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Economic growth and insurance development: The role of institutional environments

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ABSTRACT

This paper investigates how institutional environments shape the relation between insurance and economic growth by applying an innovative dynamic panel threshold model. Using multiple general measures related to political, economic, and legal environments to assess the soundness of institutional environments, we find that the relation between life insurance and economic growth is negative in the regime with relatively unhealthier institutional environments. However, this significantly negative effect becomes insignificant after a certain level or threshold of institutional quality has been achieved. A generally unhealthy institutional circumstance could deter the growth effect of life insurance sectors. This result might be explained by the problem of moral hazard and adverse selection, the behavior of risk-taking, as well as macroeconomic volatility.

1. Introduction

It is widely recognized that institution quality constitutes a potentially important mechanism for sustaining a country's development in terms of economic and financial aspects. A considerable amount of literature has been devoted to understanding the direct impact of institutions on insurance market activities and economic growth. Although the literature has documented a generally positive relationship between institutional factors and insurance development, several deficits have been indicated by most of the existing studies, conducted to examine the relationship between institutions and growth. A seemingly mysterious situation reflecting that some country-specific conditions may complicate the expected favorable effect of institutions on the economy. This begs the question as to the particular effects of institutional environments on economic performance which is somewhat unresolved and needs further investigation.

There is, however, another strand of the literature, arguing that the influence of institutions on the relation between financial development and economic growth is relevant. The impact of financial development on the growth may depend on the soundness of institutional environments. The idea behind this is that poor-quality institutional environments may hinder the function of financial system. Put differently, although unsound institutional environments are a deterrent for some sectors in the financial system, they may have favorable effects for some aspects that could benefit the economic system. For the insurance sector, whether the beneficial effects from its functions in risk transfer and indemnification as well as in financial intermediation are affected by institutional environments has not been examined in the literature to date.

The purpose of this paper is therefore to examine the effects of institutional environments on the relation between insurance development and economic growth. Our study makes three sets of contributions to the literature. First, in contrast to prior studies that separately examine the direct impact of institutions on insurance development (Ward and Zurbruegg, 2002; Beck and Webb, 2003; Lee et al., 2013) and the effect of insurance on economic growth (Han et al., 2010; Chen et al., 2012; Lee et al., 2013; Chang et al., 2014), we evaluate how institutional environments shape the impact of insurance development on economic growth by a novel dynamic panel threshold model. The dynamic panel threshold model determines the threshold value endogenously and evaluates the effects of the variables of interest on the outcome variable under different regimes, allowing us to assess the growth effect of insurance under different institutional regimes.

Second, while examining the influences of institutional factor, institution is generally considered only for a single dimension. We investigate the effect of multifaceted institutional factor, which is not explored in prior studies. The multidimensional institutions could provide a more comprehensive evaluation than the single indicator of

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external environmental factors. In the legal dimension we utilize rule of law, legal structure, and security of property rights, and we measure political soundness with polity and political rights.[1] Aside from the two institutional dimensions often used in the literature, we additionally include indices related to a country's economic environment to evaluate the effect from the economic aspect. These measures enable us to capture the effect of institutional environments on the insurance-growth relationship. Our paper thus paints a more complete picture on this topic.

Third, our findings suggest that institutional environments influence the effect of life insurance on economic growth in different manners which generate some original implications. Our empirical results reveal that the coefficients on insurance development in the regime below the threshold are significantly negative under all institutional measures but those in the regime above are not significant. Extant studies on the relation between institutions and insurance development document that a sound institution benefits insurance development. Our findings further indicate that a sound institution does not in general help the growth effect of insurance, but an unhealthy one is harmful. This suggests that institutions play a passive intermediate role on the insurance-growth relationship.

The remainder of the paper is organized as follows. Section 2 reviews the related literature on the relation between institutions, insurance, and economic growth. Section 3 discusses the theoretical background and the hypotheses we test. Section 4 introduces the methodology and variables' definition. Section 5 presents empirical results, and Section 6 provides further discussions and implications. Section 7 concludes.

2. Literature review

The role of institutions on an economic system's development has attracted much attention over the past few decades, yet regarding the impact of institutions on economic growth, the evidence is divergent. Some studies note that institution-related variables have a positive impact on economic growth (Clague et al., 1996; Minier, 1998; Persson, 2005), while a negative influence is documented as well (Blanchard and Shleifer, 2000; Persson and Tabellini, 1992; Tavares and Wacziarg, 2001). Glaeser et al. (2004) alternatively support a development view - that is, it is not institutions that benefit economic growth, but instead economic growth induces the improvement of institutions. The institution-growth issue thus remains unsolved.

Although the direct effect of institutions on economic growth remains an open question, another strand of the literature explores the relevance of institution-related variables to financial development, including legal origin (La Porta et al., 1997; La Porta et al., 1998; Shen and Lee, 2006), regulatory environments (Mayer and Sussman, 2001; Lee et al., 2013), environmental conditions of colonies (Beck et al., 2003), and the more recently developed "political economy" view (Pagano and Volpin, 2001; Rajan and Zingales, 2003; Girma and Shortland, 2008).

Institutions are correlated with insurance development as well. From a legal perspective, insurance is a contractual relation between the insurer and the insured. The protection of contractual rights depends on the soundness of the legal rules and jurisdictions. As such, the legal environment is associated with insurance activities. Another legal aspect that may affect insurance is related to the protection of property rights. Insurers need to invest their funds collected from premiums into proper instruments in order to obtain an adequate return that can meet their obligations to the insured in the future. Wen and Zhang (1993) show that an individual's long-term investment behavior is distorted when property rights cannot be assured. The protection of property rights thus has a linkage with insurers' investment behaviors.

As noted above, researchers have begun to pay attention to the influence of the political aspect in financial development. The influence of political environments on insurance market activities are also explored in the insurance literature. Beck and Webb (2003) note that political instability affects the economic horizon of potential buyers and suppliers of life insurance products and thus may discourage the development of a healthy life insurance market. Roe and Siegel (2011) indicate that traditionally important channels of investor protection, such as legal origin, trade openness, colonial conditions, and the related and resultant institutions, cannot function well under unstable political environments. Therefore, the well-functioning of other institutional dimensions, such as the legal rules and jurisdictions above, depends on the soundness of political aspects. Political environments are thus correlated directly with insurance activities or through an indirect effect on other institutional aspects.

Empirical findings on the effect of institution-related variables in insurance development generally support the arguments above. Ward and Zurbruegg (2002) show that political stability exerts a significant impact on life insurance demand both in developed and developing economies. They also find that an improvement in the legal system positively impacts the demand for life insurance, while the effect is not significant in OECD countries, possibly because OECD countries already have a sounder legal system and thus the marginal effect of any further improvement is less. Beck and Webb (2003) find that an overall institutional development, accounting for legal rules and political factors, has a positive effect on life insurance development. Avram et al. (2010) also find that the quality of the legal system and the protection of property rights exert a significant effect on developments in insurance sectors.

The extant studies on the effect of institutions in insurance development mainly explore their direct impact on insurance. It is interesting to investigate if institutions shape the relationship between insurance development and economic growth. The literature has documented that institutions exert a first-order effect on insurance development, yet whether the relation between insurance development and economic growth is affected by institutional environments, i.e., if institutions exert a second-order effect, still awaits exploration. More specifically, some attention should be paid on if institutions exert a non-linear impact on the insurance-growth link. Carter and Dickinson (1992) and Enz (2000) develop a logistic model to depict a S-shaped pattern on the demand curve for insurance. Though there is no direct examination on the non-linear link between insurance and economic growth, findings in some studies imply the existence of non-linearity. For instance, the effect of insurance on economic growth has been shown to depend on the level of economic development. Haiss and Sümegi (2008) find that life insurance plays a more important role on economic growth in mature European countries. As institutional development is usually related to the level of economic development, we could expect that institutional environments should exert an effect on shaping the insurance-growth relationship from which policy implications can be produced.

3. Theoretical background and hypotheses

The insurance literature suggests two possible opposing effects of insurance development on economic growth through its effect on the function of financial intermediation described above. From a theoretical point of view, the services provided by the financial sector can contribute to economic growth through mobilizing domestic savings and encouraging capital accumulation, improving the efficiency of risk management and capital allocation, and fostering the development of trade and commerce (see Levine, 2005, for a comprehensive survey). Accordingly, one would expect a positive relation between insurance development and economic growth.

While the traditional views would predict the favorable effect of insurance development on economic growth, there is increasing attention on how this impact is vanishing (see Panizza, 2014, for an extensive survey). The presence of high levels of inequality, credit market

[1] The binary variable of legal origin is not applicable to the dynamic panel threshold model used in this paper. We thus utilize indices related to the legal system.

imperfections might cause a negative effect on growth. Several reasons are given in the literature to explain this negative relation. First, as economies develop, financial intermediation may become a relatively less important for economic growth as competition between financial intermediaries increases and financial markets become more attractive to investors (Demirgüç-Kunt et al., 2013). A second set of explanations are relates to risk-taking and volatility. Rajan (2005) and de la Torre et al. (2011) provide some useful insights on the risks of excessive financial development. The benefit of financial development is smaller than the cost of instability brought about by the dark side. These possibility of the economy being adversely affected may be attributed to the fact of "too much finance" (Law and Singh, 2014; Arcand et al., 2015; Samargandi et al., 2015).

Given the findings from theoretical and empirical evidence regarding the influence of insurance development on economic growth is mixed, an interesting question immediately arises as to whether the one-size-fits-all approach is suitable for modeling the growth process in cross-sectional exercises. In this regard, we argue that institutional factors may play an important role in capturing the non-linear insurance-growth relationship. Whether cross-country differences in the influence of insurance development on economic growth may be explained by differences institutional environments is somewhat unresolved and needs further investigation.

Theoretically, institutional progress is expected to favor the advance of the economy because it is necessary to facilitate activities related to the evolvement of the economic system. For the real sector, a healthy institutional environment is essential in promoting business transactions and investments and reducing transaction costs, which drives the increase in the output of the economy. For the financial sector, a sound institutional circumstance could aid financial transactions, better capital markets and thus channel the fund more efficiently, which in turn benefits the economic system as well. Putting together, institutions are relevant for the whole economy to function well and in turn associated with the growth of the economy.

As mentioned above, insurance development can have either positive or negative impacts on economic growth. Arcand et al. (2015) indicate that large financial sectors might growth-promoting in the presence of a relatively sounder institutional environment, but could be damaging in countries that lack a healthy institutional infrastructure. There should be two distinct effects of institutional factors that shape the impact of insurance development on economic growth. For one, insurance development could be more beneficial in a relatively sounder institutional environment. Levine et al. (2000) show that institutional factors, like legal and accounting reforms, that enhance creditor rights and contract enforcement benefit financial intermediation and accelerate economic growth. Law et al. (2013) also demonstrate that there exists an institutional threshold effect in the finance-growth relationship in which only after a certain institutional quality is attained does finance exert an impact on growth. Following these argument, our first hypothesis is:

Hypothesis 1. Insurance development has a more positive effect on economic growth in countries with sounder institutions.

On the other hand, insurance development could be more harmful in a relatively less developed institution. Law et al. (2013) point out that an increase in financial development may not contribute to growth due to corruption or political interference. Furthermore, weak legal systems and poor institutional infrastructure not only impede market development, but also cause higher incidence of crises and more output volatility. As stated above, an insurance business might deter growth as it is prone to moral hazard and adverse selection problems that reduce the insured's incentives to engage in prudent behavior and loss mitigation (Haiss and Sümegi, 2008; Lee and Chiu, 2012). Thus, this negative effects of insurance development are somewhat worsened in less developed institutions. Following these argument, our second hypothesis is:

Hypothesis 2. Insurance development has a more negative effect on economic growth in countries with less developed institutions.

In addition, the institutional environment in more developed countries is in general sounder than in less developed countries. It is reasonable to expect that the effect of institutional circumstances on life insurance development in high-income economies is not as relevant as in low-income economies, because an increase in the quality of the institutions is less relevant if the institution circumstances are already good enough (Chang and Lee, 2012). Ward and Zurbruegg (2002) also support this point of view that the effect of legal circumstances on life insurance demand is not significant in OECD countries because OECD countries are usually perceived as having a sounder legal system. Following these vein, our third hypothesis is:

Hypothesis 3. Insurance development has an insignificant effect on economic growth in countries with sounder institutions.

4. Methodology and data

4.1. Model specification and estimation

We employ the recently developed dynamic panel threshold model introduced by Kremer et al. (2013) to explore the influence of institutional environments on the growth effects of insurance development.[2] The model is specified as:

$$\begin{aligned}\mathrm{GROWTH}_{i,t} = {} & \mu_i + \delta_1 I(\mathrm{INSTI}_{i,t} \le \gamma) + \beta_1 (\mathrm{LIP})_{i,t} I(\mathrm{INSTI}_{i,t} \le \gamma) \\ & + \beta_2 (\mathrm{LIP})_{i,t} I(\mathrm{INSTI}_{i,t} > \gamma) + \alpha_1 \mathrm{GROWTH}_{i,t-1} + \boldsymbol{\alpha}_2' \boldsymbol{z}_{i,t} + \varepsilon_{i,t},\end{aligned} \tag{1}$$

where $\mathrm{GROWTH}_{i,t}$ is real GDP per capita growth, $\mathrm{INSTI}_{i,t}$ represents proxies of the political, economic, and legal environments for country i at time t and is used as the threshold variable, LIP is life insurance penetration, $\mathrm{GROWTH}_{i,t-1}$ denotes lagged real GDP per capita growth and is the right-hand side endogenous variable, and $\boldsymbol{z}_{it}$ represents the set of controls.

We draw on the growth literature to include control variables subject to data availability (Shen and Lee, 2006; Haiss and Sümegi, 2008; Han et al., 2010; Chen et al., 2012). The ratio of the sum of exports and imports over GDP (TRADE) is used to evaluate the country's degree of openness. Government expenditure (GOVEXP) is defined as the ratio of government consumption to GDP. The inflation rate (INF) is related to monetary discipline. Growth in the terms of trade ratio (BARTER) represents the growth rate of the net barter terms of the trade index. Financial development is also identified as an element promoting economic growth. We use the ratio of domestic credit to the private sector to GDP (CREDIT) as a proxy of financial development. The slope coefficients on these variables are assumed to be regime independent so that we can focus attention on the key variable of interest.[3] The only regime-dependent variable is the proxy of insurance development, whereby our focus is on the threshold effects of institutional environments on the insurance-growth nexus.

Kremer et al. (2013)'s model also takes into account differences in the regime intercepts, which is proposed by Bick (2010) and reflected in δ_1. The inclusion of the regime intercepts assumes that the difference in the regime intercepts is the same across countries, but not individual specific. This can reduce the bias of omitting variables and is easily incorporated as a regime-dependent exogenous regressor for a given threshold. According to Bick (2010), including a regime intercept has important statistical and economic implications. From the statistical perspective, the bias of omitting variables can be diminished and

[2] We thank Professor Bick for making available the Matlab code for the estimation.

[3] Bick (2010) notes that some exogenous regressors can be constrained to have the same effect in different regimes.

the biased effect can be clearly identified when including the regime intercept. The statistical results are subsequently associated with an economical implication that the effect of the policy variable of interest becomes relevant. For instance, Bick shows that the impact of inflation rates on economic growth alters in significance as well as in magnitude after including the regime intercept in the statistical aspect, suggesting a significantly detrimental impact from high inflation rates on growth and a significantly stronger beneficial effect of low inflation rates in the economical aspect, in contrast to findings in the model without the regime intercept. We thus consider the regime intercept as well.

In Eq. (1) a major concern that needs to be tackled is the endogeneity of the lagged real per capita GDP growth, $GROWTH_{i,t-1}$. The literature has noted that a reliable inference is plagued by endogeneity in that it induces biased and inconsistent parameter estimates (Roberts and Whited, 2013). This disturbance emerges definitely in the dynamic panel data model as components of the dependent variable are involved in covariates in the right-hand side. Fortunately, Arellano and Bond (1991); Arellano and Bover (1995), and Blundell and Bond (1998) have developed a consistent and efficient estimation for the dynamic panel data model. They propose that the history of cross-section units, i.e., lags of dependent and independent variables, can be instrumental variables to address the endogenous problem. We follow their proposition, using lagged real GDP per capita growth as instruments.

In the estimation of the threshold value γ, following Kremer et al. (2013), we first run a reduced form specification by regressing the endogenous variable, i.e., $GROWTH_{i,t-1}$, on instruments. The structural equation, i.e., Eq. (1), is then estimated by least squares for a fixed threshold value γ by replacing the endogenous variable with the predicted values of the reduced form regression in the first step and the corresponding sum of squared residuals can be obtained. Repeating the above steps for a subset of the threshold variable, INSTI, we will have a set of sum of squared residuals. The estimate of the threshold value γ with the smallest sum of squared residuals is the one used in the subsequent estimation such as slope coefficients for different regimes.

There is an empirical trade-off on the choice of the lag order of instruments. Instruments are more exogenous when their lag length is expanded, but the increase in lag order may make them weaker. Arellano and Bond (1998) note that using too many instruments may lead to overfitting biases and increase the computation burden, particularly when N is small. They suggest that including the whole history is not necessary and one can exclude instruments with the least information. Following this suggestion, we include as instruments five lags of the initial GDP per capita when the sample span is long and three lags in the case of a short sample period, which the variables and data section below describes.

We finally also include year dummies to reduce cross-individual correlation. Roodman (2009) indicates that including year dummies can reduce the influence of cross-individual correlation in the dynamic panel data model, which is a way to validate the assumption of cross-individual uncorrelation as much as possible. However, including too many year dummies may incur multicollinearity. Therefore, we include dummies on a three-year interval basis.[4]

4.2. Variables' definitions and data

We obtain data on real per capital GDP and control variables from WDI (2001) compiled by the World Bank. Insurance premium data are from Sigma published by Swiss Reinsurance Company. Appendix A summarizes the variables' definition as well as data sources. To more completely assess the influence of institutions, this paper utilizes multiple indices in political, economic, and legal dimensions to proxy for the soundness of institutional environments in one country. The full sample dataset comprises an unbalanced panel of 40 countries with a maximum sample period from 1981 through 2010 for some countries. Countries included and the number of observations further varies across institutional dimensions because the span covered in different institutional measures differs in that specialized agencies begin to construct indices in different eras, possibly due to special requirements or data availability. We delineate these indices below, respectively.

4.2.1. Political dimension

We adopt two measures of political environment. One is the polity regime extracted from Polity IV dataset conducted by Marshall et al. (2011). This index (POLITY) assesses the degree of democracy relative to autocracy, which is scaled from −10 to 10 with 10 indicating strongly democratic and −10 strongly autocratic. The index allows us to evaluate if a country's polity can shape the relationship between insurance development and economic growth.

The second measure is the political rights index (FH_PR) constructed by the Freedom House. The Freedom House's political indices can be applied in assessing the effect of political components on economic activities. The index evaluates the degree of political freedom, which is rated from 1 to 7 with a higher score indicating lower political freedom. To maintain consistency in interpreting our empirical results, we reverse the political rights index so that a higher score represents higher political freedom.

The span of the two political environment indices covers the longest period among institutional measures utilized in this paper, possibly because politics is always the first thing to be addressed at the onset of a country's formation. Incorporating the political environment indices into our original data produces an unbalanced panel of 40 countries for political rights and 39 countries for polity due to unavailable data on Iceland over the period 1981–2010.

4.2.2. Economic dimension

We also measure the soundness of economic environments using two indices. The first one is the measure of economic risk (ICRG_ECO) extracted from the International Country Risk Guide (ICRG) compiled by the Political Risk Services Group (Lee et al., 2013). The index is scaled from 0 to 50, with a higher score indicating a lower economic risk. The time span covered by the ICRG is 1984–2009.

Another measure used is the economic freedom index of the world (EFW_INDEX) pulled from Gwartney et al. (2011). The index evaluates to what extent countries' policies support economic freedom, which consists of five aspects: size of government, legal structure and security of property rights, access to sound money, freedom to trade internationally, and regulation of credit, labor, and business. The index is scored on a scale of 0–10 with a higher value signifying higher economic freedom. The time period covered is from 1970 to 2009, and the data are arranged over five-year intervals before 2001 and year-by-year afterwards. To maintain consistent yearly frequency as in other institutional measures, the data span on this measure is 2001–2009.

4.2.3. Legal dimension

Two indices related to legal environment are employed as well. One is the legal structure and security of property rights (EFW_LSPR), which is a sub-index of the economic freedom of the world. The index is a comprehensive evaluation on seven dimensions related to legal circumstance: judicial independence, impartial courts, protection of property rights, military interference in rule of law and the political process, integrity of the legal system, legal enforcement of contracts, and regulatory restrictions on the sale of real property. A higher score represents a sounder legal environment and the covered period is 2001–2009, as in EFW_INDEX.

[4] Indeed, we still ran into multicollinearity in the empirical process that makes the results unavailable. In this situation we tentatively exclude the year dummy one by one until the program can be executed successfully.

Another index is rule of law (WGI_RL) obtained from the worldwide governance indicators established by Kaufmann et al. (2010). This index is a perception-based measure and captures to what extent agents are confident about the rules of their society, the quality of contract enforcement, property rights, the courts, and so on. The scale of the indicator ranges from approximately −2.5 (weak rule of law) to 2.5 (strong rule of law). The period covered spans from 1996 to 2010 with gaps in some years. As we are concerned about the dynamics on the insurance-growth relationship, we require consecutive observations, leaving us with the sample period of 2003–2010.

In the empirical growth literature a standard practice is to use the five-year average of the annual growth rate in order to decrease the influence of business cycles. In this paper we do not proceed in this manner, but instead use year-by-year observations for two reasons. First, the time span of some institutional measures we use is short, and averaging data is impractical in that it will decrease observations substantially. To maintain consistency on data frequency over different institutional measures, we keep primitive data frequency in the empirical analysis. Second, although averaging data can smooth the effect of business cycles, it also leads to information loss. Which effect dominates remains unknown and is not easy to clarify. Furthermore, insurance data are not as long in a time series and as large in the cross-section dimension as financial development data are. Thus, original data are utilized.

4.2.4. Basic statistics

In the empirical analysis we first look at the summary statistics.[5] It suggests that there is a great difference in economic growth across different countries because our sample includes developed, developing, and underdeveloped economies. The development of insurance markets also varies materially, with a penetration from 0.02% to 20.42% for life insurance sector. Similar patterns are observed as well in other macroeconomic variables. The figures in institutional proxies also reflect a large divergence in institutional environments across countries, which correspond to our sample's composition of broad economies in the sense that institutional development generally evolves with the progress of economic development.

We also observe the correlation coefficients between variables.[6] The results display some interesting pictures. First, most institutional proxies except ICRG_ECO are negatively correlated with economic growth. As noted in literature review section, how institutions impact the growth still remains unsolved. Our primary statistics appear to be in line with the argument of a negative link. Second, life insurance are negatively related to economic growth. However, as it is an unconditional correlation without incorporating the influence of other variables, more comprehensive analyses need to be done to have a definite inference. Third, an overwhelmingly positive correlation between institutions and insurance, corresponding to the findings documented in the insurance literature. With regard to other macroeconomic variables, it shows that institutional environments are positively correlated with government expenditure and negatively correlated with inflation. The rightmost column shows that institutions are also positively related to financial development.

In addition, institutional proxies are mutually and positively correlated, suggesting that different institutional dimensions may interact each other. Moreover, proxies belonging to identical dimension in general also present a high correlation, e.g., 0.943 between FH_PR and POLITY and 0.923 between EFW_LSPR and WGI_RL. This provides additional justification for our adoption of multiple indices in different institutional aspects in this article.

[5] The results are not shown to save space, but available upon request from the authors.
[6] The results are not shown to save space, but available upon request from the authors.

5. Empirical results

5.1. Dynamic threshold effect of institutional environments

5.1.1. Political environments

Table 1 presents the threshold as well as parameter estimates using political institution proxies as the threshold variable. The effect of insurance on economic growth differs across different regimes of democratization level and political right. For life insurance, the coefficients on the insurance development proxy under the threshold estimate is significantly negative at the 1% significance level, while the effect above the threshold is negative as well but is not significant. Moreover, the magnitude is larger (in absolute value) in the low regime than in the high one. The evidence suggests that life insurance has a negative impact on the growth if the level of democratization or of political rights is lower.

Regarding the effects of other control variables on economic growth, the results are generally consistent with the findings in the growth literature. Trade openness is positively correlated with the growth, and government expenditure and the inflation rate have a negative impact. However, the financial development proxy is negatively related to the growth, which is a finding contradicting previous studies. A potential substitution effect between banking and insurance may be the reason for the difference. Another variable worthwhile to discuss is the regime intercept δ_1. According to Bick (2010), it represents that the difference in the regime intercepts is not individual specific, but the same for all cross-sections, meaning the growth rate in the same regime is identical, but not different across countries within the regime. Here, it is a dummy of the low regime that represents the average economic growth rate of countries with unsound institutional environments from an economic perspective. From a statistic perspective, its inclusion in the model could reduce biases of omitting variables. The coefficients are all, however, not significant.

5.1.2. Economic environments

Table 2 presents the results for economic environments. An apparent result is observed for life insurance again. The coefficients on the insurance proxy are significantly negative in the low regime in both measures related to economic environments, suggesting a higher economic risk or a lower economic freedom is disadvantageous to the growth effect of life insurance. The parameter estimates for the regime above the threshold are not significant and have an opposite sign between the two institutional measures.

For other control variables, government expenditure and financial development have a negative effect on economic growth. One possible explanation for the negative effect of government consumption could be the crowding-out effect as noted in macroeconomics. The adverse impact of financial development is consistent with the banking crisis literature that documents the association between the expansion of domestic credit and crises (e.g., Kaminsky and Reinhart, 1999; Gourinchas et al., 2001), which in turn lead to economic downturn. The significant negative coefficients intercepts $\hat{\delta}_1$ suggest that countries with an unhealthy economic environment generally have a negative average growth rate.

5.1.3. Legal environments

Table 3 reports the results for legal environments. The results of life insurance are identical to those under the political and economic dimensions. Life insurance has a significantly negative impact on economic growth if rule of law or the soundness of legal structure is weak. In contrast, this negative effect of insurance development on economic growth becomes insignificant after a country's legal development exceeds a certain level of threshold.

In light of the analysis on the threshold effect of institutional environments, we briefly summarize the findings. A significant negative link between life insurance and economic growth is found across all

Table 1
Dynamic threshold effect of political environments on insurance development and economic growth.

	POLITY	FH_PR
Threshold estimates		
$\hat{\gamma}$	8.000	3.000
C. I.	[8.000, 8.000]	[3.000, 7.000]
Impact of insurance development		
$\hat{\beta}_1$	−0.722*** (0.200)	−0.666*** (0.208)
Obs.	457	213
$\hat{\beta}_2$	−0.026 (0.083)	−0.138 (0.086)
Obs.	608	872
Number of countries	39	40
Control variables		
L.GROWTH	0.024 (0.050)	0.018 (0.045)
TRADE	0.013** (0.006)	0.014*** (0.005)
GOVEXP	−0.266*** (0.060)	−0.262*** (0.061)
INF	−0.051*** (0.014)	−0.052*** (0.014)
BARTER	0.003 (0.011)	0.006 (0.010)
CREDIT	−0.040*** (0.004)	−0.027*** (0.004)
$\hat{\delta}_1$	0.003 (0.006)	−0.001 (0.006)

Notes: Dependent variable is real per capita GDP growth. POLITY is a measure of degree of democratization. FH_PR denotes political rights. $\hat{\gamma}$ is the estimated threshold value. C.I. is 95% confidence interval corresponding to the estimated threshold value. L.GROWTH is lagged real per capita GDP growth. TRADE is the ratio of the sum of exports and imports over GDP. GOVEXP is the ratio of government consumption to GDP. INF is the inflation rate. BARTER is the growth of the terms of trade ratio. CREDIT is the ratio of domestic credit to the private sector to GDP. Figures in parentheses are standard errors.
*** Significant at the 1% level.
** Significant at the 5% level.

Table 2
Dynamic threshold effect of economic environments on insurance development and economic growth.

	ICRG_ECO	EFW_INDEX
Threshold estimates		
$\hat{\gamma}$	34.880	7.730
C. I.	[34.790, 35.250]	[7.580, 7.760]
Impact of insurance development		
$\hat{\beta}_1$	−0.355*** (0.124)	−0.606*** (0.163)
Obs.	277	278
$\hat{\beta}_2$	−0.094 (0.082)	0.097 (0.097)
Obs.	684	74
Number of countries	40	40
Control variables		
L.GROWTH	0.079 (0.051)	−0.209 (0.172)
TRADE	−0.003 (0.006)	0.021 (0.021)
GOVEXP	−0.245*** (0.062)	−0.690*** (0.202)
INF	−0.026* (0.014)	−0.083 (0.074)
BARTER	0.003 (0.010)	−0.010 (0.028)
CREDIT	−0.022*** (0.004)	−0.030*** (0.010)
$\hat{\delta}_1$	−0.023*** (0.004)	0.024** (0.010)

Notes: Dependent variable is real per capita GDP growth. ICRG_ECO is a measure of economic risk. EFW_INDEX denotes the economic freedom index. $\hat{\gamma}$ is the estimated threshold value. C.I. is 95% confidence interval corresponding to the estimated threshold value. L.GROWTH is lagged real per capita GDP growth. TRADE is the ratio of the sum of exports and imports over GDP. GOVEXP is the ratio of government consumption to GDP. INF is the inflation rate. BARTER is the growth of the terms of trade ratio. CREDIT is the ratio of the domestic credit to private sector to GDP. Figures in parentheses are standard errors.
*** Significant at the 1% level.
** Significant at the 5% level.
* Significant at the 10% level.

institution-related measures, suggesting that an unhealthy institutional environment would hinder the growth effect of life insurance. Although this result does not support the traditional growth perspective of Hypothesis 1, it provides the novel evidence supporting the "too much finance" hypothesis and confirms our Hypothesis 2 suggesting that insurance development has an adverse influence on economic growth in countries with less developed institutions. Insurance development could be harmful because of the problem of adverse selection and moral hazard when lacking a sound institutional environment. On the contrary, when it has achieved a certain level or threshold of institutional quality, this significantly negative effect becomes smaller (either positive or negative) and insignificant, which is consistent with our Hypothesis 3. It might be because that the information asymmetries are largely reduced in a relatively sounder institutional environment. In sum, the overall evidence reveals that institutional environments play a more relevant role on the growth effect of life insurance.

5.2. Robustness check — institutional environments as a regressor

The preceding section's analyses use institution-related variables as the threshold variable, but they are not included as an explanatory variable. Studies have shown that institutional development impacts insurance market development (Ward and Zurbruegg, 2002; Beck and Webb, 2003) as well as economic growth (Hall and Jones, 1999; Acemoglu et al., 2001; Dollar and Kraay, 2003; Easterly and Levine, 2003; Rodrik et al., 2004). Therefore, one may suspect if the effect of the insurance proxy will change when institution-related variables are controlled. We thus include institution-related proxies as a regressor to check if our findings change. The results are qualitatively similar as those above, with only minor changes in estimated coefficients. The evidence is thus robust to controlling for the effects of institutions. The results are not reported for space consideration but are available from the authors upon request.

5.3. Difference between different country income levels

Generally speaking, institutional environments usually get healthier with the rise in the degree of economic development that also closely links to country's income level.[7] We check if the threshold effect of institutional environments on the relationship between insurance and economic growth differs across different country income levels. Table 4 reports the results. As can be seen, the influence of institutions is very mixed and varies greatly at different income levels. The upper panel shows that in non-high-income economies an unhealthy political environment, based on the significance of coefficient estimates, deters the growth effect of life insurance. However, in high-income economies the effects are puzzling as the results display that a better political circumstance is detrimental to the effect of life insurance on economic growth.

The middle panel exhibits that the healthiness of economic environments is in general irrelevant to the growth effect of insurance in non-high-income countries. For high-income countries, it seems that an unsound economic environment is unfavorable for the growth effect of life insurance. Lastly, the bottom panel reveals that the influence of legal environments is also divergent for countries with different income levels. For non-high-income countries, we could observe a significantly negative coefficient for life insurance, but the results are not uniform across both legal proxies. For high-income countries, the effects of law environments are generally not significant in life insurance.

The results based on income categories reveal that the influence of institutional environments on the impact of insurance on economic

[7] We divide the sample based on classification by the World Bank and group low- and middle-income economies into non-high-income ones to keep adequate observations. High-income economies include Australia, Canada, Chile, Denmark, Finland, Greece, Iceland, Ireland, Italy, Japan, Netherlands, New Zealand, Norway, Poland, Portugal, Singapore, South Korea, Spain, Sweden, Switzerland, United Kingdom, United States, and Uruguay. Non-high-income countries are Algeria, China, Colombia, Egypt, Hungary, India, Indonesia, Kenya, Malaysia, Mexico, Pakistan, Panama, Philippines, South Africa, Thailand, Tunisia, and Venezuela.

Table 3
Dynamic threshold effect of legal environments on insurance development and economic growth.

	WGI_RL	EFW_LSPR
Threshold estimates		
$\hat{\gamma}$	−0.207	7.850
C. I.	[−0.764, 1.763]	[5.360, 7.850]
Impact of insurance development		
$\hat{\beta}_1$	−4.429*** (1.218)	−0.483** (0.194)
Obs.	72	239
$\hat{\beta}_2$	0.027 (0.247)	0.102 (0.179)
Obs.	232	113
Number of countries	40	40
Control variables		
L.GROWTH	−0.439*** (0.088)	−0.215 (0.174)
TRADE	−0.039* (0.021)	0.019 (0.021)
GOVEXP	−0.479** (0.225)	−0.715*** (0.208)
INF	−0.248*** (0.079)	−0.085 (0.075)
BARTER	−0.028 (0.030)	−0.010 (0.029)
CREDIT	−0.034*** (0.012)	−0.036*** (0.011)
$\hat{\delta}_1$	0.091*** (0.020)	0.015 (0.012)

Notes: Dependent variable is real per capita GDP growth. EFW_LSPR is a measure of legal structure and security of property rights. WGI_RL denotes rule of law. $\hat{\gamma}$ is the estimated threshold value. C.I. is 95% confidence interval corresponding to the estimated threshold value. L.GROWTH is lagged real per capita GDP growth. TRADE is the ratio of the sum of exports and imports over GDP. GOVEXP is the ratio of government consumption to GDP. INF is the inflation rate. BARTER is the growth of the terms of trade ratio. CREDIT is the ratio of domestic credit to the private sector to GDP. Figures in parentheses are standard errors.
*** Significant at the 1% level.
** Significant at the 5% level.
* Significant at the 10% level.

Table 4
The effect of institutional environments on the insurance-growth relationship under different income levels.

			High-income	Non high-income
Political	POLITY	$\hat{\beta}_1$	−0.076 (0.222)	−0.740** (0.364)
		$\hat{\beta}_2$	−0.186** (0.081)	−0.012 (0.216)
	FH_PR	$\hat{\beta}_1$	0.094 (0.362)	−0.680* (0.369)
		$\hat{\beta}_2$	−0.226*** (0.082)	0.081 (0.213)
Economic	ICRG_ECO	$\hat{\beta}_1$	−0.434*** (0.154)	−0.001 (0.204)
		$\hat{\beta}_2$	−0.158** (0.080)	0.144 (0.177)
	EFW_INDEX	$\hat{\beta}_1$	−0.586*** (0.182)	−0.691 (0.444)
		$\hat{\beta}_2$	0.041 (0.122)	−0.434 (0.419)
Legal	WGI_RL	$\hat{\beta}_1$	0.480 (0.319)	−4.688*** (1.287)
		$\hat{\beta}_2$	−0.103 (0.235)	1.012 (0.621)
	EFW_LSPR	$\hat{\beta}_1$	−0.445* (0.238)	−0.130 (1.110)
		$\hat{\beta}_2$	0.039 (0.192)	−0.377 (0.393)

Notes: Dependent variable is real per capita GDP growth. $\hat{\beta}_1$ is the coefficient estimate on life insurance penetration for the regime below the threshold value of institutional variables and $\hat{\beta}_2$ is that for the regime above. Control variables as defined in other tables are included but not presented to save space. Figures in parentheses are standard errors.
*** Significant at the 1% level.
** Significant at the 5% level.
* Significant at the 10% level.

growth in high-income economies is so complicated that an exact conclusion cannot be attained. One possible explanation is that institutional development in these countries has been sound and thus factors beyond institutional aspects complicate the influence on the growth effect of insurance. The observations with respect to the non-high-income group demonstrate that the influence of political environments is more explicit as compared to that of economic and legal ones, which is not so significant. As institutional development usually evolves following the progress of economic development, it is possible that the influence of economic development level on the growth effect of insurance still outweighs that of economic as well as legal circumstances and thus the relevance of such institutional dimensions does not emerge yet.

5.4. Influence of insurance sector-specific institutional factors

The aforementioned analyses examine the effect on the relationship between insurance and economic growth of common institutional factors that exert widespread influences on all divisions within the economy. There are, however, some institutional factors that are specific or more relevant to the development of the insurance sector. For instance, social welfare or social security mechanism provided by the state will affect individual demand for life insurance. We assess as well if this aspects are relevant to the association between insurance and economic growth. For life insurance, the social security system that can be quantitatively evaluated is health expenditure by the government. We measure the social security by means of public health expenditure scaled by GDP taken from World Development Indicators.

The results reported in Table 5 show that the development of life insurance is significantly and negatively correlated with economic growth when public health expenditure is above the threshold value but is insignificant when below. This suggests that the relation between life insurance and economic growth is negative in an economy with a relatively healthier social security system. However, it is hasty to jump into the assertion that a substitution effect exists between social welfare and private insurance such that the advancement of social security system will exert an adverse influence of private life insurance development on economic growth. Indeed, private life insurance complements the social security system from the perspective of coverage hierarchy. As such, a negative link of life insurance with economic growth in an economy with higher public health expenditure needs more investigation to pinpoint the reasons behind.

6. Further discussions and implications

On the basis of our findings, there are several consideration that have implication for the effect of insurance development on growth. Our results show that in general no significant association exists between life insurance and economic growth in a relatively sounder institutional environment. One possible explanation is regarding to the relative importance to growth of these different economic sectors. As such, when institutional environments are sound so that all divisions within the economy could function well, the contribution of the insurance sector may not be so significant. Another possible reason is related to country's development level. Countries with better institutional features are usually economically more developed countries in which the development of the insurance market is relatively mature and is therefore not in a growth phase. This may also make the effect of insurance on economic growth not so obvious.

Most importantly, on the other hand, our results show that an unsound institutional environment hinders the growth effect of life insurance. This could be explained from the perspective on the functions of risk transfer and indemnification and of financial intermediation. From the former aspect, the effect of institutions on the functions of risk transfer and indemnification could be figured out from the perspective of the insured. Beck and Webb (2003) note that political instability affects the economic horizon of potential buyers and suppliers of life insurance products and thus may discourage the development of a healthy life insurance market. Whether political and economic environments are stable will thus affect an individual's inclination or decision on the purchase of insurance.

From the latter aspect, the function of the financial intermediation of life insurance is related to insurance firms. A life insurance policy is a long-term contractual relationship between the insurer and the insured. Long-run investment performance is of great importance for life

Table 5
Dynamic threshold effect of insurance sector-specific institutional proxies on the insurance-growth relation.

	Social security
Threshold estimates	
$\hat{\gamma}$	6.005
C. I.	[4.728, 6.354]
Impact of insurance development	
$\hat{\beta}_1$	−0.200 (0.132)
Obs.	448
$\hat{\beta}_2$	−0.270** (0.118)
Obs.	176
Control variables	
L.GROWTH	−0.185** (0.076)
TRADE	0.007 (0.010)
GOVEXP	−0.365*** (0.104)
INF	−0.086** (0.034)
BARTER	−0.003 (0.017)
CREDIT	−0.028*** (0.006)
$\hat{\delta}_1$	0.018** (0.007)

Notes: Dependent variable is real per capita GDP growth. Social security is measured by public health expenditure of the government scaled by GDP. $\hat{\gamma}$ is the estimated threshold value. C.I. is 95% confidence interval corresponding to the estimated threshold value. L.GROWTH is lagged real per capita GDP growth. TRADE is the ratio of the sum of exports and imports over GDP. GOVEXP is the ratio of government consumption to GDP. INF is the inflation rate. BARTER is the growth of the terms of trade ratio. CREDIT is the ratio of the domestic credit to private sector to GDP. Figures in parentheses are standard errors.
*** Significant at the 1% level.
** Significant at the 5% level.

insurers to not default on claims payable. The investment performance is associated with factors related to institutions, such as political stability, economic risk, or the protection of property rights. Wen and Zhang (1993) show that an individual's long-term investment behavior is distorted when property rights cannot be assured. Institutional factors are thus related to insurers' investment behavior, which in turn correlates with their financial intermediation functions.

In addition, from the government's perspective, improving institutional environments is undoubtedly one of its major missions for a country's development. This is relevant to almost all aspects within the economic system, not just for the insurance sector. As stated in the literature review section, studies document a positive impact of institutions on insurance development. Our findings suggest that government actions at improving institutional environments are relevant to the impact of life insurance on economic growth, even though the influence may be just passive.

In summary, our study contributes to the international insurance economics. Extant studies on the supply-leading view of the insurance-growth nexus usually focus on if insurance contributes to economic growth or what their actual relationship is, i.e., the causal relation between them. Our observation further suggests that institutional factors are an important determinant on their association - that is, institutions shape the insurance-growth relation. If the growth effect of life insurance varies between different countries, then the difference in their institutional environments could be a possible explanation.

7. Conclusion

The purpose of this study is to investigate the role of institutional environments on the insurance-growth relationship. There is a considerable literature looking at the influence of insurance development on economic growth and the direct impact of institutions on insurance market activities and economic growth. In line with these studies, scholars usually pay little attention to or even barely think of whether institutions only play an intermediate role of economic growth. How institutional environments shape the relation between insurance development and economic growth still awaits an investigation. This paper thus examines such links by applying the newest dynamic panel threshold model that allows us to perform a deeper analysis.

We utilize multiple proxies related to generally institutional environments in the political, economic, and legal aspects in an attempt to obtain a comprehensive understanding on this issue. The measures used include the democratization degree, political rights, economic risk, economic freedom, rule of law and legal structure and security of property rights. Our overall findings suggest that generally institutional development shapes the relation between life insurance market activities and economic growth. The policy implications emerge from these results are also novel regarding the previous literature. The discovery of an institutional quality threshold suggests that policymakers and authorities should pay particular attention to consider the level of institutions when exploring possible benefits from financial development.

In addition, several detailed discussion are noteworthy. Unlike the traditional perspective about the growth effect of financial development, the evidence reveals that the relation between life insurance and economic growth is negative in a relatively unhealthy environment. It adds one more dimension of explanation to the current literature concerning nonlinearity in the link between financial development and economic growth and supports the novel view of “too much finance” hypothesis. For countries with an unsound institutional environment, policymakers could focus less on increasing the size of the insurance sector and more on improving the sector's function.

On the other hand, the effect of insurance development on economic growth kicks in after institutions reach a certain threshold. The aforementioned significantly negative effect becomes insignificant, when the financial system is embedded within a sound institutional framework. It might be because that the information asymmetries, and risk-taking behaviors are largely reduced in a relatively sounder institutional environment. In terms of policy implications, policy makers should improve the level of institutional quality to more apt to function well and seek to strengthen the appropriate quality of finance rather than expanding the financial sector. The researchers concluded that “better finance” has much wider application than “more finance”. Our findings somewhat complement this observation from an alternative perspective.

Appendix A. Variables' definition and data sources

Variable	Definition	Sources
GROWTH	GDP per capita growth, Log difference of real GDP per capita (in 2005 PPP-adjusted US$)	Authors' calculation using World Development Indicators (WDI, 2001; The World Bank)
LIP	Life insurance premium volume as a share of GDP	Insurance premiums data (in US dollars) are from Sigma (Swiss Reinsurance Company, various years). GDP data are from WDI.
TRADE	Ratio of exports and imports (in 2000 US$) to GDP (in 2000 US$)	Authors' calculation using WDI
GOVEXP	Ratio of government consumption (in 2000 US$) to GDP (in 2000 US$)	Authors' calculation using WDI
INF	Annual percentage change of the consumer price index	WDI (2001)
BARTER	Log differences of the net barter terms of trade index (2000 = 100)	Authors' calculation using WDI
CREDIT	Ratio of domestic credit to private sector to GDP	WDI (2001)
POLITY	An index measuring polity (autocracy and democracy) ranging from 10 (strongly democratic) to −10 (strongly autocratic)	Polity IV Project (Marshall et al., 2011)

Appendix A (*continued*)

Variable	Definition	Sources
FH_PR	Freedom House political rights index on a one-to-seven scale, with one representing the lowest degree of freedom and seven the highest	Freedom House (2011)
ICRG_ECO	Economic risk rating	The International Country Risk Guide (2009)
EFW_INDEX	The overall index of Economic Freedom of the World	Economic Freedom Dataset (Gwartney et al., 2011)
EFW_LSPR	Legal structure and security of property rights index of Economic Freedom of the World	Economic Freedom Dataset (Gwartney et al., 2011)
WGI_RL	Rule of law	The Worldwide Governance Indicators (Kaufmann et al., 2010)

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