HOMES Research Reports are circulated to inform planners and researchers about research findings and training materials from the Household Model for Economic and Social Studies developed at the East-West Population Institute. The primary purpose of the HOMES project is to expand the scope and improve the quality of demographic information available for development planning and the formulation of economic and social policy by providing projections of the number and demographic characteristics of households. In addition, modules have been developed to forecast economic changes in the household sector, for example in the composition of consumer expenditures, labor supply, and aggregate household saving. The HOMES project has been supported by the U.S. Agency for International Development, the Asian Development Bank, and the General Motors Research Laboratories. Their support is gratefully acknowledged. A list of other HOMES publications is included with this report. For further information about HOMES please contact: Andrew Mason, East-West Population Institute, East-West Center, Honolulu, Hawaii 96848.
HOMES Research Report

No. 8

Demographic and Economic Forecasting:
A Pilot Study for Thailand

Andrew Mason

June 1988

East-West Population Institute
East-West Center
1777 East West Road
Honolulu, Hawaii 96848
This report was prepared for the Asian Development Bank as part of the Technical Assistance to Thailand for the Demographic and Economic Forecasting Pilot Study in Cooperation with the National Economic and Social Development Board.
This report summarizes demographic trends, household projections, and substantive findings from six studies undertaken as part of an Asian Development Bank project, Demographic and Economic Forecasting Pilot Study for Thailand. The purpose of the project was to provide a household projections package, HOMES, to the National Economic and Social Development Board and the National Statistical Office, to train staff to use the package, and to explore the ways in which detailed household projections can be used to improve economic forecasting and planning.

HOMES, Household Model for Economic and Social Studies, is a computer package used to project the number and demographic characteristics of households. By applying the model to standard population projections, the user is provided projections of the number of households; the age and sex of the household head; average household size; the number, age, and sex of household members; and, other basic demographic information about households. This demographic information is used, in turn, to forecast related social and economic trends and to examine the links between population growth and economic development.

Because this kind of detailed household demographic information has not been available previously, there is little or no experience about how it can be incorporated into social and economic development planning. The six sector studies were undertaken to explore ways in which this information could be effectively used. The sectors studied were: education, health, housing, consumer expenditure, household saving, and labor force, employment, and wages.

This project could not have been successful without the support of key institutions and the help of many individuals. The project was carried out in collaboration with the National Economic and Social Development Board and the team members benefited considerably from the leadership provided by Kosit Panpiemras, Deputy Director General. Jawalaksana Rachapaetayakom served as project coordinator on behalf of NESDB and her support and assistance were vital to the success of the project. An effort of this kind requires access to an extensive amount of census and survey data and we are grateful to the National Statistical Office for its support and the cooperation and assistance of Niyom Purakam, Secretary-General, Wiwit Siripak, and Varai Woramontri. I would also like to express my appreciation to consultants and other researchers involved in this project, John Bauer, Burnham O. Campbell, Robert Kleinbaum, Mathana Phananiramai, and Nipon Poapongsakorn and to my other colleagues at the East-West Population Institute. I would also like to thank the staff of the Asian Development Bank and, particularly, Ernesto Pernia, who was coordinated on behalf of ADB. Research assistance and technical support from Cheng-Hong Fong, Teresa Greenfield, David Ho, Kristsana Nithikethkul, Wayne Shima and Yoke-Yun Teh are gratefully acknowledged.
INTRODUCTION

The household and the family are often forgotten institutions when it comes to economic research, policy, and development planning. But examples abound of the central role played by these institutions in economic and social activity. Change in the supply of labor provides one example. In many countries, Thailand included, changes in labor force participation are dominated by the employment decisions of women, which are, in turn, closely connected to child rearing responsibilities and the presence of other wage earners in the household. Thus, accurate forecasts of labor supply can not be prepared if the changing family circumstances of women are ignored.

A second example is human resource development. The speed with which educational opportunities can be expanded depends on the value placed on schooling by the target population. Economic models of school attendance have stressed the importance of economic returns from higher wages and the opportunity costs of foregone employment. As important as these factors are, they neglect the importance of the family. Analysis of survey data from Thailand shows that the educational attainment of parents is the most important determinant of whether a child continues in school or not.

A third example is economic security. In industrialized and developing countries alike, but particularly in developing countries where extended or multigenerational households prevail and government sponsored social security programs are limited, the household is the basic provider of economic security. Individuals are protected from bouts of unemployment because in Thailand, for example, households average close to three workers. Thus, labor earnings of the household are much less sensitive to unemployment than labor earnings of an individual. Old age security is also effectively handled by multi-earner, extended households. In Thailand, family households with a head over 65 typically have two or more wage earners, reducing the need to rely on saving and government support.

Few would deny that the household is an important institution, but many might argue that it’s role need not be explicitly modelled except in a limited number of cases, e.g., the demand for housing. This view would have some merit if the household were a stable and unchanging institution, but such is not the case. All Asian developing countries are experiencing major demographic change that is having a profound impact on the the Asian household. The average size of households in Thailand is dropping rapidly, the average age of the head is increasing, the number of dependent children is declining, and so on. Moreover, in some developing countries, there is evidence that the extended family may be declining in importance, whereas nuclear households are becoming increasingly important.

This report and the detailed studies it summarizes examine demographic trends in Thailand, forecast changes in the number and demographic characteristics of households, and assess the implications for the macroeconomy and demographically sensitive sectors — education, health, and housing. A number of general conclusions stand out.

First, the number of households will continue to grow quite rapidly for many years to come, increasing from the current 10 million to exceed more than 22 million by 2015. The demographic character of the Thai household, it’s size and age composition, will change a great deal as a consequence of declining fertility and improved mortality. However,
currently available evidence does not indicate that the rules governing household formation are undergoing significant change, i.e., there is no apparent movement toward the Western model of the nuclear household.

Second, each of the demographically sensitive sectors will be affected in important ways by changes in Thailand’s population and household characteristics. As the number of school age children peaks and begins to decline in the near future, resources which have been devoted to expanding the system to cover a larger population base can be re-directed towards improving quality and extending coverage of secondary schooling. By the turn of the century or shortly thereafter, it may prove possible to reduce education’s share of public resources and shift funds into more pressing areas.

As Thailand’s population ages, health sector costs will undoubtedly rise. During the next few decades, however, the greater health care needs of a growing elderly population will be largely offset by the relatively declining health needs of childbearing women and the very young. Thus, broad measures of health care, e.g., number of inpatients, number of outpatients, and recurring expenditure, are expected to grow at about the same pace as the population, in the case of patients, or the economy, in the case of expenditure. However, substantial changes in the demographic characteristics of patients will occur and will require a substantial reallocation of medical resources. This could have an important impact on capital expenditure in the medical sector, but requires more extensive study than could be undertaken here.

The housing sector is, without question, the most critical sector examined as part of this study. To provide the number of housing units required to maintain existing standards will be a substantial undertaking for the Thai economy. The effort should not exceed the capabilities of the residential construction industry given reasonable growth. However, population decentralization out of Bangkok would seem imperative and the infrastructure costs associated with doubling the stock of housing over the next 30 years will be substantial.

Third, demographic change in Thailand will have a substantial impact on the aggregate economy. Household spending patterns will change in response to changing demographic characteristics of the household and improved standards of living. Expenditure on food and non-alcoholic beverages will decline quite substantially, in percentage terms, over the next two decades. Expenditure on housing, apparel, transportation and communication, recreation and reading, health, and miscellaneous items will all increase.

Household saving, which to this point has not responded to favorable demographic factors, is expected to increase over the next two decades and stabilize at about 14% of disposable income. The total supply of saving should be about 8% higher than would otherwise be expected by the turn of the century because of changes in the demographic characteristics of Thai households.

The Thai labor force should continue to grow at a relatively brisk pace for the next 15 years or so. If the Thai economy continue to grow at about 6% per annum, job opportunities should keep pace with those seeking employment. Wages, however, are expected to remain relatively stagnant throughout this period. Labor shortages should begin to
emerge sometime around the turn of the century, and real wages should begin to rise quite rapidly.

**HOUSEHOLDS AND DEMOGRAPHIC CHANGE**

Thailand is in the midst of its demographic transition – rapid changes in mortality and fertility are generating important changes in the size, rate of growth, and age structure of its population. Historical data on fertility and mortality are a little sketchy and subject to error, but the available evidence indicates that in 1960 mortality conditions were relatively good for a country with Thailand’s material standard of living. Life expectancy at birth for men was around 56 and for women around 62. At the same time rates of childbearing were quite high – women were averaging over 6 births a piece. Thus, births far outpaced deaths in any year and rapid population growth was the inevitable result. Between 1960 and 1970, the population grew by 10 million, increasing from 26.3 million to reach 36.4 million, an annual rate of growth of 3.2%.

During the last twenty-five years life expectancy has risen steadily but modestly. Fertility, on the other hand, has declined quite rapidly. By 1980 women were, on average, bearing fewer than 4 children and are bearing fewer than 3 children today. The rate of population growth has responded to declining childbearing, reaching 2.5% during the 1970's but slowing to 1.9% during the 1980's. Despite the slowdown in growth, the population increased by another 10 million during the 1970's to 46.7 million in 1980.

The most recent official projections anticipate a continuation of recent trends in fertility and mortality. Life expectancy is projected to reach 66 for men and 70 for women by the year 2000 and to improve further thereafter. The total fertility rate is projected to reach 2 births per woman by 2000 and 1.7 per woman by 2010. The continued rapid decline in fertility will provide a further brake on population growth, but driven by the momentum which characterizes any growing population, Thailand will experience considerable growth over the next several decades. By the turn of the century the population is expected to reach nearly 65 million and to exceed 70 million by the year 2010.

The age structure of Thailand’s population is also in transition, from a very young structure to one that is relatively old. In 1970, nearly one-half of all Thais (45%) were under fifteen, one-half were between the ages of 15 and 60, and the remainder (5%) were elderly. But as is true of any country experiencing improvements in mortality and rapid decline in fertility, Thailand’s population is aging quickly. By 1990, one out of three Thai’s will be under age 15 and by the year 2000 barely more than one out of four will be under 15. The number of working age (15 to 59) is increasing quite rapidly: 60% in 1990 and 65% in 2000. Although a distinct minority of Thai’s are elderly, the number over 60 is growing, in percentage terms, faster than any other group. By the year 2000, 7.5% will be 60 or older and by 2010 nearly one in ten will be elderly.

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Population</td>
<td>26.3</td>
<td>36.4</td>
<td>46.7</td>
<td>56.2</td>
<td>64.4</td>
<td>70.9</td>
</tr>
<tr>
<td>Growth Rate</td>
<td>—</td>
<td>3.2</td>
<td>2.5</td>
<td>1.9</td>
<td>1.4</td>
<td>1.0</td>
</tr>
<tr>
<td>Fertility Rate</td>
<td>6.6</td>
<td>5.6</td>
<td>3.6</td>
<td>2.6</td>
<td>2.0</td>
<td>1.7</td>
</tr>
<tr>
<td>Life Expectancy</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>56.0</td>
<td>58.0</td>
<td>60.0</td>
<td>62.6</td>
<td>66.0</td>
<td>68.5</td>
</tr>
<tr>
<td>Female</td>
<td>62.0</td>
<td>64.0</td>
<td>66.0</td>
<td>68.1</td>
<td>70.2</td>
<td>72.2</td>
</tr>
<tr>
<td>Age Distribution</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Under 15</td>
<td>43.2</td>
<td>45.1</td>
<td>40.0</td>
<td>33.4</td>
<td>27.4</td>
<td>23.0</td>
</tr>
<tr>
<td>15 to 59</td>
<td>52.2</td>
<td>50.0</td>
<td>54.6</td>
<td>60.6</td>
<td>65.0</td>
<td>67.7</td>
</tr>
<tr>
<td>65 and Older</td>
<td>4.6</td>
<td>4.9</td>
<td>5.4</td>
<td>6.1</td>
<td>7.5</td>
<td>9.3</td>
</tr>
</tbody>
</table>

Household Characteristics

In 1985 some of the salient features of households in Thailand were:

- Number of households: 50.9 million
- Average size: 5.0 members per household
- Number of children: 1.9 per household
- Family households: 96%
- Head and spouse present: 78%
- Female heads: 15%
- Heads over 60 years of age: 15%

These and other characteristics of Thai households are a product of the demographic trends described in the preceding section and the rules or behavioral decisions that govern the establishment and membership of Thai households.¹ Family households are the rule in Thailand. Ninety-nine percent of all Thai’s living in a household live with a relative, and only one per cent live by themselves or with unrelated individuals. As is true in other East and Southeast Asian countries, one offspring usually continues to live with his or her parents after marriage while any brothers and sisters establish separate households.² There may be some delay, however, between marriage and the establishment of a separate household.

¹ A group of individuals, related or not, who reside together and make common provision for food and other essentials for living are considered a household. Military personnel living in barracks and other institutionalized persons are not considered to be living in households.
² It is common in Thailand, however, for offspring to live nearby or even in compounds with their parents after establishing a separate household.
household. Of men 25–29, only about one-half head their own households and of those 30–34, only about three-fourths do so. But eventually, nearly all men (over 90%) become the head of a household.

The importance of the extended family is illustrated by Figure 1 which shows how household membership varies over the lifecycle of intact households, i.e., households with head and spouse both present. The average number of children\(^3\) per household increases steadily with age as women complete their childbearing. Then as children begin leaving home, the average number of children declines rather gradually. As those that remain bear their own children, the average number of grandchildren per household increases so that households headed by elderly still average over four members apiece.

The most surprising feature of Figure 1 is the negligible numbers of parents per household. Does this mean that the parents of young adults are no longer residing with their children? In short, the answer is no. A number of factors account for the small number of parents per household. First, many parents have died. Second, those who are alive may have several surviving offspring and live with only one at any point in time. Third, many elderly living with their children are designated as heads and, thus, would not be recorded as a parent of the head. Finally, some elderly parents may be living on their own or only with their spouse, but in 1980 only 6% of all women and 3% of all men over 65 were living alone.

\(^{3}\) In this context, children refers to relationship to head not age and includes those related by marriage.
One of the principal concerns of this study has been the extent to which the traditional Thai family system is undergoing change. Are households becoming increasingly nuclearized? Are young adults or the elderly more likely to live by themselves than previously? Do young adults establish households at an earlier or later age than they used to? Although it is commonly believed that the extended family is undermined by economic development and modernization, we find no evidence of significant change in Thailand between 1970 and 1980.

Several indicators confirm that the nuclear household is not replacing the extended household in Thailand. Age-specific headship rates compiled from the 1970 and 1980 censuses show modest declines in the probability that young male adults and modest increases in the probability that young female adults will head their own households. And there is no substantial or consistent change in the likelihood that men or women will live by themselves or with unrelated individuals. At all relevant ages the probability of being a grandchild of the head increased between 1970 and 1980. Likewise, the probability of being a parent of a head increased between 1970 and 1980. All in all, the extended family appears to be alive and well in Thailand.  

Although the rules governing the formation and composition of households do not appear to be changing, the demographic characteristics of households will be affected in important ways by the underlying demographic changes noted above. Detailed projections of the number and demographic characteristics of households point to the following major trends:

- The number of households will grow quite rapidly over the next two decades.

---

It would be a mistake to interpret these indicators as showing a resurgence of the extended family norm. Much of the change may reflect increased survival of relatives. For example, the probability of being a grandchild of the head will increase just because more elderly are surviving.
The number of households is projected to increase from 10.2 million in 1985 to 18.1 million in 2005. This amounts to an average annual rate of growth over the period of 2.9 percent as compared with a population growth rate of 1.4 percent over the same period. The greatest increases, in absolute terms, will occur at the turn of the century when the number of households will be increasing by 400,000 per year.

- Young households will grow most slowly.

Households with a head under thirty-five years of age will grow most slowly so that by 2005 only one-quarter of all households will have a head so young. Those with heads 35 to 49 years of age will grow most rapidly, increasing their share from 36 percent to 40 percent between now and 2005.

- Households are becoming smaller.

In 1970 households averaged nearly six member apiece, but by 2005 households should average only 3.7 members. The decline in household size will occur across the board. Intact households and households with single heads, households with young heads and those with old heads will all be considerably smaller within two decades.

- The family household is not on the decline.

In both 1970 and 1980 family households were dominant, as fewer than five percent of all households consisted of one person or primary individual households. Nearly four of five households were headed by a husband and wife and no significant changes in these numbers are projected.

- Lineal households are on the upsurge.

Fewer household members have a non-lineal relationship to the head. Between 1970 and 1980, the percentage of household members who were brothers, sisters, aunts, uncles, etc. dropped dramatically. At the same time, the number of members who were parents, children, or grandchildren of the head increased. The decline in other household members should continue over the next two decades. There is no evidence of a decline in the importance of lineal extended households.

- Households are becoming “adult-ified”.

Over the next two decades, the number of children per household will decline by one-half. In 1985, the average intact household had two members under 15 but is projected to average only one child by 2005. In contrast, the average number of adult members will decline only marginally during the same period. The overall dependency ratio will decline from 78 dependents per 100 prime-age adults in 1980 to 44 dependents per 100 prime-age adults in 2005.

- Elderly parents will not prove burdensome.

Over the next twenty years, the number of parents per household will increase only marginally and the number 65 and older hardly at all. By 2005 there should be no more than 10 parents per 100 households, but as aging sets in with more force
during the twenty-first century the prevalence of elderly parents in the household should increase markedly.

The importance of demographic change and changes in the character of the Thai household are examined in the material that follows. The first few sections assess how demographically sensitive sectors, education, health, and housing, will be affected by changes in age structure, the number of households, average household size and other features of Thailand's population. The remaining sections focus more on macroeconomics considerations and how Thailand's changing demography will influence spending patterns, aggregate consumption and saving, and labor supply, employment, and wages.

THE EDUCATION SECTOR

Thailand's educational sector has expanded rapidly in the last two decades driven by two factors: by a commitment to increasing the schooling available to those of school age and by rapid growth in the number of school age children. In 1978, for example, the compulsory level of education was extended from 4 to 6 years of schooling. The enrollment ratio for the secondary level increased from 11 per cent in 1960 to 30 per cent in 1980. An extensive vocational education program has been developed, and university education has been extended to large numbers of Thai citizens through the development of open universities.

Figure 2. Population Aged 5–14, Average Annual Change
These advances took place in spite of a rapid increase in the number of school age children. As shown in Figure 2, the average annual increase in the population 5–14 years of age averaged between 250 and 350 thousand per year between 1960 and 1975. Thus, the Thai educational system faced a double challenge – improving the quality and level of education achieved by the average Thai child and rapidly expanding the school system to accommodate population growth. In order to meet this challenge, between 1964 and 1985, the number of students enrolled in primary and secondary public schools doubled from 4.1 million to 8.5 million, the number of teachers increased four-fold from 114 thousand to 451 thousand, and public expenditure increased six-fold from 4.7 billion baht to 28.6 billion baht in 1985 prices.

Starting in 1980 the underlying demographics of schooling have changed quite dramatically. The population belonging to the age groups from which primary and secondary school students are drawn is essentially not growing at all. And beginning in 1995, the primary and secondary school age population are expected to decline by as much as 100 thousand potential students per year.

How will such fundamental population change affect school enrollment? Table 3 summarizes projections of school enrollment based on the continuation of essentially universal primary education and a relatively conservative extension of the coverage of secondary education. Primary school enrollment will almost certainly be relatively constant until 1995 and, at that time, begin a steady and fairly significant decline. Secondary school enrollment is projected to increase substantially over the next dozen years, but starting at the turn of the century the growth in secondary school enrollments will level off and begin to decline as well.


<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Primary</td>
<td>7,137</td>
<td>7,161</td>
<td>6,811</td>
<td>6,555</td>
<td>6,384</td>
<td>6,066</td>
</tr>
<tr>
<td>Lower Secondary</td>
<td>1,306</td>
<td>1,692</td>
<td>1,861</td>
<td>1,788</td>
<td>1,731</td>
<td>1,685</td>
</tr>
<tr>
<td>Upper Secondary</td>
<td>957</td>
<td>1,059</td>
<td>1,134</td>
<td>1,173</td>
<td>1,106</td>
<td>1,081</td>
</tr>
<tr>
<td>Academic</td>
<td>564</td>
<td>676</td>
<td>733</td>
<td>759</td>
<td>715</td>
<td>699</td>
</tr>
<tr>
<td>Vocational</td>
<td>393</td>
<td>383</td>
<td>401</td>
<td>414</td>
<td>391</td>
<td>382</td>
</tr>
<tr>
<td>Higher Education</td>
<td>966</td>
<td>1,178</td>
<td>1,335</td>
<td>1,415</td>
<td>1,427</td>
<td>1,443</td>
</tr>
<tr>
<td>Closed[1]</td>
<td>396</td>
<td>549</td>
<td>673</td>
<td>720</td>
<td>696</td>
<td>675</td>
</tr>
<tr>
<td>Open</td>
<td>570</td>
<td>629</td>
<td>662</td>
<td>695</td>
<td>731</td>
<td>768</td>
</tr>
<tr>
<td>Total</td>
<td>10,366</td>
<td>11,090</td>
<td>11,141</td>
<td>10,913</td>
<td>10,648</td>
<td>10,275</td>
</tr>
</tbody>
</table>

[1] Closed University includes associate degree training.

The future path of tertiary enrollment is much more difficult to anticipate for several
reasons. First, students are drawn from a much wider range of age groups so that demo­
graphic change has a more diffused impact on enrollments. Second, enrollment rates are
fairly difficult to predict with any accuracy because they will be determined by a variety
of forces, including the general employment situation, the availability of jobs for students
with college degrees, and, most importantly, governmental decisions about the expansion
of university education and the mix between open and closed schools.

If a conservative approach were taken toward expansion of the educational system in
Thailand, public expenditure on education would grow slowly. Barring any improvements
in the quality of the inputs to education, total public expenditure is forecast to increase
from 37 billion baht in 1985 to 41 billion baht in 1990 and 43 billion baht in 1995. This
amounts to an annual rate of growth of 1.9 per cent between 1985 and 1990 and of 1.1
per cent between 1990 and 1995. Given expected growth in gross domestic product and
government revenues, the fiscal burden imposed by education would decline steadily over
the next decade and into the future.

Expenditures on education will grow more rapidly if unit costs rise. An alternative
forecast based on the assumption that the student-teacher ratio will decline and that the
average educational attainment of teachers will increase, yields estimated education costs
of 45 billion in 1990, 51 billion in 1995 and 58 billion in the year 2000. Total educational
cost, thereafter, is forecast to grow quite slowly. Even with significant improvements in
quality, public sector educational cost should grow much more slowly than either gross
domestic product or government revenue.

The education sector may impose a greater fiscal burden if enrollment increases more
rapidly than forecast. An alternative forecast of school enrollment based on the analysis
of survey data indicates that primary school enrollment will not differ substantially from
the values reported above. There is considerable scope for increased secondary enrollment,
however, and enrollments 35% above values reported above cannot be ruled out.

Policy Implications

During the past twenty-five years, the challenge facing the education sector has been
to improve the availability and quality of schooling in the face of rapid growth in the school
age population. The next twenty-five years clearly presents a different challenge. Because
the school age population has stabilized, a broader range of policy options is feasible. In
general terms, the possibilities include 1) slowing the growth of public expenditure on
education; 2) increasing enrollments by inducing students to extend their years in school;
and/or 3) improving the quality of education by, for example, reducing class size, lowering
the student-teacher ratio, or by upgrading the average quality of the teacher corps.

The most concrete and important area in which these options arise is in the area of
employment of teachers. Between 1964 and 1985 employment of teachers grew very rapidly,
the number of primary and secondary school teachers increased from 114 thousand to 451
thousand — an annual rate of growth of 6.5%. To sustain such a rapid rate of growth
required the development of a substantial teacher training program. In 1977, for example,
there were over 40,000 graduates of teacher training programs — enough to increase the
number of teachers by 15% in a single year.
But the current student-teacher ratio of 18 to 1 can be maintained over the next twenty-five years with virtually no increase in employment. Employment would peak in 1990 at 548 thousand teachers and begin to decline rather slowly thereafter. By 2015 total employment would be about 10 per cent below the 1990 peak. The greatest decline would be in primary school teachers. Between now and 1995 employment would be constant at a about 400 thousand but by 2015 employment would drop to about 340 thousand primary school teachers. Employment of secondary school teachers would increase by about 3,000 teachers per year between now and the year 2000, the year of peak employment. Thereafter the number of secondary school teachers required would decline by about 1,000 per year.

In response to slackening demand for teachers, teachers' colleges have terminated evening programs that award teachers' certificates or diplomas and have increasingly emphasized baccalaureate education. By 1985, 66% of those enrolled in teacher training were pursuing a bachelor's degree as compared with 26% in 1980. At the same time, total enrollment has declined precipitously to the current level of fewer than 60,000 students. Lower enrollment and a longer training period will both reduce the number of newly graduated teachers seeking employment. Is further retrenchment necessary?

From 1977 to 1980, the number of teachers grew annually at between 30 and 40 thousand per year. In addition, about 10,000 teachers withdrew annually because of retirement, death or resignation. Because annual graduates from teacher training programs averaged about 40,000 during this period, the supply and demand for teachers was apparently in fairly close balance during this period. From 1981 to 1985 the number of new graduates dropped to about 32 to 33 thousand teachers each year while employment grew on average by less than 10,000 per year. Full employment of new graduates could be achieved only through replacement demand of about 20,000 teachers per year. In other words, all graduates could be employed if about five percent of the teacher corps turned over each year and all new hires were recent graduates.

For the period 1973 to 1980, the years through which data are available, the withdrawal rate generally varied from two to four percent. Thus, particularly as total employment grows more slowly, further retrenchment seemed inevitable.

There are several unfortunate aspects of a serious retrenchment in teachers training programs. First, the capacity of Thailand to train teachers would be damaged, reducing the country's capacity to respond to future expansion of the educational system. Second, current efforts to upgrade the educational achievement of teachers would be undermined. Although most of those currently being trained are pursuing a bachelor's degree, they would have a negligible impact on overall teacher quality were few recent graduates employed.

What are the alternatives to the retrenchment in employment? Three possibilities stand out. First would be to improve the quality of teaching by reducing the student teacher ratio. The second would be increase enrollments at the secondary school level. And the third would be to adopt a sabbatical system which would release teachers periodically to upgrade their skills through teacher training programs.

For the sake of illustration we consider the implications of allowing employment of teachers to increase by 1% per annum so that employment would increase by about 6,000
teachers per year increasing to closer to 7,000 teachers per year at the end of the simulation. (Between 1980 and 1985, employment grew with an annual rate of 3.9 percent.)

We consider three alternatives for absorbing the additional teachers.

Reducing the student-teacher ratio: A reduction of the student teacher ratio from 18, the current level, to 15 in 2005 and 12.6 in 2015 would absorb all additional teachers. This does not appear to be a cost effective approach to absorbing additional growth in employment. The current student/teacher ratio of 18 is already low by international standards, and compares favorably with ratios even in industrialized countries. In the U.S., for example, during the early 1980's the elementary student/teacher ratios was around 20 and the secondary ratio around 17. Of course the U.S. has also had to deal with problems of shrinking enrollments.

Increase secondary enrollment: The growth in employment up to the year 2000 could be absorbed by increasing secondary enrollment to 4.1 million. This exceeds our basic projection of secondary enrollment by 1.1 million but is nearly identical to our estimates of the potential demand for secondary education based on analysis of household survey data. To absorb growth in the number of teachers after the year 2000 by expanding employment probably would be only partially successful. To absorb the full 1% annual growth would require 2 million additional students in 2005, 2.8 million additional in 2010, and 3.9 million additional in 2015. Enrollment at these levels could be achieved only with unrealistically high enrollment ratios.

Teacher training: If enrollments are maintained at the base year level, student teacher ratios are maintained, and employment is allowed to increase, the resulting "surplus" of teachers could be absorbed by instituting a sabbatical system by which teachers would take a specified amount of time off from teaching so as to upgrade their skills, possibly to the levels of education being achieved by current graduates of teaching colleges. By 1995 approximately 1 teacher in 20 could be on sabbatical without adversely affecting staffing. By the year 2000, 1 teacher in 10 could be on sabbatical. Thereafter, a sabbatical system, by itself, could not feasibly absorb the additional teachers employed under the 1% growth in employment scenario.

The clear message in the education sector is that resource requirements associated with total growth will begin to shrink in the coming years. The remainder of this century seems to offer an excellent opportunity to improve the quality of education and to extend educational attainment, particularly at the secondary level. Thereafter, expansion of the educational system should be relatively limited. Population redistribution, not explicitly considered in this study, will become an important concern. Some localities will begin to face a decline in enrollments, requiring a retrenchment in the educational system, while other localities will experience increasing enrollments, requiring employment of additional teachers locally and construction of appropriate facilities.

**THE HEALTH SECTOR**

Analysis of health is difficult in almost any country because of the complex mix of public and private providers. The analysis undertaken here relies on a variety of resources
so as to provide an overall perspective of likely changes in the health sector. Extensive analysis was carried out using data from the Ministry of Public Health which accounts for about 60 percent of total public cost. Public and private sector use of health care facilities was assessed by analyzing micro data collected on 21,000 households in the 1981 Health and Welfare Survey. And household expenditure on health care was analyzed using micro data collected on 9,000 households as part of the 1981 Socio-Economic Survey.

The study has several objectives. The primary objective is to forecast, at the national level, trends in the number of patients and health care expenditure. This has been accomplished by estimating rates of health care use and their dependence on age, sex, household characteristics, and socio-economic characteristics of the population. The rates of use have then been applied to projections of Thailand's population, households, and the demographic characteristics of households to obtain aggregate estimates of the numbers of inpatients and outpatients. Health care costs have been obtained by applying unit costs for inpatients and outpatients to the forecast numbers of patients. The unit costs are also affected by demographic change because the treatment mix and cost varies with the age and sex of the patient. Trends in the private sector were assessed by estimating the impact of social, economic, and demographic characteristics of the households on health care expenditure. Determinants of expenditure were forecast and used to forecast total private health care expenditure.

In addition to the primary purpose of the study, two secondary objectives are pursued in less detail. The first is to describe likely changes in the patient mix that will bear on health sector planning. The second is to assess the impact at the household level of changing health needs.

Major Findings

- The number of patients will grow at about 1 to 1.5% per annum.
- Public cost will grow at about 5% per annum.
- Private expenditure will grow at about 7% per annum.
- Demand for maternal and child care will decline steadily.
- Health care needs of the elderly will grow rapidly.
- The family will continue as viable support mechanism.

Looked at in overall terms, these findings paint a fairly optimistic picture despite the increasing number of elderly, a byproduct of Thailand's demographic transition. In an aging society, it is inevitable that an increased share of resources will be devoted to health care. Such a phenomenon is very apparent in more demographically advanced Japan, for example. But Thailand is in more of a transition period. Although the health care needs of the elderly are increasing, they are balanced by the relative decline in the needs of two other groups of major health care users: young children and childbearing women. As a consequence, the overall demands of the health sector should not be excessive for the next twenty-five to thirty years.

Although the overall requirements of Thailand's health sector will not increase very
rapidly in the near future, the kinds of medical care that will be required should change quite dramatically. It is quite clear from this study that a detailed assessment of changing health needs and the implication for health care planning should be a high priority.

A recurring issue in health is the question of who should bear financial responsibility for health care: the state or the individual. The choice, in reality, is between the state and the family. The health sector analysis and analysis of other sectors indicates that the family is a viable institution for playing a major role in the financing of health care. Most elderly live with their children; households headed by elderly are not particularly economically disadvantaged, on average; and, households headed by elderly do not have excessively high per capita rates of treatment.

Detailed Discussion

Aggregate trends in three aspects of the health sector have been forecast: (1) the number of patients, (2) recurring expenditure, and (3) capital expenditure.

The number of patients seeking health care will grow in step with Thailand's increasing population, but the amount of health services required will also depend on which segments of the population grow most rapidly. In general, health needs are closely related to age. Thus, three demographic groups that rely more extensively on the health sector can be readily identified: the very young, the old, and childbearing women. In Thailand, the pattern of use is evident in proportions seeking inpatient care. Among males, the three heaviest users are children under seven, adults 50-59, and those 60 and older. Among Thai women the heaviest users are those of childbearing age (20-39), those over 50, and those under 7, in that order. A similar pattern is evident in expenditure data — the presence of an additional child under 3 or an additional member 60 or older results in higher health care expenditure by Thai households. The impact of a child under 3 is particularly noteworthy. An additional child of either sex raises health care expenditure by more than 1% of the households total disposable income. This is a remarkable impact since Thai households on average spend only 3% of their disposable income on health care.

The traditional pattern of health care use is less apparent for outpatient care. Male outpatient care follows a U-shaped age profile, but school age children are also major users of outpatient care. The female pattern is much more complex with use high among children of school age and younger, women of childbearing age, and older women.

Because the age pattern of health care use is complex, the impact of demographic change is complex as well. The first group of heavy health care users, young children, is essentially stationary and beginning to decline in Thailand. Alternative forecasts of inpatient care indicate that the number of patients under age 7 has peaked or will do so very soon and then decline very gradually over the foreseeable future.

The second group of heavy users, the elderly, are growing in numbers and quite rapidly. Those 65 and older are forecast to increase from 1.9 million in 1985 to 3.7 million in 2005 and will exceed 5 million in 2015. Over each ten year period forecast, the average annual growth rate of the elderly population varies from 3.1% to as much as 3.7%. It should come as no surprise, then, that the total demand for health care by the elderly will rise in step.
Detailed forecasts presented in the health sector study show a steady increase in inpatient care, for example, averaging 3.4% per annum for elderly women and 3.7% per annum for elderly men.

Analysis of the final group of heavy health care users, childbearing women, is more complex because two distinct demographic factors affect use. The number of childbearing women in Thailand is currently growing at a fast pace. For example, the number 20–29 is growing 2.6% per annum between 1985 and 1990. But the number of women in their twenties will essentially peak around 1995 and change little over the next 15 years. At the same time, women of childbearing age are having fewer children than in the past so that the typical woman will require less maternal health care than previously. When these multiple factors are taken into account, inpatient care for women aged 20–49 is forecast to increase by about 1% per annum between now and the year 2000, to remain essentially constant between 2000 and 2010, and to begin declining thereafter.

When these demographic impacts are combined with changes in the numbers in other groups seeking health care, the total forecast demand for inpatient and outpatient care, presented in Table 4, is obtained. Both the number of outpatients and the number of inpatients grow at a steady but declining rate over the entire simulation period. Outpatient care consistently grows more rapidly than inpatient care and somewhat more rapidly than the population, in general. Inpatient care grows somewhat more slowly than the population in every period. Thus, the overall rate of outpatient care is increasing while that of inpatient care is declining over the simulation period.

Table 4. Forecasts of Number of Patients and Recurring Costs, 1985–2015.

<table>
<thead>
<tr>
<th>Year</th>
<th>Outpatient Care</th>
<th></th>
<th>Inpatient Care</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Patients (million)</td>
<td>Cost (million baht)</td>
<td>Patients (million)</td>
<td>Cost (million baht)</td>
</tr>
<tr>
<td>1985</td>
<td>2.570</td>
<td>2,033</td>
<td>30.360</td>
<td>2,680</td>
</tr>
<tr>
<td>1990</td>
<td>2.856</td>
<td>2,755</td>
<td>32.564</td>
<td>3,525</td>
</tr>
<tr>
<td>1995</td>
<td>3.112</td>
<td>3,662</td>
<td>34.500</td>
<td>4,588</td>
</tr>
<tr>
<td>2000</td>
<td>3.357</td>
<td>4,816</td>
<td>36.249</td>
<td>5,933</td>
</tr>
<tr>
<td>2005</td>
<td>3.595</td>
<td>6,285</td>
<td>37.861</td>
<td>7,616</td>
</tr>
<tr>
<td>2010</td>
<td>3.801</td>
<td>8,098</td>
<td>39.277</td>
<td>9,745</td>
</tr>
<tr>
<td>2015</td>
<td>3.997</td>
<td>10,328</td>
<td>40.368</td>
<td>12,452</td>
</tr>
</tbody>
</table>

Figures on recurring cost presented in Table 4 reflect a combination of forces including increased number of patients, differences in health care needs and costs associated with age, and expected improvements in the quality and price of health care. Overall health care costs are expected to increase at a fairly steady pace – annual growth for outpatient care is forecast to average 5.4% and for inpatient care 5.1%. All in all, then, recurring costs
will grow at a magnitude similar to the growth in GNP expected in Thailand. Recurring expenditure for health care should be a relatively constant proportion of GNP and the government budget.

As difficult as it might be to estimate recurring expenditure on health care, developing reliable estimates of health sector investment is even more difficult. Table 5 presents results from two simple alternative methods of forecasting investment. Method 1, which provides the more conservative estimates, is based on the assumption that investment will remain a constant share of health care expenditure starting in 1985. Method 2 assumes that the incremental capital-output ratio is constant. Using either approach, growth in investment is of the same order of magnitude as the growth of recurring expenditure.

Table 5. Forecast of MOPH Investment[1], 1985-2015.

<table>
<thead>
<tr>
<th>Year</th>
<th>Method 1</th>
<th>Method 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>1985</td>
<td>359</td>
<td>359</td>
</tr>
<tr>
<td>1990</td>
<td>397</td>
<td>1,207</td>
</tr>
<tr>
<td>1995</td>
<td>1,310</td>
<td>1,530</td>
</tr>
<tr>
<td>2000</td>
<td>1,706</td>
<td>1,930</td>
</tr>
<tr>
<td>2005</td>
<td>2,207</td>
<td>2,415</td>
</tr>
<tr>
<td>2010</td>
<td>2,833</td>
<td>3,022</td>
</tr>
<tr>
<td>2015</td>
<td>3,616</td>
<td></td>
</tr>
</tbody>
</table>


Assessing likely changes in investment on health care expenditure is a fruitful area for more extensive analysis. Estimates could be improved by assessing the adaptation of new health technology, the impact of shifts in the type of health care required, and changes in the geographic distribution of the population and, hence, the demand for health care services.

From discussion of key demographic groups above it is exceedingly clear that Thailand will experience substantial shifts in the demographic character of patients and, as a consequence, changes in the mix of health care to be provided. Figure 3 clarifies this further by showing the relative sizes of child care, "maternal" care, i.e., care of women of childbearing age, and care for elderly. In 1985, inpatient care for the elderly and child care took up about one-quarter of the pie each, whereas care for women of childbearing age constituted nearly one-half. But the relative numbers of patients who are children and childbearing women steadily erodes and, by 2015, half of the pie is devoted to care for the elderly, only one-third to care for women of childbearing age, and one-sixth to care for children.

The value used (0.612) is based on changes between 1980 and 1985.
The implications of such a shift are far reaching in that they affect the mode by which medical care is provided (less reliance on schools), the pattern of treatment (decline in OB-GYN, infective, and respiratory diseases and an increase in degenerative diseases, e.g., cancer and heart disease), the facilities and equipment required to provide medical care, and possibly the means by which health care is financed.

The implications for health care financing requires additional discussion. There are two aspects of health care financing that may be affected by demographic change. First, the need for user charges and other mechanisms to promote allocative efficiency may increase with the aging of the health market. A recurring problem in the provision of public health care is underutilization of primary health care services and overuse of urban hospitals and specialized services. Schools provide an institutional setting by which children can be screened for their health care needs in a cost effective manner. But as the overall importance of child care declines, mechanisms for screening, e.g., user charges, may become more important. Furthermore, as experience in the West has shown, the potential costs of provided health care to the aged are enormous so that unlimited access to health care is not a fiscally viable alternative.

A second aspect of health care financing may be more important. A principal concern in discussions of increased privatization of health care is with equity and concern that paying for health care places an undue financial burden on those who fall ill. As increasing numbers of health care users become elderly, equity concerns may increase to the extent
that the elderly are more likely to become ill and are more likely to have low labor earnings or none at all. The burden can be ameliorated in two ways: health insurance or family support. Evidence presented throughout this study suggests that the network of family support is relatively strong in Thailand and shows no signs of crumbling. Thus, health care charges would not fall solely on the shoulders of the elderly but would be borne by a larger and more financially strong extended family.

THE HOUSING SECTOR

Housing in Thailand is examined from two distinct perspectives. The greatest attention is given to residential construction and the impact of demographic change on the demand for new housing. But additional attention is given to housing “consumption”, i.e., the monetary values of the services which flow from the existing stock of housing. Analysis of residential construction is important from the production side of the economy because a substantial amount of resources, including financial resources, are tied up in the construction of new housing units. Analysis of housing consumption is important because such a substantial portion of consumer expenditure is devoted to housing.

Principal Conclusions

Providing dwellings and associated infrastructure for Thai households will be a major undertaking for many years. Within the next few decades three to four percent of GDP will be devoted to constructing new housing units. Households typically spend about one of every five dollars on housing and household operations. And, of course, public sector investment in urban development and infrastructure is enormous.

Because of Thailand’s legacy of high fertility, the number of prime age adults, those responsible for establishing new households, will grow quite rapidly over the next few decades. If current living arrangements continue in Thailand, the number of dwelling units will more than double from 10.5 million in 1985 to 22.3 million in 2015.

Although household size will decline significantly during the same period, available statistical evidence does not show that families will choose smaller units or choose to spend less on housing. A shift in the housing stock towards multi-family dwellings might be dictated by land availability, but evidence does not show that multi-family units are preferred by small families or families with fewer children.

Thailand clearly faces enormous challenges in providing for an additional 12 million housing units during the next 30 years. The resources required to construct additional housing will not unduly strain the economy. And for individual households, the costs of housing and housing operations are not overly high. However, the provision of urban infrastructure and land shortages could prove to be severe. The public sector burden could prove to be substantial, costs to households could rise rapidly with rising land costs, and the urban environment, crowding, noise and air pollution, could deteriorate further than prevailing in Bangkok, today.

Detailed Discussion
The impact on the stock of housing of demographic change and, in particular, change in the number of households is, at first sight, obvious. New households require homes and, if households do not share housing units, each additional household requires an additional housing unit. In Thailand, "doubling up" is not a prevalent phenomenon so that, in general, there is nearly a one-to-one correspondence between housing units and the number of households. Strictly speaking, however, the analysis on housing starts and residential construction should be thought of as a housing needs assessment, i.e., the number of housing units required to house the population given current living arrangements. There is no question but that as a matter of policy, for example, the growth of the housing stock could be slowed retarding the formation of new households or increasing the prevalence of doubling up.

Not all housing units constructed in a given period go to house new families. Some housing goes towards replacing units that have been removed from the housing stock as part of urban renewal projects or general deterioration. In addition, a small proportion of housing is unoccupied at any point in time.

In more industrialized countries, it is not uncommon for a single household to own more than one housing unit, a permanent residence and a vacation home, for example. Although this might become a significant factor in Thailand sometime in the future, the possibility is ignored for purposes of the study carried out here.

Residential construction expenditure is determined as the product of the number of housing units and average expenditure per unit. In general, expenditure per unit will change in response to both economic and demographic factors. On the economic side, increased income should lead consumers to demand higher quality housing and, as a result, dwellings with higher unit cost. On the demographic side, declining household size and the presence of fewer children might lead households to demand smaller dwellings and reduce the demand for detached housing units. Of course, supply side factors may well drive up the relative price of housing of a given quality, but the supply side has not been examined in this study.

There is no direct evidence about the characteristics of new housing units and the economic and demographic characteristics of those in the market for housing. The only data that bear on the issues raised above are data on characteristics of existing housing units and household residing therein. Analysis of two sources of data provide a partial picture. The 1980 Census collected detailed housing characteristics and demographic characteristics of the household, but only limited information about economic characteristics of the household. The 1981 Socio-Economic Survey collected detailed economic and demographic data and detailed information about housing expenditure but less information about housing characteristics.

Analysis of these data do suggest the following conclusions, however. Housing expenditure rises in step with per capita income. Analysis of consumer expenditure data indicates that housing expenditure has a per capita income elasticity of 1.08, i.e., an increase in household disposable per capita income of 1% increases expenditure on housing and household operations by 1.08%. Based on this indirect evidence, forecasts of residential construction expenditure assume an income elasticity of 1.
The estimated impact of demographic factors are surprising. Analysis of census data shows little evidence that demographic characteristics of the household affect housing characteristics. But analysis of consumer expenditure data showed that demographic trends in Thailand are, generally, leading to greater housing consumption. First, given per capita income smaller households devote a higher share of their budget to housing. Second, households with an older head spend a higher share of their budgets on housing. On both counts, then, demographic trends will lead to higher housing consumption in Thailand. Forecasts of housing expenditure presented below incorporate these effects, but they could not be reliably incorporated into forecasts of residential construction. Thus, the forecasts of construction presented below might be biased downward somewhat.

Figure 4 presents forecasts from 1980-85 to 2010-15 of the annual number of housing starts. During the current five year period, 1985-90, housing starts are forecast to average 460 thousand units per year. This compares with an estimated housing stock in 1985 of about 10 million units, so that during the five year period newly constructed units would total nearly one-quarter of the entire 1985 stock of housing! The annual number of housing starts increases each quinquennia up to and including 2005-2010 when housing starts peak at an annual figure of 570 thousand units or about 25% above the current level.

Figure 4. Housing Starts and the Number of Households

The link between housing starts and new households is also illustrated in Figure 4.
At the beginning of the forecast, about 3 of every 4 newly constructed units are going to house new households and 1 of every 4 to replace existing units. But as time progresses and the housing stock grows, a higher proportion of housing units go toward replacement demand. By the end of the forecast period, nearly 2 of every 4 newly constructed units are going toward replacement and the remainder to house new families.

As a result of the attenuation of the link between housing starts and new households, the number of housing starts continues to grow after the number of additional households has peaked. Only after 2010 will the number of new housing units required begin to decline even though the number of new households peaks at the turn of the century.


<table>
<thead>
<tr>
<th>Year</th>
<th>Percent of GDP</th>
<th>Percent of GCF</th>
</tr>
</thead>
<tbody>
<tr>
<td>1980–85</td>
<td>3.4</td>
<td>16.8</td>
</tr>
<tr>
<td>1985–90</td>
<td>3.7</td>
<td>20.7</td>
</tr>
<tr>
<td>1990–95</td>
<td>3.8</td>
<td>22.0</td>
</tr>
<tr>
<td>1995–00</td>
<td>3.7</td>
<td>21.9</td>
</tr>
<tr>
<td>2000–05</td>
<td>3.5</td>
<td>21.2</td>
</tr>
<tr>
<td>2005–10</td>
<td>3.2</td>
<td>19.9</td>
</tr>
<tr>
<td>2010–15</td>
<td>2.8</td>
<td>17.9</td>
</tr>
</tbody>
</table>

What are the economic implications of the forecast growth in residential construction? Table 6 summarizes two aspects related to the production of new dwelling units. The share of gross domestic product devoted to residential construction is forecast to increase from 3.7% in the current quinquennia to peak at 3.8% in the 1990–95 period before beginning a gradual decline. By 2010–14, residential construction is forecast to stand at 2.8% of GDP. A very similar pattern is evidenced in the relationship between residential construction and gross capital formation. About 21 to 22% of all gross capital formation will be devoted to residential property during the next twenty years. Only after 2005 does the figure drop below 20%.

Forecasts of expenditure on housing and household operations are presented in Table 7. The share of the household budget devoted to shelter will increase from 20% of total expenditure in 1980 to 22.3% of total expenditure in 2005. Monthly expenditure is forecast to increase from 7.4 billion baht in 1985 to 15.4 billion baht in 1995 and 29.4 billion baht in 2005. Over the next two decades, expenditures on dwelling, viewed from the consumer's point of view, is expected to increase at just under 7% per annum. Thus, unlike expenditure

---

6 A relatively small percentage of the units will be vacant at any point in time.
on new housing which will begin to shrink in importance relative to the rest of the economy over the next few decades, expenditure on all housing combined is expected to increase in importance relative to the consumption of other goods and services.


<table>
<thead>
<tr>
<th>Year</th>
<th>Monthly Expenditure[1]</th>
<th>Percent of Total Expenditure</th>
</tr>
</thead>
<tbody>
<tr>
<td>1980</td>
<td>5,049</td>
<td>19.4</td>
</tr>
<tr>
<td>1985</td>
<td>7,411</td>
<td>20.0</td>
</tr>
<tr>
<td>1990</td>
<td>10,774</td>
<td>20.5</td>
</tr>
<tr>
<td>1995</td>
<td>15,369</td>
<td>21.1</td>
</tr>
<tr>
<td>2000</td>
<td>21,470</td>
<td>21.7</td>
</tr>
<tr>
<td>2005</td>
<td>29,387</td>
<td>22.3</td>
</tr>
</tbody>
</table>


A detailed discussion of the implications for employment and backward and forward linkages in the economy are discussed in the complete sector report. But more difficult to assess and probably more important is the impact of increased dwelling units on land use and urban infrastructure. The number of dwelling units required to maintain current housing standards is forecast to increase from 10.5 million units in 1985 to 22.3 million units in 2015. Again, given current land use patterns, this implies a doubling of the land devoted to residential use and a commensurate increase in urban infrastructure. It seems inconceivable that the current pattern of urban development, i.e., the overwhelming concentration of urban population in Bangkok, can be maintained. Thus, the development of secondary urban centers would seem to be of the highest priority in Thailand.

SPENDING PATTERNS

A recurring theme in this report is that a wide range of activities in Thailand will be influenced by changes in the demographic character of the Thai household. Spending patterns are heavily influenced by the number, ages, sex and activities of household members. Because Thailand is in the middle of such significant changes in its demographic character, spending patterns will change substantially in the years to come.

The Aging of the Thai market

The aging of the population is one of the key demographic phenomena that Thailand faces over the next few decades. Like other countries with a recent experience of rapid population growth, Thailand currently has a relatively young age structure, and numbers
are translated into purchasing power. Our estimates for 1985 show that 37% of all household spending emanated from households headed by an individual under 35 years of age. This figure is surprising for two reasons. First, Thai's do not establish households at a young age. In 1985, barely half of adult males aged 25–29 and not quite three-quarters of those aged 30–34 had established their own household. Second, adults in their twenties and early thirties are far from their peak earning years. These two factors, however, were offset by overwhelming numerical strength — 40% of all household in 1985 were headed by someone under thirty-five years of age.

Figure 5 shows the purchasing power of households divided into four age of head categories, those 35–49, 50–64, and 65 and older, in addition to “young” households. In 1985 households with a head 35–49 years of age accounted for 37% of the market, identical to the market share of young households. Households with a head over 50 accounted for only one-quarter of expenditure with four out of five dollars spent by households with a head 50–64 and the remaining dollar by households with a head over 65.

Figure 5. Purchasing Power of Households

The next three decades will be dominated by a shift in spending power from young to middle-aged households. Between 1985 and 2015, the share of purchasing power of young households will decline by nine percentage points from 37% to 28%. Households with a head 35–49 will experience a five percentage point gain. Those with a head 50–64 will
increase their share by three percentage points, and those with a head 65 or older by just under one percentage point. Thus, in the foreseeable future essentially four of every 10 dollars will be spent by households with a head aged 35-49. Out of every $10 between $2 and $2.40 will be spent by households with a head 50-64 and from $0.50 to $0.60 will be spent by elderly households.

Two aspects of this shift are of further interest. The first aspect is that expenditure patterns will be affected because the demographic and economic character of households vary systematically with the life cycle stage of the household. Thus, the structure or composition of final aggregate demand will shift towards the goods and services most favored by households with the greatest spending power. A second consideration is that shifts in expenditure shares may represent or coincide with changes in the relative standard of living or economic well-being of one group of households vis-a-vis another.

The Impact of household composition

The age of the household head is essentially an indicator of the life cycle stage of a household. There are many different ways that one can characterize the life cycle stages – by the principal activities of household members, by the important demographic processes that dominate demographic change, or simply by the age and sex of the members of the household. Households with a head under 35 years of age are distinctive demographically because childbearing and rearing of young children is a central part of their lives. Most households with a head 35-49 years of age have moved on to a new stage of the lifecycle in that childbearing is essentially complete but the rearing of children remains a central activity. In the next stages of the life cycle, childrearing plays a less important role. In general, the dependency burden for households with a head 50-64 is at a low point, because few children remain and most adults are employed. But for households with an elderly head, adult members are less likely to be economically active so that the dependency burden for older households is generally high.

Table 8. Age Distribution of Household Members, 1985.

<table>
<thead>
<tr>
<th>Age of Head</th>
<th>under 35</th>
<th>35-49</th>
<th>50-64</th>
<th>over 64</th>
<th>Combined</th>
</tr>
</thead>
<tbody>
<tr>
<td>Average Members</td>
<td>4.39</td>
<td>5.74</td>
<td>5.15</td>
<td>4.40</td>
<td>4.99</td>
</tr>
<tr>
<td>0-5</td>
<td>1.14</td>
<td>0.48</td>
<td>0.51</td>
<td>0.46</td>
<td>0.75</td>
</tr>
<tr>
<td>6-14</td>
<td>0.92</td>
<td>1.59</td>
<td>0.71</td>
<td>0.69</td>
<td>1.08</td>
</tr>
<tr>
<td>15-24</td>
<td>0.64</td>
<td>1.49</td>
<td>1.35</td>
<td>0.60</td>
<td>1.06</td>
</tr>
<tr>
<td>25-64</td>
<td>1.63</td>
<td>2.09</td>
<td>2.42</td>
<td>1.33</td>
<td>1.92</td>
</tr>
<tr>
<td>over 64</td>
<td>0.06</td>
<td>0.09</td>
<td>0.16</td>
<td>1.32</td>
<td>0.18</td>
</tr>
</tbody>
</table>

Although the above characterization of the life cycle stages of the household is ade-
quate it is far from precise. The characterization would most readily fit nuclear households whereas extended or three generation households are quite common in Thailand. Thus, households with an elderly head may include economically active, adult members who are the offspring of the household head. Or, households with a head over 50 may include preschoolers who are the grandchildren of the head.

Table 8 shows how the demographics of the household varies with the life cycle or the age of the head in Thailand as of 1985. Several features stand out:

- The average number of members varies substantially over the life cycle, rising to a peak size of 5.7 members for households with a head 35–49, i.e., those which have just completed their childrearing.
- Irrespective of the age of the head, Thai households are not small. Households with an elderly head do not, on average, fit the Western stereotype of an elderly couple or person living alone.
- Households with a head under 35 years of age have more than twice as many pre-school children, an average of 1.1, than other households. However, households with a head over age thirty-five average about one-half preschooler per household irrespective of the head’s age. Even elderly households are actively engaged in raising young children.
- Providing for school age children is a responsibility shared by households with heads of all ages, but those with heads 35–49 have substantially more children aged 6–14 than either younger or older households.
- The number of prime working age adults varies significantly across the household life cycle, rising from 1.6 per household with a head aged under 35, peaking at 2.4 per household with a head aged 50–64, and dropping off substantially to 1.3 for elderly household.
- The elderly are concentrated in households with an elderly head – 1.3 elderly per household as compared with no more than .2 elderly per household for households with younger heads.

A slightly different perspective on the life cycle is provided by the data in Table 9 which applies labor force participation data and school enrollment data to distinguish households members by their principal activity: preschoolers, students, workers, and non-working adults. A summary of these data is provided by the dependency ratio, the number of all those not working divided by all those working. Young households and elderly households are quite similar with about 1.2 dependents supported by each worker, but they are distinctive in the sense that elderly households are supporting the elderly whereas young households are more heavily concentrating on rearing the young. Each worker in households with a head 35–49 supports only 0.85 dependents and each in households with a head 50–64 supports only 0.61 dependents.

How will the demography of the household life cycle change as Thailand proceeds through its demographic transition? Figure 6 shows the “division of labor” for all house-
Table 9. Activity of Members Over the Life-Cycle, 1985.

<table>
<thead>
<tr>
<th>Age of Head</th>
<th>under 35</th>
<th>35–49</th>
<th>50–64</th>
<th>over 64</th>
<th>Combined</th>
</tr>
</thead>
<tbody>
<tr>
<td>Preschoolers</td>
<td>1.14</td>
<td>0.48</td>
<td>0.51</td>
<td>0.46</td>
<td>0.75</td>
</tr>
<tr>
<td>Students</td>
<td>0.95</td>
<td>1.70</td>
<td>0.83</td>
<td>0.72</td>
<td>1.16</td>
</tr>
<tr>
<td>Workers</td>
<td>1.98</td>
<td>3.11</td>
<td>3.19</td>
<td>2.03</td>
<td>2.60</td>
</tr>
<tr>
<td>Non-Working Adults</td>
<td>0.32</td>
<td>0.45</td>
<td>0.62</td>
<td>1.19</td>
<td>0.48</td>
</tr>
<tr>
<td>Dependency Ratio</td>
<td>1.22</td>
<td>0.85</td>
<td>0.61</td>
<td>1.17</td>
<td>0.92</td>
</tr>
</tbody>
</table>

holds combined by reporting the average number of pre-schoolers, students, workers, and non-working adults. Between 1985 and 2005, the average household size declines from 5 members to 3.5 members per household. In percentage terms, the decline is shared equally by all non-working members; the number of pre-schoolers, students, and non-working adults is cut in half over two decades. During the same period, the number of working adults should decline by only 12%. As a result the dependency ratio declines from 0.92 dependents per worker to 0.52 dependents per worker over the twenty year period.

Figure 6. Principal Activity of Household Members
A somewhat different pattern emerges over the remainder of the projection. Average household size declines at a considerably slower pace than during the preceding two decades, but there is a significant increase in the number of non-working adults. This is the beginning of a trend which reflects the underlying aging of the Thai population and projections further into the future would yield an additional increase in the number of non-working adults, particularly those who are elderly.

Expenditure patterns and demographic composition

Changes in the demographic composition of households will affect expenditure patterns in diverse ways that can be difficult to anticipate. Consider, for example, the estimated impact on monthly expenditure of an additional child 2 or younger as pictured in Figure 7. Although providing the material needs for a young child undoubtedly involves substantial cost, the total impact on household expenditure is quite small — average monthly expenditure increases by less than 10 baht per month. This is possible not because a child can be supported on 5 baht per month, but because expenditures on the child are substituted for expenditures on other members, i.e., others in the household do with less. Changes in the types of goods and services consumed by the household are influenced by the particular needs of the additional members, but may depend as much on what other members can do without. For example, monthly food expenditure is reduced by almost 40 baht per month with the addition of a child 2 or younger because other family members are spending less on their own food. Expenditure on clothing, housing, and discretionary items are not much affected by the addition of a young member. Expenditure on medical care, however, increases by almost 60 baht per month as a result of the addition of the new member. It would be incorrect, however, to surmise that the additional medical care is devoted solely to the additional child. The change undoubtedly reflects increased maternal health care, as well.

Figure 8 shows similar estimates of the budgetary impact of a household member aged 3–12, 13–19, 20–59, or 60 and older. An additional child or teenager induces higher monthly expenditure whereas an additional prime age adult or elderly member induces lower monthly expenditure. Households with an additional child or teen shift expenditure toward discretionary items and out of housing and, for teens, food. The impact on the composition of the budget of an additional adult is quite similar to the impact of an additional teen. Monthly expenditures on food decline by 80 baht per month and on housing by 20 baht per month while expenditure on discretionary items increase by almost 50 baht per month and on clothing by about 15 baht per month. The addition of a prime age adult and an elderly member have quite similar impacts on food expenditure, but housing expenditure is higher given an elderly member and discretionary expenditure is lower.

7 This is a catch-all category which includes spending on tobacco and alcohol, transportation and communication, education, reading and recreation, personal care, and miscellaneous items.
8 These estimates are based solely on the consumption side and do not include expenditure out of increased earning associated with additional members.
9 These results do not distinguish the sex of the additional member. In Thailand, gender has very little effect on spending patterns except for spending on alcohol and tobacco products. See the detailed findings for more information.
The overall impact on expenditure patterns

Aggregate spending patterns will be shaped by the following forces:

1. Changes in the population age distribution will shift spending power from young to middle aged households.

2. The demographic character of households will change affecting the propensity to consume and the composition of the household budget.

3. Economic growth and improved standards of living will induce budgetary shifts away from basic essentials, e.g., food, and toward luxury goods and services.

The most significant change is the dramatic decline in the importance of food and non-alcoholic beverages – from over half of the family’s budget in 1980 to only one-third of the budget in 2005. The resources thus freed up are devoted to a number of areas. During the same period expenditure on housing is forecast to increase its share of the budget from 19.4 percent to 22.3 percent; apparel increases from 6.6 percent to 7.5 percent; medical care increase from 3.5 percent to 4.3 percent; and discretionary expenditure increases from 19.4 percent to 32.0 percent.

Forecasts of total monthly private expenditures are presented in Table 10. From a value of about 26 billion baht per month in 1980, expenditures on all goods and services combined are forecast to reach nearly 133 billion baht per month in 2005, which represents
Figure 8. Monthly Expenditure: Impact of Additional Members

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Food</td>
<td>13,311</td>
<td>17,717</td>
<td>23,198</td>
<td>29,652</td>
<td>36,979</td>
<td>45,021</td>
</tr>
<tr>
<td>Alcohol and Tobacco</td>
<td>1,027</td>
<td>1,479</td>
<td>2,102</td>
<td>2,918</td>
<td>3,950</td>
<td>5,222</td>
</tr>
<tr>
<td>Apparel</td>
<td>1,721</td>
<td>2,618</td>
<td>3,855</td>
<td>5,476</td>
<td>7,521</td>
<td>10,041</td>
</tr>
<tr>
<td>Housing</td>
<td>5,049</td>
<td>7,411</td>
<td>0,774</td>
<td>15,369</td>
<td>21,470</td>
<td>29,387</td>
</tr>
<tr>
<td>Medical Care</td>
<td>917</td>
<td>1,368</td>
<td>2,006</td>
<td>2,886</td>
<td>4,077</td>
<td>5,624</td>
</tr>
<tr>
<td>Personal Care</td>
<td>550</td>
<td>779</td>
<td>1,086</td>
<td>1,479</td>
<td>1,965</td>
<td>2,555</td>
</tr>
<tr>
<td>Transport and Communication</td>
<td>1,316</td>
<td>2,205</td>
<td>3,592</td>
<td>5,652</td>
<td>8,599</td>
<td>12,723</td>
</tr>
<tr>
<td>Recreation and Reading</td>
<td>460</td>
<td>760</td>
<td>1,223</td>
<td>1,906</td>
<td>2,882</td>
<td>4,246</td>
</tr>
<tr>
<td>Education</td>
<td>260</td>
<td>375</td>
<td>512</td>
<td>661</td>
<td>801</td>
<td>916</td>
</tr>
<tr>
<td>Miscellaneous</td>
<td>1,468</td>
<td>2,540</td>
<td>4,284</td>
<td>6,997</td>
<td>11,035</td>
<td>16,848</td>
</tr>
<tr>
<td>Total Expenditure</td>
<td>26,079</td>
<td>37,253</td>
<td>52,633</td>
<td>72,999</td>
<td>99,279</td>
<td>132,583</td>
</tr>
</tbody>
</table>

a rate of growth of 6.5 per cent per annum. The forecast aggregates represent a gradual decline in the rate of growth of private expenditures from 7.1 per cent during the 1980–1985 quinquennium to reach 5.9 per cent during the 2000–2005 quinquennium. Although in percentage terms, expenditures on food and non-alcoholic beverages grows more slowly than expenditures on any other category, the absolute increase is greatest. Monthly expenditures rise from 13 billion baht per month in 1980 to 45 billion baht per month in 2005. The greatest increases in percentage terms are anticipated for discretionary items. Transportation and communication, recreation and reading, and miscellaneous items are each expected to rise ten-fold over the twenty-five year period tracked.

HOUSEHOLD SAVING

There are two important reasons why patterns of household saving should be carefully scrutinized. First, by saving households accumulate financial reserves that protect them against unforeseen contingencies and which provide an basis of support if and when household members retire. Second, household saving is the principal component of national saving and, thus, provides the resources needs for investment in new plants and equipment, the development of improved infrastructure, replacement and refurbishment of the existing physical plant, etc.

In Thailand household saving has generally averaged between 12 and 15% since the 1950s and has been an extremely important component of national saving and investment. Between 1980 and 1985, net national saving was 14.5% of national income – during the same period household saving averaged 12.7% of national income. Thailand compares favorably with other countries in its ability to generate saving in the household sector. For twenty-five countries reporting figures on household saving to the United Nations household saving averaged only 5.8% of gross domestic product.
Despite the positive aspects of saving in Thailand, there are some negatives. Starting from 1974, national saving has declined steeply and steadily so that by 1985, the net national saving ratio was at the lowest point in fifteen years. Not surprisingly, investment has been adversely affected and the reliance on foreign sources to finance domestic investment has increased.

The major portion of the decline in national saving can be traced to a decline in government and business saving rather than household saving, but household saving was, on average, two percentage points less during the first half of the eighties than during the 1970s. In some respects this is a surprising development. Many Asian countries have maintained relatively high and even rising saving ratios during the same period. Although experts disagree about the exact reasons behind the higher saving ratios, demographic factors have been increasingly favorable. Fertility decline has led to a reduced financial burden from childrearing. And changes in the age structure have resulted in a relative increase in the number of households at their peak earning years.

Figure 9. Age Profile of Dependency, 1985–2015

Thailand is undergoing the same demographic changes as experienced elsewhere in Asia. Figure 9 shows the “dependency” ratio for four different age of head categories. The dependency ratio is a simple way of summarizing the burden of members who do not contribute to household earning. Typically, the ratio is calculated by dividing the
population under 15 or over 65 by the population of working age. But the ratio reported in the figure is the number of non-working members divided by the number of worker members per household. The shape of the dependency profile in 1985 is typical of a moderate to high fertility population. It is highest among households with young heads because they have many children to support but few members old enough to work. The ratio declines as both the number of children declines and as the number of working adults increases. In 1985, for example, households with a head under age 35 averaged 2.0 workers whereas households with a head 35–49 averaged 3.1 workers and those with a head 50–64 averaged 3.2 workers. The dependency profile turns up again for older households as household members enter their retirement years and withdraw from the labor force.

Over the next thirty years, the dependency burden will decline substantially irrespective of the age of the household head. Between 1985 and 2005 the dependency ratio is anticipated to drop by 30% for households with a head under 35 or 35–49, by over 40% for households with a head 50–64, and by over 20% for households with an elderly head. Thus, to the extent that dependency discourages saving, households at all stages of the life cycle should enjoy higher rates of saving in the future than they do today.

Saving should also be affected by shifts in the composition of households. As shown in Table 11, Thai households were concentrated at high dependency stages of the life cycle in 1985. Over 30% of all households were under age 35 and fewer than one-quarter belonged to the low dependency 50–64 age category. By 2015, however, only 20% of all households will belong to the high dependency under 35 group and just over 30% will belong to the 50–64 group. Over the next thirty years then, households will be increasingly concentrated at stages of the life cycle which, from a demographic perspective, are more conducive to saving.


<table>
<thead>
<tr>
<th>Age of Head</th>
<th>under 35</th>
<th>35–49</th>
<th>50–64</th>
<th>over 64</th>
</tr>
</thead>
<tbody>
<tr>
<td>1985</td>
<td>31.4</td>
<td>35.5</td>
<td>23.7</td>
<td>23.7</td>
</tr>
<tr>
<td>1995</td>
<td>29.6</td>
<td>37.7</td>
<td>23.1</td>
<td>23.1</td>
</tr>
<tr>
<td>2005</td>
<td>24.8</td>
<td>39.7</td>
<td>25.1</td>
<td>25.1</td>
</tr>
<tr>
<td>2015</td>
<td>20.3</td>
<td>37.7</td>
<td>30.1</td>
<td>30.1</td>
</tr>
</tbody>
</table>

Analysis of Thai survey data provides fairly clear support for the view that shifts in dependency affect saving. Although children under age 3 have no discernible affect on the consumption or saving ratios, an additional child aged 3–12 is estimated to decrease the saving ratio by about 1 percentage point and an additional child aged 13–19 by about one-half percentage point, whereas an additional prime age adult is estimated to increase the saving ratio by about one percentage point. The impact of demographic change on
household saving is shown in Figure 10, which compares 1980 and 2005. At every age saving is expected to be greater, but particularly at stages of the life cycle where childrearing is an important activity.

Figure 10. Age Profile of Household Saving, 1980–2005

<table>
<thead>
<tr>
<th>Age of Head</th>
<th>1980</th>
<th>2005</th>
</tr>
</thead>
<tbody>
<tr>
<td>Less than 25</td>
<td>0.103</td>
<td>0.105</td>
</tr>
<tr>
<td>25–29</td>
<td>0.140</td>
<td>0.146</td>
</tr>
<tr>
<td>30–34</td>
<td>0.137</td>
<td>0.148</td>
</tr>
<tr>
<td>35–39</td>
<td>0.139</td>
<td>0.154</td>
</tr>
<tr>
<td>40–44</td>
<td>0.123</td>
<td>0.140</td>
</tr>
<tr>
<td>45–49</td>
<td>0.132</td>
<td>0.144</td>
</tr>
<tr>
<td>50–54</td>
<td>0.131</td>
<td>0.137</td>
</tr>
<tr>
<td>55–59</td>
<td>0.134</td>
<td>0.136</td>
</tr>
<tr>
<td>60–64</td>
<td>0.121</td>
<td>0.123</td>
</tr>
<tr>
<td>65–69</td>
<td>0.118</td>
<td>0.122</td>
</tr>
<tr>
<td>70–74</td>
<td>0.112</td>
<td>0.119</td>
</tr>
<tr>
<td>75 and Older</td>
<td>0.109</td>
<td>0.121</td>
</tr>
</tbody>
</table>

What will be the overall impact on aggregate saving and the overall impact on the economic security of Thai households? Forecast saving is presented in Table 12. A steady increase in the household saving ratio is anticipated starting in 1980 and ending in 2000. Thereafter, the saving ratio is expected to remain relatively constant at about 14% of disposable income. The gradual increase in the saving ratio together with rising income combine to push the absolute amount of domestic resources supplied by households for investment purposes by substantial amounts. Monthly aggregate household saving is calculated to rise from 5.9 billion baht in 1980 to 32.6 billion baht by 2005 and 55.5 million baht by 2015. Thus, household saving is forecast to increase ten-fold over the 35-year projection period, representing a rate of growth of 6.4 percent per annum.

How will financial security of households be affected by the changes anticipate? It is very hard to reach any firm conclusions. As indicated above, the average household saving ratio for Thailand is relatively high as compared with other developing countries. It is also relatively high among young households so that most accumulate financial reserves
early on to protect themselves against unanticipated economic emergencies. Are sufficient resources being accumulate for retirement? Analysis of the forecast saving behavior of households established in the 1980s indicates that by the time they reached retirement age, the average household would accumulate wealth equal to four to five times average annual earnings beyond any inherited wealth. Currently older households clearly do not rely on accumulated financial wealth to support their consumption. In fact, the average household with an elderly head contained 2 workers in 1985 according to our calculations. It would appear, then, that the combination of labor earnings and accumulated saving provides a reasonable base of economic security for the average Thai household.

**LABOR SUPPLY, EMPLOYMENT, AND WAGES**

Thailand's recent labor market experience has been mixed. On the one hand, economic growth has been sufficient to absorb a rapidly growing labor force. Between 1971 and 1985 employment grew at an annual rate of 3.0% as nearly 8 million additional workers were employed, bringing the total labor force to 25.9 million in 1985. Despite the rapid increase in the numbers seeking jobs, unemployment was kept largely in check. Labor force surveys conducted two or more times a year since 1974 report an unemployment rate of 4% on only one occasion, during the July-September round of 1982.

On the other hand, real wages have risen very slowly or not at all in recent years. Between 1977 and 1988 the real monthly wage of Thai workers is estimated to have been essentially constant.

The Thai experience is a text book example of the impact of population growth on the labor market as illustrated by Figure 11. Between 1970 and 1985 the population of prime working age (15–59) grew at slightly more than 3% per annum. With no change in the propensity to work, labor supply would be expected to increase annually by 3%, as well, represented by a shift to the right of the labor supply curve. Employment and wages are also determined by shifts in the demand for labor. Between 1971 and 1985, the
rapid expansion of demand for workers can be traced to the success in the overall growth in the economy – gross domestic product increased by 6.2% per annum. In short, each 2 percentage points in economic growth generated about 1 percentage point of growth in employment. The growing labor force has been absorbed but real wages have been stagnant.

Figure 11. Demand and Supply of Labor, 1977 and 1985

Future trends in employment and wages will be governed by the same forces. Growth in the numbers of working age and changes in labor force participation rates will determine shifts in the supply of labor. The impact on wages and employment will depend on the extent to which the Thai economy can continue to generate demand for additional workers.

Figure 12 summarizes forecasts based on extensive analysis of the supply of labor and alternative assumptions about the ability of the Thai economy to generate employment opportunities. According to our forecasts, Thailand faces two distinct phases during the next few decades. During the first phase, lasting the next fifteen years or so, the supply of labor will continue to grow at a rapid pace. The number seeking employment will increase annually by 730 thousand between 1985 and 1990, and during the early 1990's, the number of new workers seeking jobs will peak at 770 thousand annually. Overall, the rate of growth of labor supply will average 2.3% during the remainder of this century – somewhat slower than during the last two decades but still a substantial rate of growth.
Will the Thai economy be able to absorb the additional workers? In the immediate future expectations are that the growth in additional jobs will just match the increased supply of workers. The 5-year economic plan projects an increase in the number of jobs by 780 thousand annually between 1986 and 1991. If these numbers hold, supply and demand should be roughly in balance with only slight upward pressure on wages. Following the five year plan, the growth in labor demand is based on alternative scenarios — one corresponding to annual GDP growth of 4% and the other corresponding to GDP growth of 6%.

Figure 12. Forecast Annual Increase in Labor Force, 1985–2015

Whether the economy grows at a modest or a more rapid pace we expect employment to grow at between 2.4% and 2.9% annually between now and the year 2000, so that total employment should stand somewhere between 33.0 and 34.7 million workers by 1995. Wages should rise modestly or not at all during this period. If gross domestic product grows at 4% per annum, we expect wages, in real terms, to continue to be essentially stagnant until 1995. If gross domestic product grows at 6% per annum, we expect wages to grow at less than 1% per annum.

Depending on the speed with which the Thai economy expands, the Thai labor market should enter a second phase sometime shortly after the turn of the century. Significant labor shortages should develop as the increase in the supply of workers begins dropping
quite rapidly. Because labor force participation rates will be at or near 90%, it is unlikely that higher wages will induce a significant expansion of the labor force. The annual increase in supply is forecast at 665, 560, and 444 thousand for the first three quinquennia of the next century. But if low wages and current trends in economic growth continue unabated as many as one to two million additional workers could find employment annually.

The impact on wages will depend very much on the success with which firms deal with labor shortages. At one extreme, if labor is easily substituted by other factors and GDP grows at 4% per annum, wages are forecast to grow at 2.9%. If, on the other hand, GDP grows at 6% per annum and firms find it difficult to reduce their reliance on labor inputs, wages are forecast to grow at 12.7%. Irrespective of the speed with which wages increase, employment is expected to grow at a much slower pace between 2000 and 2015. The number of workers should grow at between 1.3 and 1.5% per annum and total employment should reach about 46 million workers, more or less, in 2015.

To summarize, employment should continue to grow rapidly during the next fifteen years or so followed by substantially slower growth thereafter. Wages should be relatively stagnant during the period of rapid growth, but as labor force growth slows, wages should increase at a brisk pace or, if firms find it difficult to adopt less labor intensive techniques, quite rapidly. From the perspective of “worker welfare”, rapid growth in wages should be viewed as a positive element in the Thai economy, especially given the absence of growth in recent years. On the other hand, too rapid a growth in wages may undermine Thailand’s comparative advantage in labor intensive exports and impinge on profits and other returns to non-labor factors, undermining overall growth. Clearly, both public and private sector planning in Thailand should anticipate increasing labor costs and the need to shift to less labor intensive modes of production.

Labor Quality

The character of the Thai labor force is changing in two important respects — the workforce is, on average, more educated and more experienced with each passing year.

The most important features of the educational transition are illustrated by Figure 13 which shows educational attainment of male workers in their late twenties. This is a pivotal age group from a manpower planning perspective since these are the workers who are filling many of the new jobs becoming available. Two aspects of educational trends stand out. First, the percentage with only a primary school education is quite substantial in 1985 and forecast to remain so throughout the forecast period. Even by 2015, barely less than half have completed only primary school. Second, of those who have gone beyond the primary school level, there is a remarkable emphasis on tertiary education. By the year 2000, for example, 22% are forecast to have completed tertiary education as compared with only 18% forecast to have completed only secondary education.

Although for purposes of illustration, we have highlighted only a small segment of the labor force, the educational trends observed permeate the entire work force. Educational attainment among women in the labor force is very similar to attainment for men. Older

---

10 The participation rate is measured as the labor force divided by the population aged 15–64.
workers, of course, have lower attainment than younger workers so that the percentages with elementary schooling are even higher. And for all but the oldest age groups, the emphasis on tertiary education among those advancing beyond elementary school emerges during the forecast period.

The unusual trends in educational attainment raise important questions. Continued economic growth and the potential labor shortages discussed above mandate a structural shift in the Thai economy away from agriculture and other labor intensive industries toward an industrially based economy which requires a more highly educated labor force. Will educational attainment be sufficient if nearly half of entering workers have not completed secondary school? And if the demand for more educated workers does grow rapidly, how much education is required? Will there be sufficient jobs for the large numbers of college graduates? And if not, will their skills be under-utilized or, even worse, not utilized at all?

The forecast trends in educational attainment are by no means inevitable. They are based on assumptions about educational policy that are detailed in the education chapter and, as such, are subject to change. However, the aging of the Thai labor force and the accompanying increase in the average experience of the Thai worker is an inevitable consequence of past and continuing demographic conditions in Thailand.

Figures 14 and 15 provide different perspectives on the aging of the Thai labor force. Figure 14 shows the absolute numbers of workers in five broad age categories. At present, the number of workers is growing in all age categories, but the number 11–24 is increasing.
slowly at the moment and forecast to begin a gradual decline after 1990. The 25-34 and 35-44 age groups are registering the largest absolute increases, forecast to exceed one million workers each between 1985 and 1990. Although the number of workers 45 or older is increasing more slowly than the number under 45, that pattern reverses itself starting in the year 2000 when the growth of workers over 45 will exceed the increase in the number of workers under 45. In percentage terms, the clearest contrast is revealed by comparing workers under 35 with workers 35 or older. In 1985, 60% of all workers were under 35 years of age. In 2000, the value is forecast to stand at 50% and by 2015 only 40% of all workers will be under 35 years of age.

Figure 14. Age Distribution of Thai Labor Force

![Age Distribution of Thai Labor Force](image)

Figure 15 presents an alternative and simple summary of the aging of the Thai labor force. The median age in 1980 was just under 32, i.e., half of the Thai labor force was under 32 years of age! Although little change occurred between 1980 and 1985, the median is forecast to exceed 34 by the year 2000 and 39 by 2015.

What are the important implications of the aging of the Thai labor force? First, an increase in the average age and, hence, the experience of the average worker should lead to higher labor productivity. Change over the next fifteen years, when the percent in the 11-24 age category is declining rapidly and the percent in the 35-44 age category is rising rapidly, should be particularly conducive to higher average labor productivity. Second,
at some point innovativeness and labor mobility may be adversely affected by labor force aging. Young workers tend to be more likely to change jobs because they have invested less in developing job specific skills. Moreover, young workers are more likely to have up to date information to the extent job skills are imparted through formal schooling rather than on the job training. The evidence on these points is by no means conclusive, but the rapid growth in the number of workers over 45 starting around 1995 may well have important implications that bears further study. Third, shifts in the relative numbers of workers may affect the structure of wages. Research on the United States, Japan, Korea, and Taiwan, among other countries, shows that relative wages are inversely related to the relative size of labor cohorts. This implies that, in Thailand, the wages of young workers should rise relative to the wages of older workers, other factors not with standing, and that lifetime earnings of members of smaller incoming labor cohorts should improve beyond that attributed solely to overall economic growth. Such a phenomenon would have implications for the intergenerational distribution of wealth, could affect the provision of old age security, and influence saving patterns, as well.

Figure 15. Median Age of Workers

![Median Age of Workers Graph](image-url)

Labor and the Household

The material summarized above emphasizes national trends in employment, wages, and labor characteristics with no specific attention to the impact of such trends on Thai
households. Of course, if in the aggregate job opportunities fail to keep pace with the growing supply of workers, resulting in unemployment and/or stagnant wages, households that rely on wage earnings will be adversely affected. And if wages begin to rise rapidly after the turn of the century in response to labor shortages, the economic standing of wage earning households will benefit. But is there more than we can say about employment trends and households?

The average number of workers per household is expected to decline quite steadily over the next several decades. In 1985, the typical household had two or three workers—the average was 2.6 workers per household. Over the next decade, the average will decline only by one-tenth of a worker, but by 2005 the average will decline to 2.3 workers and by 2015 to 2.1 workers per household. The decline, however, will not be uniform across all types of households. In particular, households with elderly heads and households with female heads will experience the greatest declines. For elderly households, the average number of workers will drop from 2.0 workers in 1985 to 1.6 workers in 2005 and 1.3 workers in 2015. For female headed family households, the average will drop from 2.4 in 1985, to 1.9 in 2005 and 1.6 in 2015.

Even for elderly and female headed households, the decline in the average number of workers should not, on average, result in economic hardship because the average household size and, hence, the number of members relying on labor earnings will decline more rapidly than the average number of workers. Among households with an elderly head, the number of dependents per worker will decline from 1.2 in 1985 to 0.9 in 2005. And among female headed family households, the dependency ratio will decline from 0.9 dependents per worker in 1985 to 0.7 in 2005.

In some cases, however, averages can conceal as well as enlighten. As households come to depend on fewer workers, they will be increasingly vulnerable to unemployment. Households with two or three workers have more protection against unemployment, but households with only one worker lose all labor earnings when hit by unemployment. Although in some cases previously non-working adults may enter the labor force, there will be relatively few non-working adults in households with elderly or single heads so that options will be more limited.

CONCLUDING OBSERVATIONS

The sector studies, summarized here and described fully in accompanying detailed reports, demonstrate the importance of demographic factors as contributors to trends in various dimensions of social and economic activity. Both the composition and amount of goods and services, such as education, health care, and housing, provided by the public sector alone or in partnership with the private sector, will be affected by changes in the number and demographic character of Thai households. Likewise, important dimensions of the Thai macroeconomy, including employment and wages, aggregate rates of saving, and the level and composition of household consumption, will change with the aging of the population, the rapid decline in average household size, and other demographic features of Thailand.
The importance of demographic factors to social and economic development planning have been appreciated for some time. Many countries, Thailand included, regularly prepare population projections as input to their five year development plans and to other long range planning documents. The incorporation of demographic factors into the planning process has been limited, however, by the absence of more complete information about households and their characteristics. Labor force participation, school enrollment, saving behavior, the demand for health services, and the demand for housing are all influenced by the household and its characteristics. Reliable forecasts in each of these sectors is possible only when the importance of the household is recognized and incorporated into the forecasting process. Likewise, the impact of social and economic policy can only be reliably determined when potential responses by households are carefully evaluated.

The major contributions of this project have been to show how more detailed household characteristics can be projected and brought to the planning process. As with any new methodology, however, the full potential of household demographic data can be realized only through extensive interaction between members of the research and planning community. It is hoped that this project will contribute to that process both in and outside of Thailand.
THE EAST-WEST CENTER is a public, nonprofit educational institution with an international board of governors. Some 2,000 research fellows, graduate students, and professionals in business and government each year work with the Center’s international staff in cooperative study, training, and research. They examine major issues related to population, resources and development, the environment, culture, and communication in Asia, the Pacific, and the United States. The Center was established in 1960 by the United States Congress, which provides principal funding. Support also comes from more than 20 Asian and Pacific governments, as well as private agencies and corporations.

Situated on 21 acres adjacent to the University of Hawaii’s Manoa Campus, the Center’s facilities include a 300-room office building housing research and administrative offices for an international staff of 250, three residence halls for participants, and a conference center with meeting rooms equipped to provide simultaneous translation and a complete range of audiovisual services.

THE EAST-WEST POPULATION INSTITUTE, established as a unit of the East-West Center in 1969, carries out multidisciplinary research, training, and related activities in the field of population, placing emphasis on economic, social, psychological, and environmental aspects of population problems in Asia, the Pacific, and the United States.