

## Life Insurance Markets in Developing Countries

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### ABSTRACT

Many developing countries consider financial institutions that are locally incorporated or even state-owned monopolies an essential element of their economic and political independence. This cross-sectional study of developing countries presents some empirical tests of the relationship between financial development and the development of the life insurance sector and provides empirical evidence of the negative effect of a monopolistic market on life insurance growth.

### INTRODUCTION

Developing countries are not only consumers but also suppliers of insurance services. In a domestic market, the supply of insurance generally consists of services provided by national companies, with local and/or foreign capital, as well as by foreign companies and agencies or branches. Browne and Kim (1993) suggest that a number of variables may explain international differences in life insurance demand. They also suggest that a number of factors affects the supply of life insurance, although their study considers only the demand side.

It is often argued that the development of financial institutions may have a significant impact on both the productivity of the economy and the volume of savings. Indeed, so important is insurance in the trade and development matrix that, at its first session in 1964, the United Nations Conference on Trade and Development (UNCTAD) (1964) formally acknowledged that "a sound national insurance and reinsurance market is an essential characteristic of economic growth" (p. 55).

Insurance, like other financial services, has grown in quantitative importance as part of the general development of financial institutions. The governments of many developing countries historically have held the view that the financial systems they inherited could not serve their countries' development needs adequately, so during the past thirty years they have directed considerable efforts

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to changing the structure of these financial systems and controlling their operations in order to channel savings to investments, which are crucial components of development programs (United Nations Conference on Trade and Development, 1984, 1988).

Recent empirical evidence suggests that developing countries have a supply-leading causality pattern of development rather than a demand-following pattern (Jung, 1986; Dee, 1986). Many governments have indeed established new financial institutions under what has been termed a "supply-leading approach" to financial development and have considered locally-incorporated insurance institutions or even state-owned monopolies an essential element of their economic and political independence.<sup>1</sup>

The protectionism that has developed in most countries should be viewed as a decision to internally produce rather than import insurance services. Public enterprises are considered a macroeconomic policy tool and, as such, are used by governments to provide not only insurance services but also to achieve social and macroeconomic objectives such as increased employment and foreign exchange reserves. Today, almost all developing countries have a local insurance market providing coverage for most domestic risks (United Nations Conference on Trade and Development, 1984, 1988).

Protective measures in the provision of insurance services can be classified into three categories: those related to establishment within the host country, access to the domestic market, and insurer operations (Skipper, 1987). The ultimate limitation on the establishment of insurance companies is a flat prohibition, the situation that prevails in monopolistic markets. Indeed, a monopolistic market technically should not be viewed as unfairly discriminatory against the local establishment of a foreign-owned insurer, since it applies equally to all potential domestic establishments.

Many governments of developing countries prohibit their nationals from placing insurance in other than locally-licensed and -incorporated insurers. In most instances, a localization regulation is accompanied by a "localization of ownership" requirement that a majority, if not the totality, of ownership interests in locally-domiciled insurers must be held by nationals of the country. Insurance localization requirements stipulate that certain or all lines of insurance must be placed with locally-domiciled insurers (see Table 1).

The main objective of this article is to investigate empirically the relationship between life insurance premium income, a measure of life insurance development, and the level of financial development and the market structure of insurance institutions in developing countries. The next section details the factors explaining

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<sup>1</sup> According to this "supply-leading" view, the financial sector precedes and induces real growth. Conversely, in the "demand-following" pattern, the real side of the economy develops, its demands for financial services materialize and are met passively from the financial side. As the process of real growth occurs, the supply-leading impetus gradually becomes less important, and the demand-following financial response becomes dominant (Patrick, 1966, p. 177).

the growth of the life insurance business. Then, an empirical analysis of life insurance development is conducted. The article concludes with a discussion of the major findings.

**Table 1**  
**Ownership Structure of the Insurance Markets in Developing Countries**

|                           | UNCTAD Survey:<br>90 Countries | This Study:<br>48 Countries |
|---------------------------|--------------------------------|-----------------------------|
| Monopolistic Market       | 28                             | 11                          |
| Localization of Ownership | 25                             | 14                          |
| Localization of Insurance | 31                             | 17                          |
| Foreign-Controlled Market | 6                              | 6                           |

### FACTORS EXPLAINING THE GROWTH OF LIFE INSURANCE

The life insurance sector is small in many developing countries, because life insurance may be considered irrelevant or inappropriate for ideological, cultural, or religious reasons, or because economic security is provided through the family.

No unique, integrated theory of savings through life insurance exists, though several models of the demand for life insurance products have been developed and tested empirically (for a review of the literature, see Babbel and Ohtsuka, 1989, and Lewis, 1989). Nearly all theoretical work on the demand for life insurance takes Yaari (1965) as a starting point. He pointed out that the demand for life insurance is properly considered within the context of the consumer's lifetime allocation process. It is assumed here that each utility-maximizing household has the same degree of relative risk aversion, although some evidence indicates that intercountry differences are likely to reflect differences in the degree of relative risk aversion and therefore affect the demand for life insurance.<sup>2</sup>

Following Yaari (1964, 1965) and Hakansson (1969), a demand function for life insurance derived from the maximization of the utility function of the consumer should depend on wealth, the income stream, a vector of interest rates, a vector of prices including insurance premium rates, and the consumer's subjective discount functions for the utility functions for consumption and wealth, which are affected by the level of the financial development of the market (see also Outreville, 1985).

Fundamental motives for savings in developing countries should be similar to those operating in industrial countries. However, the environment in which

<sup>2</sup> A country's health status may alter the structure of utility functions (Viscusi and Evans, 1990) as well as life expectancy (Ram and Schultz, 1979). Intercountry differences in human resources capital endowment are likely to reflect differences in the degree of risk aversion (Szpiro and Outreville, 1988) as well as the predominant religion in a country (Browne and Kim, 1993).

decisions on savings are made is quite different. In the life-cycle savings hypothesis, capital markets are assumed perfect so that borrowing and lending are allowed to assume that income and consumption decisions are separable. Under this formulation, standard instantaneous utility functions (concave in consumption) will generate relatively flat consumption demand over the life cycle. Also, because the income earned as a function of age does not follow the same pattern, it is only under the assumption that a change in the population growth rate does not affect the intergenerational distribution of income that the life-cycle hypothesis will work.

In the context of the least-developed countries, the life-cycle hypothesis may be less well equipped to explain aggregate savings rates. As for the assumptions of the model, the capital markets in many least-developed countries are frequently poorly organized. The timing of consumption may be, by necessity, more closely tied to the income stream than is allowed in the stylized maximization problem of the individual. Some of this effect can be offset by intrafamily transfers within an extended family (Kotlikoff and Summers, 1981).

A second concern is the increase in the growth rate of the population but also, at the same time, the existence of a highly skewed distribution of personal income. A rapidly growing population has a large number of young people who tend to consume more than they produce. In this context, Hammer (1986) shows that an increase in the growth rate of the population caused by an increase in the rate of fertility reduces aggregate savings. The widely-held belief that a more even income distribution encourages savings by the lower-income groups poses a difficult problem for many developing countries, since personal savings are only acquired by a very small segment of the population, as pointed out by Gupta (1971). The connection with the overall age distribution is even more difficult to handle in view of the scanty information available.

Moreover, a relatively large proportion of households in developing countries derives its income from agriculture, and incomes are subject to large fluctuations owing to variations in world prices of agricultural commodities and to climatic conditions.

Finally, structural characteristics of the market of financial institutions play a major role in determining the allocational efficiency of the demand for and supply of financial services. Distortions also arise when a government imposes a panoply of control measures and taxes. A variety of factors, especially in the economies of developing countries, may account for the prevalence of price distortions. "Financial repression" usually describes a set of policies that aim to use the financial system to channel resources into specific sectors of the economy (Feldman and Gang, 1990). A government can force sales of government debt to the insurance industry or use interest-rate controls. Artificially low real interest rates reduce the overall revenues of life insurance companies, as well as the supply of capital, and therefore the ability of the insurance companies to answer to potential demand.

### *Hypotheses and Model Specification*

The empirical model presented below is designed to take into account the problems that have been set forth above. First, by hypothesis, demand is positively related to the real disposable personal income. Per capita gross domestic product (GDP) is the variable used to measure the real disposable income because it is available for all countries. Demand for life insurance is theoretically also related to the amount of nonhuman wealth possessed by the insured, and the sign of this relationship is ambiguous and dependent upon the shape of the risk aversion function of the insurance consumer (see, for example, Fortune, 1973, and Lewis, 1989). However, data pertaining to levels of nonhuman wealth are not available, and there is no reasonable proxy in the case of developing countries. Omission of this variable from the model may impart a bias to the estimated impact of other variables, to the extent that it is correlated with them.

Demand for life insurance is also hypothesized to be related to real interest rates (RIR), anticipated inflation (AI), and the price of insurance (PI). In this study, instead of using a vector of alternative rates of return, only one such rate is considered to capture the effect of the whole spectrum of alternative rates. There is disagreement in the literature on the actual effects of interest rate policy on savings, and the results depend partly on how real interest rates are estimated (Khatkhate, 1986).

Inflation is assumed to affect the life insurance industry by altering the consumption pattern of the industry's products (Cargill and Troxel, 1979), and the negative effect of anticipated inflation on savings through life insurance has been largely documented in the literature (Fortune, 1973; Outreville, 1985). Life insurance is most commonly purchased on a level premium plan; that is, the same price is charged throughout the contract's duration. Because total life insurance premium income is generated by contracts of different nature and duration, it is not strictly comparable to premium income in lines of insurance business corresponding only to yearly contracts. Moreover, for countries experiencing high inflation rates, life insurance may not adequately serve the interests of individuals and families.

Because the commercial price for life insurance (PI) is not available, life expectancy at birth (LIFEXP) is included in the model to reflect the actuarially fair price of life insurance in a country. A long life span decreases the price for insurance but also leads to greater incentives for human capital accumulation. Therefore, longer life expectancy is expected to have a substantial positive effect on the demand for life insurance as verified by Beenstock, Dickinson, and Khajuria (1986).

The supply of life insurance is also related to the commercial price of insurance and interest rates. The actuarially fair price related to life expectancy should lead to a no-profit/no-loss situation and is therefore neutral to the insurance suppliers.

It is also hypothesized that the demand for life insurance is a function of the competitive structure of the domestic market and of the country's level of financial development (FD).<sup>3</sup>

The following model is proposed:

$$Q_d = Q_d[\text{GDP, PI, LIFEXP, AI, RIR}]$$

$$Q_s = Q_s[\text{PI, RIR, FD, Market structure variables}]$$

$$Q^* = Q_d = Q_s.$$

Since the amount of premium written, or premium income, in a market is equal to the average price of one unit of insurance coverage (PI) multiplied by the quantity of insurance protection needed in life insurance (Q), the following reduced-form equation is proposed:

$$\text{Premium income} = \text{PI} \cdot Q$$

$$\begin{matrix} (+) & (?) & (-) & (+) & (+) & (?) & (?) \\ = f[\text{GDP, RIR, AI, LIFEXP, FD, MONOPOLY, FOREIGN}], \end{matrix}$$

where MONOPOLY is a dummy variable indicating whether the market is a monopolistic one, and FOREIGN is a dummy variable indicating whether foreign companies are writing business in the market.<sup>4</sup>

#### EMPIRICAL ANALYSIS

The empirical analysis is based on a cross-section of 48 developing countries for which gross life insurance premiums per capita is available for the year 1986. Premium income in a country includes all forms of life insurance business including annuities.<sup>5</sup> Summary statistics on all variables used in the analysis are presented in Table 2.

The insurance data are published in a statistical survey by UNCTAD (1990). The information is compiled by UNCTAD with the help of a questionnaire sent to governments and supervisory offices. Although this survey includes data for 90 developing countries, the data base for this study is limited to 48 countries for which life insurance is reported for 1986 and for which complete statistical information is available. For a list of the countries, see Appendix A. All other data are taken from statistics published by the International Monetary Fund or from handbooks published by the United Nations. For a list of these sources, see Appendix B.

<sup>3</sup> The level of financial development also creates a larger set of options for household financial investment. Demand depends, therefore, on a vector of alternative rates of return.

<sup>4</sup> The market share of foreign insurers would be more appropriate than a dummy variable, but this information is not available for most of the countries concerned.

<sup>5</sup> In many countries, health insurance is a government program not included in the life insurance business. Information on the size of the health insurance business is not available.

**Table 2**  
**Summary Statistics**

|                                      | Mean    | Standard<br>Deviation | Minimum | Maximum |
|--------------------------------------|---------|-----------------------|---------|---------|
| Premium Income                       | 18.18   | 47.77                 | 0.02    | 248.1   |
| Gross Domestic Product<br>per Capita | 1858.81 | 2273.1                | 119.0   | 10097.0 |
| Real Interest Rate                   | 27.40   | 79.44                 | 3.0     | 555.0   |
| Anticipated Inflation                | 14.50   | 6.2                   | 1.1     | 440.0   |
| Life Expectancy                      | 62.57   | 8.56                  | 41.90   | 74.6    |
| Level of Financial<br>Development    | 37.39   | 18.09                 | 12.20   | 90.0    |
| Rural Population (%)                 | 37.41   | 20.85                 | 1.20    | 87.1    |
| Education Level                      | 11.51   | 10.40                 | 0.40    | 38.7    |
| Health Status                        | 59.75   | 24.91                 | 6.0     | 100.0   |
| Muslim Population (%)                | 21.69   | 34.70                 | 0       | 99.0    |
| Social Security                      | 4.59    | 8.15                  | 0       | 43.29   |
| Dependency Ratio                     | 80.50   | 15.55                 | 42.1    | 109.0   |
| Human Development Index              | 0.64    | 0.22                  | 0.15    | 0.93    |
| Growth Rate of Population            | 9.56    | 0.97                  | 0.40    | 6.0     |

Since the predetermined variables and stochastic disturbances appear on the right-hand side of the equation, and the predetermined variables are assumed to be uncorrelated with the disturbance term, the ordinary least squares method can be applied to estimate the impact coefficients of the reduced-form equation. Life insurance premium income and the gross domestic product are calculated per capita. In the current sample, per capita GDP for 1986 varies from approximately US \$130 to US \$6,000, but there are no breaks or discontinuities in the data as is the case when comparing developing and developed countries.

Several equations have been estimated by ordinary least squares, and the regression results are presented in Table 3. The Park test verifies the assumption of homoscedasticity by regressing the residuals obtained from the regression on the size variable. No statistically significant relationship is found between the variables.

The relationship to the income variable is estimated in linear form and in logarithmic form. Other variables are not expressed as logarithms since they are already expressed in percentage terms. The estimation of the income elasticity is very similar to that estimated by Beenstock, Dickinson, and Khajuria (1986) and Browne and Kim (1993), with a cross-section of developed and developing countries.

In view of the difficulties in estimating real interest rates, it is not surprising that the variable used in our estimation is not significant. The bank discount rate reported for all countries in the International Financial Statistics Survey is used as

**Table 3**  
**Cross-Country Estimates of the Reduced-Form Equation**  
**for Aggregate Premium Volume**

|                                                  | Linear   |         | Logarithmic |         | Logarithmic |         |
|--------------------------------------------------|----------|---------|-------------|---------|-------------|---------|
|                                                  | Estimate | t-value | Estimate    | t-value | Estimate    | t-value |
| Intercept                                        | -3.63    |         | -5.37       |         | -5.86       |         |
| Gross Domestic<br>Product Per Capita             | 0.0002   | 2.76    | 0.52        | 2.75    | 0.52        | 2.75    |
| Real Interest Rate                               | 0.0025   | 0.77    | -0.0027     | 0.81    | -0.0044     | 1.34    |
| Anticipated Inflation                            | -0.84    | 1.92    | -0.93       | 2.14    | -1.15       | 2.68    |
| Life Expectancy                                  | 0.11     | 4.81    | 0.09        | 3.32    | 0.09        | 3.32    |
| Level of Financial<br>Development,<br>(M1-M2)/M2 | 0.01     | 1.48    | 0.02        | 1.73    |             |         |
| Adjusted Level of<br>Financial<br>Development    |          |         |             |         | 0.02        | 1.73    |
| Monopolistic Market                              | -2.51    | 6.06    | -2.28       | 5.44    | -2.66       | 6.47    |
| Foreign Companies<br>in Market                   | -0.16    | 0.45    | -0.13       | 0.36    | -0.13       | 0.36    |
| R <sup>2</sup> /F                                | 0.85     | 32.06   | 0.85        | 32.01   | 0.84        | 32.00   |

Note: The dependent variable is the premium volume per capita in U.S. dollars in the linear equation and the natural logarithm of this variable in the logarithmic equations. (M1-M2)/M2 is the ratio of quasi-money to the broad definition of money. This variable is a proxy for the complexity of the financial structure.

a basis to determine the RIR variable in the equation. To calculate the real rate, the anticipated inflation (AI) is subtracted to the current bank discount rate. Alternatively, the lending rate was also tested without success. Because the use of direct estimates of anticipated inflation is not possible, a weighted average of realized price changes over a five-year period is used as a basis for measuring anticipated price changes. As expected, the effect of the anticipated rate of inflation is negative and significant. Life expectancy at birth (LIFEXP), as expected, has a positive sign and is significant.

The measurement of financial development (FD) is very controversial (Jung, 1986), but two alternative proxies are usually employed. One is the ratio of quasi-money (M2-M1) to the broad definition of money (M2). This variable is a proxy for the complexity of the financial structure. A higher ratio means a higher level of financial development that is carried out in the form of noncurrency assets. The other measure of financial development is the ratio of M2 to the nominal gross

domestic product, that is, financial deepening (Feldman and Gang, 1990).<sup>6</sup> The reciprocal of this ratio,  $GDP/M2$ , is a measure of the income velocity of money. A high income velocity indicates a financially repressed economy that must still undergo expansion of its real monetary base. Broad money  $M2$  is often taken as an adequate measure of the financial sector in developing countries in view of the predominance of the banking sector, as well as owing to the lack of data on other financial assets (see Hemming and Manson, 1988, and Liu and Woo, 1994). For these variables, the average value over the period 1983 through 1986 has been calculated to smooth the value of the level of financial development.

All variables tested show the expected positive sign, but only the first measure of financial development  $(M2-M1)/M2$  is significantly different from zero and is reported here.

A tendency toward less strict conditions for the admission of new companies and the involvement of the private sector in insurance business has manifested itself recently in several developing countries. Interestingly, the coefficient associated with a monopolistic market (MONOPOLY) is negative and significant.

It is important to notice that the effect of the presence of foreign companies (FOREIGN) in a market is not significant. However, in many developing countries, the insurance markets are characterized by the existence of too large a number of small companies with small insurance capacity. It is no coincidence that a few developing countries with high concentration of insurance business in few companies have been more successful in developing insurance services. The presence of foreign companies does not seem to be the determining factor. The appropriate variable to test in this context, if available, would be a measure of the concentration ratio.<sup>7</sup>

Although we are estimating a reduced-form equation, it may be argued that the level of financial development is determined endogenously and belongs to a general interdependent system of simultaneous equations. If financial development were endogenous, ordinary least squares would yield inconsistent estimates. An alternative approach is to regress the measure of financial development on the average inflation rate, the real rate of return, and the dummy variable associated with a monopolistic market, and use residuals of the estimation procedure as an adjusted measure of financial development ( $FD^*$ ). The estimates are presented in Table 3 and confirm the previous results.

Country-specific variables have also been tested to handle the problems mentioned above. The agricultural status of the country is the rural population as a

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<sup>6</sup> For a discussion of the issues and controversies concerning the meaning and determinants of financial deepening, see Gupta (1984).

<sup>7</sup> As suggested by one reviewer, the foreign variable may be picking up two different effects. First, the presence of foreign firms may drive down the price of insurance and increase its consumption. Alternatively, foreign firms may enter markets if there are excess returns available. In that case, the presence of foreign firms suggests that prices are too high. However, increased competition should drive down the price after some time. The information on the presence of foreign firms is too scanty to test this hypothesis.

percentage of total population. The average rate of growth of the population is calculated over the period 1970 through 1986. The health status variable is defined and calculated by the United Nations Development Program as the population with access to safe water or by the population with access to health services.

The human capital endowment is one source of comparative advantage for financial services. A standard approach is to treat human capital, or the average years of schooling of the labor force, as an ordinary input in the production function. The work of Makiw, Romer, and Weil (1992) is in this tradition. Following Baldwin (1971), the percentage of the labor force with tertiary education is used as a proxy variable for human capital endowment. As an alternative approach, the Human Development Index (HDI) calculated by the United Nations Development Program is also tested.

As indicated above, the degree of risk aversion in a country may be related to the predominant religion. Browne and Kim (1993) verify that predominantly Islamic countries consume less life insurance than non-Islamic countries. The percentage of the population that is Muslim is used as a proxy, but only in a few countries are the laws influenced by Islamic law.<sup>8</sup>

The dependency ratio (the ratio of the population defined as dependent, under 15 and over 64 years, to the working-age population aged 15–65) and social security contributions are also tested as suggested by Beenstock, Dickinson, and Khajuria (1986) and Browne and Kim (1993).

The results of the regression including all the country-specific variables are presented in Table 4. The simple correlation coefficients of all variables with life insurance premium income exhibit the expected sign, with the exception of the dependency ratio and the social security variable. However, in a multiple regression analysis, only a few of these variables are statistically significant at the 5 percent level. The level of education, health status, social security, and human development index all exhibit unexpected signs. If we regress each of the explanatory variables on all the remaining variables, the correlation coefficients of these auxiliary regressions give a measure of the degree of multicollinearity. However, this measure, as well as other measures, suffers from the lack of a clear definition of what constitutes a "high" degree of multicollinearity. The correlation matrix in Appendix C shows also some multicollinearity among these variables. The only effect of multicollinearity is to make it difficult to get coefficient estimates with small standard errors. But having a small number of observations also has the same effect.

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<sup>8</sup> Countries that have the largest percentage of population that is Muslim are Egypt (94%), Ethiopia (45%), Ghana (30%), Indonesia (87%), Kuwait (85%), Libya (97%), Malaysia (38%), Morocco (98%), Nigeria (50%), Oman (99%), Syria (90%), and Tunisia (99%).

**Table 4**  
**Cross-Country Aggregate Premium Volume Regression**  
**with Additional Socioeconomic Variables**

|                                      | Bivariate Regression <sup>a</sup><br>Correlation Coefficient | Multiple Regression<br>Coefficient | t-value | Auxiliary Regression<br>Correlation Coefficient |
|--------------------------------------|--------------------------------------------------------------|------------------------------------|---------|-------------------------------------------------|
| Gross Domestic Product<br>per Capita | 0.74                                                         | 0.62                               | 2.28    | 0.79                                            |
| Real Interest Rate                   | 0.02                                                         | 0.0039                             | 0.09    | 0.86                                            |
| Anticipated Inflation                | -0.08                                                        | -0.99                              | 1.97    | 0.81                                            |
| Level of Financial<br>Development    | 0.67                                                         | 0.03                               | 2.11    | 0.69                                            |
| Life Expectancy                      | 0.75                                                         | 0.06                               | 1.75    | 0.86                                            |
| Monopolistic Market                  | -0.71                                                        | -2.35                              | 5.22    | 0.48                                            |
| Foreign Companies<br>in Market       | 0.57                                                         | -0.37                              | 0.83    | 0.62                                            |
| Rural Population (%)                 | -0.70                                                        | -0.03                              | 1.34    | 0.90                                            |
| Education Level                      | 0.36                                                         | -0.01                              | 0.24    | 0.52                                            |
| Health Status                        | 0.59                                                         | -0.002                             | 0.25    | 0.61                                            |
| Muslim Population (%)                | -0.08                                                        | -0.01                              | 1.53    | 0.56                                            |
| Social Security                      | 0.21                                                         | -0.03                              | 1.00    | 0.72                                            |
| Dependency Ratio <sup>b</sup>        | -0.55                                                        | 0.02                               | 1.48    | 0.72                                            |
| Human Development<br>Index           | 0.68                                                         | -1.43                              | 0.72    | 0.91                                            |
| Growth Rate of<br>Population         | -0.27                                                        | -0.23                              | 0.96    | 0.64                                            |

<sup>a</sup> Bivariate correlation coefficients between each variable and aggregate premium volume.

<sup>b</sup> The dependency ratio is the ratio of the population defined as dependent, under 15 and over 64 years, to the working-age population aged 15-65.

### CONCLUSION

This article presents the situation in developing countries with regard to life insurance services. The analysis shows that life insurance development is significantly related to personal disposable income and to the country's level of financial development. Life insurance is also markedly affected by the level of anticipated inflation. Monopolistic markets are significantly less developed than competitive markets.

It has been said that the economic importance of the insurance sector, and in particular the life insurance sector, is still low when considering the share of total business generated in developing countries. One way to instill vigor is through economic growth and financial development, as shown by the results of the empirical investigation.

Many inefficiencies may be less a function of ownership than of government regulation and market structure. Adequate regulation of an industry requires so much information that establishing effective regulation of privatized firms may prove more demanding of the state's administrative capabilities than operating a state-owned monopolistic institution. The proper sequencing of privatization and liberalization is emerging as a critical issue for policy-makers (see, e.g., Hemming and Manson, 1988, and Van de Walle, 1989).

If it is true that developing countries have a supply-leading causality pattern to development, then more attention should be paid to the supply forces in the insurance market. Over the past twenty years, the nature and extent of government intervention in the business of insurance has varied from country to country, depending on the political philosophy of the government concerned. Many developing countries consider locally-incorporated insurance institutions an essential element of their economic and political independence, and hence the "infant industry" argument has justified particular efforts directed toward the protection of local markets.

Structural, financial, and technical constraints—such as the small size of markets, under-capitalization of the insurance companies, and lack of sufficient experience and know-how—create the extensive technical and financial dependence of developing countries' markets on international services. The insurance industries of developing countries also usually suffer from a major handicap—a shortage of skilled personnel. This may have a significant impact on the supply shortage of insurance services. More research needs to be done on the supply side to analyze the managerial issues.

**APPENDIX A**  
**THE LIFE INSURANCE SECTOR IN 90 DEVELOPING COUNTRIES**

| Percentage of Insurance Portfolio |                             |                                 |                       |
|-----------------------------------|-----------------------------|---------------------------------|-----------------------|
| Less than 1 Percent               | 1-10 Percent                | 11-50 Percent                   | More than 50 Percent  |
| Afghanistan <sup>M</sup>          | Argentina <sup>S</sup>      | Angola <sup>M</sup>             | Bahamas <sup>S</sup>  |
| Cap Verde <sup>M</sup>            | Bahrain                     | Bangladesh                      | Guyana <sup>S</sup>   |
| Central Africa                    | Benin <sup>M</sup>          | Barbados <sup>S</sup>           | India <sup>S</sup>    |
| Chad <sup>M</sup>                 | Bolivia                     | Bhutan <sup>M</sup>             | Korea <sup>S</sup>    |
| Congo <sup>M</sup>                | Burkina Faso <sup>M,S</sup> | Botswana <sup>S</sup>           | Senegal               |
| Cuba <sup>M</sup>                 | Burundi <sup>M,S</sup>      | Brazil <sup>S</sup>             | Thailand <sup>S</sup> |
| Iran <sup>M</sup>                 | Ecuador <sup>S</sup>        | Cameroon <sup>S</sup>           | Trinidad and Tobago   |
| Iraq                              | Ethiopia <sup>M,S</sup>     | Chile <sup>S</sup>              | Zimbabwe <sup>S</sup> |
| Lesotho                           | Gabon                       | China <sup>M</sup>              |                       |
| Mali                              | Gambia                      | Colombia <sup>S</sup>           |                       |
| Mauritania <sup>M</sup>           | Ghana <sup>S</sup>          | Costa Rica <sup>M,S</sup>       |                       |
| Mauritius                         | Libya <sup>M,S</sup>        | Cyprus <sup>S</sup>             |                       |
| Mozambique <sup>M</sup>           | Madagascar                  | Dominican Republic <sup>S</sup> |                       |
| Niger                             | Myanmar <sup>M,S</sup>      | Egypt <sup>S</sup>              |                       |
| Papua New Guinea                  | Oman <sup>S</sup>           | El Salvador <sup>S</sup>        |                       |
| Qatar                             | Peru <sup>S</sup>           | Fiji <sup>S</sup>               |                       |
| Rwanda <sup>M,S</sup>             | Sri Lanka <sup>M,S</sup>    | Guatemala <sup>S</sup>          |                       |
| Seychelles <sup>M</sup>           | Sudan                       | Honduras <sup>S</sup>           |                       |
| Solomon Islands                   | Syria <sup>M,S</sup>        | Indonesia <sup>S</sup>          |                       |
| Vietnam <sup>M</sup>              | Togo                        | Jamaica <sup>S</sup>            |                       |
|                                   | Turkey                      | Jordan                          |                       |
|                                   | United Arab Emirates        | Kuwait <sup>S</sup>             |                       |
|                                   | Uruguay <sup>M</sup>        | Malawi <sup>S</sup>             |                       |
|                                   | Zaire <sup>M,S</sup>        | Malaysia <sup>S</sup>           |                       |
|                                   |                             | Malta <sup>S</sup>              |                       |
|                                   |                             | Mexico <sup>S</sup>             |                       |
|                                   |                             | Morocco <sup>S</sup>            |                       |
|                                   |                             | Nepal                           |                       |
|                                   |                             | Nicaragua <sup>M</sup>          |                       |
|                                   |                             | Nigeria <sup>S</sup>            |                       |
|                                   |                             | Panama                          |                       |
|                                   |                             | Philippines <sup>S</sup>        |                       |
|                                   |                             | St. Lucia                       |                       |
|                                   |                             | Singapore <sup>S</sup>          |                       |
|                                   |                             | Tunisia <sup>S</sup>            |                       |
|                                   |                             | Tanzania <sup>M</sup>           |                       |
|                                   |                             | Venezuela <sup>S</sup>          |                       |
|                                   |                             | Zambia <sup>M,S</sup>           |                       |

Note: Life insurance business is not reported by several countries, including Afghanistan, Cap Verde, Cuba, Iraq, Mauritius, Papua New Guinea, Qatar, Solomon Islands, and Vietnam. This does not mean there is no life insurance business transacted in these countries. For some other countries, the amount reported is so small that it raises questions on the quality of the data. For all other countries not included in the sample, data was not available for 1986.

<sup>M</sup> Monopolistic market.

<sup>S</sup> Countries included in the sample.

## APPENDIX B DATA SOURCES

|                                                                               |                                                                                                                       |
|-------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------|
| Life Insurance Income                                                         | United Nations Conference on Trade and Development, <i>Statistical Survey on Insurance in Developing Countries</i>    |
| Gross Domestic Product, Inflation, Agricultural Population                    | United Nations Conference on Trade and Development, <i>Handbook of International Trade and Development Statistics</i> |
| Interest Rates, M1, M2                                                        | International Monetary Fund, <i>International Financial Statistics</i>                                                |
| Social Security Contributions                                                 | International Monetary Fund, <i>Government Finance Statistics</i>                                                     |
| Life Expectancy, Education, Health, Human Development Index, Dependency Ratio | United Nations Development Programme, <i>Human Development Report</i>                                                 |
| Religion                                                                      | Central Intelligence Agency, <i>The World Factbook</i>                                                                |

## APPENDIX C COUNTRY-SPECIFIC VARIABLES: CORRELATION MATRIX

|         | LIFEXP | %AGRIC | %EDUC | HEALTH | %MUSLIM | SocSec | %DEPEND | HDI   | Acc.POP |
|---------|--------|--------|-------|--------|---------|--------|---------|-------|---------|
| LIFEXP  | 1.0    |        |       |        |         |        |         |       |         |
| %AGRIC  | -0.85  | 1.0    |       |        |         |        |         |       |         |
| %EDUC   | 0.53   | -0.51  | 1.0   |        |         |        |         |       |         |
| HEALTH  | 0.72   | -0.68  | 0.39  | 1.0    |         |        |         |       |         |
| %MUSLIM | -0.16  | -0.13  | -0.14 | -0.04  | 1.0     |        |         |       |         |
| SocSec  | 0.36   | -0.36  | 0.39  | 0.27   | -0.09   | 1.0    |         |       |         |
| %DEPEND | -0.72  | 0.63   | -0.44 | -0.52  | 0.15    | -0.39  | 1.0     |       |         |
| HDI     | 0.90   | -0.84  | 0.63  | 0.69   | -0.16   | 0.37   | -0.70   | 1.0   |         |
| Acc.POP | -0.36  | 0.19   | -0.13 | -0.14  | 0.37    | -0.38  | 0.60    | -0.27 | 1.0     |

Note: LIFEXP = life expectancy at birth. %AGRIC = the rural population as a percent of total population. %EDUC = the percentage of the labor force with a tertiary education. HEALTH = the population with access to safe water or health services. %MUSLIM = the percentage of the population that is Muslim. SocSec = social security contributions. %DEPEND = the dependency ratio. HDI = the human development index. Acc.POP = the average rate of growth of the population.

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