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THE EFFECTS OF STOCK MARKET DEVELOPMENT ON THE DEVELOPMENT OF INVESTMENT – LINKED INSURANCE PRODUCTS IN VIETNAM

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ABSTRACT

Investment-linked insurance products (ILPs) have developed in tandem with the expansion of stock markets worldwide and have become a core offering in the life insurance sector. This study investigates the impact of stock market development on the growth of ILPs in Vietnam, using the ratio of stock market capitalization to GDP as a proxy for stock market development. Employing the Auto-regressive Distributed Lag (ARDL) approach, the analysis is based on annual time-series data spanning the period 2008–2024.

The empirical results indicate a statistically significant and positive effect of stock market development on the expansion of ILPs in Vietnam. This finding highlight the pivotal role of financial market development in shaping the life insurance landscape.

The study contributes to the literature by providing empirical evidence on the interaction between stock market growth and ILPs in an emerging market context. Policy implications are drawn to promote ILP development in close alignment with the progress of Vietnam's capital market, emphasizing the need for regulatory support, investor education, and diversified fund management strategies.

Keyword: Investment-linked insurance products (ILPs), Stock market development, Market capitalization, Life insurance, ARDL model, Vietnam

1. INTRODUCTION

Investment-Linked Insurance Products (ILPs) first emerged in the insurance markets of the United Kingdom and the United States in the 1970s [1]. They became increasingly popular across Europe during the 1980s and 1990s [2] under the name Unit-Linked Insurance Products [3] and in North America under the names Variable Life Insurance or Universal Life Insurance [4]. In Vietnam, the first investment-linked insurance product was introduced in 2006 in the form of a universal life product. A significant milestone occurred in 2008, when the Ministry of Finance issued guidelines allowing life insurers to offer both universal life and unit-linked insurance products. These products provide policyholders with a combination of life protection and investment opportunities linked to the performance of the financial market.

This study is conducted based on the fact that Investment-Linked Insurance Products (ILPs) are reshaping the global life insurance industry, emerging as a flagship product due to their ability to combine risk protection with investment growth. Indeed, In recent years, consumers have increasingly shifted from fixed annuity products to index-linked and unit-linked insurance products [5]; Notably, contracts that integrate life insurance with investment accounted for 40% of new policies, while 65% of life insurers introduced such hybrid products in 2023. Furthermore, 55% of new customers expressed a preference for integrated options that simultaneously provide financial growth and protection [6]. In the Vietnamese market, the life insurance sector has experienced rapid expansion, with ILPs constituting an increasingly significant share of premium revenue, highlighting their strategic importance. This trend is driven by rising consumer demand for comprehensive financial solutions that provide both security and optimized returns, particularly within the context of expanding investment channels, such as the stock

market. Therefore, an in-depth study on the impact of the stock market on the development of ILPs is necessary in the current context.

The stock market is widely recognized as a fundamental channel for mobilizing and allocating medium- and long-term capital within the economy [7, 8], while the investment component of ILPs, tied to the performance of underlying funds, is significantly influenced by stock market fluctuations [9]. Thus, stock market volatility shapes both ILP performance and broader financial decision-making.

To date, most empirical studies have primarily assessed the impact of macroeconomic factors such as GDP [10, 11] and inflation [12, 13] on the life insurance market, while the influence of the stock market on the life insurance sector has not yet been extensively examined. In particular, research addressing the effect of stock market dynamics on the development of investment-linked insurance products remains scarce, largely due to difficulties in data collection. Against this background, the objective of this paper is to provide a systematic assessment of the influence of stock market development on the growth of investment-linked insurance products. To address this objective, three key indicators are selected to capture the development of investment-linked insurance products, namely premium revenue, the number of new policies issued, and the number of in-force policies. Using principal component analysis (PCA), these indicators are consolidated into a composite index that reflects the overall development of investment-linked insurance products in Vietnam during the period 2008–2024. This composite index is then employed within the Auto-regressive distributed lag (ARDL) framework to empirically examine the dynamic relationship between stock market development and the growth of investment-linked insurance products. Among the main findings, I provide strong evidence that the development of the stock market exerts a positive impact on the growth of investment-linked insurance products.

2. THE DEVELOPMENT OF INVESTMENT-LINKED INSURANCE PRODUCTS AND THE STOCK MARKET

Numerous studies have established a linkage between the development of ILPs and stock market dynamics due to several factors: (i) the premium, after deducting associated costs, is allocated to underlying investment funds, which typically comprise equities, bonds, and other financial instruments in the capital market, thereby rendering the performance of ILPs directly contingent on stock market fluctuations. When the stock market exhibits stable growth, the Net Asset Value (NAV) of ILPs tends to increase, yielding attractive returns for investors [14], (ii) The performance of many investment-linked funds has been demonstrated to exhibit a strong correlation with stock market indices [15], (iii) Stock price volatility significantly impacts the capital flows and returns of investment-linked insurance products [16]. However, the influence of stock market dynamics on ILPs is moderated by macroeconomic policies, legal frameworks, regulatory guidelines, financial infrastructure, and enforcement standards, which vary across countries and over time [12].

In Vietnam, investment-linked insurance products are designed on the principle of ensuring a clear separation between the insurance component and the investment component within a single contract. Policyholders are entitled to the full investment returns from the portion of premiums allocated to investment, after the deduction of relevant charges. This design reflects the strong market-oriented nature of investment-linked insurance products, as policyholder benefits depend directly on the performance of the underlying investment assets, while also enhancing transparency and the accountability of insurers in their financial investment activities [17].

However, the impact of the stock market on investment-linked insurance products has not been extensively examined in previous studies. In this context, the primary objective of this paper is to assess the influence of stock market development on the growth of investment-linked insurance products, drawing upon theoretical perspectives on the relationship between life insurance and the stock market in general.

3. LITERATURE REVIEW

The evaluation of the stock market's influence on the development of investment-linked insurance products has not been extensively investigated in the existing literature. In some prior studies, such as Guiyun et al. (2014) employed the Auto-regressive Distributed Lag Model (ARDL) in an empirical study on the relationship between

insurance premiums and macroeconomic variables in China during the period 1980–2012, with the aim of analyzing both the long-term and short-term dynamics. The study was grounded in the notion that insurance contracts are characterized by long premium payment periods and high persistency. The variables selected for analysis included property insurance premiums (P), gross domestic product (GDP), consumer price index (CPI), and fixed asset investment (FAI) [18].

In the study by Bayar et al. (2022), the impact of pension funds and insurance companies on stock market development was examined across 15 emerging market economies over the period 2004–2019, utilizing cointegration and causality tests. The causality analysis indicated that stock market development exerts a significant effect on pension funds and the insurance sector in the short term; however, cointegration tests revealed that pension funds positively contribute to stock market development in Brazil, Chile, Hungary, Mexico, Peru, and South Africa, while the insurance industry demonstrates a positive influence on stock market development in Chile, Indonesia, South Korea, the Philippines, and South Africa in the long term [19].

In the study by Madhavi et al. (2024), the analysis and evaluation of the performance of investment-linked insurance products across nine life insurance companies utilized quantitative data assessed through statistical methods, including mean, standard deviation, coefficient of variation, and t-tests. The results indicated a positive causal relationship between stock market development and the growth of insurance companies, encompassing the life insurance sector. A robust stock market facilitates enhanced expected investment returns for insurance companies, thereby promoting the development of investment-linked insurance products that integrate financial, insurance, and investment components [20].

An empirical study in India reported by Reuters (2025) demonstrates that the boom in the stock market has significantly increased the demand for investment-linked insurance products among life insurers, reflecting a trend in which customers gravitate toward products with higher return potential in a favorable financial market environment [21].

Building upon the above studies, this paper applies the ARDL model to examine the effect of stock market development on the growth of ILPs, using time-series data for Vietnam over the period 2008–2024.

4. METHODOLOGY

Similar to Guiyun et al. (2014), this paper employs the Auto-regressive Distributed Lag model (ARDL). The ARDL framework was first introduced by Charemza and Deadman (1992)[22] as a relatively innovative approach to testing for cointegration. The model was subsequently refined and advanced by Pesaran and Shin (1999)[23], Pesaran (2001)[24], so on. The general form of the model is as follows:

$$Y = \alpha + \sum_{i=1}^{p} \emptyset_i Y_{t-i} + \sum_{j=0}^{q} \beta_j X_{t-j} + \varepsilon_t$$

where:

α is the intercept term, β is the lag length of the dependent variable, ∅ is the lag length of the independent variables, ε is the error term.

To ensure the applicability of the ARDL model, this study conducts unit root tests using the Augmented Dickey-Fuller (ADF) test to determine the stationarity of the variables. The test is performed sequentially for both the dependent and independent variables. If a variable is found to be non-stationary in its level form, the first difference of that variable is taken. If the first difference of a variable is stationary, the variable is concluded to be integrated of order one, denoted as I(1). Next, the optimal lag length is determined using the Vector Autoregression (VAR) procedure. Specifically, a VAR model is estimated, and the optimal lag order is selected based on established information criteria such as the Akaike Information Criterion (AIC), the Schwarz Bayesian Criterion (SC), and the Hannan-Quinn Criterion (HQC). Among these, the AIC is often preferred in empirical research due to its tendency to minimize the risk of model underfitting. The selected lag length is then applied to the ARDL specification to ensure robustness and consistency of the estimation results.

After determining the optimal lag length, the study proceeds with the Granger causality test to examine the causal relationships between the dependent and independent variables. The Granger causality framework evaluates whether

past values of one variable contain useful information for predicting another. This step provides preliminary evidence on the direction of influence among variables before establishing the long-run and short-run dynamics within the ARDL framework.

Subsequently, the Bounds Test for cointegration is employed to verify the existence of a long-run equilibrium relationship among the variables. The test involves comparing the calculated F-statistic against the lower and upper critical bounds. If the F-statistic exceeds the upper bound, cointegration is confirmed; if it falls below the lower bound, no cointegration exists; and if it lies between the two bounds, the result is inconclusive.

Once cointegration is established, the Error Correction Model (ECM) is applied to capture the short-run dynamics while simultaneously maintaining the long-run equilibrium identified in the ARDL framework. The ECM incorporates an error correction term (ECT), which measures the speed of adjustment of the dependent variable towards its long-run equilibrium after a short-run shock. A negative and statistically significant coefficient of the ECT indicates that deviations from the long-run equilibrium are corrected over time, confirming the stability of the system.

Finally, a series of diagnostic tests is conducted to validate the robustness and reliability of the estimated ARDL model. These include the Ramsey RESET test for functional form misspecification, the Jarque-Bera test for normality of residuals, the Breusch-Godfrey LM test for serial correlation and the Breusch-Pagan-Godfrey test for heteroskedasticity. In addition, the stability of the estimated coefficients is assessed through the Cumulative Sum of Recursive Residuals (CUSUM) and Cumulative Sum of Squares (CUSUMSQ) tests. The results of these diagnostic checks ensure the accuracy, consistency, and stability of the ARDL model applied in this study.

5. EMPIRICAL STUDY

5.1. Data

Considering data availability, this study utilizes annual data from 2008 to 2024 in Vietnam to investigate the relationship between stock market development and the development of ILPs. The independent variable is the stock market capitalization-to-GDP ratio (variable: MCR), which reflects the degree of stock market development. The dependent variable is a composite indicator of ILPs development (DEV_ILP), constructed using principal component analysis (PCA) based on three measures: premium income (PREM), the number of new policies (NEW), and the number of in-force policies (INFOR).

Data on the stock market capitalization-to-GDP ratio are obtained from the World Bank Global Financial Development Database, while data on investment-linked insurance products are collected from the Insurance Supervisory Authority of Vietnam.

5.2. Unit Root Test

To ensure the validity of applying the ARDL model, the study conducts a unit root test using the Augmented Dickey-Fuller (ADF) test to determine the stationarity of the variables. This article uses Eviews 11 for unit root test and results are shown in Table 1, indicate that the variable DEV_ILP is stationary at level I(0), while MCR is stationary at first difference I(1). This outcome satisfies the necessary condition for proceeding with the subsequent steps of the ARDL model.

Variables	P-Value (Level)	P-Value (1st Diff.)	Integration
DEV_ILP	0,0006	-	I(0)
MCR	0,2868		I(1)
Δ(MCR)*		0,0012	

Source: Author's calculation using EViews 11

Table 1. Results of the ADF Unit Root Test[1]

5.3. Optimal Lag Length Selection

The results of the optimal lag length selection based on the VAR procedure for the two variables DEV_ILP and MCR are presented in Table 2.

[1] *The null hypothesis of the ADF unit root test is that the series has a unit root. Rejection at the 5% significance level indicates stationarity.*

** Δ(MCR) denotes the first difference of the variable MCR, which is stationary at order one – I(1)*

Lag	LogL	LR	FPE	AIC	SC	HQ
0	-14,16607	NA	0,025870	2,020759	2,117333	2,025705
1	13,55759	45,05096*	0,001345*	-0,944699*	-0,654978*	-0,929863*

Source: Author's calculation using EViews 11

Table 2. Results of Optimal Lag Length Selection

The results of the optimal lag length selection from the VAR model indicate that a lag order of one is the most appropriate, as all lag selection criteria—AIC, SC, and HQ—converge at this lag for the small sample size. This finding suggests that the development of the stock market, measured by the MCR ratio, may influence the development of investment-linked insurance products in the subsequent year, and vice versa.

In the context of a relatively short time series (2008–2024), selecting a lag order of one not only captures the dynamic characteristics of the model but also avoids the loss of degrees of freedom that would arise from including excessive lags.

5.4. Granger Causality Test Results

The results of the Granger causality test presented in Table 3 indicate a unidirectional causal relationship from the stock market (MCR) to the development of investment-linked insurance products (DEV_ILP), reflecting the leading role of the financial market in shaping the development of investment-oriented insurance products in Vietnam during the study period.

Null Hypothesis	Obs	F-Statistic	P-Value
MCR does not Granger-cause DEV_ILP	16	10,2981	0,0068
DEV_ILP does not Granger-cause MCR	16	2,72586	0,1227

Source: Author's calculation using EViews 11

Table 3. Granger Causality Test Results

The Granger causality test, conducted with a lag length of one, reveals that the null hypothesis, stating that MCR does not Granger-cause DEV_ILP, is rejected at the 1% significance level (F-statistic = 10,2981, p-value = 0,0068). This result provides strong evidence of a short-run causal relationship from MCR to DEV_ILP. Conversely, the null hypothesis that DEV_ILP does not Granger-cause MCR cannot be rejected (F-statistic = 2,72586, p-value = 0,1227), indicating no statistically significant causal effect from DEV_ILP to MCR in the short run.

5.5. ARDL model estimating

This study estimates the ARDL (1,1) model, with the estimation results presented in Table 4.

Variable	Coneff.	Std.Error	t-statistic	P-Value
DEV_ILP(-1)	0,5106	0,0851	5,9970	0,0001
MCR	2,6136	0,6970	3,7496	0,0028
MCR(-1)	3,2314	0,8285	3,9002	0,0021
C	-1,8825	0,3607	-5,2189	0,0002

Source: Author's calculation using EViews 11

Table 4. ARDL(1,1) Estimation Results for DEV_ILP

The ARDL(1,1) model demonstrates high statistical significance and strong explanatory power for the variation in the development index of investment-linked insurance products (DEV_ILP). The coefficient of the lagged dependent variable DEV_ILP(-1) is 0,5106 and statistically significant at the 1% level (p = 0,0001), indicating an autoregressive characteristic of the DEV_ILP index, whereby its current value is influenced by its past value.

Both independent variables, MCR and MCR(-1), have positive coefficients (2,6136 and 3,2314, respectively) and are highly significant at the 1% level (p = 0,0028 and 0,0021). This suggests that

increases in the stock market capitalization-to-GDP ratio (MCR), both contemporaneously and with a lag, exert a significant positive impact on the development of ILPs.

The model exhibits a high goodness of fit, with R^2 = 0,978 and adjusted R^2 = 0,973, indicating that approximately 97,3% of the variation in DEV_ILP is explained by the model. The overall F-statistic is 180,98 (p < 0,01), confirming that the model is statistically significant.

The ARDL estimation and F-Bounds test for long-run relationships show that the F-statistic (18,1073) substantially exceeds all critical value bounds at conventional significance levels. Specifically, at the 5% level, the upper bound critical value I(1) is 6,35 (n = 30). Therefore, the null hypothesis of 'no cointegration' between DEV_ILP and MCR is rejected, confirming the existence of a long-run cointegrating relationship in the model (Table 5).

ARDL(1,1) - Case 3 (Constant)							
F-Statistic and t - Statistic							
Test	**Value**	**Bounds at significance levels**					
		10%		**5%**		**1%**	
		I(0)	**I(1)**	**I(0)**	**I(1)**	**I(0)**	**I(1)**
F-statistic	18,1073	4,29	5,08	5,395	6,35	8,17	9,285
t-statistic	-5,7489	-2,57	-2,91	-2,86	-3,22	-3,45	-3,82

Source: Author's calculation using EViews 11

Table 5. ARDL Estimation and F- and t-test Results

In addition, the t-Bounds test with a t-statistic of –5,7489 also exceeds the 5% upper critical bound (I(1) = –3,22), further strengthening the statistical evidence for a long-run relationship between the two variables.

The estimated long-run equation is specified as:

$DEV\_ILP_t = 11{,}9422 \times MCR_t$

The coefficient of MCR is 11,9422 and highly significant (p < 0,05). This implies that, in the long run, a one-unit increase in the stock market capitalization-to-GDP ratio (MCR) leads to an average increase of approximately 11,9422 units in the development index of investment-linked insurance products (DEV_ILP). This result confirms a long-run and positive relationship between stock market development and the growth of ILPs.

After establishing the long-run cointegrating relationship, the short-run error correction model (ECM) is estimated. The estimation results of the short-run ECM are reported in Table 6.

The short-run error correction model (ECM) **Dependent variable: ΔDEV_ILP – Case 3 (Constant)**				
Variables	**Coeff.**	**Std.Error**	**t-statistic**	**P-Value**
C	**-1,8825**	**0,3387**	**-5,5576**	**0,0001**
ΔMCR	**2,6136**	**0,6435**	**4,0617**	**0,0016**
CointEq(-1)*	**-0,4894**	**0,0781**	**-6,2636**	**0,0000**

Source: Author's calculation using EViews 11

Table 6. ECM Model estimation results of ARDL

5.6. Model Diagnostic Tests

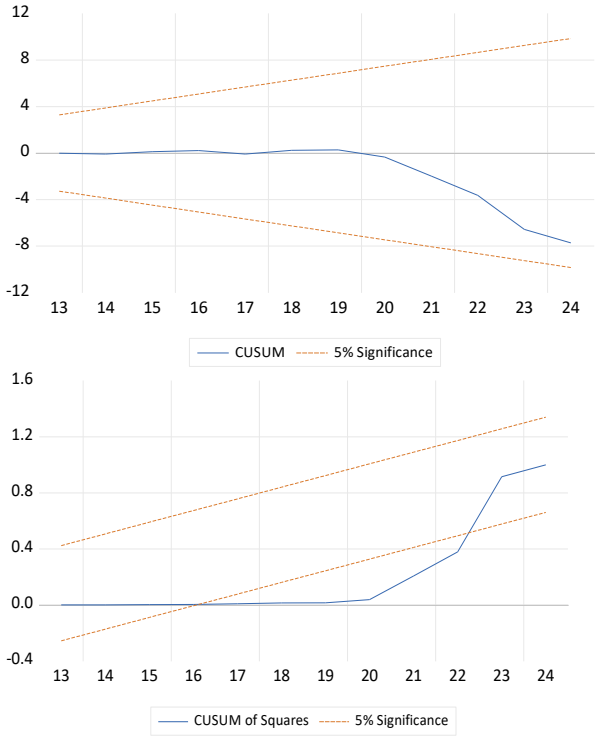
This study evaluates the validity of the research model through several diagnostic tests, including the Ramsey RESET test, the normality test of residuals, the Breusch–Godfrey Serial Correlation LM test, and the heteroskedasticity test. All test statistics yield p-values greater than 0,5, indicating that the research model is well-specified and reliable (Table 7).

Test	Value	P-Value	Conclusion
Ramsey Test	0,1143	0,7417	Model is well-specified
Normality Test		0,9907	Residuals are normally distributed
Breusch-Godfrey Serial Correlation LM Test	2,8866	0,1024	No serial correlation
Heteroskedasticity Test	0,2126	0,8857	

Source: Author's calculation using EViews 11

Table 7. Model Diagnostic Tests

The study employs two stability diagnostics, namely the Cumulative Sum of Recursive Residuals (CUSUM) test and the Cumulative Sum of Squares of Recursive Residuals (CUSUMSQ) test, to examine the stability of the model. These tests are conducted at the 5% significance level, and the CUSUM/CUSUMSQ plots are compared against the confidence bands, as illustrated in Figure 1.



Source: Author's calculation using EViews 11

Figure 1. CUSUM and CUSUMSQ Test Results

The CUSUM test indicates that the CUSUM line remains within the confidence bands, confirming parameter stability and no structural breaks in the dataset. In contrast, the CUSUMSQ test shows deviations beyond the bands during 2017–2022, particularly in 2020, coinciding with the COVID-19 pandemic (VN-Index fell 8,27% in 2020; insurance premiums grew 21%). The instability is also evident in 2021, a period of strong stock market expansion (VN-Index up 35,4%), when the rapid growth of the market and heightened demand for ILPs likely increased the sensitivity of DEV_ILP to MCR, as captured by the CUSUMSQ test.

6. CONCLUSION

This study examines the nexus between stock market development and the growth of investment-linked insurance products (ILPs) in Vietnam from 2008–2024, employing ARDL and Granger causality models. Results confirm a unidirectional short-run causality from MCR to DEV_ILP and a strong long-run cointegrating relationship, where stock market growth significantly promotes ILP development. The model is well-specified based on diagnostic tests, although CUSUMSQ indicates temporary instability during 2020–2021 due to COVID-19 shocks and rapid stock market expansion. These findings emphasize the stock market's leading role in fostering ILPs and highlight the interdependence between financial market dynamics and insurance innovation.

The study contributes empirical evidence for policymakers and insurers in designing strategies that align capital market growth with sustainable insurance development. Future research should broaden the scope by incorporating additional macroeconomic, demographic, and behavioral variables to provide a more comprehensive understanding of ILP development.

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