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AN ASSESSMENT OF NATIONAL HOUSING
NEEDS AND AFFORDABILITY IN ECUADOR
1984-2004

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Washington, D.C. 20523

August 1984

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I. INTRODUCTION

This Assessment of Housing Needs and Affordability in Ecuador, sponsored by USAID's Office of Housing and Urban Programs, is intended to support the efforts of the Government of Ecuador in developing effective long-term responses to the basic housing needs of its people.

Housing needs were assessed using the "Basic Needs" approach. The methodology used is presented in detail in Guidelines for Preparation of a Housing Needs Assessment.¹ The methodology projects housing needs based on population, macroeconomic, income, and housing stock parameters. All of the analyses are disaggregated for three sectors: metropolitan, other urban, and rural. Based on a stated minimum housing standard, the minimum investment required to ensure all households are housed at this standard or better is computed. For households not able to afford the full value of this minimum standard shelter, the subsidy necessary to make the shelter affordable is computed. Housing stock in the base year which does not meet the minimum standards (due to lack of sanitation or poor construction) is upgraded over

1. Robert R. Nathan Associates, Inc. and the Urban Institute, Housing Needs Assessment Methodology, USAID, Office of Housing and Urban Programs, April 1984.

time. The calculations necessary to compute these investment and subsidy values are done on a microcomputer. Using a computer model has made many alternate scenarios possible. This paper presents housing needs projections based on this methodology, and examines several possible alternate scenarios.

In the last 10 years, significant improvements have been made in the overall standard of housing in Ecuador generally and within each sector. The number and percentage of dwelling units with access to sanitary sources of water, electricity, and sanitary sewage disposal have increased. A greater proportion of Ecuadoreans now reside in more comfortable and sanitary living conditions than ever before.

Notwithstanding the progress which has been made, however, the availability of adequate housing for low-income families in Ecuador is seriously deficient and deteriorating rapidly. Existing rates of population growth and urbanization are currently generating approximately 39,000 new households per year in urban areas alone, while annual production of both public and private formal sector urban housing has been averaging only about 18,000 units. The substantial gap between production and demand has been filled primarily by the informal sector through the provision of unauthorized and predominantly substandard housing.

In addition to the problems created by the short supply of low-income housing, a scarcity of production for middle-income groups has resulted in the frequent displacement of low-income families from low-cost housing schemes by middle and lower-middle income groups. Programs of national housing institutions, which are charged with the role of

increasing the provision of low-cost housing solutions, have generally been targeted toward these middle and lower-middle income groups. Very few efforts have been focussed directly at satisfying the housing requirements of the poorest groups.

To fully meet the shelter requirement of new households as well as to gradually upgrade or replace the existing substandard housing stock will obviously require that the rate of housing construction be increased several fold in coming years. A wide variety of constraints -- financial, legal, organizational, technical, political, and social -- will need to be overcome if future housing programs are to have any appreciable impact in reversing current trends.

This assessment offers three alternative national housing programs which are primarily distinguished by their differing assumptions concerning the minimum acceptable standards for housing construction. The three alternatives are summarized below:

- . Alternative 1: an analysis of the affordability and cost of meeting housing needs according to minimum standards derived from preliminary proposals being considered by the new Ministry for Housing.
- . Alternative 2: an analysis of the affordability and costs of meeting housing needs according to the standards reflected by current projects targeted toward lower-income households and utilizing "modern" construction techniques.
- . Alternative 3: an analysis of the affordability and costs of meeting housing needs according to standards which permit the

use of the local construction material and greater use of progressive housing concepts.

The presentation of these alternatives, which includes sensitivity analysis of the impacts of major determinants of housing needs and affordability such as income growth, population growth, construction cost escalation, interest rate levels, and the share of household income devoted to housing, provides a broad assessment of policy alternatives and an identification of priority areas for further investigation.

The estimate of median household income and income distribution for each sector was also studied. The changes in Ecuador's distribution of income from prior surveys were estimated, and factors responsible for those changes were discussed.

The report is organized into five chapters including this Introduction. Chapter II provides a brief overview of the methodology. Chapter III discusses the determinants of future housing needs in Ecuador, including population growth, urbanization, household formation, and the replacement and upgrading of the existing housing stock. Chapter IV discusses the determinants of housing affordability in Ecuador, including mean and median household incomes and income distribution, income growth, the share of household income devoted to housing, and financial lending terms and conditions. Chapter V presents the housing design standards and costs for each of the three alternatives and analyzes the affordability of each alternative from the perspective of both individual households and public sector finances. Detailed methodologies for updating the estimates of median income levels are presented in the Appendix.

II. METHODOLOGY

The methodology used in this assessment is oriented primarily toward evaluating alternative strategies for meeting projected housing needs and identifying major contingencies inherent in each strategy through sensitivity analysis. A "model" of household formation and housing expenditures provides the logical framework for the calculations performed by the microcomputer. Like all models, this one is premised on certain basic assumptions that should be clearly understood both in structuring the scenarios to be analyzed with the methodology and in interpreting the results it provides.

The most important aspect of the methodology which needs to be kept in mind is that all calculations are based on the assumption that the total housing needs projected for each time period will be fully met by the housing program being analyzed. No future increments to the substandard housing stock are assumed to take place at any time following the base year chosen for the analysis.

If the methodology were oriented primarily toward forecasting the prediction, this would limit its applicability where future increments to the substandard stock -- the continuing proliferation of squatter settlements -- may be

inevitable. However, since the model is in fact structured to facilitate the comparative evaluation of alternative approaches, the stipulation that all housing programs analyzed be of a scale commensurate with needs provides a common standard for strategy evaluation.

The model is designed to accept up to three regional disaggregations for the projection of housing needs and the configuration of appropriate housing programs. In Ecuador the most meaningful disaggregations were "metropolitan" (including the two largest cities, Quito and Guayaquil), "other urban" (based upon the National Instituto of Statistics and Census definition),¹ and "rural."

Housing needs for these three areas are projected for each 5-year period within a 20-year planning period on the basis of population growth, interregional migration, household formation trends, and a program defined by the user to upgrade or replace substandard components of the base year housing stock at a rate which he determines.

New housing units and upgrades of existing housing units required to meet these total needs are costed on the basis of unit costs provided by the user in accordance with

1. In Ecuador, the concepts of rural-urban population are given by the administrative divisions. Ecuador is divided into provinces, which are in turn divided into "cantones," in turn subdivided into "parishes." The population living in the provincial capital or in the "canton" principal agglomeration is considered an urban population. The rest is rural population. This definition was used with one alteration. Peripheral area of urban centers which according to the Census are included in the rural sector were instead considered for this assessment to be included in either the metropolitan or urban sectors.

the design standards specified for each strategy. These costs are compared with the maximum housing values that households in each quintile of the income distribution are estimated to be able to afford, to determine what level of public subsidy, if any, would be required to implement the program specified.

Key factors affecting the total cost of housing programs defined in this manner include: growth in total household numbers, growth in the rate of urbanization,¹ construction cost escalation rates, and especially the minimum design standards and corresponding unit costs specified for the housing program.

Housing affordability increases (and subsidy requirements decreases) with increasing household incomes, increasing shares of income devoted to housing, more favorable financial lending terms, and reduced housing costs.

Of these variables, minimum housing design standards and costs are most directly amenable to public policy intervention. Through successive iterations of the model, the interplay of total housing program costs and housing affordability can provide genuinely useful guidance to housing planners and policy analysts in structuring a realistic approach to the satisfaction of basic needs through the adoption of standards which, while offering real improvement over informal sector living conditions, are also affordable by the majority of low-income households.

1. Unit costs for urban dwelling units will generally greatly exceed rural costs primarily because on-site infrastructure needs are greater in the more densely populated urban areas.

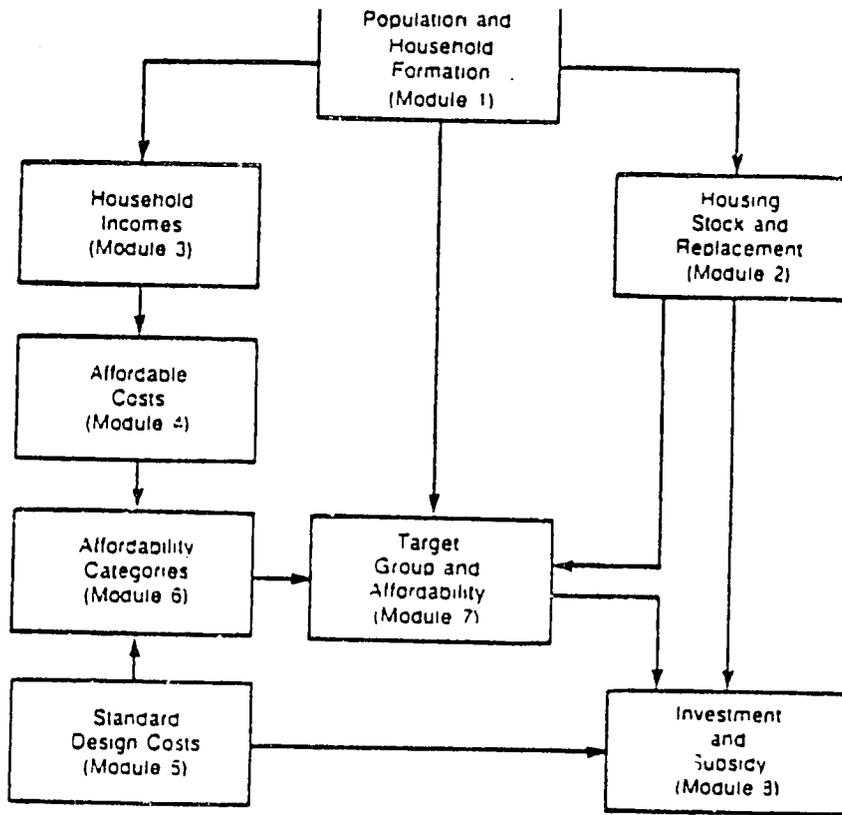
Figure 1 identifies the main components of the model in somewhat greater detail.

As discussed above, the major determinants of projected physical needs for shelter are future population growth, household formation trends, and the adequacy of the existing housing stock to meet the needs of the current population. As shown in Figure 1, these estimates and projections are developed through modules 1 and 2 of the model. Together, these determine the scale of the "housing program" to be analyzed through subsequent calculations.

The affordability of alternative housing "packages" is determined by current and projected incomes of the various sectors of the population requiring housing, and by the costs of these alternatives. These elements of a housing needs assessment are considered in modules 3, 4, 5, and 6 of the model in the following manner:

- . Module 3 projects household incomes for subsectors of the population by income distribution subgroupings;
- . Module 4 calculates housing affordability for subsectors of the population based on household incomes, housing expenditure patterns, and terms of housing finance;
- . Module 5 specifies the current and future costs of alternative shelter solutions defined on the basis of the dwelling standards established by planners; and
- . Module 6 then classifies all households according to the housing standards that they can afford.

Figure 1. Main Components of the Housing Needs Assessment Model



On the basis of total shelter needs and the housing standards which are affordable by various segments of the population, modules 7 and 8 are then used to:

- Determine global housing investment requirements;
- . Identify those segments of the population which, on the basis of their inability to afford currently available, minimum standard, formal sector housing make up the target group for new housing programs; and
- . Estimate the level of direct subsidy that would be required to bring all housing to the chosen standard, if any.

The information provided through these last two modules enables planners to evaluate the implications of alternative housing programs in relation to macro-level projections of investment and savings, public sector expenditures, formal sector loan volume, and other indicators.

III. DETERMINANTS OF FUTURE HOUSING NEEDS IN ECUADOR

The major determinants of the projected physical needs for shelter in Ecuador are the future population growth, household formation trends, and the adequacy of the existing housing stock to meet the needs of the current population. In addition, factors such as trends in urbanization and urban migration, sectoral differentials in fertility, death rates, and size of households will determine the sectoral composition of Ecuador's projected housing needs. In the following discussion and throughout this report, three sectors are analyzed -- metropolitan, other urban, and rural. The metropolitan sector consists of Quito and Guayaquil and their peripheral areas, the other urban sector consists of all other areas defined as urban in the latest national census plus all other peripheral areas, and the rural sector consists of the balance.

Population Growth, Urbanization, and Household Formation

According to the 1982 national census, Ecuador's population totalled 8.05 million persons, corresponding to an average annual growth rate of 2.7 percent since the prior census in 1974 (Table 1). This average annual growth rate of 2.7 percent represents a significant decline from the

Table 1. Ecuador: Population by Sector, 1962, 1974 and 1982
(Thousands unless otherwise specified)

	1962		1974		1982		Average annual growth rate	
	Number	Percent	Number	Percent	Number	Percent	1962-74	1974-82
Total Ecuador	4,476.0	100.0	6,521.7	100.0	8,053.3	100.0	3.2	2.7
Metropolitan ^a								
Quito	372.2 ^b	8.3	624.1	9.6	887.6	11.0	4.4	4.5
Guayaquil	532.7 ^b	11.9	827.5	12.7	1,188.8	14.8	3.7	4.7
	<u>904.9^b</u>	<u>20.2</u>	<u>1,451.6</u>	<u>22.3</u>	<u>2,076.4</u>	<u>25.8</u>	<u>3.0</u>	<u>4.6</u>
Other urban ^a	1,423.4 ^c	31.8	2,190.4	33.6	2,844.5	35.3	3.7	3.3
Rural	2,147.7 ^d	48.0	2,879.7	44.1	3,132.4	38.9	2.5	1.1

a. Peripheral areas are included in metropolitan and urban sectors.

b. Population for 1962 in the metropolitan areas was estimated based on the trend in the relationship between Pichincha and Guayas provinces reported urban population (excluding peripheral areas) and those provinces population including peripheral areas between 1974-82. Provincial urban population was then translated into estimates for the metropolitan areas assuming a factor at 80 percent for Quito and 75 percent for Guayaquil.

c. Estimated as the residual of metropolitan and rural from national population.

d. Estimated on the basis that 25 percent of reported rural population consisted of persons in the peripheral areas (in 1974 and 1982, the actual percentage was 24.7 and 23.9 percent, respectively).

Source: Junta Nacional de Plainificacion y Coodinacion Economica, Resumen de los Censos de Poblacion y Vivienda de 1962, Abril 1965; INEC, III Censo de Poblacion 1974, Resultados Definitivos, Resumen Nacional, Abril 1977, Tables Land 3, INEC, IV Censo de Poblacion 1982, Resultados Provisionales, Febrero 1983.

rate of 3.2 percent recorded between the prior censal period of 1962 to 1974.

Table 1 also shows the change in sectoral distribution of Ecuador's population between 1962 and 1982. In 1982, over 61 percent of Ecuador's population resided in either metropolitan or other urban areas as compared to the 52 and 56 percent that lived in those areas in 1962 and 1974, respectively. In 1982, nearly 2.1 million persons resided in metropolitan areas, which represents an average annual growth rate of 4.6 percent over the 1974 metropolitan population of 1.5 million. The growth rate of the metropolitan area of nearly 1.7 times the national average indicates that extensive urban migration occurred during the 1974-82 period.

Within the metropolitan sector, Guayaquil's population increased at a slightly higher average annual rate than Quito's population during the 1974-82 period, with Guayaquil accounting for approximately 57 percent of the total metropolitan population in 1982.

The average annual growth rate of other urban areas of 3.3 percent between 1974 and 1982 was also in excess of the national average of 2.7 percent. In 1982, more than 2.8 million persons resided in other urban areas, accounting for more than 35 percent of the national population.

Whereas metropolitan and other urban areas population increased significantly between 1974 and 1982, population growth in the rural sector was considerably more moderate. In fact, rural sector population increased by only 250,000

during the eight-year period, representing an average annual growth of 1.1 percent. The share of national population in the rural sector dropped from 44 percent in 1974 to 39 percent in 1982.

What accounted for this significant change in the sectoral distribution of Ecuadorean population? The answer lies in an analysis of two basic factors, natural population growth (the difference between birth and death rates) and net sectoral migration. Table 2 presents data on the number of national births and deaths per thousand persons for selected periods from 1920 through 1979. These data indicate clear trends in the reduction of both national birth and death rates. While birth rates from 1920 through 1974 declined from 47.7 births per thousand to 45.0 births per thousand, the decline greatly accelerated during the 1974-79 period with the national birth rate estimated at 35.6 per thousand. This dramatic decrease can be attributed to greater use of contraceptive techniques, the overall trend toward urbanization with its lower fertility rates, and the trend of women bearing children later in life.

The decline in the national death rate for this 1974-79 period was more consistent with the long-term Ecuadorean experience. The national death rate declined from 28.9 per thousand to 10.2 per thousand from 1920-74. This decline continued between 1974 and 1979 with the national death rate at 8.2 percent. The combination of the lower birth and death rate for the 1974-79 period results in a lower rate of natural growth of 2.7 percent.

Statistics for sectoral birth and death rates were only available for 1977 and 1979, and these are also summarized in Table 2. The metropolitan sector is characterized by

Table 2. Ecuador: Birth, Death, and Natural Growth Rates, National 1920-79 and Sectoral 1977-79

Sector and period	Events per thousand persons		
	Births (percent)	Deaths (percent)	Natural (growth rate)
<u>Total Ecuador</u>			
1920-24	47.7	28.9	1.9
1940-44	46.0	24.0	2.2
1960-64	45.4	14.7	3.1
1965-69	45.2	11.1	3.4
1970-74	45.0	10.2	3.5
1974-79 ^a	35.6	8.2	2.7
<u>Average of 1977 and 1979</u>			
Metropolitan			
Quito ^b	30.7	7.4	2.3
Guayaquil ^b	25.6	5.9	2.0
Other urban	38.5	9.2	2.9
Rural ^c	37.6	8.9	2.9

a. Based on average of rates for 1975, 1977, and 1979. Birth rates reported for the nation and each sector were increased by 17 percent to reflect the historical late or underreporting of births.

b. Based on data for Pichincha and Guayas provinces urban areas.

c. Includes peripheral areas.

Source: INEC, Anuario de Estadísticas Vitales 1975, December 1977, Encuesta Anual de Estadísticas Vitales 1977, Encuesta Anual de Estadísticas Vitales 1979, March 1984, World Bank, Ecuador: Development Problem and Prospects, 1979, Table A.2.

lower birth, death, and natural growth rates than either the other urban or rural sectors. Within the metropolitan sector, Guayaquil reported lower birth, death, and natural growth rates than Quito during 1977 and 1979. The natural growth rate for Guayaquil was calculated at 2.0 percent compared to 2.3 percent in Quito.

The natural growth rates calculated for other urban areas and rural were significantly higher with both sectors having a vegetative growth rate of 2.9 percent. Somewhat surprising is the slightly higher birth and death rates in other urban areas relative to the rural sector. Possible explanations include the better reporting of both births and deaths in other urban areas as compared to the rural sector which is not reflected by the application of national average for underreporting.

Based on these sectoral natural growth rates, Table 3 demonstrates the composition of sectoral population growth between vegetative growth and net migration between 1974 and 1982. As expected, the greatest net migration occurred in the metropolitan area where net migration contributed more to the population increase than natural growth. Overall net migration into the metropolitan areas totalled over 350,000 persons during the 1974-82 period, with Guayaquil having a net migration estimated at 219,000 persons and Quito at 139,000 persons.¹

1. These estimates of net migration into metropolitan areas are higher than those observed from statistics of provincial migrations such as reported in Albert Berry, Employment and the Role of Intermediate Cities in Ecuador During the Coming Years, prepared for the AID Office of Housing and Urban Programs/Ecuador.

One explanation is that the estimates shown in Table 2 also include migration from Pichincha and Guayas, province to Quito and Guayaquil, respectively.

Table 3. Ecuador: Composition of Population Growth Between
Natural Growth and Net Migration by Sector, 1974 and 1982
(Thousands of persons)

	Total Ecuador	Metropolitan ^a			Other urban ^a	Rural
		Total	Quito	Guayaquil		
1974 population	6,521.7	1,451.6	624.1	827.5	2,190.4	2,879.7
1982 population	8,053.3	2,076.4	887.6	1,188.8	2,844.5	3,132.4
Net change	1,531.6	624.8	263.5	361.3	654.1	252.7
Change due to natural growth	1,599.3	266.5	124.5	142.0	562.9	740.0
Change due to net migration	(67.7)	358.3	139.0	219.3	91.2	(487.3)

a. Peripheral areas are included in metropolitan and urban areas.
Sources: Tables 1 and 2.

Net migration into other urban areas was smaller during the 1974-82 period and accounted for only about 14 percent of the total population growth in that sector. Net migration into other urban areas is estimated at 91,000 persons during the 1974-82 period, or approximately 20 percent of the total net urban migration (metropolitan plus other urban).

The rural sector experienced a substantial net emigration during this period. Based on a natural growth rate of 2.9 percent annually, it is estimated that over 480,000 persons migrated from the rural sector to either urban areas or outside Ecuador. One might also expect that the relative small population increase in the rural sector could be attributable to the changes in the classification of some rural communities into urban areas; however, the same classification system was utilized for both years in the national census. Thus, these data show a marked trend toward population moving to established metropolitan and urban areas. Reasons for individuals migrating to metropolitan and urban areas have been primarily due to the potential for employment and greater income and for the opportunities for education.¹

Ecuador's population was estimated for 1984 and projected for the next 20 years based upon assumptions concerning the natural growth and future urban migration trends. National natural population growth was assumed to continue to decline but at more moderate rates. Also it was

1. Albert Berry, Employment and the Role of Intermediate Cities in Ecuador During the Coming Years, prepared for the Aid Office of Housing and Urban Programs/Ecuador. Data derived from INEC, Encuesta de Migracion Urbana de la Sierra.

assumed the sectoral natural population growth would converge toward the national average. A third assumption was that urban migration would continue but again at more moderate levels. Also urban migration was assumed to be shared more equally in the future between metropolitan and other urban areas.

Table 4 presents the population projections for Ecuador based on these assumptions. National population is projected to increase at an average annual rate of 2.3 percent between 1984 and 1989 and to gradually reduce to an average annual rate of 2.0 percent by 1999. Thus Ecuador's population is projected to total nearly 9.5 million by 1989 and over 11.6 million by 1999.

The metropolitan sector is projected to still grow at a faster rate than the national average, reflecting the continuation of the urban migration. Population in the metropolitan sector is projected to increase at an average annual rate of 3.3 percent during the 1984-89 period and to taper to an average annual growth rate of 2.5 percent by 2004. By 1989, metropolitan sector population is projected at over 2.6 million, representing approximately 28 percent of the nation's total population.

Population in the other urban areas is projected to be 3.5 million by 1989, corresponding to an average annual growth of 3 percent. This growth rate is projected to decline throughout the 20-year period to a rate of 2.4 percent annually by 2004. The other urban sector share of Ecuador's population is projected to increase from 36 percent in 1984 to 37 percent in 1989 and to 40 percent by 2004.

Table 4. Ecuador: Projections of Population and Household Formation by Sector, 1984-2004

	1984	1989	1994	1999	2004
	-----	-----	-----	-----	-----
Metropolitan Area					
Population (1000s)	2236.80	2625.30	3001.30	3407.30	3850.30
Annual Growth Rate %	0.00	3.25	2.71	2.57	2.53
Average Household Size	4.75	4.70	4.65	4.60	4.55
Total Households (1000s)	470.91	558.57	645.44	740.72	848.42
New Households per Year	0.00	17.53	17.37	19.06	21.54
Other Urban Areas					
Population (1000s)	3028.30	3505.30	4001.30	4511.50	5079.60
Annual Growth Rate %	0.00	2.97	2.68	2.43	2.40
Average Household Size	4.80	4.75	4.70	4.65	4.60
Total Households (1000s)	630.90	737.96	851.34	970.22	1104.26
New Households per Year	0.00	21.41	22.68	23.77	25.81
Rural Areas					
Population (1000s)	3195.40	3358.40	3527.80	3709.80	3899.00
Annual Growth Rate %	0.00	1.00	1.30	1.00	1.00
Average Household Size	5.20	5.15	5.10	5.05	5.00
Total Households (1000s)	614.50	652.12	692.12	734.61	779.00
New Households per Year	0.00	7.52	8.00	8.50	9.04
Country					
Population (1000s)	8460.50	9489.00	10532.40	11628.60	12838.90
Annual Growth Rate	0.00	2.32	2.11	2.00	2.00
Average Household Size	4.93	4.87	4.81	4.76	4.70
Total Households (1000s)	1716.30	1948.65	2188.90	2445.55	2732.42
New Households per Year	0.00	46.47	48.05	51.33	57.39

The rural sector was assumed to grow at an average annual rate of 1 percent throughout the 20-year study period. This reflects assumptions concerning reduced natural growth and reduced rates of emigration. Total rural population is therefore projected to increase from 3.2 million in 1984 to 3.9 million by 2004. The rural sector share of Ecuador's population is projected to decline from 38 percent in 1984 to 34 percent in 1989 and to 30 percent in 2004.

Table 4 also presents projections of annual household formation in each sector based upon the population projections discussed above and estimates of the average household size. An indication of the trend in average household size in each sector can be obtained from a comparison of the 1974 and 1982 national censuses of population and housing which yield estimates of the average number of occupants per occupied house. As can be seen in Table 5 below, the national average of occupants per occupied house declined from 5.2 in 1974 to 4.9 in 1982.

Table 5. Ecuador: Average Number of Occupants Per Occupied House by Sector, 1974 and 1982

Sector	1974	1982
Total Ecuador	5.22	4.90
Metropolitan	5.62	4.88
Quito	5.16	4.55
Guayaquil	5.99	5.16
Other urban	5.40	4.99
Rural	4.91	4.82

Source: Tables 1 and 6.

The decline in average number of occupants per occupied house occurred in all sectors, reflecting the general decline in vegetative growth rates during the 1974-82 period. Within the metropolitan sector, it is interesting to note the continued differential between Quito and Guayaquil in terms of average occupants per house. In 1982, Quito had an average of 4.55 occupants per house compared to the 5.2 occupants per house registered in Guayaquil.

If one were to assume that the average number of occupants per house equalled the average household size, then there would be (using sectoral averages) no overcrowding of housing in Ecuador. Discussions with several housing officials confirmed that this was not the case and that overcrowding does occur. In fact, data from the 1982 housing census indicates that nearly 8 percent of all urban occupied houses had more than 4.5 occupants per room. The percentage was nearly double for rural areas.¹

An indicator of overcrowding based on occupants per room does not necessarily imply that there is more than one household per housing unit, which is the model's definition of overcrowding. Therefore, instead of projecting that an additional new housing unit would be required to relieve this type of overcrowding, home improvement construction, such as the addition of one or more rooms, might be adequate. However, the national housing census indicates that 1 percent of urban and 3 percent of the rural houses contain

1. INEC, IV Censo de Poblacion, III de Vivienda, Resultados Anticipados por Muestreo, Noviembre 1983, Table 8.

more than eight occupants per house.¹ These percentages of overcrowding were therefore used to be consistent with the model's definition of more than one household per unit.

The estimates of average household size per sector shown in Table 4 were therefore derived based upon the trend in occupants per house from Table 5 and factor for overcrowding by sector.² Consistent with the projected decline in natural growth rates, the estimates of average household size are projected to decline moderately over the 20-year study period. Thus the national average household size is projected to decline slightly from 4.9 in 1984 to 4.7 by 2004.

The result of the projections and calculations summarized in Table 4 is a set of estimates of the average number of new households which may be expected to emerge annually within each sector and within each 5-year subperiod of the 20-year planning period ending in 2004. As shown, the combination of population growth, urbanization, and average household size indicates that an average of 17.5 thousand new households per year will be formed in the metropolitan areas, 21.4 thousand in other urban areas, and 7.5 thousand in the rural areas of Ecuador during the 1985-89 period. During this 5-year period, a total of 194 thousand new households will require housing in the urban areas alone.

1. Ibid.

2. Discussions with housing officials indicated that the estimate for average household size in the rural sector was too low. It was therefore assumed that the rural sector average household size was 5.2 in 1984 and that overcrowding remained at approximately 3 percent.

When this figure is compared with estimates of the total formal sector housing construction for 1983 of about 18 thousand units, the magnitude of Ecuador's prospective housing problem becomes starkly apparent. Unless something is done to greatly increase the housing output of the formal sector (both private and public), no more than 90-100 thousand additional units may be expected from this source during the next 5-year period, and nearly 100 thousand new urban households, more than 50 percent of all new urban households anticipated for the 1985-89 period, will be obliged to turn to the informal sector for their shelter needs.

Immediate measures to substantially increase the housing output of the formal sector in Ecuador are clearly necessary. This can be done only if affordable strategies can be devised. It appears that the only approach which may offer hope of meeting this formidable challenge is one which confronts the issue of raising housing standards from the bottom up and, through "formalizing" the informal sector. Such an approach would involve measures to increase the security of land tenure, reduce municipal minimum building standards, redirect financial savings toward low-cost housing, and provide for a greater degree of cooperation between the public and private sectors.

The Existing Housing Stock: Its Upgrading
and Replacement

The total housing stock in Ecuador increased from 1.25 million units in 1974 to 1.64 million units in 1982.¹ This implies that nearly 400 thousand additional dwelling units were constructed during this eight-year period. Assuming that the estimated 1983 formal sector housing construction of 18 thousand units had occurred over this period, then the formal sector (public and private) supplied a maximum of 144 thousand units and the informal sector accounted for a minimum of 250 thousand of the total additional new units.

Despite this substantial reliance on the informal sector to furnish Ecuador's housing needs, significant improvements have been made in the overall standard of housing in the nation and within each sector. Table 6 presents a comparison of the housing stock characteristics in 1974 and 1982. The percentage of dwelling units with an internal source of water supply increased nationally from 33.4 percent in 1974 to 45.4 percent in 1982. The percentage of total dwelling units connected to electricity increased from 41.2 percent to 62.9 percent. The percentage of units with an internal toilet facility rose from 33.3 percent to 46.7 percent, while those with a piped sewage system increased from 28.1 percent to 34.0 percent between 1974 and 1982.

1. INEC, II Censo de Vivienda 1974, Resultados Definitivos, Resumen Nacional, Diciembre 1976, and IV Censo de Poblacion, III de Vivienda, Resultados Anticipados por Muestreo, November 1983. Includes only units that were occupied.

Table 6. Ecuador: Housing Stock Characteristics by Sector,^a 1974 and 1982
(Percentage distribution unless otherwise specified)

	Total Ecuador		Metropolitan areas						Other urban areas		Rural	
	1974	1982	Total		Quito ^b		Guayaquil ^b		1974	1982	1974	1982
			1974	1982	1974	1982	1974	1982				
Total houses (000s of units) ^c	1,249.8	1,644.6	258.2	425.7	120.0	195.2	138.2	230.5	405.6	569.6	586.0	649.3
<u>Type of water supply</u>												
In unit	33.4	45.4	75.3	72.2	82.7	83.9	69.6	63.3	69.4	78.3	6.1	15.7
Outside unit	9.5	6.7	6.9	4.0	6.9	4.5	6.9	3.6	15.7	6.8	8.9	8.4
Listern or well	27.0	20.4	3.2	2.1	5.3	3.5	1.6	1.1	5.8	3.2	42.6	38.6
River	22.8	14.1	1.4	0.8	0.9	0.7	1.7	0.8	2.4	1.1	37.4	27.4
Truck	4.9	10.6	11.8	19.5	3.0	5.8	18.8	30.0	3.3	7.4	2.4	6.4
Other	2.4	2.8	1.4	1.4	1.2	1.6	1.4	1.2	3.4	3.2	2.6	3.5
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
<u>Connection to electricity</u>												
Connected	41.2	62.9	90.2	94.9	90.7	96.0	89.9	94.1	75.2	88.6	11.6	32.8
No electricity	58.8	37.1	9.8	5.1	9.3	4.0	10.1	5.9	24.8	11.4	88.4	67.2
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
<u>Type of toilet facilities</u>												
Exclusive or common facilities	33.3	46.7	77.7	79.5	84.5	88.6	72.4	72.6	65.2	74.4	6.2	15.3
Latrine	8.7	13.2	10.0	12.5	3.3	5.5	15.2	17.7	13.0	12.3	7.0	14.1
None	58.0	40.1	12.3	8.0	12.2	5.9	12.3	9.6	21.8	13.4	86.8	70.6
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
<u>Sewage disposal</u>												
Piped sewage	28.1	34.0	70.5	62.7	82.8	82.0	60.8	47.9	55.2	61.3	3.2	5.4
Septic tank or pit	9.9	14.9	15.2	20.9	4.1	7.5	24.0	31.2	16.6	14.5	5.9	11.2
None	62.0	5.1	14.3	16.4	13.1	10.5	15.2	20.9	28.2	24.2	90.9	83.3
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

a. Peripheral areas are included in number of units of metropolitan and other areas; however distribution of housing stock characteristics are based on peripheral areas included in the rural sector.

b. Distribution of housing characteristics for Quito and Guayaquil are based on Pichincha and Guayas urban characteristics respectively.

c. Does not include houses reported as unoccupied.

Source: INEC, II Censo de Vivienda 1974, Resultados Definitivos, Resumen Nacional, December 1976 and IV Censo de Poblacion, III de Vivienda Resultados Anticipados Por Muestreo, November 1983.

While these improvements clearly indicate that a significant number of Ecuadoreans now reside in more comfortable and sanitary living conditions, these statistics also point to the need for a continuation of significant improvements in the future if the goal of minimum standard of housing for all is to be achieved. The needed improvements become more clear if one looks at the characteristics of the 1982 housing stock by sector.

As one would expect, conditions in the metropolitan sector are generally better than in either other urban areas or especially the rural sector. Within the metropolitan sector, however, conditions in Quito and Guayaquil differ significantly. For example, whereas 84 percent of the units in Quito have access to an internal water supply, only 36 percent of the units in Guayaquil have the same. In fact, the percentage of units in Guayaquil with an internal water system decreased from 70 percent in 1974 to 63 percent in 1982. Similarly, the percentage of units in Guayaquil with a pipe sewage disposal system decreased from 61 percent in 1974 to 48 percent in 1982.

The reasons for this deterioration in housing conditions in Guayaquil include the substantial migration into Guayaquil during the 1974-82 period and the proliferation of informal sector housing. While water supply and sewage disposal are clearly problem areas, it appears that connection to electricity has occurred with 96 percent and 94 percent of the dwelling units in Quito and Guayaquil possessing electricity, respectively.

Housing conditions in other urban areas in 1982 are only slightly behind those in metropolitan areas. Over 78 percent of the dwelling units have an internal water supply system and nearly 89 percent have electricity. In other urban areas, the greatest need appears to be the supply of sewage disposal systems, where over 24 percent reported "none."

The rural sector is clearly still in the greatest need for the provision of basic services. In 1982, only 16 percent of the rural dwelling units had access to internal water systems and only 33 percent had electricity. Of even more concern, nearly 71 percent of the units had no toilet facilities (including latrines), and 83 percent had no sewage disposal system.

The categorization of Ecuador's housing stock in 1974 and 1982 by type of constructive and construction materials is shown in Table 7. The definition of each category is as follows:¹

- . "Casa or Villa" - permanent construction resistance materials such as concrete, wood, brick, adobe, stone with wood, tile or brick floor, and exclusive use of sanitary facilities.
- . Apartment - a group of rooms for residence, forming part of a building of one or more floors, with independent entry and exclusive use of water supply and sanitary facilities.

1. Definitions of national housing census as reported in AID, Office of Housing, Ecuador: Shelter Sector Analysis and Recommendations, July 1976, p. D-7.

Table 7. Ecuador: Categorization of Housing Stock by Sector,^a 1974 and 1982
(Percentage distribution unless otherwise specified)

	Metropolitan areas											
	Total Ecuador		Total		Quito ^b		Guayaquil ^b		Other urban areas		Rural	
	1974	1982	1974	1982	1974	1982	1974	1982	1974	1982	1974	1982
Total houses (000s of units) ^c	1,249.8	1,644.6	258.2	425.7	120.0	195.2	138.2	230.5	405.6	569.6	586.0	649.3
Casa or villa	29.1	54.9	26.0	48.0	22.8	37.1	28.6	56.5	40.1	61.0	27.4	56.7
Apartment	8.7	9.3	25.3	20.6	25.2	24.7	25.3	17.3	12.5	11.3	0.7	1.6
Boarding house	12.6	9.1	33.4	17.6	41.0	25.7	27.5	11.4	21.1	15.1	1.6	1.4
Mediagua	16.3	12.8	4.9	7.7	9.9	10.9	0.9	5.4	10.8	7.6	22.6	18.1
Rancho or covacha	24.4	10.2	9.7	4.9	0.3	0.4	17.0	8.2	14.7	4.3	33.3	15.9
Choza	8.5	3.0	d	0.1	0.1	0.2	d	d	0.4	0.1	14.2	5.9
Other	0.2	0.5	0.4	0.3	0.5	0.8	0.3	0.8	0.2	0.4	0.1	0.3
Non-residential	0.2	0.2	0.3	0.3	0.2	0.2	0.4	0.4	0.2	0.2	0.1	0.1
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

a. Peripheral areas are included in number of units of metropolitan and urban areas; however categorization of housing stock is based on data with peripheral areas included in the rural sector.

b. Categorization of housing stock for Quito and Guayaquil is based on data for Pichincha and Guayas urban areas, respectively.

c. Does not include houses reported as unoccupied.

d. Less than 0.05 percent.

Source: INEC, II Censo de Vivienda 1974, Resultados Definitivos, Resumen Nacional, December 1976, Table 3; and IV Censo de Poblacion, III de Vivienda Resultados Anticipados por Muestreo, November 1982, Table 2.

- . Rooms in a Boarding House - belonging to a building with common entryway to a hall, patio, walkway, or street, and which usually does not include exclusive use of water and sanitary facilities, with these services being available to the building as a whole.
- . "Mediagua" - one story construction with walls of adobe, mud, or wood and with a roof of tile or metal.
- . "Rancho or Covacha" - a unit covered with straw, palm leaves, or other vegetation, with walls of cane, bahareque and a floor of wood, cane, or earth.
- . "Choza" - a unit with walls of adobe or straw, earth floor, and roof of straw.
- . Other - this category includes huts, caves, kiosks, boats, wagons, tents, etc.

As can be seen from Table 7, the national percentage of "casa or villa" units increased from 29 percent in 1974 to 55 percent in 1982. Interestingly, the rural sector shared equally in this improvement with nearly 57 percent of total 1982 rural dwelling units falling into this category.

The Housing Needs Assessment model uses a disaggregation of the existing housing stock into three classifications:

- . Permanent, meaning of acceptable constructions in relation to the minimum standards established;
- . Substandard and upgradable; and
- . Substandard and not upgradable.

Based upon the characteristics of the 1982 housing stock by sector shown in Tables 6 and 7, and definitions of minimum acceptable standards, Ecuador's 1982 housing stock

in each sector was disaggregated into the above three classifications.

For all sectors, a combination of criteria based upon the availability of a sanitary toilet facility for the dwelling unit and type of construction and construction materials was applied. Dwelling units that had access to a sanitary toilet facility were used to determine the number of permanent units and the type of construction was used to determine whether units, were upgradable.¹ For metropolitan and other urban areas, dwelling units of construction types casa or villa, apartment, boarding house and mediagua were considered as satisfying minimum acceptable construction materials standards. In the rural sector, the above construction types plus rancho or covacha were considered as satisfying the minimum acceptable construction materials standard. In the rural sector, units with either exclusive or common use of standard toilet facilities or sanitary latrines were considered acceptable. In metropolitan and other urban areas, units with latrines were excluded from the definition of minimum acceptable standards. Table 8 shows the resulting classification of Ecuador's housing stock by sector as used in this assessment.

Nearly 95 percent of Ecuador existing housing stock is classified as either permanent or upgradable and only 5.7 percent is classified as non-upgradable and will have to be

1. Since in all sectors, the type of construction criteria yielded a higher percentage of units than sanitary toilet facilities criteria, it was assumed that those units which satisfied both criteria would be classified as permanent. Upgradable units were then determined as those units of permanent construction that lacked sanitary toilet facilities and other basic services.

Table 8. Ecuador: Condition of Existing Housing
Stock by Sector, 1984
(Percent of total housing stock)

Sector	Permanent	Upgradable	Non-upgradable	Total
Total Ecuador	58.6	35.7	5.7	100.0
Metropolitan	79.5	14.4	6.1	100.0
Quito	88.6	9.8	1.6	100.0
Guayaquil	72.6	18.0	9.4	100.0
Other urban	74.4	20.6	5.0	100.0
Rural	29.4	64.3	6.3	100.0

Source: Derived from Tables 6 and 7 as discussed in text.

replaced. The metropolitan sector has the highest percentage of units classified as permanent and the lowest percentage of units classified as non-upgradable.

In the rural sector, only 29.4 percent of the units were classified as permanent, yet over 90 percent of the non-permanent units were considered as upgradable, primarily through the supply of sanitary toilet facilities.

Based upon the condition of the existing housing stock and the projections of household formation, the Housing Needs Assessment model calculates the housing construction requirements for each sector disaggregated into five components of housing needs. These five components are:

- . Housing required to replace unacceptable and non-upgradable stock in the last year;
- . Construction required to upgrade housing stock not meeting minimum standards in the base year;
- . Housing required to accommodate new households formed over time;
- . Construction required to replace aging existing stock of acceptable construction; and
- . Housing required due to overcrowding in the base year.

With regard to the improvement or replacement of the substandard stock, and to the provision of new units to relieve overcrowding, it has been assumed for the base case that such remedial actions will be taken at the rate of 5 percent per year. Thus, for the base case, it is assumed that all of the non-upgradable stock will be replaced, the

upgradable stock upgraded, and overcrowding relieved at a steady annual rate spread over the full 20-year planning period.

Permanent dwelling units in the metropolitan and other urban sectors were assumed to decay and be retired at the rate of 2 percent per year, thus requiring replacement.¹ In the rural sector, where construction materials have a relatively shorter life span, it is assumed that dwelling units will decay at the rate of 3 percent per year.

Table 9 presents a summary of Ecuador's projected housing needs for each of these five components by sector. In the metropolitan areas, for instance, it was estimated that 17.5 thousand new households will be formed during the 1985-89 period. As shown in Table 9, an additional 8.8 thousand units per year would be required if replacement of the housing stock were to proceed as assumed for the base case (7.3 thousand to make up for the obsolescence of permanent dwelling units, 1.3 thousand units to replace non-upgradable substandard units, and 0.2 thousand units to gradually relieve overcrowding). Thus a total of 26.4 thousand new units per year are estimated to be required in the metropolitan areas during the upcoming 5-year period if the needs of new households are to be met and remedial action with respect to the existing housing stock is taken at the gradual rates specified above. In addition, a 20-year upgrading program for the metropolitan areas would

1. Alternatively, this estimate may be interpreted as meaning that investment -- additional to regular maintenance -- equivalent to 2 percent of the value of a new dwelling unit are required yearly to prevent the deterioration of these units.

Table 9. Ecuador: Existing Housing Stock and Construction Requirements by Sector, 1984-2004

	1984	1989	1994	1999	2004
	-----	-----	-----	-----	-----
Metropolitan Area					
Dwelling Units by Construction Standard					
Acceptable Construction	365.20	476.92	587.84	707.16	838.91
(Annual Planned Repl.)	0.00	7.30	9.54	11.76	14.14
Non-Upgradable Construct.	26.70	20.05	13.40	6.75	0.10
(Annual Planned Repl.)	0.00	1.33	1.33	1.33	1.33
Upgradable Construction	65.00	48.75	32.50	16.25	0.00
(Planned Ann. Upgrading)	0.00	3.25	3.25	3.25	3.25
Total Dwelling Units	456.90	545.72	633.74	730.16	839.01
Total Overcrowded Units	14.01	12.86	11.71	10.56	9.41
Planned Annual Construction to					
Relieve Overcrowding	0.00	0.23	0.23	0.23	0.23
New Households/Year	0.00	17.53	17.37	19.06	21.54
Construction New Units/Yr	0.00	26.40	28.47	32.37	37.24
Total Construction/Year	0.00	29.65	31.72	35.62	40.49
Other Urban Areas					
Dwelling Units by Construction Standard					
Acceptable Construction	452.20	599.69	753.49	912.79	1087.27
(Annual Planned Repl.)	0.00	9.04	11.99	15.07	19.26
Non-Upgradable Construct.	30.40	22.80	15.20	7.60	-0.00
(Annual Planned Repl.)	0.00	1.52	1.52	1.52	1.52
Upgradable Construction	125.20	93.90	62.60	31.30	-0.00
(Planned Ann. Upgrading)	0.00	6.26	6.26	6.26	6.26
Total Dwelling Units	607.80	716.39	831.29	951.69	1087.27
Total Overcrowded Units	23.10	21.57	20.05	18.52	17.00
Planned Annual Construction to					
Relieve Overcrowding	0.00	0.31	0.31	0.31	0.31
New Households/Year	0.00	21.41	22.68	23.77	26.91
Construction New Units/Yr	0.00	32.28	36.50	40.67	46.99
Total Construction/Year	0.00	38.54	42.76	46.93	53.15

Table 9 (continued)

Rural Areas					
Dwelling Units by Construction Standard					
Acceptable Construction	194.70	354.19	516.07	680.44	847.50
(Annual Planned Repl.)	0.00	5.64	10.63	15.48	20.41
Non-Upgradable Construct.	41.80	31.38	20.95	10.53	0.10
(Annual Planned Repl.)	0.00	2.09	2.09	2.09	2.09
Upgradable Construction	425.90	319.43	212.95	106.47	-0.00
(Planned Ann. Upgrading)	0.00	21.30	21.30	21.30	21.30
Total Dwelling Units	662.40	704.99	749.97	797.44	847.50
Total Overcrowded Units	0.00	0.00	0.00	0.00	0.00
Planned Annual Construction to					
Relieve Overcrowding	0.00	1.00	1.00	1.00	1.00
New Households/Year	0.00	7.52	8.00	8.50	9.04
Construction New Units/Yr	0.00	16.44	21.71	27.06	32.53
Total Construction/Year	0.00	37.74	43.00	43.36	50.67
TOTAL COUNTRY					
New Construction/Year	0.00	75.12	86.67	100.10	116.66
Total Construction/Year	0.00	105.93	117.48	130.91	147.47

require the upgrading of 3.3 thousand units per year, bringing the total construction requirement to 29.7 thousand units per year during this period.

Similar calculations for the other urban areas of Ecuador result in an estimated total construction requirement for the 1985-89 period of 38.5 thousand units per year, of which about 32.3 thousand would need to be new units to fully satisfy projected housing needs.

In the rural sector, annual construction of nearly 16.4 thousand new units is anticipated in this scenario for the 1985-89 period, with an additional 21.3 thousand upgradings per year if all substandard housing in the rural sector is to be raised to a minimum standard within 20 years.

IV. DETERMINANTS OF HOUSING AFFORDABILITY IN ECUADOR

The estimation of the capital cost of dwelling units that households in each sector and in each quintile¹ of the income distribution can afford is an integral part of this study's analysis. Key determinants of housing affordability, such as average income levels, the distribution of income, the share of household income available for mortgage payments and prevailing financial lending terms and conditions, are evaluated in this chapter. Also, the future growth in income levels is discussed based on an assessment of current economic conditions and future growth prospects.

Economic Situation

The Ecuadorean economy has gone through some important changes during the last decade. Since 1974 petroleum export earnings and high levels of foreign housing produced a marked increase in national income per capita, which was

1. In this analysis, each quintile represents successive groups of households accounting for 20 percent of the total number of households in each sector. The first quintile refers to the poorest income group, while the fifth quintile corresponds to the richest 20 percent of households in each sector.

accompanied by expanded public sector expenditures and increased imports. Foreign exchange inflows permitted the maintenance of relative stability in domestic prices and the foreign exchange rate, as well as supporting widespread subsidies through the financial sector and directly in a variety of goods and services markets.

Unfortunately, during the last 3 years the situation has changed radically for the worse. Ecuador is currently undergoing its worst economic crisis in recent decades, for which effective economic policy solutions have yet to be implemented.

A new government is taking office in Ecuador, a fact which has generated renewed expectations and hope among a large number of Ecuadoreans. Economic recovery will nonetheless require a major effort to control price inflation, reduce the external trade deficit, mobilize domestic savings, increase employment, and stimulate exports to the point of providing the foreign exchange for priority imports required to support increased national production -- all within a social context requiring widespread reforms.

Although the new government has just taken office, public statements by prominent members of the new economic team permit the identification of a number of intended policy measures with relative confidence. These are discussed in the text which follows.

The likely effects of implementing these measures have been taken into consideration in establishing the basic economic scenarios used in this study, which, it is hoped, will itself contribute to the ongoing policy debates.

Factors Affecting Income
Distribution in Ecuador

The population census of 1974, published by INEC in 1975, is the last census providing data on household incomes and their distribution. Since that time, a number of economic developments have taken place which are likely to have altered income distribution in some degree. Major factors include:

- . Per capital GDP has increased from US\$880 in 1974 to about \$1150 in 1982, and is likely to grow to \$1185 by the end of 1984. This represents a 34 percent increase in real terms.
- . Domestic demand growth between 1974-82 has undoubtedly contributed to industrialization, which along with public sector investment has contributed to the modernization of physical infrastructure and the capital stock.
- . Unemployment in the formal sectors of the economy is widely believed to have increased in recent years, which renders the results of household income surveys conducted since 1974 questionable, since they have focussed primarily on formal sector remuneration of employees.
- . Between 1974 and 1982, income taxes have fallen as a percent of GDP. Subsidies on imports, energy consumption, education, and credit have also reduced net internal tax receipts, which have been largely made up by petroleum taxes.
- . Since 1975, non-petroleum exports (excluding shrimp) have fallen, generating income distribution effects away from traditional export sectors.
- . Monetary policies, especially those followed since 1982, are also an important factor affecting the distribution of incomes.

Currently, over 60 percent of the resources of private "financieras" and 35 percent of the assets of the private banking sector are being provided by the Central Bank. The Central Bank, however, is currently operating on the basis of negative reserves; the lack of foreign exchange has prevented amortization of external debts and it is feared that import payments may be lagging as much as two months. Renewed access to foreign commercial credit is not foreseen in the short term. In brief, domestic credit is highly dependent on Central Bank resources but this institution is currently undergoing difficulty in backing the supply of money. The current monetary situation clearly has redistributive impacts in favor of borrowers.

- . Another key factor affecting income distribution during the last decade has been the implicit cross-subsidy and transfer of resources from the rural to urban sectors. Such transfers have in many cases been explicit -- e.g., tariff and other barriers to fertilizer and chemical imports which forces the agricultural sector to consume more costly domestic supplies. Indirect transfers take place through the imposition of price controls on agricultural goods and through the taxation of agricultural production and exports. Resources gathered from the agricultural sector clearly have been used to finance manufacturing production and exports, thus favoring primarily urban dwellers.
- . Finally, minimum wage policy, which has resulted in more than a tripling of wages since 1975, has clearly favored the lower income strata of salaried workers.

The above factors indicate a strong likelihood that income distribution has substantially changed since 1975. For this reason, we have preferred for the purposes of this study to make an admittedly approximative effort to adjust existing income distribution estimates, rather than rely on the clearly outdated results of the 1974 census.

Short-Term Outlook

As mentioned earlier, recent statements of key officials of the new government of Ecuador give some indication of the major policy thrusts to be expected:

- . Initiation of a large-scale, low-cost housing program, intended not only to make-up an increasing housing deficit, but to stimulate employment and the general level of economic activity.
- . Provision of incentives to stimulate the growth of domestic savings through a reduction in inflation and appropriate interest rate policies. It is hoped that increased domestic savings will in part reduce the need for foreign borrowing. It is also understood that policies to promote the development of equity markets will complement the general effort to increase domestic savings.
- . Promotion of foreign direct investment in those areas where such investments can contribute to economic development. It is likely that one such area will be petroleum exploration to reverse the current declining trend in reserves. This effort will need to be supported by policies to restrain the growth in domestic energy demand.
- . Stabilization of the recent cycle of inflation-devaluation inflation which has in recent years eroded confidence and hampered economic recovery. This cycle may be broken through the formulation of consistent monetary and foreign exchange rate policies, seeking to equilibrate the external market, and to maintain that equilibrium through control of domestic price inflation.
- . Stimulation of the use and employment of domestic factors of production, especially through the growth of exports with high domestic value-added. In this regard, it is an important recommendation of this study

that the use of domestic materials -- wood, adobe, bamboo and others -- in housing construction be significantly increased.

- . Revision of price and subsidy policies, especially as these may negatively affect agriculture. Also, revision of tariff and tax incentives for industries which have been shown to be inefficient and probable postponement or cancellation of projects such as petrochemicals, auto assembly, production of lubricants and steel which are highly capital-intensive and have few linkages to the domestic economy.
- . Improvement in public administration seeking greater efficiency in tax collection and public expenditures.

These policy initiatives of the new government will, of course, face obstacles to implementation: legal and institutional constraints, the inertia usually encountered in altering consumption and savings behavior, and the restrictions imposed by the crisis situation itself. The new government is fully aware of the need to ensure that these policies are implemented, however, at least in substantial measure. It is our belief that they can be implemented and it is this belief, along with other factors that have been mentioned, that substantiates the moderate optimism of our projections of GDP growth -- between 4 and 6 percent per annum in real terms for the remainder of the decade. These projections are the basis for household income growth and the affordability analyses presented in subsequent sections of this report.

Estimation of Household Income and Its Distribution

The most desirable and reliable method for estimating income levels and distribution is through a well-designed

household survey of adequate size. It is only because no acceptable survey has been conducted in Ecuador during the last 9 years, that we have attempted to develop and apply methods for updating available information.

The methodology we have adopted is based primarily on the National Income Accounts, which, in our judgment provide the most accurate and current economic data available. An additional advantage in using data from the national accounts, is that income estimates contained therein are defined broadly to include all categories of income -- wages and salaries, payments in-kind, transfers, subsidies and bonuses, interest and profits -- which together make up the total income received by households.

Household Income Estimates

Given the absence of adequate data on, for example, wage levels by occupation, economic sectors, and geographic regions; informal sector earnings; average numbers of wage earners per family by economic and regional strata; and, income flow to property ownership -- data that would provide direct information on the incomes of Ecuadorean households -- it is necessary to resort to alternative methodologies for estimating current income levels.

Various alternatives are possible. One method relies on information on the general inflation rate as estimated through the consumer price index. It has the advantage of facilitating a quick update of survey information from earlier years. Its use requires, however, the implicit assumption that incomes have increased at the same rate as prices, and also that the incomes of all income strata have

grown at an equal rate. Particularly in a period of economic instability, such assumptions are questionable.

An alternative method relies on the time series information on savings, which can be derived from the accounts of the financial system. Here, real savings levels might be taken as a proportional indicator of incomes, itself a questionable assumption. Further, such a methodology neglects totally those families who have no savings or whose savings are not channelled through the formal financial sector, generally the lower-income households which are the main focus of this study.

A third method is based on a small-scale, quick survey of house expenditures. Results of such a survey would undoubtedly produce interesting and useful results. However, such surveys are only representative of the groups contained within the sample, which in general will not include higher-income families or groups who are not easily accessible. It is also generally observed that income data generated in this manner are subject to problems of underreporting, recall, seasonality, and a variety of other non-sampling errors.

The methodology adopted for this study seeks to overcome such limitations through primary reliance on the National Income Accounts published by the Central Bank of Ecuador. Estimates of Gross Domestic Product (GDP),¹ combined with information on the sectoral and spatial

1. Disaggregated into the following sectors: agriculture, petroleum, manufacturing, public utilities, construction, commerce, transport, finance, and services.

distributions of the population, and with estimates of average household size are used to calculate average household income levels. Of course, such a methodology can only provide an estimate of average income levels, and not of income distribution. Its major advantage is that it provides an estimate of total household incomes, consistent with the aggregates of income generated through domestic production. The appendix contains a full description of the manner in which the methodology has been applied for purposes of this study.

The following estimates have been derived:

Table 10. Average Household Income Levels, 1984

	Metropolitan areas	Other urban areas	Rural areas
Total income (millions of sucres per month)	19,698	19,500	10,800
Number of households	472,210	631,047	614,423
Average monthly income per household (sucres)	41,716	30,901	17,577

Household Income Distribution

As discussed earlier, recent statistics of income distribution are not available in Ecuador. A variety of studies conducted in recent years have based their analysis

on the distributions estimated by INEC in 1975,¹ generally assuming constancy in the distribution itself and only updating estimates of absolute income levels.

Such a procedure raises questions due to the implicit assumption that structural changes which have been occurring at the macroeconomic level -- especially as regards the functional distribution of national incomes and the increased size of the public sector -- have had no impact on the size distribution of household income.

Assumed constancy of the income distribution further ignores sectoral and regional changes which have occurred in the structure of national output.

As we discussed earlier, important factors which have undoubtedly affected the distribution of household incomes in Ecuador since 1975 include:

- . Growth and structural evolution of the economy;
- . Government policies with respect to prices, taxes, subsidies, government services, land tenure, etc.;
- . Technological change within the various sectors of the economy, influencing the demand for and productivity of labor;
- . Population growth and its spatial distribution;
- . International developments and their influence on the composition of demand;

1. INEC, "Encuesta de Presupuestos Familiares," y "Censo de Poblacion y Ocupacion," 1975. Compiled by JUNAPLA and the Central Bank in "Análisis de la Coyuntura Economica," August 1977.

- . The regional dispersion of industrialization and infrastructural development; and
- . Minimum wage and related labor legislation.

The presence of these factors in Ecuador during the last decade renders the assumption of unchanged income distribution untenable.

Because the 1982 census did not include information on incomes, recent studies of income distribution in Ecuador have used partial survey results. Such surveys have, however, generally only included urban areas, and within these, only salaried workers. Also, they have tended to suffer from limited sample sizes. While such surveys may provide useful information on salary earnings within the regions in which they are conducted, they do not provide an adequate basis for estimating changes in the distribution of total national income among the various strata of the Ecuadorean population.

As noted earlier, it was decided that, in spite of the difficulties and uncertainties involved, it was preferable to adjust the 1975 income distribution estimates of INEC, rather than accept the hypothesis of constancy over the last 10 years. A methodology was developed to assess the impacts of economic factors such as mentioned above. This methodology is presented in detail in the appendix. Our estimates indicate a moderate improvement in the size distribution of household incomes in Ecuador, especially in the "other urban areas" of the country. Our estimates of household income distribution in Ecuador, updated to 1984, are presented in Table 11.

Table 11. Estimated Size Distribution of Household Income, 1984

Quintile	Metropolitan		Other urban		Rural	
	Percent of income	Cumulative	Percent of income	Cumulative	Percent of income	Cumulative
One (0-20%)	4.9	4.9	5.1	5.1	2.4	2.4
Two (21-40%)	10.7	15.6	11.9	17.0	7.7	11.1
Three (41-60%)	12.2	27.8	15.2	22.2	11.6	22.7
Four (61-80%)	23.6	51.4	20.8	53.0	16.3	39.0
Five (81-100%)	48.6	100.0	47.0	100.0	61.0	100.0
----- (Suces) -----						
Average monthly income all quintiles		41,716		30,901		17,577
Average monthly income by quintile						
One		10,221		7,880		2,988
Two		22,318		18,386		6,768
Three		25,449		23,639		10,195
Four		49,225		32,291		14,325
Five		100,536		72,618		53,610

Note: Percentages shown above are rounded to one decimal place. Computations were based on the figures shown in the Appendix, however.

With respect to the average income levels presented in Table 11, the fifth quintile in each area -- that which receives the largest part of national income distribution attributable to the returns on capital -- is also the quintile within which is found the greatest dispersion in individual family incomes. The average income level shown for this quintile is therefore the least representative of all of the average income estimates shown.

Because this higher income group is not the primary focus of this study, no further investigation of income dispersion within the fifth quintile was attempted. For the first four quintiles, however, average income estimates are more closely representative of all the families they contain, due to the smaller degree of dispersion of incomes within each of these quintiles.

Although a point estimate of median incomes could be calculated arithmetically on the basis of the income distribution estimates given above, the necessarily approximate nature of these estimates would make such an exercise spurious. We can assert, with a high degree of confidence, however, that median household incomes in each area lie between the average income estimate presented for the second and third quintiles. In the case of the metropolitan areas, for example, this means that median household income in 1984 is estimated to fall within the range of \$22,000 - 25,000 per month.

Housing Expenditures and Financial Lending Terms

In the absence of detailed and reliable household expenditure surveys, the percentage of gross household

income which may be presumed to be available for housing expenditures (mortgage service or rent, plus recurrent expenditures on items such as maintenance, utilities, and real estate taxes) must be estimated on the basis of informed judgment. In estimating the appropriate share of household income that can be devoted to these expenditures, care must be taken to consider the definition of income against which this estimate will be applied.

An extremely broad definition of income has been utilized in this analysis. This definition includes all sources of household income including remunerations, rents, and payments in-kind. While it is theoretically reasonable that a household could substitute payments in-kind for its monetary requirements for many purposes, it is less likely to be able to convert or substitute a significant portion of these types of payments for purposes of making mortgage payments.

Based on this consideration, one would expect a reasonable estimate of the share of income that can be devoted to housing to be lower than estimates based on a more narrow income definition. In Ecuador, estimates of the share of income devoted to housing normally range from 25 percent to 40 percent. The Instituto Ecuatoriano de Seguridad Social (IESS) uses an estimate of 40 percent in part due to their ability to automatically deduct mortgage payments directly from wages of its participants.¹ Other lending institutions do not have this ability. Estimates by the USAID Office of

1. The 40 percent criteria used by IESS applies only to the basic wages and not extra salaries and bonuses. Considering that extra salaries and bonuses add 40 percent to basic salaries, then the 40 percent of income for housing used by IESS is equivalent to 28 percent of total income.

Housing and Urban Programs assume a maximum of 25 percent of household income available for housing expenditures.

For this analysis, we have assumed that the poorest quintile in each sector would be able to devote 25 percent of income for these expenses. The middle three quintiles were assumed to be able to spend 30 percent of their income for housing and the richest quintile would devote only 25 percent of its income for these purposes. The rationale for poorest and richest quintile estimates is as follows. The poorest quintile, in addition to its shelter needs, is confronted by basic requirements for food and clothing. Given these other important demands for the poorest quintile's household income, it was felt that a smaller proportion would be available for housing relative to the other quintile groups. Conversely, the richest income quintile does not need to spend the same proportion of its income on housing to satisfy its desire for acceptable housing. These assumptions were subjected to a sensitivity test using a range of estimates from 25 to 40 percent.

The model also calculates the amount of total housing expenses that are required for recurring household expenditures such as normal maintenance, electricity, and water costs. It was assumed that recurring expenditures would constitute 15 percent of total housing expenses in all sectors and income groups.

For the base case scenario, the current interest rate of 21 percent was used for mortgage loans.¹ Given projections of inflation to average 18 percent, this implies a

1. It is not necessary that a household actually negotiate a mortgage and purchase a house. Rent payments can be thought of as payments amortizing capital costs over 20 years.

gradual movement toward real interest rates in the range of 3 percent.

Affordability, however, is determined by the level of nominal interest rates even when cost and income variable are expressed in real terms. While the 21 percent rate in the base case reflects current interest levels, several alternative scenarios using rates of 18 and 24 percent were also tested.

It was also assumed that housing expenditures would be capitalized over 20 years in urban areas and over 15 years in rural areas. The differential in lending terms between urban and rural areas is assumed for all scenarios for two reasons:

- . The reduced liquidity of housing assets in rural areas which makes mortgage lending more risky; and
- . The generally shorter lived materials used in housing construction in rural areas.

All scenarios assume a 10 percent downpayment on housing purchases for all areas in Ecuador.

One other assumption concerning the financial lending terms and conditions was also incorporated into the base case scenario. It was assumed that the graduated payment concept would be used as the mortgage instrument with a graduation rate of 4 percent annually. The use of a graduate payment instrument increases the affordability of housing for all income groups. In the sensitivity analyses, the effects on affordability of using a standard mortgage instrument and a higher annual rate of graduation were also tested.

Affordable Capital Costs

Based upon estimates for all the determinants of affordability discussed above, the capital housing costs for each quintile in each sector were calculated. The resulting affordable capital costs for the metropolitan, other urban, and rural sectors are shown in Tables 12, 13, and 14, respectively.

In metropolitan areas, the poorest 20 percent of households, on average, are estimated to currently receive an annual income of 122 thousand sucres and to be able to devote a maximum of about 2.2 thousand sucres per month to mortgage service or rental payments (Table 12). On this basis, the maximum dwelling units cost which they could currently afford without subsidy is estimated at 164.5 thousand sucres. While these households will, over time, gradually increase the level of housing they can afford, even by the year 2004, it is estimated that their maximum affordability will only reach 221.4 thousand in 1984 sucres. The second quintile of metropolitan households is currently estimated to be able to afford about 4.7 thousand sucres per month for housing, which would permit the purchase, without subsidy, of a unit valued at about 430 thousand sucres. The third quintile can afford housing in the 500 thousand sucres range, and the fourth quintile in the 900 thousand sucres range. The richest 20 percent of metropolitan households can afford housing in the range of 1.6 million sucres.

As shown in Tables 13 and 14, other urban households in Ecuador can only afford housing units of about three-fourths of the cost of those in metropolitan areas, and the first four income quintiles in rural areas can afford an average

Table 12. Metropolitan Sector: Affordable
Capital Costs by Quintile, 1984-2004

Metropolitan Area					
Interest Rate (%)	21.00				
Graduation Rate (%)	4.00				
Loan Term (Years)	20.00				
Graduation Term (Years)	20.00				
Downpayment Required (%)	10.00				
	1984	1989	1994	1999	2004
	-----	-----	-----	-----	-----
Thousands of Currency Units					
Quintile 1					
Mean Annual Income	122.65	125.15	133.24	148.18	165.12
% Available for Housing	25.00				
% Needed for Recurr. Exp.	15.00				
Monthly Income for Mortg.	2.17	2.22	2.36	2.62	2.92
Affordable Dwelling Cost	164.45	167.82	178.67	198.70	221.40
Quintile 2					
Mean Annual Income	267.82	273.30	290.96	323.58	360.56
% Available for Housing	30.00				
% Needed for Recurr. Exp.	15.00				
Monthly Income for Mortg.	5.69	5.81	6.18	6.88	7.66
Affordable Dwelling Cost	430.93	439.75	468.18	520.67	590.16
Quintile 3					
Mean Annual Income	305.36	311.61	331.75	368.95	411.10
% Available for Housing	30.00				
% Needed for Recurr. Exp.	15.00				
Monthly Income for Mortg.	6.49	6.62	7.05	7.84	8.74
Affordable Dwelling Cost	491.35	501.40	533.81	593.66	661.49
Quintile 4					
Mean Annual Income	590.70	602.79	641.75	713.70	795.25
% Available for Housing	30.00				
% Needed for Recurr. Exp.	15.00				
Monthly Income for Mortg.	12.55	12.81	13.64	15.17	16.90
Affordable Dwelling Cost	950.47	969.92	1032.62	1148.39	1279.61
Quintile 5					
Mean Annual Income	1206.43	1231.11	1310.69	1457.64	1624.20
% Available for Housing	25.00				
% Needed for Recurr. Exp.	15.00				
Monthly Income for Mortg.	21.36	21.80	23.21	25.81	29.76
Affordable Dwelling Cost	1617.68	1650.79	1757.49	1954.53	2177.67

Table 13. Other Urban Sector: Affordable Capital Costs by Quintile, 1984-2004

Other Urban Areas

Interest Rate (%)	21.00
Graduation Rate (%)	4.00
Loan Term (Years)	20.00
Graduation Term (Years)	20.00
Downpayment Required (%)	10.00

	1984	1989	1994	1999	2004
	-----	-----	-----	-----	-----
Thousands of Currency Units					
Quintile 1					
Mean Annual Income	94.56	97.85	104.34	116.86	131.04
% Available for Housing	25.00				
% Needed for Recurr. Exp.	15.00				
Monthly Income for Mortg.	1.67	1.73	1.85	2.07	2.32
Affordable Dwelling Cost	126.79	131.21	139.91	156.69	175.71
Quintile 2					
Mean Annual Income	220.63	228.32	243.47	272.66	305.75
% Available for Housing	30.00				
% Needed for Recurr. Exp.	15.00				
Monthly Income for Mortg.	4.69	4.85	5.17	5.79	6.50
Affordable Dwelling Cost	355.01	367.38	391.76	438.74	491.98
Quintile 3					
Mean Annual Income	283.67	293.55	313.03	350.57	393.11
% Available for Housing	30.00				
% Needed for Recurr. Exp.	15.00				
Monthly Income for Mortg.	6.03	6.24	6.65	7.45	8.35
Affordable Dwelling Cost	456.45	472.35	503.69	564.09	632.54
Quintile 4					
Mean Annual Income	387.50	401.00	427.61	478.88	537.00
% Available for Housing	30.00				
% Needed for Recurr. Exp.	15.00				
Monthly Income for Mortg.	8.23	8.52	9.09	10.18	11.41
Affordable Dwelling Cost	623.51	645.23	688.05	770.55	864.06
Quintile 5					
Mean Annual Income	871.41	901.76	961.61	1076.91	1207.60
% Available for Housing	25.00				
% Needed for Recurr. Exp.	15.00				
Monthly Income for Mortg.	15.43	15.97	17.03	19.07	21.38
Affordable Dwelling Cost	1168.46	1209.16	1289.41	1444.02	1619.25

Table 14. Rural Sector: Affordable Capital Costs
by Quintile, 1984-2004

Rural Areas

Interest Rate (%)	21.00
Graduation Rate (%)	4.00
Loan Term (Years)	15.00
Graduation Term (Years)	15.00
Downpayment Required (%)	10.00

	1984	1989	1994	1999	2004
	-----	-----	-----	-----	-----
Thousands of Currency Units					
Quintile 1					
Mean Annual Income	35.86	41.87	51.40	61.80	74.31
% Available for Housing	25.00				
% Needed for Recurr. Exp.	15.00				
Monthly Income for Mortg.	0.63	0.74	0.91	1.09	1.32
Affordable Dwelling Cost	45.81	53.49	65.66	78.96	94.93
Quintile 2					
Mean Annual Income	81.21	94.82	116.40	139.96	168.28
% Available for Housing	30.00				
% Needed for Recurr. Exp.	15.00				
Monthly Income for Mortg.	1.73	2.02	2.47	2.97	3.58
Affordable Dwelling Cost	124.49	145.37	179.45	214.58	257.99
Quintile 3					
Mean Annual Income	122.34	142.85	175.35	210.86	253.52
% Available for Housing	30.00				
% Needed for Recurr. Exp.	15.00				
Monthly Income for Mortg.	2.60	3.04	3.73	4.48	5.39
Affordable Dwelling Cost	187.55	219.00	268.83	323.26	388.66
Quintile 4					
Mean Annual Income	171.90	200.73	246.40	296.29	356.24
% Available for Housing	30.00				
% Needed for Recurr. Exp.	15.00				
Monthly Income for Mortg.	3.65	4.27	5.24	6.30	7.57
Affordable Dwelling Cost	263.54	307.74	377.75	454.23	546.13
Quintile 5					
Mean Annual Income	643.32	751.20	922.13	1108.81	1333.15
% Available for Housing	25.00				
% Needed for Recurr. Exp.	15.00				
Monthly Income for Mortg.	11.39	13.30	16.33	19.64	23.61
Affordable Dwelling Cost	821.88	959.71	1178.07	1416.57	1703.18

capital housing cost of about one-third of those in metropolitan areas. A summary of the affordable capital housing costs for each quintile and in each sector is shown in Table 15.

**Table 15. Summary of Affordable Capital Costs
by Income Quintile and Sector, 1984-2004**

	1984	1989	1994	1999	2004
(Thousands of Currency Units)	-----	-----	-----	-----	-----
Metropolitan Area					
Affordable Costs by Quintile					
1	164.45	167.82	178.67	198.70	221.40
2	430.93	439.75	468.18	520.67	580.16
3	491.35	501.40	533.81	593.66	661.49
4	950.47	969.92	1032.62	1148.39	1279.61
5	1617.68	1650.79	1757.49	1954.53	2177.87
Other Urban Areas					
Affordable Costs by Quintile					
1	126.79	131.21	139.91	156.69	175.71
2	355.01	367.38	391.76	438.74	491.98
3	456.45	472.35	503.69	564.09	632.54
4	623.51	645.23	688.05	770.55	864.06
5	1168.46	1209.16	1289.41	1444.02	1619.25
Rural Areas					
Affordable Costs by Quintile					
1	45.81	53.49	65.66	78.96	94.93
2	124.49	145.37	178.45	214.58	257.99
3	187.55	219.00	268.83	323.26	388.66
4	263.54	307.74	377.75	454.23	546.13
5	821.88	959.71	1178.07	1415.57	1703.18

V. HOUSING PROGRAM AND POLICY ALTERNATIVES

In this chapter, the financial feasibility of implementing three alternative housing programs is analyzed, from the point of view of both individual households and public sector finances.

The three alternatives are basically distinguished by their different assumptions concerning the minimum acceptable standards for housing construction. As noted earlier, the type of housing solutions offered and the establishment of practical minimum acceptable standards for housing construction are among the most effective policy instruments available to government housing officials for increasing the scope and coverage of available resources for housing programs.

The first alternative analyzed is based on estimates of housing standards and costs as described in preliminary proposals being considered by the Ministry of Housing.¹ The second alternative is based upon the recent experience of a combined Banco Ecuatoriano de la Vivienda (BEV), Junta

1. These estimates were obtained from an internal memorandum made available to the AID Office of Housing and Urban Programs, which described a preliminary proposal for urban development and housing for the 1984-88 period.

Nacional de la Vivienda, and AID project in the Solanda area of Quito. The third alternative analyzed considers the use of lower-cost local construction materials, such as adobe and bamboo, and the construction of smaller "starter units" than in the first two alternatives.

For each alternative, three levels of cost are established and analyzed for each of the three sectors (metropolitan, other urban, and rural). Cost level 1 is defined as the cost of upgrading an existing unit to minimum acceptable standards established for each sector. Cost level 2 is defined as the cost of constructing a new unit to whatever minimum standard applies in each alternative being analyzed. Cost level 3 is defined as the minimum price available from the formal sector for a new unit meeting or exceeding the minimum applicable standards.

In addition to the analysis of each alternative for the "base case scenario" utilizing assumptions concerning the determinants of household affordability presented in Chapter IV, sensitivity analyses were conducted reflecting variations in these underlying economic assumptions.

Alternative 1

At the time this analysis was being conducted, the new Ministry of Housing had not formally announced details of its proposed housing program for the upcoming 5-year period. A preliminary proposal being considered was presented to the AID Office of Housing and Urban Programs in June 1974. While it is clearly inappropriate to consider those preliminary proposals as representing the program of the new Ministry of Housing, it is hoped that the results of the

Housing Needs Assessment model will provide valuable information to housing planners concerning the financial feasibility of the widespread application of the proposed programs.

The proposals did not contain specific cost estimates for upgrading existing units to minimum standards (design level 1). However, as upgrading is considered to be an important component of the national housing program costs, estimates for the upgrading of housing in each sector were prepared.

In metropolitan and urban areas, the upgrading program was assumed to consist of the supply of infrastructure such as water and sewer lines to each house; electrical connection; street paving, sidewalks, and curbs; and construction of a sanitary core for each house consisting of a toilet, shower, and sink. In the rural sector, the upgrading would consist of the provision of a sanitary water supply, either a well or water line where feasible, an electrical connection, and either a septic tank or latrine for sanitary sewage disposal. Rural upgrading would also include the provision of a sanitary core.

Table 16 presents a summary of the estimated costs for each of these upgrading components for each sector in 1984. In metropolitan areas, an average upgrade is estimated at 94.4 thousand sucres, in the other urban areas at 85.0 thousand sucres, and in the rural sector at 55.2 thousand sucres. These cost estimates for upgrading represent the minimum standard of services in each sector and will be used in all three of the alternatives analyzed.

Table 16. Estimated Upgrading Costs by Sector, 1984

Type of infrastructure improvement	Metropolitan ^a	Other urban ^b	Rural
1. Water line plus house connection	17,175	15,450	17,175 ^c
2. Sewer line plus house connection and street drainage	30,000	27,000	8,750 ^d
3. Electrical line plus house connection	14,425	13,000	14,425
4. Street paving	10,175	9,150	--
5. Sidewalks and curbs	7,775	7,000	--
6. Sanitary core	14,875	13,400	14,875
Total	94,425	85,000	55,225

a. Based on costs for 80m² lot. Although lot size is expected to be greater in other urban and rural areas, cost estimates for upgrading purposes was assumed to also be for 80m² lots.

b. Costs were assumed to be 10 percent less than in metropolitan areas.

c. Assumes either sanitary well or connection to water line where practical.

d. Based on average of either septic tank or sanitary latrine.

Source: AID Project Paper, Secondary Cities Low Income Housing, July 1982, p. 42. These 1981 costs were adjusted to 1984 based on the change in the implicit price deflator for construction of 1.75.

Cost estimates for design levels 2 and 3 were derived from the preliminary proposals under consideration by the Ministry of Housing.¹ The minimum sales price of a new housing unit under a new program of the preliminary plan was 550 thousand sucres. This was assumed to correspond to the cost of a design level 2 unit in metropolitan areas under Alternative 1. The housing unit in the preliminary plan selling for 990 thousand sucres was assumed to correspond to design level 3, or the minimum standard formal sector house in the metropolitan area.

Based on the assumption of the use of concrete as a construction material and estimate of land costs, lot size, and infrastructure requirements, estimates of design levels 2 and 3 costs were derived for other urban and rural areas. Table 17 presents the components of these costs for all three sectors as used in the Alternative 1 analysis.

Table 18 shows a summary of the design standards and costs used in Alternative 1, projected over the 20-year study period. As can be seen from the table, housing construction costs in this base case scenario are projected to escalate at the same rate as inflation. Thus housing costs are projected to remain constant in thousands of 1984 sucres. The assumption concerning constant real construction costs is subjected to sensitivity analyses in other scenarios discussed below.

1. These estimates also reflect information obtained from AID Office of Housing and Urban Programs Officials who had discussed some of the components of the preliminary proposal with representatives of the new Ministry of Housing.

Table 17. Alternative 1: Estimate of Design Level 2
and Design Level 3 Costs by Sector, 1984
(1984 sucres)

Design level and cost component	Metropolitan	Other urban	Rural
<u>Design Level 2</u>			
Land ^a	70,000	24,000	12,000
Infrastructure ^b	80,000	107,000	40,400
Urbanized land	140,000	131,000	52,400
House construction (33m ²) ^c	283,500	283,500	283,500
Indirect costs and contingencies ^d	126,500	124,400	100,800
Total sales price	550,000	538,900	436,700
<u>Design Level 3</u>			
Land ^a	75,000	24,000	12,000
Infrastructure ^b	99,500	107,000	40,400
Urbanized land	174,500	131,000	52,400
House construction (68m ²) ^c	587,100	587,100	587,100
Indirect costs and contingencies ^d	228,400	215,400	191,900
Total sales price	990,000	933,500	831,400

a. Based on average land prices of 750, 200, and 40 sucres per m² for metropolitan, other urban, and rural, respectively. Land prices were found to be substantially higher in the Sierra region than in the Coast region, the prices used in each sector for this national study are based on the average of these two regions. Lot size of 80, 120, and 300m² for metropolitan, other urban, and rural respectively. For design level 3, assume lot of 100m² in metropolitan areas.

b. Based on infrastructure costs, excluding sanitary core from Table 16 and increased for different lot sizes in metropolitan and other urban areas.

c. Based on construction cost of 8,600 sucres per m² utilizing data from Solanda project currently estimated at 8,000 sucres and inflated to end of year.

d. Estimated at 30 percent of direct costs based on recent experience of the Solanda project and includes contractor profit or administrative expenses (10 percent), interest during construction (based on 21 percent for nine months 15 percent), and contingencies (59 percent).

Source: Derived from preliminary proposal being considered by the Ministry of Housing.

Table 18. Alternative 1: Design Standards and Costs, 1984-2004

	1984	1989	1994	1999	2004
	-----	-----	-----	-----	-----
Average Inflation Rate %	0.00	20.00	18.00	15.00	15.00
Construction Cost Esc. %	0.00	20.00	18.00	15.00	15.00
Metropolitan Area					
Price Minimum Standard Formal					
Sector Housing (Level 3)	990.00	990.00	990.00	990.00	990.00
Design Cost New Housing Unit					
(Level 2)	550.00	550.00	550.00	550.00	550.00
Design Cost Upgrade Existing Unit					
(Level 1)	94.40	94.40	94.40	94.40	94.40
Value of an Upgradable Unit					
(Add. to upgrade cost)	30.00	30.00	30.00	30.00	30.00
Other Urban Areas					
Price Minimum Standard Formal					
Sector Housing (Level 3)	933.50	933.50	933.50	933.50	933.50
Design Cost New Housing Unit					
(Level 2)	538.90	538.90	538.90	538.90	538.90
Design Cost Upgrade Existing Unit					
(Level 1)	85.00	85.00	85.00	85.00	85.00
Value of an Upgradable Unit					
(Add. to upgrade cost)	30.00	30.00	30.00	30.00	30.00
Rural Areas					
Price Minimum Standard Formal					
Sector Housing (Level 3)	831.30	831.30	831.30	831.30	831.30
Design Cost New Housing Unit					
(Level 2)	436.60	436.60	436.60	436.60	436.60
Design Cost Upgrade Existing Unit					
(Level 1)	55.20	55.20	55.20	55.20	55.20
Value of an Upgradable Unit					
(Add. to upgrade cost)	20.00	20.00	20.00	20.00	20.00

Over the longer term future, several factors may be expected to influence the relative rate of construction cost escalation. On the one hand, a sharp increase in the volume of construction would be expected, all other things being equal, to bid construction costs up relative to inflation. On the other hand, high rates of urban unemployment and a lowering of the import content of new buildings, which could result from revisions in minimum design standards, would tend to moderate the rate of increase in construction costs. On balance, constant cost levels in real terms may be quite reasonable to assume for long-term planning purposes.

Table 18 also shows the estimated value of existing upgradable housing in Ecuador. Since payments of some sort are being made by the occupants of this housing, and the level of such payments is assumed to be based on the value of the units, estimates of the value of existing upgradable housing units and associated monthly payments are necessary to avoid overstating income available among such households to pay for upgrades. These values, however, are not counted in the capital costs of an upgrade.

The next step in the analysis is to compare the design costs of Alternative 1 against the estimates of maximum housing affordable by each quintile of households calculated in Chapter IV. Tables 19A, 19B, and 19C show this comparison and a designation of affordable design level for each quintile for metropolitan, other urban and rural areas. The bottom three quintiles could currently afford only the cost of an upgrade, the fourth quintile could afford a new minimum standard unit, but not the full cost of a formal sector unit. Only the richest 20 percent of households in both the metropolitan and other urban sectors can afford a new formal sector unit without subsidy.

Table 19A. Alternative 1: Metropolitan Sector
Comparison of Design Costs and Quintile
Housing Affordability

	1984	1989	1994	1999	2004
	-----	-----	-----	-----	-----
Metropolitan Area					
Quintile 1					
Affordable Costs	164.45	167.82	178.67	198.70	221.40
Affordable Level	1.00	1.00	1.00	1.00	1.00
Design Cost	94.40	94.40	94.40	94.40	94.40
Quintile 2					
Affordable Costs	430.93	439.75	468.18	520.67	580.16
Affordable Level	1.00	1.00	1.00	1.00	2.00
Design Cost	94.40	94.40	94.40	94.40	550.00
Quintile 3					
Affordable Costs	491.35	501.40	533.81	593.66	661.49
Affordable Level	1.00	1.00	1.00	2.00	2.00
Design Cost	94.40	94.40	94.40	550.00	550.00
Quintile 4					
Affordable Costs	950.47	969.92	1032.62	1148.39	1279.61
Affordable Level	2.00	2.00	3.00	3.00	3.00
Design Cost	550.00	550.00	990.00	990.00	990.00
Quintile 5					
Affordable Costs	1617.68	1650.79	1757.49	1954.53	2177.87
Affordable Level	3.00	3.00	3.00	3.00	3.00
Design Cost	990.00	990.00	990.00	990.00	990.00

Table 19B. Alternative 1: Other Urban Sector
Comparison of Design Costs and Quintile
Housing Affordability

Other Urban Areas
Quintiles

Quintile 1					
Affordable Cost	126.79	131.21	139.91	156.69	175.71
Affordable Level	1.00	1.00	1.00	1.00	1.00
Design Cost	85.00	85.00	85.00	85.00	85.00
Quintile 2					
Affordable Cost	355.01	367.38	391.76	438.74	491.98
Affordable Level	1.00	1.00	1.00	1.00	1.00
Design Cost	85.00	85.00	85.00	85.00	85.00
Quintile 3					
Affordable Cost	456.45	472.35	503.69	564.09	632.54
Affordable Level	1.00	1.00	1.00	2.00	2.00
Design Cost	85.00	85.00	85.00	538.90	538.90
Quintile 4					
Affordable Cost	623.51	645.23	688.05	770.55	864.06
Affordable Level	2.00	2.00	2.00	2.00	2.00
Design Cost	538.90	538.90	538.90	538.90	538.90
Quintile 5					
Affordable Cost	1168.46	1209.16	1289.41	1444.02	1619.25
Affordable Level	3.00	3.00	3.00	3.00	3.00
Design Cost	933.50	933.50	933.50	933.50	933.50

Table 19C. Alternative 1 - Rural Sector: Comparison
of Design Costs and Quintile Housing Affordability

Rural Areas
Quintiles

Quintile 1					
Affordable Costs	45.81	53.49	65.66	78.96	94.93
Affordable Level	0.00	0.00	0.00	1.00	1.00
Design Cost	0.00	0.00	0.00	55.20	55.20
Quintile 2					
Affordable Costs	124.49	145.37	178.45	214.58	257.99
Affordable Level	1.00	1.00	1.00	1.00	1.00
Design Cost	55.20	55.20	55.20	55.20	55.20
Quintile 3					
Affordable Costs	187.55	219.00	268.83	323.26	388.66
Affordable Level	1.00	1.00	1.00	1.00	1.00
Design Cost	55.20	55.20	55.20	55.20	55.20
Quintile 4					
Affordable Costs	263.54	307.74	377.75	454.23	546.13
Affordable Level	1.00	1.00	1.00	2.00	2.00
Design Cost	55.20	55.20	55.20	436.60	436.60
Quintile 5					
Affordable Costs	821.88	959.71	1178.07	1416.57	1703.18
Affordable Level	2.00	3.00	3.00	3.00	3.00
Design Cost	436.60	831.30	831.30	831.30	831.30

In the rural sector, the housing affordability outlook is more bleak. The poorest quintile currently and for the next 10 years cannot afford even the cost of an upgrade. This group will have to receive some subsidy if they are to reside in units meeting the defined minimum acceptable standards. The middle three quintiles can afford an upgrade but not a new minimum standard house (design level 2) based upon Alternative 1 standards. If households in these quintiles are to construct new minimum standard houses, they would require varying degrees of subsidy.

At this point, it becomes useful to separate income groups requiring government assistance in acquiring housing from those groups that do not need assistance. For illustrative purposes, the following discussion will focus on the metropolitan sector, but the calculations are the same for the other sectors. Recall from Chapter II that it was estimated that a total of 29.7 thousand units would be required during the 1985-89 period in the metropolitan areas. Of these, 3.3 thousand units per year would be upgrades of existing units, while 26.4 thousand would be new dwelling units destined to fulfill the following components of projected housing needs:

	<u>(000s units/year)</u>
New households	17.5
Replacement of acceptable units	<u>7.3</u>
Subtotal	24.8
Replacement of non-upgradable units	1.3
New units to relieve overcrowding	<u>0.3</u>
Subtotal	1.6
Total new units	26.4
Planned upgrades	<u>3.3</u>
Total construction	29.7

Two basic assumptions are used in allocating this total requirement among maximum affordable cost levels. First, household quintiles which are able to afford cost level 3 (formal sector housing) without subsidy are classified out of the target group.¹ Second, all substandard and overcrowded housing in the base year is assumed to be found among the remaining households that make up the target group.

Thus, since only one quintile in the metropolitan areas in 1989 is estimated to be able to afford formal sector housing without subsidy, 20 percent of new households plus 20 percent of replacements of acceptable dwellings ($.2 \times 17.5 + .2 \times 7.3 = 5.0$ thousand households) are classified out of the target group. The remainder ($29.7 - 5.0 = 24.7$ thousand) are allocated proportionately among target group affordable levels according to the number of quintiles falling within each level.² As was shown in Table 19A, the bottom four metropolitan area quintiles fall into affordable level "1." Thus four-fifths of the metropolitan dwelling units allocated to target group households are classified into affordable level 1.

Table 20 presents the estimated number of households falling within the target group and each affordability category (for all three sectors) based on the methodology

1. New households coming into being in each sector and year are assumed to be evenly distributed within the income distribution of that region in that year. Also, base-year households that possessed acceptable housing in the base year but require replacement housing because of obsolescence, are assumed to be evenly distributed throughout their respective sectoral income distributions.

2. This assumes that all upgrades and overcrowded units are evenly distributed among the quintiles making up the target group and not necessarily only in the poorest quintile.

Table 20. Alternative 1: Number of Target Group Households by Sector, 1984-2004

	1984	1989	1994	1999	2004
Thousands of Households	-----	-----	-----	-----	-----
Metropolitan Area					
Affordable Level 0	0.00	0.00	0.00	0.00	0.00
Affordable Level 1	0.00	18.51	20.96	15.53	8.74
Affordable Level 2	0.00	6.17	0.00	7.77	17.48
Subtotal, Target Group	0.00	24.68	20.96	23.30	26.22
Affordable Level 3	0.00	4.97	10.76	12.32	14.27
Total	0.00	29.65	31.72	35.62	40.49
Other Urban Areas					
Affordable Level 0	0.00	0.00	0.00	0.00	0.00
Affordable Level 1	0.00	24.34	26.87	19.58	22.07
Affordable Level 2	0.00	8.11	8.96	19.58	22.07
Subtotal, Target Group	0.00	32.45	35.82	39.16	44.14
Affordable Level 3	0.00	6.09	6.93	17.77	9.01
Total	0.00	38.54	42.75	46.93	53.15
Rural Areas					
Affordable Level 0	0.00	8.77	9.82	0.00	0.00
Affordable Level 1	0.00	26.30	29.46	32.67	35.95
Affordable Level 2	0.00	0.00	0.00	10.89	11.98
Subtotal, Target Group	0.00	35.07	39.28	43.56	47.94
Affordable Level 3	0.00	2.67	3.73	4.80	5.39
Total	0.00	37.74	43.00	48.36	53.32

described above. In the metropolitan sector for 1989, the target group consists of 18.5 thousand households in affordability level 1 and 6.2 thousand households in affordable level 2. Those classified in affordable level 2 and those outside the target group (15.0 thousand households) will not require any subsidy. Of the 18.5 thousand households classified at affordable level 1, those households receiving an upgrade of an existing unit will not require subsidy. Only the remainder of affordable level 1 households, who would need to be allocated new units to meet their housing needs, would require a subsidy to make up the difference between maximum asset values they can afford and the cost of new units meeting design 2 standards.¹

In Table 21, the estimated totals of target group households requiring some amount of subsidy are presented as are the total annual capital costs of providing the target group with housing meeting Alternative 1 standards. The total amount of subsidy which would be required to implement a program based on such standards is also shown.

At the national level, over 59 percent of all target group households (in 1989) would require some level of subsidy if a housing program based on Alternative 1 standards were to be implemented to meet projected housing needs. The total annual capital costs of housing the target group is estimated for 1989 at 33.9 billion sucres. Of this

1. In the metropolitan sector, there were no quintiles or households classified at affordable level 0 (not being able to afford an upgrade). If there were households in that category (as in the rural sector), then those receiving an upgrade would require subsidy to design level 1 costs and those receiving new housing units would require subsidy to design level 2 costs.

Table 21. Alternative 1: Target Group Investment
and Subsidy Requirements by Sector, 1984-2004

	1984	1989	1994	1999	2004
	-----	-----	-----	-----	-----
Country					
Target Households (1000s)					
Not Requiring Subsidy	0.00	37.39	32.87	59.50	71.72
Requiring Subsidy	0.00	54.81	63.18	46.51	46.57
Total	0.00	92.20	96.05	106.02	118.29
Target Group Cost (Millions)					
Subsidy Portion	0.00	10757.09	10964.11	10369.06	10134.34
Supported by Target Group	0.00	23170.42	24570.07	30122.46	36506.62
Total	0.00	33927.51	35534.18	40491.52	46690.96
Metropolitan Area					
Target Households (1000s)					
Not Requiring Subsidy	0.00	8.61	3.25	9.93	18.56
Requiring Subsidy	0.00	16.07	17.71	13.36	7.66
Total	0.00	24.68	20.96	23.30	26.22
Target Group Cost (Millions)					
Subsidy Portion	0.00	2898.71	2770.36	2543.70	2516.14
Supported by Target Group	0.00	9194.74	7275.29	8789.07	10424.14
Total	0.00	12093.45	10045.64	11332.77	12940.28
Other Urban Areas					
Target Households (1000s)					
Not Requiring Subsidy	0.00	12.81	13.65	22.71	25.20
Requiring Subsidy	0.00	19.64	22.17	16.45	18.94
Total	0.00	32.45	35.82	39.16	44.14
Target Group Cost (Millions)					
Subsidy Portion	0.00	4228.31	4296.37	3967.80	3383.71
Supported by Target Group	0.00	10417.65	12166.26	14294.57	17060.33
Total	0.00	14645.96	16462.64	18262.36	20944.04
Rural Areas					
Target Households (1000s)					
Not Requiring Subsidy	0.00	15.97	15.97	26.86	27.96
Requiring Subsidy	0.00	19.09	23.30	16.70	19.98
Total	0.00	35.07	39.28	43.56	47.94
Target Group Cost (Millions)					
Subsidy Portion	0.00	3630.07	3897.38	3857.56	3784.49
Supported by Target Group	0.00	3558.02	5128.51	7038.83	9022.15
Total	0.00	7188.09	9025.90	10896.39	12806.65

amount, 10.8 billion sucres or 32 percent of the total capital costs would be required in the form of subsidies.

These numbers are placed in a broader macroeconomic perspective in Table 22. First, target group investment is added to non-target group investment¹ to obtain an estimate of average annual total housing investment during each 5-year planning period. As shown in Table 22, total housing investment associated with a program designed to fully meet projected housing needs in Ecuador during the 1985-89 period according to Alternative 1 standards is estimated at about 60.5 billion sucres per year, or about 7 percent of real GDP projected for 1989. The implementation of such a program would require annual subsidies on the order of 10.8 billion sucres -- more than 11 percent of the public sector capital budget² projected for 1989.

The figures for target group investment shown in Table 22 differ from target group capital costs shown in Table 21 due to the inclusion of additional household expenditures for housing over the minimum standards. Thus, in Table 22, non-target group investment is based on all households spending up to their affordability units.³

On the basis of the percentage of target households requiring some subsidy (59 percent), the actual magnitude of the subsidy (10.8 billion 1984 sucres estimated for 1989),

1. Investment for both the target and non-target groups is based on affordability estimates.

2. Central government capital expenditures were 11 percent of GDP in 1983 and were projected for future years on this basis.

3. The line in Table 22 corresponding to total housing expenditures includes total housing investment plus total mortgage interest payments due that year.

Table 22. Alternative 1: Housing Investment
in Relation to GDP, 1984-2004

	1984	1989	1994	1999	2004
	-----	-----	-----	-----	-----
(Millions of Currency Units)					
Country					
Total Housing Expend.	138649.80	168675.90	210160.90	268224.40	342329.70
Non-target Group Invest.	0.00	18130.91	28346.64	37134.19	49301.07
Target Group Investment	0.00	31587.57	31715.46	40044.02	51388.29
Subsidy Required	0.00	10757.09	10964.11	10369.06	10184.34
Total Housing Investment	0.00	60475.58	71026.21	87547.28	110873.70
Metropolitan Area					
Total Housing Expend.	54551.20	66031.23	81231.91	103674.80	132318.10
Non-target Group Invest.	0.00	8200.39	15017.27	19121.46	24674.86
Target Group Investment	0.00	12729.26	8150.01	10098.93	12689.41
Subsidy Required	0.00	2898.71	2770.36	2543.70	2516.14
Total Housing Investment	0.00	23828.36	25937.64	31764.09	39880.41
Other Urban Areas					
Total Housing Expend.	54594.87	66084.10	81296.94	103757.80	132424.01
Non-target Group Invest.	0.00	7365.36	8940.83	11218.51	14594.35
Target Group Investment	0.00	12923.21	15245.74	18707.73	23693.22
Subsidy Required	0.00	4228.31	4296.37	3967.80	3883.71
Total Housing Investment	0.00	24516.88	28482.93	33894.04	42171.27
Rural Areas					
Total Housing Expend.	29503.76	36560.57	47632.07	60791.89	77587.5
Non-target Group Invest.	0.00	2565.16	4388.54	6794.23	10031.8
Target Group Investment	0.00	5935.10	8319.71	11237.37	15005.6
Subsidy Required	0.00	3630.07	3897.38	3857.56	3784.4
Total Housing Investment	0.00	12130.33	16605.64	21889.15	28822.0
Total Housing Investment in the Base Year	17799.00				
Subsidy as a Percent of Public Expenditures	0.00	11.29	9.24	6.84	5.2
Total Housing Investment as a Percent of GDP	2.54	7.08	6.68	6.45	6.4

the relative size of the subsidy (11 percent of total projected government capital expenditures in 1989), and the required level of housing investment as a percent of GDP (7.1 percent), the widespread application of Alternative 1 housing standards in Ecuador would not appear to be financially feasible. Certainly when one considers other important demands for the public sector capital expenditures, the subsidy levels required to implement Alternative 1 standards are not economically practical.

What if some of the assumptions concerning the determinants of household income and affordability were altered? Two sensitivity analyses were prepared to test the impact of key factors such as interest rates, GDP growth, inflation rates, and construction cost escalation rates. These are designated as "Alternative 1-Best Case" and "Alternative 1-Worst Case" and are presented in Tables 23 and 24, respectively.

For the Best Case, it was assumed that interest rates were set at 18 percent instead of the 21 percent rate used in the base case scenario. GDP was estimated to grow at a rate of 6 percent higher than in the base case for all projects. Inflation was assumed at an annual rate of 15 percent. Construction costs were assumed to escalate in the Best Case at the rate of general inflation, as in the base case scenario.

With the combination of these optimistic assumptions concerning household affordability, the level of subsidy required (as shown in Table 23) drops by 30 percent to 7.5 billion sucres in 1989 (it was 10.8 billion in the base case). However, even with these optimistic assumptions,

Table 23. Alternative 1 - Best Case: Housing Investment in Relation to GDP, 1984-2004

	1984	1989	1994	1999	2004
	-----	-----	-----	-----	-----
(Millions of Currency Units)					
Country					
Total Housing Expend.	138850.20	195797.40	248587.20	332665.60	445181.50
Non-target Group Invest.	0.00	29788.88	46116.33	62924.43	103274.50
Target Group Investment	0.00	33831.16	36598.77	48590.80	47502.95
Subsidy Required	0.00	7522.77	7113.60	6856.38	6637.58
Total Housing Investment	0.00	71142.81	89828.69	118371.60	157415.00
Metropolitan Area					
Total Housing Expend.	54751.57	72896.10	96300.72	128972.10	172459.90
Non-target Group Invest.	0.00	16975.20	21027.67	28073.99	45215.49
Target Group Investment	0.00	9354.56	11390.88	14794.98	11615.10
Subsidy Required	0.00	1823.73	1777.49	1736.19	1670.09
Total Housing Investment	0.00	28153.49	34196.04	44605.15	58500.67
Other Urban Areas					
Total Housing Expend.	54594.87	72687.48	96025.11	128503.20	171966.30
Non-target Group Invest.	0.00	9555.92	19099.87	25128.75	43007.99
Target Group Investment	0.00	16819.06	13679.15	17533.03	13161.41
Subsidy Required	0.00	2822.53	2594.79	2597.51	2678.27
Total Housing Investment	0.00	29195.51	35393.82	45259.30	58847.67
Rural Areas					
Total Housing Expend.	29503.76	40213.84	56261.33	75290.33	100755.40
Non-target Group Invest.	0.00	3259.76	5988.79	9721.69	15051.03
Target Group Investment	0.00	7657.54	11508.73	16262.78	22726.43
Subsidy Required	0.00	2876.51	2741.32	2522.68	2289.23
Total Housing Investment	0.00	13793.82	20239.84	28507.16	40066.69
Total Housing Investment in the Base Year	17799.00				
Subsidy as a Percent of Public Expenditures	0.00	7.18	5.07	3.65	2.64
Total Housing Investment as a Percent of GDP	2.54	7.58	7.15	7.04	7.00

Table 24. Alternative 1 - Worst Case: Housing Investment in Relation to GDP, 1984-2004

	1984	1989	1994	1999	2004
	-----	-----	-----	-----	-----
(Millions of Currency Units)					
Country					
Total Housing Expend.	138850.20	164896.70	200580.50	249959.70	311495.20
Non-target Group Invest.	0.00	13179.04	11515.55	15300.80	20385.86
Target Group Investment	0.00	32037.22	39791.31	48817.94	61091.49
Subsidy Required	0.00	15334.93	19875.38	24474.68	30159.39
Total Housing Investment	0.00	60551.19	71182.24	88553.42	111526.90
Metropolitan Area					
Total Housing Expend.	54751.57	64695.89	77703.30	96832.42	120670.80
Non-target Group Invest.	0.00	6970.16	7849.77	9759.37	12296.76
Target Group Investment	0.00	10715.25	11896.89	14470.03	17348.40
Subsidy Required	0.00	4579.41	5607.49	6704.61	8587.11
Total Housing Investment	0.00	22264.83	25354.15	31134.02	38732.26
Other Urban Areas					
Total Housing Expend.	54594.87	64510.73	77480.91	96555.25	120325.40
Non-target Group Invest.	0.00	6208.88	7100.00	8000.00	9000.00
Target Group Investment	0.00	10864.57	21015.04	25261.15	31369.70
Subsidy Required	0.00	6417.50	8202.70	9821.97	12146.19
Total Housing Investment	0.00	23490.94	29217.74	35083.13	43515.89
Rural Areas					
Total Housing Expend.	29503.76	35690.13	45396.25	56571.98	70498.97
Non-target Group Invest.	0.00	0.00	3665.78	5541.43	7989.10
Target Group Investment	0.00	10457.40	3879.38	9086.76	11363.39
Subsidy Required	0.00	4338.02	6065.18	7708.10	9426.30
Total Housing Investment	0.00	14795.42	16610.34	22336.29	29278.79
Total Housing Investment in the Base Year	17759.00				
Subsidy as a Percent of Public Expenditures	0.00	16.49	17.57	17.33	17.17
Total Housing Investment as a Percent of GDP	2.54	7.27	7.02	7.01	7.08

housing subsidies still would require more than 7 percent of total public sector capital expenditures, a relatively high percentage considering Ecuador's other capital requirements. In addition, 43 percent of all the target group households would still require some subsidy. While the results in the Best Case scenario are clearly better, they still indicate a degree of government support in housing that might not be sustainable for a 20-year period.

What if less optimistic assumptions concerning household income and affordability are utilized? The Worst Case scenario assumes that interest rates will rise to 24 percent and that GDP growth will range from 3.5 percent annually during the first 5-year period and rise to 4.5 percent in later years. In addition, it is assumed that construction costs escalate at a rate of 2 percent greater than the general inflation rate of 21 percent.

While these assumptions for the Worst Case scenario are not any less plausible than those assumed in the Best Case earlier, the results of the Worst Case scenario under Alternative 1 housing standards are nearly disastrous. Over 65 percent of all target group households would require some subsidy in 1989 and subsidies that year would total nearly 15 billion sucres, or nearly 17 percent of the total public sector capital expenditures projected for 1989.

The results of the base case scenario and two sensitivity analyses demonstrate that housing standards corresponding to those in Alternative 1 are not financially feasible in Ecuador if widespread solutions to the housing needs are to be implemented. Either Ecuador must resign itself to ever-growing numbers of its people occupying the

squatter shanties of the informal sector, or more realistic lower-cost housing alternatives must be actively sought.

Alternative 2

What of the standards which have been implemented on a modest scale through a variety of public sector low-cost housing schemes in Ecuador? Projects supported by institutions such as the IBRD and AID and administered by JNV/BEV have targeted lower income household shelter requirements. These projects have been or are currently being implemented in Quito and Guayaquil and in secondary cities. Design and costs data for one of these ongoing projects in the Solanda area of Quito were used as being generally representative of these type of projects and also because current and reasonably accurate cost data for this project were available.

Generally, the housing standards of these projects are slightly lower than those defined in Alternative 1. These projects use the concept of progressive housing programs where core houses or starter units with services are provided, and families improve and/or expand these units as their financial resources, time, and innovation permit. While implementation problems have invariably arisen, these progressive housing programs have been considered successful in terms of providing adequate housing to lower-income households.

Table 25 presents estimates of design level 2 costs for Alternative 2 based on housing types and costs of these progressive housing projects.¹ The costs for land and

1. Design level 1 costs (upgrading an existing unit) are assumed to be the same as those specified in Alternative 1.

infrastructure are the same as used in Alternative 1. However, the basic housing unit from these projects consists of only 24m² of construction as compared to the 33m² estimated in Alternative 1. In this alternative, it is assumed that concrete is used as the primary construction material. Design level 2 costs based on these standards would be 450 thousand, 439 thousand, and 336 thousand sucres in metropolitan, other urban, and rural sectors, respectively.

Also shown in Table 25 are the Alternative 2 costs estimates for design level 3 (minimum formal sector prices). In this alternative, we have assumed that the minimum acceptable design level 3 unit would consist of 50m² of construction (as compared to 68m² in Alternative 1) and that lot size in metropolitan areas would be 90m² as opposed to 100m² used earlier. The resulting Alternative 2 costs for design level 3 are 763 thousand sucres in metropolitan areas, 729 thousand sucres in other urban areas, and 627 thousand sucres in rural areas.

Table 26 shows the comparison of Alternative 2 design costs against the base case housing affordability levels for each quintile in the metropolitan sector. While the first two quintiles still are classified at affordable level 1 in 1984, the next two quintiles have improved and are now classified at affordable levels 2 and 3, respectively.¹ Also, by 1994, due to growth in average household income implied by the base case assumptions, the second quintile will move up from a design level 1 classification to design

1. Recall from Table 19A that the third and fourth quintiles under Alternative 1 standards were classified at only affordable level 1 and 2, respectively.

Table 25. Alternative 2: Estimate of Design Level 2
and Design Level 3 Costs by Sector, 1984
(1984 sucres)

Design level and cost component	Metropolitan	Other urban	Rural
<u>Design Level 2</u>			
Land	60,000	24,000	12,000
Infrastructure	80,000	107,000	40,400
Urbanized land ^a	140,000	131,000	52,400
House construction (24m ²) ^b	206,400	206,400	206,400
Indirect costs and contingencies ^c	103,400	101,200	77,600
Total sales price	449,800	438,600	336,400
<u>Design Level 3</u>			
Land ^d	67,500	24,000	12,000
Infrastructure	89,500	107,000	40,400
Urbanized land	157,000	131,000	52,400
House construction (50m ²) ^b	430,000	430,000	430,000
Indirect costs and contingencies ^c	176,100	168,300	144,700
Total sales price	763,100	729,300	627,100

a. Base on same assumptions as in Alternative 1.

b. Based on construction costs of 8,600 sucres per m² as in Alternative 1.

c. Based on 30 percent of direct costs as explained in Table 17.

d. For metropolitan area assumes a lot size of 90m².

Source: Derived from current cost and housing types included in Solanda project as provided by AID/Ecuador Office of Housing and Urban Development.

Table 26. Alternative 2: Metropolitan Sector
Comparison of Design Cost and Quintile Housing
Affordability, 1984-2004

	1984	1989	1994	1999	2004
	-----	-----	-----	-----	-----
Metropolitan Area					
Quintile 1					
Affordable Costs	164.45	167.82	178.67	198.70	221.40
Affordable Level	1.00	1.00	1.00	1.00	1.00
Design Cost	94.40	94.40	94.40	94.40	94.40
Quintile 2					
Affordable Costs	430.93	439.75	468.18	520.67	580.16
Affordable Level	1.00	1.00	2.00	2.00	2.00
Design Cost	94.40	94.40	449.70	449.70	449.70
Quintile 3					
Affordable Costs	491.35	501.40	533.81	593.66	661.49
Affordable Level	2.00	2.00	2.00	2.00	2.00
Design Cost	449.70	449.70	449.70	449.70	449.70
Quintile 4					
Affordable Costs	950.47	969.92	1032.62	1148.39	1279.61
Affordable Level	3.00	3.00	3.00	3.00	3.00
Design Cost	763.10	763.10	763.10	763.10	763.10
Quintile 5					
Affordable Costs	1617.68	1650.79	1757.49	1954.53	2177.87
Affordable Level	3.00	3.00	3.00	3.00	3.00
Design Cost	763.10	763.10	763.10	763.10	763.10

level 2. This would not have occurred under Alternative 1 standards until 2004.

Is a nationwide program aimed at meeting the total projected housing needs of the Ecuadorean population at these lower standards financially viable? The answer indicated through the estimates shown in Table 27 is "probably not." Although such a program clearly could reach a much wider portion of the population than could one based on Alternative 1 standards, the number of target group households and the subsidies required for its implementation would still absorb a significant portion of total public sector capital expenditures -- probably unacceptable given the other pressing development needs of the country.

Total annual subsidies required in 1989 under Alternative 2 standards would be approximately 6.3 billion sucres, or 6.7 percent of projected total public sector capital expenditures. In this alternative, nearly 50 percent of all target group households would still require some subsidy. Subsidies would account for 25 percent of the total annual capital cost of the target group.

These results based on Alternative 2 standards were subjected to the same sensitivity tests that were used for Alternative 1. Thus the same "Best Case" and "Worst Case" assumptions were applied for Alternative 2. The results of these sensitivity test are compared to those of Alternative 2 base case scenario in Table 28 below.

Table 27. Alternative 2: Housing Investment in
Relation to GDP, 1984-2004

	1984	1989	1994	1999	2004
	-----	-----	-----	-----	-----
(Millions of Currency Units)					
Country					
Total Housing Expend.	138649.80	168675.90	210160.90	268224.40	342329.70
Non-target Group Invest.	0.00	22949.07	28346.64	43120.58	57098.87
Target Group Investment	0.00	26047.64	31715.46	33281.42	42730.09
Subsidy Required	0.00	6330.80	6435.11	6223.55	6408.23
Total Housing Investment	0.00	55327.51	66497.22	82625.56	106227.20
Metropolitan Area					
Total Housing Expend.	54551.20	66031.23	81231.91	103674.80	132318.10
Non-target Group Invest.	0.00	13018.55	15017.27	19121.46	24674.86
Target Group Investment	0.00	7189.33	8150.01	10098.93	12689.41
Subsidy Required	0.00	1601.53	1599.84	1677.43	1748.15
Total Housing Investment	0.00	21809.41	24767.13	30897.82	39112.42
Other Urban Areas					
Total Housing Expend.	54594.87	66084.10	81296.94	103757.80	132424.00
Non-target Group Invest.	0.00	7365.36	8940.83	17204.90	22382.14
Target Group Investment	0.00	12923.21	15245.74	11945.12	15035.01
Subsidy Required	0.00	2479.10	2553.67	2361.78	2529.57
Total Housing Investment	0.00	22767.67	26740.23	31511.80	39946.72
Rural Areas					
Total Housing Expend.	29503.76	36560.57	47632.07	60791.89	77587.53
Non-target Group Invest.	0.00	2565.16	4386.54	6794.23	10031.86
Target Group Investment	0.00	5935.10	8319.71	11237.37	15005.67
Subsidy Required	0.00	2250.17	2281.60	2184.34	2130.52
Total Housing Investment	0.00	10750.43	14989.86	20215.93	27168.04
Total Housing Investment in the Base Year	17799.00				
Subsidy as a Percent of Public Expenditures	0.00	6.65	5.42	4.11	3.31
Total Housing Investment as a Percent of GDP	2.54	6.48	6.25	6.09	6.13

Table 28. Alternative 2: Comparison of
Sensitivity Analysis Results, 1989

	Base case	Best case	Worst case
Percent of target group households requiring subsidy	49.5	34.3	62.0
Annual subsidy required (billions of 1984 sucres)	6.3	4.8	9.9
Subsidy as a percent of target group capital cost	24.8	17.5	32.9
Subsidy as a percent of public capital expenditures	6.7	4.5	10.7

Source: Housing Needs Assessment model based on assumptions discussed in text.

Under Alternative 2, Best Case assumptions, the financial feasibility of implementing a nationwide housing program appears more reasonable. Annual subsidies required in 1989 are only 4.8 billion sucres, representing 4.5 percent of public capital expenditures. The percentage of target group households requiring some subsidy (34 percent) and the subsidy as a percent of the target group capital costs (17.5 percent), while above ideal levels, are within a more acceptable range.

However, the Best Case scenario reflected optimistic assumptions continuing over a 20-year period. It is unlikely that these assumptions would remain valid for that entire period. For this reason, it would not seem valid to rely on Alternative 2 standards for meeting the total projected housing needs of Ecuador's population.

Does this mean that there is no hope for providing acceptable housing for a significant proportion of Ecuador's population over the next 20 years? Not at all. What is required is the provision of lower-cost housing solutions than are currently offered by either the public or private formal sector. Alternative 3 examines possible strategies and approaches for achieving this objective and analyzes the financial feasibility of a nationwide housing program based on these standards and strategies.

Alternative 3

A key factor in Ecuador's potential success in providing low-cost housing solutions to the substantial number of households projected to require such shelter is the possibility of involving the private sector in such activities. Currently, many municipalities in Ecuador possess building codes and regulations which effectively prohibit contractors from offering and constructing units affordable to low-income families. The result has been that families operating in the "informal" sector, outside of existing legal procedures, increasingly invade often marginal land and construct housing that in nearly all cases would be considered substandard. Because the families lack tenure for the land (which is only possible through the formal sector), they are less likely to undertake significant home improvements or expansions to upgrade their housing. In addition, due to their legal status, these units cannot obtain basic sanitary services from their neighboring municipality.

Perhaps due to an inclination to deny that these invasions are truly part of the urban area, or perhaps just due to the lack of financial resources, municipalities are

often reluctant to undertake measures to improve the living conditions of these households. However, ignoring the problems will not provide any solutions and over the longer term can lead to greater costs in terms of disease, crime, and the general social welfare of an area.

Alternative 3 assumes that the scope of these problems will be recognized and that corrective measures will be undertaken, such as the lowering of municipal building codes and regulations and granting land tenure to low-income households. In addition, it assumes that feasible, low-income housing units will be constructed of local materials, using construction techniques that have proven successful and practical in other Latin American countries.

Examples of these alternatives to concrete for construction include adobe and wood construction in the Sierra region and the greater use of bamboo in the coastal areas. Currently, several pilot projects are underway that should provide valuable information concerning the application of these construction techniques in Ecuador. While this assessment cannot specify which of these or other techniques are the most applicable to meet the housing needs for Ecuador, it does appear that perhaps several alternative approaches using local construction materials are indeed feasible from a construction point of view.

What would be the financial implication of undertaking such measures and the use of local construction materials for a national housing program in Ecuador? Table 29 presents cost estimates for constructing design level 2 units based on Alternative 3 assumptions. The costs of two types of

Table 29. Alternative 3: Estimate of Design Level 2
Costs for Two Types of Units by Sector
(1984 sucres)

Design level and cost component	Metropolitan	Other urban	Rural ^a
<u>Pisco-Techo Unit</u>			
Land	60,000	24,000	--
Infrastructure, Urbanized land ^b	<u>80,000</u>	<u>107,000</u>	<u>--</u>
	140,000	131,000	--
House construction (24m ²) ^c	144,000	144,000	--
Indirect costs and contingencies ^d	<u>82,500</u>	<u>82,500</u>	<u>--</u>
Total sales price	369,200	357,500	--
<u>Local Material Unit</u>			
Land	60,000	24,000	12,000
Infrastructure, Urbanized land ^b	<u>80,000</u>	<u>107,000</u>	<u>40,400</u>
	140,000	131,000	52,400
House construction (36m ²) ^e	154,800	154,800	154,800
Indirect costs and contingencies ^d	<u>88,400</u>	<u>85,700</u>	<u>62,100</u>
Total sales price	383,200	371,500	269,300
Average sales prices of two types of units	376,200	364,500	269,300

a. Pisco-techo units of concrete construction were not assumed to be provided in the rural sector.

b. Based on same assumptions as in Alternative 1.

c. Based on construction costs of 6,000 sucres per m² utilizing data from Solanda project currently estimated at 5,600 sucres and inflated to end of year.

d. Based on 30 percent of direct costs as explained in Table 17.

e. Based on construction of adobe and wood in Sierra regions and bamboo and cement in Coast regions utilizing current estimated average cost of 4,000 sucres per m² and inflated to 4,300 sucres by end of year.

Source: Pisco-techo construction costs from Solanda project as provided by AID/Ecuador Office of Housing and Urban Programs and local material construction costs from discussion with local housing officials.

units are shown, one based on the piso-techo concept and concrete construction and the other based on a completed unit using local materials. The piso-techo unit was included due to the possibility that in metropolitan areas, such as Quito, the availability and lower cost of local materials such as adobe might not be universally possible. In addition, the piso-techo concept was considered to provide a better alternative than a strictly sites-and-services approach due to the climatic conditions in the Sierra. The estimated cost of a piso-techo unit of 24m² of construction based on the recent Solanda experience would be 369 thousand sucres in the metropolitan area and 357 thousand sucres in other urban areas.¹

The costs of a design level 2 unit constructed of local materials, such as adobe, wood, or bamboo, are not available from current projects in Ecuador. In addition, cost estimates obtained from pilot projects would not necessarily be applicable to a more widespread and greater use of economies of scale associated with a national housing program. The costs per m² of construction used for Alternative 3 as shown in Table 28 of 4,300 sucres may be high. A sensitivity analysis discussed later will estimate the overall impact of different cost estimates. A completed house of 36m² of construction using local materials was estimated to cost 383 thousand, 371 thousand, and 269 thousand sucres in metropolitan, other urban, and rural areas, respectively.²

1. These prices include the cost of land, which was provided free in the Solanda project.

2. The costs for design level 1 and design level 3 were assumed to be the same as those in Alternative 2 discussed earlier.

Alternative 3 therefore assumes that design level 2 costs would be an average of the piso-techo unit and the local construction materials unit. The impact of using the costs of household affordable housing level is shown for each quintile of the metropolitan areas in Table 30. With Alternative 3 standards, the second quintile can now afford a design level 2 unit, whereas in the other alternatives households in this income group could only afford an upgrade. In other urban areas, the second quintile will be able to afford a design level 2 unit by 1984, whereas in Alternative 2 this would not occur until 1994.

Table 31 presents data on housing investment and subsidies required in each sector based on Alternative 3 standards. Total annual subsidies required in 1989 would be 4.0 billion sucres accounting for 4.3 percent of the projected public sector capital expenditures. The percent of target group households requiring some subsidy is estimated at 31.7 percent in 1989, and the subsidy portion would represent only 19 percent of their annual capital costs that year.

These results look indeed to be more financially feasible than either of the other two alternatives. A national housing program utilizing the minimum housing standards of Alternative 3 appears to be financially feasible for meeting the objective of providing adequate housing for the entire Ecuadorean population over the next 20-year period. The lowering of minimum standards to include the utilization of local materials does not mean that everyone will be living in a house of adobe or bamboo. The model realistically assumes that all households will spend up to their affordability limit for housing. What is crucial is

Table 30. Alternative 3: Metropolitan Sector
Comparison of Design Costs and Quintile Housing
Affordability, 1984-2004

	1984	1989	1994	1999	2004
	-----	-----	-----	-----	-----
Metropolitan Area					
Quintile 1					
Affordable Costs	164.45	167.82	178.67	198.70	221.40
Affordable Level	1.00	1.00	1.00	1.00	1.00
Design Cost	94.40	94.40	94.40	94.40	94.40
Quintile 2					
Affordable Costs	430.93	439.75	468.18	520.67	580.16
Affordable Level	2.00	2.00	2.00	2.00	2.00
Design Cost	375.60	375.60	375.60	375.60	375.60
Quintile 3					
Affordable Costs	491.35	501.40	533.81	593.66	661.49
Affordable Level	2.00	2.00	2.00	2.00	2.00
Design Cost	375.60	375.60	375.60	375.60	375.60
Quintile 4					
Affordable Costs	950.47	969.92	1032.62	1148.39	1279.61
Affordable Level	3.00	3.00	3.00	3.00	3.00
Design Cost	763.10	763.10	763.10	763.10	763.10
Quintile 5					
Affordable Costs	1617.68	1650.79	1757.49	1954.53	2177.87
Affordable Level	3.00	3.00	3.00	3.00	3.00
Design Cost	763.10	763.10	763.10	763.10	763.10

Table 31. Alternative 3: Housing Investment
in Relation to GDP, 1984-2004

	1984	1989	1994	1999	2004
(Millions of Currency Units)					
Country					
Total Housing Expend.	138649.80	168675.90	210160.90	268224.40	342329.70
Non-target Group Invest.	0.00	22949.07	28346.64	43120.58	57088.87
Target Group Investment	0.00	26047.64	31715.47	33281.42	42730.09
Subsidy Required	0.00	4054.04	4134.02	4209.50	4140.85
Total Housing Investment	0.00	53050.74	64196.12	80611.50	103959.80
Metropolitan Area					
Total Housing Expend.	54551.20	66031.23	81231.91	103674.80	132318.10
Non-target Group Invest.	0.00	13018.55	15017.27	19121.46	24674.86
Target Group Investment	0.00	7189.33	8150.01	10098.93	12889.41
Subsidy Required	0.00	1140.30	1162.47	1182.25	1180.77
Total Housing Investment	0.00	21348.18	24329.75	30402.64	38545.05
Other Urban Areas					
Total Housing Expend.	54594.87	66084.10	81296.94	103757.80	132424.00
Non-target Group Invest.	0.00	7365.36	8940.83	17204.90	22382.14
Target Group Investment	0.00	12923.21	15245.74	11945.12	15035.01
Subsidy Required	0.00	1527.60	1459.87	1741.01	1816.60
Total Housing Investment	0.00	21816.17	25846.44	30891.02	39233.75
Rural Areas					
Total Housing Expend.	29503.76	36560.57	47632.07	60791.89	77587.53
Non-target Group Invest.	0.00	2565.16	4388.54	6794.23	10031.86
Target Group Investment	0.00	5935.10	8319.71	11237.37	15005.67
Subsidy Required	0.00	1386.14	1311.68	1286.25	1143.48
Total Housing Investment	0.00	9886.40	14019.93	19317.84	26181.00
Total Housing Investment in the Base Year	17799.00				
Subsidy as a Percent of Public Expenditures	0.00	4.26	3.48	2.78	2.14
Total Housing Investment as a Percent of GDP	2.54	6.21	6.03	5.94	6.00

that low-cost alternatives be provided for low-income households and that a range of alternative housing units be offered that include these low-cost units.

As with the other alternatives, sensitivity analyses were conducted utilizing a Best Case scenario and Worst Case scenario for Alternative 3. Again both these scenarios apply the same assumptions as in the earlier sensitivity analyses. The results of these sensitivity analyses for Alternative 3 are presented in Table 32 below.

Table 32. Alternative 3: Comparison of Sensitivity Analysis Results, 1989

	Base case scenario	Best case scenario	Worst case scenario
Percent of target group households requiring subsidy	31.7	30.0	49.1
Annual subsidy required (billions of 1984 sucres)	4.1	3.1	6.0
Subsidy as a percent of target group capital cost	19.0	16.4	23.9
Subsidy as a percent of public capital expenditures	4.3	3.0	6.5

Source: Housing Needs Assessment Model based on assumptions discussed in text.

As might have been expected, the results of the Best Case look promising indeed. With an annual subsidy of only 3.1 billion sucres required in 1989, representing only 3.0 percent of public capital expenditures, this program would clearly be affordable.

What happens to the feasibility of a national housing program based on Alternative 3 standards under the assumptions of the Worst Case scenario? The affordability of the program is, of course, not as favorable under these assumptions. Still with the subsidy at 6.5 percent of total public capital expenditures and an annual subsidy of 6.0 billion sucres, a program based on Alternative 3 standards would not be disastrous under the Worst Case scenario.

As all of the Worst Case conditions are unlikely to persist continuously over a 20-year period -- as is assumed in the results shown in Table 32 -- this Worst Case scenario might best be interpreted as indicating that even during the periodic short-term economic downturns which may occur, the implementation of a nationwide housing program following the broad parameters of Alternative 2 appears feasible.

Further Sensitivities and Summary of Results

As indicated above, Alternative 3 seems to provide the general outline of a feasible housing program that can realistically aspire to satisfy Ecuador's projected housing needs. It merits further investigation and development.

Seven further sensitivity tests were conducted utilizing the assumptions of the Alternative 3 Base Case scenario. The assumptions which varied from the base case assumptions for each sensitivity are described below:

Sensitivity analysis	Assumption changed
No. 1	Assumes population growth rate in each sector and each period at 10 percent greater than base case.
No. 2	Cost per m ² of construction using local materials such as adobe or bamboo at 20 percent higher.
No. 3	Cost per m ² of construction using local materials at 20 percent lower.
No. 4	Assumes all upgrading and replacement of non-upgradable housing stock occurs within 10 years.
No. 5	Assumes no graduation of mortgage payments.
No. 6	Assumes a graduation of mortgage payments at 6 percent annually.
No. 7	Assumes only 20 percent of household income is devoted to housing for the richest and poorest quintiles. The three middle quintiles were assumed to devote 25 percent.

The results of these sensitivity analyses as well as a summary of the main scenarios for the three alternatives analyzed are presented for 1989 and 1994 in Table 33. It was felt that, although the planning period covered 20 years, the effects of the sensitivity analysis could be noticed by the 10-year point, or by 1994. The results of each of the sensitivity analyses will be briefly discussed.

If Ecuador's population increases at a rate of 10 percent higher than projected in the base case, a national housing program based on Alternative 3 assumptions would still appear to be financially feasible. While there would be a higher proportion of target group households requiring subsidy, subsidy levels would still be affordable at approximately 4.5 billion sucres annually, or about slightly over 4 percent of public capital expenditures.

Table 35. Summary of Results for Main Scenario for All Three Alternatives and Sensitivity Analysis for Alternative 3

Scenario and alternative	Percent of target group households requiring subsidy		Annual subsidy required (billion of 1984 sucses)		Subsidy as a percent of target group capital costs		Subsidy as a percent of public capital expenditures		Economic assumptions
	1989	1994	1989	1994	1989	1994	1989	1994	
<u>Base case scenario</u>									
Alternative 1	59.4	65.8	10.8	11.0	31.7	30.9	11.3	9.2	GDP growth ranging from 4-5 percent annually, inflation at 18 percent, interest rates at 21 percent.
Alternative 2	49.5	41.1	6.3	6.4	24.8	22.2	6.7	5.4	
Alternative 3	31.7	28.7	4.1	4.1	19.0	17.1	4.3	3.5	
<u>Best Case Scenario</u>									
Alternative 1	43.2	30.2	7.5	7.1	24.1	28.8	7.2	5.1	GDP growth at 6 percent annually, inflation at 15 percent, interest rates at 18 percent.
Alternative 2	34.3	25.2	4.8	4.6	17.5	17.5	4.5	3.3	
Alternative 3	30.0	25.2	3.1	2.9	16.4	13.4	3.0	2.1	
<u>Worst Case Scenario</u>									
Alternative 1	65.4	66.3	15.3	19.9	40.2	40.0	16.5	17.6	GDP growth ranging from 3.5-4.5 percent annually, inflation at 21 percent, construction inflation at 23 percent, interest rate at 24 percent.
Alternative 2	62.0	64.2	9.9	12.7	32.9	34.3	10.7	11.2	
Alternative 3	49.1	59.8	6.0	7.7	23.9	25.0	6.5	6.8	
<u>Alternative 1</u>									
Base case scenario with greater share of household income for housing	49.5	41.7	8.5	8.5	27.2	24.0	8.9	7.2	
Best case scenario with greater share of household income for housing	27.8	30.2	6.2	6.0	22.2	18.8	5.9	4.3	
<u>Alternative 3</u>									
1. 10 percent higher population growth rate	39.6	28.9	4.3	4.6	19.2	17.5	4.5	3.8	
2. Local materials cost 20 percent higher	43.2	33.4	4.9	5.0	21.5	19.3	5.2	4.2	
3. Local materials cost 20 percent lower	31.7	28.7	3.5	3.6	17.3	15.8	3.7	3.0	
4. Urban upgrade and replacement within 10 years	28.6	26.2	4.2	4.4	18.2	16.5	4.5	3.7	
5. No graduation of mortgage payments	52.5	41.1	5.1	5.2	24.0	21.5	5.4	4.4	
6. 6 percent annual graduated payment rate	31.7	31.1	3.7	3.8	17.2	17.5	3.9	3.2	
7. Smaller share of household income for housing	52.5	43.9	5.2	5.3	24.2	21.7	5.4	4.4	

Source: Housing Needs Assessment model based on assumptions discussed in text.

The effect of 20 percent lower or 20 percent higher construction costs utilizing local materials also would not materially affect the feasibility of a housing program based on Alternative 3 standards. Subsidy levels would range from 3.5 billion annually under the lower cost assumption to 5.0 billion annually under the higher cost assumption.

With respect to replacement and upgrading, it will be recalled that all scenarios presented up to this point have assumed that such activities would take place at the very modest rate of 5 percent of the existing substandard housing stock per year. At this rate, it would take a full 20 years to bring the existing substandard stock up to acceptable conditions, even assuming that no further growth of the substandard stock is permitted to take place.

What would be the impact on affordability if all of non-upgradable metropolitan and other urban housing stock is replaced in 10 years and if the upgradable housing stock is upgraded in 10 years? These assumptions imply an additional replacement of non-upgradable urban units of 2.9 thousand units annually and an additional 9.5 thousand units upgraded annually during the 1985-94 period. The financial effect of this accelerated upgrading and replacement of non-upgradable housing stock in the metropolitan and other urban areas is minimal and deserves further study.

The base case scenario assumed that household mortgage payments would utilize the graduated payment concept and would increase at a rate of 4 percent for the term of the loan. If this mechanism for mortgage payment were not permitted, it would adversely affect the housing affordability and subsidy requirement. The average affordable unit by

all households in all income groups would decrease by approximately 16 percent. The total annual subsidy requirements would increase slightly to over 5.1 billion sueres or over 5 percent of public capital expenditures. While this reduction in affordability is not substantial, it does indicate that the graduation of payments is one mechanism through which housing affordability can be improved. This conclusion is confirmed by analysis of an increase in the graduation rate of 6 percent.

Table 33 also presents a summary of the results of the three alternatives studied under the base case, best case, and worst case scenarios.

As shown in Table 33, the implementation of housing standards based on affordability can have a marked impact on the financial viability of a nationwide housing program designed to meet the basic needs of all households. Standards such as represented by Alternative 3 could reduce total subsidy requirements during the upcoming 1985-89 period by about 60 percent in comparison with Alternative 1. Similarly, such standards would reduce the subsidies required to implement the housing program by almost 35 percent as compared to a program based on Alternative 2 standards. Thus, a national housing program based on Alternative 3 standards would reduce subsidies to a level which, at 4.3 percent of projected public sector capital expenditures, might realistically be considered for implementation following detailed analysis and refinement of designs.

As shown in Table 33, Alternative 1 is unlikely to be feasible on a national scale even under the best of economic

conditions. Alternative 3, on the other hand, remains manageable even under worst case assumptions regarding economic growth, real construction cost escalation, and interest rates -- assumptions which are very unlikely to persist in combination over a 20-year period.

If the share of households' income devoted to housing is decreased for each quintile from the base case scenario, as in sensitivity analysis 1, annual subsidies in 1989 are estimated to be at 5.2 billion sucres, or 5.4 percent of total projected public capital expenditures. While this would be the highest level of subsidy required under any of the sensitivity analyses, Alternative 3 standards would still require less subsidies than any of the other alternative base case scenarios.

VI. CONCLUSIONS AND RECOMMENDATIONS

While Ecuador faces an enormous housing challenge in the upcoming years, the results of our analyses clearly indicate that this challenge is not insurmountable. Success in meeting the projected housing needs of its growing population will require decisive action and reversals of historical trends and precedent:

- . Minimum design standards for low-cost housing should be reduced from those currently proposed in preliminary national housing plans and from those currently being implemented as low-cost housing projects.
- . Municipal codes and regulations that hinder or prohibit the use of lower cost local housing construction materials and minimum lot size requirements should be revised, thus permitting the private formal sector to introduce these lower cost solutions.
- . Plans for a national housing program should contain a range of alternative solutions targeted from the lowest income groups to middle income groups. The housing requirements for these households whose income place them outside of the target group should be provided for by the functioning of the private formal sector.
- . Private sector participation in the financial, construction, and marketing of low-cost housing units should be greatly increased.

Public sector administrative procedures at both central and local levels of authority must be streamlined and abbreviated.

- . Public sector subsidies, which can never be entirely eliminated if the housing needs of the very poor are to be met, should be strictly contained and narrowly targeted.
- . The greater use of financial instruments, such as graduated payments, to increase the current level of affordability for low-income groups should be widely implemented.
- . Low-income families should be encouraged in their self-help efforts to gradually upgrade the quality of their dwellings. Government measures concerning the granting of land tenure and the increased availability of credit to support such efforts may be required.

While none of these conclusions is novel, it is hoped that the analyses presented herein will serve to focus the planning dialogue on the subject of housing needs in Ecuador on the issue of affordability of all households, particularly the growing needs of low-income families. This analysis has shown that feasible strategies exist for meeting Ecuador total housing needs in the next 10-20 years if sensible and affordable housing solutions are offered.

APPENDIX A. METHODOLOGY FOR ESTIMATING AVERAGE
HOUSEHOLD INCOME AND ITS DISTRIBUTION

Estimating Average Household Incomes

This section explains the methodology employed to derive an estimate of average household income and its application to derive estimates for 1984. The following data are required:

- I. Remuneration of salaried employees (national total)
- II. Returns to capital (national total)¹
- III. Net indirect taxes plus net profits of foreign companies
- IV. Gross domestic products
- V. Rural salaries and wages
- VI. Rural returns to capital
- VII. Urban salaries and wages
- VIII. Urban returns to capital
- IX. Number of rural households (rural population/average rural household size)

1. In the Ecuadorian National Income Accounts, returns to capital are designated "Excedente Bruto de Explotacion."

- X. Number of urban households (urban population/average urban household size)
- XI. Ratio of household sizes in the metropolitan, other urban and rural sectors
- XII. Estimated ratio of average metropolitan to average other urban household income.

The methodology employed includes the following steps:¹

- . Calculation of total income attributable to wages and to the returns to capital:

$$\text{XIII} = \text{I} + \text{II}$$

- . Calculation of total income in the rural and urban sectors:

$$\text{XIV} = \text{V} + \text{VI}$$

$$\text{XV} = \text{VII} + \text{VIII}$$

- . Sectoral income percentages:

$$\text{XVI} = \text{XIV}/(\text{XIV} + \text{XV})$$

$$\text{XVII} = \text{XV}/(\text{XIV} + \text{XV})$$

- . Calculation of national income:

$$\text{XVIII} = \text{IV} - \text{III}$$

- . Rural income:

$$\text{XIX} = \text{XVI} \times \text{XVIII}$$

1. Formulas designate variables by the Roman numerals used above.

. Urban income

$$XX = XVII \times XVIII$$

. Average annual income of rural households:

$$XXI = XIX/IX$$

. Average annual income of urban households:

$$XXII = XX/X$$

The data from the National Income Accounts shown in Table A-1 were applied to these equations:

Table A-1.

(1984 millions of current sucres)^a

Wages and salaries	186,430
Returns to capital	450,125
Net indirect taxes	65,039
Net profits of foreign companies	36,581
Gross domestic product	701,594
Rural wages and salaries ^b	9,105
Rural returns to capital ^b	79,837
Urban wages and salaries ^b	69,146
Urban returns to capital ^b	253,965
Rural population ^c	3,195
Urban population ^c	5,272
Number of rural households ^d	614,423
Number of urban households ^d	1,103,252

a. Estimated to end-1984, using regression analysis and the assumptions presented in Chapter IV.

b. See Table A-2.

c. In thousands.

d. As defined in Chapter III.

The following results were obtained:

XXIII = S/17,577 average monthly income of rural households

XXIV = S/35,530 average monthly income of urban households

To disaggregate urban incomes into "metropolitan" and "other urban," the ratio of 1.35 was used, based on AID Project Paper 518-0037, Annex V. Also average household sizes of 4.75 (metro) and 4.8 (other urban) were used, as discussed in Chapter III.¹

Hence,

XXIV (a) S/41,716 average monthly income of metropolitan households

XXIV (b) S/30,901 average monthly income of other urban households

1. The following formulas are used:

a. Number of metropolitan households =

$$\frac{\text{Metro population}}{\text{avg. metro hh. size}} = \frac{2,242,000}{4.75} = 472,210$$

Number of other urban households

$$= \frac{\text{other urban population}}{\text{avg. other urban hh. size}} = \frac{23,029,000}{4.8} = 631,04$$

b. Percent of urban households: metropolitan = 42.8%
other urban = 57.2%

c. Ratio of average household income, metro/other urban 1.35. Therefore other urban income is given by: $(.428) (1.35 X) + (.572) X = 35,530$
 $X = 30,901$ and metropolitan income by: $1.35 X = 41,716$.

Estimating the Distribution of Household Income

The method used for updating income distribution estimates from the 1974 utilizes the following variables taken from the National Income Accounts:

- . Total remuneration of employees in urban and rural areas, which includes total payments made in cash or in kind by employers to employees during the year.
- . Legal minimum wage levels.
- . Returns to capital in the urban and rural sectors.
- . Wages and salaries, as well as returns to capital, at the national level.
- . Final consumption expenditures of the public sector.
- . Net indirect taxes on production. These include taxes on production, on foreign trade and on the utilization of factors of production. Subsidies provided to the private sector are deducted from total indirect taxes.
- . Gross domestic product at current prices.
- . National investment (gross fixed capital formation).
- . Sectoral investment (gross fixed capital formation in each sector).

Values for these variables are presented in Table A-2.

Table A-2. Data Inputs for Updating Income
Distribution Estimates

(Millions of current sucres)

	1975	1984 ^a
Gross domestic product	107,740	701,594
Remuneration of employees	32,047	186,430
Returns to capital	64,953	450,125
Indirect taxes (net)	10,740	65,039
National investment	29,907	126,940
Rural employee remunerations ^b	2,708	9,105
Urban employee remunerations ^b	8,273	69,146
Rural returns to capital ^b	18,782	79,837
Urban returns to capital ^b	50,099	253,965
Investment rural sector	2,083	8,333
Investment urban sector	15,170	58,180
Legal minimum wage ^c	2,000	6,600
Public sector consumption	15,624	84,100

a. Estimated for end-1984.

b. Urban employee remunerations and returns to capital do not include the petroleum, mining, construction, public works or community and personal services sectors, because income derived from these activities is either appropriated by the public sector or is roughly proportionately distributed between urban and rural areas.

c. Sucres per month.

The methodology developed for updating income distributions, which makes use of the data presented in Table A-2, is based on the premise that different strata of the size distribution of income derive their incomes from wages and salaries (remuneration of employees) and from profits (returns to capital) in different proportions. Changes in the functional distribution¹ of income over time therefore

1. Relative participation of wages and salaries vs. profits in national income.

may be expected to affect the incomes of different strata of the size distribution in different ways. Taxation of wages and of profits are also considered in assessing the changes which have taken place in disposable income.

Starting with this basic premise, factors have been estimated to quantify these impacts for each quintile of the household income distribution in each region of Ecuador. As explained below, the incidence of each factor is different for each quintile, depending on the relative importance of wages versus profits in the total income of the quintile. The following factors have been derived:

- . Factor I. Ratio of the minimum wage level in 1984 to the minimum wage in 1975, weighted by the ratio of total wages to total profits in 1984.

Factor I is applied to incomes of the first quintile with a weight of 1.0 and to incomes of the second quintile with a weight of .75. This is because changes in the minimum wage only affect lower income wage-earners.

- . Factor II. After tax remunerations in 1984, as a percentage of total remunerations, over this same percentage calculated for 1975 (this factor captures changes in the after tax share of wage income over time).

Taxes on wage earnings (remunerations) are estimated as the difference between public sector consumption and net indirect taxes.

This factor is applied with a weight of 1.0 to incomes of the third quintiles. This is because households in this quintile depend almost exclusively on wage earnings. Their incomes are high enough, however, so as not to be exempt from income taxes. The factor is applied to the second quintile with a weight of only .25, as earnings within this group are lower and exempt from income taxes to a much greater degree.

In the case of the fourth quintile, the factor is applied with a weight of .66, as .34 percent of their earnings, and 100 percent of the earnings of quintile five, are affected by Factor III (explanation below).

Factor III. The 1984 share of profits left after investment and payments to other income groups for domestic services are deducted is related to that share in 1975. This ratio is a proxy for the change which has taken place in the proportion of income from profits which is available for consumption.

This factor is applied with a weight of 1.0 to incomes of quintile 5, due to the importance of returns from capital to the incomes of this group. It is applied with a weight of .34 to the incomes of the fourth quintile.

Each of these factors, weighted according to their incidence, is applied to the 1975 income shares of each quintile. Each factor individually acts on all quintiles in that, in increasing the share of one quintile, it must necessarily decrease the share of all other quintiles. The impact of all factors taken together on the original income distribution is derived from the product of the individual impacts of each factor, as is shown under the heading "Total Factors" in Tables A-3 and A-4 below. "Total Factors," applied to the 1975 distribution, gives the estimated distribution at end-1984.

The census figures published in 1975 did not distinguish between metropolitan and other urban distributions. Income differentials for these two areas estimated by the Banco Ecuatoriano de la Vivienda were therefore applied to the updated total urban estimate in order to arrive at the required disaggregation.

TABLE A.3

RURAL-B1 INCOME DISTRIBUTION METHODOLOGY-NATIONAL ACCOUNTS

	1975	12	FACTORS			TOTAL
	DISTR	DISTR	I	II	III	FACTORS
1ST	2.8	0.14	1.3667737	1	1	1.2112492
2ND	6.4	0.33	1.2750803	1.0147944	1	1.1582941
3RD	12.3	0.615	1	1.0591778	1	0.9365099
4TH	17.3	0.865	1	1.0390573	1.0165242	0.937018
5TH	61	3.05	1	1	1.0492284	0.996762

DATA BASE	1975	1984	NEW DISTR*	
WAGES	32047	186430	1ST	3.4062056
RENT	64953	450125	2ND	7.677894
GROSS TAX	10740	65039	3RD	11.569027
GDP	107740	701594	4TH	16.280711
INVESTMENT	29907	126940	5TH	61.066163
MIN WAGES	2000	6600	TOTAL	100
PUB. EXPEND	15624	84100		
RURAL WAGE	2708	9105		
RURAL RENT	13782	79337		

RRL FACT 0.9858194 0.9889551 1.0352127 1.0129324
1.0380364

-----FACTOR I-----	-----FACTOR II-----	-----FACTOR III-----	TOTAL FACTORS				
1.3667737	0.9805618	0.9989546	0.9917003	0.9918296	0.9965433	0.9230017	1.2112492
0.9894345	1.2750803	1.0147944	0.9917003	0.9918296	0.9965433	0.9230017	1.1582941
0.9894345	0.9805618	0.9989546	1.0591778	0.9918296	0.9965433	0.9230017	0.9365099
0.9894345	0.9805618	0.9989546	0.9917003	1.0390573	1.0165242	0.9230017	0.937018
0.9894345	0.9805618	0.9989546	0.9917003	0.9918296	0.9965433	1.0492284	0.996762
5.3245117	5.1973274	5.0106127	5.0259789	5.0063757	5.0026974	4.7412353	5.2398331

TABLE A.4

METRO &
URBAN1

INCOME DISTRIBUTION METHODOLOGY-NATIONAL ACCOUNTS

	1975	1%	FACTORS			TOTAL
	DISTR	DISTR	I	II	III	FACTORS
1ST	3.5	0.175	1.3667737	1	1	1.4164452
2ND	8.3	0.415	1.2750803	1.0147944	1	1.3587541
3RD	12.4	0.62	1	1.0591778	1	1.0922334
4TH	22	1.1	1	1.0390573	0.9602029	1.0201379
5TH	5.8	2.69	1	1	0.9371893	0.8930235

DATA BASE	1975	1984	TOT URBAN DISTR*	
WAGES	32047	186430	1ST	4.9444425
RENT	24953	450125	2ND	11.247664
GROSS TAX	10740	65039	3RD	13.507672
GDP	107740	701594	4TH	22.583342
INVESTMENT	29907	126940	5TH	47.91688
MIN WAGES	2000	6600		
PUB. EXPEND	15624	84100		
URB WAGE	3273	69146		
URB RENT	50099	253965		
URB FACT	0.834867	0.7277341	0.8716768	1.0129324 1.0380364

	SURVEY FACTORS		NEW DISTRIBUTION	
	METRO BEV-83	URBAN BEV-83	METRO	URBAN
1ST	4.9	5.1	4.8633909	5.053681
2ND	8.2	9.1	10.753214	11.914083
3RD	13.3	16.6	12.226133	15.234927
4TH	24.8	21.9	23.571751	20.781606
5TH	48.6	47.3	48.585511	47.0157
TOTALS	100	100	100	100

FACTOR I	FACTOR II		FACTOR III		TOTAL FACTORS		
1.3667737	0.9751018	0.9986609	0.9916232	0.9889838	1.0112248	1.0731432	1.4164452
0.9866973	1.2750803	1.0147944	0.9916232	0.9889838	1.0112248	1.0731432	1.3587541
0.9866973	0.9751018	0.9986609	1.0591778	0.9889838	1.0112248	1.0731432	1.0922334
0.9866973	0.9751018	0.9986609	0.9916232	1.0390573	0.9602029	1.0731432	1.0201379
0.9866973	0.9751018	0.9986609	0.9916232	0.9889838	1.0112248	0.9371893	0.8930235
5.313563	5.1754874	5.0094331	5.0256707	4.9949926	5.0051022	5.2297622	5.780614

The differentials used are indicated under the heading "Survey Factors" in Table A-4.

The following section of this appendix presents the numerical calculations required to implement the methodology in full detail.

Calculations of Income Distribution Factors

Data for the following calculations are taken from Table A-2.

Factor I

- . Increase in minimum wages:
3.3 = 6,600/2,000
- . Ratio of wages/profits:
0.414 = 186,430/450,125
- . Factor for quintile 1: 1.367 = 3.3 x 0.414
- . Factor for quintile 2: 1.275 = 1 + (.367 x .75)

Factor II

- . Direct taxes on wages, 1984: 19,061/(=84,100
- 65,039)
1975: 4,884/(=15,624
- 10,740)
- . After tax wages as a percent of total wages,
1984: .898 (=186,430 - 19,061) (186,430)
1975: .848 (=32,047 - 4,884) (32,047)
- . Change in after tax share of wages:
1.059 (= .898/.848)
- . Factor for quintile 3: 1.059
- . Factor for quintile 2: 1.015 (=1 + (.059 x .25)

- Factor for quintile 4: $1.039 (=1 + (.059 \times .66))$

Factor III

- Profits net of investment = total profits (-) payments to other income groups (-) investment.
- Profits net of investment:
 - Rural sector 1975: $.745 = \frac{18,782 - 2,708 - 2,083}{18,782}$
 - 1984: $.782 = \frac{79,839 - 9,105 - 8,333}{79,837}$
- Change in share of net profits:

$$1.0492 = \frac{.782}{.745}$$
- Urban sector
 - 1975: $.532 = \frac{50,099 - 8,273 - 15,170}{50,099}$
 - 1984: $.499 = \frac{253,965 - 69,146 - 58,180}{253,965}$
- Change in share of net profits: $.937 = \frac{.499}{.532}$
- Factor for rural quintile 5: 1.0492
- Factor for rural quintile 4: $1.0165 (=1 + (0.49 \times .34))$
- Factor for urban quintile 5: .937
- Factor for urban quintile 4: $.979^1 (=1 (0.63 \times .34))$

1. Table A-4 contains an error in the calculation of this factor.

Total Factors

A factor causing an increase in the income distribution share of one quintile must result in a proportional reduction in the shares of all other quintiles. A formula for calculating the impact on the shares of other quintiles is given below:

$$AX_1 + B(X_2 + X_3 + X_4 + X_5) = 1.00$$

Therefore,

$$B = \frac{1.00 - AX_1}{1.00 - X_1}$$

where A is the increase in share of any given quintile and B gives the resulting decrease in share¹ of all other quintiles.

For example, Factor I implies an increase in the share of quintile of 36.68 percent, 1975-84. If so, then Factor I results in a decrease in share of all other quintiles equal to 1.1 percent (i.e. = 1.0 - 989):

$$B = \frac{1.00 - 1.3668 (0.28)}{1.00 - .028} = .989$$

The combined effect of all factors taken together is the product of the individual effects of each factor on each quintile. As shown in Table A-3, for example, the combined

1. The X's indicate the quintile income shares in the base year.

effect of all factors on the income share of quintile 1 in rural areas was estimated to have resulted in a net increase of about 21 percent, raising the share of this quintile from 2.8 percent of rural incomes in 1975 to about 3.4 percent in 1984.

APPENDIX B. SUPPLEMENTARY TABLES

ALTERNATIVE 1: BASE CASE SCENARIO
 NATIONAL AND HOUSEHOLD INCOMES

120.

	1984 ----	1989 ----	1994 ----	1999 ----	2004 ----
National Income (Constant Units)					
GDP (Millions of units)	701594.00	853596.20	1063736.00	1357626.00	1732713.00
GDP Ann. Growth Rate %	0.00	4.00	4.50	5.00	5.00
Agricultural GDP (Mill.)	151544.30	187791.20	244659.30	312254.00	398523.90
Non Agri. GDP (Mill.)	550049.70	665805.10	819076.70	1045372.00	1334189.00
Metropolitan Area					
Mean Annual Disposable Income					
All Households (1000s)	500.59	510.84	543.86	604.83	673.94
Annual Growth Rate of Mean Household Income %	0.00	0.41	1.26	2.15	2.19
Quintile Mean Incomes (1000s)					
1	122.65	125.15	133.24	148.18	165.12
2	267.82	273.30	290.96	323.58	360.56
3	305.36	311.61	331.75	368.95	411.10
4	590.70	602.79	641.75	713.70	795.25
5	1206.43	1231.11	1310.69	1457.64	1624.20
Other Urban Areas					
Mean Annual Disposable Income					
All Households (1000s)	370.81	383.73	409.20	458.26	513.67
Annual Growth Rate of Mean Household Income %	0.00	0.69	1.29	2.29	2.32
Quintile Mean Incomes (1000s)					
1	94.56	97.85	104.34	116.86	131.04
2	220.63	228.32	243.47	272.66	305.75
3	283.67	293.55	313.03	350.57	393.11
4	387.50	401.00	427.61	478.88	537.00
5	871.41	901.76	961.61	1076.91	1207.60
Rural Areas					
Mean Annual Disposable Income					
All Households (1000s)	210.92	246.30	302.34	363.54	437.10
Annual Growth Rate of Mean Household Income %	0.00	3.15	4.19	3.76	3.75
Quintile Mean Incomes (1000s)					
1	35.86	41.87	51.40	61.80	74.31
2	81.21	94.82	116.40	139.96	168.28
3	122.34	142.85	175.35	210.86	253.52
4	171.90	200.73	246.40	296.29	356.24
5	643.32	751.20	922.13	1108.81	1333.15

ALTERNATIVE 1: BASE CASE SCENARIO
COMPONENTS OF TARGET GROUP HOUSING COST

	1984	1989	1994	1999	2004
(Millions of Currency Units)	----	----	----	----	----
Country					
Cost of Upgrading Existing Units	0.00	2014.38	2014.38	2014.38	2014.38
of which:					
Infrastructure component	0.00	1565.63	1565.63	1565.63	1565.63
Construction component	0.00	448.75	448.75	448.75	448.75
Cost of New Housing Unit	0.00	31913.12	33519.79	38477.13	44676.58
of which:					
Land component	0.00	3292.33	3163.26	3601.58	4158.09
Infrastructure component	0.00	8129.26	8515.27	9667.79	11192.19
Construction component	0.00	20491.53	21841.26	25207.76	29336.30
Target Group Housing Cost	0.00	33927.51	35534.18	40491.52	46690.96
Metropolitan Area					
Cost of Upgrading Existing Units	0.00	306.80	306.80	306.80	306.80
of which:					
Infrastructure component	0.00	258.33	258.33	258.33	258.33
Construction component	0.00	48.47	48.47	48.47	48.47
Cost of New Housing Unit	0.00	11786.65	9738.84	11025.97	12633.48
of which:					
Land component	0.00	2003.73	1655.60	1874.41	2147.69
Infrastructure component	0.00	2710.93	2239.93	2535.97	2905.70
Construction component	0.00	7071.99	5843.31	6615.58	7580.09
Target Group Housing Cost	0.00	12093.45	10045.64	11332.77	12940.28

ALTERNATIVE 1: BASE CASE SCENARIO
COMPONENTS OF TARGET GROUP HOUSING COST (CONTINUED)

Other Urban Areas

Cost of Upgrading Existing Units	0.00	532.10	532.10	532.10	532.10
of which:					
Infrastructure component	0.00	448.03	448.03	448.03	448.03
Construction component	0.00	84.07	84.07	84.07	84.07
Cost of New Housing Unit	0.00	14113.86	15930.53	17730.26	20411.94
of which:					
Land component	0.00	987.97	1115.14	1241.12	1428.84
Infrastructure component	0.00	4516.44	5097.77	5673.68	6531.82
Construction component	0.00	8609.46	9717.63	10815.46	12451.28
Target Group Housing Cost	0.00	14645.96	16462.64	18262.36	20944.04

Rural Areas

Cost of Upgrading Existing Units	0.00	1175.48	1175.48	1175.48	1175.48
of which:					
Infrastructure component	0.00	859.28	859.28	859.28	859.28
Construction component	0.00	316.21	316.21	316.21	316.21
Cost of New Housing Unit	0.00	6012.61	7850.41	9720.90	11631.16
of which:					
Land component	0.00	300.63	392.52	486.05	581.56
Infrastructure component	0.00	901.89	1177.56	1458.14	1744.67
Construction component	0.00	4810.09	6280.33	7776.72	9304.93
Target Group Housing Cost	0.00	7188.09	9025.90	10896.39	12806.65

ALTERNATIVE 2: BASE CASE SCENARIO
DESIGN STANDARDS AND COSTS

	1984	1989	1994	1999	2004
	-----	-----	-----	-----	-----
Average Inflation Rate %	0.00	20.00	18.00	15.00	15.00
Construction Cost Esc. %	0.00	20.00	18.00	15.00	15.00
Metropolitan Area					
Price Minimum Standard Formal					
Sector Housing (Level 3)	763.10	763.10	763.10	763.10	763.10
Design Cost New Housing Unit					
(Level 2)	449.70	449.70	449.70	449.70	449.70
Design Cost Upgrade Existing Unit					
(Level 1)	94.40	94.40	94.40	94.40	94.40
Value of an Upgradable Unit					
(Add. to upgrade cost)	30.00	30.00	30.00	30.00	30.00
Other Urban Areas					
Price Minimum Standard Formal					
Sector Housing (Level 3)	729.30	729.30	729.30	729.30	729.30
Design Cost New Housing Unit					
(Level 2)	438.60	438.60	438.60	438.60	438.60
Design Cost Upgrade Existing Unit					
(Level 1)	85.00	85.00	85.00	85.00	85.00
Value of an Upgradable Unit					
(Add. to upgrade cost)	30.00	30.00	30.00	30.00	30.00
Rural Areas					
Price Minimum Standard Formal					
Sector Housing (Level 3)	627.10	627.10	627.10	627.10	627.10
Design Cost New Housing Unit					
(Level 2)	336.40	336.40	336.40	336.40	336.40
Design Cost Upgrade Existing Unit					
(Level 1)	55.20	55.20	55.20	55.20	55.20
Value of an Upgradable Unit					
(Add. to upgrade cost)	20.00	20.00	20.00	20.00	20.00

ALTERNATIVE 2: BASE CASE SCENARIO
 TARGET GROUP INVESTMENT AND SUBSIDY REQUIREMENTS

	1984	1989	1994	1999	2004
	-----	-----	-----	-----	-----
Country					
Target Households (1000s)					
Not Requiring Subsidy	0.00	44.06	56.56	66.49	78.68
Requiring Subsidy	0.00	43.16	39.49	31.76	30.60
Total	0.00	87.23	96.05	98.25	109.28
Target Group Cost (Millions)					
Subsidy Portion	0.00	6330.80	6435.11	6223.55	6408.23
Supported by Target Group	0.00	19206.56	22556.39	23318.86	27557.31
Total	0.00	25537.36	28991.50	29542.41	33965.54
Metropolitan Area					
Target Households (1000s)					
Not Requiring Subsidy	0.00	8.74	15.05	16.61	18.56
Requiring Subsidy	0.00	10.97	5.90	6.68	7.66
Total	0.00	19.71	20.96	23.30	26.22
Target Group Cost (Millions)					
Subsidy Portion	0.00	1601.53	1599.84	1677.43	1748.15
Supported by Target Group	0.00	6108.55	6669.79	7644.60	8888.25
Total	0.00	7710.08	8269.63	9322.03	10636.39
Other Urban Areas					
Target Households (1000s)					
Not Requiring Subsidy	0.00	19.36	21.04	23.01	25.50
Requiring Subsidy	0.00	13.09	14.78	8.38	9.62
Total	0.00	32.45	35.82	31.39	35.12
Target Group Cost (Millions)					
Subsidy Portion	0.00	2479.10	2553.67	2361.78	2529.57
Supported by Target Group	0.00	9539.99	10943.98	9193.16	10662.30
Total	0.00	12019.09	13497.65	11554.94	13191.86
Rural Areas					
Target Households (1000s)					
Not Requiring Subsidy	0.00	15.97	20.47	26.86	34.62
Requiring Subsidy	0.00	19.09	18.81	16.70	13.32
Total	0.00	35.07	39.28	43.56	47.94
Target Group Cost (Millions)					
Subsidy Portion	0.00	2250.17	2281.60	2184.34	2130.52
Supported by Target Group	0.00	3558.02	4942.62	6481.09	8006.77
Total	0.00	5808.19	7224.22	8665.43	10137.29

ALTERNATIVE 3: BASE CASE SCENARIO
DESIGN STANDARDS AND COSTS

	1984	1989	1994	1999	2004
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Average Inflation Rate %	0.00	20.00	18.00	15.00	15.00
Construction Cost Esc. %	0.00	20.00	18.00	15.00	15.00
Metropolitan Area					
Price Minimum Standard Formal					
Sector Housing (Level 3)	763.10	763.10	763.10	763.10	763.10
Design Cost New Housing Unit					
(Level 2)	375.60	375.60	375.60	375.60	375.60
Design Cost Upgrade Existing Unit					
(Level 1)	94.40	94.40	94.40	94.40	94.40
Value of an Upgradable Unit					
(Add. to upgrade cost)	30.00	30.00	30.00	30.00	30.00
Other Urban Areas					
Price Minimum Standard Formal					
Sector Housing (Level 3)	729.30	729.30	729.30	729.30	729.30
Design Cost New Housing Unit					
(Level 2)	364.50	364.50	364.50	364.50	364.50
Design Cost Upgrade Existing Unit					
(Level 1)	85.00	85.00	85.00	85.00	85.00
Value of an Upgradable Unit					
(Add. to upgrade cost)	30.00	30.00	30.00	30.00	30.00
Rural Areas					
Price Minimum Standard Formal					
Sector Housing (Level 3)	627.10	627.10	627.10	627.10	627.10
Design Cost New Housing Unit					
(Level 2)	262.30	262.30	262.30	262.30	262.30
Design Cost Upgrade Existing Unit					
(Level 1)	55.20	55.20	55.20	55.20	55.20
Value of an Upgradable Unit					
(Add. to upgrade cost)	20.00	20.00	20.00	20.00	20.00

ALTERNATIVE 3: BASE CASE SCENARIO
 TARGET GROUP IDENTIFICATION

	1984	1989	1994	1999	2004
	-----	-----	-----	-----	-----
Thousands of Households					
Metropolitan Area					
Affordable Level 0	0.00	0.00	0.00	0.00	0.00
Affordable Level 1	0.00	6.57	6.99	7.77	8.74
Affordable Level 2	0.00	13.14	13.97	15.53	17.48
Subtotal, Target Group	0.00	19.71	20.96	23.30	26.22
Affordable Level 3	0.00	9.94	10.76	12.32	14.27
Total	0.00	29.65	31.72	35.62	40.49
Other Urban Areas					
Affordable Level 0	0.00	0.00	0.00	0.00	0.00
Affordable Level 1	0.00	8.11	8.96	10.46	11.71
Affordable Level 2	0.00	24.34	26.87	20.93	23.42
Subtotal, Target Group	0.00	32.45	35.82	31.39	35.12
Affordable Level 3	0.00	6.09	6.93	15.54	18.03
Total	0.00	38.54	42.75	46.93	53.15
Rural Areas					
Affordable Level 0	0.00	8.77	9.82	0.00	0.00
Affordable Level 1	0.00	17.53	9.82	21.78	23.97
Affordable Level 2	0.00	8.77	19.64	21.78	23.97
Subtotal, Target Group	0.00	35.07	39.28	43.56	47.94
Affordable Level 3	0.00	2.67	3.73	4.80	5.89
Total	0.00	37.74	43.00	48.36	53.82

ALTERNATIVE 3: BASE CASE SCENARIO
 TARGET GROUP INVESTMENT AND SUBSIDY REQUIREMENTS

	1984	1989	1994	1999	2004
	-----	-----	-----	-----	-----
Country					
Target Households (1000s)					
Not Requiring Subsidy	0.00	59.54	68.45	72.06	78.68
Requiring Subsidy	0.00	27.69	27.61	26.19	30.60
Total	0.00	87.23	96.05	98.25	109.28
Target Group Cost (Millions)					
Subsidy Portion	0.00	4054.04	4134.02	4209.50	4140.85
Supported by Target Group	0.00	17302.29	20022.53	20335.30	24009.74
Total	0.00	21356.33	24156.55	24544.80	28150.60
Metropolitan Area					
Target Households (1000s)					
Not Requiring Subsidy	0.00	14.23	15.05	16.61	18.56
Requiring Subsidy	0.00	5.49	5.90	6.68	7.65
Total	0.00	19.71	20.96	23.30	26.22
Target Group Cost (Millions)					
Subsidy Portion	0.00	1140.30	1162.47	1182.25	1180.77
Supported by Target Group	0.00	5349.39	5795.08	6654.29	7753.55
Total	0.00	6490.19	6957.55	7836.53	8934.32
Other Urban Areas					
Target Households (1000s)					
Not Requiring Subsidy	0.00	25.90	28.43	23.01	25.50
Requiring Subsidy	0.00	5.55	7.39	8.58	9.62
Total	0.00	32.45	35.82	31.59	35.12
Target Group Cost (Millions)					
Subsidy Portion	0.00	1527.60	1659.87	1741.01	1816.60
Supported by Target Group	0.00	8550.81	9647.29	7951.67	9336.44
Total	0.00	10078.40	11307.16	9692.67	11053.04
Rural Areas					
Target Households (1000s)					
Not Requiring Subsidy	0.00	19.41	24.96	32.43	34.62
Requiring Subsidy	0.00	15.65	14.31	11.13	13.32
Total	0.00	35.07	39.28	43.56	47.94
Target Group Cost (Millions)					
Subsidy Portion	0.00	1386.14	1311.68	1286.25	1143.48
Supported by Target Group	0.00	3401.59	4580.17	5729.34	7019.76
Total	0.00	4787.73	5891.85	7015.60	8163.24

ALTERNATIVE 3: BASE CASE SCENARIO
COMPONENTS OF TARGET GROUP HOUSING COST

	1984	1989	1994	1999	2004
	----	----	----	----	----
(Millions of Currency Units)					
Country					
Cost of Upgrading					
Existing Units	0.00	2014.38	2014.38	2014.38	2014.38
of which:					
Infrastructure component	0.00	1565.63	1565.63	1565.63	1565.63
Construction component	0.00	448.75	448.75	448.75	448.75
Cost of New Housing Unit	0.00	19341.94	22142.17	22530.42	26136.21
of which:					
Land component	0.00	1900.03	2120.70	2213.30	2552.53
Infrastructure component	0.00	5018.83	5685.14	5539.24	6399.19
Construction component	0.00	12423.08	14336.32	14777.88	17184.49
Target Group Housing Cost	0.00	21356.33	24156.55	24544.80	28150.60
Metropolitan Area					
Cost of Upgrading					
Existing Units	0.00	306.80	306.80	306.80	306.80
of which:					
Infrastructure component	0.00	258.33	258.33	258.33	258.33
Construction component	0.00	48.47	48.47	48.47	48.47
Cost of New Housing Unit	0.00	6183.39	6650.75	7529.73	8627.52
of which:					
Land component	0.00	1051.18	1130.63	1280.05	1466.68
Infrastructure component	0.00	1422.18	1529.67	1731.84	1984.33
Construction component	0.00	3710.04	3990.45	4517.84	5176.51
Target Group Housing Cost	0.00	6490.19	6957.55	7836.53	8934.32

ALTERNATIVE 3: BASE CASE SCENARIO
COMPONENTS OF TARGET GROUP HOUSING COST (CONTINUED)

Other Urban Areas

Cost of Upgrading Existing Units	0.00	532.10	532.10	532.10	532.10
of which:					
Infrastructure component	0.00	448.03	448.03	448.03	448.03
Construction component	0.00	84.07	84.07	84.07	84.07
Cost of New Housing Unit	0.00	9546.30	10775.06	9160.57	10520.94
of which:					
Land component	0.00	668.24	754.25	641.24	736.47
Infrastructure component	0.00	3054.82	3448.02	2931.38	3366.70
Construction component	0.00	5823.24	6572.79	5587.95	6417.77
Target Group Housing Cost	0.00	10078.40	11307.16	9692.67	11053.04

Rural Areas

Cost of Upgrading Existing Units	0.00	1175.48	1175.48	1175.48	1175.48
of which:					
Infrastructure component	0.00	859.28	859.28	859.28	859.28
Construction component	0.00	316.21	316.21	316.21	316.21
Cost of New Housing Unit	0.00	3612.25	4716.36	5840.11	6987.75
of which:					
Land component	0.00	180.61	235.82	292.01	349.39
Infrastructure component	0.00	541.84	707.45	876.02	1048.16
Construction component	0.00	2889.80	3773.09	4672.09	5590.20
Target Group Housing Cost	0.00	4787.73	5891.85	7015.60	8163.24

ALTERNATIVE 1: BEST CASE SCENARIO
NATIONAL AND HOUSEHOLD INCOMES

	1984	1989	1994	1999	2004
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National Income (Constant Units)					
GDP (Millions of units)	701594.00	936890.80	1256447.00	1681410.00	2250105.00
GDP Ann. Growth Rate %	0.00	6.00	6.00	6.00	6.00
Agricultural GDP (Mill.)	151544.30	206556.00	288982.90	386724.20	517524.10
Non Agri. GDP (Mill.)	550049.70	732334.80	967464.40	1294685.00	1732581.00
Metropolitan Area					
Mean Annual Disposable Income					
All Households (1000s)	500.59	561.88	642.38	749.08	875.18
Annual Growth Rate of Mean Household Income %	0.00	2.34	2.71	3.12	3.16
Quintile Mean Incomes (1000s)					
1	122.65	137.66	157.38	183.52	214.42
2	267.82	300.61	343.67	400.76	468.22
3	305.36	342.75	391.85	456.94	533.86
4	590.70	663.02	758.01	883.91	1032.72
5	1216.44	1365.37	1560.99	1820.26	2126.70
Other Urban Areas					
Mean Annual Disposable Income					
All Households (1000s)	370.81	422.07	483.33	567.55	667.32
Annual Growth Rate of Mean Household Income %	0.00	2.62	2.75	3.26	3.29
Quintile Mean Incomes (1000s)					
1	94.56	107.63	123.25	144.73	170.17
2	220.63	251.13	287.58	337.69	397.05
3	283.67	322.89	367.75	434.18	510.50
4	387.50	441.07	505.08	593.09	697.34
5	871.41	991.87	1135.82	1333.75	1568.19
Rural Areas					
Mean Annual Disposable Income					
All Households (1000s)	210.92	270.91	357.11	450.25	567.62
Annual Growth Rate of Mean Household Income %	0.00	5.13	5.68	4.74	4.74
Quintile Mean Incomes (1000s)					
1	35.86	46.05	60.71	76.54	96.49
2	81.21	104.30	137.49	173.34	218.53
3	122.34	157.13	207.12	261.14	329.22
4	171.90	220.79	291.04	366.95	462.61
5	643.32	826.27	1089.18	1373.25	1731.23

ALTERNATIVE 1: BEST CASE SCENARIO
 AFFORDABLE COSTS BY INCOME CLASS AND REGION

131.

	1984	1989	1994	1999	2004
	----	----	----	----	----
(Thousands of Currency Units)					
Metropolitan Area					
Affordable Costs by Quintile					
1	193.94	217.68	248.87	290.21	339.06
2	508.20	570.42	652.15	760.47	988.49
3	579.45	650.39	743.57	867.07	1013.04
4	1120.89	1258.13	1438.38	1677.29	1959.66
5	1923.57	2159.08	2468.41	2878.40	3362.97
Other Urban Areas					
Affordable Costs by Quintile					
1	149.52	170.19	194.89	228.86	269.08
2	418.67	476.54	545.70	640.80	753.44
3	538.29	612.70	701.62	823.88	968.70
4	735.31	836.96	968.42	1125.44	1323.26
5	1377.97	1568.46	1796.08	2109.07	2479.80
Rural Areas					
Affordable Costs by Quintile					
1	52.93	67.98	89.61	112.98	142.3
2	143.83	184.74	243.52	307.03	387.07
3	216.68	278.30	366.86	462.54	583.12
4	304.48	391.07	515.50	649.95	819.38
5	949.54	1219.58	1607.64	2026.94	2555.32

ALTERNATIVE 1: WORST CASE SCENARIO
 NATIONAL AND HOUSEHOLD INCOMES

132.

	1984	1989	1994	1999	2004
	----	----	----	----	----
National Income (Constant Units)					
GDP (Millions of units)	701594.00	833273.50	1013804.00	1263385.00	1574407.00
GDP Ann. Growth Rate %	0.00	3.50	4.00	4.50	4.50
Agricultural GDP (Mill.)	151544.30	183320.20	233175.00	290578.50	362113.50
Non Agri. GDP (Mill.)	550049.70	649953.30	780629.40	972806.10	1212293.00
Metropolitan Area					
Mean Annual Disposable Income					
All Households (1000s)	500.59	498.67	518.33	562.85	612.37
Annual Growth Rate of					
Mean Household Income %	0.00	-0.08	0.78	1.66	1.70
Quintile Mean Incomes (1000s)					
1	122.65	122.18	126.99	137.90	150.03
2	267.82	266.79	277.31	301.12	327.62
3	305.36	304.19	316.18	343.34	373.55
4	590.70	588.44	611.63	664.16	722.60
5	1216.44	1211.78	1259.53	1367.71	1488.06
Other Urban Areas					
Mean Annual Disposable Income					
All Households (1000s)	370.81	374.59	389.99	426.45	466.92
Annual Growth Rate of					
Mean Household Income %	0.00	0.20	0.81	1.80	1.83
Quintile Mean Incomes (1000s)					
1	94.56	95.52	99.45	108.74	119.07
2	220.63	222.88	232.04	253.74	277.82
3	283.67	286.56	298.34	326.23	357.20
4	387.50	391.45	407.54	445.64	487.93
5	871.41	880.29	916.47	1002.16	1097.27
Rural Areas					
Mean Annual Disposable Income					
All Households (1000s)	210.92	240.43	288.14	338.31	397.16
Annual Growth Rate of					
Mean Household Income %	0.00	2.65	3.69	3.26	3.26
Quintile Mean Incomes (1000s)					
1	35.86	40.87	48.98	57.51	67.52
2	81.21	92.57	110.94	130.25	152.91
3	122.34	139.45	167.12	196.22	230.36
4	171.90	195.95	234.84	275.72	323.69
5	643.32	733.32	878.84	1031.84	1211.35

ALTERNATIVE 1: BASE CASE WITH 30-35% OF INCOME FOR HOUSING
AFFORDABLE CAPITAL COSTS

Metropolitan Area

Interest Rate (%)	21.00
Graduation Rate (%)	4.00
Loan Term (Years)	20.00
Graduation Term (Years)	20.00
Downpayment Required (%)	10.00

	1984	1989	1994	1999	2004
	----	----	----	----	----
Thousands of Currency Units					
Quintile 1					
Mean Annual Income	122.65	125.15	133.24	148.18	165.12
% Available for Housing	30.00				
% Needed for Recurr. Exp.	15.00				
Monthly Income for Mortg.	2.61	2.66	2.83	3.15	3.51
Affordable Dwelling Cost	197.34	201.38	214.40	238.44	265.68
Quintile 2					
Mean Annual Income	267.82	273.30	290.96	323.58	360.56
% Available for Housing	35.00				
% Needed for Recurr. Exp.	15.00				
Monthly Income for Mortg.	6.64	6.78	7.21	8.02	8.94
Affordable Dwelling Cost	502.76	513.04	546.21	607.45	676.86
Quintile 3					
Mean Annual Income	305.36	311.61	331.75	368.95	411.10
% Available for Housing	35.00				
% Needed for Recurr. Exp.	15.00				
Monthly Income for Mortg.	7.57	7.73	8.22	9.15	10.19
Affordable Dwelling Cost	573.24	584.97	622.78	692.60	771.74
Quintile 4					
Mean Annual Income	590.70	602.79	641.75	713.70	795.25
% Available for Housing	35.00				
% Needed for Recurr. Exp.	15.00				
Monthly Income for Mortg.	14.64	14.94	15.91	17.69	19.72
Affordable Dwelling Cost	1108.88	1131.58	1204.72	1339.79	1492.88
Quintile 5					
Mean Annual Income	1206.43	1231.11	1310.69	1457.64	1624.20
% Available for Housing	30.00				
% Needed for Recurr. Exp.	15.00				
Monthly Income for Mortg.	25.64	26.16	27.85	30.97	34.51
Affordable Dwelling Cost	1941.22	1980.94	2108.99	2345.44	2613.45

ALTERNATIVE 1: BASE CASE WITH 30-35% OF INCOME FOR HOUSING
AFFORDABLE CAPITAL COSTS

Other Urban Areas

Interest Rate (%)	21.00
Graduation Rate (%)	4.00
Loan Term (Years)	20.00
Graduation Term (Years)	20.00
Downpayment Required (%)	10.00

	1984	1989	1994	1999	2004
	----	----	----	----	----
Thousands of Currency Units					
Quintile 1					
Mean Annual Income	94.56	97.85	104.34	116.86	131.04
% Available for Housing	30.00				
% Needed for Recurr. Exp.	15.00				
Monthly Income for Mortg.	2.01	2.08	2.22	2.48	2.78
Affordable Dwelling Cost	152.15	157.45	167.90	188.03	210.85
Quintile 2					
Mean Annual Income	220.63	228.32	243.47	272.66	305.75
% Available for Housing	35.00				
% Needed for Recurr. Exp.	15.00				
Monthly Income for Mortg.	5.47	5.66	6.04	6.76	7.58
Affordable Dwelling Cost	414.18	428.61	457.05	511.86	573.97
Quintile 3					
Mean Annual Income	283.67	293.55	313.03	350.57	393.11
% Available for Housing	35.00				
% Needed for Recurr. Exp.	15.00				
Monthly Income for Mortg.	7.03	7.28	7.76	8.69	9.75
Affordable Dwelling Cost	532.52	551.07	587.64	658.10	737.97
Quintile 4					
Mean Annual Income	387.50	401.00	427.61	473.88	537.00
% Available for Housing	35.00				
% Needed for Recurr. Exp.	15.00				
Monthly Income for Mortg.	9.61	9.94	10.60	11.87	13.31
Affordable Dwelling Cost	727.43	752.77	802.73	898.98	1008.07
Quintile 5					
Mean Annual Income	871.41	901.76	961.61	1076.91	1207.60
% Available for Housing	30.00				
% Needed for Recurr. Exp.	15.00				
Monthly Income for Mortg.	18.52	19.16	20.43	22.88	25.66
Affordable Dwelling Cost	1402.15	1451.00	1547.29	1732.82	1943.10

ALTERNATIVE 1: BASE CASE WITH 30-35% OF INCOME FOR HOUSING
AFFORDABLE CAPITAL COSTS

Rural Areas

Interest Rate (%)	21.00
Graduation Rate (%)	4.00
Loan Term (Years)	15.00
Graduation Term (Years)	15.00
Downpayment Required (%)	10.00

	1984	1989	1994	1999	2004
	-----	-----	-----	-----	-----
Thousands of Currency Units					
Quintile 1					
Mean Annual Income	35.86	41.87	51.40	61.80	74.31
% Available for Housing	30.00				
% Needed for Recurr. Exp.	15.00				
Monthly Income for Mortg.	0.76	0.87	1.09	1.31	1.58
Affordable Dwelling Cost	54.97	64.19	78.80	94.75	113.92
Quintile 2					
Mean Annual Income	81.21	94.82	116.40	139.96	168.28
% Available for Housing	35.00				
% Needed for Recurr. Exp.	15.00				
Monthly Income for Mortg.	2.01	2.35	2.89	3.47	4.17
Affordable Dwelling Cost	145.24	169.60	208.19	250.34	300.99
Quintile 3					
Mean Annual Income	122.34	142.85	175.35	210.86	253.52
% Available for Housing	35.00				
% Needed for Recurr. Exp.	15.00				
Monthly Income for Mortg.	3.03	3.54	4.35	5.23	6.29
Affordable Dwelling Cost	213.81	255.50	313.64	377.13	453.44
Quintile 4					
Mean Annual Income	171.90	200.73	246.40	296.29	356.24
% Available for Housing	35.00				
% Needed for Recurr. Exp.	15.00				
Monthly Income for Mortg.	4.26	4.98	6.11	7.35	8.83
Affordable Dwelling Cost	307.46	359.03	440.71	529.94	637.16
Quintile 5					
Mean Annual Income	643.32	731.20	922.13	1108.81	1333.15
% Available for Housing	30.00				
% Needed for Recurr. Exp.	15.00				
Monthly Income for Mortg.	13.67	15.96	19.60	23.56	28.33
Affordable Dwelling Cost	936.25	1131.65	1413.98	1699.88	2043.81

ALTERNATIVE 1: BEST CASE WITH 30-35% OF INCOME FOR HOUSING
AFFORDABLE CAPITAL COSTS

Metropolitan Area

Interest Rate (%)	18.00
Graduation Rate (%)	4.00
Loan Term (Years)	20.00
Graduation Term (Years)	20.00
Downpayment Required (%)	10.00

	1984	1989	1994	1999	2004
	----	----	----	----	----
Thousands of Currency Units					
Quintile 1					
Mean Annual Income	122.65	137.66	157.38	183.52	214.42
% Available for Housing	30.00				
% Needed for Recurr. Exp.	15.00				
Monthly Income for Mortg.	2.61	2.93	3.34	3.90	4.56
Affordable Dwelling Cost	232.73	261.22	298.65	348.25	406.88
Quintile 2					
Mean Annual Income	267.82	300.61	343.67	400.76	468.22
% Available for Housing	35.00				
% Needed for Recurr. Exp.	15.00				
Monthly Income for Mortg.	6.64	7.45	8.52	9.94	11.61
Affordable Dwelling Cost	592.90	665.49	760.84	887.21	1036.57
Quintile 3					
Mean Annual Income	305.36	342.75	391.85	456.94	533.86
% Available for Housing	35.00				
% Needed for Recurr. Exp.	15.00				
Monthly Income for Mortg.	7.57	8.50	9.71	11.33	13.24
Affordable Dwelling Cost	676.02	758.79	867.50	1011.59	1181.88
Quintile 4					
Mean Annual Income	590.70	663.02	758.01	883.91	1032.72
% Available for Housing	35.00				
% Needed for Recurr. Exp.	15.00				
Monthly Income for Mortg.	14.64	16.44	18.71	21.91	25.60
Affordable Dwelling Cost	1307.71	1467.82	1678.11	1956.84	2286.27
Quintile 5					
Mean Annual Income	1216.44	1365.37	1560.99	1820.26	2126.70
% Available for Housing	30.00				
% Needed for Recurr. Exp.	15.00				
Monthly Income for Mortg.	25.85	29.01	33.17	38.68	45.19
Affordable Dwelling Cost	2308.28	2590.89	2962.10	3454.08	4035.57

ALTERNATIVE 1: BEST CASE WITH 30-35% OF INCOME FOR HOUSING
AFFORDABLE CAPITAL COSTS

Other Urban Areas

Interest Rate (%)	18.00
Graduation Rate (%)	4.00
Loan Term (Years)	20.00
Graduation Term (Years)	20.00
Downpayment Required (%)	10.00

	1984	1989	1994	1999	2004
	----	----	----	----	----
Thousands of Currency Units					
Quintile 1					
Mean Annual Income	94.56	107.63	123.25	144.73	170.17
% Available for Housing	30.00				
% Needed for Recurr. Exp.	15.00				
Monthly Income for Mortg.	2.01	2.29	2.62	3.08	3.62
Affordable Dwelling Cost	179.43	204.23	233.87	274.63	322.90
Quintile 2					
Mean Annual Income	220.63	251.13	287.58	337.69	397.05
% Available for Housing	35.00				
% Needed for Recurr. Exp.	15.00				
Monthly Income for Mortg.	5.47	6.23	7.13	8.37	9.84
Affordable Dwelling Cost	488.45	555.97	636.65	747.60	879.01
Quintile 3					
Mean Annual Income	283.67	322.89	369.75	434.18	510.50
% Available for Housing	35.00				
% Needed for Recurr. Exp.	15.00				
Monthly Income for Mortg.	7.03	8.00	9.17	10.76	12.66
Affordable Dwelling Cost	628.00	714.82	818.56	961.20	1130.16
Quintile 4					
Mean Annual Income	387.50	441.07	505.08	593.09	697.34
% Available for Housing	35.00				
% Needed for Recurr. Exp.	15.00				
Monthly Income for Mortg.	9.61	10.93	12.52	14.70	17.29
Affordable Dwelling Cost	857.86	976.45	1118.16	1313.01	1543.81
Quintile 5					
Mean Annual Income	871.41	991.87	1135.82	1333.75	1568.19
% Available for Housing	30.00				
% Needed for Recurr. Exp.	15.00				
Monthly Income for Mortg.	18.52	21.08	24.14	28.34	33.32
Affordable Dwelling Cost	1653.56	1882.15	2155.30	2530.98	2975.76

ALTERNATIVE 1: BEST CASE WITH 30-35% OF INCOME FOR HOUSING
AFFORDABLE CAPITAL COSTS

Rural Areas

Interest Rate (%)	18.00
Graduation Rate (%)	4.00
Loan Term (Years)	15.00
Graduation Term (Years)	15.00
Downpayment Required (%)	10.00

	1984	1989	1994	1999	2004
	----	----	----	----	----
Thousands of Currency Units					
Quintile 1					
Mean Annual Income	35.86	46.05	60.71	76.54	96.49
% Available for Housing	30.00				
% Needed for Recurr. Exp.	15.00				
Monthly Income for Mortg.	0.76	0.98	1.29	1.63	2.05
Affordable Dwelling Cost	63.51	81.57	107.53	135.57	170.91
Quintile 2					
Mean Annual Income	81.21	104.30	137.49	173.34	218.53
% Available for Housing	35.00				
% Needed for Recurr. Exp.	15.00				
Monthly Income for Mortg.	2.01	2.59	3.41	4.30	5.42
Affordable Dwelling Cost	167.80	215.53	284.10	358.20	451.58
Quintile 3					
Mean Annual Income	122.34	157.13	207.12	261.14	329.22
% Available for Housing	35.00				
% Needed for Recurr. Exp.	15.00				
Monthly Income for Mortg.	3.03	3.90	5.13	6.47	8.16
Affordable Dwelling Cost	252.80	324.69	428.00	539.63	680.30
Quintile 4					
Mean Annual Income	171.90	220.79	291.04	366.95	462.61
% Available for Housing	35.00				
% Needed for Recurr. Exp.	15.00				
Monthly Income for Mortg.	4.26	5.47	7.22	9.10	11.47
Affordable Dwelling Cost	355.22	456.24	601.42	758.27	955.94
Quintile 5					
Mean Annual Income	643.32	826.27	1089.18	1373.25	1731.23
% Available for Housing	30.00				
% Needed for Recurr. Exp.	15.00				
Monthly Income for Mortg.	13.67	17.56	23.15	29.18	36.79
Affordable Dwelling Cost	1139.45	1463.50	1929.17	2432.32	3066.38

ALTERNATIVE 3: BASE CASE WITH 10% HIGHER POPULATION GROWTH RATE
POPULATION AND HOUSEHOLD FORMATION

	1984 -----	1989 -----	1994 -----	1999 -----	2004 -----
Metropolitan Area					
Population (1000s)	2236.80	2666.30	3131.20	3599.50	4129.10
Annual Growth Rate %	0.00	3.58	3.27	2.83	2.78
Average Household Size	4.75	4.70	4.65	4.60	4.55
Total Households (1000s)	470.91	567.30	673.38	782.50	907.49
New Households per Year	0.00	19.28	21.22	21.82	25.00
Other Urban Areas					
Population (1000s)	3028.30	3556.40	4112.40	4692.20	5345.10
Annual Growth Rate %	0.00	3.27	2.95	2.67	2.64
Average Household Size	4.80	4.75	4.70	4.65	4.60
Total Households (1000s)	630.90	748.72	874.98	1009.08	1161.98
New Households per Year	0.00	23.56	25.25	26.82	30.58
Rural Areas					
Population (1000s)	3195.40	3374.60	3564.40	3764.80	3976.40
Annual Growth Rate %	0.00	1.10	1.10	1.10	1.10
Average Household Size	5.20	5.15	5.10	5.05	5.00
Total Households (1000s)	614.50	655.26	698.90	745.50	795.28
New Households per Year	0.00	8.15	8.73	9.32	9.96
Country					
Population (1000s)	8460.50	9597.30	10808.00	12056.50	13450.60
Annual Growth Rate	0.00	2.55	2.40	2.21	2.21
Average Household Size	4.93	4.87	4.81	4.75	4.70
Total Households (1000s)	1716.30	1971.28	2247.26	2537.08	2864.75
New Households per Year	0.00	50.99	55.20	57.96	65.53

ALTERNATIVE 3: BASE CASE WITH ACCELERATED URBAN UPGRADING AND REPLACEMENT
HOUSING STOCK AND REPLACEMENT

	1984	1989	1994	1999	2004
	----	----	----	----	----
Metropolitan Area					
Dwelling Units by Construction Standard					
Acceptable Construction	365.20	499.82	633.64	730.06	838.91
(Annual Planned Repl.)	0.00	7.30	10.00	12.67	14.60
Non-Upgradable Construct.	26.70	13.40	0.10	0.10	0.10
(Annual Planned Repl.)	0.00	2.66	2.66	0.00	0.00
Upgradable Construction	65.00	32.50	0.00	0.00	0.00
(Planned Ann. Upgrading)	0.00	6.50	6.50	0.00	0.00
Total Dwelling Units	456.90	545.72	633.74	730.16	839.01
Total Overcrowded Units	14.01	12.86	11.71	10.56	9.41
Planned Annual Construction to					
Relieve Overcrowding	0.00	0.23	0.23	0.23	0.23
New Households/Year	0.00	17.53	17.37	19.06	21.54
Construction New Units/Yr	0.00	27.73	30.26	31.96	36.37
Total Construction/Year	0.00	34.23	36.76	31.96	36.37
Other Urban Areas					
Dwelling Units by Construction Standard					
Acceptable Construction	452.20	638.59	831.29	951.69	1087.27
(Annual Planned Repl.)	0.00	9.04	12.77	16.63	19.03
Non-Upgradable Construct.	30.40	15.20	0.00	0.00	0.00
(Annual Planned Repl.)	0.00	3.04	3.04	0.00	0.00
Upgradable Construction	125.20	62.60	-0.00	-0.00	-0.00
(Planned Ann. Upgrading)	0.00	12.52	12.52	0.00	0.00
Total Dwelling Units	607.80	716.39	831.29	951.69	1087.27
Total Overcrowded Units	23.10	21.57	20.05	18.52	17.00
Planned Annual Construction to					
Relieve Overcrowding	0.00	0.31	0.31	0.31	0.31
New Households/Year	0.00	21.41	22.68	23.77	26.81
Construction New Units/Yr	0.00	33.80	38.79	40.71	46.15
Total Construction/Year	0.00	46.32	51.51	40.71	46.15

ALTERNATIVE 3: BASE CASE WITH ACCELERATED URBAN UPGRADING AND REPLACEMENT
HOUSING STOCK AND REPLACEMENT (CONTINUED)

Rural Areas

Dwelling Units by Construction Standard

Acceptable Construction	194.70	354.19	516.07	680.44	847.50
(Annual Planned Repl.)	0.00	5.84	10.63	15.48	20.41
Non-Upgradable Construct.	41.80	31.38	20.95	10.53	0.10
(Annual Planned Repl.)	0.00	2.09	2.09	2.09	2.09
Upgradable Construction	425.90	319.43	212.95	106.47	-0.00
(Planned Ann. Upgrading)	0.00	21.30	21.30	21.30	21.30
Total Dwelling Units	662.40	704.99	749.97	797.44	847.60
Total Overcrowded Units	0.00	0.00	0.00	0.00	0.00
Planned Annual Construction to					
Relieve Overcrowding	0.00	1.00	1.00	1.00	1.00
New Households/Year	0.00	7.52	8.00	8.50	7.04
Construction New Units/Yr	0.00	16.44	21.71	27.06	32.53
Total Construction/Year	0.00	37.74	43.00	48.36	53.83

TOTAL COUNTRY

New Construction/Year	0.00	77.97	90.76	99.73	119.05
Total Construction/Year	0.00	119.29	131.07	121.02	136.34

ALTERNATIVE 3: BASE CASE WITH NO GRADUATION OF MORTGAGE PAYMENTS
AFFORDABLE COSTS BY INCOME CLASS AND REGION

	1984	1989	1994	1999	2004
	----	----	----	----	----
(Thousands of Currency Units)					
Metropolitan Area					
Affordable Costs by Quintile					
1	135.75	138.53	147.48	154.02	182.76
2	355.72	363.00	386.46	429.79	478.90
3	405.59	413.89	440.64	490.04	546.04
4	784.58	800.64	852.39	947.95	1056.27
5	1335.34	1362.66	1450.75	1613.40	1797.76
Other Urban Areas					
Affordable Costs by Quintile					
1	104.66	108.31	115.49	129.34	145.04
2	293.05	303.26	323.38	362.16	406.11
3	376.78	389.90	416.78	465.63	522.14
4	514.69	532.61	567.96	636.06	713.26
5	964.52	998.12	1064.36	1191.98	1336.64
Rural Areas					
Affordable Costs by Quintile					
1	38.54	45.00	55.24	66.43	79.87
2	104.74	122.30	150.13	180.53	217.05
3	157.79	184.25	226.17	271.96	326.98
4	221.72	268.90	317.81	382.15	459.47
5	691.46	807.42	991.13	1191.78	1432.91

ALTERNATIVE 3: BASE CASE WITH LOCAL MATERIALS COST 20% HIGHER
DESIGN STANDARDS AND COSTS

	1984 ----	1989 ----	1994 ----	1999 ----	2004 ----
Average Inflation Rate %	0.00	20.00	18.00	15.00	15.00
Construction Cost Esc. %	0.00	20.00	18.00	15.00	15.00
Metropolitan Area					
Price Minimum Standard Formal					
Sector Housing (Level 3)	763.10	763.10	763.10	763.10	763.10
Design Cost New Housing Unit (Level 2)	396.40	396.40	396.40	396.40	396.40
Design Cost Upgrade Existing Unit (Level 1)	94.40	94.40	94.40	94.40	94.40
Value of an Upgradable Unit (Add. to upgrade cost)	30.00	30.00	30.00	30.00	30.00
Other Urban Areas					
Price Minimum Standard Formal					
Sector Housing (Level 3)	729.30	729.30	729.30	729.30	729.30
Design Cost New Housing Unit (Level 2)	384.60	384.60	384.60	384.60	384.60
Design Cost Upgrade Existing Unit (Level 1)	85.00	85.00	85.00	85.00	85.00
Value of an Upgradable Unit (Add. to upgrade cost)	30.00	30.00	30.00	30.00	30.00
Rural Areas					
Price Minimum Standard Formal					
Sector Housing (Level 3)	627.10	627.10	627.10	627.10	627.10
Design Cost New Housing Unit (Level 2)	309.70	309.70	309.70	309.70	309.70
Design Cost Upgrade Existing Unit (Level 1)	55.20	55.20	55.20	55.20	55.20
Value of an Upgradable Unit (Add. to upgrade cost)	20.00	20.00	20.00	20.00	20.00

ALTERNATIVE 3: BASE CASE WITH LOCAL MATERIALS COST 20% LOWER
DESIGN STANDARDS AND COSTS

	1984 ----	1989 ----	1994 ----	1999 ----	2004 ----
Average Inflation Rate %	0.00	20.00	18.00	15.00	15.00
Construction Cost Esc. %	0.00	20.00	18.00	15.00	15.00
Metropolitan Area					
Price Minimum Standard Formal					
Sector Housing (Level 3)	763.10	763.10	763.10	763.10	763.10
Design Cost New Housing Unit (Level 2)	356.10	356.10	356.10	356.10	356.10
Design Cost Upgrade Existing Unit (Level 1)	94.40	94.40	94.40	94.40	94.40
Value of an Upgradable Unit (Add. to upgrade cost)	30.00	30.00	30.00	30.00	30.00
Other Urban Areas					
Price Minimum Standard Formal					
Sector Housing (Level 3)	729.30	729.30	729.30	729.30	729.30
Design Cost New Housing Unit (Level 2)	344.40	344.40	344.40	344.40	344.40
Design Cost Upgrade Existing Unit (Level 1)	85.00	85.00	85.00	85.00	85.00
Value of an Upgradable Unit (Add. to upgrade cost)	30.00	30.00	30.00	30.00	30.00
Rural Areas					
Price Minimum Standard Formal					
Sector Housing (Level 3)	627.10	627.10	627.10	627.10	627.10
Design Cost New Housing Unit (Level 2)	229.10	229.10	229.10	229.10	229.10
Design Cost Upgrade Existing Unit (Level 1)	55.20	55.20	55.20	55.20	55.20
Value of an Upgradable Unit (Add. to upgrade cost)	20.00	20.00	20.00	20.00	20.00

ALTERNATIVE 3: BASE CASE WITH 6% ANNUAL GRADUATION OF MORTGAGE PAYMENTS
AFFORDABLE CAPITAL COSTS

Metropolitan Area

Interest Rate (%)	21.00
Graduation Rate (%)	6.00
Loan Term (Years)	20.00
Graduation Term (Years)	20.00
Downpayment Required (%)	10.00

	1984	1989	1994	1999	2004
	----	----	----	----	----
Thousands of Currency Units					
Quintile 1					
Mean Annual Income	122.65	125.15	133.24	148.18	165.12
% Available for Housing	25.00				
% Needed for Recurr. Exp.	15.00				
Monthly Income for Mortg.	2.17	2.22	2.36	2.62	2.92
Affordable Dwelling Cost	183.12	186.86	198.94	221.25	246.53
Quintile 2					
Mean Annual Income	267.82	273.30	290.96	323.58	360.56
% Available for Housing	30.00				
% Needed for Recurr. Exp.	15.00				
Monthly Income for Mortg.	5.69	5.81	6.18	6.88	7.66
Affordable Dwelling Cost	479.84	489.66	521.31	579.75	646.00
Quintile 3					
Mean Annual Income	305.36	311.61	331.75	368.95	411.10
% Available for Housing	30.00				
% Needed for Recurr. Exp.	15.00				
Monthly Income for Mortg.	6.49	6.62	7.05	7.84	8.74
Affordable Dwelling Cost	547.10	558.30	594.39	661.03	736.56
Quintile 4					
Mean Annual Income	590.70	602.79	641.75	713.70	795.25
% Available for Housing	30.00				
% Needed for Recurr. Exp.	15.00				
Monthly Income for Mortg.	12.55	12.81	13.64	15.17	16.90
Affordable Dwelling Cost	1058.33	1079.99	1149.80	1278.71	1424.82
Quintile 5					
Mean Annual Income	1206.43	1231.11	1310.69	1457.64	1624.20
% Available for Housing	25.00				
% Needed for Recurr. Exp.	15.00				
Monthly Income for Mortg.	21.36	21.80	23.21	25.81	28.76
Affordable Dwelling Cost	1801.26	1838.12	1956.93	2176.33	2425.01

ALTERNATIVE 3: BASE CASE WITH 6% ANNUAL GRADUATION OF MORTGAGE PAYMENTS
AFFORDABLE CAPITAL COSTS

146.

Other Urban Areas

Interest Rate (%)	21.00
Graduation Rate (%)	6.00
Loan Term (Years)	20.00
Graduation Term (Years)	20.00
Downpayment Required (%)	10.00

	1984	1989	1994	1999	2004
	----	----	----	----	----
Thousands of Currency Units					
Quintile 1					
Mean Annual Income	94.56	97.85	104.34	116.86	131.04
% Available for Housing	25.00				
% Needed for Recurr. Exp.	15.00				
Monthly Income for Mortg.	1.67	1.73	1.85	2.07	2.32
Affordable Dwelling Cost	141.18	146.10	155.79	174.47	195.65
Quintile 2					
Mean Annual Income	220.63	228.32	243.47	272.66	305.75
% Available for Housing	30.00				
% Needed for Recurr. Exp.	15.00				
Monthly Income for Mortg.	4.69	4.85	5.17	5.79	6.50
Affordable Dwelling Cost	395.30	409.07	436.22	498.52	547.81
Quintile 3					
Mean Annual Income	283.67	293.55	313.03	350.57	393.11
% Available for Housing	30.00				
% Needed for Recurr. Exp.	15.00				
Monthly Income for Mortg.	6.03	6.24	6.65	7.45	8.35
Affordable Dwelling Cost	508.24	525.95	560.85	628.10	704.32
Quintile 4					
Mean Annual Income	387.50	401.00	427.61	478.88	537.00
% Available for Housing	30.00				
% Needed for Recurr. Exp.	15.00				
Monthly Income for Mortg.	8.23	8.52	9.09	10.18	11.41
Affordable Dwelling Cost	694.27	718.45	766.13	857.99	962.11
Quintile 5					
Mean Annual Income	871.41	901.76	961.61	1076.91	1207.60
% Available for Housing	25.00				
% Needed for Recurr. Exp.	15.00				
Monthly Income for Mortg.	15.43	15.97	17.03	19.07	21.38
Affordable Dwelling Cost	1301.06	1346.38	1435.73	1607.88	1803.01

ALTERNATIVE 3: BASE CASE WITH 6% ANNUAL GRADUATION OF MORTGAGE PAYMENTS
AFFORDABLE CAPITAL COSTS

147.

Rural Areas

Interest Rate (%)	21.00
Graduation Rate (%)	6.00
Loan Term (Years)	15.00
Graduation Term (Years)	15.00
Downpayment Required (%)	10.00

	1984	1989	1994	1999	2004
	----	----	----	----	----
Thousands of Currency Units					
Quintile 1					
Mean Annual Income	35.86	41.87	51.40	61.80	74.31
% Available for Housing	25.00				
% Needed for Recurr. Exp.	15.00				
Monthly Income for Mortg.	0.63	0.74	0.91	1.09	1.32
Affordable Dwelling Cost	50.34	58.78	72.16	86.77	104.32
Quintile 2					
Mean Annual Income	81.21	94.82	116.40	139.96	168.28
% Available for Housing	30.00				
% Needed for Recurr. Exp.	15.00				
Monthly Income for Mortg.	1.73	2.02	2.47	2.97	3.58
Affordable Dwelling Cost	136.81	159.76	196.11	235.81	283.52
Quintile 3					
Mean Annual Income	122.34	142.85	175.35	210.86	253.52
% Available for Housing	30.00				
% Needed for Recurr. Exp.	15.00				
Monthly Income for Mortg.	2.60	3.04	3.73	4.48	5.39
Affordable Dwelling Cost	206.11	240.67	295.43	355.24	427.12
Quintile 4					
Mean Annual Income	171.90	200.73	246.40	296.29	356.24
% Available for Housing	30.00				
% Needed for Recurr. Exp.	15.00				
Monthly Income for Mortg.	3.65	4.27	5.24	6.30	7.57
Affordable Dwelling Cost	289.62	338.19	415.13	499.18	600.17
Quintile 5					
Mean Annual Income	643.32	751.20	922.13	1108.81	1333.15
% Available for Housing	25.00				
% Needed for Recurr. Exp.	15.00				
Monthly Income for Mortg.	11.37	13.30	16.33	19.64	23.61
Affordable Dwelling Cost	903.20	1054.67	1294.64	1556.73	1871.70

APPENDIX C. BIBLIOGRAPHY

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