LIFE INSURANCE IN DEVELOPING COUNTRIES
A Cross-Country Analysis

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"Indeed, if it is agreed that differences in government policies are responsible for much of the variation in economic performance among nations, it must be a research topic of the uppermost priority to try to establish which institutional circumstances are conducive to various types of policies." J.E. Stiglitz, "Economics of Information and the Theory of Economic Development", NBER, 1985, Working Paper No. 1, p. 566.

I. THE DEVELOPMENT OF LIFE INSURANCE MARKETS

The 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.

Insurance, like other financial services, has grown in quantitative importance as part of the general development of financial institutions. As the governments of many developing countries historically held the view that the financial systems they had inherited could not serve their countries' development needs adequately, during the past thirty years they have accordingly directed considerable effort to changing the structure of these financial systems and controlling their operations in order to channel savings to investments which were considered a priority in their development programmes.

Recent empirical evidence in the literature suggests that the developing countries rather have a supply-leading causality pattern of development 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.

The protectionism which has developed in most countries should be viewed as a decision to produce internal insurance services as opposed to importing these services. Public enterprises were

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considered a macroeconomic policy tool and, as such, used by governments to produce not only insurance services but also social and macroeconomic objectives, such as employment or increased foreign exchange reserves. Today, almost all developing countries have a local insurance market providing coverage for most domestic risks.

Protective measures in the provision of insurance services can be classified into three categories: those related to (i) establishment within the host country; (ii) access to the domestic market; and (iii) insurer operations (Skipper, 1987). The ultimate in limitation on establishment of insurance companies is a flat prohibition, the situation that prevails in monopolistic markets. Indeed, technically a monopolistic market 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 prohibit their nationals from placing insurance with other than locally licensed and incorporated insurers. In most instances, a localization regulation is accompanied by a requirement that a majority, if not the totality, of ownership interests in locally domiciled insurers must be held by nationals of the country. This is referred to as "localization of ownership". Localization of insurance requirements stipulates that certain or all lines of insurance must be placed with locally domiciled insurers (see table 1).

Table 1

Ownership structure of the insurance markets in 90 developing countries

Monopolistic market	Localization of ownership	Localization of insurance	Foreign-controlled market
28	25	31	6

Source: Outreville (1992).

However, owing to the great diversity in the political, economic and social environment in which these national markets evolve, situations may show a considerable degree of dissimilarity in each case. Also, a tendency towards less strict conditions for the admission of new companies or involvement of the private sector in insurance business has manifested itself in several developing countries in recent years. The trend towards liberalization of services has probably had a bearing on this new policy orientation. However, it is important to recall that the critical shortage of foreign exchange that currently affects most developing countries and the relative scarcity of capital and technical know-how may still justify particular efforts directed towards the protection of local markets.

II. MEASURING THE ECONOMIC IMPORTANCE OF LIFE INSURANCE MARKETS IN DEVELOPING COUNTRIES

Insurance is of primordial importance in domestic economies and internationally. The role of insurance in the development process is difficult to assess, but there is some evidence that the promotion of life insurance programmes might have a particularly significant impact on the level of personal savings in many developing countries (UNCTAD, 1982). However, the life insurance sector remains small in developing countries. The market share of world life insurance premiums in developing countries declined between 1980 and 1990 (table 2).

Table 2

Market share of world life insurance premiums

Market	1980	1990
United States of America	36.75	29.09
Canada	2.89	2.26
EEC	26.00	24.58
Other Europe	4.90	6.86
South Africa	1.43	1.23
Japan	22.96	28.74
Korea, Republic of	0.52	3.17
Oceania	1.60	1.76
Developing countries	2.95	2.31
Total	**100.0**	**100.0**

Source: Sigma (May 1982 and April 1992).

The economic significance of the life insurance industry of a country is evaluated here by means of the ratio of premiums to the gross domestic product (GDP). Although this measure does not give a complete picture of the insurance output because of the considerable variation in premiums rates between different countries, it has the advantage of not being influenced by currency factors. It is worth noting that the value of the ratio is smaller than one per cent in most of the developing countries (table 3) while on average it equals 2.75 per cent for OECD countries in 1990.

Table 3

Breakdown of developing countries by region
Life insurance premiums as a percentage of GDP over the period 1984-1986

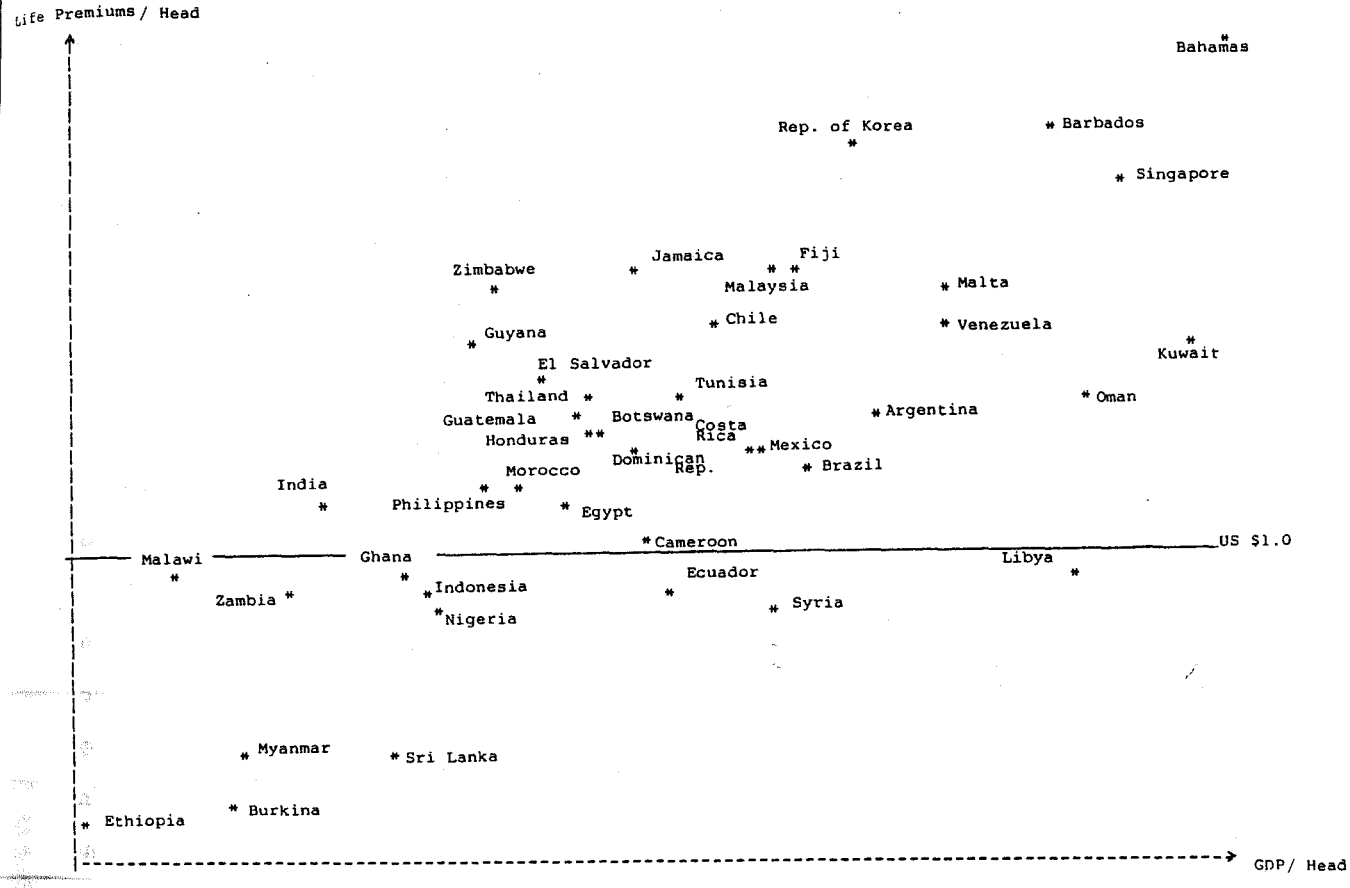
Region	2% or more	1.0 to 1.9%	0.5 to 0.9%	0.1 to 0.49%	less than 0.1%
Central America	6	1	3	3	1
South America	0	1	2	4	3
North Africa and West Asia	0	0	3	7	5
Rest of Africa	1	0	4	5	22
Asia and Pacific	1	3	2	4	9
Total	**8**	**5**	**14**	**23**	**40**

Source: UNCTAD (1990).

The life insurance sector is often of little importance, as in many developing countries life insurance may be considered irrelevant or inappropriate for ideological, cultural or religious reasons, or because economic security is provided through the family. Insurance development is assumed to be correlated with GDP (Outreville, 1990; Beenstock *et al.*, 1988). The relationship between life insurance premiums written per capita and GDP per capita is hypothesized to be a non-linear relationship. Graphic analysis makes it possible to verify that the adjustment appears to be relatively satisfactory, bearing in mind the diversity of the countries considered, the disturbing influence of exchange rates and probable imperfections in the statistical data.

To measure the contribution of insurance companies with the financing of the national economy, it will suffice to compare the increase in technical reserves and provisions (or assets) of the insurance sector with the economy's financial requirements. However, such data generally do not exist and there has been a lack of quantitative evidence on this subject both in developed and developing countries. In this study, the contribution of the insurance sector is measured in terms of insurance density, defined as a country's premium income per capita, and insurance penetration, defined as the amount of premium income as a percentage of GDP.

Figure 1: The relationship between life insurance and GDP
(In logarithms scale)



III. FACTORS EXPLAINING THE GROWTH OF LIFE INSURANCE

Savings in developing countries are very low, both in absolute terms and in relation to the rate of real economic growth sought by these countries. This view, however, ignores the fact that the savings rate reflects the outcome of a complex series of interactions within the economic system and a number of structural and behavioral factors. Risk aversion of individuals is one example if individual utility depends on a single attribute: a person's wealth. We are assuming here that each utility-maximizing household has the same degree of relative risk aversion, although there is some evidence that inter-country differences in human resources capital endowment are likely to reflect differences in the degree of relative risk aversion (Appendix 1).

Fundamental motives for savings in developing countries should be similar to those operating in industrial countries. However, the environment in which 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 inter-generational distribution of income that the life-cycle hypothesis will work.

In the context of the least developed countries (LDCs), 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 LDCs 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 intra-family 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 equitable income distribution encourages savings by 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 in developing countries, 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, where incomes are subject to large fluctuations owing to variations in world prices of agricultural commodities and to climatic conditions.

Finally, the 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. The term "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). Governments 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.

The descriptive analysis presented below is based on a cross-section of 45 developing countries for which gross life insurance premiums per capita were available for the year 1986. The insurance data was published in a statistical survey by UNCTAD (1990). The information was compiled with the help of a questionnaire sent to governments and supervisory offices. Although this survey included data for 90 developing countries, the data base for this study has been limited to 45 countries for which life insurance represents more than one per cent of the global insurance portfolio of a country and for which complete statistical information is available (Appendix 2).

All other data used in this paper are taken from *International Financial Statistics* published by the IMF, or from the *Handbook of International Trade and Development Statistics* published every year by the United Nations.

The country-specific variables, which include the agricultural status of the country (%Agric is the percentage of the agricultural labour force), the health status of the country (%Health is the percentage of the population having access to water) and the level of higher education (%Educ), are also considered in this analysis. Human capital endowment for each country is proxied by the percentage of the labour force with higher education relative to the population, as proposed by Baldwin (1971).

As shown in figure 1, there is a significant relationship between life insurance development and economic development. Replication in figure 2 shows an income elasticity of 1.41, a result similar to those of Outreville (1990) and Beenstock *et al.* (1988) for non-life insurance. Two groups of countries emerge in the graph:

Group 1: High insurance density: Republic of Korea (21), Singapore (25), Bahamas (28), Barbados (30);

Group 2: Least developed countries: Burkina Faso (2), Burundi (3), Ethiopia (5), Myanmar (23) and Zaire (9) to be added to this group.

Figure 3 shows the relationship between life insurance development and financial development. There are countries which have developed their financial sector far out of proportion to their own demand. These countries appear in the right-hand corner of figure 3 and explain the non-linearity of the fitted curve.

Group 3: High financial development: Malta (45), Guyana (38), Singapore (25), Kuwait (44).

Figure 4 shows the negative relationship between the agricultural status of a country and the life insurance development. The group of least developed countries (group 2) is at the bottom right-hand side of this graph. Figure 5 shows the positive but non-significant relationship between the level of

higher education in a country and life insurance development. Again, the group of low level of education is included in the group of least developed countries.

Group 4: Higher education: Argentina (29), Philippines (24), Republic of Korea (21), Venezuela (43).

Figure 6 shows the positive but non-significant relationship between the health status of a country and life insurance development:

Group 5: High health status: Malta (45), Kuwait (44), Singapore (25).

Group 6: Very low health status: Ethiopa (5), Zaire (9), Oman (15), Burkina Faso (2).

Figure 2: The relationship between life insurance development and economic development

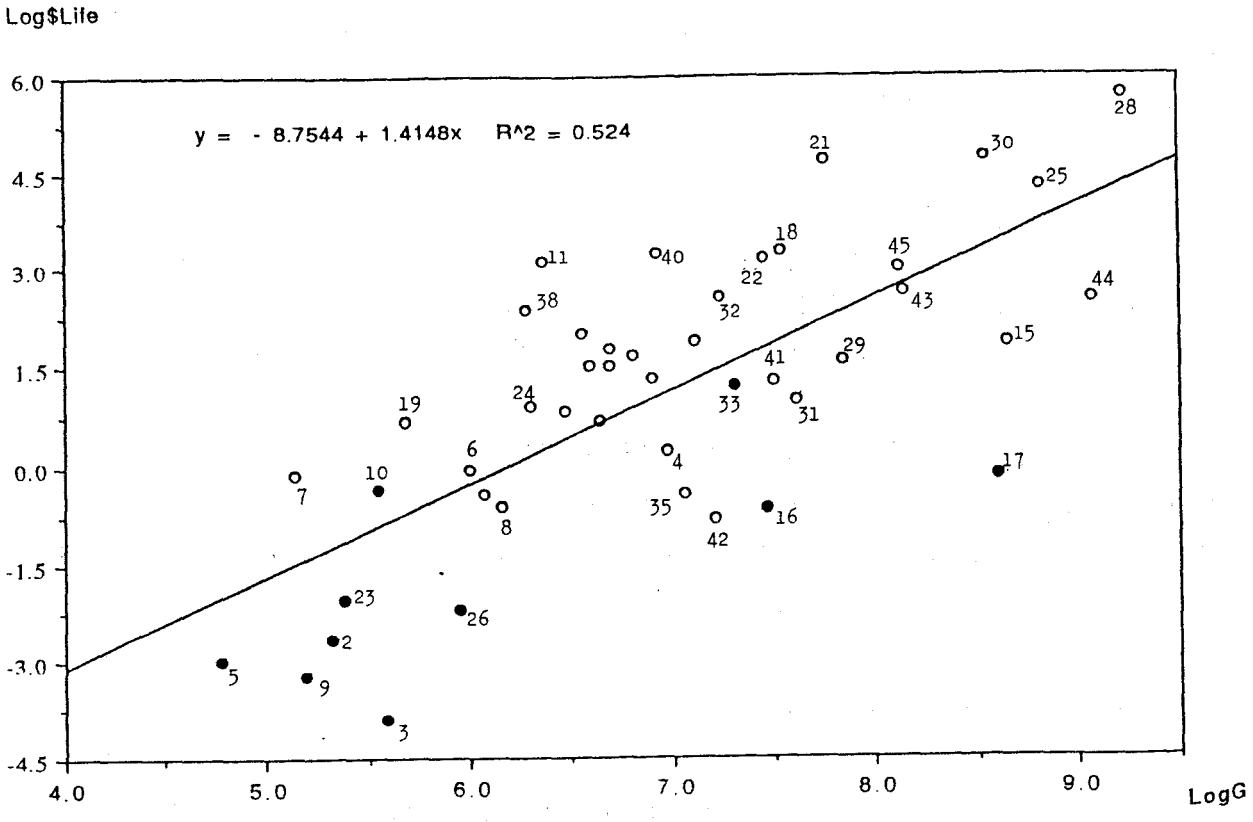


Figure 3: The relationship between life insurance development and financial development

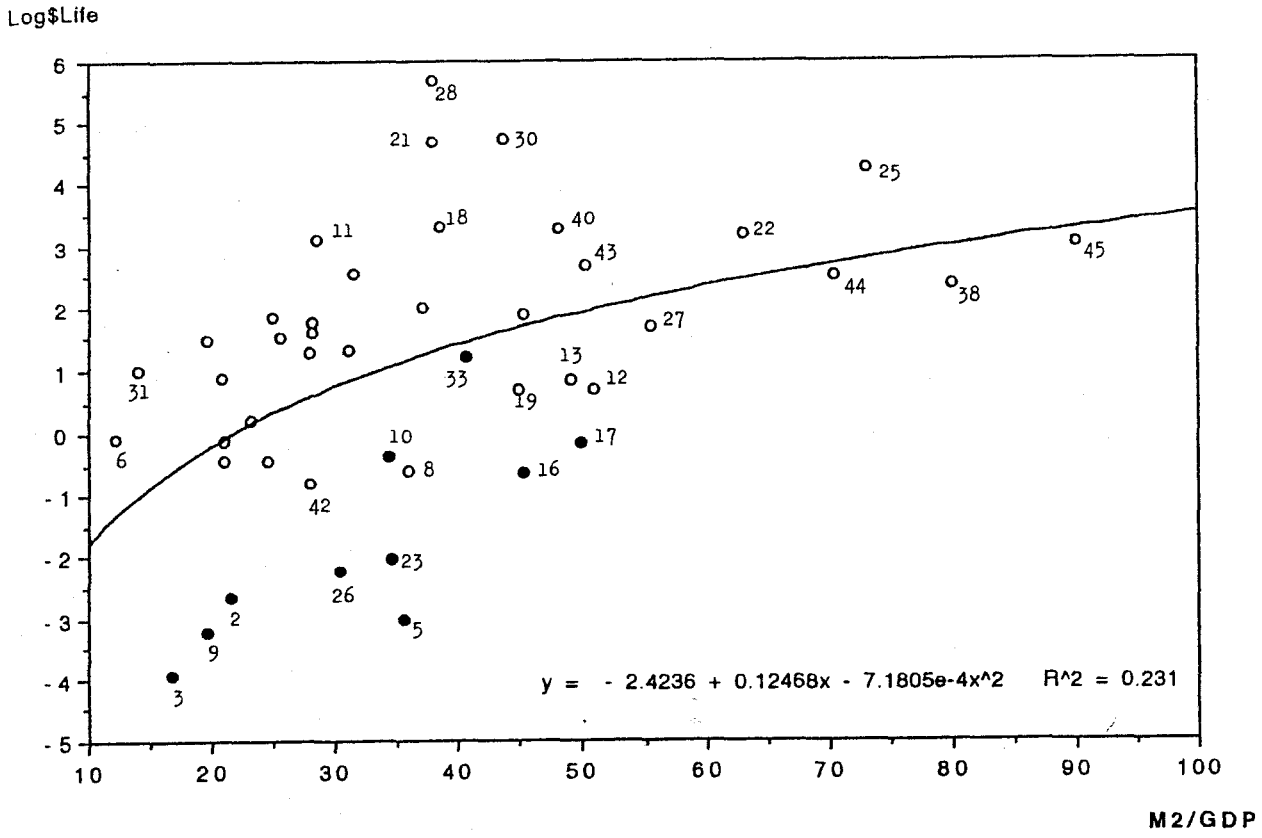


Figure 4: The relationship between life insurance development and agricultural status

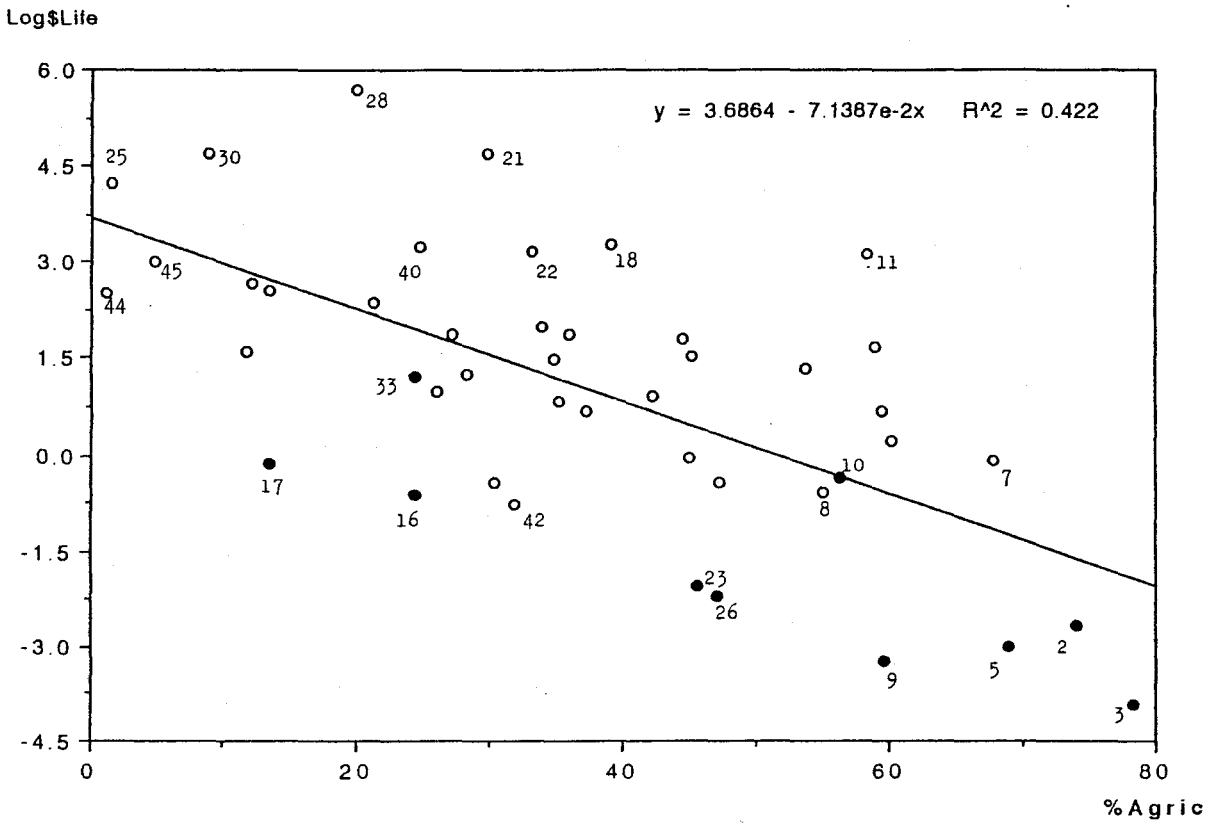


Figure 5: The relationship between life insurance development and the level of higher education

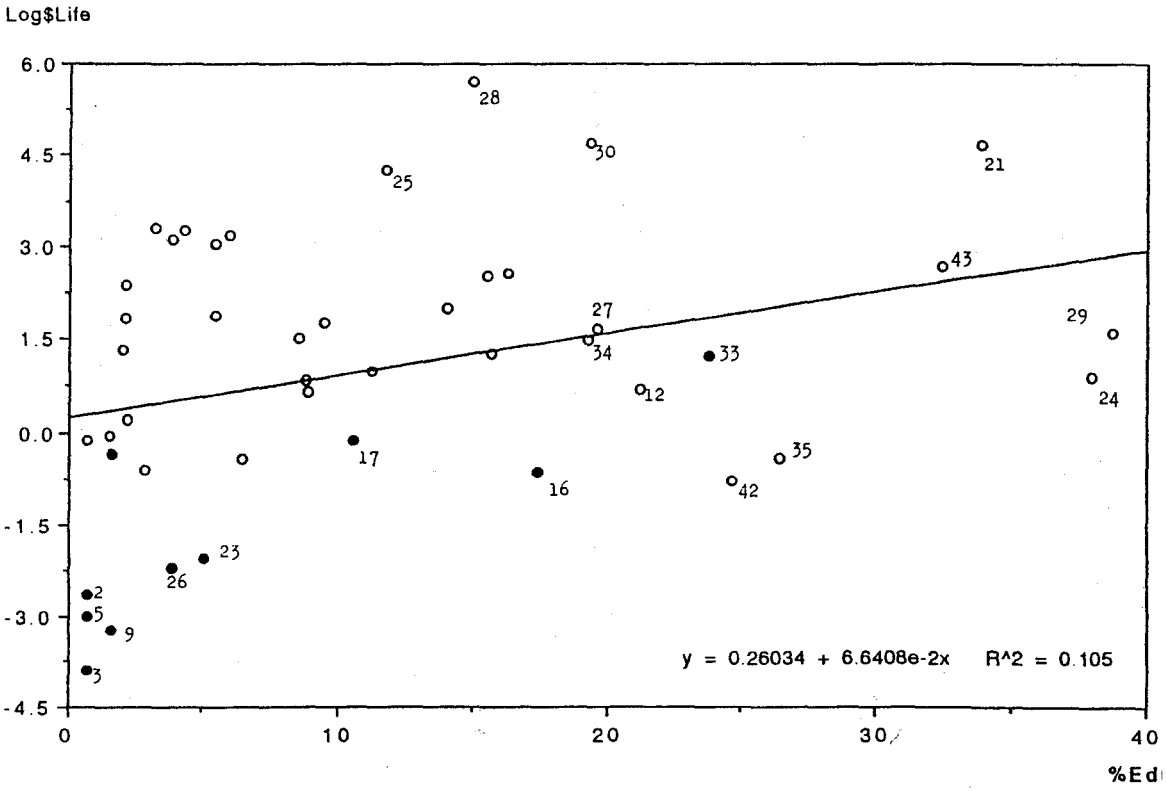
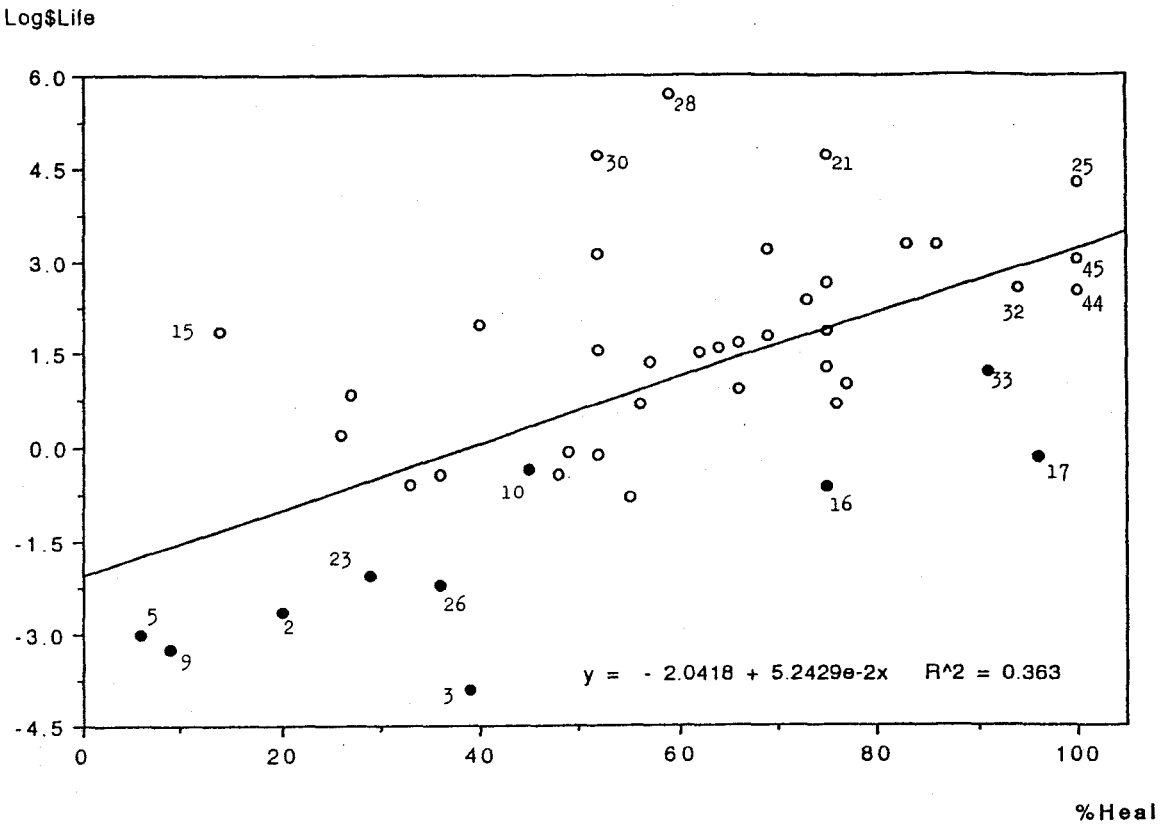


Figure 6: The relationship between life insurance development and health status



IV. AN EMPIRICAL ANALYSIS

There is no unique, integrated theory of savings through life insurance, though several models of the demand for life insurance products have been developed and tested empirically (see Babbel and Ohtsuka, 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.

Consider an individual household trying to maximize its utility functions, which depend on the consumption of present and future commodities, and its structure of assets in the form of money and various types of securities, including life insurance. 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.

In the context of developing countries, the empirical model presented below is designed to take into account the problems that have been set forth in the preceding section.

First, demand is positively related to real disposable personal income. Per capita GDP is the variable used to measure the real disposable personal income. Demand for life insurance is theoretically also related to the amount of non-human wealth possessed by the insured, and the sign of this relationship is ambiguous and dependent upon the shape of the absolute risk aversion function of the insurance consumer. However, data pertaining to levels of non-human wealth are not available and no data can serve as a 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 related to interest rates (RB), anticipated inflation (PA) 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 commented in the literature (Fortune, 1973; Outreville, 1985). Life insurance is most commonly purchased on a level premium plan; that is to say, the same price is charged throughout the contract's duration. In this sense, total insurer premium income is not strictly comparable to total income premium in other lines of insurance business. Moreover, for

countries experiencing high inflation rates, life insurance may not serve adequately 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 actuarial 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, higher life expectancy should be expected to have a substantial positive effect on the demand for life insurance.

Supply of life insurance is also related to the commercial price of insurance and interest rates. The actuarial 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 level of financial development of the country (MFD)[1]. Country-specific variables such as the percentage of the labour force in the agricultural sector (%AGRIC), the annual average growth rate of the population (%POP), the level of higher education (%EDUC) and the health status (%HEALTH) are also necessary to handle the factor mentioned earlier on:

The following model is proposed:

$$Qd = Qd\underset{(+)\ (-)\ (+)\ (-)\ (?)}{[\ GDP,\ PI,\ LIFEXP,\ PA,\ RB\ ]}$$

$$Qs = Qs\underset{(+)\ (+)\ (+)}{[\ PI,\ RB,\ MFD,}\ \text{Country structural variables}]$$

$$Q^{*} = Qd = Qs$$

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),[2] the following reduced-form equation is proposed:

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

$$= \underset{(+)\ (?)\ (-)\ (+)\ (+)\ (?)\ (?)\ (-)\ (-)}{F[GDP,\ RB,\ PA,\ LIFEXP,\ MFD,\ MONOPOLY,\ FOREIGN,\ \%AGRIC,\ \%POP]}$$

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[1] 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.

[2] In life insurance, one unit is a monetary amount or scale factor (for example, $1,000).

(MONOPOLY is a dummy variable indicating whether the market is monopolistic or not, and FOREIGN is a dummy variable indicating whether foreign companies are writing business in the market.)

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 OLS method can be applied to estimate the impact coefficients of the reduced-form equation.

Several equations are estimated by ordinary least squares and the regression results are presented in table 4.

As is usual in empirical studies on insurance, the relationship is hypothesized to be non-linear. The estimation of the income-elasticity coefficient is very similar to that estimated by Outreville (1990), and Beenstock, Dickinson and Khajuria (1988), with a cross-section of countries for property-liability insurance.

A major shortcoming of cross-sectional analysis, particularly when carried out on the basis of simple correlation techniques, is the strong possibility that the observed relations may be due to some third factor which influences the observed variables. Indeed, an adequate analysis of the relationship between personal income, on the one hand, and savings behaviour on the other must start with a fully specified model. Adding to the equation, the level of financial development and the dummy variables for the market structure reduce the income elasticity to a value not significantly different from 1.0.

In view of the difficulties in estimating real interest rates, it is not surprising if the variable used in our estimation is not significant. The bank discount rate reported for all countries in the *International Financial Statistics Survey* was used as a basis to determine the RB variable in the equation. Alternatively, the lending rate was also tested without success. As the use of direct estimates of anticipated inflation is not possible, a weighted average of realized price changes is used as a basis for measuring anticipated price changes. As expected, the effect of the anticipated rate of inflation is negative and significant.

The coefficient of life expectancy at birth (LIFEXP), as expected, has a positive sign but is only significant at a 10 per cent level. When country-specific variables are entered in the equation, it becomes non-significant owing to multi-collinearity between the variables.

The measurement of financial development (MFD) 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 non-currency assets. The other measure of financial development is the ratio of M2 to the nominal

Table 4

Regression results

Variables	(1)	(2)	(3)	(4)	(5)	(6)
INTERCEPT	-9.8725 (-6.19)	-10.4020 (-7.70)	-8.7295 (-5.39)	-7.5589 (-5.40)	-7.8117 (-6.13)	-6.9125 (-1.98)
Log GDP	1.3997 (4.92)	1.4145 (5.03)	0.9974 (3.47)	1.0088 (3.67)	0.9979 (4.06)	0.9548 (3.49)
RB	0.0027 (0.67)	-	-	-	-	-
PA	-0.9607 (-1.69)	-0.6459 (-2.31)	-0.4866 (-1.77)	-0.5983 (-2.49)	-0.5790 (-2.64)	-0.6180 (-2.65)
LIFEXP	0.0462 (1.32)	0.0469 (1.36)	0.0467 (1.39)	0.0471 (1.38)	0.0333 (1.08)	0.0236 (0.55)
M2/GDP			0.4751 (1.08)	-	-	-
FD*			-	0.4654 (0.97)	-	-
(M2-M1)/M2			-	-	0.0245 (2.59)	0.0269 (2.52)
MONOPOLY			-1.7840 (-3.72)	-1.7807 (-3.69)	-1.5497 (-3.41)	-1.4692 (-3.17)
FOREIGN			0.2489 (0.62)	0.2566 (0.63)	-0.0243 (-0.06)	-
%AGRIC						-0.0088 (-0.44)
%POP						0.1045 (0.44)
R^2	0.728	0.732	0.811	0.839	0.837	0.834
SSR	42.93	43.43	28.11	28.31	24.19	23.97
SER	1.11	1.09	0.92	0.92	0.85	0.86
F	27.12	36.63	28.92	28.68	34.51	28.98

GDP, i.e. financial deepening (Feldman and Gang, 1990). The reciprocal of this ratio, namely GDP/M2, is a measure of the income velocity of money. A high income velocity indicates a financially repressed economy that has still to 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 (Hemming and Manson, 1988).

Another alternative approach is to regress the measure of financial development on the GDP and on the average inflation rate over the same period, and use residuals of the estimation procedure as an adjusted measure of financial development (FD*). All variables tested show the expected positive sign, but only the first measure of financial development (M2-M1)/M2 is significantly different from zero.

A tendency towards less strict conditions for the admission of new companies and the involvement of the private sector in insurance business has manifested itself in recent years in several developing countries. It is interesting to note that the coefficient associated with a monopolistic market (MONOPOLY) is negative and significant.

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

The country-specific variables are never significant in the equation, although they show the expected sign.

V. DISCUSSION AND CONCLUSION

The preceding sections seek to present 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 level of financial development in the country. Life insurance is also markedly affected by the level of anticipated inflation. Monopolistic markets are significantly less developed than competitive markets.

Over the past twenty years, the nature and extent of government intervention in the insurance business varied of course from country to country, depending on the political philosophy of the

government concerned. Many developing countries have considered that insurance institutions locally incorporated are an essential element of their economic and political independence, and hence the "infant industry" argument has justified particular efforts directed towards the protection of local 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. 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 (Hemming and Manson, 1988; Van De Walle, 1989).

Liberalization of services should not override the objective of development in developing countries' laws and regulations and their own choice of modalities for achieving it. However, if it is true that the developing countries have a supply-leading causality pattern to development, then more attention should be paid to the supply forces in the insurance market.

Structural, financial and technical constraints, such as the small size of markets, under-capitalization of the insurance companies and the lack of sufficient experience and know-how, make the technical and financial dependence of developing countries's markets on international services very extensive. The insurance industries of developing countries also usually suffer from a major handicap, i.e. 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.

Acquiring a long-term competitive position in insurance services depends on the development of human capital, the level of development in the rest of the economy, and improvements in the financial strength of the insurance carriers. It is unrealistic to presuppose that developing countries will be able to gain access to developed countries' markets unless an agreement provides developing countries with preferential market access opportunities. This, however, should not mean relaxation in prudential supervisory standards.

One major aspect of the governmental role should be to control the number of companies. This implies that economies of scale and scope must be considered in determining this number, particularly when the policy goal is to increase competitiveness. Competitiveness in any business can be obtained through four basic factors: (a) quality of product, (b) economically feasible price, (c) effective marketing, and (d) up-to-date technology. Consideration should be given to how the competitiveness

of suppliers can be maintained and enhanced in order to cope with pressures from both domestic consumers and foreign competitors.

The increased participation of companies from developing countries in sharing arrangements or pools with experienced and large companies from developed countries could help in transferring the necessary technological and human resources know-how which developing countries need for building competitive insurance firms.

APPENDIX 1

Risk aversion and development

Numerous difficulties are encountered in attempting to measure preferences with risk in a real world setting. Siegel and Hoban (1982) present some empirical evidence of either decreasing, constant or increasing relative risk aversion, depending on wealth measure and sample size. Attention has been also focused on the conditions under which it is possible in principle to recover individual investors' risk preferences from their demand for assets (Dybvig and Polemarchakis, 1981) or their demand for insurance (Szpiro, 1986). The results by Wolf and Pohlman (1983) suggest that individuals may be consistent in displaying the same type of risk aversion in different contexts but that their degree of aversion may depend on the specific context in which their choices are made.

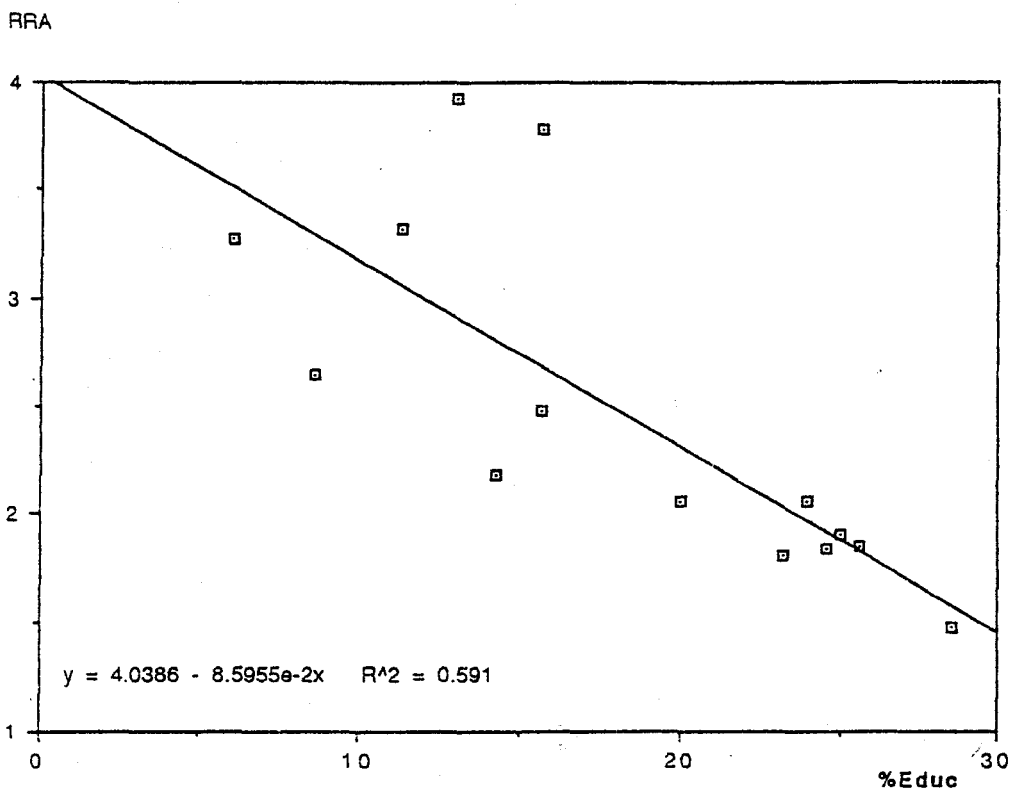
Following the evidence presented by Szpiro (1986), this appendix examines the degree of relative risk aversion (RRA) in 14 countries, including eight developing countries, from our sample, for which time series data on the demand for property and liability insurance are available. Data on RRA are provided by Szpiro and are calculated under the assumption of constant RRA. For the sample as a whole, the mean degree of RRA is 2.47 (Appendix table) and is consistent with similar results derived from the demand for assets by other authors.

Correlation results are presented in Appendix figures 1 and 2. A negative and important relationship exists between the level of risk aversion and the level of higher education in a country. This confirms the finding by Kelly (1980).

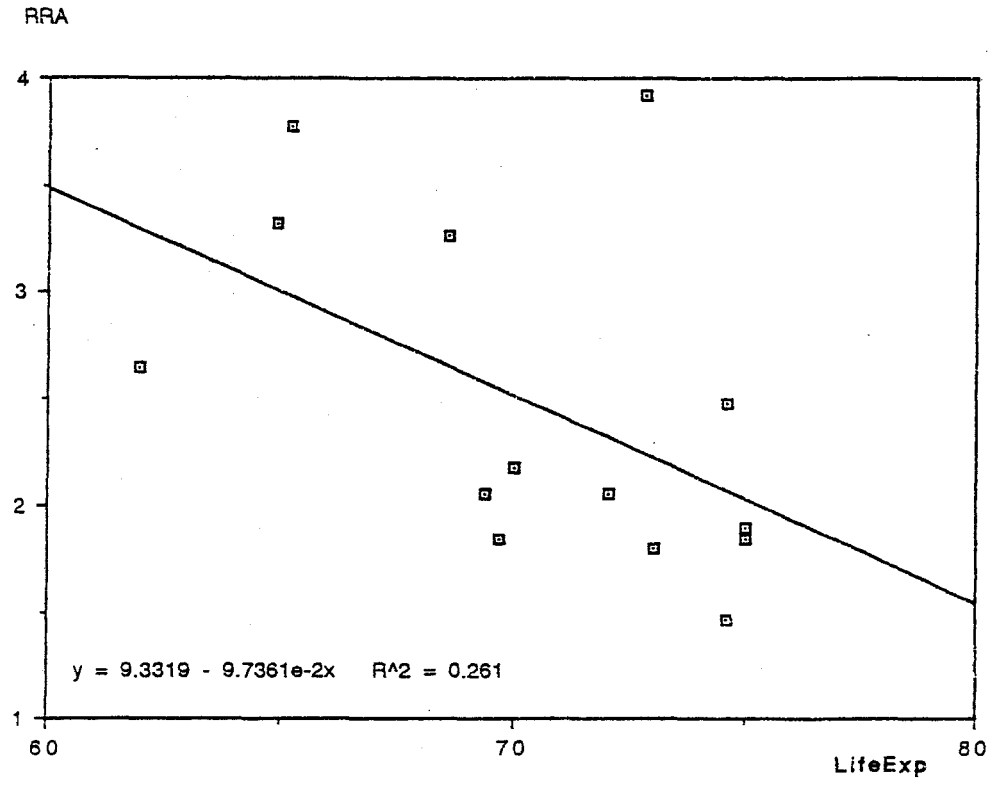
Appendix table: Relative risk aversion

Brazil	3.32	Austria	2.06
Guatemala	2.64	Cyprus	2.48
Korea, Republic of	2.06	Denmark	1.47
Malaysia	3.27	France	1.90
Mexico	3.78	Norway	1.85
Singapore	3.92	Portugal	2.18
Venezuela	1.84	Spain	1.80
Average value:	2.47		
Correlation values:	with higher education:	-.77	
	with life expectancy:	-.51	

Appendix figure 1: Relative risk aversion and high education



Appendix figure 2: Relative risk aversion and life expectancy



APPENDIX 2

The life insurance sector in 90 developing countries

% of insurance Portfolio			
less than 1%	1-10%	11-50%	More than 50%
Afghanistan (M)	Argentina (29)	Angola (M)	Bahamas (28)
Cap Verde (M)	Bahrain	Bangladesh	Guyana (38)
Central Africa	Benin (M)	Barbados (30)	India (19)
Chad (M)	Bolivia	Bhutan (M)	Korea, Rep. of (21)
Congo (M)	Burkina Faso (M,2)	Botswana (1)	Senegal
Cuba (M)	Burundi (M,3)	Brazil (31)	Thailand (27)
Iran (M)	Ecuador (35)	Cameroon (4)	Trinidad & Tobago
Iraq	Ethiopia (M,5)	Chile (32)	Zimbabwe (11)
Lesotho	Gabon	China (M)	
Mali	Gambia	Colombia	
Mauritania (M)	Ghana (6)	Costa Rica (M,33)	
Mauritius	Libya (M,17)	Cyprus	
Mozambique (M)	Madagascar	Dominican Rep. (34)	
Niger	Myanmar (M,23)	Egypt (12)	
Papua New Guinea	Oman (15)	El Salvador (36)	
Qatar	Peru (42)	Fiji (18)	
Rwanda (M)	Sri Lanka (M,26)	Guatemala (37)	
Seychelles (M)	Sudan	Honduras (39)	
Solomon Islands	Syria (M,16)	Indonesia (20)	
Vietnam [M]	Togo	Jamaica (40)	
	Turkey	Jordan	
	United Arab Emirates	Kuwait (44)	
	Uruguay (M)	Malawi (7)	
	Zaire (M,9)	Malaysia (22)	
		Malta (45)	
		Mexico (41)	
		Morocco (13)	
		Nepal	
		Nicaragua (M)	
		Nigeria (8)	
		Panama	
		Philippines (24)	
		St. Lucia	
		Singapore (25)	
		Tunisia (14)	
		Tanzania (M)	
		Venezuela (43)	
		Zambia (M,10)	

Note: (M) = Monopolistic market
Countries retained in the analysis are numbered from 1 to 45.

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