time they discern sufficient similarities to justify referring to "the Asian model."

This Asian model in its early stages of development was tailored to transfer technologies from abroad rather than to develop them at home. This made sense for Asian economies that were relatively late to develop and could take rapid strides simply by importing and assimilating foreign technologies. Thus, other countries emulated the "MITI-model" of industry creation, predicated on the assumption that the appropriate technology already exists, that there is no need to create it from scratch, and that it can be acquired "by one means or another" (Mathews and Cho 2000, 76).[9]

But the longer Asian rates of growth outstripped comparable rates in Europe, Japan, and US, the closer Asia drew to the technological frontier. Closer to the frontier, the rate of return to innovation is greater, while the rate of return to emulation is less (Krugman 1985). Put another way, as convergence proceeds, growth responds less to capital formation and more to R&D and other sources of productivity advance (see Gittleman and Wolff 1995, and Pianta 1995).[10] There is overwhelming evidence that the production of new technologies takes place close to a firm's home base (Freeman 1995, Patel 1995) and that technological spillovers weaken with distance (Keller 2000) even in our technologically globalized world. This points to the need to remake the Asian model to encourage innovation rather than emulation.

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[9] The elements of the model were well known. As these authors describe them, MITI first selected a field with innovation and spin-off potential. After extensive study, it decided whether to target the industry. Targeting entailed pump-priming subsidies designed to get some generic technology developed and to encourage firms to follow up on the commercial possibilities. Where needed, government leverage was used to acquire foreign technology on favorable terms. The recipient firms were then encouraged, through administrative coordination and other mechanisms, to avoid "destructive competition", coordinate the adaptation and commercialization of the new technology, and collaborate in R&D.

[10] This is evident in the tendency, described in Section II above, for the elasticity of output with respect to capital to decline as an economy matures.

As Mathews and Cho (2000) document, the Asian model has already evolved in this direction. At the same time, the fear remains that because institutions exhibit inertia, Asian innovation systems designed for importing and adapting known technologies remain imperfectly suited to nurturing the radical innovations needed if countries are to remain near the frontier in our technologically dynamic, globalized world.

A. Channels

Channels for the acquisition of technology from abroad include licensing, capital goods imports, turnkey plants, foreign direct investment, joint ventures, strategic alliances, and outsourcing. Of these, capital goods imports, licensing, and joint ventures have long been the staples of the Asian model; they have been the mechanisms compatible with the late development of Asian economies and with the desire of Asian governments to promote the acquisition of technology and encourage productivity spillovers.

Capital goods imports have long been a key element of the Asian innovation system. Reflecting this fact, East Asian countries have a higher propensity to import capital goods than the typical developing country. New technologies are embodied in new capital goods, and importing and utilizing such equipment opens up opportunities for learning by using and reverse engineering. Table 3 shows machinery imports as a percentage of domestic expenditures on machinery for six economies at different stages of development, including two Asian economies. The contrast is striking between India, which has long encouraged domestic substitutes for imports of capital goods, and Korea, which has relied disproportionately on equipment for technology transfer.[11]

Table 3. **Machinery Imports as a Percentage of Domestic Expenditures on Machinery (ISIC 38)**

India (1983-84)	0-18
Korea (1983)	0-41
Sweden (1982)	0-56
Norway (1982)	0-57
Denmark (1982)	0-70
Netherlands (1980)	0-61

Source: Mowery and Oxley (1995).

[11]Mathews and Cho (2000) similarly emphasize the disproportionate importance of capital goods imports for technology transfer in Korea. In this context it is interesting to note that the figures for Korea are still lower than those for the smaller European countries, perhaps reflecting the historical protection of Korean industry.

Information on licensing is harder to obtain. Incomplete data suggest substantial reliance on this channel: OECD (1992) reports that Korean spending on licences for imports of technology grew tenfold between 1982 and 1991. Historically, Asian governments have preferred "unpackaged" forms of technology transfer such as licensing to the construction of greenfield plants by foreign investors, on the grounds that licensing (like similarly unpackaged capital-goods imports) offers greater scope for technology transfer.[12] For similar reasons, Asian governments have generally preferred joint ventures to stand-alone operations by foreign multinationals and their subsidiaries.[13]

On the other hand, foreign direct investment (FDI) has the advantage that it is a channel for transferring managerial and technical expertise, which comes bundled with foreign plant and equipment. Such expertise will be particularly valuable when the importing country is attempting to implement relatively sophisticated foreign technologies with a high tacit component. The technologies transferred through wholly owned foreign projects tend to be newer and closer to the technological frontier than those associated with joint ventures and licensing agreements.

Finally, in sectors where minimum efficient scale is modest and foreign managerial and technical expertise is less important, foreign technologies can be acquired via contract manufacturing and assembly operations (that is, being on the receiving end of outsourcing). Such operations facilitate learning by doing. They are an attractive option in a world where information technology allows domestic production to be networked with foreign producers and limits economies of scale.

Table 4 (also reproduced in Mathews and Cho 2000) shows the evolution of these different sources in the Korean case. The special importance of capital goods imports as a source of technology transfer to Korea is apparent throughout the period. Also evident, however, is the economy's reliance on FDI in the early-to-mid 1970s. The importance of FDI declined thereafter, as policy sought to emphasize different channels for technology transfer and to protect indigenous producers from multilateral competition. In its place licensing as a source of technology transfer was promoted. Comparable figures for Taipei,China would highlight that economy's greater reliance on licensing, while those for Malaysia and Singapore would show the importance of FDI by multinationals.

[12]There is some evidence in support of this view; thus, Belderbos et al. (2000) find that local content and related spillovers tend to be lower in Japanese electronics firms' greenfield subsidiaries than in their joint ventures in the ASEAN-4 countries and People's Republic of China (PRC).

[13]The PRC government in particular has encouraged joint ventures over wholly owned subsidiaries. In fact, the evidence that licensing and joint ventures lead to more learning by local firms is scant to nonexistent (see Saggi 1999).

Table 4. **Korea: Channels of Technology Leverage in all Industries, 1965-91**
(**$ millions**)

	1962-66	1967-71	1972-76	1977-81	1982-86	1987-91
FDI	47	219	879	721	1,768	5,636
Licensing	1	16	97	451	1,185	4,359
Technology Consultants	0	17	18	55	332	1,348
Capital Goods	316	2,541	8,841	27,978	44,705	52,155
Total	364	2,793	9,835	29,205	47,990	63,498

Source: Based on Hong (1994, table 7).

B. Policies

Each of these channels for technology transfer has been fostered by policy. The application of uniform tariff rates that do not discriminate against capital-goods imports has already been noted. Similarly, Asian governments, following the example of Japan, have sought to secure technology licences for domestic producers on the most favorable possible terms and made entry by foreign multinationals contingent on such licensing agreements.[14]

Asian governments have also pursued policies to maximize the spillovers and externalities associated with licensing, foreign direct investment, capital goods imports, and outsourcing, again taking a cue from Japan, which in the 1950s and 1960s required technology licensing as a quid pro quo for permission for foreign firms to engage in FDI in the Japanese market, encouraged domestic firms to bundle imports of heavy electronic machinery with licences to produce copies of the equipment, and supported entry by domestic producers into the production of this equipment (Ozawa 1985). Thus, Korea both protected domestic producers and placed pressure on foreign joint venture partners in the 1970s to withdraw and leave the field to indigenous firms (Mathews and Cho 2000, 19). The Korean Law for Promotion of Engineering Services, adopted in 1973, stipulated that all government-financed projects should engage local engineering firms as the prime contractor. A 1976 revision extended favorable tax treatment to local engineering firms involved in such projects (Kim and Ma 1997).

Macroeconomic, trade, and financial policies are integral to the Asian system of innovation. Stable monetary and fiscal policies, supplemented by favorable demographics, supported high levels of saving. Much of this saving was channeled through government-controlled bank and postal savings systems that provided concessionary credits to firms and conglomerates in technologically progressive

[14]Thus in the 1950s and 1960s, MITI encouraged the negotiation of unpackaged technology transfer in the form of patent rights, detailed drawings, operating instructions, and manuals. Often it informally designated a particular firm to negotiate with a specific foreign company and sometimes delayed its approval in order to enhance that firm's bargaining power or made approval conditional on the extension of lower licensing rates (Kim and Ma 1997).

sectors. More controversially, controls on capital exports were used to ensure that domestic saving, once mobilized, was devoted to capital formation at home. Japan; Korea; and Taipei,China all employed such restrictions in the early stages of their industrial growth, and the People's Republic of China (PRC) continues to do so.[15] Barriers to entry by multinational corporations and domestic start-ups gave incumbents Schumpeterian breathing space to learn by doing. Where economies of scale were important and where multidivisional structure was seen as necessary to capture technological spillovers, governments of countries like Korea provided preferential credit for the growth of integrated industrial groups. Since leading-edge technologies (for integrated steel making in the 1970s and 1980s, or semiconductors in the 1990s) were characterized by substantial minimum efficient scale and dynamic increasing returns, policies of export promotion were used to overcome the constraints posed by limited domestic markets, while the imperative of exporting exposed producers to the discipline of foreign competition.

Asia is not alone in pursuing policies to encourage the transfer of advanced technologies from abroad, although it arguably has had more success than most other late-developing regions. This success can be attributed to three factors. First, Asian economies possess the engineers and scientists needed to recover the principles underlying foreign technologies, which in turn facilitates the dissemination of techniques from foreign firms to domestic producers and allows substitutes for foreign capital goods to be produced at home at a relatively early date.[16] Hong Kong, China; Singapore; and Taipei,China have long been ahead of other developing countries in the share of their populations enrolled in post-secondary education in scientific and engineering fields and have encouraged the best students in these fields to acquire advanced training abroad. One of Singapore's first initiatives when the decision was taken to attract foreign high-tech producers was to train a cadre of knowledge workers. Korea and Taipei,China have established publicly funded advanced research institutes staffed by these scientists and engineers trained at foreign universities, and encouraged them to establish links with commercial firms. That such initiatives have enhanced absorptive capacity is clear.

A more controversial assertion is that the Asian system of innovation was successful because firms were subjected to relatively intense competition, applying pressure to emulate best practice, specifically the best-practice techniques of foreign-owed and operated firms. The intensity of the competition to which producers in Asia's rapidly industrializing economies have been exposed is

[15]At the same time, Hong Kong, China; and Singapore promoted savings, investment and technology transfer while permitting—indeed, encouraging—the free international flow of portfolio capital.

[16]Thus, Urata and Kawai (2000) measure technology transfer by comparing the level of TFP between parent firms and overseas affilitiates, and find that transfer is highest for Asian countries with relatively ample supplies of scientists and engineers.

contested.[17] Instances can be cited where incumbent firms enjoyed protection from foreign competitors and domestic entrants and devoted their energies to lobbying government against granting licences to new entrants rather than to raising productivity.[18]

Third, it is asserted that this Asian system of innovation was successful because restraints on entry and other policy interventions were guided by well-defined rules and because technocrats enjoyed the bureaucratic autonomy necessary to avoid capture by domestic industry. Bureaucrats are protected by civil service systems that ensure adequate compensation and merit- (exam-) based recruitment and promotion, and disciplined by strictly enforced dismissal policies. Japan, Korea, and Singapore are the paradigmatic cases. Early land reform and support for small- and medium-scale industry was similarly important for preventing the emergence of concentrated interests positioned to capture the policy making process.

This argument has been rendered controversial by the Asian crisis; where commentators once wrote approvingly of "bureaucratic autonomy", they now decry "crony capitalism." The capture of industrial policy, in this view, is as much a problem in Asia as in other parts of the world. Perhaps the traditional interpretation was never right, or maybe the new emphasis on crony capitalism is overdrawn.

Or possibly problems of capture have intensified with time. The longer industrial policies are pursued, the more intimate become the connections between the regulators and the regulated. The longer the period for which preferences are extended to certain firms and sectors and the greater the government's emphasis on solving coordination problems, the larger grow the leading firms and conglomerates, and the more able they are to influence policy. And as the economy grows more technically sophisticated, monitoring the performance of the enterprises receiving preferential treatment grows more difficult for the bureaucrats.

C. Adapting to Globalization

This argument—that policies of bureaucratic direction that worked well at an earlier stage of Asia's technological development work less well today, is a specific illustration of a more general point. National systems of innovation and learning are dynamic: their structure varies with time. In early stages of their industrial development, Asian countries relied heavily on arms-length transac-

[17]In addition, this argument is controversial because of Schumpeter's thesis that a degree of restraint of competition may actually encourage technical progress by giving firms the breathing space they need to experiment with unproven techniques.

[18]Kim and Ma (1997) cite the Indian petrochemical industry in this connection. To the extent that competitive pressure has been felt, this would appear to have been experienced mainly by export-oriented firms.

tions—technology licensing and purchases of foreign capital goods—and less on foreign direct investment, joint ventures, and outsourcing. Adopting licensed technologies arguably requires more limited adaptations of domestic economic structure than FDI and joint ventures, which will be attractive to foreign firms only if the economy is comprehensively restructured. Licensing also tends to be a source of less sophisticated technologies (Mansfield et al. 1982). Thus, as economies approach the technological frontier, they increasingly prefer FDI. Because joint ventures also tend to transfer older and less sophisticated technologies (Smarzynska 1999), there is a similar tendency to move away from them as a country approaches the technological frontier. This evolution of the national system of innovation also finds reflection in the growing R&D-intensity of domestic firms.

But while there is a tendency for national innovation systems to evolve as the economy matures, there is also a tendency for the policies and institutions developed for and appropriate to earlier stages of economic and technological development to become locked in. Thus, if small firms are disproportionately responsible for the development of new technologies, then at some point industrial policies conducive to the growth of large conglomerates will become an obstacle to innovation.[19] And the existence of those large conglomerates will create pressure to retain those policies. If the development of new technologies requires venture capital to fund start ups, and if venture capital can be allocated efficiently only by decentralized securities markets, then a relatively concentrated bank-based financial system, while once having been appropriate to funding large firms using known technologies subject to substantial minimum efficient scale, will now become an obstacle to indigenous innovation.[20] Moreover, the existence of those large banks will create pressure to slow the emergence of the securitized markets needed to efficiently allocate capital to research-intensive activities. Increasingly, the pre-existing system of innovation will be a barrier to technical change.

Moreover, as globalization proceeds, the national innovation systems of the continent's early developers may no longer be available to the latecomers. The multinational corporations that are the source of advanced technologies are

[19]Acs and Audretsch (1987, 1990) find that smaller firms (with fewer than 500 employees) have a higher number of innovations per employee in a majority of US industries. The subsequent literature has reached mixed conclusions, although it is fair to say that a majority of studies find that R&D intensity is greatest for relatively small and relatively large firms, and least for middle-sized firms. Also relevant in this connection are the conclusions of Cohen et al. (1987), who find that if size favors R&D, it is the size of the business unit and not the overall size of the firm that matters, which does not favor the conglomerate form of organization adopted in some Asian countries.

[20]Carlin and Mayer (1998), using data from 27 industries in 20 countries, show that equity-financed industries tend to carry out more R&D and employ more highly skilled workers, while bank-financed industries tend to be more physical-capital-intensive (see also Hoshi et al. 1990).

inclined to license the latter only when they are prevented from setting up their own branch plants utilizing these techniques in promising foreign markets themselves. As more emerging markets have thrown open their economies to foreign direct investment, it becomes harder for individual governments to insist on licensing as an alternative. Even as Korea has created a world-class electronics industry while minimizing its reliance on FDI, as firms there and elsewhere in Asia are recognized as competitors by US producers, the latter will become more reluctant to license them their most advanced technologies.[21]

If it is correct that globalization makes it more difficult for economies to approach the technological frontier by importing capital goods, luring foreign direct investment, and licensing foreign technologies, and if it is correct that Asian economies as they reach more advanced stages of technical development must in any case rely more heavily on indigenous technical change, then the Asian system of innovation must be comprehensively remade. Preferences for large firms and conglomerates must be removed. Banks will have to give way to securities markets. Governments' command over resources and technocrats' efforts to control their allocation will have to be reduced.

This is not to say that the Asian system of innovation will become indistinguishable from its foreign counterparts. On the contrary, certain features of the Asian system are eminently well suited to a globalized, technically fluid world—and these are strengths on which the Asian model can build. The emphasis on export competitiveness remains an admirable characteristic of national systems of innovation faced with rapidly changing technologies and globalized production. Investments in scientists and engineers should of course remain a high priority. Governments should still encourage and actively support collaboration between universities, technical institutes, and private-sector firms and promote the commercialization of new technologies.

That said, the Asian system of innovation will have to be renovated top to bottom. This will require the same concerted efforts that Asian countries used to initiate industrialization and transfer technology from the West after World War II. But this time it will require taking government out of the process rather than putting it in.

IV. MANAGING POVERTY

Globalization will be most warmly received if its benefits are widely shared. The fact that economies that are more deeply integrated into global markets tend to have larger public sectors can be understood as providing social protection for

[21]Similarly, insofar as the Internet allows firms to outsource the production of components internationally, it makes it harder for governments to promote the transfer of advanced technologies by requiring the construction of branch and turnkey plants.

those who cannot protect themselves from the volatility and pressures of globalization (Rodrik 1998). Such protection helps to support the broad-based political coalition needed to sustain a commitment to openness. It facilitates the quick policy adjustments needed to absorb globalization-related shocks insofar as there is the perception that the costs of adjustment, like the benefits, are equitably shared.[22]

There are two characterizations of the links between globalization and poverty. One current in the advanced industrial economies is that globalization aggravates inequality by increasing skill premiums and reducing the demand for unskilled labor.[23] There appears to be evidence for individual countries, such as PRC and Thailand, that opening and globalization aggravate inequality and lead to an increasing concentration of poverty in particular regions and occupations (see Ahuja et al. 1997; Table 5 for trends in poverty in Asia). However, systematic cross-country empirical studies of developing countries provide little support for this claim. Dollar and Kraay (2000) find no evidence that openness to foreign trade benefits the poor less than the whole economy. They find no evidence that the presence or absence of capital account restrictions has a differential impact on the relative status of the poor.

The other view is that globalization increases risk rather than redistributing income, and that the poor are least able to cope with the consequences. The poor have the least savings. They have the fewest assets and least valuable collateral. They are least able to afford insurance. Hence, they suffer disproportionately from the insecurity caused by globalization.[24]

For countries seeking to capitalize on globalization, this points to the need for two policies: for the short term, insurance against shocks; and for the long term, measures to foster the accumulation of forms of human capital that are useful in an economically globalized world, specifically among socioeconomic groups that have not traditionally possessed them.

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[22]The advantages of shared growth are a theme of much of the recent literature on the Asian Model: see for example World Bank (1993) and Campos and Root (1996). Rodrik (1997) links the concept to ease of adjustment to external shocks.

[23]In relatively poor developing countries, however, the opposite is plausibly true: openness and globalization should lead to increasing specialization in the production and export of labor-intensive goods, not skill-intensive goods.

[24]Agenor and Aizenman (1998) show that globalization that raises growth but also raises volatility can reduce welfare when costly state verification makes insurance difficult to obtain. While the authors do not explicitly distinguish the poor, it is to them that the rationing of insurance most plausibly applies.

Table 5. **Poverty in East Asia, 1975-1995**

	Number of People in Poverty (millions)				Head-count Index (percent)				Poverty Gap (percent)			
Economy	**1975**	**1985**	**1993**	**1995**	**1975**	**1985**	**1993**	**1995**	**1975**	**1985**	**1993**	**1995**
East Asia[a]	716.8	524.2	443.4	345.7	57.6	37.3	27.9	21.2	n.a.	10.9	8.4	6.4
East Asia excluding PRC	147.9	125.9	91.8	76.4	51.4	35.6	22.7	18.2	n.a.	11.1	6.0	4.6
Malaysia	2.1	1.7	<0.2	<0.2	17.4	10.8	<1.0	<1.0	5.4	2.5	<1.0	<1.0
Thailand	3.4	5.1	<0.5	<0.5	8.1	10.0	<1.0	<1.0	1.2	1.5	<1.0	<1.0
Indonesia	87.2	52.8	31.8	21.9	64.3	32.2	17.0	11.4	23.7	8.5	2.6	1.7
PRC	568.9[b]	398.3	351.8	269.3	59.5[b]	37.9	29.7	22.2	n.a.	10.9	9.3	7.0
Philippines	15.4	17.7	17.8	17.6	35.7	32.4	27.5	25.5	10.6	9.2	7.3	6.5
Papua New Guinea	n.a.	0.5	n.a.	1.0[c]	n.a.	15.7	n.a.	21.7[c]	n.a.	3.7	n.a.	5.6[c]
Lao PDR[d]	n.a.	2.2	2.2	2.0	n.a.	61.1	46.7	41.4	n.a.	18.0	11.5	9.5
Viet Nam	n.a.	44.3	37.4	31.3	n.a.	74.0	52.7	42.2	n.a.	28.0	17.0	11.9
Mongolia	n.a.	1.6	n.a.	1.9	n.a.	85.0	n.a.	81.4	n.a.	42.5	n.a.	38.6

n.a. means not available.

Note: All numbers in this table (except for Lao PDR) are based on the international poverty line of $1 per person per day at 1985 prices. Italics are explained in Appendix A.

[a]Includes only those economies presented in the table.

[b]Data are for 1978 and apply to rural PRC only.

[c]Data are for 1996.

[d]Available data on purchasing power parity (PPP) exchange rates and various price deflators for Lao PDR are not very reliable and lead to anomalous results. Poverty estimates for Lao PDR are not very reliable and lead to anomalous results. Poverty estimates for Lao PDR are based on the national poverty line, which is based on the level of food consumption that yields energy level of 2,100 calories a person per day and a nonfood component equivalent to the value of nonfood spending by households who are just capable of meeting their food requirements (see World Bank 1995a for details). While the $1 a day poverty line is based on characteristic poverty lines in low-income countries that have comparable food and nonfood consumption needs, this is a different methodological approach than that used for the rest of the economies in the table. Thus the poverty estimates for Lao PDR are not strictly comparable to those for other economies.

Source: World Bank staff estimates.

A. Social Insurance

Insurance provides protection against accidents. In the context of globalization, the relevant accidents can range from sharp changes in relative prices on world markets to full-blown economic and financial crises. Building an effective social safety net takes time, however; ramping up programs in response to a crisis can be difficult and inefficient (Birdsall and Haggard 2000). This makes it important to put in place the infrastructure providing social protection before a crisis strikes.

To maximize bang for the buck, the safety net should be targeted at the poor. To limit welfare dependency, it should offer support for a limited period of time. Once one moves beyond these generalities, however, difficult issues of

design immediate arise. Insofar as there is a consensus on these issues, it runs as follows.

(i) *The safety net should provide workfare for those able to work.* Workfare is a relatively efficient way of providing relief, especially when local input is used in selecting works projects and the workers are also the beneficiaries of the public works in question (which helps with quality-control problems: see Ravillion 1999). Workers can be offered public employment at a wage equal to, say, 90 percent of the wage for unskilled agricultural labor prior to the crisis. Workfare designed in this way will protect the poorest workers against the loss of income associated with the crisis without drawing other workers away from private employment or encouraging welfare dependency.

South Asia has been a pioneer among developing countries in the development of workfare programs. The Indian State of Mahrastra is known for its Employment Guarantee Scheme, which efficiently targets the poor.[25] Bangladesh has experimented with similar programs, though these have been limited by the availability of donor resources to finance them. Sri Lanka's Janasaviya Program makes entitlement to food coupons conditional on a household supplying 24 days of labor monthly to rural public works projects; in contrast to Bangladesh's program, it enjoys dedicated budgetary funding. These programs are not free of criticism: women receive only 25 percent of the benefits, many of the assets created are of poor quality, maintenance is inadequate, and wages are often too high to provide efficient self targeting (Subbarao, Braithwaite, and Jalan 1995). Still, they are an obvious element of the social safety net that societies need to build to protect their poorest members.

(ii) *The safety net should provide targeted transfers to those unable to work.* Workfare should be supplemented with cash transfers targeted at subgroups such as the elderly and pregnant women. Effective targeting maximizes the budgetary bang for buck. On the other hand, targeting runs the risk of creating social stigma for the recipients, especially in the Asian context (Birdsall and Haggard 2000). And an emphasis on targeting can create a clash between poverty alleviation, strictly defined, and other social programs,

[25]The relatively low wage, which is only a fraction of the formal sector minimum wage, encourages self-selection by the poor.

such as the provision of education, which are universal and investment-based.

Making targeting effective is a perennial problem in such programs, since politically powerful groups seem to be able to insist on a share of the spoils. India's Public Distribution System has long been criticized for failing to target its benefits.[26] Bangladesh's public food distribution scheme is said to cost six times the value of the transfers actually received by targeted households. The Philippines' generalized food subsidy program costs the government three pesos for every peso transferred to households, and the households in question are not generally the poorest.[27]

(iii) *The safety net should provide credit for those affected by the fallout from financial crises.* Crisis conditions can force poor households into distress sales of productive assets that depress their postcrisis income and productivity. Disruptions to financial markets can interrupt access to the trade and producer credit needed to obtain essential inputs. Limited amounts of credit extended in response to these disruptions should therefore minimize the adverse consequences for poor households. Here, too, Asia has considerable experience with such programs, providing a foundation on which to build. India's Integrated Rural Development Program provides credit to means-tested households for purchases of nonland assets. While it has been criticized for not reaching the poorest households or only doing so at considerable budgetary cost, the approach taken by Bangladesh's Grameen Bank is seen as a solution to this problem. Credit has been effectively channeled to the ultrapoor, including women. Studies suggest that participants' incomes rose by more than 50 percent relative to those of the relevant control groups (Khandker, Khalily, and Khan 1994).

Poverty alleviation should build on the existing safety net. As noted above, scaling up existing workfare, microcredit, and targeted transfer programs in response to a crisis is easier than creating new programs from scratch. Additional

[26] An exception is the state of Kerala, where the poorest 60 percent of the population has historically received 80 to 90 percent of the benefits. Other Indian states are now using various forms of means testing to more effectively target PDS benefits. Sri Lanka's food stamp program also appears to be relatively well targeted.

[27] Thus, in the first half of the 1990s, the National Capital Region and Cagayan Valley, which account for less than 3 percent of the poor (measured in terms of nutritional standard) received 35 percent of the subsidized rice (Subbarao, Braithwaite, and Jalan 1995).

support can be distributed through existing channels and can build on the existing administrative infrastructure.

While South Asia has considerable experience in the administration of such programs, the limited success of the poverty alleviation efforts in East Asia in 1997-1998 can be understood in terms of the absence of pre-existing safety net programs that could be quickly ramped up.[28] While the proportionate increase in spending on such programs was largest in Korea, where it rose from negligible levels prior to the crisis to nearly five percent of the budget, and in Indonesia, where the budgetary share rose from very low levels to 3.6 percent, in both cases only a fraction of the poor was covered. In Korea, safety net programs covered only a third of the poor prior to the crisis, and this share fell to 17 percent in 1998 despite rapid increases in spending. As of June 1998, only 7 percent of the 1.5 million unemployed had received unemployment benefits. Numbers participating in the government's newly created workfare scheme reached 200,000 at the beginning of 1999, but there were more than 700,000 applicants for these positions (despite the fact that they paid submarket wages), again indicating the partial nature of coverage. Indonesia, for its part, introduced a public works scheme and a rice distribution program. Estimates suggest that no more than a third of poor Indonesian households have participated in some form. Birdsall and Haggard (2000) argue that well-organized rural lobbies prevented the program from being extended to the urban poor. And while the rice distribution scheme made available to targeted households ten kilos of medium-grade rice each month at subsidized prices, this was the equivalent to only a small fraction of the income of a household living at the poverty line.[29]

B. Structural Remedies

Turning from crises to structural sources and remedies for poverty one finds an enormous literature. The standard emphases for relatively poor countries like those of South Asia are on land reform, education, the abolition of pricing policies that discriminate against agriculture, and the creation of a stable macroeconomic and legal framework. Education is associated with the adoption of relatively innovative agricultural technologies by rural residents, and perhaps more importantly, from the point of view of income distribution and poverty alleviation, facilitates their movement from rural to urban employment. Market liberalization and stable macroeconomic and legal frameworks stimulate growth, whose benefits filter down to the poor. A relatively equal distribution of land encourages the

[28] In addition, of course, there was the exceptional severity of the crisis and the budgetary strains it entailed. Manuelyan Atinc and Walton (1998) estimate that a fully-funded workfare program in Indonesia would have cost the central government of that country as much as 5 percent of GDP, where precrisis spending on safety net programs was less than a tenth this amount.

[29] Data and estimates in this paragraph are from World Bank (2000).

adoption by family farmers of economically and organizationally efficient modes of cultivation.

These points are well known; the question is what difference, if any, globalization makes for the antipoverty agenda. Because globalization exposes national economies to external shocks, it requires workers as well as firms to be quick on their feet. The implication is that educational spending should impart general knowledge rather than technical training and sector-specific skills. The literature on this subject (e.g., Heckman 2000) shows that such general knowledge is imparted most efficiently at early stages in the education process. This suggests targeting educational subsidies at primary education and ensuring that the poorest (and both genders) are included. The first point feeds into an Asian strength: the high-performing Asian economies have long allocated a disproportionate share of educational spending to basic as opposed to higher education.[30] In contrast, the second observation points to the need to reorient the Asian model, which has traditionally focused heavily on vocational training of sorts that are likely to be less easily transferred in a rapidly changing high-tech world.

Recent contributions to the development literature (e.g., Lopez, Thomas, and Wang 1998) suggest that a more equal distribution of education has a positive impact on average per capita incomes. The obstacle to a more equal distribution of education, according to much of the development literature, is the fact that the extra income from child labor, which is indispensable to poor families, comes at the expense of the children's longer-term prospects of escaping poverty through education.[31] And insofar as openness leads poor countries to specialize in the production and export of labor-intensive goods, there is the danger that globalization will draw poor children out of school. Targeted subsidies for school attendance are an obvious policy response. Bangladesh's Food-for-Education Program, which offers a stipend to selected participants (somewhat more than the equivalent of 13 percent of monthly earnings for boys and 20 percent for girls) has demonstrated an ability to ensure nearly full school attendance by those to whom it is extended.[32] Early evidence similarly suggests that Indonesia's Stay in School

[30]World Bank (1993) takes the contrast between Venezuela and Korea as illustrative: whereas Venezuela allocated 43 percent of its education budget to higher education in 1985, in the same year Korea allocated only 10 percent to higher education. While government finance in Korea accounts for nearly 100 percent of the direct costs of primary schooling, it provides less than 50 percent of such costs for tertiary education.

[31]The ancillary assumption is that parents cannot borrow to finance schooling.

[32]Ravillion and Wodon (1999) find, however, that reductions in the incidence of child labor account for only a proportion of the increase in school enrollment. Taken literally, their results suggest that many households are substituting children's leisure for their schooling. But it is also not possible to reject the hypothesis that informal, nonreported work is the actual substitute for schooling. Similar results obtain for the *Bolsa Escola* program in Brazil—both its effectiveness in increasing school enrolment and its uncertain effects on child labor (Sedlacek, Ilahi, and Gustafsson-Wright 2000).

program, which provides grants to the poorest schools and transfers to the poorest students, has been similarly effective (Birdsall and Haggard 2000, 31). Such programs have the additional advantage that local schools are important stakeholders, leading them to become actively involving in monitoring and administering their operation.

V. MANAGING VOLATILITY

Globalization, recent experience has made clear, can be a source of volatility. As they integrate into the global economy, emerging markets are increasingly exposed to disturbances emanating from outside their borders. For example, the slump in global semiconductor prices, an instance of an adverse terms-of-trade shock, is blamed for undermining the health of the Korean economy in the run-up to its 1997-1998 crisis (Goldstein 1998). And as they become integrated into global markets, economies become increasingly susceptible to contagion-related spillovers from national, regional, and global financial crises. The fact that the PRC did not succumb to the Asian crisis has been ascribed to the fact that it retained capital controls and consequently was not deeply integrated into global financial markets. More generally, Eichengreen, Rose, and Wyplosz (1995) have shown that countries are more likely to be able to contain speculative pressure when they are not yet integrated into global financial markets. This is not to suggest that the costs of globalization swamp the benefits, but to emphasize the importance of developing institutions and pursuing policies aimed at limiting volatility and minimizing its adverse social consequences.[33]

A. Effects of Volatility

There is now ample evidence of the costs of macroeconomic volatility.[34] Ramey and Ramey (1995) estimate that a unit increase in the standard deviation of the innovation in GDP reduces the rate of growth of GDP per capita by one-fifth of one percent per annum. Easterly and Kraay (1999) also find that an increase in the standard deviation of growth reduces the average annual rate of per capita growth by roughly the same order of magnitude as Ramey and Ramey.[35] Upon controlling for other determinants of the secular rate of growth that are standard in the empirical growth literature, IDB (1995) finds that growth depends negatively on the volatility of the terms of trade, the volatility of the real exchange rate, the

[33]While the view that openness is a source of volatility is commonplace (and will strike many readers as intuitive), the evidence is mixed. Kraay (1998) analyzes the connections between financial openness and the volatility of capital flows and fails to detect a consistent effect.

[34]A compendium of research on this topic is Interamerican Development Bank (1995).

[35]Obvious issues arise about the direction of causality underlying all of these correlations that should be borne in mind when interpreting the results.

volatility of monetary policy, and the volatility of fiscal policy.[36] Using data ending in 1992, IDB estimates that real GDP (measured in growth rates) was half again as volatile in East and South Asia as in the advanced industrial countries.[37] De Ferranti et al. (2000), upon updating these calculations through the end of the 1990s (thereby including the Asian crisis), predictably find a larger differential: real GDP volatility has been fully twice as volatile in East Asia as in the industrial countries.[38] South Asia, for its part, lies midway between East Asia and the industrial countries according to these calculations.[39]

Does this volatility reflect external disturbances or domestic policies? For the period ending in 1992, the answer is "policies" if the comparison is with the industrial countries. On average, the external shocks experienced by East and South Asian countries have not been dramatically different in magnitude than those hitting the advanced industrial countries. The standard deviation of the change in the terms of trade was roughly the same.[40] Nor was the standard deviation of international capital flows as a percentage of GDP dramatically different than in Europe, Japan, and US.[41] But budget deficits were relatively volatile outside the four East Asian "miracle economies" (in which the volatility of fiscal policy is indistinguishable from the advanced-industrial countries).[42] And monetary policy was relatively volatile throughout the region. The IDB's estimates imply that this volatility reduced growth in East Asia over the period 1960-1985 by about a tenth of a percent a year.[43]

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[36]The largest effects are associated with the volatility of the terms of trade and the real exchange rate. A variety of other studies (e.g., Mendoza 1994; Guillaumont, Jeanneney, and Brun 1999; Easterly and Kraay 1999) have also documented this association between terms-of-trade volatility and growth.

[37]In an accounting sense, much of this differential is attributable to investment (again measured in terms of its rate of growth), which was twice as volatile in the "East Asian Miracle" economies as the industrial countries over the sample period.

[38]Their estimates (Figure 2.1) include also seven Pacific countries.

[39]Thus, real GDP growth volatility as calculated by de Ferranti et al. (2000) has risen from 3 percent in the 1960s through 1980s to 4.5 percent in the 1990s for East Asia, but fallen from more than 2.5 percent to a bit more than 1.5 percent in South Asia over the same period.

[40]Terms-of-trade shocks can obviously be calculated in different ways, and decisions of how to do so may be important for such comparisons. Thus, de Ferranti et al. (2000) compare the volatility of the change in the terms of trade across regions and decades, but also interact this measure with the openness of the economy (to derive a measure they label "terms of trade shocks"). While terms-of-trade disturbances to South Asia in the 1990s were nearly four times as large as to East Asia according to the first measure, they were of identical magnitude according to the second.

[41]This pattern obviously changed as Asian economies opened their markets to international capital flows in the 1990s, as the 1997 crisis revealed, and the updated estimates to be discussed momentarily indicate clearly.

[42]The public consumption component of the budget, however, has consistently been more volatile in East Asia than the industrial countries (de Ferrenti et al. 2000).

[43]And by about half that amount in South Asia.

B. Effects on Growth

The negative association of volatility with growth reflects adverse impacts on productivity and investment. Productivity will suffer if unpredictable changes in relative prices render one technology appropriate but lead firms to chose another. In the face of relative-price uncertainty, companies may hedge their bets by investing in several alternative technologies, all but one of which will be less efficient and productive than the optimal technology in any state of nature. Countries where volatility is high also display relatively low investment rates, reflecting the reluctance of entrepreneurs to commit to projects when prices and macroeconomic conditions change unpredictably. While East Asian investment rates are high by international standards, recent empirical work suggests that they would have been higher still (by an additional two to three percentage points of GDP) if volatility had been as low as in Europe, Japan, and US (see IDB 1995, Goldberg 1993, and Kenen and Rodrik 1986).

It can be argued that this emphasis overlooks a major source of volatility and a key channel through which volatility exercises its adverse effect on growth, namely, financial crises. Crises are incompatible with growth: they lead to stop-go policies, interfere with the operation of the domestic financial system, cause distress in the corporate sector, and force governments to curtail public investment. Crises have multiple causes, but one unquestionably important cause is financial fragility, which becomes increasingly important as the action shifts from the current to the capital account and thus from nonfinancial to financial transactions. Because creditors will rationally hesitate to tie up their funds in a volatile macroeconomic environment, volatility encourages reliance on short-term debt, which heightens the fragility of financial systems. Creditors will similarly hesitate to invest in assets denominated in domestic currency when exchange rates are volatile. This "double mismatch problem," that the balance sheets of domestic financial and nonfinancial firms display either a maturity mismatch (a combination of long-term assets and short-term liabilities) or a currency mismatch (a combination of domestic-currency-denominated assets and foreign-currency denominated liabilities), leaves domestic markets vulnerable to destabilization by sudden changes in financial conditions.

C. Effects on Other Social Indicators

There is now ample evidence that volatility has undesirable consequences for the distribution of income, poverty, and educational attainment. The poor, unskilled and uneducated are least able to protect themselves by hedging their incomes and diversifying their investments; it stands to reason that they should suffer disproportionately from volatility. Gavin and Hausmann (1995) find, in a study of a cross section of countries, that the volatility of real GDP has a strong

negative effect on the equality of income distribution. Other studies (e.g., Guitan 1995) have similarly found that countries with more volatile rates of inflation display higher levels of income inequality. Moreover, there is evidence that crises and the policy adjustments they entail are particularly bad for income distribution and that their unequalizing effects are especially pronounced in middle-income countries (the category into which many Asian economies fall) (see Bourguignon, de Melo, and Suwa 1991).

Similar results obtain for poverty rates. The poor and near poor tend to be employed in sectors and activities that suffer from volatility, and cuts in social spending in times of crisis fall disproportionately on their shoulders (Morley 1994). As noted above, households near the poverty line have the least savings, the worst collateral, and the most tenuous access to credit and insurance. Moreover, volatility aggravates poverty through its negative impact on growth. Ravallion (1997) estimates that the elasticity of poverty, as measured by the proportion of the population falling below the poverty line, with respect to the growth of per capita income lies between -1.5 and -3.5. Dollar (2000) obtains similar results for a larger sample of countries. Crises are an extreme case in point, in that the elasticity of poverty with respect to income rises sharply in crisis periods. In Indonesia in 1997-1998, the rate of increase of poverty is estimated to have been ten times the rate of decline in income and consumption. In Korea, the poverty rate as conventionally measured more than doubled between 1997 and 1998. Previous studies relating poverty rates to per capita incomes in Korea would have led to forecasts of barely a fifth this amount (see the discussion in World Bank 2000).

Cutler et al. (2000), in a study of several successive Mexican crises, find that crisis-related volatility worsens health outcomes. In the Tequila crisis of 1995-1996, mortality rates were 5 to 7 percent higher than in the immediate precrisis years. The greatest percentage increase was among the elderly. This effect seems to operate mainly by reducing incomes and placing a heavier burden on the medical sector, rather than by forcing less healthy members of the population into the labor force or by compelling primary care givers to go to work.

Finally, volatility is associated with low levels of educational attainment. It affects education partly through its impact on inequality: Williamson (1993) finds that more egalitarian societies (as measured by the ratio of the share of total income of the bottom 40 percent to the share of the top 20 percent) have higher secondary school enrollment rates. In economies that are volatile, the poor, who are already on the margin of subsistence, may be forced periodically to withdraw their children from school so that the latter can contribute to household income, and this interruption of attendance will hinder educational attainment. Governments, forced by crises to cut social services, may be unable to sustain adequate levels of spending on schooling and to retain capable instructors. Where volatility hinders the development of financial markets, families will find it particularly difficult to insure against these risks, forcing them to rely on their children for

relatively inefficient insurance. These effects are likely to be most pronounced in poorer countries suffering larger shocks: thus, it is revealing that school enrollment rates fell in Indonesia but not in Korea or Thailand in 1998 (Frankenberg, Thomas, and Beegle 1999).

D. Managing Volatility

If globalization can aggravate volatility and volatility can aggravate social ills from slow growth to low investment, income inequality, poverty, and inadequate educational attainment, then it is important to adopt policies and develop institutions to limit the volatility that globalization can bring. There is an immense literature on policies for limiting volatility in emerging markets and safeguarding against crisis, and a broad consensus around the following points.

First, foreign trade and investment confer substantial benefits. The positive impact on the growth of merchandise trade and FDI is now widely recognized, though the benefits of portfolio capital flows continue to be questioned. In principle, the portfolio investment permitted by capital account liberalization should relax financial constraints on growth, deepen domestic financial markets, and make direct investment more attractive by facilitating the hedging of exposures and the repatriation of profits. That said, there is concern that the interaction of portfolio capital flows with preexisting distortions can heighten volatility and create crisis risk. The results of Klein and Olivei (1999) are interpretable in this light; the authors find that portfolio capital flows stimulate financial deepening and, by inference, growth in relatively high-income countries, where policy and market distortions are least, but if anything have a perverse effect on financial development in low-income non-OECD countries.

Second, as globalization proceeds, statutory restrictions on transactions on capital account will become increasingly difficult to operate without disrupting other forms of economic activity. Foreign direct investment and multinational production will lead to a growing volume of cross-border transactions by financially sophisticated agents on the lookout for ways of circumventing controls. As small firms penetrate export markets, they will gain the ability to evade controls through leads and lags and over- and under-invoicing. The wider adoption of information and communications technologies will open up avenues for evasion by households, by facilitating international financial transactions via the Internet, for example. Thus, the effective operation of capital controls will require increasingly comprehensive and invasive restrictions on economic behavior, extending to domains well beyond the financial. This is something that individuals are unlikely to welcome and something that they can effectively oppose in an age of democratization.

The bottom line is that capital account liberalization is likely to become increasingly difficult to resist as economic and financial globalization proceeds. This

heightens the importance of coordinating international financial liberalization with the elimination of distortions that would otherwise cause it to heighten volatility and crisis risk. Concretely, this means the following.[44]

(i) *Strengthen the financial sector in preparation for capital account liberalization.* Capital account liberalization will have benefits on balance only if it is preceded by measures to strengthen the domestic financial sector, remove implicit guarantees, and impose hard budget constraints on financial institutions. If bank capitalization is inadequate, managers will be inclined to excessive risk taking, and the offshore funding available through the capital account will permit them to lever up their bets. If bank liabilities are guaranteed on the grounds that widespread bank failures would be devastating to a financial system dominated by banks, foreign investors will not hesitate to provide the requisite funding. A simple explanation for why the resolution costs of banking crises have been larger in the 1980s and 1990s than in earlier decades and larger in emerging than advanced economies is the coincidence of these domestic financial weaknesses with premature capital-account opening. Capital account liberalization thus should follow rather than precede recapitalization of the banking sector, the reinforcement of prudential supervision and regulation, and the removal of blanket guarantees.

The corollary is that capital-account restrictions should remain in place until prudential supervision is strengthened and implicit guarantees are removed. Unfortunately, maintaining barriers to capital flows and foreign financial competition may diminish the pressure for restructuring; developing countries may never achieve the nirvana where their domestic financial systems have been strengthened sufficiently to allow the capital account to be liberalized. This suggests using capital account liberalization to force the issue. But recent experience in Asia and elsewhere casts doubt on the notion that external liberalization that increases the urgency of complementary financial reforms will necessarily deliver the needed reforms before crisis strikes. While crisis itself can breed reform, it does so at a price.

[44]More details on the points that follow can be found in Eichengreen (2000), from which this discussion draws.

(ii) *Liberalize foreign direct investment quickly.* FDI is the form of foreign investment that most plausibly comes packaged with managerial and technological expertise. It is the form least likely to aggravate weaknesses in the domestic banking system. It is the form least likely to be associated with capital flight and creditor panic. This suggests liberalizing inward foreign investment as the first stage of financial-side opening. It suggests liberalizing inward FDI as quickly as possible. This advice would seem obvious but for the large number of governments that have failed to heed it. As of 1996, 144 of 184 countries surveyed by the International Monetary Fund still maintained controls on FDI. One element of the Korean crisis was the government's reluctance to allow inward FDI and its readiness, in the face of foreign pressure, to instead open other components of the capital account.[45]

Skeptics like Kraay (1998) question whether FDI is more stable than other capital flows. In fact, data on the volatility of flows (World Bank 1999) do not suggest a strong contrast between direct investment and portfolio capital. Still, there is an obvious sense in which a foreign direct investor cannot easily unbolt machines from the factory floor in order to participate in a creditor panic.[46] Admittedly, direct investors have a particular incentive to hedge by purchasing other financial assets they can liquidate in a crisis. They can borrow on domestic markets in order to sell short the domestic financial assets needed to take positions in anticipation of a currency collapse. The implication is that the share of inward foreign investment in the form of FDI will offer some protection against financial instability in the early stages of capital account liberalization, that is, before the rest of the capital account has been opened and direct foreign investors, like others, can take positions on securities markets to hedge their exposures. But the more open the capital account, the easier it becomes to arbitrage different instruments, and the less the share of FDI in total capital inflows is likely to matter in this respect.

[45]Admittedly, Thailand's lifting of most restrictions on inward FDI in import-competing industries in the 1970s and on export industries in the 1980s did not prevent a serious crisis. But the problem there was that the country also opened the capital account to portfolio flows without strengthening its financial system and rationalizing prudential supervision.

[46]A recent study by Sarno and Taylor (1999), using time series data for Asian and Latin American countries and Kalman filtering methods, does in fact find that FDI flows have a larger permanent component than bank credit, equity flows, bond flows, and official credit.

(iii) *Use internationalization to strengthen the banking system.* The case for liberalizing FDI early in the process of external financial opening extends to the banking system. Entry by foreign banks is a low-cost way of upgrading the sector's risk-management capacity. The knowledge spillovers that figure prominently in discussions of other forms of FDI apply also to the financial sector. Moreover, insofar as foreign banks are overseen by their home-country regulators, opening the banking sector to foreign investment should raise the average quality of prudential supervision. And insofar as foreign banks are better capitalized, they are less likely to engage in excessive risk taking. For all these reasons, entry by foreign banks can accelerate the upgrading of domestic financial arrangements that is a prerequisite for further capital account liberalization (Demirguc-Kunt, Levine, and Min 1998).

Two caveats should be noted here. First, foreign entry tends to squeeze margins, reduce franchise values, and intensify pressure on weak intermediaries. If gambling for redemption is a problem, then that problem is likely to intensify as entry gets underway. Hence, the stabilizing impact of opening the banking system may be less initially than subsequently. The first-best solution is to strengthen the domestic financial system early in the process of capital account opening (as emphasized above). Failing that, it may be desirable to phase in competition from foreign banks rather than throwing the domestic market open to foreign entry all at once.

Second, entry by foreign banks will undermine the effectiveness of measures designed to limit portfolio flows. International banks with local branches and ongoing relationships with domestic broker-dealers will find it easier than other international investors to borrow the domestic securities needed to short the currency, controls or not.

It follows that banks should be permitted to fund themselves offshore only late in the game. This is a lesson of the Asian crisis and of the literature on sequencing capital account liberalization. It is the message of Korea's crisis, which cannot be understood without reference to the decision to give the banks access to foreign funding before liberalizing other components of the capital account.

Equally, it is important to avoid creating artificial incentives for bank-to-bank lending. Thailand opened other components of the

capital account before giving banks access to offshore funds. But it then created the Bangkok International Banking Facility, under which Thai banks borrowing offshore (and onloaning the proceeds in foreign-currency terms) received favorable tax and licensing treatment. In part this policy is to be understood as an attempt to develop Bangkok as an international financial center. In part it reflects the government's tendency to use the banks as an instrument of industrial policy. Either way it is indicative of policies that are incompatible with the goal of limiting volatility.

(iv) *Rely on market-friendly instruments for regulating foreign exposures.* The preceding might be taken as encouragement for governments to micro-manage the process of liberalization. But efforts to fine-tune the capital account carry their own dangers. They threaten to create a heavy administrative bureaucracy conducive to rent seeking and capture. Financial development makes it progressively easier for participants to evade the authorities' efforts by relabeling positions and repackaging obligations. Interventions relying on markets instead of bureaucrats minimize these risks. This is the attraction of the Chilean approach to capital-import taxes. The Chileans required a noninterest-bearing deposit of one year duration from investors seeking to import capital from abroad.[47] Since the deposit had to be maintained for a year, the implicit tax fell more heavily on investors with short horizons than on those prepared to stay for the long haul. It was transparent and insulated from administrative discretion. There was less scope for evasion than of taxes designed to fall on some foreign investments but not others.

There is an enormous debate over the effectiveness of these measures (Ulan 2000). Some warn that avoidance is a problem. Others point to the lack of evidence that Chile's taxes limited the overall level of foreign borrowing. And still others observe that the Chileans have themselves abolished the measure, which should raise questions about its efficacy. The third objection is misplaced in the sense that the Chilean tax remains on the books; all that has been done is to set the tax rate to zero for the time being. The rationale

[47]The tax was initially set at 20 percent in 1991, raised to 30 percent in 1992, reduced to 10 percent in June of 1998 and set to zero percent in October, and the scope of capital flows to which it was applied was progressively widened. Investors could opt to pay the central bank a sum equivalent to the forgone interest without actually placing the deposit with the bank, as some in fact chose to do.

for doing so was that capital inflows were in particularly short supply following the Asian and Russian crises; a prudential measure that might have been desirable under other circumstances then became too expensive to operate in this period of capital scarcity. More fundamentally, Chilean-style holding periods taxes can be justified as a form of prudential supervision, where short-term inflows, because they are volatile, pose risks to financial stability.[48] Attempting to limit bank borrowing offshore will be futile if domestic nonfinancial corporations are free to borrow and to pass on the proceeds to the banks. Hence the case for an across-the-board holding-period tax on inflows on prudential grounds.[49] This should be regarded as a transitional policy to be pursued until more conventional forms of prudential supervision and regulation have been upgraded, at which point exceptional measures directed toward the capital account can come off. Chile itself can be thought of as having completed this process of upgrading in the 1980s and 1990s.

The second objection—that there is no evidence of the measure reducing the level of capital inflows—overlooks the fact that the goal was never to limit the level of borrowing. Rather, the goal was alter its maturity—to limit short-term inflows as a share of total debt and a share of international reserves. And on the maturity front the evidence is compelling (see Gallego, Hernandez, and Schmidt-Hebbel 1999[50]; see also Table 6.) As for the first objection, it is important to recall that such a measure, to effectively lengthen the maturity structure of the debt, need not be evasion-free.

[48]This analogy is not without limitations; see Laurens and Cardoso (1998) for the relevant objections.

[49]Valdes-Prieto and Soto (1998) argue that this invocation of prudential supervision does not justify controls on nonbanks. But this view overlooks the scope for arbitrage between the bank and nonbank sectors.

[50]That studies of other countries that have employed similar policies reach analogous conclusions is reassuring; see for example Cardenas and Barrera (1995) on Colombia. More generally, Calvo and Reinhart (1999) find in a 15-country panel, including Chile, that the presence of capital controls is associated with a lower share of portfolio plus short-term capital flows as a percentage of total flows. That they do not find the same when they look at portfolio flows alone suggests that the impact on short-term flows is doing most of the work.

Table 6. **Capital Flows and Reserves before and after Implementation of Capital Controls**

	Period[a]			
	***t* - 1 year**	***t***	***t* + 1 year**	***t* + 2 year**
Capital Account Balance (percent of GDP)				
Brazil (August 1994)	1.7	1.5	4.2	4.3
Chile (June 1991)	9.4	2.8	7.5	6.7
Colombia (September 1993)	0.4	5.3	4.3	5.1
Czech Republic (August 1995)	11.0	15.8	7.3	2.1
Malaysia (January 1994)	16.8	1.8	8.7	9.4
Malaysia (September 1998)	2.2	-3.5	-3.6[b]	—
Short-term Flows (percent of GDP)				
Brazil (August 1994)	1.1	-0.8	1.0	1.4
Chile (June 1991)	0.0	-2.6	4.2	0.6
Colombia (September 1993)	2.1	0.9	2.0	0.8
Czech Republic (August 1995)	—	4.2	1.6	1.2
Malaysia (January 1994)	5.2	-1.1	1.5	3.3
Malaysia (September 1998)	3.4	-7.4	-1.8[b]	—
Change in Reserves (billions of US dollars)				
Brazil (August 1994)	8.1	6.5	12.7	8.6
Chile (June 1991)	2.5	1.0	2.1	0.5
Colombia (September 1993)	1.3	0.2	0.2	0.4
Czech Republic (August 1995)	2.4	7.7	-1.5	-2.7
Malaysia (January 1994)	10.0	-1.8	-1.6	3.2
Malaysia (September 1998)	-6.2	4.8	4.2[c]	—
Ratio of Reserves to Short-term Debt				
Brazil (August 1994)	1.0	1.5	1.6	1.4
Chile (June 1991)	1.5	2.2	1.9	1.9
Colombia (September 1993)	2.4	2.2	1.5	1.4
Czech Republic (August 1995)	3.8	3.6	2.6	1.8
Malaysia (January 1994)	3.7	3.9	3.0	2.4
Malaysia (September 1998)	1.4	2.8	3.8[b]	—

[a]Period *t* refers to the year in which controls were imposed.
[b]World Bank staff estimates.
[c]As of November 1999.
Source: World Bank (2000).

The same point—the desirability of transparent, comprehensive, market-based taxes rather than controls—applies equally to the outflow side. One manifestation of this fact is how Malaysia has moved from comprehensive outflow controls to an exit tax on foreign capital satisfying a minimum-stay requirement.[51] But not too much should be expected of outflow controls in times of crisis, given the strong incentives that then exist for avoidance.

(v) *Liberalize stock and bond markets next.* Because bank deposits are a contractual obligation to repay at par, the withdrawal of foreign deposits can jeopardize the stability of the banking system. In contrast, when investors liquidate their positions in stock and bond markets, their actions simply show up in the prices of securities, which is less destabilizing to the financial system.[52] When banks and firms can fund themselves by floating bonds as well as issuing short-term debt, the destabilizing impact on their balance sheets of sharp changes in market interest rates will be less. And when they can fund themselves by issuing bonds denominated in domestic as well as foreign currency, the destabilizing financial impact of sharp changes in exchange rates will be reduced. This suggests developing bond markets as a way of diversifying the sources of corporate debt, and developing stock markets as a way of avoiding excessive reliance on debt in general. It suggests liberalizing foreign access to domestic stock and bond markets before freeing banks to fund themselves offshore.

The reality is that securitized markets are late to develop. Historically, markets in corporate bonds and debentures tend to develop before deep and liquid equity markets since their informational requirements are less. But even they tend to develop only once a deep and reliable market has first grown up in a benchmark asset, typically treasury bonds, transactions in which provide liquidity and minimum efficient scale and whose prices provide a reference point

[51] In September of 1998, nonresidents were prohibited from repatriating investments in domestic-currency-denominated financial assets for a 12-month period. These quantitative controls were replaced by graduated exit levies in February 1999.

[52] In reality, things are not so simple. A stock- or bond-market crash can damage the balance sheet position of banks and others who themselves hold stocks and bonds. It can make life difficult for entities, including the government, with funding needs and for whom the prices of their liabilities are an important signal of credit worthiness. But the single most reliable predictor turned up by the copious literature on leading indicators of currency crises is the term structure of portfolio capital inflows (Radelet and Sachs 1998, Rodrik and Velasco 1999).

for other issues. And the development of a deep and liquid treasury bond market in turn requires a government with a record of sound and stable macroeconomic and financial policies. Where that record is lacking, banks become the captive customers for government bond placements, which is not good for their balance sheets and in return for which they receive other favors (such as guarantees) which give rise to the financial-sector problems alluded to above.

Firms in countries where equity finance is available are likely to enjoy additional advantages in a globalized world. In terms of managing volatility, firms in countries with well-developed equity markets will be less dependent on short-term finance and less susceptible to liquidity crises. Compared to countries where enterprises rely disproportionately on debt finance, enterprises will be less highly geared, rendering their balance sheets less sensitive to the changes in interest rates that exposure to globalized financial markets can bring. Compared to countries where debt is denominated in foreign currency, they will suffer less damage from exchange rate changes. And in a technologically dynamic world, where firms are forced to choose between as-yet-unproven, competing technologies, equity finance has advantages in terms of competitiveness and innovation (as explained in Section III above).

In practice, the informational and contractual prerequisites for the development of deep and active stock markets are substantial—even more substantial than the prerequisites for the development of deep and active bond markets. In the absence of disclosure by firms following recognized auditing and accounting practices, outsiders will be reluctant to purchase their securities for fear of market manipulation by insiders; hence, stock market capitalization and turnover will be low. In the absence of adequate contract enforcement and equitable bankruptcy procedures, investors will be reluctant to invest for fear that issuers will walk away from their obligations. And in the absence of adequate mechanisms for corporate control, investors will be reluctant to purchase minority stakes in publicly traded enterprises for fear of being expropriated by majority stakeholders. This is why significant stock market capitalization and turnover tend to be observed relatively late in the process of financial development—as was the case historically even in countries like the UK and US that now have some of the most advanced market-based financial systems in the world. It is why many countries, and developing countries in particular, rely on

banks for intermediation services, banks having a comparative advantage through long-term relationships with their clients in assembling information and enforcing contracts.

Creating active stock and bond markets thus requires putting in place a regulatory framework mandating the disclosure of accurate and up-to-date financial information, the use of recognized auditing and accounting standards, penalties for insider trading and market manipulation, and statutes protecting the rights of minority shareholders. In the US, putting in place these prerequisites for deep and liquid markets took several decades (Bordo, Eichengreen, and Irwin 1999). Late-developing economies in Asia and elsewhere can telescope this process by importing proven regulatory technologies.[53] Still, developing deep and active stock and bond markets is a hard slog. Success will not be achieved overnight.

(vi) *Strengthen monetary and fiscal institutions.* Limiting volatility in a financially globalized world requires building credible policy-making institutions. The greater the credibility of the individuals and institutions responsible for monetary policy, the less the danger that a shock will incite an investor panic and a self-fulfilling crisis. To the contrary, if policy makers have accumulated sufficient credibility, the markets will do much of the stabilizing work for them. If inflation accelerates, for example, pushing up interest rates and depressing the prices of short-term interest-bearing assets, investors anticipating that the acceleration of inflation is only temporary will buy into temporarily depressed fixed-income markets, stabilizing asset prices and interest rates. If the currency depreciates, investors will similarly purchase domestic-currency-denominated assets at their temporarily depressed prices, providing capital inflows that work to strengthen the exchange rate.

Similarly, the more credible is fiscal policy, the greater will be the capacity to pursue countercyclically stabilizing budgetary policies. If the fiscal authorities are committed to running budgets that are balanced over the cycle, they will be able borrow and run deficits in recessions. If, on the other hand, policy makers' intentions are sus-

[53]They can also follow the example of US companies prior to the emergence of deep and liquid domestic securities markets—US railways, the large corporations of their time, issued bonds and debentures in London as a way of circumventing the underdevelopment of American financial markets—but this will not solve the currency-of-denomination issue; it will not create an investor base with an appetite for domestic-currency-denominated issues.

pect, they will have to cut spending and/or raise taxes in recessions, rendering fiscal policy procyclical and aggravating rather than limiting volatility.

One solution is to delegate responsibility for policy to an individual or individuals with a reputation for valuing the appropriate objectives; the utility of this approach is questionable, however, so long as the policy makers in question can be arbitrarily dismissed (Drazen and Masson 1994). The alternative is to design policy-making institutions so that the individuals in question have an incentive to pursue particular objectives and the capacity to do so. Hard-and-fast rules—a currency board arrangement for monetary policy, or a balanced-budget rule for fiscal policy—are the obvious way of doing so, but these lack the flexibility desirable for coping with a volatile environment. A more flexible approach is to give the policy authorities a mandate and the independence to pursue it. For monetary policy this is the well-known formula of independence for the central bank and a mandate to pursue price stability. For fiscal policy there is an analogous argument for creating an independent fiscal authority responsible for setting a ceiling for the budget deficit and a set of rules for cutting expenditure in the event that the fiscal authorities overrun it (Eichengreen, Hausmann, and von Hagen 1999).

This is only one of a variety of possible formulas for enhancing the credibility of policy-making institutions. There are a number of other approaches to developing monetary policy credibility; inflation targeting—a regime in which the central bank is given a mandate to pursue an explicit target for inflation, shares with the public its forecasts and its model of the links from monetary policy to inflation, and is held accountable for missing that target—is an increasingly popular approach in many parts of the world. Its advantages are greater flexibility than a rigid monetary rule but the same stabilizing impact on market expectations. Its principal limitation is that it can create policy credibility only when the central bank has the independence required to pursue it. Not only must the central bank enjoy statutory independence, but there must be political support for its independent status, in order to limit the prospect that its autonomy will be compromised if it pursues policies that are not congenial to the government. Moreover, its mandate to pursue low inflation must be supported by a broadly compatible economic policy stance by the government; in particular if the fiscal authori-

> ties are prone to chronic deficits, monetary policy may have to used to fill the fiscal gap (the "fiscal dominance" problem), in which case the stated objective of pursuing policies of low inflation will lack credibility.
>
> In the case of fiscal policy, alternatives to rigid rules include delegating more agenda-setting and veto power to a single agent—typically, the finance minister or the prime minister—who possesses more of an incentive to internalize the externalities associated with excessive deficits, and adopting more centralized and hierarchical budgetary procedures (von Hagen and Harden 1994, Alesina and Perotti 1994).

Other means of building credibility are conceivable. But, whatever the solution, policy credibility is essential in a world of globalized markets.

VI. CATALYZING INSTITUTIONAL CHANGE

Economists tend to assume the existence of appropriate institutions. Put another way, if a certain set of institutions is efficient, economists assume that they will develop in response to the latent demand (Davis and North 1971). Thus, if new technologies generated by start-up firms are the motor for growth, and if supporting their development requires financial markets capable of providing venture capital and bidding for initial public offerings, then a market-based financial system will spring up in response to the profit incentives perceived by aspiring venture capitalists. And if, to attract FDI, countries must adopt demanding corporate disclosure standards and legal systems affording strong protection for creditor rights, then they will do so in order to prevent FDI from being diverted to jurisdictions that are quicker to respond.

The existence of this presumption makes it important to understand why, in this context, demand need not elicit a corresponding supply. Institutions can be understood as coordinating mechanisms—as coordinating the actions of economic and social agents. They do so by providing standards for socially constructive behavior. Because they function as standards, they are a source of network externalities. And like any technology that throws off network externalities, once established they tend to become locked in. As David (1993) has put it, institutions, by virtue of their inertial character, become the "carriers of history."

A. The Constructive Role of Crises

Because institutions have an inertial character, radical institutional change is the exception, not the rule. Wholesale change requires that the political and economic system be displaced from its equilibrium. It follows that radical change

oftentimes occurs in response to major shocks—crises, for example.[54] By definition, crises disrupt the operation of existing institutions. That disruption creates a vacuum in which new arrangements can develop.[55] More generally, the suboptimal performance of existing institutions made clear by a crisis can foster the consensus needed for agreement on changes in prevailing arrangements. Thus, the political and economic crises of the 1940s and 1950s are commonly credited with creating a hothouse environment conducive to the growth of the institutions that served Asia so well in its period of rapid economic growth. Economies like Korea and Taipei,China emerged from World War II and from the Asian conflicts that erupted in its wake in a parlous economic state. In Korea, for example, years of foreign occupation and civil war had left the population on the margin of subsistence. There was reason to fear that economic failure could jeopardize national survival, given political disputes in the region and the fact that East Asia was a principal battleground of the Cold War. "South Korea was threatened by invasion from the North; Taiwan, from the mainland; and Thailand, from North Vietnam and Cambodia. Thailand, Indonesia, Malaysia and Singapore faced formidable internal communist insurgencies; Malaysia and Singapore had to contend with additional difficulties imposed by ethnic diversity" (Campos and Root 1996, 28). These conditions created a crisis of national survival. This crisis in turn cultivated political support for the institutional changes needed to strengthen the state and the economy. It supported land reform in Korea and Taipei,China, which allowed the benefits of rising agricultural productivity to be widely shared and created a rural middle class. It supported the development of effective tripartism (coordinated negotiations over wages and other determinants of industrial development involving labor, management, and government) in Korea; Singapore; and Taipei,China. It induced powerful urban interests to acquiesce to government programs designed to develop the rural infrastructure necessary for balanced growth. It gave regime leaders the autonomy to develop independent technocracies and performance-based civil service systems. These institutional ingredients of Asia's "miracle" are by now well understood. The point is that their development should be seen as a social response to this crisis of national survival.

In the wake of the financial crisis of 1997-1998, it is again clear that a crisis can catalyze reform. This is particularly evident in the steps taken by Asian countries to update and strengthen their financial institutions, with the aim of restoring investor confidence and also the long-run goal of equipping themselves with the institutional prerequisites for navigating a world of global finance. Prudential supervision and regulation have been strengthened, and new rules have been adopted to encourage arms-length dealing between financial institutions and their custom-

[54]A model of the linkage is provided by Drazen and Grilli (1993).

[55]This is the story famously told by Mancur Olson of institutional change in the wake of war and crisis (Olson 1982).

ers. Governments have encouraged the development of bond markets long suppressed in favor of bank-based intermediation. Foreign investment has been liberalized in all countries in the region: Thailand replaced its Alien Business Law with new provisions allowing foreign firms to hold up to 100 percent equity in Thai banks, and 39 sectors have been opened to increased foreign participation; Korea opened real estate, securities dealing and other financing business to foreign investors and granted foreigners the right to purchase 100 percent of equity in domestic firms. East Asian countries have taken comprehensive action to facilitate mergers and acquisitions, both domestic and international.[56] Indonesia and Thailand have adopted significant legislative changes to their bankruptcy systems. In the second half of 1998, Indonesia created a specialized commercial court with jurisdiction over bankruptcy-related matters and adopted an automatic stay provision similar to that provided for under the US bankruptcy code. In Thailand, new bankruptcy legislation pushed through over political opposition had a decidedly positive impact on the equity valuation of financial and nonfinancial companies (Foley 1999). Such reforms can be seen as prerequisites for growth and stability in a financially globalized world. While financial reform has long been on Asia's agenda, it is hard to imagine such rapid progress in the absence of the crisis.

While crisis can breed reform, reform without crisis is to be preferred. The question is how it is best achieved.

B. Global Initiatives

One level at which this process can be organized is globally. Thus, the IMF, the World Bank, and the Financial Stability Forum, with impetus from G7 governments, have launched a multi-pronged effort to encourage industrial and developing countries to upgrade their financial practices and institutions. The focus of this effort is institutional arrangements in areas like data dissemination; fiscal, monetary, and financial policy transparency; banking regulation and supervision; securities and insurance regulation; accounting; auditing; bankruptcy; and corporate governance. The mechanism is the promulgation of international standards for acceptable practice in these areas that all countries, including Asian countries, must meet, and efforts to encourage compliance through a combination of IMF surveillance, peer pressure, and market discipline (see http://www.imf.org/external/standards).

The case for these global initiatives is straightforward. If markets are global, so must be their regulation, as must be the institutions through which that regulation takes place. In a world of contagious crises and systemic risk, economic and

[56]Indonesia and Malaysia appear to be exceptions: the Indonesian system does not favor mergers and acquisitions, while Malaysia's appears to favor domestic but not international M&A activity.

financial stability takes on the character of a global public good (Wyplosz 1999). Institutional arrangements affecting, inter alia, prudential supervision and the conduct of monetary-cum-exchange-rate policies are of critical interest to not just the initiating country but also the rest of the world. Global initiatives to influence national practices are justified as a way of internalizing these externalities.

The danger is that these global initiatives will subject countries to one-size-fits-all advice, denying them the opportunity to design regulatory institutions responsive to their distinctive economic, cultural, and legal traditions. This is where standards come in. Standards, which define criteria to be met by all countries but permit them to meet them in different ways, offer a way of reconciling the common imperatives created by participation in international markets with the diversity of economic systems and structures. The complaint that the IMF's structural interventions are arbitrary and capricious at least partly explains the backlash they have provoked; with the promulgation of standards there will exist objective criteria to which the Fund can refer when it demands structural reforms.

There are also objections to the approach. Neither the IMF nor the official community as a whole possesses the resources to design and monitor compliance with detailed international standards in all the relevant areas. In its early country reports on the observance of standards and codes, the Fund has been forced to rely on self-evaluations by the subject countries, a practice that threatens the objectivity of the process. For the IMF to carry out this function in a satisfactory way would require a very significant increase in its staff and a radical change in expertise, which are unlikely for the foreseeable future.[57]

Moreover, reservations have been voiced about how much can be accomplished through the promulgation of international standards. There is disagreement about the definition of acceptable standards; observe the dispute between the US and Europe over accounting standards or the wide variation among the advanced-industrial countries in the provisions of bankruptcy and insolvency codes. There is the danger that an international standard broad enough to encompass these variations will tend toward a lowest common denominator. Moreover, standards, by defining the minimum acceptable threshold, may weaken the incentive for countries to do better. What will prevent governments from taking steps to meet the letter of the requirement without in fact satisfying its spirit?

Such qualms are reinforced by the experience with the most important experiment in standard setting to date, the Basle Capital Standard. The 1988 Capital Accord established an 8 percent minimum (weighted) capital adequacy standard for international banks. It deserves some credit for steps taken subsequently, by countries represented on the Basle Committee of Banking Supervisors and others, to bring capital adequacy up to this minimum. Reassuringly, the existence of the Basle Accord has not prevented countries like Argentina from doing better. But, at

[57]See the discussion of resource implications in IMF (1999).

the same time, the Basle standard has been subject to evasion. The gap between the reported and actual capital of Japan's international banks is a case in point; the Basle Accord did nothing to head off or resolve the Japanese banking crisis. Banks have discovered ways of shifting assets subject to high capital charges off balance sheet through securitization and the use of derivative securities without modifying the underlying risks. This should serve as a warning of the danger that the standard setters will always be one step behind the markets. Finally, experience with the 1988 Accord points up the fact that poorly designed standards, or standards that lag behind circumstances, can create perverse incentives. One need only recall the incentive in the Accord to engage in short-term lending to non-OECD countries.[58] Observers of the Asian crisis will be aware of the consequences.

In hindsight, the perverse incentives conferred by the Basle capital adequacy standards for international banks are clear. But there is a more fundamental point. The idea that appropriate institutional arrangements for financial stability can be identified at the global level assumes a knowledge of the operation of those institutions that does not exist. The problem is not the limited resources of the IMF but the limitations of economic science in its prevailing state. Economists disagree among themselves over the design of an efficient bankruptcy law, over the stabilizing or destabilizing effects of additional data disclosure, and over the merits of fixed versus flexible exchange rates. This is a reflection of the state of knowledge in the discipline. Casual observation confirms a continued diversity of institutional arrangements among the high-income countries themselves, and opinion about the merits of these competing institutions has oscillated over time. If the experts cannot agree among themselves, then how can the international community be confident that a global initiative to change national institutions and practices in a particular way will in fact make the world a safer financial place?

There follows, by analogy to evolutionary biology, an argument for encouraging a continuing diversity of national practice, on the grounds that this will encourage the survival of the "species" best adapted to a globalized environment.[59] The burden of reform, in other words, should remain at the national level.

C. National Initiatives

If one buys into this argument for diversity of national practices, then one must also accept that there is no single blueprint for how countries should identify and implement those national arrangements. No single mode of governance is op-

[58]While lending to OECD banks was given a risk weight of 20 percent irrespective of the term of the loan, lending to non-OECD banks carried this reduced weight only for loans of less than a year, whereas loans of longer maturity carried the full 100 percent risk weight.

[59]Rodrik (1999) refers to this as the case for "local knowledge."

timal, in other words. The implication is that there is not much more to say under the present heading.

Scholars seeking to go further distinguish three forms of governance: the strong state, the participatory state, and the decentralized state. The strong-state model vests responsibility for designing and implementing institutional arrangements with an authoritarian government and its bureaucratic arm: Singapore and Korea prior to the 1990s have been seen as cases in point. The decentralized state encourages experimentalism and competition among local jurisdictions, on the same grounds that the national approach encourages experimentation and competition among countries. Thus, India's federal system encourages competition in the design of industrial policy among its states and has led to some notable successes, as with Bangalore's development of a thriving software industry. Policies of regional devolution in the PRC, which led to the emergence of town and village enterprises, can be seen in a similar light.

Rodrik (1999) suggests that there are advantages to the participatory approach. Democratic governance facilitates the development of institutions that produce greater short-term stability, ease adjustment to adverse shocks, and deliver superior distributional outcomes. The implication is that these characteristics will be particularly advantageous in a globalized world where volatility is pervasive, small states are susceptible to adverse shocks emanating from international markets, and income distribution is under strain.

Sah (1991) observes that democracies empower a wider range of decision makers and argues that this diversification implies less risk in an environment of imperfect information; hence, democracy should be positively associated with short-term stability. Rodrik (1997) provides cross-section evidence for the period 1960-1989 supportive of this hypothesis. He also reports evidence that democracies were more successful in adjusting to external (terms-of-trade) disturbances over this period. A stronger point follows: more open democracies with less executive autonomy handle shocks better.[60] Finally, there is evidence that participatory systems pay higher wages and are characterized by less income inequality, since the participation leads to the development of more elaborate social insurance and transfer mechanisms.

D. The Regional Option

Regional initiatives have been suggested as a compromise between the national and global approaches by those who suggest that they combine the best of both. The argument for the coordination of policies and institutions across coun-

[60]Rodrik observes that the recent experience of East Asia is consistent with these conclusions: Korea and Thailand, with their more open, participatory political regimes, handled the crisis better than Indonesia, by providing an alternative to "voice" (that is, to riots, protests and demonstrations) and by facilitating the smooth transfer of power to new leaders.

tries can be addressed at the regional level, while the need for continued diversity of policies and institutions can be satisfied by differences in these practices across regions. Insofar as the cross-border externalities associated with national policies are felt mainly by countries within a region, they create an argument for coordination at the regional and not the global level. There is evidence that the spread of currency crises is mainly a regional phenomenon (Glick and Rose 1999). Eaton, Gutierrez, and Kortum (1998) similarly show that R&D spillovers are regionally concentrated and that their magnitude diminishes with physical distance. These are arguments for coordinating exchange rate and R&D policies at the regional rather than the global level.

Frameworks for addressing such problems at the regional level have developed in other parts of the world, providing precedents that Asia could follow. The European Monetary System, which gave birth to Europe's monetary union, illustrates the scope for regional cooperation in the monetary-cum-exchange-rate domain. The Consultative Group on International Agricultural Research (CGIAR), which encourages its participating centers to share the fruits of their agricultural research, is an example of similar arrangements for R&D.

The regional option attracted new attention in Asia in the wake of the 1997-1998 financial crisis, reflecting the perception that the advice and conditionality of the international financial institutions were inadequately tailored to the particulars of the Asian crisis and the distinctive features of the Asian model. The proposal for an Asian Monetary Fund can be seen as a reflection of this desire to build a regional financial institution better tailored to Asia's needs. The Chiang Mai Initiative to expand swap lines among Asian countries can similarly be seen as a way of addressing regional financial pressures on terms better suited to Asia's distinctive economic, social, and financial system. And discussions of the case for a common basket peg for Asian countries (viz., Williamson 1999) are seen as responding to the dilemma of having to choose between a hard peg and a floating exchange rate; since there is strength in numbers, the argument goes, Asian countries can skirt this Hobson's choice by agreeing to a collective peg and supporting one another in its maintenance. This regional approach to institution building has worked in Europe, where it has promoted cooperation, encouraged the harmonization of policies and institutions, and created a zone of monetary and financial stability. And if it has been successful in Europe, there is no reason why it should not be pursued in other regions, including Asia.

It is critical to observe that a very special set of historical circumstances have allowed European countries to effectively manage the challenges of globalization at the regional level, culminating in their crowning achievement, European monetary unification.[61] European monetary unification was the culmination of a half-century-long process of strengthening regional economic, monetary, and po-

[61]The argument here draws on Eichengreen and Bayoumi (1999).

litical ties. The immediate origins go back to the Treaty of Rome, which established the European Economic Community and identified the exchange rates of member countries as a matter of common concern. A plan for monetary union was drawn up in 1962 by the Commission of the European Communities. In 1970 the Werner Committee recommended completing that transition within a decade (although this timetable was disrupted by the collapse of the Bretton Woods System and the generalized financial turbulence that followed). From the "snake-in-the-tunnel" in 1972 to the Maastricht Treaty in 1991, mechanisms for limiting exchange rate variability were the vehicle for the pursuit of economic and monetary integration.

But, in an important sense, the origins of European monetary integration go back even further than this. There is a long-lived strand of integrationist thought in Europe that has permitted politicians and the public to contemplate compromises of national sovereignty more readily than their counterparts in other parts of the world. The Pan-European Union, founded in 1923, lobbied for a European federation, attracting the support of, among others, Konrad Adenauer and Georges Pompidou. Even earlier, in the mid-19th century, European intellectuals like Victor Hugo were advancing the case for a United States of Europe. Before him, William Penn proposed a European parliament, Jeremy Bentham a European assembly, Jean-Jacques Rosseau a European federation, Henri Saint-Simon a European monarchy. One could go on, but this is enough to make the point. Many generations before the signing of the Maastricht Treaty and the advent of the euro, there already existed a powerful strand of European integrationist thought.

After World War II, the lesson drawn was that nationalism and the struggle for industrial resources had been the cause of the three bloody wars in less than a century. This geopolitical logic, advanced in Europe but argued and financed by the United States, lent momentum to the process. Underlying it were two powerful European dynamics, for commercial integration and political integration. Europe's first great postwar project was its customs union, to which currency instability posed an ever-present threat. But always present behind the scene was the desire on the part of the founding members of the European Communities for political integration, to be achieved by building a Single Market whose need for governance would encourage the development Europe-wide political institutions.

In Asia, the motivation for monetary cooperation is different. There is no desire for political integration, given the split between Malaysia and Singapore in the 1960s, conflicts between Indonesia and Malaysia, and the Viet Nam War. Rather, the impetus for monetary cooperation reflects the desire to create a zone of financial stability. The fear created by the 1997-1998 crisis is that small currencies and large financial markets are incompatible. Asian central banks, left to their own devices, lack the resources to cope with global financial flows and even with the position-taking ability of a few highly leveraged institutions. Confronted with the vast liquidity of global capital markets, unilateral floats and unilateral pegs are

subject, in this view, to speculative manipulation, and both are therefore equally uncomfortable for the government attempting to operate them. The solution is the pooling of reserves designed to marshal sufficient resources for the authorities to counter speculative pressures and, ideally, maintain the stability of intra-Asian rates. Whether this desire, unaccompanied by commercial and political integration a la Europe, proves strong enough to support regional cooperation, only time will tell.

VII. CONCLUSION

This paper has reviewed the opportunities and risks of globalization. Its premise is that there exist powerful technical, economic, and political forces that will render the world economy even more globalized in the future than today. Globalization has been rolled back before but only under extraordinary circumstances. Countries, their governments, and their citizens all have made substantial investments in globalization. Significant costs have been sunk, making it less likely that the clock will be turned back. Contingency planning is always prudent, but extensive planning for the disintegration of international markets makes little sense if this is in fact a remote possibility.

The challenge therefore is how to capitalize on the opportunities for growth and development afforded by globalization while at the same time minimizing the risks. In an obvious sense this means following appropriate policies: stable macroeconomic policies, prudent financial policies, and sound regulatory policies. But the appropriate policies are easier to describe than to implement. And their specifics are likely to vary over time. The more fundamental problem is thus how to develop institutions with the capacity to determine appropriate policies, implement them, and stick to them until circumstances change.

Institutions with this capacity are likely to have the following characteristics. They combine insulation from capture with accountability to their principals. They facilitate the development of a social consensus on goals and instruments and an equitable sharing of the benefits from their implementation. They allow governments to make credible commitments but also provide escape clauses designed to allow those commitments to be modified or revoked in the event of fundamental changes in circumstance.

For Asia, late 20th and early 21st century globalization coincides with an important change in the sources of economic growth. For the last four decades, Asian countries have recorded rapid rates of growth by maintaining high rates of factor accumulation—capital accumulation in traded-goods sectors in particular—and by selling their products into world markets. Policies and the institutions through which they are made have been adapted to this growth model: they have promoted saving and investment, favored investment in traded goods sectors, and rewarded export performance. But as Asia's high-growth economies mature, the

source of their growth will progressively shift from factor accumulation to factor-productivity growth. This will require changes in policies and institutions. In addition, low-income Asian countries that wish to follow their high-income predecessors down the path of labor-intensive, export-oriented manufacturing using technologies imported via licensing will find their task complicated by globalization. Many more countries, both Asian countries like the PRC and India and competitors in other parts of the world, are attempting to implement the same strategy. Competition among them is intense. Selling the products of low-wage manufacturing industries into global markets will become increasingly cutthroat. And as more countries compete for foreign investment, the ability of countries to acquire technology via licensing will be correspondingly reduced. Sustaining growth in this setting will require telescoping the transition from accumulation- to innovation-based growth. In turn, this will require accelerating the evolution of policies and the renovation of policymaking institutions.

Capitalizing on globalization also means preventing its risks from disrupting growth and development and from engendering a backlash against open markets. This means tailoring policies to contain the heightened risk of crisis and the volatility created by the integration and liberalization of financial markets. It means creating a social safety net to support those who are left behind.

To imagine the prospects for Asia in the 21st century, it helps to step outside the region for a moment and consider Ireland. In the 1970s and the first half of the 1980s, Irish growth was disappointing (GDP growth averaged 3.7 percent between 1971 and 1986). The country was widely seen as the sick man of Europe, due to its slow growth, exploding debts, and chronic high unemployment. While per capita incomes, in purchasing power parity terms, were almost the same as in Asia's newly industrializing economies, there was every sign that Ireland was about to be left in the dust by the NIEs. The basis for its subsequent transformation is no secret. The government put in place sustainable macroeconomic and financial policies. It cut public spending, balanced the budget, and pared down the public debt ratio to the levels required by the Maastricht Treaty. It joined the EMS and EMU as a way of creating a bulwark against exchange rate and financial instability; it put the crisis problem behind it without resorting to controls or other devices that might have discouraged foreign investors. Tax incentives, a well-educated labor force, the reduction of labor-market rigidities, and a commitment to integrate with the European Union made Ireland an attractive platform for foreign investors seeking to establish production in Europe. Regional cooperation played a supporting role, with the Structural Funds of the European Union financing very considerable investment in and upgrading of the country's infrastructure.

Critically, the country's literate and numerate labor force, extensive university–industry cooperation, market-based financial system, and efficient infrastructure made it attractive for international companies to locate in Ireland not just assembly operations, as they did initially, but also R&D. The R&D expendi-

tures of foreign-owned firms, as a percentage of Irish GDP, have doubled since 1986 (Barry, Bradley, and O'Malley 1999). And given the nature of R&D spill-overs, R&D by international firms did much to stimulate R&D by indigenous producers. As a result of these changes, Ireland is now the "tiger" of Europe, with growth accelerating since 1987 to 6.2 percent and in the second half of the 1990s reaching levels of 10 percent per annum. TFP growth, meanwhile has doubled from 2 percent per annum in the first period (where it accounted for slightly more than half of GDP growth, in other words, the postwar Japanese pattern) to 4 percent per annum (or nearly two thirds of GDP growth, the Continental European pattern).[62]

Ireland is not Asia. Its labor markets are different. Its financial markets are different. Its membership in the European Union sets it apart. But Ireland is an example of a country that was able to alter its policies and institutions to capitalize on globalization. It thus offers a vision of the challenges and opportunities facing Asia in the global economy of the 21st century.

[62]Calculations are from Nugent (1998-9) for 1971-1986 and 1987-1997.

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Fostering Capital Markets in a Bank-based Financial System: A Review of Major Conceptual Issues

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The paper presents a review of major conceptual issues as a framework in which to conceptualize the rationales and strategies for fostering capital markets in a largely bank-based financial system. As elsewhere in the developing world, the relative underdevelopment of capital markets in developing Asia can be attributed to inadequate market and legal infrastructure, which, in the presence of informational problems, raises the cost of external finance. In such an environment, bank finance is often a less costly means of external finance because it can minimize informational problems by establishing a long-term monitoring relationship with borrowers. On the other hand, the benefits of capital market finance rise with economic development, which tends to increase the complexity and dispersion of information held in the economy. Price signals provided by market finance can lead to a better allocation of resources by allowing better investment and saving decisions. With the passage of time, an equity market will become particularly beneficial as a means of financing new and complex economic activities, as equity finance does not require fixed assets and can better reward risk taking activities. The paper concludes by discussing several conceptual issues that are important in designing an optimal financial structure.

I. INTRODUCTION

This paper presents a review of major conceptual issues as a framework in which to conceptualize the rationales and strategies for fostering capital markets in a largely bank-based financial system, such as those found in much of developing Asia. While bearing in mind the need for practical relevance within the Asian context, we rely heavily on the academic literature, which is largely abstract and, when empirical, is mostly based on industrial country experience. Our emphasis is on analytical issues, as opposed to practical ones. Hence, we will not discuss specific measures of legal and institutional nature concerning, for example, how to

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design a settlement and clearance system for secondary trading, how to develop an institutional investor base, and how to establish accounting and disclosure standards for capital markets. We believe that the literature we survey contains much that is conceptually applicable to the Asian policymakers as they continue to foster the development of capital markets.

The topic of domestic capital market development is particularly pertinent today, as the Asian currency crisis of 1997-1998 has brought to our attention the potential vulnerability of a bank-dominated system (Herring and Chatusripitak 2000). Some have argued that the crisis was in part caused by a poorly supervised banking sector which, given some distorted incentive structure, had acquired mismatched balance sheets in terms of maturity, currency, and sectoral allocation. Because corporate financing was heavily dependent on the banking sector, the argument goes, the initial currency depreciation set in motion a downward spiral on the economy, as the resulting deterioration in the balance sheet led to a contraction of bank credit to the corporate sector, which had little alternative to bank borrowing. According to this view, in a bank-based system, everything tumbles once the banking sector gets into difficulty. Hence, the call for the development of domestic capital markets in postcrisis Asia (APF 2000).

To be sure, such a view of the Asian crisis may be too simplistic. For one thing, if there was a problem in the financial system at all, it could not have been the mere fact that the system was bank-based, but the problem must have reflected its overall institutional weakness in governance, accounting and disclosure rules, or financial supervision; this may or may not be directly connected with its presumed bank-based structure (Allen 2000). Moreover, since the late 1980s, progress had already been made in much of emerging Asia to develop capital market institutions, so that the financial structure of the crisis-affected countries could not have been characterized as bank-based in the same sense that they were in the early 1980s (Skully 1982, 1984). Within the framework of rapid economic growth, interest rate liberalization, and other financial deregulation, considerable improvements were made in the infrastructure of capital markets, and the size of the equity and bond markets did expand considerably in the late 1980s and early 1990s (Masuyama, Vandenbrink, and Yue 1999).

Despite the recent growth of capital markets, however, the Asian financial systems may still rightly be characterized as largely bank-based, even for the more advanced emerging market economies (see, for example, Cole, Scott, and Wellons 1995; Della et al. 1995; Fry 1995; Zahid 1995; and Yoshitomi and Shirai 2001). First, perhaps with the exception of Hong Kong, China and Malaysia, the number of listed firms as well as the participation of individual investors in the equity markets are limited. Much of the growth of the equity markets from the late 1980s to the early 1990s was driven by expectations of capital gains associated with booming economies, irrespective of the quality of market institutions or price formation. This was further aided by increased foreign investment, motivated by

portfolio diversification within the environments of financial market liberalization and rapid economic growth (Claessens 1995, Feldman and Kumar 1995). Given the concentrated ownership of shares and the lack of adequate transparency and investor protection, however, liquidity is necessarily limited.

It is true that the market for equities is sizable in emerging East Asia and may even exceed the balance of bank loans in some of them. It should be stressed, however, that the relatively large size of equity markets in these countries does not necessarily reflect the level of sophistication of the market infrastructure. Because equity holders can potentially claim unlimited upside returns (with downside risks limited to the value of initial investment by virtue of limited liability), equity markets can grow even when an existing market infrastructure does not support the development of a market for corporate bonds, for which the upside return is bounded by the contractual face value (Herring and Chatusripitak 2000). In this respect, an active equity market can flourish in a bank-based system, if there are growth opportunities, even in the absence of financial liberalization (Feldman and Kumar 1995).

Second, the bond markets remain even more limited. In virtually all Asian countries where bond markets exist, they are dominated by government securities, which are mostly held to maturity (Yoshitomi and Shirai 2001). Even in Malaysia and Singapore, where there is a relatively large balance of government securities, they are typically held by social securities institutions and the banking system for statutory liquidity requirements. The corporate bond market is virtually nonexistent. Thus, while there is now a fairly well developed market infrastructure, with the captive nature of primary placements and often regulated yields, the bond market has remained the least developed segment of the financial system, especially as a vehicle of long-term corporate financing (Herring and Chatusripitak 2000). As a result, Della et al. (1995) go as far as to call Korean corporate bond issues (largely purchased or guaranteed by banks) as a form of loan packages, and the Philippine bond market (dominated by short-term commercial paper issues) as essentially a money market. The banking sector continues to play a dominant role even in the corporate bond market (see also Endo 2001).

In view of the limited role of capital markets in the region and the perceived need to create a more robust financial system less susceptible to crisis, various initiatives have been made in recent years to foster the development of capital markets in Asia (see OECD 2001, APF 2001).[1] This paper is intended to provide theoretical underpinnings for such initiatives. It will present a theoretical framework for thinking about financial issues from an agency perspective; consider both the benefits of bank finance and the need for market finance; discuss issues involved in designing an optimal financial structure; and draw implications for Asia.

[1]The author was a contributor in the process. This paper in part draws on work presented to these fora (Takagi 2001).

The rest of the paper is organized as follows. Section II presents agency perspectives on finance, focusing on issues of imperfect information, agency cost, and the role of finance in economic growth. Section III discusses the economic functions of financial intermediaries. Section IV provides a discussion of why capital markets are important. Section V discusses major conceptual issues relevant to creating an optimal financial structure, including the role of debt finance, the choice and synergy between bank finance and market finance, institutional and regulatory requirements for market and bank finance, corporate governance, and unique challenges for financial sector development in Asia. Finally, Section VI concludes.

II. AGENCY PERSPECTIVES ON FINANCE

A. Finance under Imperfect Information

The financial system of an economy performs two fundamental tasks: (i) to channel savings to productive uses and (ii) to provide corporate governance. In a world of imperfect information, the "financing" role and the "corporate governance" role of the financial system are not independent. If a lender believes, for example, that the funds will be misused by the borrower, otherwise profitable projects will not be funded. Thus, in order to raise outside funds at minimum possible cost, there must be a credible mechanism of corporate governance to minimize the problems associated with imperfect information.

Imperfect information typically manifests itself as asymmetric information, whereby the borrower possesses more information about the profitability of an investment project (as well as about his own creditworthiness) than the lender does. This leads to two types of problems the financial system must address: moral hazard and adverse selection. In the context of credit markets, moral hazard refers to the incentives of borrowers to shirk efforts once the funds are provided, while adverse selection refers to the difficulty of assessing profitability and risk, such that a higher interest rate would attract riskier projects.

How the market mechanism may fail to work under imperfect information is illustrated by the well-known phenomenon of equilibrium credit rationing, which arises because adverse selection and moral hazard cause the probability and expected cost of monitoring to increase with the interest rate (Stiglitz and Weiss 1981). This means that those willing to borrow but cannot at the prevailing interest rate will not be able to bid the funds away from those receiving them by offering a higher interest rate. Moreover, as the cost of monitoring increases, the possibility of equilibrium credit rationing also increases. Williamson (1986) has shown that, with costly monitoring, asymmetry in the payoff functions between lender and borrower alone can generate equilibrium credit rationing, without resorting to moral hazard and adverse selection (see also Williamson 1987).

In his pioneering work on the economics of imperfect information, Akerlof (1970) explained the controlling role of "managing agencies" in Indian industrial enterprises as a solution to the problem of asymmetric information, which is considered severe in developing countries. Likewise, we find large industrial groups and informal financial arrangements, such as family-based or rural financial systems and interlinked transactions, in much of developing Asia (Ghate 1992; also see Hoff and Stiglitz 1990 for an imperfect information approach to rural financial arrangements). Braverman and Stiglitz (1982) have shown how interlinked transactions (whereby credit transactions are simultaneously made with concurrent transactions in another—such as labor, land, or product—market) can mitigate moral hazard problems when the cost of monitoring is high (see also Bell and Srinivasan 1989). These economic institutions can be considered as a response to the problems of asymmetric information within the environment of inadequate accounting and legal rules.

In a world of perfect information with complete markets and no transactions cost, two firms faced with the identical investment opportunity would make an identical decision. In such a world, there would be no role for financial institutions or financial intermediaries, and the choice of debt and equity would make no difference (i.e., the so-called Modigliani-Miller theorem). In the real world, however, information is imperfect, markets are incomplete, and transactions are not frictionless. In such an environment, institutions develop as a way of reducing transactions cost or mitigating the informational problems (Greenwald and Stiglitz 1986). Hence, the effectiveness of a financial system is measured by its ability to overcome the problems of moral hazard and adverse selection.

B. Agency Costs

Within the context of corporate finance, the cost of asymmetric information is called agency cost, which arises from the separation of management and control. Agency costs are made up of (i) the monitoring expenditures by the principal or investor, (ii) the bonding expenditures by the agent or manager (to guarantee that he would not take certain actions that would harm the principal), and (iii) the residual cost associated with the reduction in the principal's welfare due to the divergence between the agent's decisions and the welfare-maximizing ones (Jensen and Meckling 1976; also Shleifer and Vishny 1997, Stulz 2000). Agency problems arise from two sources of imperfect information, namely, the "hidden action problem" (i.e., the investor does not see all the actions of management) and the "hidden information problem" (i.e., management has information that the investor does not possess).[2]

[2]According to Stulz (2000), the expressions "hidden action problem" and "hidden information problem" were first coined by Kenneth Arrow.

The agency problem creates a wedge between the cost of internal finance and the cost of external finance, which may stifle profitable investments (Stulz 2000). In the extreme case where the agency problem becomes prohibitively serious, no external funds will be raised. For example, if the investor believes that management will take the funds for personal gains, otherwise profitable projects will not be financed. Self-serving actions of management may include not only consumption (e.g., flashy offices, corporate jets, other perquisites) but also value-reducing expansion and diversification.[3]

It is for these reasons that a firm generally prefers internal finance, which is cheaper under the presence of agency cost. In fact, not only start-up firms but also large firms, including those in industrial countries, are known to make a predominant use of internal finance. When used properly, corporate mergers and acquisitions can also become an informal way of using internal funds; with mergers and acquisitions, information is internalized and informational asymmetry is mitigated (Allen and Gale 1995). Likewise, corporate groups may also act as an informal market for internal funds. In this respect, the dominance of large family-based corporate groups found in many Asian countries may be a reflection of the severity of the existing informational problems (Khan 1999).

C. Financial Development and Economic Growth

Empirical evidence suggests that economic growth is positively related to the stage of financial development, usually defined in terms of the size of financial markets or outstanding bank assets relative to gross domestic product (GDP) (see Levine 1997 for a review of the literature). The literature seems to suggest that financial development has a positive impact on growth both by facilitating better risk sharing and by better mitigating informational problems. First, productivity growth is achieved through greater specialization or use of long-gestation capital production technologies, both of which would place more and more resources at greater risk (Saint-Paul 1992; Bencivenga, Smith, and Starr 1995). The role of financial markets and institutions is to promote specialization and use of long-gestation technologies by reducing this risk by allowing agents to hold a diversified portfolio or by increasing the liquidity of investments. In the absence of effective financial markets, on the other hand, there would be less specialization and less use of capital inputs, leading to slower economic growth.

Second, a more developed financial system contributes to growth by providing more information about the quality of available investment projects and hence

[3]Morck, Shleifer, and Vishny (1990) have shown that acquisitions by the United States (US) involving diversification, purchase of growth firms, and poorly performing management had predominantly negative announcement period returns to bidding firms. During roughly the same period, however, the work of Kang, Shivdasani, and Yamada (2000) indicates that acquisitions by Japanese firms had significantly positive announcement period returns, particularly when financing arrangements with banks were involved.

guiding more resources to better uses; it also enjoys a greater ability to overcome the problems of moral hazard and adverse selection, hence reducing the cost of external finance. Rajan and Zingales (1998) have postulated that, if this view is correct, financial development should disproportionately help firms typically dependent on external finance for their growth. They then used the benchmarks obtained from a sample of US firms, and tested the hypothesis against cross-country data over the period 1980-1990. Their results indicate that the firms and industries that are more dependent on outside financing indeed do grow faster in a financially more developed economy, whether defined in terms of domestic credit or equity market capitalization relative to GDP.

The effect of financial structure (bank-based or market-based) on economic growth, however, is less clear. Greenwood and Jovanovic (1990) have emphasized the informational role of financial intermediaries as a factor contributing to growth, the point empirically confirmed in a sample of over 80 countries by King and Levine (1993). By showing the positive contribution of banking deregulation to faster per capita income growth in the US, Jayaratne and Strahan (1996) have noted the importance of bank loan quality in raising the efficiency of investments. On the other hand, Atje and Jovanovic (1993) and Levine and Zervos (1998) have shown the importance of equity market liquidity (as opposed to equity market size) as a factor contributing to growth, as market liquidity reduces the disincentive of savers to invest in long-duration projects with higher returns. It may be that banking sector development and capital market development independently contribute to economic growth and that financial sector development is a worthy goal to pursue, irrespective of what structure it may take (Levine 2000).

III. ECONOMIC FUNCTIONS OF FINANCIAL INTERMEDIARIES

A. Transactions Cost, Imperfect Information, and Incomplete Markets

Even under perfect information, the presence of transactions cost is a sufficient reason for the emergence of financial intermediaries. With transactions cost, investors with short-term liquidity needs may want to keep their assets in the form of bank deposits, while banks will mobilize them for longer-term investment. An important economic role of financial intermediaries is to transform illiquid assets into liquid liabilities, thus providing better risk sharing among people who need to consume at different random times (Diamond and Dybvig 1983). With transactions cost and imperfect information, and if there are multiple investors per firm, there are potential economies to be gained from not duplicating each other's information gathering or monitoring activity. An intermediary has a gross cost advantage in collecting information because the alternative is either duplication of

effort (if each lender monitors directly) or a free rider problem, in which case no monitoring takes place.

In a world of imperfect information and incomplete markets, there are more reasons for financial intermediaries to exist. When it is not possible to specify all contingencies in financial contracts, institutions emerge to use reputation to bond themselves, and achieve negotiated outcomes that are superior to those that can be obtained through direct transactions in the market (Rajan and Zingales 2001). In this respect, the distinguishing characteristic of financial intermediaries is their investment in reputation and relationships with clients, which give rise to their ability to outperform the market. This view of banking is referred to in the literature as the "incomplete-contract" approach (Rajan 1998).[4]

Relationship banking constitutes the core of modern banking theory (Boot 2000). Long-term relationships associated with bank finance can also reduce the cost of screening and monitoring. The effectiveness of screening and monitoring is further enhanced by the development of expertise and human capital within the banking sector. Anderson and Makhija (1999) have confirmed the benefit of bank monitoring in a sample of Japanese firms in the 1980s, by showing that they typically preferred bank finance to market finance when faced with intangible growth opportunities for which information asymmetry is particularly severe. Likewise, Kang, Shivdasani, and Yamada (2000) have shown that, during 1977-1993, bank-financed acquisitions in Japan had significantly positive announcement period returns, indicating the benefit of bank monitoring in improving the quality of investment decisions.

B. Financing for Small and Young Firms or Uncertain Projects

Bank finance is better suited for financing small to medium-size firms, because it reduces the agency cost associated with lending to entities for which the cost of information acquisition is large. The bank first screens prospective clients. Later, by threatening to cut off credit, it provides the firm with incentives to take the right investments. As a result of the diminished adverse selection and the reduced moral hazard, the bank has the capacity to provide "cheap informed funds" (Rajan 1992). More generally, small and medium-size firms would prefer bank finance because of the large fixed transactions costs involved in securities underwriting and distribution. Capital market finance, especially bond finance, is not a viable option for small firms. Perhaps for these reasons, small firms are dis-

[4]According to this view, however, the recent information and technology revolution has reduced the rationale for commercial banks by enhancing contractual possibilities. Rajan (1998) argues that the only thing special about banks now is that they are regulated.

proportionately dependent on bank finance even in financially advanced countries, such as the United States.[5]

Bank finance (or intermediated finance, more generally) also has a feature that is particularly suited for financing young firms with uncertain prospects (as well as uncertain projects of more established firms), namely its greater ability to provide "staged financing."[6] Under staged financing, a project may start on a scale that allows investors to learn about it and stop funding if it is found unprofitable (Stulz 2000). With bond finance, it is also possible to provide staged financing by rolling over a series of short-term debt. Short-term debt mitigates adverse selection problems because those who would accept contracts of this form more willingly are those who have greater confidence in their venture; short-term debt also mitigates conventional agency problems, because there must be refinancing at short intervals (Dowd 1992). However, the cost of renegotiation is not trivial, diminishing the value of bond finance as a vehicle of staged financing.

If bank finance needs to be staged, the bank must expend resources to assess the project at each stage. It then follows that some restrictions must be placed on competition among financial intermediaries, in order to allow them to extract rents from successful projects, thereby justifying the expenditure of resources on projects to increase their probability of success. Some ability to extract rents is necessary for relationship banking, so as to recoup the cost of the initial subsidy by charging higher than competitive rates when firms are older (Stulz 2000). In fact, there is evidence to show that more credit is available to credit-rationed young and small firms in a concentrated banking market than in a competitive banking market (Petersen and Rajan 1994, 1995; Rajan and Zingales 2001).

This relationship-enhancing aspect of a concentrated banking market, however, should be weighed against the possibility that the ability of monopolistic banks to extract rents from successful ventures may discourage entrepreneurial ventures. Petersen and Rajan (1994) have shown that while relationship banking increases the availability of credit to small firms, it does not pass on cost reductions associated with scale economies in information production to the borrower; likewise, Houston and James (1996) have shown the significant "hold-up" of high-growth borrowers by monopolistic banks by finding a negative relationship between growth opportunities (measured by R&D expenditures or the ratio of market to book values of assets) and reliance on bank finance in a sample of publicly traded US firms in the 1980s, when they had a borrowing relationship with a single bank. On the other hand, Anderson and Makhija (1999) have found a positive

[5]Gertler and Gilchrist (1994) have shown that tight money disproportionately affects small firms, indicating that they have limited access to capital markets. Houston and James (1996) show that reliance on bank finance is inversely correlated with firm size in a sample of publicly traded US firms.

[6]In addition to banks, venture capitalists (as inside investors) can also provide staged financing (Gompers 1995).

relationship between growth opportunities and reliance on bank finance in a sample of Japanese firms in the 1980s, suggesting that the relative advantage of bank finance as a vehicle of financing projects with a large agency cost, after all, is an empirical matter.

C. Financial Restraint

Largely motivated by Japan's postwar experience, Stiglitz and others have recently noted the virtue of restrictive banking sector policy as an instrument of "financial restraint", which is a moderate form of financial repression (Stiglitz and Uy 1996; Hellmann, Murdock, and Stiglitz 1997, 1998). Under financial restraint, the government sets deposit rates below the competitive level, controls entry and competition in the financial sector, and regulates lending rates, so as to create rents in the banking industry. Rents, defined as returns in excess of those generated by a competitive market, are designed to induce private banks to expend sufficient resources in deposit collection. Unlike the situation under financial repression, however, real interest rates are kept in positive terms through creating a stable macroeconomic environment, so as to encourage savings; in order to minimize potential distortions, some competition is created in the industry. It is argued that, by creating financial restraint, the government can promote financial deepening, a key ingredient of economic development.

In order for financial restraint to work, there must be policies not only to restrict competition within the banking industry but also to restrict the substitution of alternative assets to bank assets. Thus, capital markets are not desirable when the process of financial deepening is beginning, as they compete with banks for household funds. Moreover, developing market institutions is often much more costly and takes much more time than developing concentrated financial expertise in the banking sector. By creating opportunities to earn rents, incentives are also being created for banks to capture them through continued viable operations, which both require greater efforts to screen and monitor the borrowers and facilitate the development of expertise over time. With greater deposit mobilization and better investment decisions, the banking sector is expected to contribute to faster economic growth.

Financial restraint cannot be a permanent arrangement, however. Even if one accepts its virtues at an early stage of economic development, it must be liberalized to allow for a more competitive environment as financial depth is acquired. The regulatory and protective culture that would develop from the policy of financial restraint has the danger of weakening the quality of financial intermediation. Horiuchi (1999) has argued that the creation of rents in the Japanese banking system (which may have served the country well in the early postwar years) created vested interests and resistance to change, causing the Japanese government to err in preserving the system for too long when economic conditions began to change.

In this view, the Japanese banking crisis of the 1990s was a result of the poor management of the transition to a more competitive environment by the government (Hellmann, Murdock, and Stiglitz 1998).

D. Delegation Costs and the Optimality of Two-sided Debt Contracts

If we think of the financial intermediary as a delegated monitor, it has an incentive problem of its own. Besanko and Kanatas (1993) have argued that while borrowers' moral hazard problem makes bank finance valuable, use of bank finance would be limited in equilibrium by banks' own moral hazard problem; banks choose the level of monitoring to maximize their own profits, while external investors would prefer that they choose the level of monitoring that maximizes the expected net present value (NPV) of investment projects.[7] The problem of providing incentives for delegated monitoring has been termed in the literature as "delegation costs." Then, the delegation costs of providing incentives to the intermediary must be netted out from any cost savings in information production. Optimal contracts must be designed to ensure simultaneously that the borrower report truthfully to the intermediary and that the intermediary report truthfully to the investor (Krasa and Villamil 1992).

This issue has been addressed in the literature. Diamond (1984) has shown that a financial intermediary has a net cost advantage over direct transactions because of diversification within the intermediary. This follows from the fact that the per-borrower cost of providing incentives to the intermediary is reduced as it contracts with more borrowers with independently distributed projects, which increases the probability that the intermediary has sufficient loan proceeds to repay a fixed debt claim to the investors (depositors), even though the intermediary is not being monitored by them (also Williamson 1986). With a diversified loan portfolio, it is easier to assess bank management's performance (which presumably depends more on macroeconomic or aggregate signals) than to assess the performance of management in an undiversified firm. Moreover, the short-term nature of bank deposits exerts discipline on bank management (Stulz 2000).

Krasa and Villamil (1992) have considered the relative performance of "one-sided contracts" (i.e., direct trade between investor and firm, where each investor monitors each firm in case of bankruptcy) and "two-sided contracts" (i.e., financial intermediation between intermediary and firm, and between intermediary and investor, where the investors elect a monitor to perform the costly verification task). They have shown that, from the point of view of minimizing monitoring cost, (i) two-sided simple debt contracts with delegated monitoring dominate di-

[7]Besanko and Kanatas (1993) have further argued that, as a result, the equilibrium level of bank debt (and monitoring) would be less than the level preferred by outside investors and that borrowers typically finance their investment projects by a combination of bank loans and market financing.

rect lending and borrowing in an economy with default risk (if there are sufficiently many borrowers), and that (ii) simple debt is an optimal contract for both the intermediary-borrower and intermediary-lender sides of the contract.[8] For the lower end, a deposit with bankruptcy penalties provides the intermediary with incentives for paying the depositors and for monitoring the borrower (see also Diamond 1984, Williamson 1986, and Dowd 1992).

E. The Information Role of Intermediaries

Bank finance has some beneficial informational features. Certain types of proprietary information (e.g., about patents or new products) cannot be communicated to the public without reducing firm value, as it is also conveyed to the competitors. Other types of complex information can only be communicated to markets at a substantial cost, as disclosure must involve "verifiable detail sufficient to indicate the true state of nature" (Myers and Majluf 1984). An equity-financed firm may choose to pass up valuable investment opportunities, if it has sufficiently favorable inside information and acts in the interest of the old shareholders, because the cost of issuing shares at a bargain price outweighs the project's NPV in some cases.[9] In these cases, bank finance is the preferred way of raising funds at a lower cost. Likewise, a bank may obtain information about the firm in the course of lending, which cannot easily be supplied in any other way.

As inside debt, bank loans also provide positive signals to the market. James (1987) has shown that significant positive abnormal returns accrue to the equity holders of firms announcing new bank loan agreements. Moreover, negative abnormal returns are associated with the announcement of private placements and straight debt issues used to retire bank debt. On the other hand, Lummer and McConnell (1989) have shown that it is loan renewals, not new loans, which affect stock prices, suggesting that banks may not necessarily have informational advantage regarding new borrowers but acquire information from their relationships with the borrowers over time.

F. Financial Distress

When a firm gets into financial distress, it may be because of the poor quality of its projects (in which case, the firm should be liquidated) or for reasons unrelated to project quality (in which case, the firm should not be liquidated but debt be renegotiated, as continuation value is greater than liquidation value).

[8]More general discussion of the optimality characteristics of debt will be deferred to Section V.

[9]Bolton and Freixas (2000) have called this cost of equity finance "information dilution cost."

Lenders are unable to distinguish between the two kinds of situations without devoting additional resources to evaluation. Some have argued that the flexibility of banks in dealing with financial distress, arising from long-term relationships with borrowers, is the single most important benefit of bank finance (Bolton and Freixas 2000).

Financial distress can be costly if free-rider problems and information asymmetries make it difficult for the firm to renegotiate with the creditors, when it is in fact solvent. The free-rider problem is a situation where an individual creditor bears the full cost of renegotiation, all creditors share the benefits, so that no renegotiation will take place. Given the long-term relationship the bank maintains with the borrower, it is more likely to bail out a solvent firm in distress by internalizing the stream of future benefits that result from keeping the firm in business (Rajan and Zingales 2001). This is an example of the ability of bank finance to respond to different contingencies in a flexible manner (Berlin and Loeys 1988).

In contrast, with bond finance, the cost of collective creditor action, hence the cost of debt restructuring, is much higher because ownership is generally diversified. According to Shleifer and Vishny (1997), the higher renegotiation cost may explain why public debt is such an uncommon financing instrument even in a few developed countries where it is available. Moreover, bond finance lacks the flexibility to modify covenants in accordance with the realization of different contingencies. Bond covenants are written in terms of readily observable but noisy indicators of the firm's ability to repay. As the covenants are based on imperfect information, default policies based on these covenants can be inefficient, when they allow unprofitable projects to continue or profitable projects to be terminated.

The advantage of bank finance in dealing with financial distress is enhanced by the bank's desire to acquire reputation for "financial flexibility" and making the "right" decisions concerning the choice between renegotiation and liquidation. This provides an incentive for the bank to devote a larger amount of resources than bondholders toward such evaluations. A bank is able to use reputation as a commitment device to promise the borrower credibly that it will devote more resources toward evaluation and thereby make better renegotiation/liquidation decisions if the firm falls in financial difficulty (Chemmanur and Fulghieri 1994).

Hoshi, Kashyap, and Schafstein (1990) have used a sample of Tokyo Stock Exchange listed firms to show that bank group-affiliated firms invest more and sell more than independent firms in the years following the onset of financial distress. Moreover, independent firms that receive a greater fraction of debt financing from their largest lender bank invest more and sell more in the postdistress years. On this basis, they conclude that relationship banking reduces the cost of financial distress, by minimizing the free rider problem and the problem of informational asymmetry. By the same token, however, financial dependence can make firms vulnerable to the banking sector's own distress. Evidence suggests that firms that

relied more on bank finance contracted investment more, during the Japanese banking crisis of the 1990s (Kang and Stulz 2000).

IV. WHY CAPITAL MARKETS?

Despite these many functions of bank finance, and its particularly useful role under the conditions of severe informational and legal imperfections as typically found in developing Asia, there are several reasons why it is still important to develop capital markets.

A. Lower Average Cost of External Finance

Bank finance can be costly because banks themselves face the cost of capital (Bolton and Freixas 2000). A less obvious source of the higher cost of bank finance is banks' potential monopoly power, which arises from their ability to learn more about borrowers' characteristics than their competitors do. While competition may initially keep interest rates low, the lending bank may begin to exploit its monopoly power over time as the borrower becomes "informationally captured" (Sharpe 1990, Rajan 1992).[10] Although the bank may continue to make the best offer because of the difficulty in conveying certain types of information to other banks, it may extract rents from the borrowing firm.[11] The higher cost of bank finance under monopolistic conditions may stifle profitable growth opportunities.[12]

The greater flexibility of bank finance to deal with financial distress also comes with a cost. Firms with a higher probability of financial distress may be willing to pay more for this insurance function of bank finance. Likewise, more risky borrowers may prefer to borrow from banks with greater reputation for flexibility in dealing with firms in financial distress, even if the interest rate charged may be higher (Chemmanur and Fulghieri 1994, Bolton and Freixas 2000). On the other hand, firms with a lower probability of financial distress may not want to pay more for bank finance but prefer to use lower-cost capital market finance, if it is available.

Weinstein and Yafeh (1998) have shown that, prior to the financial market liberalization of the 1980s, Japanese firms with a main bank had lower profits and

[10] As another aspect of inefficiency, more funds are allocated to low-quality firms than socially desirable because interest rates are kept low in the initial period when the bank is least familiar with the borrowers (Sharpe 1990).

[11] This ability to exploit the borrower, however, is limited by the desire of banks to develop good reputation to maintain market share (Sharpe 1990).

[12] Houston and James (1996) have shown in a sample of US firms that the relationship between growth opportunities and bank finance is negative when a single bank is involved, while the relationship is positive if the borrower has access to market finance or multiple banks.

lower growth rates than their industry peers,[13] suggesting that main banks captured most of the rents through higher interest payments (and through pressure on clients to use large quantities of bank-financed capital inputs). Thus, when capital markets are underdeveloped and entry into the banking sector is restricted, close bank–firm relationships may lead to a redistribution of rents away from the manufacturing sector to the financial sector. In the case of these larger Japanese firms (for which asymmetric information is presumably less severe), access to market finance reduced the cost of external finance. The net benefit of bank finance, therefore, must be assessed by comparing the monitoring-induced reduction in the cost of funds against the value of rent extraction.

B. Efficient Capital Structure

Because a higher agency cost leads to a higher cost of finance, it is in the firm's residual owners' interest to choose a capital structure that minimizes agency cost. On the one hand, debt mitigates the conflict between insiders (owner-managers) and outside investors, by committing the former to a prespecified level of payment to outside investors, hence reducing room for opportunistic behavior. On the other hand, as leverage increases, insiders have incentives to engage in activities that promise high payoffs if successful even though they have a very low probability of success. Because of this incentive problem of debt, as well as the monitoring and bankruptcy costs it entails, the firm will never be entirely leveraged. The optimal mix of debt and equity is chosen so as to minimize total agency cost.[14]

Zender (1991) has considered a world inhabited by active and passive investors, where the active investor holds equity, hence the control of the firm, and the passive investor holds debt. Disagreement may arise between the two investors because of asymmetric information. In this environment, the debt holder's cash flows are fixed in order to ensure optimal decision making by allowing the controlling investor to realize the marginal product of investment. The potential for moral hazard (i.e., underinvestment or excessive risk taking, given the fixed payment schedule) is offset by the ultimate transfer of control in case of default. Moreover, repaying as much as possible in bankruptcy states allows the fixed repayment in

[13]The main results are: (i) the share of capital used by main bank clients was significantly higher than that of independent firms prior to 1980, but the difference in capital use virtually disappeared since; (ii) the transfer of rents from client firms to main banks often took the form of higher interest payments; (iii) main bank client firms grew no faster than independent firms; and (iv) main bank client firms did not outperform their independent peers in terms of growth and profitability (Weinstein and Yafeh 1998).

[14]Demirguc-Kunt and Maksimovic (1994) present an empirical application of the agency-theoretic approach to capital structure in developing countries (including India, Korea, Malaysia, Pakistan, and Thailand); the results were broadly consistent with the predictions of the theory based on annual data for 1980-1991.

nonbankruptcy states to be minimized, thus minimizing the probability of bankruptcy and hence the cost (Gale and Hellwig 1985).

Because agency cost reflects the cost of information gathering and legal enforcement, it is not independent of the nature of the firm's business, the development of financial institutions and markets in the economy, and the efficiency of the legal system. Jensen and Meckling (1976) have argued that when the incentive effects of outside equity and debt are very different, there will be specialization in the use of the low agency cost financing arrangement. For example, in industries where it is easy for management to reduce firm value by outright theft (e.g., the restaurant industry), the ownership structure should be characterized by relatively little outside equity, with almost all outside capital obtained through debt. On the other hand, in conglomerates where it is easy to shift outcome distributions adversely for debt holders, the structure should be characterized by a relatively lower use of debt. In industries where the freedom of management to take riskier projects is severely constrained, such as regulated industries, there should be more intensive use of debt financing. The upshot is that the optimal financial structure of an externally financed firm is usually some mixture of debt and equity. Without well-developed equity markets, it is difficult to achieve an optimal financial structure.

C. Corporate Control

When external funds must be raised, the premium over the cost of internal finance needs to be reduced by a credible mechanism of corporate control. One of the devices used for this purpose is equity, which gives voice to the investor in the direct control of the firm. In contrast, public debt provides less binding control on management, particularly when the maturity is long; in the case of long-term zero coupon bonds, there is virtually no monitoring of management. For shorter-term maturity bonds, however, each possible rollover becomes an opportunity to monitor management. In terms of this characterization, a pecking-order theory of governance structure has been suggested in which the firm first wants to start with internal funds, then long-term and short-term debt, followed by equity, which gives full control to the investor (Aghion and Bolton 1992).

Capital markets exert discipline on management not only through outside control but also through security prices and pressure for better disclosure and transparency. In a liquid market, public trading of securities can also provide managerial incentives through the market's constant assessment of managerial decisions (Holmstrom and Tirole 1993). Although financial intermediaries can perform these functions, in practice, the viability of long-term relationships inherent in bank finance necessarily requires some degree of opacity (Rajan and Zingales 2001), creating an environment conducive to misguided decisions, such as excessive risk taking. This danger is particularly strong when banks are state-

owned or closely connected with family or industrial groups, or when full deposit insurance creates moral hazard for banks.

Equity possesses several control mechanisms to align the interests of management with those of equity holders. First, shareholder meetings are a formal mechanism of management control, although the ability of small shareholders to voice their views may be limited. Second, performance pay (e.g., bonuses or stock options) is another control mechanism, allowing managerial compensation to rise with firm value. Third, a takeover (or just a threat of it) can discipline management by serving them notice that they will be ousted if they do not act in the best interest of equity holders. Managers will then be less likely to take self-serving actions that may lower firm value and increase the probability of a takeover (Scharfstein 1988; also Stein 1988).[15]

These disciplinary roles of equity finance are precisely the reasons why equity markets do not develop in many developing countries. Owner-managers do not want to dilute their control through equity issues; nor do they want to expose their books to the public. However, there is a limit to the ability of start-up firms to expand through internal finance alone. If the owner-manager relies too much on debt for external finance in order to retain control, the risk of default, hence the probability of losing control to the creditors will rise. Thus, the owner-manager must sooner or later begin to weigh the marginal cost of diluting control rights to new shareholders against the marginal cost of debt and default (Aghion and Bolton 1992). Furthermore, the perceived risks of small start-up firms may be so high that investors are willing to invest only if they get an equity stake to share the upside returns (Bolton and Freixas 2000).

D. Efficient Resource Allocation

Market finance provides price signals for investment decisions, hence leading to a more efficient allocation of resources. This, of course, presupposes that the capital markets are well developed, such that securities are correctly priced. For this to hold, there must be accurate disclosure of balance sheet information and a competent financial analysis industry, the conditions not likely met in most developing countries. When these conditions are met, however, capital market fi-

[15]Whether or not these control mechanisms work in practice is a different story. First, with shareholders' meetings, it is difficult and costly to coordinate the interests and actions of small shareholders to influence the management who may have superior information. In order to exert any real control, equity ownership must be reasonably concentrated but, with concentrated ownership, the interests of large shareholders may be served at the expense of small shareholders (Stiglitz 1985). Second, available empirical evidence suggests that performance pay is not used sufficiently to minimize agency problems, perhaps owing to political and social constraints that limit huge payoffs for exceptional performance (Jensen and Murphy 1990). Third, while a liquid market is essential for the takeover mechanism to work, there is no guarantee that shareholders, if convinced of the raider's ability to increase firm value, will be willing to sell their holdings. Nor is it clear, in the first place, that the raider's assessment of firm performance is superior to that of the current management who should have informational advantage.

nance permits information feedback from equilibrium market prices to the decisions of firms, which in turn affect those market prices (Boot and Thakor 1997). In contrast, with relationship banking, there are no price signals to guide investment decisions, so that the effective cost of financing can deviate substantially from the true risk-adjusted cost (Rajan and Zingales 2001).

Here, there is a synergy between equity market development and bond market development. For a bond market to develop, there must be a well-developed equity market capable of processing complex information. In contrast, an equity market can develop without a well-developed bond market, particularly in a growing economy where downside risks are low. Given the principle of limited liability, equity holders may even be willing to invest in shares of poorly disclosed company stocks in order to benefit from upside gains. An efficiently priced equity market, however, will not develop without a well-developed bond market, which provides the correctly priced term structure of risk-adjusted discount rates (Herring and Chatusripitak 2000). Boot and Thakor (1997) have argued that the active use of bond finance by US firms can be explained by the greater information content of price signals in the US capital markets where a significant number of firms are covered by financial analysts.

Another source of resource misallocation comes from the nature of banks as creditors. Because the value of debt falls as risk increases, banks have incentives to discourage risk taking. Consequently, banks evaluate additional investment decisions differently from the firm, preventing otherwise profitable opportunities from being financed.[16] On the other hand, when state intervention (in the form of implicit guarantees) creates moral hazard, banks may take excessive risk by engaging in speculative activities, the phenomenon recently observed in the crisis East Asian countries. Likewise, when banks are controlled by family business groups, inefficient credit allocation may result from lending made to affiliated firms (Fry 1995). These problems of outright misallocation do not exist at least to the same extent with market finance, particularly equity finance.

Resource allocation is also affected by incentives. When bank finance involves an element of revenue sharing (e.g., providing intertemporal subsidies by lending at lower interest rates to young firms in exchange for higher interest rates later), banks may use their bargaining power to extract rents when the investment turns out to be profitable. In these cases, management's incentives to exert effort will be reduced, as it can no longer claim all of the marginal product of investment. In contrast, market finance would allow the borrower to realize the marginal product of investment. For this reason, market finance gives greater incentives to exert effort, hence better allocation of resources (Rajan 1992).

[16] Weinstein and Yafeh (1998) show that Japanese main banks have inhibited firm growth by discouraging risky yet profitable investments. This tendency, however, can be mitigated to some extent by allowing banks to hold equity (Stulz 2000).

E. Financing for Innovation

An important feature of debt finance is the requirement of collateral in one form or another. Even when debt is not explicitly secured, it is still effectively collateralized by the value of the whole firm (Stulz 2000). While collateral can be an efficient means of resolving moral hazard and adverse selection problems by making default more costly (Chan and Thakor 1987), this feature of debt finance is more conducive to financing of fixed assets than to economic growth, particularly when it involves innovative activities (such as R&D) that do not necessarily yield collateral. Some have thus argued that equity finance is essential as a way of financing intangible assets, including growth opportunities. Rajan and Zingales (2001) have observed that equity-financed industries tend to have few hard assets, and the development of accounting and legal standards would make it easier to finance intangible assets with equity. In contrast, in economies with inadequate accounting and legal standards, the resultant greater use of debt finance tends to distort asset holdings towards fixed capital.

A well-developed equity market, moreover, promotes innovation by permitting venture capitalists to exit through an initial public offering (IPO). Exit is important because the investors need to evaluate the venture capitalists' skill as well as the risks and returns on the investments, and to be able to withdraw the funds if necessary (Black and Gilson 1998). The potential for exit through IPOs, made possible by a well-developed equity market, allows the venture capital provider and the entrepreneur to enter into an implicit contract over future control of the portfolio company; to the extent that the entrepreneur values retaining control, but is not able to do so at the time of the initial venture capital financing, an IPO allows the entrepreneur to reacquire control if the project is successful. In the absence of a liquid stock market, the only way of exit is by selling the company to a larger company (Black and Gilson 1998).

More generally, market finance (including both equity and bond finance) is particularly useful when diversity of opinion or serendipitous information becomes more important, such as when there is great demand uncertainty about introducing a new product (Allen and Gale 1999, Subrahmanyam and Titman 1999). Serendipitous information here refers to the type of information that is generated in the market place and is more likely held outside the firm.[17] Likewise, firms that rely on complex or new technologies also gain more from the feedback role of market finance. In contrast, bank finance may be more suited for traditional industries where there is consensus on how the firms should be run (Allen and Gale 1995). In the case of new or dynamic industries where innovation matters and wide agreement is lacking, however, loan or monitoring decisions by a few bankers may

[17] Serendipity is defined as the extent to which investors may by chance come across valuable information in their day-to-day activities.

not be adequate (Allen and Gale 1999). Banks may not possess the needed information; even if it does, it may not be able to process the information correctly. In either case, banks may fail to provide financing to promising but uncertain investments.

V. CREATING AN OPTIMAL FINANCIAL STRUCTURE—ADDITIONAL ISSUES

A. Optimality Characteristics of Debt

When informational asymmetry is particularly severe, the ability of debt finance to economize on monitoring becomes useful as a control device: debt carries no need for monitoring as long as the borrower is making the stated coupon payment. In a class of what is called costly state verification (CSV) models (in which verification is costly and the agents have limited wealth), first developed by Townsend (1979), the optimal contract is shown to be a simple debt contract, which requires a fixed repayment when the firm is solvent, requires the firm to be declared bankrupt if this fixed payment cannot be made, and allows the creditor to recoup as much of the debt as possible from the firm's assets.

In these models, debt is optimal in the following way. In an alternative scheme, if the payment to outside investors varies with the reported cash flows, the firm may have an incentive to underreport its cash flows. If there is no way of verifying the true cash flows, the firm will always underreport its cash flows and the investor will not recover the investment. Debt is a way of solving this problem by designating certain levels of reported cash flows as being subject to verification. If a low cash flow report results in verification (i.e., default or bankruptcy), the firm with a high realized cash flow may not want to underreport.

The potential for deception is limited by two factors. First, if the firm falsely underreports to the point of requiring verification, it will certainly be found out because the contract requires the investor to observe the true state. Second, in order for the investor to be deceived, he must receive the same income as if the announced state had actually occurred. If that is the case, it must be that the firm is able to pay this income from the actual revenues (Gale and Hellwig 1985). This feature of a debt contract that encourages truthfulness on the part of the firm is called "incentive-compatibility." In other words, with debt, the borrower has no incentive to lie about the true state, even though the contract is made contingent, not on the true cash flows, but on the reported cash flows.

Debt also exerts a disciplinary effect on management, because a default would give the creditor the option to force the firm into liquidation. Thus, management has an incentive to avoid that possibility by making sound investment decisions. If the cost of bankruptcy is low, high leverage works particularly well as an incentive and monitoring device, because liquidation becomes a real possibility

in the event of mismanagement. Management that makes mistakes will not be able to repay the debt, and ends up yielding the control of the firm to the creditors (Harris and Raviv 1990, and Stulz 2000). In sum, debt is optimal because (i) it dispenses with the need for costly verification in good states; (ii) as management receives nothing when verification takes place, it tries to minimize the probability of verification taking place; and (iii) it is incentive-compatible (Townsend 1979, Williamson 1987, Chang 1990, and Dowd 1992).

B. The Choice between Bank Finance and Market Finance

Market finance and bank finance coexist because they address different types of informational problems with different degrees of effectiveness. In broadest terms, bank finance is better suited for mitigating the problems of asymmetric information, while market finance has a superior allocative function through its ability to provide price signals. Thus, the choice between bank finance and market finance is effectively a tradeoff between a more efficient attenuation of moral hazard and improved real decisions associated with feedback from market prices.

Boot and Thakor (1997) have conceptualized this tradeoff by assuming two types of investors (traders), called discretionary and liquidity traders. Discretionary traders pay a fixed cost to become either an informed trader or a monitoring trader. The financial market consists of informed traders, uninformed discretionary traders, and liquidity traders, where the presence of liquidity traders makes prices noisy and sustains the ex post trading profits of informed traders. Banks consist of monitoring agents and nonmonitoring depositors. The financial market is ineffective in deterring borrowers from investing in an unprofitable project. The bank, on the other hand, specializes in deterring borrowers from investing in unprofitable projects, but it learns nothing about the firm-specific piece of information that is conveyed by the market signal.

In this environment, it is shown that the firm chooses a combination of bank finance and bond finance by optimally balancing the benefits of bank monitoring and financial market information aggregation. If asset-substitution (postlending) moral hazard is severe, the firm is likely to choose considerable bank funding to induce sufficient monitoring. If moral hazard is low, the firm can better exploit the information aggregation benefits of financial markets by borrowing more by public bond issues. This prediction is consistent with the observation that firms in industries with substantial state verification (hence, little need for additional monitoring) use capital markets, while firms in industries that require a lot of monitoring use banks (Boot and Thakor 1997).

C. Reputation Acquisition through Bank Loans

Reputation can to some extent mitigate the problems caused by asymmetric information. Diamond (1989) has analyzed the joint influence of adverse selection and moral hazard on the ability of reputation to eliminate the conflict of interest between borrowers and lenders about the choice of risk in investment decisions. If there is initially widespread adverse selection, such that a large proportion of borrowers have undesirable characteristics, reputation effects are too weak to eliminate the conflict of interest for borrowers with short track records. Adverse selection becomes less severe as time produces a longer track record, and a good reputation can eventually become strong enough to eliminate the conflict of interest for borrowers with a long record of repayment without a default. If adverse selection is initially not substantial, reputation can begin to work immediately.

Because reputation requires time to develop, new borrowers face more severe incentive problems and would be most likely to utilize costly methods for dealing with such problems, including restrictive covenants in bond indentures and additional monitoring by a financial intermediary. The incentive problem is that debt contracts may encourage risky and less valuable projects. With a long time horizon, the reduced interest rates for a borrower who does not default imply that the present value of the borrower's rents for any constant investment decision rises over time. The value of a good reputation rises over time, as does the cost of default. Therefore, over time, the payoff of a risky project declines relative to a safe but profitable project. The reputation itself becomes a valuable asset, and a single default causes a large decline in its value (Diamond 1989).

If moral hazard is sufficiently widespread, new borrowers will begin their reputation acquisition by being monitored by a bank and later switch to issuing bonds. A borrower's credit record acquired when monitored by a bank serves to predict future actions of the borrower when not monitored. A bond is a contract with terms that depend only on public information. A bank loan uses this information plus information from costly monitoring of a borrower's actions to condition the decision to grant a loan or to condition the loan's covenants (Diamond 1991). Firms build reputation by taking on costly finance, and those that acquire good reputations then switch to bond finance to save monitoring costs. Evidence based on a large sample of US firms does confirm that reputation (proxied by the age of borrowers) and bank finance both reduce the yield spread of first-time public bond issues (Datta, Iskandar-Datta, and Patel 1999).

D. Institutional and Regulatory Requirements for Market and Bank Finance

Market finance and bank finance have different levels of institutional requirements. The infrastructure that supports market finance includes an appropriate legal framework, well-defined accounting and disclosure standards, ef-

ficient clearing and settlement systems, capable underwriting and distribution networks, and a competent financial analysis industry, including independent rating agencies. In addition, a viable bond market requires the rigorous and speedy enforcement of contractual terms, while a liquid equity market presupposes an adequate system of investor protection, including rules against insider trading. As noted earlier, while an equity market can flourish without a bond market, it may not be efficient. An equity market that is efficient in the processing of information presupposes the existence of an efficient bond market (Herring and Chatusripitak 2000).

In contrast, bank finance can function even if laws are poorly drafted and contracts not enforced. While market-based systems require transparency as a guarantee of protection, relationship-based systems are designed to preserve opacity, which has the effect of protecting the relationships from the threat of competition (Rajan and Zingales 2001). In fact, some restrictions on competition and disclosure are necessary for relationship banking to thrive. With too much competition and disclosure, hence with a reduced ability to appropriate rents, there is little incentive for banks to invest in resources in project evaluation, in which case they do not develop expertise, unprofitable projects might be started or continued, or fewer profitable projects would be funded. With too little competition, on the other hand, the bank may become too powerful, reducing the payoff to innovative activities, hence making it less likely that profitable projects will be undertaken (Rajan 1992).

E. Corporate Governance and Market Liquidity

The corporate governance role of equity finance may be compromised by attempts to enhance the quality of price signals through disclosure, fair trading and other investor protection measures designed to improve market liquidity. While market liquidity improves performance monitoring by enhancing the information content of securities prices (Holmstrom and Tirole 1993), a diversified equity holding inherent in a liquid market weakens the equity holders' stake in the firm. On the other hand, concentrated ownership may be better able to discipline management by minimizing the free rider problem inherent with diversified equity holding. It may be for this reason that concentrated equity holding is known to be widespread and very substantial where present (Shleifer and Vishny 1986, 1997).

There is thus a tradeoff between market liquidity (enhanced by diffused ownership and information) and corporate governance (enhanced by concentrated equity holding), so that attempts to increase market liquidity may weaken corporate governance, unless they are accompanied by efforts to strengthen the requisite legal systems. Active equity holders who reduce agency cost by providing internal monitoring reduce market liquidity by creating information asymmetry. Conversely, equity market liquidity discourages internal monitoring by reducing the

cost of exit for dissatisfied equity holders. It is said that US securities laws and rules since the New Deal have discouraged concentrated equity holding, with disclosure regulations and restrictions on insider trading, which are designed to protect small equity holders and to reduce the risks of diffused equity holding. Against the gains in market liquidity, Bhide (1993) argues that the lack of concentrated equity holders has created serious corporate governance problems in large US firms. Ideally, there must be a calculated balance between diffused and concentrated equity holding, if the equity market is to play an effective corporate governance role.

Obviously, the benefit of a liquid market is the lower cost of information gathering. There is a synergy between market liquidity and the development of institutions that reduce the cost of information gathering. In the US, compared with other countries, there are a far more number of investment banks and financial analysts engaged in producing information about companies, reducing the cost to investors of evaluating firms (Chemmanur and Fulghieri 1999). Because these security analysis activities reduce the agency costs associated with the separation of ownership and control, they are socially productive, although they may not increase the rate of return (Jensen and Meckling 1976). As noted, this of course comes at the expense of effective corporate governance.

The benefit of market liquidity (relative to corporate governance) depends on the nature and type of information that is relevant to the firm in question. When investors receive different signals, diversified holding can generate better information than can be generated by more concentrated holding. Thus, the advantage of public financing increases as costly information becomes more diverse and cheaper to acquire. Moreover, as the equity market develops, the information conveyed by stock prices generally improves, which in turn increases the incentive for private firms to go public and for conglomerates to spin off independent business units. The same argument made for the value of equity finance when information is serendipitous applies here for the value of a liquid market with diversified equity holding (Subrahmanyam and Titman 1999).

F. Challenges for Financial Sector Development in Asia

The banking industry in most of Asia has certain features that are not well captured in the characterization of financial intermediaries in the academic literature (Okuda 2000). First, a large segment of the private banking sector is controlled by family business groups. Second, the share of state-owned banks is significant, though generally declining over time. Third, as a result of economic and financial liberalization, the nature of the historical tripartite relationship between governments, banks, and businesses has changed in the direction of smaller state involvement, causing the profitability of conventional banking to decline. Fourth, most Asian banks are small in size.

These conditions present unique challenges to the bankers and bank regulators of Asian countries. Limited size constrains the ability of banks to exploit the economy of scale in use of resources on developing financial expertise. Incentives to screen and monitor borrowers are limited by the culture and history of family control or state intervention. In the current environment of greater deregulation, moreover, Asian banks are increasingly orienting themselves toward consumer finance and other high-return activities of short-term nature, limiting their role in maturity transformation. Hence, in order to ensure that banks do well what they are supposed to do, we must not only safeguard their managerial autonomy from family control or government intervention, but also make sure that they be provided with sufficient resources and appropriate incentives to develop the capacity to collect and analyze information about their borrowers (Khan 1999, Okuda 2000).

The strategy for capital market development in Asia must take account of this reality of the banking sector. While it is important to develop capital markets as an alternative and potentially lower cost alternative of external financing, capital markets should not threaten the viability of the banking sector, which is likely to remain the predominant source of financing for a large segment of Asian economies. In this regard, universal banking may be a definite option, as it promotes the formation of larger institutions in a manner consistent with a liberalized financial regime necessary for capital market development. If implemented properly, financial restraint can be an acceptable policy for developing a strong banking sector, but it is not compatible with capital market development in the long run.

Recent research suggests that universal banking can yield considerable benefits in terms of better underwriting services (even for small firms) without necessarily undermining the viability of investment specialists, other specialized financial services or capital markets; potential conflict of interest problems do not seem to be significant (Benston 1994; Gande, Puri, Saunders, and Walter 1997; Puri 1999). The presence of well-established banks as equity investors may also be useful in the early stages of capital market development when effective corporate governance requires monitoring by concentrated yet independent shareholders.

VI. CONCLUSION

This paper has presented a review of major conceptual issues discussed in the academic literature, as a framework in which to conceptualize the rationales and strategies for fostering capital markets. The paper has argued that the presence of severe informational asymmetry explains the predominance of bank finance in much of developing and emerging Asia, as bank finance has advantage over capital market finance in mitigating adverse selection and moral hazard through closer monitoring. In an environment where accounting and disclosure rules are inade-

quate and legal enforcement is weak, it is difficult to develop capital markets; equity tends to be held privately or in a concentrated manner, so that the equity market remains illiquid.

Given the time it will take to develop adequate legal frameworks and other requisite institutions, bank finance is likely to remain the dominant source of external finance for a large portion of developing and emerging Asia, especially for smaller and younger firms. Thus, high priority should be given to improving the quality of bank intermediation by taking measures to safeguard the autonomy of banks from family or state control, develop expertise in screening, monitoring and information gathering, and minimize moral hazard arising from the provision of a deposit guarantee. To create sufficient incentives, it may be necessary initially to insure sufficient size and rent creation, but too strong a banking sector will begin to stifle profitable investment opportunities. It is also in this sense that developing capital markets becomes important as an alternative source of external finance.

The choice between bank finance and market finance is influenced by the country's stage of economic development as well as by the government's regulatory policies. The benefit of capital market finance increases with the development of financial and legal infrastructure, which reduces the cost of information acquisition, improves the informational content of securities prices, and ensures that covenants are enforced. With the country's financial development and the maturing of larger firms with long credit histories, more firms with a lower agency cost may want to benefit from the lower cost of capital market finance. It is thus important that policymakers create an appropriate legal and institutional environment that is conducive to the working of natural economic forces driving firms to move from bank finance to capital market finance.

With the passage of time, a well-developed, liquid equity market will become increasingly beneficial for the financing of technical innovation and new economic activities. While use of debt finance tends to distort asset holdings toward fixed capital, equity finance facilitates the development of innovative activities (such as R&D) that do not necessarily yield collateral; a well-developed equity market supports a venture capital industry by allowing venture capitalists to exit through an IPO. At the same time, market finance in general becomes valuable with economic development, which causes information to be held more widely in the economy. In these and other ways, the innovation-promoting and price signaling roles of market finance are expected to become more important in Asia, where there will be an increasing need to support technical innovation and to process an ever more complex set of information.

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Poverty Reduction Issues: Village Economy Perspective

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Since land and human capital are the two most important resources in rural areas, it is essential to increase the amount of land and human capital owned by the poor and to increase wage rates for them by increasing labor demand, in order to reduce rural poverty. The major policy means to achieve such goals are land reform, investment in agricultural research, investment in human capital, and promotion of rural industrialization. Polices intended to reduce rural poverty, however, are often ineffective and sometimes result in adverse consequences. The major purposes of this paper are to identify major flaws of the existing policies and to derive policy implications for more effective poverty reduction, through a survey of the literature on land reform and land tenancy, agricultural research, human capital investment, and rural industrialization.

I. INTRODUCTION

Since income basically consists of the sum of returns to owned resources, including both physical and human assets, it is determined by the amount of owned resources and the rates of returns to those resources or factor scarcities reflected in factor prices. Important assets in rural areas are land and human capital. Thus, the agricultural landless laborers are generally poor because they do not own land (David and Otsuka 1994, Hayami and Otsuka 1993a). Furthermore, in general, they possess smaller amounts of human capital. Landless tenants are generally wealthier than landless laborers, because tenants tend to engage in management-intensive activities requiring human capital, such as fertilizer application and water control, whereas landless laborers tend to engage in simple tasks, such as weeding and harvesting. Farmers in low-potential or agriculturally marginal areas, which tend to be located in remote areas, are poor primarily because

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returns to land and labor tend to be low or the quality-adjusted labor and land endowments are meager. It is also important to note that the poor spend much of their income on foods. Therefore, their welfare depends critically on the availability of cheap foods.

In order to reduce rural poverty, it is essential to increase the amount of land and human capital owned by the poor, to reduce land rent if the poor are tenants, to increase wage rates for the poor by increasing labor demand, and to reduce food prices by increasing food supply. The major policy means to achieve such goals are: (i) land reform, (ii) investment in agricultural research, (iii) investment in human capital or schooling, and (iv) promotion of rural industries. Land reform is supposed to transfer land or returns to land from land-rich to land-poor households. Investment in agricultural research, coupled with investment in irrigation and drainage, increases the supply of food and, in addition, the demand for labor, if developed technology is labor-using. If research successfully develops appropriate technologies for unfavorable areas, it will contribute to increases in factor returns for the poor. Investment in human capital and rural industrialization both increase labor income of the rural poor by increasing the stock of and demand for human capital.

At the outset it must be pointed out that although not explicitly covered in this paper, there are other policy instruments that can be also used to achieve poverty reduction. Investments in road and other social infrastructures can increase access to labor markets for the poor. Provision of microenterprise credit to poor rural households that are credit-constrained may be able to increase the returns to labor held by the rural poor.

While the theoretical consideration to reduce rural poverty is simple and straightforward, actual policies intended to reduce rural poverty often result in adverse consequences. The first purpose of this paper is to review critically the impacts of existing land reform programs on the welfare of the poor with a view to suggesting the design of desirable land reform programs. The second purpose is to reconsider the role of agricultural research in poverty reduction based on the experience of the rice Green Revolution in Asia. Finally, the importance of human capital investment and the development of rural industries to reduce rural poverty will be discussed.

II. LAND REFORM[1]

A. Common Features of Land Reform Programs

Land reform programs in Asia typically consist of tenancy reform and land redistribution programs. Tenancy reform rules out the practice of share tenancy,

[1]This section draws partly on Otsuka (1993).

regulates the leasehold rent at a low level, and prohibits the eviction of tenants. The land redistribution policy sets the ceiling on the maximum land holding and transfers the ownership right of land in excess of the ceiling to the actual cultivators. In order to "protect" or preserve the status of land reform beneficiaries, transaction of tenancy rights including new leasing and subleasing is prohibited by law. Another common feature is that areas under owner cultivation are exempted from land reform, which permits large owner-cultivation with the employment of hired labor. These features of the Asian land reform programs are widely shared by land reforms laws in a number of Asian countries (Ladejinsky 1977; Herring 1983; Prosterman and Riedinger 1987; Hayami, Quisumbing, and Adriano 1990; Riedinger 1995).

Land reform programs have the twin objectives of reducing rural poverty by transferring wealth from the landed class to landless tenants, and achieving higher production efficiency by converting share tenancy to owner cultivation as well as leasehold tenancy. There are two important presumptions justifying these programs. First, the tenants belong to the poorest segment of rural society. Second, share tenancy is less efficient than leasehold tenancy and owner cultivation, even with the employment of hired labor.

In general, however, these presumptions are empirically incorrect. In what follows, the paper will examine the adverse consequences of the existing land reform programs and suggest the direction of desirable changes.

B. Effects on the Landless

First of all, it must be emphasized that the poorest of the rural poor are landless laborers (David and Otsuka 1994). Yet, the conventional land reform programs are ineffective in reducing the incidence of landlessness,[2] which is a major source of rural poverty. Clearly, a major reform is needed in the design of land reform programs so as to provide direct benefits to the landless laborers.

Second, by suppressing the option of tenancy contracts, land reform tends to induce large owner cultivation with the employment of hired labor.[3] In fact, it is widely reported that in areas where land reform was implemented, tenants were often evicted and converted to hired laborers. Moreover, large owner-cultivation with hired labor is inefficient (Hayami and Otsuka 1993a). The inefficiency arises because it is costly to supervise the work effort of hired labor. In fact, hired laborers have weaker incentives to work than tenants, since the former receive fixed or

[2] Landlessness pertains exclusively to landless laborers, but not to landless tenants, as tenants have access to cultivation rights on land. Also note that landless households refer to landless laborer households in subsequent discussions.

[3] This type of hired labor is also called permanent labor employed for at least a season or a year, whose obligation is to perform the same type of farm tasks as tenants. Permanent labor must be distinguished from hired labor employed for specific tasks.

near-fixed wages regardless of their work effort (Otsuka, Chuma, and Hayami 1993). This inefficiency is likely to explain, at least partly, why the inverse correlation often exists between farm size and productivity, in which family-labor-dependent, efficient small farms coexist with hired-labor-dependent, inefficient large farms.

Third, land reform tends to block the agricultural ladder for landless laborers to ascend by prohibiting or suppressing tenancy transactions, thereby perpetuating rural poverty (e.g., Hayami and Otsuka 1993b). When one is young, one may begin one's farming career as a landless laborer. As he/she accumulates farming experiences and small amounts of capital, he/she may be able to become a share tenant or even a leasehold tenant. Finally, the tenant may become an owner-cultivator after acquiring larger amount of human and financial resources. Such agricultural ladder is closed if tenancy transactions are suppressed. Thus, once the landless become landless laborers or were born as children of the landless, they have little chance to become even tenants and are forced to remain poor agricultural laborers.

C. Land Reform and Share Tenancy

Contrary to the presumption of conventional land reform programs, share tenancy is generally not significantly inefficient compared with leasehold tenancy and owner-cultivation, according to the global survey of the empirical literature by Hayami and Otsuka (1993a). Traditionally share tenancy was considered inefficient in the economic literature, in view of the fact that they receive only a portion of the output, which, like proportional income tax, will reduce work incentives (Otsuka, Chuma, and Hayami 1992). Share tenancy contracts, however, are often made among the circle of extended family members and friends, and enduring personal relationships tend to deter shirking of tenants. Furthermore, more often than not, share tenancy contracts are long-term and, hence, dishonest behaviors are penalized in the long run in terms of loss of reputation in the rural communities, termination of contracts, or even ostracism. As a result, share tenants tend to work as hard as owner cultivators and leasehold tenants.

Yet, there are two well-known studies that report the significant production inefficiency of share tenancy (Bell 1977, Shaban 1987). They found significant inefficiency by comparing yields of owner-operated and share-tenanted fields of the same operators in India. In India, however, the land redistribution program, known as the land-to-the-tiller program, was implemented to transfer land from large landlords to tenants who actually cultivate the land (Ledejinsky 1977, Herring 1983). The important assumption of this program is that there is only a single tenant on each plot of tenanted land. In many areas, however, landlords shifted tenants every year or every season to prevent them from claiming that they are actual tillers of any particular plot of land (Ladejinsky 1977, Walker and Ryan

1990). In other words, share tenancy contracts became extremely insecure as the landlords attempted to circumvent the implementation of the land-to-the-tiller program. It is precisely under these conditions that Bell and Shaban found the significant inefficiency of share tenancy.

Under the one-period contract with no possibility of contract renewal, the penalty on a tenant's shirking is bound to be limited because future punishment, such as termination of contract, is absent. In consequence, productivity is adversely affected. Thus, significant inefficiency of share tenancy is likely to be more of a consequence of land reform regulations than of the inherent difficulty of enforcing contractual terms under a share contract. In fact, significant inefficiency of share tenancy is not found in Southeast Asia where land reform programs have seldom been implemented except in the Philippines. In this country, significantly lower profit per hectare is found under share tenancy in Central Luzon, where land reform was vigorously implemented (Estudillo and Otsuka 1999).

D. New Designs of Land Reform Programs

The major issue of land reform in Latin America and southern Africa is to transfer land from huge mechanized, commercial estates to hired laborers, who are not experienced in farm management. Binswanger and Deininger (1993) and Deininger (1999) therefore argue that land reform is much more difficult in these regions than in Asia, because inexperienced farm-laborers must be trained; in contrast, simple transfer of land rights from large landlords to experienced tenants is sufficient in Asia.

In Asia too, however, the transfer of land to inexperienced landless laborers is becoming an important agenda of land reform, if its aim is to reduce rural poverty. De Janvry et al. (2001) strongly argue in the context of Latin America that tenancy contract must be promoted to provide opportunities to manage farms for landless workers, so as to make it possible for them to ascend the agricultural ladder in the future. When contemplating the reform of dualistic farm structures in South Africa, Binswanger and Deininger (1993) and Deininger and Binswanger (2001) also develop essentially the same argument. Considering that share tenancy provides management experience to the rural poor and that the poverty associated with growing landlessness is becoming important in Asia, it is highly advisable to activate the share tenancy transactions in Asia. Thus, the first recommendation is to remove any legal obstacles to prevent or suppress share tenancy in Asia. We expect that such policies will reduce inefficiency of production on large farms with the employment of hired labor and the inefficiency of share tenancy caused by inappropriate tenancy policies. Furthermore, such policies will contribute to the reduction of severe rural poverty associated with landlessness.

Needless to say, the promotion of tenancy contracts alone cannot solve the rural poverty and income inequality associated with unequal distribution of land.

Unfortunately there are good reasons to believe that land sales market cannot reallocate land from less efficient large farms to more efficient small farms. The conventional redistributive land reform that attempts to transfer land from landlords to tenants is often ineffective and, where effective, creates adverse consequences, such as the eviction of tenants, excessive employment of hired laborers, and the adoption of labor-saving production methods to produce labor-extensive crops. A recent and detailed review of the Philippine land reform by Riedinger (1995) amply exemplifies the difficulty of implementing land reform, even if the government has a strong will to achieve land redistribution. Thus, a large number of economists recommend market-assisted land reform, which attempts to accomplish land reallocation by "voluntary" land market transactions (Hayami, Quisumbing, and Adriano; Binswanger and Deininger 1993; Deininger 1999; Deininger and Binswanger 2001; Sadoulet, Murgai, and de Janvry 2001).

"Voluntary" land markets cannot function without deliberate policy interventions in support of purchase of land by poor households. Such intervention can be justified not only on the equity ground but also by the generalizable proposition that small farms are more efficient than large farms, unless markets are unduly distorted. Thus, it is imperative to remove all the policies that favor large farms, such as the majority of formal-sector credit programs requiring land as collateral, inappropriate tax, subsidy, and marketing policies in favor of large farms. Further, it is highly recommended to support credit programs targeted specifically at the rural poor.

In order to effect massive land transfers, policy measures directly assisting land transfers, such as subsidy for the purchase of land or imposition of progressive land tax, will be indispensable. The World Bank experimented on market-assisted land reform, which provides grant or subsidy to the poor to purchase land (Deininger 1999). Hayami, Quisumbing, and Adriano (1990) propose the progressive land tax, which intends to induce land sales by large landowners. It is beyond the scope of this article to delineate the circumstances under which one policy option performs better than the other.

III. AGRICULTURAL RESEARCH[4]

A. Lessons from Green Revolution

Agricultural research can contribute to poverty reduction in three major ways. Since the poor people spend a considerable share of their income on foods, the first objective of agricultural research should be to contribute to an increase in supply of foods by developing yield-increasing technologies. Binswanger and Quizon (1989) demonstrate that equity-enhancing effects of the Green Revolution

[4]This section draws heavily on Otsuka (2000).

technology came mainly from lowered food prices due to output expansion. There is no question that the Green Revolution contributed to the declining trend of rice and other grain prices for the last three decades (Pingali, Hossain, and Gerpacio 1998). Thus, the development of high-yielding varieties must remain a critical component of the research strategy to alleviate poverty (Barker and Herdt 1985).

Second, since the poor depend primarily on labor incomes, the research should aim to increase labor demand by developing labor-using technologies. It is widely accepted that the Green Revolution technology, represented by the development and widespread adoption of modern varieties (MVs), is labor-using and land-saving, so that the share of labor income increases relative to income accrued to land. Since the land is distributed much less equally than labor among rural households, it is expected that the Green Revolution technology would contribute to the reduction in poverty as well as equalization of income distribution (Hayami and Kikuchi 1982). It is found, however, that the effect of MV adoption on labor demand is relatively modest and that the subsequent adoption of labor-saving technologies, such as tractors, threshers, and direct seeding replacing transplanting in rice production, often offset or even more than offset the earlier gains in labor demand (Otsuka, Gascon, and Asano 1994).

Third, since the poor tend to reside in unfavorable or marginal agricultural areas, the research should aim at developing technologies suitable for such areas. It is widely argued that the Green Revolution neglected the unfavorable areas, thereby worsening the poverty in such areas by reducing market prices of grains without improving technology (Lipton and Longhurst 1989). There is, however, evidence that benefits of the Green Revolution technology in favorable areas accrue to unfavorable areas through interregional labor migration from the latter to the former areas (David and Otsuka 1994, Renkow 1993). The question remains, however, as to what types of technology are suitable for marginal areas, for which research has high expected payoffs in terms of income generation and, hence, poverty reduction in such areas.

B. Favorable vs. Unfavorable Areas

Recent data comparing yields of MVs and traditional varieties (TVs), labor use, and income across production environments are rare. We examine here the community and household data collected by the International Rice Research Institute in the late 1980s (David and Otsuka 1994). Table 1 compares the MV adoption and yields of MVs and TVs across production environments in India, Philippines, and Thailand.[5] As would be expected, the adoption rates of MVs are higher in more favorable production environments. It is also true that MVs were

[5]We have chosen only these three countries because MVs completely dominated in many survey areas so that the comparison of yields of MVs and TVs is infeasible.

widely adopted in rainfed areas. According to the resurvey of the same villages in Bangladesh and the Philippines (Hossain, Sen, and Rahman 2000; Hossain, Gascon, and Marciano 2000), as well as in Thailand (Isvilanonda, Ahmad, and Hossain 2000), the same tendencies have been confirmed in recent years.

Table 1. **Adoption and Rice Yields by Variety across Production Environments in Selected Locations of Asia, 1985-87**[a]

Location/ Environment	MV Adoption (%)	Yields (tons/hectare)	
		Modern Varieties	Traditional Varieties
Central Luzon and Panay islands, Philippines, 1985			
Irrigated	97	3.6	2.4 [b]
Favorable rainfed	99	3.3	2.2 [b]
Unfavorable rainfed	40	2.6	2.0
Central Thailand, 1986			
Irrigated	71	4.4	1.9
Rainfed	11	3.3	2.1
Deep-water	1	1.8	1.9
Tamil Nadu, India, 1987			
Canal irrigation	100	5.6	n.a.
Tank irrigation	72	4.3	2.6
Rainfed	66	3.9	2.8

[a]Based on survey of 50 villages in the Philippines, 33 villages in Thailand, and 30 villages in India.
[b]Yields when traditional varieties were grown in the 1970s.
Source: David and Otsuka (1994).

It is important to observe that the yields of MV are higher in more favorable areas, whereas the yields of TVs are less sensitive to differences in production environments. This observation implies that the yield gains associated with MV adoption are larger, the more favorable are the production environments. Thus, as Byerlee (1996, 701) aptly points out, based on the more comprehensive literature review, "the yield advantage of MVs is lower in marginal areas."

Recently, however, Fan and Hazell (1999) report that based on the estimation of agricultural production function, the marginal returns to agricultural research were higher for low-potential rainfed environments than for irrigated environments in India. They use district level data, define rainfed areas as areas where less than 25 percent of the area is irrigated, and use MV adoption rate as a key explanatory variable. I would like to point out that it is possible that MVs were

adopted in the irrigated portion of "rainfed" districts. It is also surprising that MV adoption was insignificant in the estimation of production function for irrigated environments but highly significant for low-potential rainfed environments (Table 4), even though the estimated total factor productivity grew faster in the former than in the latter. Moreover, the estimated coefficient is much higher for low-potential rainfed environments. Such findings are obviously inconsistent with the general observation that at present MV adoption and crop yields are higher in irrigated areas than in rainfed areas in India (e.g., Janaiah, Bose, and Agarwal 2000). Thus, while we cannot deny the potential contribution of Fan and Hazell, their findings need to be interpreted with caution before they are supported by micro-level empirical evidence.

The use of hired labor for weeding, harvesting, and other simple tasks, is closely associated with the production environments and the rate of MV adoption. This hired-labor using effect would arise partly from the short maturity of MVs, which leads to sharp peak demands for labor, and partly from the negative income effect of MV adoption on supply of family labor of farm households (David and Otsuka 1994). The increased demand for hired labor would have expanded the employment opportunities in rice production. Since the main source of hired labor is landless laborers, there is no question that the adoption of MVs in favorable production environments does contribute to the reduction in poverty.

The greater labor demand, particularly for hired labor, from modern rice technology should increase wage rates in the favorable areas faster than in the unfavorable areas, unless interregional labor migration from unfavorable to favorable areas takes place. If a labor market adjusts through interregional permanent and seasonal migration, wages will tend to equalize across production environments. In such a case, benefits from technical change in the favorable areas will be shared with people in the unfavorable areas, particularly with landless workers, who tend to be geographically more mobile than farmers. Those who remain in unfavorable areas, as well as migrant workers, benefit from MV adoption in the favorable areas because wage rates increase in unfavorable areas as a result of out-migration.

It is clear that rice research for unfavorable areas does not have high returns. Then, what types of technologies are appropriate for such areas? Although it is difficult to provide general answers to this question, an example is provided here of appropriate technology for marginal areas, specifically agroforestry growing commercial tree crops in hilly and mountainous environments.

In marginal areas shifting cultivation is often practiced. In a recently completed comparative study of Asia and Africa by Otsuka and Place (2001), it is found that agroforestry is much more profitable and efficient than shifting cultivation growing miscellaneous food crops on sloping land. They also argue that the establishment of agroforestry on degraded land will contribute to the prevention of soil erosion and the creation of biomass. Another major finding of their study is that customary or communal land tenure institutions are largely favorable or mov-

ing in the right direction to provide proper incentives to plant and manage tree crops.

Here we briefly examine the profitability of rubber agroforestry in comparison with upland rice cultivation, which is a major alternative use of upland in Western Sumatra (Quisumbing and Otsuka 2001; Suyanto, Tomich, and Otsuka 2001). As is shown in Table 2, the average profit of upland rice production is almost zero, despite the large inputs of family labor (i.e., 173 days per hectare). Yet, upland rice fields are located in relatively flat land, which is more suitable for cultivation than rubber fields located on sloping land. A major factor affecting the low profitability of upland rice cultivation is the shortening of fallow periods because of increasing population pressure and limited access to new forest land. Currently, the average fallow period is about five years, which is insufficient for restoring soil fertility.

Table 2. **Gross Revenue, Residual Profit, and Labor Use per Hectare between Upland Rice Production and Rubber Agroforestry, by Age of Trees in Sumatra, 1997**[a]

	Gross Revenue ('000 Rupiah)	Residual Profit ('000 Rupiah)	Labor Use (person-days)
Upland rice	622	4	173
Rubber			
1st year	23	-339	59
2-3	0	-193	33
4-7	0	-60	14
8-10	728	165	78
11-15	1,007	217	101
16-20	1,017	278	88
21-25	1,166	328	110
26-30	1,303	378	114
30-	964	284	91

[a]Based on a random survey of 162 households in Jambi province.
Source: Quisumbing and Otsuka (1999).

In the first year of rubber field management, some annual crops are grown, which generate some revenue, but the residual profit is negative and large due to labor costs for land preparation and tree planting. Gross revenue is zero for the next several years. Most trees, if not all, begin to produce latex in the eighth year and consequently the residual profit turns positive. The internal rate of return to investment in rubber is estimated to be 15 to 20 percent, using cross-section age-profile of profits. Thus, the rubber agroforestry system is reasonably profitable and its adoption will increase farmers' income by increasing the efficiency of land use.

It is important to emphasize that rubber production is highly labor-intensive. Although labor use per cultivated hectare during the cropping season was higher for upland rice than for rubber, upland rice requires a fallow period. Thus, if the fallow period is considered, the average labor intensity for the land use system taken as a whole is much greater for rubber production than it is for upland rice.

Similar findings are made for cinnamon cultivation in Sumatra and cocoa agroforestry in Western Ghana (Quisumbing and Otsuka 1999). In Uganda, the adoption of cocoa agroforestry has been increasing, which suggests the greater profitability of coffee over food crops (Place and Otsuka 2001). In addition to the high profitability and labor-using nature, another advantage of agroforestry is storability of outputs, which reduces transportation costs, so that agroforestry can be developed in remote areas. It is clear that agroforestry systems growing commercial trees are appropriate for remote and hilly areas, where people are particularly poor.

C. New Designs of Agricultural Research Policy

Rice research has historically focused on favorable environments, such as irrigated environments and lowland rainfed environments free from flooding and deep water, because of high probability of scientific success. The homogeneous nature of irrigated areas also implies wide adaptability of new technologies, ensuring the large effects on rice production. Rice research, however, has been under strong pressure to shift priorities toward the unfavorable rice production environments as a way to reduce rural poverty. It is, however, scientifically much more difficult to develop new varieties for unfavorable production environments (David and Otsuka 1994). Unfavorable environments are highly heterogeneous, suffering from drought, submergence, salinity, and other problems, so that superior varieties, even if successfully developed, can be diffused only in limited areas. Moreover, the effect of new varieties tends to be marginal in marginal areas not only in rice production, as we have seen, but also in wheat and maize production (Byrlee 1996). Thus, if grain research focuses on marginal areas, it will have limited impacts not only on the supply of grains but also on the welfare of poor people in marginal areas. Indeed it is hardly believable that cereal producers in marginal areas in developing countries can compete with producers in developed countries, the majority of whom are in favorable areas, through international trades. It is also worth emphasizing that the landless are net consumers of rice and, hence, benefited from lower prices of rice.

The first conclusion therefore is that the allocation of research resources to the development of high input cereal technology for marginal agricultural areas

can be justified neither from the efficiency point of view nor from the viewpoint of poverty reduction.[6]

I do not argue that agricultural research should not try to develop new technologies for marginal areas. I argue that resources should be allocated to research, which generates appropriate technologies for such areas. I argue against rice and other cereal research for unfavorable areas, simply because the development and diffusion of appropriate technology can hardly be expected. I would like to suggest that the development of new technology for agroforestry growing commercial tress has high potential, as it is much more efficient than shifting cultivation. Therefore, the development and wide adoption of new and more efficient agroforestry systems will improve income of poor farmers in marginal areas by increasing the efficiency of land use. Yet, it is surprising that no serious research has been conducted on this promising technology. There might be also other crops and technologies particularly appropriate for agriculturally marginal areas.

The second conclusion is that if agricultural research ought to reduce poverty in marginal areas by developing new technologies for such areas, it must focus on the development of appropriate technologies conducive to the efficiency of resource use.

III. HUMAN CAPITAL INVESTMENT AND RURAL INDUSTRIALIZATION

A. Increasing Role of Human Capital

Household incomes in rural areas of Asia have increasingly depended on nonfarm income sources. This is the case even in the Philippines where the development of the nonfarm sector has been less spectacular than in other countries (Estudillo and Otsuka 1999). It is also widely observed that human capital, as reflected in schooling, is a major determinant of nonfarm income throughout Asia (David and Otsuka 1994). Let us examine the increasing importance of nonfarm income and human capital based on the case studies in the Philippines (Estudillo, Quisumbing, and Otsuka 2001a, b, c).

Table 3 compares the average annual income per capita between farm and landless households across the three villages in Panay Island in 1985 and 1998. Income of farm households in irrigated village is higher than in rainfed villages, and income of farm households is higher than that of landless households in the same production environment. However, income of the landless in unfavorable rainfed, i.e., rainfed village II, is significantly lower than the income of the landless in other villages. The landless in rainfed village II were significantly poorer,

[6] If biotechnology is particularly useful for developing disease- and pest-resistant varieties, those varieties will be diffused primarily in favorable areas, as in the case of the Green Revolution technology.

not only because this is the least favorable village in rice production but also because this is located in the most remote area with the least access to nonfarm sectors. Therefore, there were a relatively small number of landless households in this village. Landless households are also geographically mobile and our respondents in 1985 had left the village in 1998. It is also found that there was no significant difference in agricultural wages between the three villages.

Table 3. **Changes in Average Annual Per Capita Income of Farm and Landless Households in Selected Villages in the Philippines, 1985 and 1998**[a]

Household Characteristics	Irrigated Village	Rainfed Village I	Rainfed Village II
1985			
Farm Household			
Per capita income (1,000 pesos)	4.5	3.6	1.6
Proportion of rice income (%)	(37)	(45)	(14)
Proportion of nonfarm income (%)	(37)	(27)	(37)
Landless Household			
Per capita income (1,000 pesos)	2.6	3.0	1.4
Proportion of rice income (%)[b]	(9)	(20)	(52)
Proportion of nonfarm income (%)	(81)	(73)	(32)
1998			
Farm Household			
Per capita income (1,000 pesos)	26.3	16.5	9.6
Proportion of rice income (%)	(30)	(12)	(22)
Proportion of nonfarm income (%)	(61)	(66)	(22)
Landless Household			
Per capita income (1,000 pesos)	14.3	10.9	--[c]
Proportion of rice income (%)[b]	(8)	(5)	
Proportion of nonfarm income (%)	(74)	(75)	

[a]Income figures are undeflated.
[b]Wage income from labor employment in rice production.
[c]There was only one full-time nonfarm landless household.
Sources: David and Otsuka (1994); Estudillo, Quisumbing and Otsuka (1999).

Incomes of the landless households in irrigated village and rainfed village I were comparatively high in both 1985 and 1998, because the landless actively engaged in nonfarm jobs. As a result, nonfarm income accounted for 70 to 80 percent of their incomes. In contrast, the proportion of nonfarm income among the landless was noticeably low in rainfed village II in 1985. Moreover, their income

from hired wage employment in rice production is barely sufficient for their own rice consumption. This implies that, in all likelihood, reduction in rice price will increase their welfare, even if it will reduce the demand for hired labor in rice production.

The importance of agricultural income, in general, and rice income, in particular, declined from 1985 to 1998. On the average, across three villages, rice income accounted for 40 percent and 16 percent of income of farm and landless households, respectively, in 1985. It accounted for only 21 percent and 6 percent, respectively in 1998. The dependence of the landless households on wage earnings in rice production was even lower. In terms of agricultural income or rice income, the gap between farm and landless households became smaller in 1998 than in 1985. The overall income gap between them, however, became larger, because the gap in nonfarm income became even larger. This is explained by the fact that members of farm households are more educated than those of the landless households and that education is the most important factor in wage earnings from nonfarm sectors including overseas employment.

In short, the major determinant of income gap across areas and between the farm and landless households changed from the difference in access to land to the difference in human capital. This is true not only in Panay but also in Central Luzon and Laguna (Hayami and Kikuchi 2000). It is expected that the importance of schooling will continue to increase as a determinant of income and poverty reduction, so far as the nonfarm sector continues to grow. It is also worth emphasizing that the poor landless no longer rely on labor employment in rice production to a significant extent, at least in the Philippines. This suggests that the impact of research on rice may not have major direct impacts on their livelihood.

Although how universal such changes observed in the Philippines are needs to be examined carefully, it is highly likely that the same tendency is observed. This is because the growth rate of the Philippines economy has been very slow compared with its neighboring countries. If so, investment in schooling for children of poor households will have to play a larger role in poverty reduction in the future in most Asian countries.

B. Role of Rural Industrialization

It is well known that large cities in Asia are highly congested and polluted. Thus, the conventional prescription that the economic development must entail continuous flow of migrants from poor rural areas to cities, where modern sector develops, is no longer valid. Given the congestion in cities, the prevalence of rural poverty, and increased dependence of incomes of farm population on nonfarm sources, the optimum development strategy should include the development of rural industries, which provide lucrative nonfarm employment opportunities for the rural poor.

Historically food processing and production of wood products used to be major categories of industrial sectors in rural areas. Yet, the evolution of rural industrialization involved a shift from relatively undynamic rural activities, using traditional technologies and targeted to local rural markets, to more dynamic activities geared to the demands of the urban and export markets. In fact, such new industrial sectors as garments, metal products, and machinery have become more important in rural areas of East Asia (Otsuka 1998). In this new stage of development, small-scale industries play a major role in the development of rural industries.

Not only social infrastructure but also "social capital" made significant contributions to rural industrialization in East Asia. Many rural entrepreneurs in East Asia, who are enterprise managers and local traders, were born and grew up in the locality where they operate their businesses, and they generally have work experience either in urban enterprises, with which subcontracting arrangements are often made (Otsuka 1998). They have enduring personal relations with locally recruited workers and have established a reputation as reliable partners among urban-based entrepreneurs and traders, who offer subcontracts to them. Hayami (1998) argues that the system of "relational contracting", which denotes the long-term, continuous contract relations that are enforced and maintained by personal ties, mutual trust, and community obligations, can be a dominant production organization in rural areas. The relational contracting embraces the operation of small rural enterprises connected by web of interenterprise cooperation and coordination. Traders and trading houses also assist the operation of small-scale rural enterprises not only historically in Japan (Hayami et al. 1991) but also in contemporary Taipei,China (Levy 1991). The system of rural-based small-scale industries is viable, only if transaction costs of interenterprise cooperation are comparatively small. The East Asian model of rural industrialization attests to the importance of low cost of interenterprise transactions in stimulating the development of small-scale enterprises in rural areas.

The development of transactions between urban and rural enterprises is the key to successful rural industrialization, because of the difficulties rural enterprises would face, which include inadequate access to modern technology and product methods; lack of access to markets and market information, such as designs most demanded by markets; and lack of capital. Many authors therefore advocate the subcontracting of rural enterprises with urban enterprises and trading houses, which possess better knowledge of marketing and modern technology and have better access to financial markets (e.g., Schmitz 1982, Lanjouw and Lanjouw 1995). Furthermore, subcontracting may promote the division of labor or the specialization of production processes among enterprises so as to reduce overall production costs (Watanabe 1971, Mead 1984). The specialization makes it possible to operate small-scale factories in rural areas, which reduces the initial capital requirements and, hence, entry barriers. Moreover, if parent companies provide

materials under putting-out contracts, working capital for subcontracting enterprises can be saved. Further, materials provided by the urban principal under putting-out contract usually embody designs demanded by markets, and the contract itself assures the procurement of materials and sales of final products. Thus, subcontracting can potentially overcome constraints imposed on the development of rural industries.

The rigorous quantitative assessment of how important subcontracting is for rural industrialization and how moral hazard and adverse selection, which potentially arise under subcontracts, are overcome is an important issue for further study. It seems clear to me, however, that it is difficult to reduce rural poverty without the development of rural industries, which provide ample employment opportunities for the rural poor.

IV. CONCLUSION

Several policy implications can be derived form our preceding discussions for the alleviation of rural poverty. First, land reform program should encourage tenancy transactions, contrary to the existing land reform programs that discourage such transactions.

Second, in order to facilitate the transfer of land, market-assisted land reform programs must be sought. To develop effective market-assisted programs, however, further in-depth research is needed.

Third, regarding agricultural research, it is imperative to continue the development of yield-increasing grain technologies for favorable areas, while paying due attention to the development of appropriate technologies for agriculturally marginal areas. It must be clearly understood that without increasing the efficiency of resource use in marginal areas, the contribution of agricultural research to the reduction of rural poverty is necessarily limited. It must be also emphasized that a major contribution to the poverty reduction that modern scientific agricultural research can make rests on the enhancement of overall production efficiency of food production sectors, thereby increasing the food security for the poor.

Fourth, investment in schooling of the children of the rural poor will have to play increasingly a major role in the reduction of rural poverty, considering the importance of human capital in nonfarm employment and the increasing importance of nonfarm income in rural areas.

Finally, the development of rural industries should be promoted. Yet, empirical research on rural industrialization is scanty. Thus, what policies are conducive to rural industrialization need to be further examined through careful empirical studies.

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How Does Spousal Education Matter? Some Evidence from Cambodia

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An econometric analysis of the World Food Programme Civil Insecurity Baseline Survey (1998) and Cambodia Socio-Economic Survey (1999) data is undertaken to examine the role of education and literacy in explaining household expenditure, as hypothesized in human capital theory where education is an investment with returns in the form of income. Explanatory variables were selected from a large set of observed variables by a systematic procedure to avoid the bias arising from arbitrary model selection. Spousal education and literacy are found to be significant explanatory variables in the determination of household expenditure, exceeding even the coefficients attached to the head of household. This suggests that educated and literate spouses may have a significant unobserved role in household consumption decisions and income determination in Cambodia. This finding builds on existing international literature on the importance of maternal and girls' education in economic development and offers a number of important policy implications.

"If you plant mangoes, you cannot get papayas."
—*A Khmer Proverb*

I. INTRODUCTION

Cambodia emerged in the last decade from 20 years of civil war and revolution, having depleted or destroyed nearly all its human capital and institutions: from doctors and judges to temples and schools. Today, nearly two million Cambodians aged 15 or older are considered illiterate or nearly one third of that population. More than three quarters of Cambodia's teachers and secondary school students fled or were murdered between 1975-1979 and 36 percent of Cambodians

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are considered poor (World Bank 1999a). With 1.7 million deaths—or a quarter of its population—in that same period, Cambodia has had to rebuild from an extremely low base. Furthermore, the exodus of hundreds of thousands of Cambodian refugees in the 1970s and 1980s (primarily to Thailand) for asylum in third countries exacerbated the loss of human capital. Those who left prior to 1975 tended to be the more educated and affluent. An examination of Cambodia's current stock of human capital, and in particular the returns to education and their interplay with other socioeconomic indicators, seems particularly appropriate given these circumstances.

Few studies have been done on the economics of education in Cambodia and the returns to education for the household, as a measure of welfare. This study contributes to the small but growing empirical stock on spousal education and to the even smaller stock of knowledge on human capital development in Cambodia. Although we primarily examine spousal education, our work should be seen in the context of the maternal education and literacy literature, as an offshoot of girls' education. We anchor our study in Section II by qualifying the relationship between these studies and our work and by augmenting our concept to include not just households with children and not just anthropomorphic or cognitive indicators, but a measure of welfare in the form of consumption data. In Section III, we take stock of the economics of education literature in Cambodia and follow in Section IV with the traditional human capital theory framework, which we adapt later for hypothesis testing. We explain the data's strengths and weaknesses and develop a theoretical model that underlies this study in Sections V and VI, respectively. Using two data sets to ensure the robustness of empirical evidence across data sets, we present the results in Section VII. Consistent with our hypothesis, we find that spousal education matters, and that it is important in and of itself as a contributor to household welfare. At the same time, it has the potential to impact future generations. In addition, if the cost of education for men and women is equal, then our study finds that the rate of return on spousal education (overwhelmingly women) is higher than education of head of household (overwhelmingly men). We discuss several policy implications in our conclusion.

II. SPOUSAL EDUCATION IN CONTEXT

This study is concerned with the importance of spousal education on household consumption, as a measure of welfare, in Cambodia. Although research on human resource development in Cambodia is emerging, the dearth of available data due to Cambodia's tragic recent past makes this study one of the first of its kind either to focus on Cambodia or more generally on any country. The term

"spousal education"[1] as distinguished from "maternal education"[2] or "girls' education"[3] does not preclude the possibility that the household might be without children, nor that the spouse should necessarily be a woman—although in Cambodia's case, this is almost always the case. As such, this study acknowledges the now widely assumed benefits of girls' education (see Schultz 1991, 1993; Psacharopolous and Tzannatos 1992 as surveyed in World Bank 2001) while augmenting the concept to include spousal education.

The study of spousal education *per se* has been relatively modest. Using Brazilian data, Tiefenthaler (1997) analyzed 50,451 married couples surveyed in 1989. She estimated the effects of spousal education on own productivity for both men and women in different market sectors. Tiefenthaler's results support the hypothesis that there are increases in productivity from both division of labor and association in marriage, and that there is a positive relationship between own productivity and marriage. Based on the World Bank's Living Standards Measurement Study data, Arslan (2000) replicated Tiefenthaler's research for Panama. Using data from the 1985 Michigan Panel Study of Income Dynamics, Airsman and Sharda (1993) compared the extent to which the occupational attainment processes of men and women are affected by having ever married and by the human capital assets that spouses bring to the marriage. They also examined the extent to which spousal assets continued to influence the occupational status outcomes of men and women after a marriage has ended in divorce.

In the wider literature, the concept of spousal education is most closely linked with maternal education. For example, according to Lefebvre and Merrigan (1998), higher levels of spousal education, along with higher levels of maternal education and skills, greater maternal age, and higher levels of the maternal grandmother's schooling are all associated with higher levels of cognitive skills for children. Briefly, maternal education has a long lineage in the public health literature. Higher levels of maternal education are correlated with more timely receipt of prenatal care, contraceptive use, less frequent and later childbearing, and

[1]Although it would be possible to interpret the term "spousal education" in its broadest sense—inclusive of even education on *how* to be a wife or *how* to be a husband, this study uses empirical evidence that follows the more traditional view of educational attainment. Cambodia's culture includes that possibility in an age-old (though no longer widely practiced) tradition for girls called *choul mloup* or entering the shade. Having entered puberty, the girl's parents will leave her in a room for three months to a year where she will be fed a diet of rice, peanuts, and sesame seeds and be taught (by her mother or grandmother) *chbap srei* or rules of conduct for women. There are corresponding rules of conduct for men, called *chbap pros*. For more details, see Frieson (2000).

[2]We acknowledge that maternal education can also include the possibility education in the sense of motherhood—how to rear, medicate, and generally take care of children, for example—but that in most instances reference to that term seems to also be in the realm of traditional education attainment.

[3]For resources on girls' education, see the World Bank, the United Kingdom's Department for International Development, the Rockefeller Foundation, and UNICEF's joint website: http://www.girlseducation.org/.

lower incidence of stillbirths (Stoltenberg et al. 1998). The early work was pioneered by LeVine (1980, 1987). Maternal education also improves child survival (Rao, Pandey, and Shajy 1997; O'Toole and Wright 1991; Behm 1987; United Nations 1985; and Cochrane and O'Hara 1982). According to the World Health Organization (2000), Southeast Asia, as a region, has "the unenviable distinction of making the largest contribution to the number of illiterate women in the world." Thus, the study of Cambodia's human resources predicament is particularly germane in this context.

Maternal education also has a tradition in the human capital literature, backed by worldwide empirical evidence. Rosenzweig and Wolpin (1994) empirically tested the hypothesis that maternal schooling augments the production of children's human capital, and could not reject the hypothesis using models that take into account heterogeneity in maternal endowments. They found that postponement of the initiation of childbearing by two years among women who are tenth-graders would result in a 5 percent increase in their children's achievement test scores. Behrman et al. (1999) hypothesized that increases in the schooling of women enhance the human capital of the next generation and thus make a unique contribution to economic growth. They found that in India, a component of the significant and positive relationship between maternal literacy and child schooling reflects the productivity effect of home teaching. In North York, Canada, higher levels of maternal education were associated with higher receptive vocabulary scores in children of those mothers with higher education (HRDC 2001). In the next section, we turn to the Cambodian human development context and review the literature on the economics of education in Cambodia.

III. THE ECONOMICS OF EDUCATION IN CAMBODIA

Cambodia ranks 130th out of 173 countries in the Human Development Index (UNDP 2002), and has the lowest Purchasing Power Parity per capita GDP and the second lowest life expectancy among its neighbors Laos, Thailand, and Viet Nam (see Table 1). GNP per capita (World Bank Atlas method) was $260 in 1999. Adult literacy (percent age 15 and above) is far behind that of Thailand and Viet Nam, while total fertility is a high 5.2 percent per year (1995-2000).

Table 1. **Human Development Indicators for Selected Countries**

Country	Adult Literacy in 2000 (%)	Life Expectancy	Total Fertility, 1995-2000 (%)	GDP per Capita, 2000 (PPP US$)	HDI Rank
Thailand	95.5	69.6	2.1	6,402	70
Viet Nam	93.4	67.2	2.5	1,996	109
Laos	48.7	52.5	5.3	1,575	143
Cambodia	67.8	56.5	5.2	1,446	130

Source: UNDP (2002).

In terms of human resources, this explosive demographic trend has significant implications for Cambodia's labor force which, when compared to its neighbors, is extremely young. According to the 1998 Census, nearly 55 percent of Cambodia is under 20 years of age. The recent high total fertility rate can be seen as a "replacement" rate for the massive loss of life in the 1970s. Without appropriate investment in human capital however, millions of would-be Cambodian workers will not be able to participate in the global economy (Ear 1997). With 152,166 government employees and 138,506 military officers (World Bank 1999b, 132-133), Cambodia can no longer afford to generate state-driven employment.[4] Moreover, with 83 percent male literacy and only 61 percent female literacy, the education of women is especially important today. In particular, this is why we have chosen to examine how spousal (the overwhelming majority of whom are women) education matters in Cambodia.[5]

Literature on the economics of education in Cambodia per se is very limited. There is a small but growing body of work, though much of it is qualitative in nature. Ayres (2000) examines the history of education in Cambodia since independence in 1953, as does Ear (1995) but from an economic perspective. Dykstra and Kucita (1997) offer a brief history of education in Cambodia since 1900 and its evolution, and introduce cluster-school based management as a case study for Cambodia. Frieson (2000) predates colonial education for women and provides the most comprehensive review of their education (and parental expectations) through Cambodian independence in 1953. Bray (1996, 1999) looks at the (private) cost of (public) education financing and Sloper (1999) examines the reconstruction of higher education in Cambodia in an edited volume. The Asian Development Bank (ADB) was a pioneer in targeting education for Cambodia. ADB (1996) was an excellent first attempt at assessing the sector strategically, as was Fiske (1995), which examined women and education in Cambodia on behalf of the ADB. Unfortunately, both were authored before any major survey results were available, as a result, both relied heavily on anecdotal evidence.

Improvements in source availability and utilization began in the late 1990s. In the framework of a baseline survey on household livelihoods and nutrition in Cambodian communes affected by civil conflict since 1989, Helmers and Kenefick (1999) provide some descriptive statistics and heuristic correlation analysis on education and health for a targeted subpopulation, as do UNICEF-WFP (1998) and UNICEF (2000). Although large (1,000+ households) multistage random sampled surveys, these were not nationally representative and their findings only apply

[4]Further, Bray (1999) found that spending on education is a paltry $6.48 per student per year, and primary education was found to have been financed in the following percentages: government (12.5); politicians (10.4); NGOs and external aid agencies (18); households and communities (59.9); and school-generated income (0.1). Politicians in Cambodia have a long history of diverting public money for public *and* private purposes.

[5]ADB (1996, 14) states that: "In primary schools, the proportion of girls is 45%; lower secondary 40% and upper secondary only 25%."

apply to the subpopulation surveyed. At the national level the Socio-Economic Surveys of Cambodia (SESC 1993/94, 1996) and the Cambodia Socio-Economic Surveys (CSES 1997, 1999) randomly sampled approximately 6,000 households and offered important, nationally representative, findings. The SESC 1993/94 poverty results were profiled in Prescott and Pradhan (1997). The CSES 1997 was analyzed in World Bank (1999a) and, together with the SESC 1996 and CSES 1999, in UNDP-funded Ministry of Planning *Cambodia Human Development Reports* (UNDP 1997; MoP 1998, 1999, 2000). Beyond these, the 1998 Census provides access to a few education indicators but public data is available only at the village level and thus is too aggregated to draw conclusions based on household behavior.

World Bank (1999a) performs multivariate analysis of schooling outcomes and school enrollment using the CSES 1997 data. Among the findings were that a child's current enrollment in school is significantly related to the child's age, child's gender, adults' education, household size and composition, per capita consumption, distance to the nearest upper-secondary school, and province of residence. Whether a child has ever enrolled is significantly related to the child's age, child's gender, parents' education, per capita consumption, household size and composition, and distance to the nearest lower-secondary school. However, no study has yet examined the importance of spousal education and literacy in Cambodia.

IV. EDUCATION AND HUMAN CAPITAL THEORY

Economists have been interested in education since the time of Adam Smith. For example, Smith considered the acquisition of skills through education and study as a form of capital. Ricardo and Malthus favored education as a means of inculcating habits that would lead to slower population growth. Alfred Marshall emphasized the importance of education as a means to increase industrial efficiency (Vaizey 1962, 19).

One of the most significant effects of education is to increase one's own income and productivity. Classical economists have treated education as a productivity increasing mechanism, and thus the variations in labor income have been partially attributed to the difference in the amount of human capital acquired by workers (Cohn 1979, 28). We follow this human capital approach in this study.[6]

[6]Human capital theory has been challenged by the theory of signaling (also known as credentialism) on the basis that people may still choose to go to school even if school does nothing to improve their productivity. In signaling models, people engage in costly activities that do not directly make them more productive, but convince observers the signaler has desirable attributes. As an alternative to human capital theory, signaling is most powerful when the education given to students at school has very little to do with the skills required for the work they do. For further discussion, see Spence (1973) and Weiss (1995).

Weisbrod (1962) argued that education benefits children, inter alia, through schooling in the short run and gives them subsequent employment options and financial opportunities in the long run. Becker (1962) advanced the theory of human capital to treat the process of investing in people more formally. Today, a number of microeconomic studies on education and human capital are available (e.g., Behrman 1999, Schultz 1988) and its macroeconomic consequences have also been analyzed (e.g., Becker, Murphy, and Tamura 1990; Hanushek and Kimko 2000).

The role of women in education has often been emphasized. Empirical evidence supports the existence of increasing returns to the intergenerational production of human capital (Rosenzweig and Wolpin 1994). The returns to schooling are found to be higher for females in Indonesia (Deolalikar 1994). A cross national study shows that, in less developed countries—especially some of the poorest—educational expansion among school-age girls at the primary level has a stronger effect on long-term economic prosperity than does educational expansion among school-age boys (Benavot 1989).

We shall now develop a simple model to explain why household decisions on child education may differ based on the argument due to Becker (1962). Our purpose here is not to give a complete treatment of household decision on education, but to simply extend the model so as to include the effect of initial level of income controlled for other factors.

First, we derive the internal rate of return (IRR) to education for a simple case. Let $t \in N \cup \{0\}$, and $\{Y_t\}$ and $\{X_t\}$ be two net earnings streams obtained with and without education respectively, which we shall refer to as *ex post* and *ex ante* income. Suppose that K-12 education[7] takes place at $t = 0$, then the cost of this education is given by $C \equiv X_0 - Y_0$. The difference in present value of those two earnings streams is given by

$$d = \sum_{t=0}^{n} \frac{Y_t - X_t}{(1+i)^t} = \sum_{t=1}^{n} \frac{Y_t - X_t}{(1+i)^t} - C$$

where n and i are the maximum age of the individual and the market discount rate. The IRR is defined as a rate of discount equating the present value of returns to the present value of costs. Thus, the IRR r is implicitly defined as:

[7]Because of its intuitive appeal as a continuous variable, we employ K-12 education here, but the term is essentially interchangeable with literacy. It is perhaps conceptually counterintuitive to understand literacy as a continuous variable, but letting household choice be a mixed strategy in a game-theoretic sense, it is perfectly possible to interpret it as a continuous variable (i.e., the probability of the child receiving education for literacy).

$$C = \sum_{t=1}^{n} \frac{Y_t - X_t}{(1+r)^t}$$

In particular, if the return at each period after K-12 education is constant $k(= Y_t - X_t, \forall t \geq 1)$, then we have $r \uparrow k/C(n \to \infty)$. Assuming that n is large enough, we have $r \approx k/C$. The household can be thought of as maximizing the child's discounted lifetime utility U by the level of that child's K-12 education. Hereafter, we assume that k depends on education level C and *ex ante* income X with $k_C(C,X) \equiv \partial k/\partial C > 0$, $k_{CC}(C,X) \equiv \partial^2 k/\partial C^2 < 0$, $k_X(C,X) \equiv \partial k/\partial X < 0$ and $k_{CX}(C,X) \equiv \partial^2 k/\partial C \partial X < 0$. The first two inequalities say that investment in education raises the return at a decreasing rate. The third inequality means that the increase in income for a given level of education will be smaller when the initial income is already large. The fourth inequality tells us that the marginal return to education is increasing. This is a reasonable assumption if X is interpreted as general productivity controlled for factors other than education and it interacts positively with education. Note that we only need to consider the maximization of r, because whenever r is maximized, d is maximized, and thus U is maximized. By the first order condition, the optimal level of education, C^*, must satisfy $C^* k'(C^*) - k(C^*) = 0$. Totally differentiating this equation, we have

$$\mathrm{d}C^*/\mathrm{d}X = (k_X/C^* - k_{CX})/k_{CC} > 0$$

Therefore, the optimal level of education is higher for people with higher *ex ante* income.

Though this conclusion rests on the above critical assumptions, this model suggests that human capital theory captures, at least partly, the underlying mechanism that gives rise to the interdependence between income and the decision to allocate education. We shall investigate further the relationship among education, household income, and other socioeconomic factors in the subsequent sections.

V. CSES 1999 AND WFP 1998 DATA QUALITY

The issue of data quality and its representation is of primary concern in the interpretation of survey results. In this study, we use two data sets: the Cambodia Socio-Economic Survey (CSES) 1999 and the World Food Programme Protracted Emergency Target (henceforth WFP) Survey 1998 (WFP 1998). The CSES 1999 is a national survey of 6,000 households, while the WFP Survey is a subpopulation survey of 1,040 households affected by civil conflict since 1989 that have at least

one child under five years of age. NIS (2000a) is the CSES main report and NIS (2000b) is the CSES technical report. The latter offers specific details on objectives, scope, and coverage of the CSES 1999. Helmers and Kenefick (1999) do the same for the WFP Survey. Both surveys used multistage random sampling procedures and their strengths and weaknesses are summarized in Table 2.

Table 2. **Data Strengths and Weaknesses**

CSES 1999	WFP 1998
Strengths	
• Nationally representative socioeconomic survey of 6,000 households throughout Cambodia. The survey used two-stage systematic random sampling.	• Subpopulation survey of 1,040 households (with a child under 5 years of age) affected by civil conflict since 1989 using two-stage random sampling.
• The number of households sampled from each village was restricted to 10 to reduce cluster effects and improve the precision of estimates.	• Although less thorough than the CSES (which took 2-2.5 hours per household to complete), the WFP questionnaire contained questions of particular interest to this study, like whether a any school-age child had been sent to primary school.
• Two rounds permitted the capture of some seasonal variations.	
Weaknesses	
• Answers to questions on literacy and education were self-assessed and are by their nature subjective. Education was measured as highest grade-level completed. No objective literacy test was administered to respondents.	• Likewise, self-assessed literacy, except that years of schooling was asked (not grade level completed) and normalized from 0 to 12 years.
	• Targeted group represents 183,000 individuals in the country, or 1.6% of the total population.
• For security reasons, 4% of the country was excluded in the truncated list used as the sampling frame.	• Certain communes could not be surveyed, but alternates were chosen in the first stage of random sampling.
• More than 1/3 of households surveyed had to be re-interviewed to correct entries and to clarify doubtful responses.[8]	• Cluster effect possibility: 26 households were selected from 40 villages in order to produce the overall sample of 1,040 households.

It must be stressed again that the results of the WFP Survey pertain only to a subpopulation (households affected by civil conflict since 1989) within those communes, and among those households with children under five years of age. Needless to say, the survey is *not* nationally representative and cannot give results at the national, district, commune, or village level. Compared to the CSES data,

[8]The extent to which progress was made in clarifying these problems is unknown to us. This is a reason why most of our analyses are based on the WFP data, even though the CSES contains more detailed household information.

the subpopulation surveyed by WFP was much poorer. Expenditures for this group averaged 156,087 Riels (or $50) per household per month compared to 284,444 Riels per household per month in rural areas (already the lowest among the three categories that included Phnom Penh and Other Urban areas) as was found in the CSES data. As in the case of the CSES, the literacy and education observations (from 0-12 years) used from the WFP Survey in this study are self-assessed and are thus limited. No objective literacy test was administered by a third party. Moreover, although household expenditures are low, these households are likely to have been receiving assistance for many years from development agencies and tend to be better off than one might expect (when compared to subsistence farmers for example). Further, the report on the WFP Survey itself admits, that it "shares the weakness of all quantitative survey instruments in that it misses important realities bearing on rural people's livelihoods, nutrition status, power relations, and social development process issues" (Helmers and Kenefick 1999, 19).

The CSES data was processed to enable a comparison with the WFP data. In the data processing procedure, we ignored records when relevant data was missing. For example, spouse-less households were dropped. As a result, about 13 percent and 10 percent of the records were not used in the CSES and the WFP data, respectively. The identification numbers for the head of household, the spouse, and respective literacy responses were extracted from the CSES files. This data was then combined with data on household expenditure. Finally, the province, district, commune, zone, and sector codes and the household weight were extracted and combined to form one data file that contained the basic elements common to the WFP data.

VI. MODEL SELECTION

Our analysis is based on the fundamental assumption that an earnings function exists. Neoclassical economic theory requires that income be determined by the marginal productivity of labor. This is likely to be partly explained by socioeconomic variables. However, the existence of such a function is not self-evident. Interpersonal differences that cannot be captured by socioeconomic variables may undermine its explanatory power. Moreover, it is impossible to include all of the *true* independent variables in practice, because not all the relevant variables can be identified (a problem of specification) and not all the variables identified in the model can be observed (a problem remedied by the use of instrumental variables).

Despite these limitations, we can maximize the explanatory power of an assumed earnings function by carefully selecting a model. In particular, it is critical to include all the significant explanatory variables in the data while excluding variables that do not help explain the residual deviance. To do so, we took two steps. First, we obtained correlation coefficients between total household expenditure and other variables characterizing each household to identify explanatory variable

variable candidates for the WFP data. We then ran ordinary least squares (OLS) regressions that included all the candidates and deleted one term at a time from our OLS model. The Akaike information criterion (AIC) was used to determine when to stop the stepwise deletion. Loosely speaking, the AIC is a way to find an approximation to the Kullback-Leibler information criterion that measures the distance between the true distribution and the predicted distribution. Although there can be an appreciable bias in the AIC estimate (Mittelhammer et al. 2000, 512), for the purpose of finding a good estimate, this procedure sufficed. To verify that the model was not chosen by coincidence alone, we carried out stepwise deletions several times with different initial models. We found some variables consistently survived the process. Also, we note that stepwise deletion using the P-value associated with the t-statistic for each coefficient has yielded a similar model.[9] Among all the models, we chose the smaller ones for simplicity and convenience.

The variables we identified as important are described in Table 3. It should be noted that we did not use logarithmic expenditure as our dependent variable. Though it is conventional to take the logarithm to eliminate heteroskedasticity, it is not theoretically clear that the error term should be proportionate to income.[10] Moreover, the coefficients can be interpreted in a straightforward manner if income is used without taking the logarithm.

Spousal education or spousal literacy consistently survived stepwise deletion, while the education or literacy of household head did not. The question that naturally arises is why this would be the case, and one which we discuss in further detail in Section VII. Among several models obtained from the procedure described above starting from different initial model, we chose a model with relatively few variables as our reference model (M_0) for simplicity and convenience.

[9]This procedure essentially violates the basis of the t- and the F-tests, because the t- and F-statistics do not have *ex ante* properties once a model is constructed. However, given that we never know the *true* model, the importance of finding the best-fit model should not be ignored.

[10]Admittedly, there is evidence of heteroskedasticity. We carried out White's general test. The asymptotic chi-squared statistic was 35.82 and it was 25.62 when the logarithm was taken. Both of those figures are much higher than $\chi^2_{0.95,\,10}$ (=18.31). Thus, in our case, taking the logarithm is not a remedy for heteroskedasticity. We report the standard error based on White estimator of variance. We assume the random error term is uncorrelated with the right hand side variable, which is a reasonable assumption as most of the right hand side variables are a dummy variable and thus take care of idiosyncratic shocks specific to it.

Table 3. **Key Variables Identified Using the WFP Survey 1998**

Variable Name	Explanation
Y	Total household monthly expenditure. Y2 denotes squared expenditure.
ZONE1 ZONE2 ZONE3 ZONE4	These zones represent the cross-provincial areas where households affected by civil insecurity since 1989 were targeted and deemed most likely to be located. Zone 1: Odtar Meanchey and Banteay Meanchey; Zone 2: Battambang; Zone 3: Siem Reap, Preah Vihear, and Kampong Thom; Zone 4: Kampong Spueu and Kampong Chhnang
HHSIZE	Household size
SPLIT	Spouse literate? (HHLIT for household head)
PRIPAR	Main participants in the primary income earning activity (1: men, 2: women, 3: both)
SICK	Any household member became very sick or badly injured in an accident in 1998?
NSCHL	Location of nearest functioning primary school (1: In this settlement, 2: Elsewhere in this commune, 3: In another commune)
NCLNC	Location of nearest functioning health clinic (as above)
SPEDU	Total years of spousal education (HHEDU for household head)
TLIT	Training about literacy received from development organizations since 1992?
THEAL	Training about health received from development organizations since 1992?
DISP	Household internally displaced since 1989?

Note: Dichotomous choice variables take 1 when yes, 0 when no.

Our OLS regression model M_0 has the following form with $g(\bullet) = Y$:

$$g = \sum_{t=0}^{p} \beta_i g_i(\boldsymbol{x}_i), \beta \in \boldsymbol{R}^{p+1}, g \in G \ (G : \textit{linear space of functions spanned by } g_i, \forall 0 \le i \le p)$$

The regression results are summarized together with descriptions of each basis (g_0 to g_{10}) in Table 4. It must be noted that both the t- and F-statistics are obtained under the added assumption of normality. All the coefficients appear reasonable, if not easily interpretable. The model suggests that geographical differences exist. The negative coefficient for SICK and the positive coefficient for

HHSIZE also make intuitive sense. The logarithmic expenditure regression model not reported here yields qualitatively similar results.

Table 4. **Summary of Regression Results for Model M_0**

Basis	Function	β coefficient	t-statistic	P-value
g_0	Constant function	28735.75	1.93	0.054
g_1	ZONE1 dummy	50532.23	3.33	0.001
g_2	ZONE2 dummy	16866.82	1.76	0.079
g_3	ZONE3 dummy	-8177.896	-0.66	0.507
g_4	SICK dummy	68747.35	6.28	0.000
g_5	PRIPAR2 dummy	-37406.11	-2.87	0.004
g_6	PRIPAR1 dummy	-15787.56	-1.53	0.126
g_7	HHSIZE	14711.88	6.97	0.000
g_8	NCLNC2 dummy	10903.96	0.96	0.338
g_9	NCLNC1 dummy	40377.73	2.14	0.033
g_{10}	SPEDU	7642.092	3.43	0.001

Number of Obs	900
F(10,889)	13.68
Prob > F	0.000
R^2	0.1988
Root MSE	1.2e+05

Note: t-statistic is computed based on White estimator of variance.

VI. HYPOTHESIS TESTING

To test the hypothesis that spousal education matters more than the education of the head of household for the WFP data, we first added g_{11}, a function of HHEDU, to our core model M_0, to obtain model M_1. We then carried out a one-sided t-test to see if there was a significant difference in the effects of spousal and head of household education on expenditure. First, we defined $\tau = \beta_{10} - \beta_{11}$. The null hypothesis for this test is H_0: $\tau \leq 0$, which is equivalent to $\beta_{10} \leq \beta_{11}$, and the alternative hypothesis is H_1: $\tau > 0$. The results for this test are summarized in Table 5. H_0 is rejected by a t-test of size 0.05. Therefore, the coefficient for spousal education is significantly higher than that of the household head.

Table 5. **Summary of the t-test of H_0: $\tau \leq 0$**[11]

Coefficient	Estimate	t-statistic	P-value
β_{10}	7408.61	3.24	0.001
β_{11}	764.51	0.48	0.634
τ	6644.10	2.16	0.015

[11]The P-value for β_{10} and β_{11} are for a two-sided test, whereas the P-value for τ is for a one-sided test. The t-statistic is based on Huber estimate of standard error.

Because of the targeted nature of the WFP Survey (which can claim to represent around 183,000 people), this conclusion may not hold at the national level. To test if our findings hold at the national level, we employed the CSES data. As an indicator of education, we used spousal literacy instead of spousal education when comparing the two data sets. This is because the two surveys use different measures of education level. The CSES asked for the grade level of education completed (including tertiary education), while the WFP Survey asked for years of schooling (normalized to between 0 and 12). Given high dropout and repetition rates in Cambodia,[12] this measurement may be susceptible to surveyor interpretation and/or respondent wariness. Thus, for our purposes, a straightforward self-assessed answer to a query like "Can you read and write a simple message in Khmer or any other language?" is a better indicator.

Since the survey questionnaires were not designed in the same way, we employed responses to very similar questions from the two data sets and constructed a simple linear regression model for both data sets. It should be noted that the selection of a common model is necessarily restricted to the variables common to both data sets. Although this has drawbacks, it is the only way in which a comparison can be made.

The normal linear regression model we employed follows:

$$Y = \gamma_0 + \gamma_1 HHSEX + \gamma_2 HHAGE + \gamma_3 HHLIT + \gamma_4 SPLIT + \varepsilon$$

HHSEX and HHAGE refer to household head and sex respectively. For the CSES data, we used weighted least squares (WLS) because of the sampling procedure. The weight is given as a variable in the data. The estimated coefficients and other summary statistics are shown in Table 6. F_0 and the P-value for F_0 are associated with the fitted sum of squares. F_1 corresponds to the null hypothesis that $\gamma_3 = \gamma_4$. The null hypothesis is accepted by an F-test of size 0.05 in both cases, but for the WFP data, it is rejected by an F-test of size 0.1. It may well be the case that the difference in the coefficient γ_3 and γ_4 may be significantly different between the two data sets. For convenience we first defined $\tau \equiv \gamma_4 - \gamma_3$. We denote the coefficients for WFP and CSES data using the superscripts W and C, respectively.

[12]World Bank (1999c, 7) reports that "Repetition and dropout rates are so high that it currently takes 19 student years to produce a primary school graduate. Repetition rates generally decline in the primary cycle (from 41% in grade 1 to 8% in grade 5), while dropout rates increase (from 12% to 21% in the same grades)."

Table 6. **Summary of Regressions Using WFP and CSES Data**

	WFP Data (OLS)		CSES Data (WLS)	
Number of Obs		900		4767
γ_{0}(Constant)	75440.9	(2.52)	214267	(4.04)
γ_1 (HHSEX)	-6197.8	(-0.26)	-100980	(-2.24)
γ_2 (HHAGE)	1769.7	(3.25)	4220.2	(7.19)
γ_3 (HHLIT)	13790.4	(1.28)	80670.6	(3.99)
γ_4 (SPLIT)	41177.6	(4.36)	108422.9	(6.42)
F_0 for Model		9.11		30.64
P-value for F_0		0.0000		0.0000
R^2		0.0391		0.0251
F_1 for $\beta_0 = \beta_0$		2.88		0.81
P-value for F_1		0.0899		0.3680

Note: Values in parentheses denote the t-value.

We then tested the hypothesis that $\tau^W = \tau^C$. To do this, first note that we know that γ is distributed normally under our assumptions. Therefore, τ must also be distributed normally. Thus, $\lambda = \tau^W - \tau^C$ is distributed normally. However, since we do not know the true variance of those two samples (i.e., data sets), we need to take a slightly different approach. The situation is analogous to a normal two-sample model, but it is not self-evident how to weigh those two samples. We employed a simple criterion; each household has the same weight across the samples. However, since the CSES has a weight parameter, we adjusted the scale parameters in order to sum them to 6,000 (the total number of households). For the WFP data, we gave an equal weight to each household. Since we are not trying to explain the variation in expenditure by using two data sets, but are interested in the properties of the two samples, our assumptions are reasonable.

We regressed total household expenditure as follows:

$$Y = \sum_{s\in \{W,C\}}\left(\gamma^S_0 + \gamma^S_1 HHSEX + \gamma^S_2 HHAGE + \gamma^S_3 HHLIT + \gamma^S_4 SPLIT\right)ind(S)+\varepsilon$$

where ind(S) denotes the indicator function. The regression was run without the constant term because ind(C) + ind(W) = 1. We then used the restricted model where $\gamma^W_i = \gamma^C_i \; \forall$ i. The ANOVA table obtained follows:

Table 7. **ANOVA Table for Structural Differences between the WFP and the CSES Data**

	SS	DF	MS	F	P-Value
(2)	1.261e+15	4	3.153e+14		
(1) after (2)	1.185e+14	5	2.370e+13	59.894	0.000
Residual	2.383e+15	5657	3.957e+11		
Total	3.514e+15	5666			

The results in Table 7 suggest that the two samples are significantly different. We can further test the hypothesis that the difference in the effects on expenditure between household head literacy and spousal literacy is the same between the two data sets. To test this, we can again use an F-test or a t-test. We imposed a restriction $(\gamma^{W}_{4} - \gamma^{W}_{3}) - (\gamma^{C}_{4} - \gamma^{C}_{3}) = 0$ and carried out an F-test. The P-value obtained from the F-test was 0.28. Thus, although the properties of the two samples differ significantly from one another, the estimates of $\gamma_4 - \gamma_3$ for the two samples are not significantly different. Therefore, we conclude that the degree to which spousal literacy matters more than the literacy of the head of household as a determinant of expenditure for the WFP subpopulation may not differ from that for the entire Cambodian population represented by the CSES data.

We now turn to the implications of our findings. Spousal education may not only affect current expenditure by the household, but also future consumption by the children of that household (when they become adults) through education today. To see if this is the case, we constructed two logit models. First, an education model, where the education of household head and spousal education directly affect the probability of sending a school-age child to primary school, SNDSCH. Second, we created an expenditure model, where the probability of sending a child to school, denoted by $\pi(\bullet) = P(\boldsymbol{SNDSCH} = 1)$, is affected by household expenditure. The general form of the regression function is as follows:

$$\pi = \frac{e^{\theta}}{1+e^{\theta}}, \theta = \sum_{i=0}^{p} \beta_i g_i(\mathbf{x}_i), \beta \in \mathbf{R}^{p+1}, g \in G$$

The results of the regressions are summarized in Table 8. We found that SPEDU is statistically significant while HHEDU is not. This implies that the effect of spousal education positively affects the probability of sending a child to school. That probability may well be affected by expenditure. The results of the expenditure model suggest that increased expenditure leads to increased probability of sending a child to school. Thus, spousal education has a positive effect on the probability again in this model. It should be noted that in the expenditure

model, the negative coefficient for Y2 is consistent with the education and human capital theory we developed in Section III.

Table 8. **Education and Expenditure Logit Models for Probability of Sending a Child to School**

	Education Model		Expenditure Model	
Number of obs		900		900
LR chi2(5)		110.92		171.56
P-value		0.0000		0.0000
Pseudo R^2		0.0896		0.1386
Constant	-3.040	(-6.11)	-3.743	(-7.24)
HHSEX	-0.511	(-1.37)	-0.489	(-1.29)
HHAGE	0.889	(8.92)	0.081	(8.16)
TLIT	0.627	(2.51)	0.499	(1.91)
HHEDU	0.005	(0.17)		
SPEDU	0.075	(2.11)		
Y			8.74e-06	(6.96)
Y2			-6.74e-12	(-4.74)

Note: Values in parentheses denote the asymptotic Z-value.

In sum, we have found that spousal education appears to be an important determinant of household expenditure. Through hypothesis testing, we verified that spousal education accounts for expenditure more than the education of the household head. Comparison of the results of the two regressions using WFP and CSES data suggests that this is not specific to the WFP data, although both data sets differ significantly from one another in terms of their regression coefficients. Therefore, although our findings originate from the WFP data, we expect that a similar pattern may exist for the entire Cambodian population. Finally, higher spousal education seems to increase the probability that a household will send a child to school. This implies that the child's future consumption, as a measure of welfare, depends on the level of spousal education today. Thus, the importance of spousal education is not limited to the determination of current expenditure.

VIII. DISCUSSION AND CONCLUSION

This study has been about spousal education as distinguished from girls' education and maternal education. Much of the literature has developed first in the realm of girls' education and into maternal education. This study has taken a different tact through the use of spousal education, and focused on a country where evidence has been sorely lacking. Although maternal education's importance has been shown in countries as varied as Canada and India, the Cambodian context has never been examined. This study contributes to that literature. The analysis is mainly based on the WFP data, but the overall conclusion is consistent with the

CSES data. The use of different data sets strengthens the reliability and validity of the empirical evidence we find.

A major finding of this study is that spousal education is a significant explanatory variable in the determination of total household expenditure. The coefficient for spousal education is greater than the coefficient for education of the head of household. This is consistent with girls' education literature, which finds that the private rate of return for girls' education is higher than that of boys. We add robust empirical evidence from Cambodia using an unconventional method of hypothesis testing based upon two data sets.

One interpretation is that the return on spousal education is higher than household head education. Although not presented in our hypothesis testing section, we found this to be especially true for lower expenditure groups in the WFP Survey. Since 96 percent of household heads in the WFP Survey are men, the overwhelming majority of spouses are women. Moreover, in both the WFP and CSES data, households headed by women were predominantly single-headed households without spouses. The finding suggests that literate women who are spouses may have a significant (unobserved) role in household consumption decisions. Future research will hopefully shed light on the source and significance of this role.

One possible explanation for this is that spouses who are literate are able to contribute to household income, and thus permit higher total household consumption. That would follow the human capital theory approach, where investment in education improves productivity and increases income. Our use of expenditure as a proxy of income permits an alternative explanation, namely that the more literate the spouse, the more the household consumes. Of course, ceteris paribus, increased consumption without increased income is not a sustainable proposition. At the same time, our findings say nothing about the direction of causality. It is possible, if not likely, that the wealthier a household, the more likely the spouse is able to be educated. Or perhaps, more educated people marry each other, which is probably true in every society. In turn, they probably tend to be better off than those with less education.

There are at least three policy implications that derive from our findings. First, there may be scope for adult literacy programs, targeted toward spouses. This is because spousal education and literacy have more significantly positive effects than those of the household head. Second, if the cost of educating girls and boys is the same, investing in girls' education is likely to have a higher rate of return than boys' education. Third, an awareness campaign to raise parents' consciousness about the value of educating girls could increase their dismal enrollment rate relative to boys. This may be because Cambodian parents misperceive the rate of return of educating their girls.

Finally, the fact that households with more educated spouses are more likely to send a child to school than households with less educated spouses has an impor-

tant intergenerational implication. If the spouse is less educated, the child may not have an opportunity to go to school and may be likely to earn less income as an adult. It has been said:

> If you educate a boy, you educate a man.
> If you educate a girl, you educate a family.
> And a family passes on what it learns to the next generation.

In that spirit, we believe that improving girls' education will give opportunities not only to the individuals themselves, but to their future families, and to the next generation of Cambodians.

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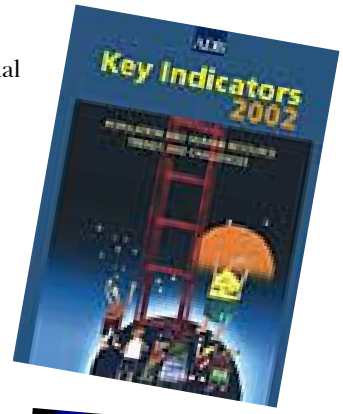

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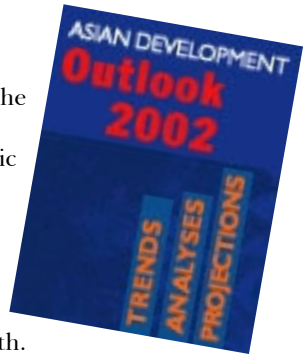

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