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GUIDELINES FOR CREATING  
A HOUSING FINANCE STRATEGY  
IN A  
DEVELOPING COUNTRY

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## PREFACE

These Guidelines have been prepared for the Office of Housing and Urban Programs at the Agency for International Development. It is anticipated that it will be used by the staff of the Office as well as consultants working for it. Since it was prepared for AID, some references, particularly in Section 4, may be foreign to those not familiar with the Office.

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## 1. Why Was the HFS Method Developed?

In 1985 the Office of Housing and Urban Programs was considering ways to shift the focus of its operations from a project based approach to a sector level approach. That is, it was examining alternatives for using AID resources to encourage governments to make broad policy reforms that would increase the production of standard quality housing for lower income households. Correspondingly, AID resources would be less tied to specific housing projects but support a range of government actions facilitating the provision of housing finance, land, and infrastructure with actual production by private firms and individuals.

While there were many origins to this thrust, one important factor was the recent completion of several national Housing Needs Assessments. The results of these assessments highlighted the huge and growing gaps between current levels of production of acceptable housing, including AID-financed projects, and needed production levels. As such the results encouraged a reorientation in AID's traditional approach.

Housing finance offered a natural entry point into sector level policymaking. Because of housing's capital intensive nature, creation of effective housing demand generally requires the ability of the household or investor to borrow funds to finance development. In most developing countries, mortgage financing available through regulated institutions accounts for only 10 to 20 percent of housing production, and is typically limited to families at the top of the income distribution. Lower income households are forced to rely on "informal" financial sources, especially friends and the extended family; sometimes they turn to much higher cost unregulated money lenders for shorter term financing. Hence, an expanded volume of financing is need to fuel housing demand.

Operating through housing finance is also attractive for another reason. Mobilizing more financial resources will typically require reforms in the financial sector which will make the sector more efficient and likely reduce implicit

subsidies.[1] This makes such reforms of interest to the country's monetary authorities and economic planners, and this expands the political support for reform.

### The Housing Finance Strategy Method

The purpose of the method described in this document is to develop a strategy for a country to mobilize additional financial resources for the housing sector and to target these incremental funds for lending to lower income households. It is important to remember that both parts are critical: you must mobilize the additional funds before they can be on-lent; but, it does little good to have generated these funds if they are simply lent to households who would have been living in perfectly acceptable housing if they had not received the loan. It is for this reason that the method deals both with the mobilization of funds and their deployment.

If the method is successfully applied, the products will include a concrete strategy for increasing the financial resources in the housing sector. It might call, for example, for integrating housing finance with broader financial markets by paying market rates for deposits and charging corresponding market rates for mortgages. Alternatively, it might address the same objective by recommending the sale of market-rate debentures by housing finance specialty institutions to major institutional investors.[2]

The method will also yield a quantitative analysis of alternative schemes for using these funds and a recommendation for which alternative to adopt. The Housing Quality Simulation Model, developed as part of the Method, is employed in this analysis. The alternatives investigated might include, for example, additional lending through existing formal institutions, probably retargeted to lower income households; expansion of loans for residential infrastructure upgrading projects; more lending for privately developed sites and services; and small home improvement loans. Different deployment packages could be developed for urban and rural areas. Importantly, the elements in each package should be defined so as to be mutually consistent and reinforcing.

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1. For an elegant statement of this argument see Hanson (1976). Full references are at the end of the paper.

2. If the suggestion for selling debentures were made, the feasibility of actually making these placements would have been investigated in detail.

When should the Method be applied? Assuming that senior officials are receptive to ideas for change in the housing finance sector, there are two broad cases for which an application of the Method would be particularly valuable. The first is when housing finance is isolated from the broader financial markets generally. Typically lending volumes will be low and housing finance will be dependent on limited funding sources, such as a payroll tax or government appropriations. The second case is when housing finance is reasonably integrated with financial markets but it is not competing well for funds and/or its lending programs are not reaching lower income households. In both of these cases a sectoral approach will generally be needed to resolve the current problems. In contrast, the difficulties of a single institution--in raising funds or making loan repayment collections, for example--are not problems for which the Method should be employed.

It may be helpful for the reader to know the outset that while the use of the Housing Quality Model to analyze program impacts is an important element of the overall Method, it is certainly possible to apply the Method without it. Such an application would focus more on mobilization and less on the impacts of how funds are employed. Without using the Housing Quality Model, the analysis of program impacts will be largely qualitative. Similarly, the Housing Quality Model can be employed to analyze alternative sector-wide strategies quite independent of whether the strategy emphasizes housing finance.

In general, employing the full Housing Finance Strategy Method, including the Housing Quality Model, will be warranted when it is likely that policies or programs quite different from those currently in place will emerge from applying the Method. In such cases having the hard, quantitative information on the comparative impacts and efficiency provided by the Housing Quality Model can be key to persuading policymakers of the payoff from undertaking far reaching reforms.

### **Outline of the Guidelines**

The balance of this paper describes the method that has been fashioned to guide the development of housing finance strategies. The material presented is based in part on the original developmental work on the method done in 1985; but it relies more heavily on the experience gained in its application in Sri Lanka (1985) and Honduras (1986).

The next section describes the six steps involved in the strategy development process; as such it is the heart of the presentation. Section 3 outlines the Housing Quality Simulation

Model, a model developed to estimate the impact on the quality of housing occupied by various income groups from deploying the incremental resources invested in the housing sector in different ways.[1] The final section discusses how to organize an application of the method, including the type of staff needed and the general level of effort required. Annex A provides additional information on indicators of the maturity of financial markets, and Annex B describes the results for Sri Lanka and Honduras of applying the method's six steps. Annex C provides an outline of the key points of the Method, and Annex D gives a more complete description of the Housing Quality Model than that given in Section 3.

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1. The analysis of mobilizing additional resources is not assisted by a computer model, owing to the complexity of financial markets and the variation in the attributes of these markets among countries.

## 2. Six Steps in Developing a Strategy

This section outlines the six analytic steps in formulating a housing finance strategy. (For reference, these steps are listed and briefly described in Annex C.) In practice, these steps may not be as distinctly separate as they seem in the discussion and they may not be executed in this particular sequence. Nevertheless, the content of each must be accomplished somewhere in the overall process. Also, beyond these analytical steps it is necessary to engage in coalition building and other actions to gain acceptance for the strategy; we offer some ideas for this in Section 4, but what is best to do will have to be worked out on a case-by-case basis among the project team, the cognizant AID staff, and the host country officials "sponsoring" the project.

### Step 1: Assessing Financial Markets

In the past there has been a strong tendency to consider housing finance in isolation from the balance of a country's financial markets. As described below, this has often resulted in an extremely narrow set of possibilities for increasing the volume of finance in the housing sector. A central thesis of the Housing Finance Strategy Method is that the housing finance system must be shaped in the context of broader financial markets. Hence, the first step in the method is a careful look at a country's financial markets.

Three related aspects of financial markets need to be considered to form a reasonably complete picture of the financial market environment for housing: (a) the depth of financial markets, (b) the degree to which saving is being done in financial form, and (c) the degree of government interference in these markets.

The first point concerns the maturity and depth of the financial market. A number of indicators of these characteristics is available. One set, reviewed in some detail in Annex A, are ratios of various monetary indicators to GNP. These include, for example, the ratio of money, broadly defined to GNP, the ratio of commercial bank assets to GNP, and the ratio of deposit institution assets to GNP. There is a general relationship between higher levels of per capita GNP and higher values of these ratios, as demonstrated by some scatter diagrams shown in Annex A. These ratios offer a quick way to place a country in a broad perspective relative to other countries.

Other general indicators of the depth and maturity of

financial markets are readily available. Does the country have an active equity market? Is there a stock exchange, and, if so, what is the number of firms listed and the volume of turnover? Are debentures being publicly sold or even privately placed in any significant volume? Another good indicator is the absence or presence of any secondary market operations. Typically a market in government securities will be the first to develop; has this occurred yet? Another way to approach this question is to inquire about the vitality of the informal market. To what degree do commercial enterprises obtain operating capital from commercial banks or from informal sources? (The ratio of commercial banks loans to total investment is a rough indicator.) Are large enterprises obtaining financing for expansion from loans from regulated sources or from private equity placements or informal borrowing?

The second aspect for judging financial markets concerns the possibilities for savings in financial form. The key distinction is between total savings, which might be in any form including gold, jewels, or durables, and savings in financial form, which means in cash or financial instruments including savings accounts. The less savings in financial form, the greater the possibility for transforming household savings in real form into financial form to finance additional investment in the housing sector.

In some countries, like India and Sri Lanka, there have been extraordinary expansions in the number of branch banks as part of a government policy to move savings into financial form so these funds can flow to productive investments. In other countries, such as Honduras, comparatively little branch banking has occurred and the opportunities for financial savings is limited for many households. Beyond simply providing more branches, the quality of services is important -- especially the possibility of obtaining loans as well as making deposits.[1] In addition, the real rate of return (i.e., roughly the nominal rate less the rate of inflation[2]) paid by formal institutions on savings is a critical determinant of the attractiveness to households of this form of savings. In many countries this rate has been consistently negative for a number of years because of repressive government interest rate policies, thereby sharply discouraging savings in this form.

A final point to consider in assessing the possibilities for expanded financial savings is the amount of "forced savings" already occurring through payroll taxes for social insurance

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1. For more on this point see Vogel and Burkett (1986).
  2. See Khatkhate (1986).

schemes. In Sri Lanka, for example, government workers contribute 8 percent and private sector wage employees contribute 3 percent of their salaries to pension funds. These households may have little additional ability to increase their savings rate in any form.

Lastly, and possibly most importantly, is the extent of Government's intervention in capital markets. There are numerous ways in which governments intrude in these markets, quite beyond their legitimate regulatory and macroeconomic functions. In general, the greater these intrusions the greater the loss in the efficiency with which investable funds are collected and allocated throughout the economy.

Governments in many developing countries run large budget deficits; and, to keep the cost of servicing their outstanding debt to a minimum, they force major financial institutions to purchase government debt, generally at below market interest rates. Such "captive institutions" often include government savings institutions (such as postal savings systems), government pension funds and insurance companies. This strategy has been followed by Sri Lanka and Kenya, for example.

In terms of interest rate policies, on the one hand, governments often set interest rates by fiat and do not adjust them with changing market conditions. As suggested above, this can lead to negative interest rates on deposits and thereby discourage financial savings. Similarly, governments sometimes set maximum lending rates, even differentiating the rates that can be charged to different sectors. The interest rate structure set by Government in India, which features this kind of fine-tuning, is possibly the most elaborate in the world.[1] There are generally two clear consequences of such policies, one intended and one unintended. The intended effect is to allocate funds to sectors with higher lending rate ceilings; the unintended effect is for the unfavored sectors to resort to borrowing from unregulated sources.

Governments also use a whole series of credit allocation schemes in addition to interest rate policies. A prominent example is the lending of government development banks which make long term loans to favored industries at subsidized rates--often causing the rates on long term loans to be less than the short term rates of commercial banks. Parastatals typically rank high among borrowers. In addition, some governments resort to direct credit allocations, ordering commercial banks to devote some share of their lending to favored sectors. More commonly, however, the central bank will offer to rediscount loans to some

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1. See Morris (1985) for a full description.

sectors or bank reserve requirements will be increased and the extra funds lent to favored sectors. Often these practices lead to higher lending rates to unfavored industries.[1]

Understanding the "ground rules" for credit allocations as defined by ministry of finance and central bank regulations and policies is a crucial first step in determining ways to channel additional funds into the housing sector. As suggested by the foregoing material, this can often be a complex and time consuming task.

## Step 2: Housing Finance in Relation to Financial Markets

Armed with the results of the first step, the team can address this step quite efficiently. The main question is the degree to which housing finance is integrated into broader financial markets. In many countries, housing finance has been supported by Government through a "special circuit"--an arrangement under which funds from particular sources are earmarked for housing, and thus for which the housing sector does not have to compete. One example is an earmarked payroll tax, which is used in the Philippines and many other countries. In Sri Lanka, the current system is even easier: government simply lends funds to the government parastatal institution.

Almost always the funds made available for mortgage lending under these arrangements carry below market interest rates, and they are on-lent at rates which are also below market (frequently to higher income families). Thus, the special circuit isolates housing finance from the rest of financial markets, since depositors want higher returns and other lenders will not compete to loan at the below market rates of the parastatal. Thus, the major impediment to expanded housing finance is often the very arrangements which were set up previously to establish some minimum lending in the sector.

Knowing the current sources of funds mobilized by housing finance institutions, aside from those locked into special circuits, helps define the possibilities for raising additional funds and for assessing the extent of interest rate and term risk these lenders face. Are they primarily depository institutions or are they more like mortgage bankers, borrowing from other investors? Generally, they are depository institutions, as is the case, for example, in Honduras and Kenya.

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1. For an excellent discussion of these points, see Hanson and Rocha (1986).

The quality of the housing specialty institutions themselves is also an important factor for system expansion. The weaker their balance sheets--for example, the greater their problems with mortgage payment collections and the greater their interest rate and (related) maturity risks--the more difficult it will be for them to sell mortgage-backed debentures to investors. Hence, a clear first step in any system expansion will be to strengthen the key housing finance institutions if they need it, or even replace them if warranted.

A related factor is the degree of innovation shown by the existing institutions lending for housing. Have they explored the use of alternative mortgage instruments? Have they been aggressive in looking for new sources of funds? Have they tried innovative underwriting procedures to reach lower income households? Often, officials in institutions drawing funds from special circuits have little incentive to be innovative. But institutions with other incentives sometimes show great entrepreneurship; a prime example is the senior staff at the Housing Development Finance Corporation in India.[1]

Finally, as in the case of financial markets overall, one must know the extent of government interference. Are mortgage interest rates set by government? If so, are they adjusted with adequate frequency? Are there restrictions on the types of liabilities (e.g., deposits) for housing specialty institutions can compete? Are there restrictions on the type of lending they can do?

Combining all of the above information should provide a good starting point for identifying impediments to the expansion of housing finance and for exploring possible innovations

### Step 3: Possibilities for Generating Additional Resources

It is essential to begin the search for additional funds for the housing sector by examining the full range of options. Such an examination will include discussions with decision makers at a range of private institutions--banks, insurance companies, pension funds--as well as officials at similar public sector agencies and the central bank and ministries of finance and housing. Such discussions would determine current investment patterns and constraints and explore possibilities for shifts in these practices. As always, the more concrete the description of possible new modalities offered by the analysis team, the

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1. See Buckley, Khadduri, and Struyk (1985) for a description of HDFC operations and innovations under the extremely controlled conditions of India financial markets.

clearer the response will likely be. The results of such meetings and analysis of current investment patterns, beyond ideas for specific alternatives, should be some central themes for reform.

Typically, the most obvious candidates for expansion will be the formal sector specialty housing finance institutions. As suggested, there are two broad, not necessarily mutually exclusive, routes that can be chosen for expansion. One model is the deposit-based model, in which the source of funds is primarily deposits from households. There are a number of cases in which this model has worked very well. An outstanding example is the Jordan Housing Bank, the country's largest depository institution (Gardner, 1986), and the almost exclusive source of housing finance. A tool often advocated as giving housing finance institutions a comparative advantage is the contract savings scheme, under which a depositor is assured of a mortgage loan up to a predetermined multiple of its savings, if it successfully completes its savings contract (Chretien, 1986). Other possibilities are arrangements with large firms, unions and cooperatives for access to housing loans (for improvements as well as purchase) tied to savings.

Opportunities also exist for serving what have been neglected parts of the savings markets, such as low income urban areas and rural areas. One startling successful example of a cooperative bank is the Grameen Bank in Bangladesh which has gathered funds from low income families and lent them out on the basis of group repayment responsibility; it may soon begin originating and servicing of housing loans for other banks (Madeley, 1987). As suggested earlier, the wisdom of pursuing deposits will depend on the degree of competition for deposits already present in the country. As recounted in Annex B, expansion of deposits was the central thrust of the strategy developed for Honduras.

The alternative route is for housing finance institutions to tap large institutional investors either by obtaining term loans or by selling them mortgages or mortgage-backed debentures. This might be called the "mortgage banker" model. The most lucrative targets for such investments are often pension funds (both public and private) and insurance companies. These investors prefer long-term investments which both match their liabilities and minimize the active management of the investment portfolio. If mortgages or long-term debentures can be sold, it is particularly advantageous to the housing institutions since it reduces their exposure to term and interest rate risk. Generally, investors will prefer to hold mortgage-backed securities rather than purchase whole mortgages, since the

latter require much less administrative effort than the former.[1]

Normally, the sales of mortgage-backed securities to other investors begins with individual placements. This may eventually mature into a genuine secondary market for mortgages. Some countries have tried to move more aggressively toward establishing a secondary market--the Philippines being a notable example. But these initiatives have not always gone well. The housing finance strategy developed for Sri Lanka recommended placements of debentures with a few very large institutions as the first phase in raising additional funds for housing (Boleat, 1987).

In terms of tapping informal financial sources, the most obvious strategy is to create housing opportunities which cause households to access assistance from their extended family, friends, and unregulated lenders and to invest more of their own savings in housing. It is commonplace in developing countries that there is a scarcity of units built to minimum standards and affordable to lower income households. Expansion of the supply of such units will induce households who still may not have access to formal finance to tap their traditional financing sources. An approach that might be preferred to permitting some lower income households obtain high loan-to-value ratio loans at reasonable interest rates from formal institutions but most to obtain no loan from these sources might be to keep loan-to-value ratios in the range of .6 to .7 to encourage all borrowers to use informal sources to some extent or to rely heavily on savings.[2]

Another avenue for tapping informal sources is for formal institutions to use informal sector actors as their agents. Small scale lenders could be contracted with to be deposit points and loan servicers. More expansively, community groups

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1. Investment in whole mortgages is complicated by loan prepayment which generally cannot be well anticipated. When prepayment occurs, investment officers must deal with the reinvestment of these funds. This contrasts with some mortgage-backed instruments which generally provide a scheduled flow of income.

2. A potential problem with this strategy is that some borrowers will obtain high cost loans from moneylenders. Given the higher interest rates on these loans, the borrowers will be sure to make payments on these first. If the borrower has any problems making payments on both loans, the formal sector loan will go into delinquency first.

can provide loan security for individual members through the collateral of deposits by the group held at the formal institution; the loans can be originated and serviced by representatives of the community. Use of community groups was recommended in the Honduras finance strategy. Examples of other arrangements have also be catalogued.[1]

A final important source of additional financing for housing is Government. As discussed earlier, Government is very important in establishing the "ground rules" for the competition for funds and the allocation of credit. Governments can and should also serve a role in promoting innovation in housing finance, generally by reducing the risk associated with certain innovations. Clear examples are for government to provide guarantees for the first sales of mortgage-backed securities by a secondary mortgage institution or to establish a self-financing mortgage default insurance agency.

Our particular interest here is in government as an actual generator of additional housing finance. Explicit subsidies for housing are often thought of as the primary form of financing provided by government. While these can be important, payroll taxes and "off budget" loans (frequently at below market interest rates) by the central bank to financial institutions can easily be of greater magnitude.

In thinking about a proper role for government in mobilizing funds it is useful to begin with the idea that it can be a very efficient generator of long-term funds. In countries with relatively primitive financial markets, only government may be able to mobilize long term funds, in the sense that only it can bear the interest rate risk over a long period. The more volatile the interest rate environment, the stronger the case for government borrowing for on lending to housing institutions. In addition, of course, the government's guarantee of interest payments and the large scale of its borrowing operations lowers the price of borrowed funds compared to the prices paid by other borrowers. One must use considerable judgement as to when to exploit the advantages of government in the capital market. Since reliance on government is easy compared to other solutions, there is a natural tendency to move in this direction.

Our view is that much reliance on government should be avoided, since it will slow down the development of efficient private financial markets. Certainly, there are countries where this dictum cannot be followed. If borrowing or other forms of

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1. See the documents by the United Nations Centre for Human Settlements listed in the references.

financing by government is necessary, then the emphasis should be on on-lending these funds to housing institutions at market rates. This practice will encourage the creation of private alternative sources and dodge problems of misallocation of resources.

A concluding note to this section concerns the role of donor provided financing for housing. External financing has the advantage of reducing pressure on financial markets to provide the funding for various competing purposes. And it often permits a rapid expansion of housing lending, probably more rapid than could otherwise be achieved. However, large infusions of external funds to individual institutions can have the effect of reducing their efforts to generate funds domestically, thereby slowing overall development of housing finance. This problem can be accentuated if donors permit their funds to be on lent as below market interest rates, which will discourage other lenders from making loans in the sector. In general donors must exercise extreme care in setting the terms for their loans, including the rate at which funds are released to the institutions--slower rates of dispersal will maintain pressure on the institution to seek funds from other sources.

#### Step 4: Develop Alternative Packages

In this step the analysts puts together various possibilities for expanding the amount of financing in the housing sector identified in Step 3 into internally consistent and reinforcing packages. One wants to be certain, for example, that the housing finance needs of various groups are addressed in each package and that each initiative supports others which are included.

For each element in the package several "parameters" must be defined:

- the amount of funds that might be generated
- the terms on which the funds could be obtained
- regulatory or legislative changes needed to permit raising the funds in this way
- terms on which funds would be on-lent
- the target group for the funds, both location (urban/rural) and income group.

Alternative packages can be defined in different ways. One way is to vary the elements included in the package; so, for example, selling debentures in one package might be exchanged for a greater emphasis on expanding deposits in another. Another way to vary the packages is to alter the amount of funds that might be generated from different sources, the terms on which

they are obtained, and the targeting of the lending.

In general, some packages should be defined at the outset that contain a good deal of innovation and fairly sharp changes, so as to provoke a proper airing of a wide range of options.

It is at this stage in the process that the explicit link between the sources of funds and their uses is made. Many of these linkages are quite natural. For example, a simple expansion in the deposits taken by a group of housing finance institutions would presumably result in a continuation of current lending patterns. Likewise, additional government lending would be tied to its own assistance programs. But there is also room for change and innovation. Deposits might be expanded through establishing contract savings schemes through unions or large employers; this would probably result in a shift of lending to somewhat lower income families than is standard practice. Alternatively, in exchange for being able to sell market rate debentures to the government pension fund, lenders could be required to on lend the funds to households with incomes at or below the 70 income percentile.

Lastly, lending to small investors in rental housing should be considered. In some countries, like Kenya, most housing is produced by this group and being able to obtain medium term financing could sharply increase supply.

The objective in this step is to establish a range of feasible options which can be further explored along several lines. One line is acceptability to the principal actors in the sector. Such exploration takes place through a series of bilateral meetings or through a meeting of an advisory panel set up as part of the strategy development process (see Section 4, below). Another line to be followed is an estimate of the impact of pursuing the policies contained in that set of a few packages that looks most promising.

#### Step 5: Analyzing Impacts

Two distinct types of impacts from implementing the policy reform packages formulated in Step 4 are of interest: impacts on the quality of housing occupied by different income groups, and impacts on the balance of the economy.

As indicated earlier, a primary objective of increasing the volume of housing finance available is to improve the quality of housing occupied by lower income families. Thus, a primary analytic question concerns the number of lower income households who will likely occupy minimally adequate housing beyond the number occupying such housing in the absence of the policy

reforms. Moreover, one should also answer questions of the efficiency with which various policy packages are able to accomplish such improvements: what is the cost per additional low income household occupying minimally adequate housing? what is the subsidy cost per additional household? (Subsidies should include both explicit government expenditures as well as tax expenditures, in-kind grants of land, etc.)

Answering these questions is both exceedingly complex and important. To address them the Urban Institute developed the Housing Quality Simulation Model, which is outlined in the next section of this paper and fully described in a separate users manual. Suffice for now to say that this model was explicitly designed to address exactly these issues and is flexible enough to deal with almost any conceivable government housing program or private lending operation for housing. Note also that the Housing Quality Model can be used to analyze policy initiatives quite separate from those involving housing finance reforms. In Honduras, for example, it was used to simulate the outcomes of three competing plans for the use of a large block of Housing Guaranty dollars--plans that would certainly be executed prior to any of the reforms in housing finance that the analysts might recommend.

There are several impacts on the balance of the economy of increasing the financing available for housing which will be of interest, especially to those at the central bank and ministries of planning and finance.

Balance of payment effects. How would a surge in housing investment effect the country's balance of payments? This question is best addressed through a careful analysis of the direct and indirect (i.e., inputs for production of building materials) import content of housing for low income families. If detailed analyses are not available, general discussions and experience from other countries would have to be relied upon.[1]

Employment and investment multipliers. In the short run an increase in housing investment can be expected to have economy wide impacts of about double the amount invested, with considerable variation among countries and the type of housing produced. More precise estimates might be obtained for a country if an input-output analysis has been done or if the housing sector has been included in economy-wide econometric models--both more the exception than the rule.

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1. A good review of the general record on import content is in Katsura (1984).

The longer term effects of housing--which stem from housing as an input into the production of a healthier and more productive labor force (through improved sanitation and health conditions) and a better education population (through reduced absenteeism at school) have been much more difficult to measure and are probably best left as qualitative statements (Katsura, 1984).

Efficiency of financial markets. Clearly, changes of the type outlined above which result in genuine innovation or reform of financial markets can significantly improve the efficiency with which these markets operate. A good sign that this will be the case is whenever the prices for capital--paid to savers or by borrowers--are moved closer to market rates or when additional credit is being allocated by competition rather than government directives.

While measuring the gain in market efficiency directly is difficult, one should be able readily to compute the reduction in subsidies in the system from raising interest rates from their below market levels.[1]

Financial savings. In many countries increasing the share of savings held in financial form is an important policy objective, since savings in this form can be allocated to productive investments whereas savings in real form like gold generally are hoarded. Hence, it is possible for a country to increase its investable resources without effecting its total savings rate. To the extent that actions called for in the reform packages increases financial savings, this will be a major plus to officials concerned with overall economic growth.

The econometric evidence on the sensitivity of financial savings in developing countries to interest rates paid and the transactions costs associated with this form of savings is far from definitive. There are spectacular cases such as India where the financial savings rate increased dramatically in response to an aggressive expansion of branch banks. Similarly, very sharp rises in interest rates in Korea and Taiwan caused surges in financial savings. But the overall experience has not led to a convenient rule of thumb. Hence, the analyst will in

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1. The calculation of subsidies may overstate the efficiency gain since some formerly favored investments would have been willing to pay the market rate but did not because they did not have to.

general be limited to qualitative statements.

The final action in this step is the selection of the preferred policy package. This recommendation is based on a weighing of the impacts on the degree of improvement in the quality of housing occupied by lower income households and the broader effects on the economy. Where there is a conflict between these impacts, the choice will be determined in part by the extent to which support for the reforms will be needed outside of the housing community.

#### Step 6: Detailing the Initial Changes

Having selected the recommended course of action--and discussed its acceptability with AID officials and other knowledgeable individuals--now is the time to detail the concrete actions for implementing the recommended package of reforms. Most attention should be devoted to those actions required in the near-term, but other changes needed over a several year period should be sketched so that the full range of developments is clear. Note that these are all actions following a decision to go forward with the reforms; they are not a "game plan" for obtaining those decisions.[1]

Many of the required actions will fall within the purview of various government agencies. For example, in Sri Lanka the Ministry of Finance would have to signal the National Savings Bank that buying housing-backed debentures would be acceptable, instead of the NSB using all of its deposits to purchase government debt. Similarly, central banks will have to take action to permit the interest rates on deposits and mortgages of housing finance institutions to move to market levels and move with the market thereafter. Central banks also control the types of deposit accounts institutions can offer and the types of loans finance institutions can make. In Honduras, actions by the central bank to realign the powers of commercial banks and S&Ls were a critical element in the program of change. On the other hand, it will be the ministry of housing that typically will have to implement policies to increase the interest rates charged to beneficiaries of its schemes.

Some changes requiring legislation might also be necessary. One example of this type in Sri Lanka was a change in the law governing the type of investments that could be made with funds from the civil servants' pension fund--a major potential

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1. Clearly such plans will have to be made and are part of the overall process. Some ideas in this direction are discussed in Section 4.

customer for housing debentures. In general, changes that can be made by a directive or through modifications of regulation are preferred to those requiring legislation because the latter involve both a longer process and a more uncertain outcome.

Beyond the kind of actions just outlined, the analysts should also indicate the type of technical assistance and other actions by the donor community that will be instrumental in achieving the reforms. Technical assistance is one avenue. In Kenya a key element in achieving the goal of attracting more capital to the housing sector is the creation of a limited secondary mortgage market; substantial outside expert assistance is needed to formulate a concrete plan that will be acceptable to housing finance institutions and potential purchasers. Another avenue is seed money to support particular innovation. In Honduras the analysis team recommended that AID fund the initial reserves of a privately operated mortgage insurance fund, which would enhance the saleability of mortgage-backed securities to a broad range of investors.

In short, the final part of the housing strategy developed by the analysts should be an outline of a concrete plan of initial essential actions to implement the recommendations. It should be a kind of blueprint for what to do when consensus is achieved.

### 3. The Housing Quality Simulation Model

The Housing Quality Simulation Model is designed to help analysts evaluate alternative strategies for deploying resources to meet a country's housing needs. Specifically, year-to-year changes in housing quality are simulated for alternative intervention strategies under specified by the user. The goal of this Model is to provide some solid, numerical estimates of improvements a country can achieve in housing conditions by deploying its resources effectively. Before delving into the specifics of this Model, a few key attributes should be noted.

First, the Housing Quality Model can best be understood as a record-keeping or accounting model, rather than as a behavioral model. While numerous behavioral assumptions are incorporated into the model, most must be explicitly supplied by users as part of the data entry process. Second, this is primarily a demand-side model, focusing on the capacity of households to achieve significant improvements in housing quality, either independently or through participation in publicly-sponsored assistance programs. And third, the Housing Quality Model is a spatial model only to a limited extent, as an application simply divides a nation into metro, other urban, and rural areas.

Several specific features of this model make it particularly useful for policy analysis in developing countries. For one, it categorizes households by income, tenure, and dwelling quality, and analyzes transitions by households between tenure and dwelling quality classes under various government programs. In addition, the model operates on an annual basis, so that alternative policies can be compared with respect to the rate at which housing improvements are achieved. And finally, the model focuses on the transition of households from unacceptable dwelling and infrastructure conditions to acceptable conditions rather than on more abstract, continuous measures of housing quality. This chapter briefly outlines the Housing Quality Model, and discusses several useful measures that the Model generates for evaluating alternative policies.

#### The Housing Quality Model in Brief

The central organizing concept of the Housing Quality Model is a matrix that classifies households according to income, tenure, and housing condition. Users specify the initial distribution of households within the classification matrix, and the model then stimulates year-to-year shifts by households between cells. This matrix classifies incomes by decile. Within each income decile, households are assigned to one of four possible tenure categories: 1) secure owners possessing clear title to their properties; 2) squatters -- owners lacking title or secure tenure; 3) unit renters; and 4) room renters. Finally,

within each tenure category, households are distributed across six possible dwelling statuses, defined on the basis of both structural adequacy and infrastructure acceptability. Dwelling status categories are defined as:

- 1) Permanent structure, infrastructure passes adequacy standard;
- 2) Permanent structure, infrastructure fails adequacy standard;
- 3) Semi-permanent structure, infrastructure passes adequacy standard;
- 4) Semi-permanent structure, infrastructure fails adequacy standard;
- 5) Improvised structure, infrastructure passes adequacy standard; and
- 6) Improvised structure, infrastructure fails adequacy standard.

Starting with the initial distribution of households, the Housing Quality Model simulates year-to-year shifts by households from one cell to another, and computes the construction levels and resource requirements generated by these tenure and dwelling status transitions. The transitions of primary interest to model users stem from publicly-sponsored housing assistance initiatives, but significant changes in the distribution of households also occur in the absence of government interventions. Therefore, the Housing Quality Model begins by simulating a set of "background" transitions, which are assumed to occur regardless of the policy environment.

There are three sets of transitions that the Housing Quality Model simulates each year. These include 1) the addition of net new households; 2) improvements in the existing stock of housing units --from upgradable to fully adequate structures, and from unacceptable to acceptable infrastructure; and 3) replacement of units lost due to depreciation. In each case, the Model user provides assumptions about the rate at which these transitions occur, and the model calculates the implications for housing construction and housing investment.

Next the Housing Quality Model simulates the impacts of any publicly-sponsored housing assistance programs specified by the user. There are four basic ways in which either financial resources can be directly introduced into the housing sector or the demand for these resources by households can be stimulated. These are 1) expansion of formal housing finance; 2) provision of infrastructure; 3) improving tenure security; and 4) sites-and-services or direct construction projects. For each year, the

Model allows the user to design a policy package consisting of any number of programs from each of these four basic types.

For any policy scenario specified by the analyst, the Housing Quality Model determines the number of participants by income class, changes in the distribution of households across tenure and dwelling status categories, new housing production levels by dwelling status, and changes in the allocation of housing resources between formal financing, savings/informal financing, and government spending.

Expansion of formal housing finance can take many forms. Increased funds can be generated by making private housing finance institutions more competitive in attracting funds, by establishing a secondary purchase facility or market, or by other government action, possibly involving its funding public banks. How the funds are mobilized, however, is less important to the Housing Quality Model than how they are to be deployed. Specifically, the volume of loans issued can be increased without any meaningful change in terms, or a lending program more targeted to households in marginal housing circumstances can be established, at higher or lower interest rates.

The Housing Quality Model offers the flexibility to simulate the full range of available approaches for expanding the availability of formal finance. The user specifies both the loan terms and the expected allocation of loans, by income, initial tenure, and initial housing circumstances. Based on this specification, the Housing Quality Model performs the following process for each group of participating households:

- 1) Calculate the maximum loan households can afford to borrow, given income available for housing investment and loan terms.
- 2) Determine the total house value households can afford, given the loan amount, savings/informal financing, and equity from a current dwelling.
- 3) Shift participating households into the highest tenure/dwelling status category they can afford.

Provision of infrastructure to areas lacking adequate services -- particularly water and sanitation -- has been shown to have the double effect of directly upgrading some services and simultaneously stimulating additional investment in effected dwellings. A considerable range of program designs exist. Some programs operate as grant mechanisms under which new services are provided without charge. More typically, some of the capital costs are paid by recipient households at the time of installation and the balance is paid over time through service fees. In some cases, loan programs (possibly for unit

improvements as well for the household share of the capital expenses) are linked with infrastructure programs. Again, the Housing Quality Model offers users the opportunity to specify any of these program designs, varying the required household contribution, subsidy levels, and the expected allocation of assistance. In addition, an infrastructure program can be accompanied by earmarked loans.

The Model assumes that, by definition, all participating households shift to "acceptable infrastructure" cells. In addition, however, some participants may be able to afford to upgrade their dwelling units at the same time, or over the next several years. The analyst specifies how much recipient households will invest in their units from savings and informal sources. Then, the Housing Quality Model shifts participating households into the highest dwelling status category they can afford, and schedules some participants for further upgrades in subsequent years.

Provision of secure tenure to homeowners lacking clear title to their properties has also been documented to stimulate investment in housing. Financing for purchase of the lots can come from earmarked pools of funds from government or private institutions in addition to savings and informal finance. Such loans may also incorporate additional funds for improvements to the units. The Housing Quality Model assumes that all participants in policies of this kind are either squatters or unit renters, and that these households become secure owners if they can afford the costs of program participation. In addition, the Model shifts participating households into the highest dwelling status category that they can afford, and schedules some participants for incremental upgrades in future years.

Sites and services and/or direct construction projects encompass all programs in which the government or private developers sell sites offering adequate infrastructure accompanied by differing degrees of structure. Like the previous two types of policy, sites and services or direct construction programs are often accompanied by an earmarked pool of housing finance.

In simulating the effects of policies of this type, participants are assumed to move to new dwelling units, but the model user can specify whether these are completely finished dwellings, shell units, or simply serviced sites. Moreover, the user specifies the required household contribution, subsidy levels, and earmarked loan terms, if any. As in the infrastructure policy, some participants may be able to afford to upgrade shell units or serviced sites immediately, or within the next several years. Therefore, based on user estimates of household's responsiveness to an investment opportunity, the model allows each participating income/tenure dwelling status

group to shift to the best dwelling status category it can afford, and schedules some participants for further shifts in subsequent solution years.

### Evaluating the Alternatives

In thinking about the relative efficacy of alternative public interventions in the housing sector a key criterion is the impact of a program, per dollar spent, on the quality of housing occupied by the target group, i.e., households initially living in inadequate housing. The Housing Quality Model focuses on just this issue. However, per dollar impacts depend on several underlying factors. One is the extent to which public resources do in fact reach the intended beneficiaries. Many programs nominally serve a target group, but, in fact, are designed and administered in ways that cause this good intention to be realized only to a limited extent. The Housing Quality Model does not simulate "leakage" of public resources away from intended beneficiaries. Instead, the analyst must estimate realistically what the extent of leakage will be and incorporate these estimates into assumptions about the allocation of assistance across groups.

Another factor determining per dollar impacts of public programs is the amount of housing investment a program will induce households to undertake from their own resources as well as from resources offered by the program. Again, as noted earlier, model users must provide explicit assumptions about these responses. Both immediate additional investment at the time of infrastructure upgrading, for example, and investment occurring more incrementally over an extended period should be considered.

Finally, the resource cost per dwelling or household assisted by a program is crucial, not only because of the effects on efficiency but because it determines the number of units that can be improved out of any given tranche of resources. In this regard, one is interested in both the total resource cost per unit of undertaking a program and the net cost or subsidy to the government, if any.

Given a user's assumptions about leakage, household investment responses, and per unit costs, the Housing Quality Model generates several useful indicators for measuring the per dollar impacts of alternative intervention strategies. These indicators focus on three broad issues: 1) how many households are assisted; 2) how many households actually shift from unacceptable to acceptable housing conditions as a result of their participation; and 3) what is the cost per household -- both in terms of total investment resources and in terms of government subsidies. These measures of program effectiveness can be computed on a year-by-year basis or for longer periods.

#### 4. Applying the Method

This section discusses four key aspects of the process of applying the method in a country. It begins by identifying the conditions viewed as necessary for a successful application. Next, the organization of the analysis process is discussed along with a general schedule. The final two parts deal with the type of skills which the analysis team should possess and the level of effort that will likely be required.

##### Necessary Conditions

As described earlier, the aim of applying the Housing Finance Strategy Method in a country is to achieve--or at least initiate--changes in the housing finance sector, probably by altering some of the rules governing financial markets. It is critical, therefore, that host country officials perceive the need for some type of change before the method is implemented. Indeed, there should probably be some genuine enthusiasm for undertaking changes on the part of these officials. While it is possible to initiate an application of the method on the basis of interest only by officials in the housing sector, ultimately decision makers at the ministry of finance and the central bank will also have to be involved. So it is preferable to engage them at an early stage. The interest of local officials should be manifest in part by their willingness to contribute time to the analysis effort, including help organizing two advisory panels.

A second precondition for successful application of the Method concerns data inputs, broadly defined. Since the Housing Quality Model (HQM) draws heavily on data developed in an application of the Housing Needs Assessment Model, having the HNA already applied in the country is important. Of course, this could be done as part of the Housing Finance Strategy project, but this makes the project quite a large package. Beyond the needs assessment, the HQM has considerable data requirements beyond those of the HNA. In a few countries sufficient data simply will not be available. As suggested earlier, it would still be possible to analyze ways of mobilizing additional resources for housing, and to perform a more qualitative analysis of the impacts of deploying these resources in different ways. While this would certainly be valuable, the cost of not implementing the HQM is the loss of hard, quantitative information which makes the results much more compelling to policy makers.

## Organizing the Analysis Project

An application of the Method has five phases, which might ideally be organized as follows.

1. Initiation. After a general interest in the results from an application of the Housing Finance Strategy Method has been identified by RHUDO staff, it is imperative that someone from the RHUDO staff, PRE/H, or a consultant who is quite conversant with the Method meet with senior government officials and local AID staff to detail the types of products that can be anticipated, the process involved, and the contributions expected from the various parties.

RHUDO staff would take the lead in setting up these meetings and in determining who should be the key presenter. This is also the point at which to discern the likely value of including use of the Housing Quality Model in the project.

If the decision is to go forward with applying the Method, then on the basis of these consultations, the RHUDO can draw up a clear statement of work. The host country officials at this stage should set up two advisory panels (described later) who will function during the balance of the project. Local AID or RHUDO staff should be members of each panel.

2. Issue definition and data acquisition. During this visit to the country by part of the project team, the issues outlined in the terms of reference are discussed with AID and the advisory panel of financial experts to be certain that there is general agreement on the scope and objectives of the work and the type of results to be produced.

Two types of data are acquired at this point: first, data on the housing conditions of households by tenure and income category for the HQM; and second, information on current housing lending volumes and terms and on current government program characteristics and production levels. The project team should meet with the technical advisory panel on data issues.

3. Initial calibration of the HQM. Since the calibration process can take several weeks of manipulating the data into the correct form and creating data files on government programs and private lending activities, this task is best done at the analysts' base office. At the end

of this step, the team has the HQM operating for the country and a firm grasp on private and public housing finance.

4. Main analysis and report preparation. During this field mission phase of this step the project team develops the options for mobilizing additional financing for housing, in part through wide ranging interviews with persons at banks and other financial institutions plus key actors in housing finance. The HQM is refined and used to estimate the impact of alternative ways of deploying the incremental housing resources. A report describing the results and stating recommendations is prepared. The final analysis and report writing is completed after the field phase.

During this work the team will meet with both advisory panels at key points. For example, the results of the initial results of the Housing Quality Model would be reviewed by the technical advisory panel. Similarly, the project team would meet with the financial experts panel to discuss the current workings of the housing finance system and to float new ideas. RHUDO and/or local AID officials will help the team with appointments, convening panels, and providing guidance on the politics of accomplishing change.

5. Event plus Follow up. Although the type of follow up will vary from situation to situation, it seems important to have some formal event--such as a seminar at which the results and recommendations are presented and discussed--to help launch the drive for changes in the system. Beyond this, there is the need for steady work by AID staff to promote the essential changes.

The "event" would be planned jointly by the team, AID staff, and host government officials. Typically, it makes sense for the team leader to take the lead in presenting the recommendations and the analysis underlying them. The general discussion might then be lead by a senior government official.

If the Housing Quality Simulation Model is not employed in an application, step 3 is omitted. Also, if the team leader participates in step 1, then it may be possible to combine the first two steps.

The formation of two advisory panels to help in the analytic and policy definition process has been suggested. The first panel--a technical advisory group--advises the team on the numerous data questions that arise in the course of applying the

HQM. Members of this panel should include individuals familiar with housing data in general as well as individuals with real experience working with lower income housing projects.[1]

The second advisory panel is composed of experts from housing finance and other financial institutions, e.g., pensions funds, insurance companies. This panel has two purposes. On the one hand, it provides the team with information on how particular aspects of financial markets are currently working. In addition, this panel would be used as a sounding board for new policy ideas -- both to get reactions and to help refine preliminary thinking.

Since the panels serve both technical and coalition building functions, it is important to include members from both the public and private sectors as well as the donor community. The technical panel should be fairly small, four or five people, while the financial panel might be as large as eight to ten persons. Both groups should be expected to make substantial commitment of time and thought.

In the applications to Sri Lanka and Honduras the "initiation" phase was not as complete as it might have been. Moreover, the final step, "event plus follow up" was not planned as part of the initially conceived project, although in both cases such an event was organized by RHUDO staff. Based on the experience gained in these applications, it seems clear that more attention must be given to the initiation phase and that resources for the final step should be included in the project from the start. Planning for exactly what to do for the "final event" might best be done during the main analytic phase. It is then that the direction of the recommendations becomes clear and the key persons who will make the key decisions are identified.

Finally, a word about the schedule for this work. Given the calibration time for the HQM and the usual difficulties in arranging visits when key people are available, a realistic schedule for the first four phases is on the order of five or six months. In those cases in which the HQM is not used, a three month schedule seems possible. Timing on the follow up phase is harder to project; in general, however, the "formal event" might be scheduled six to eight weeks after the report has been

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1. Many of the more difficult data questions concern how households respond to different housing opportunities. For example, if Government provides infrastructure to an established but unserved residential area, how much investment in their housing units are the residents likely to make to their unit in the next year or two?

submitted to maintain any momentum developed during the analysis phase.

### Staffing

Three types of skills are required for the application of the Housing Finance Strategy Method:

Economist -- knowledgeable about and a strong analyst in financial markets generally and housing finance in particular.

Economist/planner -- strong analyst in housing markets and government housing programs in developing countries

Computer specialist -- knowledge of Pascal programming language (used in the HQM) and experience with PCs and manipulation of multiple data sets.

If the HQM is not employed, the third staff member is not required.

### Level of Effort

A total level of effort of approximately six man months is required to conduct an application of the full Housing Finance Method. The effort distributed roughly evenly across the three skill categories, with the computer specialist having greater involvement in the third phase and little in phases one and five compared to the other team members. A rough break out of the level of effort by project phase is:

<u>phase</u>	<u>staff weeks</u>	
	<u>full application</u>	<u>no HQM</u>
1. Initiation	1	1
1. Issue definition and data acquisition	4-5	2
2. Initial calibration of the HQM	6-7	--
3. Main analysis and report preparation	14	11
4. Follow up	2	2
Total	26-28	16

These are suggestive levels, although they are quite consistent with the experience in Sri Lanka and Honduras.

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## ANNEX A: INDICATORS OF FINANCIAL DEPTH\*

This annex contains economic indicators that should prove useful for analyzing housing finance in developing countries in the context of broader financial markets. A key factor in such analysis is judging the maturity and depth of financial markets. To this end empirical measurements of the depth of these markets -- the level of mobilization of financial resources in an economy -- play a critical part in developing housing finance strategies by helping the analyst rapidly assess the overall financial system.

The primary objective of the annex is to provide indicators for a large number of countries. Hence, the analyst will be able to place a specific country in the context of other countries in that region or at the same state of development. The 77 countries selected include all those in which the Office of Housing and Urban Programs is active.

Out of a large number of possible indicators of financial depth, we have chosen three based on two criteria: the ease with which they can be constructed for most countries, and their usefulness in analyzing a country's financial system.

### THE INDICATORS

The indicators we chose can be developed easily from data in the International Monetary Fund's International Financial Statistics (IFS).<sup>[1]</sup> A description of each of the three indicators and their sources follows.

(1) Deposit bank assets as percent of GNP. This indicator represents a summation of commercial bank assets and the assets of other financial institutions relative to GNP. Commercial bank figures are found in lines 20, 21, and 22, which are part of the Deposit Money Banks section in the IFS. Lines 40 and 42 list cash and all claims for the other financial institutions.

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\* This annex was prepared by Katie Mark.

1. International Monetary Fund (1985).

(2) Aggregate financial assets as percent of GNP. The aggregate financial assets figure includes the commercial and deposit bank assets (as above) plus outstanding bonds held by commercial banks and other financial institutions. Bonds figures are found in IFS lines 26a and 46a.

(3) Circulation ratio. Jim Christian (1986) developed the ratio of total currency in circulation to the total of currency and deposits (liquid financial assets) in financial institutions as a measure of financial development. Our figure shows currency in circulation as a percentage of this measure of money broadly defined. This results in a ratio which decreases with increasing financial depth, unlike the other two indicators. This also leads to a negative relationship between the ratio and GNP per capita.

Liquid financial assets are defined as currency plus deposits in financial institutions -- IFS lines 34, 35, and 45; and currency in circulation is found in line 14a.

### VALIDITY OF THE INDICATORS

The usefulness of a number of possible indicators, including these three, was assessed by two conditions. First, we know in general that financial depth and per capita GNP are causally related. Measures which over a large number of countries are highly correlated with per capita GNP are therefore seen as valuable. Second, we used a series of International Finance Corporation (IFC) financial indicators as benchmarks. These indicators (described in greater detail in the Addendum) were carefully constructed by the IFC's Capital Markets Department from a large number of sources, including publications and in-country interviews.[2] Although our indicators constructed from IFS data can in no way match these in accuracy or detail, if they demonstrate a high degree of correlation with their IFC counterparts, they are judged as useful indicators.

To test the usefulness of the indicators constructed from IFS data, a number of correlations were run for each indicator. For each correlation reported below, three figures are provided. The top figure is the first order correlation coefficient, the middle one is the significance level of the correlation, and the bottom one is the number of country observations included in the analysis. The number of observations varies sharply because of the lack of data items for many countries and the fact that the IFC data are available for only 36 countries.

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3. International Finance Corporation (1984).

(1) As shown below, although the deposit bank assets indicator does not show an extremely significant correlation with GNP per capita, it is highly correlated with its IFC counterpart. The IFC deposit bank indicator, in turn, shows a positive and highly significant correlation with GNP per capita.

Deposit bank assets indicator correlated with:

GNP per capita [a]	GNP per capita [b]	IFC indicator [a]
0.36	0.22	0.79
0.0534	0.1385	0.0001
29	47	28

IFC deposit indicator correlated with GNP per capita [a]

0.58  
.0002  
35

NOTES: [a] population is the 36 countries listed in Table A.1, with some omitted for lack of data.  
[b] population is the 77 countries listed in Table A.2, with some omitted for lack of data.

(2) The circulation ratio shows a moderate but highly significant correlation with GNP per capita figures. When run for the 36 countries chosen by the IFC, the correlation is slightly higher than when done with the larger group of 77 countries, probably because the 36 represent a more balanced mixture of industrialized and non-industrialized countries, and because those countries tend to have more available and reliable data. This ratio has the distinct advantage of being available for a much larger number of countries than the other indicators.

Circulation ratio correlated with GNP per capita:

-0.55 [a]	-0.41 [b]
0.0004	0.0003
36	75

NOTES: [a] population is the 36 countries listed in Table A.1.  
[b] population is the 77 countries listed in Table A.2.

(3) The aggregate financial ratio shows quite high positive

correlations with both GNP per capita and its closest IFC counterpart (Financial Assets II in Table A.1). A major drawback to this indicator is the difficulty in obtaining accurate information on deposit banks assets and securities for many of the countries. The result is that a financial aggregate can only be constructed for a limited number of countries, in this case only 20 out of the 36 countries in Table A.1, and 24 out of the 77 countries from Table A.2.

Financial aggregate indicator correlated with:

GNP per capita [a]	GNP per capita [b]	IFC aggregate indicator [a]
0.61	0.66	0.66
0.0046	0.0004	0.0051
20	24	16

IFC aggregate indicator correlated with GNP per capita [a]

0.69  
0.0001  
28

NOTES: [a] population is 36 countries listed in Table A.1.  
[b] population is 77 countries listed in Table A.2.

CONCLUSION

These data are by no means intended to be infallible indicators of a country's financial system, but used judiciously they can provide guidelines for assessing the relative maturity and depth of financial markets. Table A.1 lists eight financial indicators reported by the IFC for 36 countries. Table A.2 lists the three indicators constructed from IFS data. In the case of the Deposit Bank Assets and Financial Aggregate indicators, the higher the ratio, the greater the financial maturity of an economy. As mentioned earlier, the opposite holds true for the circulation ratio. We have also listed the GNP per capita in that table for easy reference.

We have constructed the indicators for a total of 77 countries for 1983; indicators for additional countries and different time periods should be fairly easy to construct, as described above.

35

## Addendum

### The IFC Indicators

Two of our indicators are based on financial depth ratios developed by the International Finance Corporation's Capital Markets Department as part of their Country Financial System Profiles. The IFC uses a number of sources, including central bank publications, government statistics, and stock exchange reports. Although we limited our sources to the most easily available comprehensive publication, we did use the IFC's definitions as a starting point, and used their indicators as a measure of the utility of ours.

#### IFC Definitions

Deposit Bank Any financial institution, including commercial banks, for which deposits comprise more than 50 per cent of total liabilities. A "deposit" is defined here as a non-transferrable financial instrument having a maturity of one year or less.

Commercial Bank. Any deposit bank whose principal activities are short-term commercial and individual lending and checking services.

Broad Money. A financial aggregate composed of currency, all deposits and any negotiable financial instruments with maturities of one year or less.

Bonds. Any negotiable debt instrument with a maturity of more than one year.

Shares. Shares in a corporation in which some of the shares are held by outside shareholders and which can be bought or sold in the secondary market. Preferred as well as common shares are included.

Shares Outstanding. Shares or shares outstanding refers to the market value of all shares outstanding at the end of the year.

The IFC-developed indicators are found in Table A.1.

**TABLE A.1**  
**THE IPC'S SELECTED INDICATORS OF FINANCIAL MARKET DEPTH, 1983**  
 (as percentage of GNP)

Country	Commercial Bank Assets	Deposit Bank Assets <sup>1</sup>	Broad Money <sup>2</sup>	Outstanding Securities			Financial Assets	
				Bonds <sup>3</sup>	Shares <sup>4</sup>	Total	I <sup>5</sup>	II <sup>6</sup>
<u>Industrialized Countries</u>								
Canada	95	129	66	57	45	102	168	232
France	79	118 <sup>7</sup>	68	22	8	30	97	136 <sup>7</sup>
Germany	38	126	73	47	14	61	133	186
Japan	89	178	158	78	48	126	204	304
Netherlands	94	140	41	37	28	65	106	205
Spain	86	122	84	6	6	12	97	134
Sweden	75	102	70	84	36	120	190	222
United Kingdom	73	104	56	54	52	106	162	209
United States	60	91	96	57	65	122	218	213
<u>Upper Middle Income Countries</u>								
Argentina	57	na	36	17 <sup>7</sup>	5 <sup>7</sup>	22 <sup>7</sup>	58	na
Brazil	32	52	56	14 <sup>7</sup>	5 <sup>7</sup>	19 <sup>7</sup>	67	72
Chile	40	40	44	7	17	24	68	64
Greece	64	71	80	4	4	8	28	79
Israel	225	254	100	29	45	74	174	329
Jordan	101	101	93	6	54	60	153	161
Korea	78	99	39	13 <sup>7</sup>	6 <sup>7</sup>	19 <sup>7</sup>	58	110
Mexico	40	40	36	3 <sup>7</sup>	1 <sup>7</sup>	4 <sup>7</sup>	44	48
Portugal	101	154	113	8	1	9	121	162
Singapore	164	206	74	33	96	129	203	336
Uruguay	40	51	64	na	na	na	na	na
Venezuela	50	94	53	15	4	19	72	114

TABLE A.1 (continued)

Country	Commercial Bank Assets	Deposit Bank Assets <sup>1</sup>	Broad Money <sup>2</sup>	Outstanding Securities			Financial Assets	
				Bonds <sup>3</sup>	Shares <sup>4</sup>	Total	I <sup>5</sup>	II <sup>6</sup>
<u>Low and Lower Middle Income Countries</u>								
Bolivia <sup>8</sup>	13	13	13	—	—	—	13	13
Colombia	25	50	30	na	na	na	na	na
Dominican Republic	31	35	38	—	—	—	38	35
Ecuador <sup>7</sup>	39	39	30	na	na	na	na	na
India	34	35	47	1	5	6	54	42
Indonesia	27	27	21	—	—	—	21	27
Ivory Coast	52	52	24	na	3	3	na	na
Kenya	27	43	33	17	3	20	54	63
Morocco	33	36	44	na	2	na	na	na
Nigeria	46	47	56	7	4	11	74	62
Philippines	55	59	32	14	5	19	50	78
Senegal	56	80	28	—	—	—	28	80
Thailand	60	76	51	na	4	na	na	na
Turkey <sup>8</sup>	46	46	29	na	na	na	na	na
Zimbabwe <sup>9</sup>	28	57	35	28	6	34	68	90

Source: Capital Markets Department, International Finance Corporation, July 1984.

1. Includes all financial institutions whose deposit liabilities make up half (or more) of total liabilities.
2. Includes money stock and financial instruments with maturities of one year or less.
3. Corporate and government bonds at par value.
4. Outstanding shares at year-end market value.
5. Financial assets measured as the sum of the Broad Money and Total Securities ratios.
6. Financial assets measured as the sum of the Deposit Bank Assets and Total Securities ratios.
7. 1982.
8. As of September 1983.
9. As of June 1983.

( — ) Negligible, less than 1%  
na Data not available

TABLE A.2

## INDICATORS OF FINANCIAL DEPTH FOR 77 SELECTED COUNTRIES

	Deposit Bank Assets as Percent of GNP	Financial Aggregate as Percent of GNP	Circulation Ratio	GNP Per Capita (in US \$)
INDUSTRIALIZED COUNTRIES				
Canada	92	95	08	12,280
France	131	147	07	10,430
Germany	151	192	09	11,400
Greece	101	103	14	3,910
Japan	218	245	04	10,100
Netherlands	200	210	09	9,870
Singapore	167	—	14	6,660
Spain	115	130	09	4,770
Sweden	143	151	10	12,440
United Kingdom	—	—	10	9,180
United States	69	84	07	14,080
ASIA				
Bangladesh	—	—	18	130
China	—	—	26	300
Fiji	42	—	13	1,780
India	42	45	22	260
Indonesia	29	—	22	560
Korea	94	96	12	2,010
Malaysia	135	—	09	1,870
Nepal	—	—	29	160
Pakistan	—	—	29	390
Papua New Guinea	—	—	12	760
Philippines	68	74	18	750
Sri Lanka	—	—	15	330
Thailand	74	74	13	820
PANAMA & SOUTH AMERICA				
Argentina	403	—	46	2,510
Bolivia	89	89	05	480
Brazil	170	170	13	1,870
Chile	—	—	16	1,890
Colombia	47	49	21	1,410
Ecuador	35	39	16	1,420
Guyana	181	—	—	560
Panama	625	—	20	2,110
Paraguay	27	—	02	1,320
Peru	36	38	27	1,040
Surinam	—	—	10	3,390
Uruguay	—	—	10	2,470
Venezuela	84	89	07	3,830

TABLE A.2 (continued)

	Deposit Bank Assets as Percent of GNP	Financial Aggregate as Percent of GNP	Circulation Ratio	GNP Per Capita (in US \$)
<b>EAST &amp; SOUTHERN AFRICA</b>				
Botswana	—	—	09	901
Ethiopia	37	—	40	120
Kenya	41	—	13	340
Lesotho	34	35	10	460
Malawi	37	—	14	210
Mauritius	—	—	17	1,198
Seychelles	—	—	22	2,500
Tanzania	—	—	28	240
Uganda	—	—	35	220
Zimbabwe	59	—	12	740
<b>CARIBBEAN</b>				
Barbados	59	—	11	4,040
Dominican Republic	53	60	19	1,160
Haiti	18	—	26	290
Jamaica	68	—	10	1,270
<b>NEAR EAST &amp; NORTH AFRICA</b>				
Algeria	—	—	40	2,320
Israel	—	—	02	5,270
Jordan	96	—	32	1,720
Lebanon	—	—	11	—
Mauritania	—	—	30	480
Morocco	50	—	27	760
Portugal	—	—	12	2,230
Saudi Arabia	71	—	26	12,220
Sudan	—	—	34	400
Tunisia	72	—	19	280
Turkey	43	44	17	1,250
Yemen, Arab Republic	—	—	67	550
Yemen, P.D. Republic	—	—	55	520
<b>WEST &amp; CENTRAL AFRICA</b>				
Ghana	—	—	50	310
Ivory Coast	—	—	34	710
Nigeria	39	—	24	770
Senegal	—	—	28	440
Togo	—	—	37	280
Zaire	—	—	40	170

TABLE A.2 (continued)

	Deposit Bank Assets as Percent of GNP	Financial Aggregate as Percent of GNP	Circulation Ratio	GNP Per Capita (in US \$)
CENTRAL AMERICA				
Belize	65	—	15	1,063
Costa Rica	42	43	12	1,070
El Salvador	—	43	20	680
Guatemala	26	—	22	1,120
Honduras	44	—	19	670
Mexico	57	—	11	2,180
Nicaragua	—	—	36	880

Sources: International Financial Statistics, Washington, DC: IMF, 1986; The World Bank Atlas, Washington, DC: IBRD, 1986.

Note: ( — ) Information not available.

## Annex B

### Summaries of the Applications of the Method to Sri Lanka and Honduras

This annex outlines the results of the first two applications of the Housing Finance Strategy Method. The format follows the six steps described in Section 2 of the body of the paper. For each step the highlights of the findings are outlined. This review describes conditions in the countries at the time the analysis was done: 1985 for Sri Lanka and 1986 for Honduras. Full results are contained in the project reports.[1]

#### Step 1. Assess Overall Financial Markets

##### Sri Lanka

###### o Government intervention

- Government controls lending rates and directs credit allocations, through reserve and portfolio requirements and through rediscounting facilities.

- Government is financing large deficits. It holds several very large sources of institutional funds "captive" and pays them low interest rates. On the other hand, Government uses high interest rates at the National Savings Bank (NSB) to attract additional funds from small savers and to effectively set the interest rate paid on deposits by all institutions.

###### o Financial markets

- The financial system is not innovative and is quite underdeveloped.

- A moderate volume of short-term funds are competitively allocated; but no long term funds provided by private institutions. All long term financing is from government development banks at below market interest rates.

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1. For Sri Lanka, see Struyk et al. (1985); for Honduras, Rourk et al. (1986).

o Increasing Savings

- There is only a modest scope for expanded financial savings. Although there is an extensive network of bank branches, service quality is low. Real rates to savers have been positive.

Honduras

o Government intervention

- Government financing of the deficit from domestic sources is key macroeconomic factor. The principal vehicle has been payment of very high rates on government bonds, making most other investments by the financial community relatively unappealing.
- Long-term credit is allocated through government institutions at below market interest rates.
- Effective interest rate controls are imposed on lending through reserve requirements. Very high real rates are in effect.

o Financial markets

- Within the limits described, there appears to be reasonable competition.
- Moderate amount of innovation on-going, but this is being limited by very high rates of return on government securities.

o Increasing savings

- Real interest rates to small savers have been positive only in the last two years. Coverage of formal sector savings institutions is poor in rural areas and low income neighborhoods in urban areas. There are clear possibilities for increased savings.

Overall, financial markets in Honduras are more innovative and mature than in Sri Lanka, but high rates on government paper are limiting entrepreneurship.

## Step 2. Housing Finance in the Broader Market Context

### Sri Lanka

#### o Formal housing lending

- Best characterized as a special circuit for housing, with both liabilities and assets carrying below market interest rates.
- There are only two mortgage lenders: the State Mortgage Investment Bank (SMIB) and the Housing Development Finance Corporation - Sri Lanka (HDFC).
- These lenders exercise careful underwriting, geared to upper income households, except for some HG funds. They use a standard mortgage instrument which has a potential Adjustable Rate Mortgage feature.
- The total volume of loans is small: approaching 5,000 per year vs. 100,000 new units produced annually (formal & informal)

#### o Government lending

- Lending is for the high volume (50,000 units per year) Million Houses Program (MHP).
- This program imposes loose underwriting standards, and uses a simple debt instrument, which is not a full mortgage.
- MHP is targeted to lower income households through low loan amounts and standards, especially in rural areas.
- The MHP makes use of private Thrift Cooperative Credit Societies as originators and servicers of loans at the village level to control repayment problems (potential for SMIB to use as its agents as well).

### Honduras

#### o Formal sector

- Lenders include commercial banks and 7 S&Ls. Pension funds also act as loan originators. The S&Ls are about as important as the commercial banks and pension funds combined.
- Housing is quite closely integrated with other

financial markets. However, lending volume has been down in recent years because of high interest rates which have reduced demand and the ability to attract funds, and because of the collapse of refinancing facility for S&Ls (FINAVI). HG resources are now very important.

- S&Ls have lower reserve requirements but their cost of money is higher than commercial banks. Commercial banks have more powers to attract liabilities (e.g., checkings accounts) and make short as well as long-term loans.

- Formal finance is reasonably important. It financed 3,500 out of 10,000 units produced annually in recent years, as estimated by CONSUPLANE (the planning agency).

- o Government

- Since the demise of FINAVI, the only financing role of GOH is sale of a small volume of bonds by FOVI and a small rural loan program operated by INVA.

### Step 3. Possibilities for Mobilizing Additional Resources

#### Sri Lanka

- o Overview

- The broad strategy is to integrate housing into the financial system, tapping institutional investors and shifting interest rates on MHP closer to market rates.

- o Method

- Shift lending rates of SMIB and HDFC to levels at which they can compete for liabilities in the open market. This would probably require use of Graduated Payment Mortgages (GPM) to deal with the affordability problem. Current lending rates of about 16 percent would rise to 20-21 percent. Use of GPM with a conservative step size would keep the initial interest payments at 16 percent.

- SMIB & HDFC would sell 3-5 year market rate debentures to NSB and government pension funds. Sale of these instruments would be a clear financial innovation, since there have been essentially no placements of this type in the market.

- Since the deposit market is already well served, there is no point in SMIB and HDFC competing as depository institutions, except with special programs such as contract savings schemes tied to housing loans.

- Target the additional funds generated to households in the 50th to 80th income percentiles. This group has not been served in the past either by the Million Houses Program or by SMIB & HDFC.

- Expand MHP, improve collections, raise interest rates by at least 3 percentage points from the current 6-13% range. Despite the expansion in the volume of lending, subsidies may not increase because of the higher reflows due to increased interest rates.

## Honduras

### o Overview

- The broad strategy is to increase financial savings mobilization and channel some of the increase into housing. This is consistent with GOH policy to finance (not monetize) its deficit.

### o Method

1. Expand savings in financial form, generally by tying deposits to housing loan possibilities. Specifically use

-- expanded contract savings schemes through unions and large companies;

-- community groups as agents in urban areas, with access to loans facilitated by the community keeping a blocked deposit balance with a formal institution as collateral for borrowers that would not otherwise qualify

-- bonded collection agents in rural areas, where formal savings opportunities are currently very limited

-- higher ceiling on contributions to the social security fund (IHSS), since the ceiling has not been changed since 1962.

2. Encourage S&Ls to sell debentures in order to tap a wider market. Gradually increase the volume of debenture

sales over time. This effort will likely require the introduction of mortgage insurance for investor confidence.

3. Adjust the asset and liability powers of S&Ls and some reserve requirements of commercial banks to increase institutional health (S&Ls) and make housing lending more attractive (banks).

#### Step 4. Develop Several Packages of Options

##### Sri Lanka

- Three packages were defined based on varying assumptions about:

1. the amount of deregulation of financial markets that would occur and hence the ability of the housing sector to attract funds through the sale of debentures. Under limited deregulation Rs 500 million annually in debentures might be sold to major institutions (compared to their annual flows of Rs 4 billion per year). Under greater deregulation, sales of Rs 1 billion are assumed.
2. the size of the increase in the MHP that could be supported; specifically, a doubling of the rural portion of the MHP is assumed.

##### Honduras

o As part of structuring the "base case" for the analysis. The team analyzed possibilities for the allocation of Lps 95 million from HG and FOVI funds that were available for spending over the next four years.

- Housing Quality Model was used in assessing the impacts of three difference plans: Administration, CONSUPLANE (planning agency), and SNAP (association of S&Ls).

- It was determined that the Administration plan had the greatest impact on improving the housing of lower income households, and this plan was adopted. It serves as the "base case" for analysis of the effects of expanded housing finance.

- o We then developed a single policy package, which represented our "best estimate" of the additional resources that would result from actions to increase savings in financial form (and channel some to housing), tap institutional investors, and shift more commercial bank lending to housing.

## Step 5. Assess Impacts of Programs

### A. Impacts on Quality of Housing Occupied by Different Income Groups (Analyzed with the Housing Quality Model)

#### Sri Lanka

- o Increased volume of residential construction (as measured by investment)
  - Investment required in 1986 to fully meet housing needs as determined by the Housing Needs Model: Rs 6.7 billion.
  - Investment achieved: base case - Rs 4.5 billion  
policy packages - Rs 5.3-6.2 billion  
(79-93% of needed amount)
- o Targeting of additional investment
  - The best--in terms of reaching both lower income households and those middle income groups not receiving any finance from formal sources in the past--is package with combination of expanded lending and increase in MHP in rural areas.
    - Lending by SMIB/HDFC goes to middle class, i.e., those in the 50th-80th percentiles (who had no access in past).
    - Loans under the Million Houses Program go households in the lower half of income distribution.
- o Efficiency
  - About 20 percent of those receiving loans are already in good housing or cannot afford enough improvement to reach minimum quality. So 80 percent of those receiving loans obtain adequate housing, under standards defined.

This represents an improvement in the "hit rate" of about 10 percentage points over the base case.

- All policies are more efficient than the base case as judged by:

cost per unit of acceptable housing. MHP has the lowest cost per unit. But there is a reduction from the base case in new lending by SMIB/HDFC because of smaller loans to middle income group compared to loans now being made.

subsidy per unit of acceptable housing. Loans by SMIB/HDFC no longer have implicit subsidies since loans are now made at market rates. Also, subsidies in MHP are reduced through higher interest rates on these loans.

### Honduras

- o Increased volume of residential construction (as measured by investment)
  - Investment needed in 1990 according to the Housing Needs Model: Lps 670 million.
  - Investment achieved: base case - Lps 490m  
with policy package - Lps 584m  
(86% of amount needed)
- o Targeting of additional investment
  - In urban areas new acceptable housing is concentrated on those in 4th - 7th income deciles and in rural areas on 6th - 10th deciles.
  - The above pattern results from a combination of characteristics of savers participating in the new contract savings schemes (mostly middle income) and the affordability of housing solutions fully meeting the minimum standard (only about half of those obtaining a loan invest enough in the short-term to meet standards).
- o Efficiency
  - The financing policy is less efficient than policies in the "base case" in terms of program cost (subsidy plus amount of loans by formal institutions) per additional acceptable unit because the administration

plan includes a significant share of very low cost infrastructure provision solutions. In contrast, the finance policy package is financing more full units.

- The total investment per new acceptable unit is lower under the financing package because of lower share of very high cost units and because household contributions from savings and informal sources are relatively larger.

### B. Summary of Other Impacts

type of impact	probable size of impact	
	Sri Lanka	Honduras
efficiency of financial markets	modest[a]	small
financial savings rate	small	modest[b]
balance of payments[c]	small	small
employment/investment[d]	large	large

#### Notes:

a. The introduction of a new instrument is a clear financial innovation. In addition integrating housing finance with the balance of financial markets will lead to efficiency gains as funds can more easily flow between sectors in response to price signals.

b. The series of initiatives to increase financial savings should have a significant effect; overall household savings rates are currently low.

c. The import content of housing is quite small in both countries, especially for lower income housing which would constitute the bulk of production.

d. The multiplier is large because the import content low and residential construction of the type being funded generally has a low skill content (and hence draws upon a large pool of low opportunity cost labor).

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**Annex C**

**Outlines of Principles Elements of the  
Housing Finance Strategy Method**

--C.1--

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Figure 1

Objective of the Applying the Strategy Method  
and the Principal Components

Achieve policy reforms that would increase the total financial and real resources flowing into the housing sector and distribute them on a full cost recovery basis to households not living in minimally acceptable housing.

To accomplish this objective the team has two analytic tasks (in addition to coalition building/political tasks):

1. Determine how to mobilize additional financial resources for the sector from all sources -- formal institutions, informal sources, beneficiaries, and government -- in a way that is consistent with increased competitiveness and efficiency in financial markets.
2. Determine how "best" to deploy the finances generated -- where "best" is defined as the most efficient (in terms of cost) and administratively feasible way to maximize the number of households shifting from unacceptable to acceptable units.

Figure 2

Six Main Analytic Steps to Developing a Strategy

1. Assess the maturity and competitiveness of financial markets at large.
  - degree of government intervention into capital markets: credit allocations, interest rate controls, "captive institutions"
  - depth of financial markets: financial transactions in relation to GNP; presence of secondary markets; presence of equity market; degree of vitality of informal financial markets.
  - possibilities for increased savings in financial form
2. Assess the relation of the housing finance system to the rest of financial markets and the vitality of the system.
  - characterized by "special circuits" operating in isolation from broader markets or more fully integrated.
  - extent of government control on funding sources and lending patterns.
3. Determine the possibilities for generating additional resources.
  - formal finance: tapping institutional investors, possibly via secondary markets; expanding deposit base of depository institutions
  - informal: bringing informal lenders and other entities into the broader system, possibly as agents for formal institutions; possible need for regulation.
  - government: generally a very efficient borrower whose powers may have to be employed to generate long term capital; possibilities for operating secondary facilities.
4. Develop several "packages" of possible combinations for increasing the volume of finance in the sector.

- define strategies emphasizing different sources
- consider both short and longer-term possibilities
- link mobilization of resources to their deployment

5. Analyze the impacts of implementing each package on:

a. for alternative spending plans estimate the number of additional households in different income groups living in minimally acceptable housing using Housing Quality Model; efficiency measures.

b. the balance of the economy, especially the anticipated size of multiplier effects and effects on financial markets.

6. For recommended course of action, detail the institutional changes needed immediately and sketch those needed over the longer term to execute the package selected.

## ANNEX D:

THE HOUSING QUALITY SIMULATION MODEL --  
TECHNICAL DESCRIPTION

This section describes the Housing Quality Model, designed to assist in the evaluation of alternative strategies for government intervention in the housing markets of developing countries. The Model can best be used in conjunction with the Housing Needs Assessment Methodology, which calculates the annual flow of resources required to bring all households to a designated quality standard over a ten- to twenty-year period. Once this level of resources has been estimated, policy makers are still faced with the problem of how best to deploy these funds, and may still be uncertain about how rapidly improvements in housing quality can be achieved.

The Housing Quality Model attempts to address these issues by simulating the changes in housing quality that would result from alternative intervention strategies. Before delving into the specifics of this model, we broadly define it in relation to other types of housing simulation models. First, the Housing Quality Model can best be understood as a record-keeping or accounting model, rather than as a behavioral model. While some behavioral assumptions are incorporated into the model, most must be explicitly supplied by users as part of the data entry process. Second, this is primarily a demand-side model, focusing on the capacity of households to achieve significant improvements in housing quality, either independently or through participation in publicly-sponsored assistance programs. Housing supply

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constraints are reflected in the cost of various housing options, and in interest rate trends, but the Model does not attempt to represent supply behavior endogenously or to simulate the market clearing process. Finally, the Housing Quality Model is designed to reflect, not a particular housing market, but the housing sector as a whole. However, in most applications, separate simulations will be conducted for urban and rural sectors, due to critical differences in housing problems, demographic trends, and feasible programs.

Four specific features of this model make it particularly useful for policy analysis in developing countries. First, it categorizes households by income, tenure, and dwelling quality, and analyses transitions by households between tenure and dwelling quality classes under various government programs. Second, the model operates on an annual basis, so that alternative policies can be compared with respect to the rate at which housing improvements are achieved. Third, the model focuses on the transition of households from unacceptable dwelling and infrastructure conditions to acceptable conditions, rather than on more abstract, continuous measures of housing quality. Finally, in order to simulate specific government programs, the model requires analysts to formulate detailed specifications, encompassing eligibility requirements, funding levels, costs of participation, and assumptions about the distribution of assistance among households. Experience with the Needs Assessment Methodology suggests that this process of policy formulation, which requires many assumptions to be made explicit,

often proves to be as useful as the model results themselves.

In this section, we describe the model in considerable detail, including data requirements, solution steps, and model outputs. First, we outline the background transition components of the Housing Quality Model, which comprise the core of the simulation process. Then, we discuss the model's specification of housing assistance policies, including (1) expanded formal financing, (2) infrastructure upgrading and (3) sites and services or direct construction programs, and (4) policies to regularize tenure in squatter areas.

#### Simulating Background Transitions

The primary usefulness of the Housing Quality Model is as a tool for analyzing alternative strategies for government intervention in the housing sector. However, policy alternatives can best be assessed relative to a base case in which government plays a more limited role. Moreover, many dynamics affecting housing conditions and investment levels persist whether or not government intervenes to address a nation's housing problems. Therefore, the Housing Quality Model begins with a series of "no government," or "background" solution steps, which can then be supplemented by policy simulation steps.

Base-Period Household Data. The model's primary data structure is a three-dimensional matrix for classifying households. Each cell in the matrix represents the intersection of a particular income class, tenure category, and dwelling

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status. The model classifies income by decile. Then, for each decile, households can fall into one of four tenure categories:

- 1) owner with clear title;
- 2) owner without clear title;
- 3) unit renter; or
- 4) room renter.

Within each tenure category, six dwelling statuses are possible, defined on the basis of both structural adequacy and infrastructure adequacy. These are:

- 1) structure and infrastructure both adequate;
- 2) structure adequate, infrastructure inadequate;
- 3) structure upgradeable, infrastructure adequate;
- 4) structure upgradeable, infrastructure inadequate;
- 5) structure inadequate, infrastructure adequate; or
- 6) both structure and infrastructure inadequate.

The definitions of structural and infrastructure adequacy will vary from one country to another, and will be obtained from the Housing Needs Assessment performed prior to implementation of the Housing Quality Model.

Using this income/tenure/dwelling status classification matrix to organize household data within the simulation model has two important advantages. First, it focuses on the differences among households that are of greatest importance to policy makers, and does not attempt to simulate the marginal effects of other, less critical, household attributes. At the same time, however, this approach avoids the problems of "lumpiness" found in some other housing simulation models, such as the Urban

Institute Housing Market Simulation Model (Turner and Struyk, 1985). Specifically, since an actual number of households is entered into each cell in the classification matrix, and since any number of actual households can be shifted between cells, policies that affect only a small fraction of households can be accurately represented.

Annual Transitions Data. The model simulates four general types of background transitions that the model. These represent changes that occur regardless of government housing activities, and that can affect the distribution of households across tenure and dwelling status categories as well as the allocation of resources within the housing sector. To simulate background housing quality transitions, the model requires exogenous estimates of the rates at which these changes occur.

In thinking about these data requirements, however, it is helpful to keep in mind that initial transition estimates will almost certainly be somewhat judgemental, and that they can be revised through a model calibration process. In other words, model users are required to come up with initial guesses at the various transition rates, and can then revise these guesses to make the resulting model outputs more consistent with other exogenous information about housing quality, new construction levels, and housing investment. Finally, it is important to note that the model concerns itself with net changes in the distribution of households across cells in the household classification matrix, not with the actual behavior of individual

households moving between cells.

All of the transition data are in annual terms. The simplest application of the model would involve no changes in these transition rates from year to year. However, increases or decreases can be incorporated for any year in the simulation period if there is reason to expect such a discontinuity to occur. Moreover, as discussed further in a subsequent section, government policies can affect any or all of these transition data.

Solution Steps. The model operates on a year-by-year basis. In other words, it starts in an initial year with the base data provided, updates these data each year based on annual transition estimates, and reports the year's outcomes. Some cumulative totals are retained for reporting purposes, but, for the most part, each year's solution is self-contained. Therefore, this description of solution steps refers to a single year's simulation.

Adjust real incomes. Using the exogenously provided estimates of real income growth, the model inflates mean income for each income decile. If only a single growth rate is provided, mean income in each cell will change by the same amount. If, on the other hand, income growth varies by income class, all tenure/dwelling status cells within an income class will experience the same change in mean income. Note that, as real incomes increase, the implied values of "entry level" -- discussed below -- dwelling units also increase, since these

values are based on affordability calculations.

Simulate net change in the number of households. This step uses exogenous estimates of the net change in the number of households to update the number of households requiring shelter of various types. The focus here is not on the dynamics of individual household mobility into and out of a sector or between cells in the household classification matrix. Rather, the model focuses on the net change in the number and resources of households seeking shelter.

As discussed earlier, a user of the model must specify the number of net new households for each income/tenure class. The model then allocates these newcomers among dwelling status categories according to the base period household distribution. In other words, if 50 percent of decile 1 owners initially occupy permanent units with unacceptable infrastructure, then 50 percent of the incoming decile 1 owners are assigned to this dwelling status each year.

When households are added to a particular cell, the model computes the implied level of investment required to house these "newcomers." In other words, as the number of households increases, resources must be generated in the housing sector as a whole to pay for the incremental units. At this stage, the model is not concerned with the source of funds for additional units; it merely records the resource requirements generated for each cell in the household classification matrix. A later solution step concerns itself with the allocation of resource requirements among sources of funds.

The background components of the Housing Quality Model assume, based on historical evidence, that all households can afford their assigned dwelling status, and that incoming households to a cell obtain at least an "entry level" unit for that dwelling status. Since the purpose of these model components is to simulate transitions that occur regardless of the policy environment, newcomers by definition represent those households that have somehow succeeded in overcoming affordability hurdles. Therefore, in calculating the resource requirements generated by the addition of new households to the system, we assume that all newcomers have amassed sufficient resources to meet at least the entry cost of their assigned dwelling status, where the entry cost of each dwelling status is entered by the user. If the capitalized value of income available for housing investment is higher than the entry cost, households invest this higher amount, up to a ceiling of three times the entry cost.<sup>1</sup>

Each net newcomer to the housing sector generates a dwelling unit requirement as well as a resource requirement.<sup>2</sup> Dwelling unit requirements are recorded by tallying the total number of households entering and/or leaving each tenure/dwelling status category. To the degree that the number of incoming households

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1. This ceiling was imposed to limit the level of housing investment among the small number of affluent households living in poor housing circumstances.

2. Newcomers assigned to the "room renter" tenure category generate neither resource requirements nor new dwelling construction. They do, however, increase the incidence of crowding observed in the housing sector.

exceeds the number of outgoing households for any dwelling status, the production of new dwelling units will be required. A subsequent solution step is responsible for final calculations regarding the net level of new construction in each dwelling status category. At this stage, the model simply records additions to and subtractions from the number of dwelling units required to accommodate the households in each cell.

When this solution step is completed, each cell in the household classification matrix has an updated number of households, as well as data entries reflecting net new dwelling unit requirements and resource requirements generated by the addition of new households.

**Simulate dwelling unit replacements.** The next solution step is to estimate the resource requirements and new dwelling production levels necessary to replace units removed from the housing stock. Based on the distribution of dwelling units at the beginning of the current year, a fixed proportion of the units in each status must be replaced by new units.

The model computes replacements for each cell in the household classification matrix, incrementing the resource requirement and new dwelling tallies for that cell. Resource requirements are again set to the entry cost for the dwelling status, unless the capitalized value of income available for housing investment is higher. In this case, the higher value is used, up to a maximum of three times the entry cost. Replacements have no impact on the count of households in each classification cell.

**Simulate dwelling status transitions.** Based on the exogenously specified dwelling transition rates, the model shifts dwellings between cells, keeping track of owners' net resource requirements. Transitions are performed for one income/tenure category at a time. These transitions do not generate new dwelling unit production requirements, because they are all assumed to be accomplished by means of upgrading. In other words, for each transition, some number of units is simply subtracted from one dwelling status cell and added to another. However, these transitions do generate net resource requirements equal to the difference between the entry cost in the initial dwelling status and the investment level in the target status.<sup>1</sup> This effectively sets a household's "equity" in its prior dwelling status at the lower bound, and may therefore overestimate resource requirements necessary for upgrading units from one dwelling status to another.

**Tabulate net new dwelling requirements.** After all possible dwelling transitions have been accomplished, the model tallies up the total dwelling unit production requirements by tenure class and dwelling status. The results of this step will reflect new construction levels and -- if applicable -- vacancy rates. Moreover, to the degree that units are vacant at the end of any year's solution, the model retains them for subsequent solutions. Thus, these units can be occupied by incoming households without

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1. As before, the investment is at least the entry cost, and may be higher if the capitalized value of income available for housing investment is higher, up to a maximum of three times the entry cost.

creating the need for new construction in subsequent years. Vacant units are retained in the system for two full years before they start to decline in quality. Specifically, after standing vacant for two full years, permanent units become semi-permanent, semi-permanent units become improvised, and improvised units drop out of the stock.<sup>1</sup>

Compute total investment requirements. In its final background transition solution step, the model tallies up all resource requirements and allocates them between private sector formal financing and savings/informal investment.<sup>2</sup> First, all resource requirements incurred by the owners of rental property are assumed to be generated from savings/informal financing. Then, owner-occupants' resource requirements are summed across cells in the household classification matrix. Next, the pool of formal loans is allocated across owner-occupied cells. This is accomplished by applying any lending restrictions specified exogenously. Each cell is assumed to use up the formal financing allocated to it, with all remaining resources obtained from

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1. Infrastructure acceptability does not decline during periods of vacancy.

2. Ideally, one would like to distinguish savings from informal financing. However, it is generally very difficult to make such a distinction, for two reasons. First, housing data bases do not always gather exhaustive information on financing other than from formal sources. Second, even when efforts are made to collect data on informal housing finance, difficulties are encountered differentiating intra-family lending from gifts or other reciprocal arrangements. Since intra-family sources often constitute the major share of informal financing, such definitional problems are significant. Therefore, the model is currently designed to lump savings and informal financing together. If reliable data could be generated to differentiate these two sources, the model could easily be refined to treat them separately.

savings/informal financing.

By definition, formal financing -- in the aggregate -- is constrained by the exogenously defined control totals. Savings/informal investment, on the other hand, may differ from exogenous estimates. At this point, a user can run the model (after incorporating policies that reflect the status quo) in an iterative calibration mode, to achieve transition rate assumptions and savings/informal investment totals that are consistent with one another and with exogenous evidence about how the housing stock has been changing and how much savings/informal finance households are able to mobilize for housing investment.

The issue of what is included in the Housing Quality Model's total investment measure is a difficult one. To the greatest degree possible, investment levels reflected in the Housing Quality Model are designed to correspond to national income accounts. However, an exact correspondance would require the exclusion from our totals of resources devoted to "unauthorized" upgrades and construction. The Housing Quality Model diverges from this treatment by including in its resource estimates any upgrades that shift a dwelling unit from one status to another as well as all new construction, even of unconventional units. Therefore, our estimates of housing investment levels will be higher than those generally reflected in national income accounts, but will still exclude incremental upgrades that do not change a unit's dwelling status.

It is very possible that a significant share of a nation's housing improvements may be achieved through continuous

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incremental upgrading that yields shifts in dwelling status only after a number of years. In such cases, the Housing Quality Model will actually come quite close to reflecting the true situation, since a small share of units will be shown to shift status each year, with the resource cost for each transitional unit roughly equal to the value of the accumulated upgrades required to achieve the transition. Only the resources invested by households in the highest dwelling status, who continue to upgrade their units incrementally will be entirely excluded from the model's calculations.

#### Simulating Government Activities

While the background transitions are an essential starting point for simulations, the real value of the Housing Quality Model is its capacity to simulate the effects of alternative strategies for deploying housing assistance resources. The Model simulates four broad classes of housing assistance programs:

- 1) Expansion of formal housing finance. This type of policy can take many forms, ranging from an increase in the volume of loans issued without any meaningful change in terms to a targeted lending program with subsidized interest rates.
- 2) Provision of infrastructure, with recipients paying a fixed proportion of the total cost. Earmarked financing could accompany such a program, or infrastructure recipients could be assumed to finance infrastructure and any accompanying structural improvements out of savings/informal financing.
- 3) Sites and services and/or direct construction projects. This category encompasses all programs in which the government sells sites offering adequate infrastructure accompanied by differing degrees of structure. Like the previous two types of policy, sites and services or direct construction may be accompanied by an earmarked pool of housing finance.

4) Regularized tenure projects, in which squatters and/or renters are offered title to the land they are occupying. Again, tenure regularization programs may be accompanied by earmarked loan pools to enable participants to finance the purchase of secure title.

For each of these types of activities, a user must specify in considerable detail how much assistance will be available, on what terms, and to what groups of households. On the basis of this exogenous information, the model then allocates the available assistance among households, and simulates the resulting transitions in tenure and dwelling status. Like the background transitions, these calculations are performed on a year-by-year basis, with each annual solution largely self-contained.

It is important to keep in mind that the policy components of the Housing Quality Model do not displace the background components. Instead, the background transitions are always simulated first, with any government activities essentially superimposed on top of the naturally occurring background transitions. A Model user may, however, wish to change some of the data elements required by the Model's background components in light of policies being simulated. For example, a policy of financial reform would be expected to change interest rates throughout the housing sector, while other policies might affect income growth rates.

Although the data requirements and solution steps differ somewhat for the various types of government intervention, all four share the same basic solution algorithm. We describe this basic algorithm, and then outline the unique characteristics of

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each type of government policy. Finally, we show how these can be combined into an overall housing assistance strategy.

Policy Solution Steps. For each type of government policy, the user must specify the volume of assistance available, the required household investment, loan terms, the amount of the government subsidy, the dwelling status households must achieve in order to participate, and the level of savings/informal finance households can be expected to mobilize in response to this opportunity. In addition, the user indicates which cells in the household classification matrix are eligible to participate in the policy.

Based on this information, the Model implements a four-step process for simulating policy outcomes:

- 1) Confirm that all eligible households can afford to meet lending requirements. In this step, the model considers each eligible cell in the household classification matrix to ensure that households in this cell can afford to satisfy the minimum requirements of the program. For example, a low-income group might be designated as eligible even though its income is too small to support a mortgage loan at the specified terms. The model tests for affordability both to ensure that households have enough income (adjusted for expenditures on other essential items) to meet loan payments, and to ensure that they can generate sufficient savings/informal finance to meet minimum downpayment requirements. Equity from the previous dwelling is considered in this affordability test, if applicable. If some cells designated as eligible by the user cannot afford to participate in the program, the model reallocates the original pool of loans among the remaining eligible cells.
- 2) Allocate the units of assistance available across cells according to the proportionate allocation scheme specified by the user.
- 3) Simulate tenure and dwelling status transitions resulting from the loans dispensed. This step is performed for each cell receiving assistance. If the number of units of assistance allocated to a particular cell is equal to one tenth of the number of households in that cell, then one

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tenth of the households are assumed to participate. Based on the income available for housing investment for households in the cell, and on the maximum level of savings/informal finance that households are assumed to mobilize, the model calculates the maximum affordable loan and maximum dwelling value under the terms of the financing program. Recipient households are then shifted into the highest tenure/dwelling status category they can afford.

4) Increment investment and new construction totals. Based on the level of participation in the program, and on the changes in dwelling status achieved by participants, the model computes the number of new dwellings built and the total level of housing investment made as a result of the program.

Expansion of Formal Finance. The expansion of formal loans for housing can take many forms. At one extreme, government policies could work to expand the volume of loans available and could continue to allow existing private lenders to allocate these funds with no change in lending practices or terms. At the other extreme, government could take on the role of raising and lending funds for housing investment, subsidizing interest rate and targetting loans to households not already served by private lenders. Of course, many possible approaches to the expansion of formal housing finance lie between these two extremes. The Housing Quality Model has the capacity to simulate the expansion of formal finance on any terms. In fact, it is possible to specify more than one pool of formal loans, with different lending practices and terms associated with each.

To permit this kind of flexibility, the model must rely on the user for a detailed specification of how each pool of formal loans is to be allocated and on what terms. Exhibit D.1 identifies the loan terms that must be specified by the user. Most of these terms are self-explanatory, but a few merit

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additional discussion. The market rate of interest should reflect the actual cost of funds to the lender. In combination with the programmatic interest rate, this market rate is used to

EXHIBIT D.1:  
LOAN TERMS FOR EXPANDED FORMAL FINANCE POLICY

Aggregate Amount of Loanable Funds Available  
Program Interest Rate (annual)  
Market Interest Rate  
Repayment Period (in years)  
Estimated Average Loan Amount  
Max. Savings/Informal Mobilization  
Required Dwelling Status after Participation  
Minimum Dwelling Value after Participation  
Maximum Loan Amount  
Maximum Loan to Value Ratio

compute the amount of interest subsidies, if any. The maximum savings/informal mobilization rate represents the maximum downpayment households can be expected to raise from savings and informal financing in response to the program's opportunity. This rate represents a share of annual income. Finally, the required dwelling status identifies the lowest dwelling status participants can occupy -- in this case, a permanent structure with acceptable infrastructure.

In addition to these loan terms, a user must specify the expected allocation of loans among the cells in the household classification matrix. In other words, what share of loans are expected to go to each income/tenure/dwelling status cell? The allocation matrix should reflect not only program eligibility requirements, but also reasonable expectations about participation rates and leakage.

Based on the user's specification of formal financing terms and eligibility, the model allocates the available funds among

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eligible households and records the resulting changes in tenure and dwelling status, using the basic solution process outlined above.

Provision of Infrastructure. Policies of this kind involve government provision of adequate infrastructure services to areas lacking such services. To participate, a household must pay a fixed portion of the cost of the infrastructure provided, and all recipients are assumed to shift to an "adequate infrastructure" dwelling status. In addition, some recipients will presumably be prompted to raise sufficient funds to achieve meaningful improvements in dwelling quality as well, thereby shifting from semi-permanent to permanent dwelling units.

Infrastructure programs may be accompanied by earmarked pools of formal financing. If earmarked loans accompany the provision of infrastructure services, all participants are assumed to receive loans. If formal financing is not explicitly provided in conjunction with the infrastructure program, recipients are assumed to finance infrastructure improvements as well as any accompanying structural improvements entirely out of savings/informal finance.

The specification of this type of policy assumes that all participants begin with inadequate infrastructure and end up with adequate infrastructure. Beyond these two built-in assumptions, the user controls the allocation of assistance, and the terms of any earmarked financing available. Exhibit D.2 presents the program terms a user must specify each year for an infrastructure

program. The cost of a structural upgrade refers to the additional costs participants must incur to convert semi-permanent dwelling units to permanent status. Some participants will be able to afford such upgrades immediately. Of those that

**EXHIBIT D.2:  
TERMS FOR INFRASTRUCTURE POLICY**

Number of Units Programmed for Services  
Required Household Contribution  
Government Grant  
Cost of Structural Upgrade  
Share of Participants Achieving  
    Structural Upgrade After 1 Year  
  2 Years  
  3 Years  
  4 Years  
  5 Years  
Maximum Savings/Informal Mobilization  
Terms for Earmarked Loans

cannot, the user specifies the share expected to make this transition in each of the subsequent five years. As for formal finance policies, infrastructure program terms must be accompanied by the expected allocation of assistance among cells in the household classification matrix.

Based on the user's specification of the allocation and effectiveness of infrastructure assistance, the model dispenses the available funds by providing adequate infrastructure to eligible households, and records the resulting changes in dwelling status. No changes in tenure status are assumed to occur.

Sites and Services or Direct Construction. This type of policy encompasses a fairly wide range of programs, all of which include the sale of fully-serviced sites to participating

households. Under a sites and services program, a partial structure may also be provided, or only a foundation and "wet core" for subsequent construction. Under a direct construction program, a fully adequate dwelling unit is completely constructed before a household purchases the site. Thus, fully adequate infrastructure is always provided automatically, while the amount of incremental investment required to achieve full structural adequacy differs between program variants. For any particular sites and services or direct construction program, the cost to participants is assumed to be fixed. As for infrastructure policies, earmarked financing may accompany a sites and services or direct construction program. Otherwise, households' investment in their new properties are assumed to be obtained entirely from savings/informal financing. Because several variants of this policy type are possible, users can call for the implementation of more than one sites and services or direct construction program at the same time. Thus, a particular year's housing intervention strategy might include a direct construction program targetted to one income group as well as a sites and services program targetted to lower income households.

Exhibit D.3 presents the program terms that a user must specify. As in the previously described policies, the model allocates the available sites among eligible households according to the user's specifications, and records the resulting tenure and dwelling status changes.

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Tenure programs may be accompanied by earmarked pools of formal financing. If earmarked loans accompany the provision of secure tenure, all participants are assumed to receive loans. If formal financing is not explicitly provided in conjunction with the infrastructure program, recipients are assumed to finance their land purchases as well as any accompanying structural improvements entirely out of savings/informal finance.

The specification of this type of policy assumes that all participants begin as squatters or unit renters and end up as secure owners. Beyond these two built-in assumptions, the user controls the allocation of assistance, and the terms of any earmarked financing available. Exhibit D.4 presents the program terms a user must specify each year for an tenure regularization program. The cost of a structural upgrade refers to the additional costs participants must incur to convert semi-

EXHIBIT D.4:  
TERMS FOR TENURE POLICY

Number of Units Programmed  
Required Household Contribution  
Government Grant  
Cost of Structural Upgrade  
Share of Participants Achieving  
    Structural Upgrade After 1 Year  
                                    2 Years  
                                    3 Years  
                                    4 Years  
                                    5 Years  
Maximum Savings/Informal Mobilization  
Earmarked Loan Terms

permanent dwelling units to permanent status. Some participants will be able to afford such upgrades immediately. Of those that cannot, the user specifies the share expected to make this transition in each of the subsequent five years. As for all

other policies, tenure program terms must be accompanied by the expected allocation of assistance among cells in the household classification matrix.

Based on the user's specification of the allocation and effectiveness of tenure regularization, the model dispenses the available funds by providing secure tenure to eligible households, and records the resulting changes in tenure and dwelling status.

Simulating a Comprehensive Housing Assistance Strategy. Given the capability to implement various types of housing policy, how does the model simulate a comprehensive strategy for deploying housing resources?

As a general rule, policies should be viewed as supplementing background transitions. In other words, the background components of the model are always solved first, and then the incremental impacts of public policies are simulated. Policies specified by the user are implemented one-by-one in each simulation year. The model keeps track of the number of households in each cell that have received each form of assistance, including formal financing. In addition, the model records the number of households achieving fully acceptable housing through participation in each policy. This includes all participants who shift from unacceptable dwellings and/or infrastructure to fully acceptable units.

The model's annual solution algorithm will make it possible to specify an almost infinite variety of policy combinations. To

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illustrate, a user might define a housing assistance strategy calling for major structural reforms in the financial system. During the initial years, when these structural reforms would be taking place, reliance might be placed on direct public subsidy mechanisms, such as infrastructure upgrading or sites and services programs. Gradually, as the capacity of the financial system expanded, emphasis might shift toward programs relying on private sector formal financing for all but the lowest income groups. Another example of the model's potential flexibility, mentioned earlier, could involve the specification of several formal financing pools or several sites and services programs, each targeted at a particular group of households.

For any package of housing assistance programs, the model generates annual tables showing of the number of households participating and the number of households achieving improvements in dwelling status. These estimates are provided for each program and for the combination of programs in operation in any given year. In addition, counts of households achieving upgrades due to past program participation are also provided annually. In addition to these annual tables, the model produces a cumulative summary of total year-by-year participation in government programs. Finally, for any housing assistance strategy specified, the model reports total resource requirements, the relative contribution of formal financing, government subsidies, and savings/informal financing to housing sector resources, and year-end distributions of households by tenure and dwelling status for each income quintile.