The Dynamics of Life-Insurance Penetration in ASEAN Countries

Debrina Vita Ferezagia

Abstract— This study aims to examine the penetration of life insurance against inflation risk in ASEAN within the period 1990-2016. The data used is panel data with Generalized Estimating Equation (GEE) method. This study analyses the effect of inflation and time on insurance penetration. Insurance penetration in ASEAN countries is relatively small, except Singapore (5.64%). The results of the analysis show that the countries in the ASEAN Region are divided into 4 groups, namely the penetration of the insurance which is affected by inflation and time (group 1), time (group 2), inflation (group 3) and not influenced by inflation/time (group 4). Countries included in group 1: Brunei Darussalam, Philippines, and Thailand, group 2: Myanmar and Indonesia, group 3: Laos and Singapore, group 4: Cambodia, Vietnam, and Malaysia. Influence of inflation does not always have a negative effect on insurance penetration, and the influence of time does not always have a positive effect on insurance penetration. Therefore, collaborative efforts should be made to encourage insurance activities in ASEAN, both by the government and business actors to increase insurance penetration.

Index Term— Insurance penetration, generalized estimating equation, inflation

I. INTRODUCTION

Insurance contributes to the economy of a country in many ways, either directly or indirectly. Therefore, insurers like other financial institutions have grown significantly in sustainable economic growth (Holboer, 1999). However, the discussion of the role of insurance in economic growth is less thoroughly studied than the role of banks and the stock market. The importance of the insurance-economic growth relationship has been recognized in various studies (Beck and Webb, 2003; Guochen and Wei, 2012; Lee et al., 2013).

Research conducted by Boon (2005) and Han et al (2010) concluded that the insurance sector contributes to economic development in the form of “supply-leading”. The importance of insurance for economic development is also reflected in the growth of insurance premiums, in relation to GDP (Wong Hong, 2016). The result of economic growth in this insurance, called insurance penetration (Beck and Webb, 2003; Catalan et al., 2000). Insurance penetration is the percentage between insurance premium and GDP.

In general, inflation is measured as a percentage change in the overall price level as measured by price indices such as the consumer price index (CPI). Insurance companies are likely to be exposed to specific components of the CPI. Research conducted by Ahlgirm and D’Arcy (2012) is to see the impact of medical inflation on some changes in medical prices to the life insurance industry. Masterson (1968) also measures the impact of inflation on insurance companies by isolating the CPI components associated with the insurance business. In addition, Morrow and Conrad (2010) identified economic indicators that were able to measure inflation primarily on claims costs.

Previous studies conducted research with the tendency to study causality as well as certain coverage. Thus, our challenge here is to model insurance penetration under inflation and time risks. Scope under study using panel data involving many countries over time. In this study, applied to ASEAN countries.

II. LITERATURE REVIEW

Insurance contributes to economic growth through an insurance function that acts as an intermediary and also provides support to other financial partners such as banks and the stock market.

To understand the role of financial institutions-including insurance companies in the financial system and their contribution to economic growth, a commonly used approach is the functional approach of the financial system.

Merton & Bodie (1995) formulated this approach in 6 (six) main functions of the financial system, namely: (i) providing means for clearing and settling payments, in facilitating the exchange of goods, services and assets; (ii) providing a pooling / pooling-fund mechanism to run large-scale, segregated enterprises; (iii) provide a means of transferring economic resources between time, geographic area and industry; (iv) provide the means to manage risk (uncertainty and risk control); (v) provide information to help coordinate retrieval decentralized decisions in various economic sectors; and (vi) provide the means to deal with asymmetric information problems and incentives created when one party for financial transactions has information where the other party does not, or decision-making when one party acts as an agent for another.

ASEAN has ten member states, namely Brunei Darussalam, Cambodia, Indonesia, Laos, Malaysia, Myanmar (Burma), Philippines, Singapore, Thailand and Vietnam with total population over 600 million people. ASEAN has experienced rapid economic development, with total income levels approaching USD 2.4 trillion (Lim, 2014). Further integration of the new economy and the implementation of the ASEAN Free Trade Agreement (FTA) is expected to increase state revenues and trade (Plummer and Chia, 2009).

Skipper (1997) outlines the ways in which insurance companies act as intermediaries in promoting economic growth: (1) promoting financial stability; (2) facilitating trade and commerce; (3) mobilizing domestic savings; (4) allows
different risks to be managed more efficiently, thus encouraging the accumulation of new capital; (5) encouraging more efficient allocation of domestic capital, and (6) helping to reduce losses. Therefore, financial stability is important for the continuation of economic growth. Insurance offers protection to consumers, households, and companies from unexpected losses, resulting in more stable financial condition.

Insurance can help generate sufficient funds for state investment as an expansion of business investment, thereby contributing to economic growth. Insurance allows various risks to be managed more efficiently. With low-risk exposures, household and business financial conditions will be stronger. Insurance companies can be institutional investors in financial markets such as investing in the stock market. Haiss and Siimegi (2008) argue that insurance has a major role in economic growth as a function of the financial sector. This means that the insurance industry can promote long-term domestic savings through life insurance products. Zou and Adams (2006), conducted a recent study highlighting the relevance of insurance in promoting economic growth using overall premium income in the insurance industry as well as for various types of insurance products.

Pirvu and Zhang (2012) analyzed the impact of each of the stochastic market price of financial risk and inflation uncertainty on life insurance demand. This study is related to the literature on utility maximization of life insurance issues with inflation risk. Inflation risks affect financial decisions significantly for long-term financial planning. In the world of monetary economics, the risk of inflation is the most important economic risk faced by consumers and investors. Kwak and Lim (2014) also analyzed the effect of inflation risk on life insurance demand.

Avram et al. (2010) examine the insurance sector among 93 countries. This study uses density (insurance density) and penetration (insurance penetration) to represent the development of the insurance sector. Using the OLS and GMM methods, the results show that the relationship between insurance density and economic development represents a leading supplier, whereas insurance penetration does not show such relationship. Research Chen et al. (2012), which applies the GMM estimation model to 60 countries, shows that the development of the life insurance market has a strong effect on economic growth and the life insurance market is a substitution rather than complementary for the stock market.

### III. RESEARCH METHODS

Data on the modeling of this study for the years 1990-2016 in 10 countries ASEAN, namely Brunei Darussalam, Cambodia, Indonesia, Laos, Malaysia, Myanmar (Burma), Philippines, Singapore, Thailand, and Vietnam. Data obtained from Federal Reserve Bank Of St.Louis (FRED), Economic Data. The variable indicator used in table 1.

<table>
<thead>
<tr>
<th>Table 1.1</th>
<th>List of variables. Source: Author</th>
</tr>
</thead>
<tbody>
<tr>
<td>Variable/</td>
<td>descriptions</td>
</tr>
<tr>
<td>Life insurance penetration</td>
<td>LIP</td>
</tr>
<tr>
<td>[Direct domestic life premiums as % of gross domestic product]</td>
<td></td>
</tr>
<tr>
<td>Inflation</td>
<td>I</td>
</tr>
<tr>
<td>Time</td>
<td>T</td>
</tr>
</tbody>
</table>

In this research use descriptive analysis approach and approach model of Generalized Estimation Equation. Descriptive analysis, by making a plot diagram for insurance penetration. It aims to see the trend pattern of insurance penetration in ASEAN countries.

GEE approach to the model \( y_{it} = X_{it}\beta + v_{it} \) uses quasi-score likelihood to predict parameter \( \beta \). Quasi-score likelihood equation can be written as follows: \( U = \sum_{i=1}^{N} D_i T V_i^{-1}(y_i - E[y]) \) where \( D_i = \partial E[y]/\partial \beta \) and \( V_i = A_i^{-1/2} R_i A_i^{-1/2} \) \( A_i \) is a diagonal matrix with var\((y_{it})\) element, \( R_i \) is working correlation matrix for \( y_i \), and \( \emptyset \) is a constant (Dobson, 2002).

There are various structures of working correlation matrix in modeling GEE. The following table is some common structure of working correlation matrix (Horton and Lipsitz, 1999).

<table>
<thead>
<tr>
<th>Table 2.1</th>
<th>Working correlation matrix. Source: Horton and Lipsitz, 1999</th>
</tr>
</thead>
<tbody>
<tr>
<td>Structural</td>
<td>example</td>
</tr>
</tbody>
</table>
| Independence | \[
\begin{bmatrix}
1 & 0 & \ldots & 0 \\
0 & 1 & \ldots & 0 \\
\vdots & \vdots & \ddots & \vdots \\
0 & 0 & \ldots & 1 \\
\end{bmatrix}
\] | There is no correlation between repeated observations |
| Exchangeable | \[
\begin{bmatrix}
1 & \rho & \ldots & \rho \\
\rho & 1 & \ldots & \rho \\
\vdots & \vdots & \ddots & \vdots \\
\rho & \rho & \ldots & 1 \\
\end{bmatrix}
\] | The correlation between repeated observations is the same |
| Unstructured | \[
\begin{bmatrix}
1 & \rho_{12} & \ldots & \rho_{1n} \\
\rho_{21} & 1 & \ldots & \rho_{2n} \\
\vdots & \vdots & \ddots & \vdots \\
\rho_{n1} & \rho_{n2} & \ldots & 1 \\
\end{bmatrix}
\] | The correlation varies in each group of observations |
| Autoregressive | \[
\begin{bmatrix}
1 & \rho & \rho^2 & \ldots & \rho^{n-1} \\
\rho & 1 & \rho & \ldots & \rho^{n-2} \\
\vdots & \vdots & \vdots & \ddots & \vdots \\
\rho^{n-1} & \rho^{n-2} & \ldots & \rho & 1 \\
\end{bmatrix}
\] | Correlation is a function of time between observations. |
IV. RESULT AND DISCUSSION

Indicators have an important role in the financial services industry as an intermediary function of the economy, for the insurance sector using the ratio of the amount of premium to GDP (insurance penetration). The ASEAN region has different stages in the development of the insurance industry. Penetration of life insurance can also be used as an indicator of public interest in life insurance. Based on Figure 4.1, ASEAN countries can be grouped into 3 groups of countries with high, medium and low penetration. Thailand, Malaysia, and Singapore are countries with the percentage of life insurance penetration > 1%. While the country with medium penetration of Brunei Darussalam, Vietnam, Indonesia and the Philippines. Low life insurance penetration is available in Myanmar and Laos countries. The low indicator of this insurance, considering access to finance as a 'pool of funds' for the wider community to develop business, investment, education, employment opportunities to enjoy the old days less for countries with low penetration.

Hui-Shan Lee at all (2018) examines economic development in ASEAN countries. The ASEAN region has had rapid economic development and reforms in the financial sector over the past two decades. However, this has not been able to increase the penetration of life insurance, except in Singapore, Malaysia, and Thailand. One of the causes is life insurance with unit link insurance scheme is still rarely available in ASEAN (Kwon, 2002). Life insurance in the ASEAN region tends to market conventional life insurance products. In fact, life insurance combined with investment into a trend that can be developed as in developed countries. The development of this limited insurance industry, also to economic activities of a country in the future.

![Fig. 4.1. Average penetration of insurance in ASEAN countries. Source: Author Analysis](image)

Table 4.1 shows that 7 out of 10 countries in the ASEAN region have a positive change in interest in Life insurance. Insurance penetration (%) in the last 26 years from 1990 to 2016 shows that life insurance consumption is increasing for the seven ASEAN countries. Cambodia, Vietnam, Thailand, and Indonesia have an insignificantly increased insurance penetration rate of up to 50%. Phenomena that need to be studied more deeply occurred in the countries of Myanmar, Laos and Brunei Darussalam. Public confidence in insurance does not increase, even for Brunei Darussalam decreased by 24%. According to Hui-Shan Lee at all (2018) the underdevelopment of the life insurance industry in ASEAN is also caused by economic factors, demographics and lack of secondary or tertiary litigation of insurance benefits. This literacy is important to determine the demand for life insurance in various segments and needs. Countries with high insurance penetration such as Singapore, Malaysia did not experience significant changes. The development of life insurance in these countries is quite stable. Changes within 2 decades have not been able to significantly alter Life Insurance consumption behavior in most ASEAN countries. However, Singapore's insurance penetration rate is the highest among other ASEAN countries. Singapore is a country where the majority of people in ASEAN already know the benefits of insurance well, making it difficult for the country to reinvigorate significant insurance penetration.

Opportunities for the insurance industry can be felt by countries like Cambodia, Thailand, and Indonesia. People in the country began to change the old insurance paradigm into one of the consumption to invest. Insurance penetration in these countries is still low, but there has been a significant increment in the last 26 years. The market segment of this countries are wide open to investors at the insurance industry.

<table>
<thead>
<tr>
<th>Countries</th>
<th>1990</th>
<th>2016</th>
<th>% change</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cambodia</td>
<td>0.02</td>
<td>0.05</td>
<td>60%</td>
</tr>
<tr>
<td>Myanmar</td>
<td>0.01</td>
<td>0.01</td>
<td>0%</td>
</tr>
<tr>
<td>Laos</td>
<td>0.01</td>
<td>0.01</td>
<td>0%</td>
</tr>
<tr>
<td>Vietnam</td>
<td>0.12</td>
<td>0.69</td>
<td>83%</td>
</tr>
<tr>
<td>Brunei Darussalam</td>
<td>0.42</td>
<td>0.34</td>
<td>-24%</td>
</tr>
<tr>
<td>Singapore</td>
<td>4.45</td>
<td>5.25</td>
<td>15%</td>
</tr>
<tr>
<td>Philippines</td>
<td>0.67</td>
<td>1.22</td>
<td>45%</td>
</tr>
<tr>
<td>Thailand</td>
<td>1.35</td>
<td>3.75</td>
<td>64%</td>
</tr>
<tr>
<td>Malaysia</td>
<td>2.28</td>
<td>2.82</td>
<td>19%</td>
</tr>
<tr>
<td>Indonesia</td>
<td>0.46</td>
<td>0.96</td>
<td>52%</td>
</tr>
</tbody>
</table>

Penetration of life insurance in ASEAN countries is inseparable from the role of that country in encouraging the growth of the insurance industry. A country's macroeconomic indicators also need to be assessed to see the effect on insurance penetration. Therefore, what needs to be studied is the influence of inflation rate with time to life insurance premium. The inflation rate does not always have a negative effect but also has a positive effect on the penetration of insurance in a country. Inflation has a positive effect to encourage investors to invest in the insurance industry, especially at the explicit threshold of the expected inflation rate.

Table 4.2 shows the change in the inflation rate in the last 26 years in ASEAN countries. Based on the analysis of
inflation change can be concluded that not all countries in ASEAN have decreased inflation rate. Countries that managed to reduce inflation are Cambodia, Myanmar, Laos, Vietnam, Brunei Darussalam, Philippines, and Indonesia. However, increment of the inflation rate is experienced by countries that have good economic growth like Singapore, Thailand, and Malaysia.

<table>
<thead>
<tr>
<th>Countries</th>
<th>1990</th>
<th>2016</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cambodia</td>
<td>4.01</td>
<td>3.9</td>
</tr>
<tr>
<td>Myanmar</td>
<td>18.40</td>
<td>5.5</td>
</tr>
<tr>
<td>Laos</td>
<td>125.27</td>
<td>4.1</td>
</tr>
<tr>
<td>Vietnam</td>
<td>4.12</td>
<td>4.1</td>
</tr>
<tr>
<td>Brunei Darussalam</td>
<td>-0.42</td>
<td>-0.2</td>
</tr>
<tr>
<td>Singapore</td>
<td>0.2</td>
<td>1.0</td>
</tr>
<tr>
<td>Philippines</td>
<td>5.94</td>
<td>4.1</td>
</tr>
<tr>
<td>Thailand</td>
<td>0.28</td>
<td>1.9</td>
</tr>
<tr>
<td>Malaysia</td>
<td>2.74</td>
<td>3.2</td>
</tr>
<tr>
<td>Indonesia</td>
<td>20.49</td>
<td>6.4</td>
</tr>
</tbody>
</table>

Table 4.2 is the estimation of the effect of time and inflation on insurance penetration. There are 4 groups of countries differentiated according to GEE estimation results.

- Group 1: insurance penetration is significantly affected by time and inflation.
- Group 2: insurance penetration is affected by time.
- Group 3: insurance penetration is affected by inflation.
- Group 4: insurance penetration is not influenced by time and inflation.

Countries included in group 1: Brunei Darussalam, Philippines, and Thailand, group 2: Myanmar and Indonesia, group 3: Laos and Singapore, group 4: Cambodia, Vietnam, and Malaysia.

Based on the GEE model (Table 4.3), one of our findings is that the effect of inflation on insurance penetration is not always negative, as well as the effect of time is not always positive. Group 1, the country of insurance penetration is significantly influenced by inflation and time. The magnitude of the effect of inflation on insurance penetration in Brunei Darussalam, Philippines and Thailand respectively -0.866; -0.057; -0.508. The coefficient of the negative value indicates the opposite relationship, in other words, if the rate of inflation increases then the penetration of insurance will decrease. The amount of time influence for Brunei Darussalam (-0.019), Philippines (0.029) and Thailand (0.139). In the Philippines and Thailand, insurance penetration is significantly and positively influenced by time, in other words, the increasing year of insurance penetration of both countries will increase. The thing that needs to be studied is in Brunei Darussalam state, the time of significant and negative effect on the insurance penetration of -0.196.

### Table 4.3

| Variabel   | Estimate | Wald | Pr(>|W|) |
|------------|----------|------|---------|
| Cambodia   | -8.72e-4 | 1.761| 0.1845  |
| Myanmar    | -6.84e-1 | 0.24 | 0.621   |
| Laos       | 3.37e-04 | 2.49 | 0.115   |
| Vietnam    | 6.96e-03 | 0.22 | 0.6372  |
| Brunei Darussalam | -1.96e-5 | 0.02 | 0.951   |
| Singapore  | 3.64e-02 | 1.2  | 0.29    |
| Philippines| 2.93e-02 | 2.91 | 0.0068  |
| Thailand   | 1.39e-01 | 43.13| 0.0000441 |
| Malaysia   | 2.57e-03 | 0.03 | 0.87    |
| Indonesia  | 3.64e-02 | 19.2 | 0.05    |

Signif. codes: 0 ‘***’ 0.001 ‘**’ 0.01 ‘*’ 0.05 ‘.’ 1

In other words, the level of insurance penetration will decrease from year to year, one of the contributing factors is the insurance regulation in Brunei Darussalam. Insurance penetration is significantly influenced by time from year to year in Group 2 countries. In Indonesia, insurance penetration is significantly affected only by time of 0.00364, in other words from year to year penetration of insurance will increase. This is different from Myanmar country, the time has the significant and negative effect, this need to be studied more deeply. Penetration of Myanmar’s insurance has decreased from year to year by 0.000648. Group 3, inflation significantly affected the growth of insurance penetration, Laos, and Singapore. Inflation in both countries negatively affects insurance penetration, in other words, if inflation rises then the insurance penetration rate will decrease by -0.0114 for Singapore and -0.0000441 for
Laos. Group 4, insurance penetration is not influenced by inflation and time variables but is influenced by other variables not listed in this research model.

V. CONCLUSIONS

Previous research on insurance penetration relationship with inflation tends to focus on the correlation between variables. Several other studies consider the relationship of causality to narrow scope. Our study uses panel data in ASEAN region with a long period of 1990-2016. Using the GEE data panel method, we found many conclusions. The findings obtained from our research are that insurance penetration in ASEAN countries is grouped into 4 groups. Insurance penetration can be influenced by inflation and time (group 1), time (group 2), inflation (group 3) and not inflation/time (group 4). Influence of inflation does not always have a negative effect on insurance penetration, and the influence of time does not always have a positive effect on insurance penetration.

This study provides important policy implications for developing countries, especially in ASEAN. International trade is an inter- international economic interaction that is common today. Through international trade, a nation can allocate resources optimally to produce superior products and export them, and meat consumption by importing goods and services that can not be produced efficiently.

One of the international cooperation in the field of services in ASEAN is the Framework Agreement on Services (AFAS). This cooperation is aimed at improving market access for services, including financial services, to stimulate the efficiency and competitiveness of services in ASEAN. In addition, the ASEAN region also supports the realization of the ASEAN Economic Community (MEA). Stimulation of sustained insurance penetration growth between countries requires the development of a dynamic insurance industry. A dynamic and competitive insurance sector can enable the economy as an alternative source of investment, strengthen market development and support the government in providing pension benefits to employee insurance. Basically, the insurance sector in ASEAN countries should sort out the risks associated with decreasing insurance penetration in the country. This is considering the many benefits gained related to the growth of the insurance industry.

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REFERENCES


