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Insurance Market Development and Income Inequality

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A B S T R A C T

This study aims to empirically analyze the relationship between insurance market development and income inequality for 13 countries from 1980 to 2006. Specifically, we examine how country-level income distributions are related to one particular measure of insurance market development. Our proxies for insurance market development are total life insurance premiums (LP), and total non-life insurance premiums (NLP), which are used as independent variables. The dependent variable is the Gini coefficient (Gini, a common measure of income inequality). Granger causality tests and Generalized Method of Moments (GMM) methodologies were employed to analyze correlations between these variables. Granger causality tests were used to determine if the direction, if any, of the cause and effect relationships among these variables.

The results of the Granger causality test indicate that LP affects the Gini coefficient while NLP is influenced by Gini in the total sample of countries. For the higher income economies, NLP is influenced by Gini, whereas both LP and Gini affect each other, and NLP affects Gini in the lower income group.

Using the GMM methodology to perform a correlation analysis controls for endogeneity among independent variables, the results suggest that LP has negative (-) relationship with Gini for the total sample. Gini is also negatively (-) related with LP in the higher income economies. Thus, the evidence indicates that life insurance market development results in reduction of income inequality for the total sample of countries. Furthermore, income inequality is lessened as the life insurance market expands in the higher income economies. The empirical findings have some implication for insurance consumer well-being in high income countries.

Keywords: Financial Development·Insurance Development, Income Inequality, Income Distribution

Ⅰ. Introduction

It is now well known that finance affects economic growth through internal effects and external impact (Goldsmith, 1969;, King and Levine, 1993), and that economic growth affects the distribution of income (Alesina and Rodrik, 1994; Dollar and Kraay 2002). More recently, finance has attracted much attention in that it may affect income redistribution (Greenwood and Jovanovic, 1990); Beck, Demirguc-Kunt and Levine, 2007) by boosting incomes of the poorest quintile and thus reducing income inequality. Financial development, mostly measuring banking growth, appears not only to influence economic growth but also to increase the income of the poorest.

Compared with abundant research in banking or in security market, however, no empirical evidence is available regarding the insurance sector with respect to financial development and income inequality. As the insurance market becomes more developed, does the lower and/or middle income population benefit? Or, does the income

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distribution influence the development of the insurance sector? These are still open questions that this research aims to address through Granger causality tests and Generalized Method of Moments (GMM) methodology.

Using annual panel data, this research extends the existing research on finance and economic growth by identifying the macro-economic role of the private insurance sector as it relates to the gap between wealth and poverty in any economy. It also examines if the income redistribution affects the development of insurance markets in some way.

Ⅱ. Literature Survey

A. Banking development and Income inequality

Research on the relationship between financial development and the distribution of income began in the late 1990s and resulted in the creation of several competing hypotheses: (1) the inequality-widening hypothesis, (2) the inverted U-shaped hypothesis, and (3) the inequality-narrowing hypothesis. That is, financial development widens income inequality (Rajan and Zingales, 2003), or increases and decreases income inequality in an inverted U-shape (Greenwood and Jovanovic, 1990)[1], or it narrows income inequality (Banerjee and Newman, 1993; Galor and Zeira, 1993; Beck *et al*., 2007; Clarke *et al*., 2003, 2006; Liang, 2006; Li, Squire and Zou, 1998)[2].

Major empirical findings related to the alternative hypothesis are as follows. Clarke *et al* (2006) found that financial development narrows income inequality, using 83 countries data between year 1960 and year 1995 and applying OLS, 2SLS and a random effect model. They took private credit/GDP and bank assets/GDP as proxy variables for financial development, and used Gini coefficients to capture income inequality, controlling as well for risk of expropriation, ethnolinguistic fractionalization, Government expenditure over GDP, inflation, modern sector/GDP, per capital real GDP. This empirical finding was consistent with Galor/Zeira (1993), Banerjee/Newman (1993), Li, Squire and Zou (1998), and Clarke *et al*. (2003).

More recently, Beck *et al*. (2007) applied OLS and GMM methodologies in an analysis of data for 65 countries and find that financial development reduces the poverty income level more rapidly than the growth rate of per capita GDP. Using GMM analysis, Liang (2006) also investigated 29 Chinese cities between 1986 and 2000 and obtained the same outcome as the other research. Liang (2006) also found similar results from a rural area study.

B. Stock market development and Income inequality

Das and Mohapatra (2003) applied an event study model to explore the relationship between the opening of the stock market and income inequality over the period between 1986 and 1995 for 11 countries including Brazil, India, Korea, Mexico, etc. The results show that the highest quintile gains more income, the next three quintiles lose income, and the lowest quintile is unchanged.

Beltratti and Morana (2007) perform a cointegration regression with U.S. data between 1920 and 2001 and find that income inequality is mainly reduced not by the stock market directly, but by the labor market; it is influenced only slightly in the short run by stock market movements.

C. Insurance market development and Income inequality

There is virtually no research on the relationship between private insurance market development and income inequality. Williamson (2001) compared Chile, Mexico, Bolivia, and El Salvador, all of which have fully privatized pension systems, and Argentina, Colombia, Peru, Uruguay, which have partially privatized pension systems. The study showed that privatization has benefited high income male workers but not low income female workers. That is, privatization appeared to affect financial development that, in turn, widened the income inequality between males and females.

With assistance of the Internal Revenue Service,

[1] Greenwood and Jovanovic(1990) is a pioneering work to argue that financial development increases inequality gap initially but subsequently reduces the gap as financial institutions and services are further developed.

[2] Financial development is argued either to help mostly the rich (Greenwood and Jovanovis, 1990), or to help mostly the poor (Aghion and Bolton, 1997; Galor and Zeira, 1993; Galor and Moav, 2004).

Kennickell (2008) analyzed data from the Survey of Consumer Finances executed by the US Federal Reserve Board and find that the poorer or the younger people take a lower health insurance benefit whereas people with higher education or larger income get more health insurance benefits. Kahn *et al*. (2002) analyzed the impact of the social insurance system on income distribution, using data for 25 cities, in Sweden and find that the Gini coefficient is 15% lower when insurance payments are included in income. The further decomposition by type of payment indicates that disability pension payments have the largest redistributive effect on income inequality.

The brief literature survey above implies that relationship between financial development and income equality is quite a new research subject, and the relationship between the private insurance market and income equality is one area missing in the existing literature.

While few studies consider the relationship of income inequality to formal insurance markets, there are several studies that have examined the how informal insurance mechanisms are affected by the income distribution (Besley, 1995; Laczo, 2008). Genicot (2006) provides a model that suggests higher inequality in income leads to an increase in voluntary risk-sharing between parties, which subsequently could lead to a decrease the inequality in consumption. To the extent that informal insurance mechanisms work well in certain parts of society or certain countries, the lower demand for formal insurance would slow the development of the insurance market.

Ⅲ. Research Methodology

A. Data and Variables

We chose the Gini coefficient, a very popular measure of income inequality among several alternative measures for income distribution. The coefficient is much easier to collect than the other measures that vary in concepts and/or in derivation methods. The Gini coefficient is also convenient because it provides a broad picture with just one number that aggregates inequality distribution among people in any country. It also enables us to easily compare changes over time and across countries.

Gini coefficients can be obtained at WIID (World Income Inequality Database) of the UNU-WIDER (World Institute for Development Economic Research) in the United Nations University. The coefficients used here are from WIID version 2.0b of WIID published in May 2007.[3]

Insurance markets supplement financial markets through risk pooling and risk transferring. Property and casualty insurers serve to indemnify any losses or damages faced by individuals or corporations, while life insurance companies stabilize income streams to policyholders or their family members. In providing these forms of protection, both life insurers and non-life insurers may prevent middle income class people from dropping into the lower-income class, and thus narrow income equality among people as insurance develops.

On the other hand, certain types of insurance, such as compulsory insurance, “savings” policies, or any other high end insurance products, may widen income inequality as the insurance market develops, depending, in part, on the population that has access to, and participates, in these types of insurance. Thus, it is an empirical question to pursue confirmation on these alternative hypotheses.

As measures of insurance market development, this research chooses the direct premiums of life insurance and non-life insurance as independent variables. We create the following index measures for our empirical analysis:[4]

$$= \frac{Life\ \ insurance\ \ premium}{GDP}$$

Insurance market development index 1. (1)

Insurance market development index 2.

$$= \frac{Non-life\ \ insurance premium}{GDP} \quad (2)$$

The variables for our analysis are presented in Table 1. As shown in the table, we also include several control variables obtained from the World Bank's World Development Indicator (2002, 2007) and IMF's International Financial

[3] The WIID contains information on income inequality for 151 developed, developing, and transition countries. It contains several income inequality variables including the Gini-coefficient, quintiles, and other percentiles of the income distribution.

[4] Measures indicating insurance market development may include insurance density, insurance penetration ratio, insurance claim payment, insured amount, and direct premium payment. Among these measures, for national comparison, direct premium payment is chosen as proxy variable for insurance market development. Total life and non-life insurance premiums were obtained from Swiss-Re's Sigma reports.

Table 1. Definition of variables

Name of variables		Definition or Concept	Data source
Dependent variable	GINI	Gini coefficient	UNU-WIDER
Independent variables	LP	Life direct premiums(% of GDP)	Swiss-RE
	NLP	Non-life direct premiums(% of GDP)	Swiss-RE
Control variables	GDPD	GDP deflator(2000=100)	IFS
	TRADE	Trade(% of GDP)	WDI
	UNEMP	Unemployment(% of total labor force)	WDI
	GOVFE	General government final consumption expenditure(% of GDP)	WDI
	POPGR	Population growth(% annual)	WDI

Table 2. Countries Included in the Analysis

High Income Countries(8)	**Low and Middle Income Countries(5)**
Canada, Denmark, Germany, Finland, Norway, Sweden, United Kingdom, United States.	Argentina, Brazil, Chile, Colombia, Venezuela.

Table 3. Summary statistics

	GINI	ln GINI	LP	NLP	GDPD	TRADE	UNEMP	GOVFE	POPGR
N	288	288	351	351	351	349	339	342	351
mean	0.3913	-0.9877	0.0245	0.0238	0.7486	0.5082	0.0779	0.1837	0.0098
SD	0.1212	0.3187	0.0223	0.0117	0.4633	0.2093	0.0353	0.0581	0.0072
min	0.1914	-1.6500	0.0003	0.0026	0.0000	0.1155	0.0160	0.0298	-0.0035
max	0.6915	-0.3700	0.1311	0.0529	3.9730	1.0084	0.2050	0.2994	0.0315

Statistics (2008).

B. Data Construction

The initial sample for this study contained information on 50 countries, but just 13 countries were adopted for our analysis, due to discontinuity or a lack in annual data. The countries included are shown in Table 2: Argentina, Brazil, Canada, Chile, Colombia, Denmark, Finland, Germany, Norway, Sweden, United Kingdom, United States, Venezuela, which are divided into two groups in terms of income level.[5] We analyze country-level data for the period 1980 to 2006. The statistical features of our sample are shown in Table 3.

[5] Income levels for each country were determined using the WDI 2007 (GNI per capita). High income country >$10,726, Middle-high income country $10,725～$3,466, Middle-low income between $3,465～$876, And Low income < $875.

C. Research Model

1. Hypotheses

From our review of the literature, we suspect to find significant relationships between the development of the insurance market and income inequality. To be clear, our analysis proceeds with the testing of the following four hypotheses:

Hypothesis 1: insurance market development affects income distribution.

Hypothesis 2: Income inequality affects insurance development

Hypothesis 3: Total life insurance premiums are negatively related to income inequality.

Hypothesis 4: Total non-life insurance premiums are negatively related to income inequality.

2. Granger Causality Test

We begin our analysis of the first two hypotheses with an examination of the direction of causal relations between our variables, using the test developed by Granger (1988). This test evaluates the causal relationship between two variables through statistical comparisons of one current variable with another prior variable as follows.[6]

$$Y_{i,t} = \sum_{i=1}^{k} a_i Y_{t-i} + \sum_{i=1}^{k} \beta_i X_{t-i} + \mu_{1t} \quad (3)$$

$$X_{j,t} = \sum_{j=1}^{k} \gamma_j X_{t-j} + \sum_{j=1}^{k} \rho_j Y_{t-j} + \mu_{2t} \quad (4)$$

We use the Granger causality test to test Hypotheses 3 and 4. Specifically, we use the Gini coefficient as our dependent variable (measuring income inequality), and the insurance penetration ratio (direct premium written/GDP) as the independent variables (measuring financial development), and estimate the following functional equations for all countries, *i*, and years, *t*:.

$$GINI_{i,t} = F(ILP_{i,t-1},\ \ GINI_{i,t-1}) \quad (5)$$

$$GINI_{i,t} = F(INP_{i,t-1},\ \ GINI_{i,t-1}) \quad (6)$$

Next, we test the reverse of Hypothesis 3. Specifically, we estimate the following functional equations for all countries, *i*, and years, *t*:.

$$ILP_{i,t} = F(GINI_{i,t-1}, ILP_{i,t-1}) \quad (7)$$

$$INP_{i,t} = F(GINI_{i,t-1},\ \ INP_{i,t-1}) \quad (8)$$

3. Dynamic Panel instrumental variables regression

This next phase of our research employs a panel data analysis method, in particular GMM (Generalized Methods of Moments), which controls for the problem of endogeneity among explanatory variables, and produces consistent and asymptotically normal estimators by using lagged dependent variables as instruments (Arellano and Bond, 1991). The GMM estimator allows us to adjust for endogeneity and over-identifying restrictions of independent variables, time-specific effects, and the potential bias from omitted country-specific factors, such as institutional characteristics (Hansen, 1982). Further, GMM enables us to solve the problem of heteroskedasticity of conventional error terms in instrumental variables (IV) estimation and eventually to secure valid inferences of heteroskedasticity-robust standard errors and statistics. Our GMM model takes the following general form:

$$\begin{aligned} y_{i,t} - y_{i,t-1} = {} & \alpha(X^1_{i,t-1} - X^1_{i,t-2}) \\ & + \beta(X^2_{i,t-1} - X^2_{i,t-2}) \\ & + (\epsilon_{i,t-1} - \epsilon_{i,t-2}) \end{aligned} \quad (9)$$

Based upon our literature survey and corresponding hypothesis, we set up the following regression equation to test hypotheses 3 and 4, i.e., to assess the relationship between insurance market development and income inequality, for all countries, *i*, and years, *t*:

$$\begin{aligned} \ln GINI_{i,t} = {} & \alpha_1 + \beta_1(LPI_{i,t} - LPI_{i,t-1}) \\ & + \beta_2(NLP_{i,t} - NLP_{i,t-1}) \\ & + \gamma_1(GDPD_{i,t} - GDPD_{i,t-1}) \\ & + \gamma_2(TRADE_{i,t} - TRADE_{i,t-1}) \\ & + \gamma_3(UNEMP_{i,t} - UNEMP_{i,t-1}) \\ & + \gamma_4(GOVFE_{i,t} - GOVFE_{i,t-1}) \\ & + \gamma_5(POPGR_{i,t} - POPGR_{i,t-1}) \\ & + (\epsilon_{i,t} - \epsilon_{i,t-1}) \end{aligned} \quad (10)$$

Where:

$\ln GINI$ = the natural log of the measure of each country's income inequality
LP = total direct premiums written in life insurance
NLP = total direct premiums written in non-life insurance
$GDPD$ = GDP deflator
$TRADE$ = a measure of trade openness
$UNEMP$ = unemployment rate
$GOVFE$ = a measure of government expenditures
$POPGR$ = population growth

We are particularly interested in the estimates of β_i which capture the impact of insurance market development on the measure of income inequality. Our research method includes a correlation analysis of direct premiums written

[6] When there are two time series variable X_t and Y_t, and X_t helps to forecast Y_t, then we can say "X Granger causes Y" or if not helps to effect "X does not Granger causes Y".

Table 4. Correlation analysis

	All the samples(13)			High income countries(8)			Mid/Low income countries(5)		
	0 lagged	1 lagged	2 lagged	0 lagged	1 lagged	2 lagged	0 lagged	1 lagged	2 lagged
ln GINI ⇒ LP	0.35	0.29	0.38	0.32	0.13	0.30	0.95	5.35*	10.20**
LP ⇒ ln GINI	3.57*	3.56*	3.02	2.23	2.94	1.91	0.03	12.56***	6.67*
ln GINI ⇒ NLP	0.07	5.82*	5.40	1.35	4.81*	4.00	0.86	0.53	1.76
NLP ⇒ ln GINI	1.29	1.82	2.31	0.17	0.75	5.01	0.33	6.33*	4.81

*p<.05 **p<.01 ***p<.001
* ⇒ : direction between variables

Table 5. Granger causality test results

	All the samples(13)			High income countries(8)			Mid/Low income countries(5)		
	0 lagged	1 lagged	2 lagged	0 lagged	1 lagged	2 lagged	0 lagged	1 lagged	2 lagged
ln GINI ⇒ LP	0.35	0.29	0.38	0.32	0.13	0.30	0.95	5.35*	10.20**
LP ⇒ ln GINI	3.57*	3.56*	3.02	2.23	2.94	1.91	0.03	12.56***	6.67*
ln GINI ⇒ NLP	0.07	5.82*	5.40	1.35	4.81*	4.00	0.86	0.53	1.76
NLP ⇒ ln GINI	1.29	1.82	2.31	0.17	0.75	5.01	0.33	6.33*	4.81

*p<.05 **p<.01 ***p<.001
* ⇒ : direction between variables

with Gini coefficient, and a regression analysis of the dependent variable in natural log form[7], that is, semi-log model[8] and independent variables and control variables in the 1st difference in order to resolve autocorrelation.

In order to compare the fitness of our models, we ran a variety of models with varying lags of our independent variables, i.e. from one year to five years. All quantitative variables in the analysis were transformed into ratio variables, and the log model was added to measure elasticity of the variables.

Ⅳ. Empirical Results

A. Granger Causality Analysis

Granger causality tests with all the sample countries show that direct premiums written in Life insurance (LP) significantly affects the Gini coefficient, while Non-life premiums (NLP) appear to be affected by the Gini coefficient.

Among the high income countries, NLP appears to be affected by the Gini coefficient. In the low and middle income countries, on the other hand, LP and the Gini coefficient appear to affect each other, and NLP affects Gini coefficient.

Since Granger causality test is a basic univariate test that does not consider the other explanatory variables, we may not conclude any definite relationship between income disparity and insurance market growth. Rather, it may be said that the Gini coefficient may interact with insurance market growth to some degree and in one way or another. For the sake of more elaborate analysis, we run dynamic panel regression and fixed effect model, after employing the well-known Hausman test to see if random effect model is better than fixed effect model or vice versa.

[7] The reason why only Gini coefficient is transformed into natural log form is that the coefficient tends to converge into values between 0.2 and 0.5 by it nonlinear nature.

[8] Log model takes one or more variables in log forms; double log model takes both dependent variable and independent variables in log form, while semi-log model takes either dependent variable or independent variable(s) in log form.

Table 6. Results for Full Sample

Variables	GMM estimates			Fixed effect model estimates		
Model	1	2	3	1	2	3
LP	-22.4100 (-1.95) *	-24.4835 (-3.39) ***		1.3738 (1.09)	1.4894 (1.19)	
NLP	-7.3651 (-1.06)		-15.7176 (-1.92) *	1.3655 (0.73)		1.6180 (0.88)
GDPD	-2.6277 (-2.83) ***	-2.7608 (-2.59) **	-3.2667 (-3.03) ***	0.0430 (0.65)	0.0478 (0.73)	0.0409 (0.62)
TRADE	-1.4802 (-1.18)	-0.7308 (-0.59)	-1.5429 (-1.36)	0.5804 (3.62) ***	0.5659 (3.56) ***	0.5995 (3.76) ***
UNEMP	-3.5965 (-1.23)	-4.0379 (-1.33)	-2.9597 (-1.39)	-0.2377 (-0.72)	-0.2587 (-0.79)	-0.2453 (-0.74)
GOVFE	-4.5533 (-1.96) *	-2.2057 (-0.29)	-3.7937 (-0.65)	0.6044 (1.49)	0.5952 (1.47)	0.6205 (1.53)
POPGR	33.9629 (1.13)	2.9642 (0.13)	30.7243 (0.99)	8.0617 (1.78) *	7.9116 (1.75) *	8.1630 (1.80) *
Number of Countries	13	13	13	13	13	13
Sargan Test	22.04	22.02	20.9			
R-square				0.9156	0.9154	0.9153
F test				266.14 ***	266.64 ***	267.4 ***

*p<.05 **p<.01 ***p<.001

B. Dynamic Panel Instrumental Variable Regression

1. Analysis of full sample

For our panel regression analysis, we begin with our full sample of 13 countries and include independent variables in 1 lagged to 5 lagged forms for our GMM estimation. Our analysis suggests that the model with one lagged independent variable produced the optimal regression equation.

In the model 1, where both LP and NLP are simultaneously analyzed, only LP significantly affects Gini coefficient in a negative way, and the same is also found in the model 2. In model 3, where only NLP is considered, NLP appears to affect Gini coefficient negatively.

The coefficient -22.41 indicates that as one unit increase of life insurance premium results in 22.41 times reduction of Gini coefficient, which implies in particular that increase of 0.001%p is followed by 0.00002%p reduction of Gini coefficient. The results above imply that both life and non-life insurance may improve income inequality to some degree, while life insurance looks more dominant in terms of effect when controlling any endogeneity problem available in the fixed effect model.

2. Analysis of Subsample of High income countries

GMM estimates with the data from high income countries reveal that most of independent variables do not directly affect Gini coefficients except LP that appeared to affect Gini coefficient in a negative way in model 1 and 2.

High income countries reveal a similar relationship between Gini coefficient and insurance market development to the all the sample case in the previous section. That is, both life and non-life insurance market can grow to reduce income disparity, while life insurance is more effective than non-life insurance. On the contrary, the low and middle income countries show somewhat different outcomes, as you can see below.

Table 7. Results for Subsample of High income countries

Variables	GMM estimates			Fixed effect model estimates		
Model	1	2	3	1	2	3
LP	-19.0520 (-1.79) *	-16.4857 (-1.85) *		1.0906 (0.73)	1.1591 (0.79)	
NLP	14.5284 (0.92)		-10.5261 (-0.88)	1.1033 (0.35)		1.4024 (0.45)
GDPD	-27.1663 (-9.66) ***	-31.1758 (-13.21) ***	-27.1166 (-9.15) ***	-0.7425 (-1.6)	-0.7359 (-1.59)	-0.7557 (-1.63)
TRADE	-0.3278 (-0.13)	5.0932 (1.41)	1.9069 (0.52)	0.7242 (2.5) **	0.7219 (2.5) **	0.7607 (2.67) ***
UNEMP	16.0976 (1.86) *	4.4598 (0.76)	7.7568 (1.85) *	-0.8389 (-1)	-0.8253 (-0.99)	-0.8999 (-1.08)
GOVFE	-24.9864 (-1.79) *	25.4480 (1.15)	-6.0108 (-0.45)	0.9998 (0.66)	1.0281 (0.68)	1.0899 (0.72)
POPGR	104.7808 (1.23)	18.3622 (0.36)	55.1491 (0.87)	9.2699 (1.73) *	9.2679 (1.73) *	9.3156 (1.74) *
Number of Countries	13	13	13	13	13	13
Sargan Test	10.31	8.18	11.43			
R-square				0.7751	0.7750	0.7745
F test				93.2 ***	93.61 ***	93.35 ***

*p<.05 **p<.01 ***p<.001

3. Analysis of Subsample of Low and Middle income countries

In middle and low income countries, insurance appears not to influence Gini coefficient in three different models at all. Neither life insurance nor non-life insurance is shown to influence the Gini coefficient, as income disparity may be determined by some other social or economic variables in large extent. It is unclear what makes the effect of insurance market growth on income disparity between high income countries and low income countries.

Ⅴ. Discussion of Implication for Financial Consumers

It is well known that insurance is an economic mechanism for individuals and corporations to transfer their risk to insurers in exchange of insurance premium. The empirical result here leads to the following propositions regarding the role of insurance for financial consumers. As far as its role in income disparity, life insurance may play a larger role than non-life insurance in high income countries, possibly because the former is voluntary and protection-based in high income countries, whereas the latter is somewhat compulsory (i.e., in case of automobile insurance) or of commercial line. In other words, growth in life insurance in industrialized countries may protect people from being drown into poor economic class thanks to its protection type policies, while it may not mean so much in low income countries because of dominant savings elements in life insurance contracts. Non-life insurance tends to grow ahead of life insurance in most emerging economies, in particular in commercial line such as fire, ocean marine, corporate property or liability insurance. As the non-life insurance expands with economic growth, it may contribute to economic growth itself

Table 8. Results for Low and Middle Income Countries

Variables	GMM estimates			Fixed effect model estimates		
Model	1	2	3	1	2	3
LP	-76.2727 (-0.75)	-107.709 (-1.55)		-1.3510 (-0.27)	-0.2634 (-0.05)	
NLP	6.7840 (0.15)		213.4425 (1.98)	1.5336 (0.83)		1.4029 (0.79)
GDPD	-1.3301 (-1.84) *	-2.1784 (-2.21) **	-0.1278 (-0.15)	0.0992 (2.08) **	0.1049 (2.23) **	0.0995 (2.1) **
TRADE	-2.2793 (-0.46)	5.8411 (1.77) *	-0.2077 (-0.23)	0.3614 (2.25) **	0.3399 (2.14) **	0.3655 (2.29) **
UNEMP	-2.9621 (-1.52)	-2.4319 (-2.08) **	0.5840 (0.34)	-0.0193 (-0.07)	-0.0631 (-0.24)	-0.0232 (-0.09)
GOVFE	-4.8912 (-1.04)	-7.1562 (-0.94)	15.8589 (1.23)	0.5085 (1.69) *	0.4884 (1.63)	0.5068 (1.7) *
POPGR	360.3306 (1.56)	406.4943 (1.25)	277.5375 (0.8)	-36.9740 (-2.2) **	-39.1232 (-2.36) **	-38.1047 (-2.35) **
Number of Countries	5	5	5	5	5	5
Sargan Test	3.16	2.86	3.02			
R-square				0.7530	0.7516	0.7529
F test				84.18 ***	85 **	85.85 ***

*p<.05 **p<.01 ***p<.001

while not to income disparity, especially when its personal line grows mostly with compulsory insurance.

Although both life and non-life insurance are highly valuable financial services to individuals and corporations, life insurance may be said to protect the first party in voluntary basis, while non-life insurance is compulsory one to protect the third party and the first party at the same time. In that sense, the life insurance can be a critical factor to determine income disparity level as well as welfare of financial consumers, when it is appropriately designed and grown by autonomous market demand, although it is known to be generally sold not bought.

Saving-type life insurance is believed to function like a saving that may reduce economic growth rate, differently from consumption per se, while protection type life insurance play a role of shock absorber in case to recover family's economic condition to normal level in case. As a complement to social security system, life insurance may play a secondary role to income equalizer if reasonably developed as in advance countries.

In spite of its research value as the first of its kind, nevertheless, this empirical research has not yet reached any definite conclusion over the role of insurance in income equality, but has just started its exploration with that regard. Future research may be expanded with more data based upon theoretical modeling to find the role of insurance in macro- economic sense and financial consumer well-being. And comparison of life and non-life insurance should be continued in the future as well.

Ⅵ. Summary and Conclusion

Does the development of insurance markets affect income inequality? Financial consumer or insurance consumer can be better off with growth of insurance market? This is the academic question of this research that has not been addressed in previous research. Using data for

13 countries and a few different econometric methods (Granger causality test and Generalized method of moments), we find that the development of life insurance may reduce income inequality while non-life insurance may not.

This research has some limitations in that only 13 countries were included in our sample, due to difficulty in obtaining annual Gini coefficients, and we are limited to assessing this relationship using data spanning only 26 years. Further, financial development, measured by quantitative values like other researches, is measured not by qualitative or institutional aspects, which might allow for a more refined assessment of how the specific features of the insurance market, such as concentration, are related to the income distribution. Nonetheless, our data show several statistically significant results which should be informative for further research in this area.

In terms of financial consumer's welfare , this empirical research show that life insurance may be able to reduce income disparity more than non-life insurance in most countries except low income countries. This result may need further analysis both in theory and empirical research, nevertheless it is a new finding that may complement the existing research on role of insurance and finance in economic development. Combining with the previous research on the role of insurance in economic growth, this research may imply a differentiated role of life insurance and non-life insurance in income redistribution and economic growth. In order to increase financial consumer welfare through income equality, life insurance seems to play a more important role than non-life insurance, ,whereas the latter does more for economic growth in general.

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