# Business Cycles and Earnings Persistence: Evidence from the ASEAN-5 Countries

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## ABSTRACT

A business cycle is a type of volatility found in aggregate economic activity representing the presence of macro-financial risks. In the literature, it is held that the business cycle and firm performance are unequivocally interconnected, but they do not always have shared connections. For the most part, these cycles comprise two periods: an expansionary stage and a recessionary, or contractionary, stage. In this study, we analyse the effect of business cycles on firms' earnings persistence. In contrast to existing studies, in terms of identifying cycles (i.e. periods of expansion and contraction), our approach relies on results from the Markov-switching model, with the application of ASEAN-5 data (from Indonesia, Malaysia, Singapore, Thailand and the Philippines). The results show that in an expansionary regime, earnings persistence is higher than during a period of contraction. They also support the notion that business cycles have a significant effect on earnings persistence, as explained by the relevant theory.

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**Keywords:** Business Cycles; Earnings Persistence; Regime Switching

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# INTRODUCTION

Over the last few decades, we have seen that countries experiencing economic and financial crises are generally characterised by deteriorating macroeconomic performance (low economic growth, high inflation, fluctuating exchange rates, unstable asset prices, high interest rates, high unemployment). Conversely, when the economy of a country experiences recovery after a crisis, its macroeconomic indicators improve. Economic growth and credit gradually tend to move together (procyclicality), with a stable exchange rate (i.e. not volatile) and low credit risk (as measured by non-performing loans/NPLs). Although the gaps between periods of crisis and expansion, and the speed of recovery, differ, the pattern of movement is similar to that of a cycle. In the economic literature, this pattern is known as the 'business cycle'.

Real Business Cycles (RBCs) refer to the fluctuations seen in aggregate economic activity both during a recession and during expansion and are a reflection of the existence of macroeconomic risk. Business cycles typically consist of an expansionary phase and a recessionary, or contractionary, phase. Kydland and Prescott (1982) explain that fluctuations in the output of an economy (business cycles) are caused by the dynamics of factors of production (labour, capital) and other factors such as technology and government budgets (Kiyotaki, 2011; Romer, 2012). According to this view, when an economy experiences a positive shock to productivity, then the marginal product of labour will increase. The subsequent increase in productivity drives real wages, and labour supply also increases. This combination of increasing wages and labour supply will ultimately drive increased output. However, productivity increases are temporary (Kydland and Prescott, 1991). Economic growth in subsequent periods will be lower than the growth in the current period. Income and consumption growth will not have increased as much as economic growth during this time. Such circumstances encourage increased investment activity and capital stock during certain periods. This process will then create new stages of development. The opposite also applies when an economy undergoes a contractionary phase.

At the corporate (micro) level, although the business cycle stage is not always in line with company performance, the literature affirms that macroeconomic and financial environments are very close to each other. It has been argued that fundamentally, financial markets allocate resources and risks efficiently to achieve an accumulation of wealth in each entity or company. If this applies to all entities as a whole, then on aggregate the economy will grow and expand. One way of looking at the simple link between the macro and financial is to look at the relationship between interest rates and output in an economy, as described in the standard textbook of IS-LM analysis (Mishkin, 2009; Mishkin, 2012). In this analysis, it is explained that a change in interest rates leads to a change in the cost of investment funds. This change in cost will subsequently affect income from investment schemes. Thus the link between the real sector and the financial market can be illustrated through risk and return in investment activity.

In empirical research, most studies focus on identifying the effect of global shocks on firm performance (i.e. firms' profits or stock returns). Others use a set of dummy variables as measures of the financial crisis to evaluate whether a crisis has had a significant impact on firm performance (Claessens et al., 2000; Johnson, 1999; Shivakumar, 2007; Cohen and Zarowin, 2007; Li et al., 2013; Park and Shin, 2015). In Johnson's (1999) study, a pooled time series, cross-sectional regression model is estimated to represent the relationship between actual quarterly earnings per share ($q_t$) and actual quarterly earnings per share lagged four quarters ($q_{t-4}$), and indicator variables that allow the regression intercept and slope coefficient to vary across the four stages of the business cycle. The results of the study indicate that earnings persistence was higher during periods of expansion (when there were many opportunities to invest) than during recessionary periods (when there were more limited opportunities). Investment opportunities were abundant and more efficient during periods of expansion as purchasing power was high, while storage costs and inventory damage were relatively low because of high inventory turnover. Hence, earnings persistence in the period of expansion was higher than during that of the recession. The approach used a set of dummies as measures of the expansion, recession or contraction and reliquification periods in the business cycles. This approach has also been followed by other researchers such as Cohen and Zarowin (2007) in the US; Li et al. (2013) in China; and Park and Shin (2015) in Korea. From a methodological point of view, however, the technique employed by Johnson (1999); Cohen and Zarowin (2007);

Li et al. (2013); and Park and Shin (2015) has been the subject of criticism, since the identification of turning points has been exogenously treated.

Recent methodological development literature on this issue has asserted that the growth rate of real Gross Domestic Product (GDP) should be interpreted as a stochastic business cycle model. In Markov-switching autoregressive processes (MS model), contraction and expansion are modelled as regime switching of the stochastic process of generating the growth rate of real GDP. The regimes are associated with different conditional distributions of this growth rate, where, for example, the mean is positive in the first regime (expansion) and negative in the second (contraction or recession).

Our approach extends the framework adopted by Johnson (1999), Cohen and Zarowin (2007), Li et al. (2013) and Park and Shin (2015) in order to recognise the stochastic process of the regimes. Our contribution can be detailed as follows. First, we analyse the impact of economic conditions on corporate earnings persistence in the ASEAN-5 countries. This research is important because the high level of competition requires companies to be sensitive to the changes that occur in macroeconomic conditions in order for them to anticipate environmental uncertainty. The ASEAN-5 countries were chosen because economic integration in the region has increased. Accordingly, we were able to obtain empirical evidence of the earnings persistence behaviour of developed and developing countries. This information is important for investors to assess company performance in ASEAN countries so that they can place their funds wisely. For companies, the information is also important for them to assess their performance when economic conditions fluctuate and can be used as a basis for the formation of policies, especially financial ones. As for the respective governments, the information could be used as a reference for economic policymaking that supports improvements in both the macro and micro sectors.

Secondly, our approach uses ASEAN-5 data. The number of regimes capturing business cycles relies on results from the MS model. The period of expansion and contraction is determined by the results of the regime-switching method, which then analyses the behaviour of company earnings persistence in both economic periods. The results of this study indicate that earnings persistence is higher during expansionary regimes than during those of contraction. They support the notion that the business cycle has a significant effect on earnings persistence, as explained by the relevant theory.


# LITERATURE REVIEW


## Business Cycles

Business cycles were defined in Burns and Mitchell's (1946) study as an aggregate wave of economic activity consisting of the following four phases: the expansion cycle, followed by recession, contraction and revival. This series of phases continues in a repetitive and sporadic fashion. Burns and Mitchell (1946) used turning clusters in individual series (including ones that measured commodity output, revenue, prices, interest rates, banking transactions and transport services) to determine the monthly date of a turning point in the overall economic cycle.

The United States of America established the National Bureau of Economic Research (NBER) with the aim of creating an official institution charged with determining the beginning and end of recessions. According to its prevailing rules, a recession is a period of at least two consecutive quarters in which real GDP declines (Mankiw, 2007). Analysis of the duration and features of economic cycles uses, amongst other approaches, the indicator approach (Bry and Boschan, 1971), sequential signalling procedures using leading indicators (Neftci, 1982; Zarnowitz and Moore, 1983), experimental indicators (Stock and Watson, 1989), and Markov's switching models (Hamilton, 1989), with the latter having been developed and used until recently (Abiad, 2003; Krolzig, 2001; Dufrenot and Keddad, 2014; Dua and Sharma, 2016). Because there is no official institution that determines the period of business cycles in ASEAN, this study will use the regime-switching model (Hamilton, 1989) as it is the most dominant approach for classifying business cycles.

The study employs the classical method, by dividing the period/regime into expansion and contraction. Economic activity is measured using GDP as the broadest measure of overall economic conditions. The expansionary period is indicated by increasing GDP growth, demonstrating an increase in people's purchasing

power, an increase in investment and full capacity employment. In contrast, during periods of recession/contraction, there is a decrease in consumption and investment. In a recession, jobs are also difficult to find, leading to a rise in the unemployment rate, which causes real GDP to decline (Mankiw, 2007).

## Earnings Persistence over Business Cycles

Earnings quality can reduce the problem of asymmetric information[1], since players, apart from managers (e.g. investors), would be able to avoid adverse selection issues by choosing a better alternative if they had the same information on earnings quality as the agents (managers). Earnings quality thus provides useful information for users in decision-making.

Two indicators of earnings quality are sustainability and persistence; thus, earnings could serve as a useful measuring tool to assess a company's future performance (Nelson and Skinner, 2013; Dichev et al., 2013). Information about earnings persistence would be beneficial to investors as an assessment of the company's performance, thereby assisting them in determining profitable investments. Sloan (1996), Dechow and Dichev (2002) and Francis et al. (2004) used the slope of the regression between current accounting earnings and future earnings ($\beta$) as a proxy for earnings persistence. Earnings persistence is seen as something expected by the company because it is repetitive (continuous).

A simple model that shows the measurement of earnings persistence is as follows:

$$\text{Earnings}_{it+1} = \alpha + \beta_1 \text{Earnings}_{it} + \varepsilon_{it} \tag{1}$$

Earnings are typically scaled by total assets, although some researchers use sales and number of shares (Dechow et al., 2010). The higher the $\beta$, the more persistent the earnings (the $\beta$ coefficient ranges from 0 to 1, indicating high persistence).

Based on empirical evidence, there are many factors capable of influencing earnings persistence, and these can be classified as internal and external (Dechow et al., 2010). One of the external factors is macroeconomics. Companies believe that 50% of earnings (quality earnings) are influenced by non-discretionary factors; that is, industrial and macroeconomic conditions (Dichev et al., 2013). A shock in either the macroeconomic conditions or in the industry can lead to a disruption in a company's earnings persistence (Johnson, 1999; Hui et al., 2016). [2]

Research shows that GDP growth has a positive influence on corporate earnings (Guenther and Young, 2000; Hooker, 2004). Positive GDP growth has been proven to boost a company's ability to operate effectively. Based on previous research studies, earnings persistence will be higher during periods of expansion than during periods of contraction. Contraction results in reduced opportunities for a company to make a profitable investment, leading to a decline in sales and generating a tendency for costs to increase. Due to these issues, the company's earnings persistence will decrease (Johnson, 1999; Persakis and Iatridis, 2015). Therefore, the state of the economy will affect a company's profit and earnings persistence.

Based on the above discussion, the following hypothesis is formulated:

*H1: Earnings persistence during periods of expansion will be higher than during ones of contraction.*

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[1] Jensen and Meckling (1976) conclude that an agency relationship arises when one or more individuals (principals) employ another individual (agent) to provide a service and then delegate power to that agent to make a decision on their behalf. Managers would thus gain more information compared to the owners of the company or, in other words, there is asymmetric information between the two parties. The existence of this asymmetric information gives rise to three problems because it allows managers to take actions that are not in line with the interests of owners, these problems being the issues of adverse selection, moral hazard and signalling.

[2] Other research studies have proven that a worsening macroeconomic situation, which causes a decline in a company's performance, can then trigger the earnings management behaviour of managers, which will ultimately also affect earnings quality (Vitchitsarawong et al., 2010; Choi et al., 2011; Ahmad-Zaluki et al., 2011; Dimitras et al., 2015; Persakis and Iatridis, 2015). This evidence supports the work of Mishkin (1991) and Gorton (2008), who stated that asymmetric information worsens during a crisis period; i.e. investors lose their confidence in assessing financial quality.

# RESEARCH METHODOLOGY

Our research analyses earnings persistence at the corporate level in the five ASEAN countries. Each entity (company) has its own individual characteristics (in particular the differences caused by samples from different countries). Each country has used IFRS accounting standards, but with different levels of adoption. This situation can skew the value of the model variables, which may influence the predictor variables. Therefore, this study is tested using Multilevel Mixed-Effects Generalized Linear Models. This estimation method is used when attempting to test a model with different levels; for example, the company in different countries. Multilevel Mixed-Effects Generalized Linear Models can improve our results more significantly (efficiently) than others; for example, the Fixed-Effects Model.

Data from Thomson Reuters are used for 1,082 non-financial companies listed in the ASEAN-5 countries during the period of the first quarter of 2005 to the fourth quarter of 2015. Macroeconomic data are obtained from the Euromonitor database, the ADB website and the database of the World Bank.

The study uses quarterly data, in addition to the cyclical effects of the economy. According to Kothari (2001), quarterly data has the advantage of being more accurate for several reasons: it is timelier, it potentially serves as a powerful measurement to test the capital market research hypothesis and Positive Accounting Theory (PAT), and it provides more observations.

## Model Specification

Following Foster (1977), Freeman et al. (1982), Johnson (1999) and Dechow and Dichev (2002), the earnings persistence equation is formulated as follows:

$$\text{Earnings}_{it} = \alpha + \beta_1 \text{Earnings}_{it-1} + \varepsilon_{it} \tag{2}$$

To test earnings persistence behaviour when the economy experiences an expansion or contraction, we use Model 1. In this model, coefficient $\beta_3$ shows the effect of the periodic/economic regime on earnings persistence and will not be rejected if $\beta_3 > 0$.

Model 1:

$$\text{Earnings}_{it} = \alpha + \beta_1 \text{Earnings}_{it-1} + \beta_2 \text{Expansion}_t + \beta_3 \text{Expansion}_t * \text{Earnings}_{it-1} + \varepsilon_{it} \tag{3}$$

where:

| | | |
|---|---|---|
| $\text{Earnings}_{it}$ | = | Earnings before extraordinary items of firm i in quarter t |
| $\text{Earnings}_{it-1}$ | = | Earnings before extraordinary items of firm i in the previous quarter |
| $\text{Expansion}_t$ | = | dummy variable 1 if the t quarter shows expansion and 0 if contraction (determination of the period will be discussed in the following sub-chapter on the operationalisation of variables) |

## Operationalisation of Variables

### Earnings Persistence

The main variable in this study is earnings persistence. To measure this, the research uses the earnings persistence model with reference to Foster (1977), Johnson (1999), Dechow and Dichev (2002), Francis et al. (2004) and Persakis and Iatridis (2015), as shown below:

$$\text{Earnings}_{it} = \alpha + \beta_1 \text{Earnings}_{it-1} + \varepsilon_{it} \tag{4}$$

where $\beta_1$ is the earnings persistence level.

For the robustness test, the earnings persistence model is tested by following the model from Foster (1977) and Johnson (1999), which proposes an earnings persistence model whereby quarterly earnings t is influenced by the quarterly earnings of the previous year:

Model 2:

$$\text{Earnings}_{it} = \gamma + \phi_1 \text{Earnings}_{it-4} + \delta_{it} \tag{5a}$$
$$\text{Earnings}_{it} = \gamma + \phi_1 \text{Earnings}_{it-4} + \phi_2 \text{Expansion} + \phi_3 \text{Expansion*Earnings}_{it-4} + \delta_{it} \tag{5b}$$

where:

| | | |
|---|---|---|
| $\text{Earnings}_{it}$ | = | Earnings of firm i in quarter t |
| $\text{Earnings}_{it-4}$ | = | Earnings of firm i in quarter t-4 |

The robustness test is then applied to the models of Easton and Zmijewski (1989), from one of the most commonly referred to papers for measuring earnings persistence using quarterly data, applying an approach from Foster (1977) with the following formulae:

Model 3:

$$(\text{Earnings}_{it} - \text{Earnings}_{it-4}) = \lambda + \theta_1 (\text{Earnings}_{it-1} - \text{Earnings}_{it-5}) + \mu_{it} \tag{6a}$$

$$(\text{Earnings}_{it} - \text{Earnings}_{it-4}) = \lambda + \theta_1 (\text{Earnings}_{it-1} - \text{Earnings}_{it-5}) + \theta_2 \text{Expansion}_t$$
$$+ \theta_3 \text{Expansion}_t * (\text{Earnings}_{it-1} - \text{Earnings}_{it-5}) + \mu_{it} \tag{6b}$$

where:

| | | |
|---|---|---|
| $\text{Earnings}_{it} - \text{Earnings}_{it-4}$ | = | Earnings of firm i in quarter t minus quarter t-4 |
| $\text{Earnings}_{it-1} - \text{Earnings}_{it-5}$ | = | Earnings of firm i in quarter t-1 minus quarter t-5 |

## Expansion

The study measures the period of crisis endogenously (based on data), awarding 1 if the quarter falls into the expansion regime category, and 0 if it falls into that of contraction. To measure the expansion variable, the research uses the Regime Switching (RS) model, which permits regime change in time series.

The RS model is part of a stochastic process that has the Markov property (the Markov Model, Markov Chain or Markov Process). It is a random process that has all future information in the present state and is independent of the previous state. A Markov Chain is a sequence of random variables of X1, X2, X3, ... with Markov's characteristic; i.e. the state of the future and the past are independent states, or as shown in the formula:

$$\text{Pr } (Xn+1 = x | X1 = x1, X2 = x2, \dots, Xn = xn) = \text{Pr } (Xn+1 = x | Xn = xn) \tag{7}$$

This regime/behavioural change is better known as non-linear and asymmetric behaviour, as characterised by the phases of expansion, peaks, contraction and troughs that occur during the business cycle. The general idea of this regime change model is the parameter of the dimensionless time series vector - K {yt}, which is dependent on the unobserved regime variable st ∈ {1, ..., m} and represented in a state during a particular regime:

$$p(y_t | Y_{t-1}, X_t, s_t) = \begin{cases} f(y_t | Y_{t-1}, X_t, \theta_1) \; if \; s_t = 1 \\ \quad \vdots \\ f(y_t | Y_{t-1}, X_t, \theta_M) \; if \; s_t = M \end{cases} \tag{8}$$

$Y_{t-1} = \{y_{t-j}\}_1^\infty$ is the historical value of Yt, Xt is the exogenous variable and θm is the parameter vector during regime M.

The regime is divided into periods of expansion and contraction, which means that M = 2. This grouping uses real GDP growth data for each country as it is a measure of aggregate economic activity (Hamilton, 1989; Dufrenot and Keddad, 2014). Real GDP growth itself is a number derived from the following calculation (Guenther and Young, 2000; Gajurel, 2006):

$$GDPgrowth = \frac{GDP riil \; t - GDP \; riil \; t-1}{GDP \; riil \; t-1} \; x \; 100 \tag{9}$$

# RESULTS AND DISCUSSION

## Determination of Expansion Regime

The first stage is to categorise the periods of expansion and contraction for each country. Using the data for real GDP growth, and by using the Switching Regression model available in Eviews, the following groupings are obtained:

Table 1 Expansion and Contraction Regimes in ASEAN-5 Countries (2005–2015)

| Country | Expansion Period | Contraction Period |
|---|---|---|
| Indonesia | 2005Q1; 2005Q2; 2005Q3; 2005Q4; 2006Q1; 2006Q2; 2006Q3; 2006Q4; 2007Q1; 2007Q2; 2007Q3; 2007Q4; 2008Q1; 2008Q2; 2008Q3; 2008Q4; 2009Q1; 2009Q2; 2009Q3; 2009Q4; 2010Q1; 2010Q2; 2010Q3; 2010Q4; 2011Q1; 2011Q2; 2011Q3; 2011Q4; 2012Q1; 2012Q2; 2012Q3; 2013Q4; 2013Q2; 2013Q3; 2013Q4; 2013Q4; 2014Q1; 2014Q2; 2014Q3; 2014Q4; 2015Q1; 2015Q2; 2015Q3; 2015Q4 | - |
| Malaysia | 2005Q1; 2007Q2; 2007Q4;  2009Q1; 2009Q3; 2010Q1; 2010Q4; 2011Q3;  2012Q4;  2014Q1; 2014Q4 | 2005Q2; 2005Q3; 2005Q4; 2006Q1; 2006Q2; 2006Q3; 2006Q4; 2007Q1; 2007Q3; 2008Q1; 2008Q2; 2008Q3; 2008Q4; 2009Q2; 2009Q4; 2010Q2; 2010Q3; 2011Q1; 2011Q2; 2011Q4; 2012Q1; 2012Q2; 2012Q3; 2013Q1; 2013Q2; 2013Q3; 2013Q4; 2014Q2; 2014Q3; 2015Q1; 2015Q2; 2015Q3; 2015Q4 |
| Thailand | 2005Q1; 2005Q2; 2005Q3; 2005Q4; 2006Q1; 2006Q2; 2006Q3; 2006Q4; 2007Q1; 2007Q2; 2007Q3; 2007Q4; 2008Q1; 2008Q2; 2008Q3; 2008Q4; 2009Q1; 2009Q2; 2009Q3; 2009Q4; 2010Q1; 2010Q2; 2010Q3; 2010Q4; 2011Q1; 2011Q2; 2011Q3; 2011Q4; 2012Q2; 2012Q3;  2013Q2; 2013Q3; 2013Q4; 2014Q1; 2014Q2; 2014Q3; 2014Q4; 2015Q1; 2015Q2; 2015Q3; 2015Q4 | 2012Q1; 2012Q4; 2013Q1 |
| Philippines | 2005Q1; 2005Q2; 2005Q3; 2005Q4; 2006Q1; 2006Q2; 2006Q3; 2006Q4; 2007Q1; 2007Q2; 2007Q3; 2007Q4; 2008Q1; 2008Q2; 2008Q3; 2009Q2; 2009Q4; 2010Q1; 2010Q2; 2010Q3; 2010Q4; 2011Q1; 2011Q3; 2011Q4; 2012Q1; 2012Q2; 2012Q3; 2012Q4; 2013Q1; 2013Q2; 2013Q3; 2013Q4; 2014Q1; 2014Q2; 2014Q3; 2014Q4; 2015Q1; 2015Q2; 2015Q3; 2015Q4 | 2008Q4;  2009Q1; 2009Q3;  2011Q2; |
| Singapore | 2008Q4;  2009Q1;  2010Q4 | 2005Q1; 2005Q2; 2005Q3; 2005Q4; 2006Q1; 2006Q2; 2006Q3; 2006Q4; 2007Q1; 2007Q2; 2007Q3; 2007Q4; 2008Q1; 2008Q2; 2008Q3; 2009Q2; 2009Q3; 2009Q4; 2010Q1; 2010Q2; 2010Q3; 2011Q1; 2011Q2; 2011Q3; 2011Q4; 2012Q1; 2012Q2; 2012Q3; 2012Q4; 2013Q1; 2013Q2; 2013Q3; 2013Q4; 2014Q1; 2014Q2; 2014Q3; 2014Q4; 2015Q1; 2015Q2 |

Source: Processed Data

It can be seen that throughout the period 2005–2015, Malaysia and Singapore experienced more periods of contraction compared to the other countries. If this is linked to globalisation, based on a country's openness index, these two countries are in the top rank compared to the other three.[3] The more open a country, the more opportunity it has to increase economic growth, but also the greater the potential for it to be affected by crises that occur globally. This could lead to more volatile economic growth in Malaysia and Singapore.

In relation to a more particular observation, the strengthening or weakening of an economy could be influenced by increases or decreases in its export and import trading components. With regard to these components in the five countries, Singapore and Malaysia have the highest level of interaction with foreign countries, especially China (Table 2), meaning fluctuations in the economy of partner countries (especially China) would have a greater influence on both countries.

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[3] Based on the KOF Index, Singapore is ranked 6th (with an index of 86.93), Malaysia 25th (79.14), Thailand 42nd (70.45), Philippines 83rd (57.86) and Indonesia 84th (57.75). The KOF Index of Globalisation (Dreher, 2006; Dreher et al., 2008) measures three dimensions of globalisation: economic, social and political. Economic globalisation measures the number of actual flows (trade, FDI, portfolio investment) and restrictions (country imports, tariffs, international trade tax). Social globalisation measures, for example, the interaction between people living in different countries, data and information flow, and cultural exchange. Political globalisation is based on a government's political involvement, as measured by, for example, the number of embassies in a country and the number of members in international organisations. This index has a range of 0–100; the higher the index, the more open the country.

Table 2 Exports and Imports of ASEAN Countries with their Five Most Important Partner Countries

| Country | Year | Partner | Indicator | Amount (US $ Mil) | Share (%) | Country | Year | Partner | Indicator | Amount (US $ Mil) | Share (%) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Indonesia | 2014 | Japan | Export | 23,127.09 | 13.14 | Indonesia | 2014 | **China** | import | 30,624.38 | 17.19 |
| | 2014 | **China** | Export | 17,605.94 | 10.00 | | 2014 | Singapore | import | 25,186.12 | 14.14 |
| | 2014 | Singapore | Export | 16,752.34 | 9.52 | | 2014 | Japan | import | 17,007.58 | 9.55 |
| | 2014 | United States | Export | 16,560.08 | 9.41 | | 2014 | Korea, Rep. | import | 11,847.41 | 6.65 |
| | 2014 | India | Export | 12,248.96 | 6.96 | | 2014 | Malaysia | import | 10,855.39 | 6.09 |
| Malaysia | 2015 | Singapore | Export | 27,842.99 | 13.91 | Malaysia | 2015 | **China** | import | 33,242.59 | 18.87 |
| | 2015 | **China** | Export | 26,062.95 | 13.02 | | 2015 | Singapore | import | 21,096.24 | 11.97 |
| | 2015 | Japan | Export | 18,947.31 | 9.46 | | 2015 | United States | import | 14,226.54 | 8.08 |
| | 2015 | United States | Export | 18,928.95 | 9.45 | | 2015 | Japan | import | 13,770.98 | 7.82 |
| | 2015 | Thailand | Export | 11,403.39 | 5.70 | | 2015 | Thailand | import | 10,729.48 | 0.09 |
| Singapore | 2015 | **China** | Export | 47,708.49 | 13.76 | Singapore | 2015 | **China** | import | 42,135.23 | 14.20 |
| | 2015 | Hong Kong, China | Export | 39,665.72 | 11.44 | | 2015 | United States | import | 33,336.49 | 11.23 |
| | 2015 | Malaysia | Export | 37,763.92 | 10.89 | | 2015 | Malaysia | import | 33,056.87 | 11.14 |
| | 2015 | Indonesia | Export | 28,344.86 | 8.18 | | 2015 | Other Asia, nes | import | 24,680.63 | 8.32 |
| | 2015 | United States | Export | 23,224.75 | 6.70 | | 2015 | Japan | import | 18,595.66 | 6.27 |
| Philippines | 2015 | Japan | Export | 12,381.20 | 21.11 | Philippines | 2015 | **China** | import | 11,477.93 | 16.36 |
| | 2015 | United States | Export | 8,811.25 | 15.02 | | 2015 | United States | import | 7,629.44 | 10.88 |
| | 2015 | **China** | Export | 6,393.07 | 10.90 | | 2015 | Japan | import | 6,761.33 | 9.64 |
| | 2015 | Hong Kong, China | Export | 6,199.42 | 10.57 | | 2015 | Other Asia, nes | import | 5,481.24 | 7.81 |
| | 2015 | Singapore | Export | 3,649.52 | 6.22 | | 2015 | Singapore | import | 4,879.80 | 6.96 |
| Thailand | 2015 | United States | Export | 23,717.29 | 11.25 | Thailand | 2015 | **China** | import | 40,919.10 | 20.25 |
| | 2015 | **China** | Export | 23,311.43 | 11.05 | | 2015 | Japan | import | 31,134.91 | 15.41 |
| | 2015 | Japan | Export | 19,763.08 | 9.37 | | 2015 | United States | import | 13.923.31 | 6.89 |
| | 2015 | Hong Kong, China | Export | 11,641.29 | 5.52 | | 2015 | Malaysia | import | 11,875.18 | 5.88 |
| | 2015 | Malaysia | Export | 10,023.28 | 4.75 | | 2015 | United Arab Emirates | import | 8,135.33 | 4.03 |

Source: http://wits.worldbank.org/ (2017)

## Descriptive Statistics

Table 3 shows that the average of company earnings divided by total assets is 0.010154, with a maximum value of 0.122769 and a minimum of -0.133691.

Table 3 Descriptive Statistics

| Variable | Mean | Median | Maximum | Minimum | Std. Dev. |
|---|---|---|---|---|---|
| Earnings | 0.010154 | 0.009464 | 0.122769 | -0.133691 | 0.026739 |
| Expansion | 0.556603 | 1 | 1 | 0 | 0.496791 |

Note: Earnings = earnings before extraordinary items divided by total assets; Expansion = dummy variable; 1 if the quarter is an expansion period, and 0 if it is a period of contraction.
Source: Processed Data

From the whole sample, the expansion variable has a maximum value of 1 and a minimum value of 0. Point 1 represents the quarter in the expansion period and 0 indicates the quarter in the contraction period. The average expansion period is 0.556603, indicating that the number of expansion periods is higher than those of contraction in the study sample.

Table 4 shows the correlation between the earnings and expansion variables, which are valued at 0.047222, significant at a level of 0.01. This indicates, or could be an early indication, that the relationship between the two variables is positive. The economic conditions during an expansion period have been proven to have a positive effect on profit and earnings persistence.

Table 4 Correlation – Persistence Model

| | Earnings | Expansion |
|---|---|---|
| Earnings | 1 | |
| Expansion | 0.045115*** | 1 |

Note: *** significant at level α = 1%
Source: Processed Data

## Hypothesis Testing

The results of the data processing are shown in Table 5 (main model) and Table 6 (two additional models). Earnings persistence in the three persistence models shows positive and significant numbers. The coefficient β1,

which shows the level of earnings persistence, is at its highest in Model 1 (Panel A), with a coefficient value of 0.53552. The second highest earnings persistence is in Model 2 (Panel C), equal to 0.42085, with the lowest persistence in Model 2 (Panel E), with a regression coefficient of 0.26290.

The hypothesis testing can be seen from the coefficient $\beta_3$ in each model. The main model of this study is Model 1, Panel B. The results show positive and significant $\beta_3$ values; that is, moderation Earnings$_{t-1}$*Expansion has a value of 0.04253 and is significant at the 0.01 level. The same result is shown in Model 2 (Panel D) and Model 3 (Panel F), where moderation Earnings$_{t-4}$*Expansion and Expansion$_t$*(Earnings$_{it-1}$ - Earnings$_{it-5}$) are significant. So, it could generally be stated that Hypothesis 1 is not rejected. Hypothesis 1 was proven such that during the period of expansion, earnings persistence was higher than in the period of contraction.

Table 5 Regression Results of Persistence Model

| Variable | Exp.Sign | Model 1 | | | |
|---|---|---|---|---|---|
| | | Coef. | SE | z | Prob. |
| Panel A | | | | | |
| C | +/- | 0.00525 | 0.00042 | 12.42 | 0.000*** |
| Earnings$_{t-1}$ | + | **0.53552** | 0.00392 | 136.46 | 0.000*** |
| state: Identity | | | | | |
|   var(_cons) | | 7.7E-07 | 5.21E-07 | | |
|   var(residual) | | 0.00051 | 3.33E-06 | | |
| Panel B | | | | | |
| C | +/- | 0.00548 | 0.00046 | 11.83 | 0.000*** |
| Earnings$_{t-1}$ | + | 0.50950 | 0.00629 | 80.99 | 0.000*** |
| Expansion$_t$ | + | -0.00040 | 0.00031 | -1.30 | 0.193 |
| **Earnings$_{t-1}$*Expansion$_t$** | + | **0.04253** | 0.00804 | 5.29 | 0.000*** |
| Random-effects Parameters | | | | | |
| state: Identity | | | | | |
|   var(_cons) | | 0.00000 | 5.32E-07 | | |
|   var(residual) | | 0.00051 | 3.32E-06 | | |
| Note: *significant at 0.1 level **significant at 0.5 level ***significant 0.01 level<br>Earnings is Earnings before Extraordinary items divided by Total Asset; Expansion is dummy economic which is 1 if the quarter in the expansion period and 0 if it is a period of contraction | | | | | |

Source: Processed Data

The results of this study support the work of Johnson (1999). It is proven that the expansion period provides a positive climate for companies, so their performance continues to appear stable. During periods of expansion, people's purchasing power also increases because of the increase in their income. The rise in public purchasing power increases company earnings, which means they are able to increase their profits and corporate earnings persistence.

An expansionary period also means company investment is efficient. This investment helps to increase production and sales. The cost of inventory storage is also relatively low due to the high turnover of the company's inventory.

Table 6 Regression Results of the Additional Persistence Model

| Variable | Exp.Sign | Model 2 | | | |
|---|---|---|---|---|---|
| | | Coef. | SE | z | Prob. |
| Panel C | | | | | |
| C | +/- | 0.00657 | 0.00053 | 12.46 | 0.000*** |
| Earnings$_{t-4}$ | + | **0.42085** | 0.00423 | 99.60 | 0.000*** |
| state: Identity | | | | | |
| var(_cons) | | 0.00000 | 8.24E-07 | | |
| var(residual) | | 0.00058 | 3.81E-06 | | |
| Panel D | | | | | |
| C | +/- | 0.00689 | 0.0006 | 11.42 | 0.000*** |
| Earnings$_{t-4}$ | + | 0.41202 | 0.00683 | 60.36 | 0.000*** |
| Expansion$_t$ | + | -0.00052 | 0.00034 | -1.52 | 0.13 |
| **Earnings$_{t-4}$*Expansion$_t$** | + | **0.01436** | 0.00868 | 1.65 | 0.098* |
| Random-effects Parameters | | | | | |
| state: Identity | | | | | |
| var(_cons) | | 0.00000 | 9.66E-07 | | |
| var(residual) | | 0.00058 | 3.81E-06 | | |
| **Variable** | **Exp.Sign** | **Model 3** | | | |
| | | Coef. | SE | z | Prob. |
| Panel E | | | | | |
| C | +/- | -0.00004 | 0.00013 | -0.30 | 0.764 |
| Earnings$_{t-1}$ - Earnings$_{t-5}$ | + | **0.26290** | 0.00453 | 58.06 | 0.000*** |
| state: Identity | | | | | |
| var(_cons) | | 0.00000 | 1.61E-23 | | |
| var(residual) | | 0.00076 | 5.01E-06 | | |
| Panel F | | | | | |
| C | +/- | 0.00006 | 0.00019 | 0.31 | 0.759 |
| Earnings$_{t-1}$ - Earnings$_{t-5}$ | + | 0.24341 | 0.00706 | 34.47 | 0.000*** |
| Expansion$_t$ | + | -0.00018 | 0.00026 | -0.68 | 0.50 |
| **(Earnings$_{t-1}$ - Earnings$_{t-5}$)*Expansion** | + | **0.03307** | 0.0092 | 3.59 | 0.000*** |
| Random-effects Parameters | | | | | |
| state: Identity | | | | | |
| var(_cons) | | 8.34E-37 | 4.99E-22 | | |
| var(residual) | | 0.00076 | 5.01E-06 | | |
| Note: *significant at 0.1 level **significant at 0.5 level ***significant 0.01 level | | | | | |
| Earnings is Earnings before Extraordinary items divided by Total Asset; Expansion is dummy economic which is 1 if the quarter in the expansion period and 0 if it is a period of contraction | | | | | |

Source: Processed Data

In an expansionary period, companies' net exports tend to increase, thus boosting revenue and profit. Therefore, companies' earnings persistence tends to be higher during a period of expansion than during one of contraction.

In the Research Methodology section, we outlined how the Multilevel Mixed-Effects Generalized Linear Models were applied with the consideration that this study uses the ASEAN-5 countries. The earnings persistence of each country will be affected by the accounting standards that apply in each respective country. Considering that each country has adopted IFRS, we conducted a robustness test by using another statistical method, the Fixed-Effects Model. The results consistently show that earnings persistence is higher in the expansionary than

contractionary period, but the significance has a lower value than the Multilevel Mixed-Effects Generalized Linear Models. Thus the use of Multilevel Mixed-Effects Generalized Linear Models in this study is proven to be more efficient.

## CONCLUSION

The study results prove that during periods of expansion, corporate earnings persistence is higher than during periods of contraction. This supports the notion that conducive economic conditions (i.e. economic growth, a stable exchange rate and low credit risk) will create a favourable business climate for companies to be able to maintain and improve their corporate profits (Guenther and Young, 2000; Dichev et al., 2013). On the contrary, when the economy is in a less conducive situation (i.e. a period of crisis/contraction), then earnings persistence is disturbed, which will certainly affect investors' assessment of companies.

There are several implications of this study. First, in times of high environmental uncertainty, companies must be able to choose strategies and make profitable innovations so that earnings remain persistent. Second, investors must be able to carry out a good portfolio diversification strategy, so that when economic conditions decline they have the ability to minimise the risks that will occur. Third, governments need to create policies that support the stability of their respective countries' economies, with the aim of creating a conducive business environment. Macroprudential and microprudential policies are two examples of policies that should be supported in each country, as well as monetary policies that aim to maintain the stability of the macroeconomic and financial systems.

In order to obtain a detailed picture of the influence of macroeconomic transmission variables on earnings persistence, further research could investigate other macroeconomic indicators that might induce a weakening of the economy, which could in turn affect the earnings persistence of a company. These indicators might include, for example, inflation, GDP growth, the interest rate and/or exchange rate. Research that investigates how the propagation of macro variables influences earnings persistence would be of great benefit to governments for assessing the effectiveness of macroeconomic policies in influencing the micro sector (corporate level).

Furthermore, considering that the influence of the business cycle will be different between industries due to different rules and characteristics, further research might also be conducted by analysing the effect of the economic cycle on the earnings persistence in each industry.

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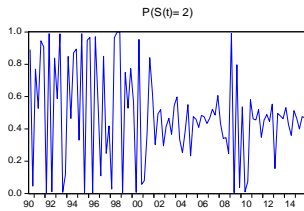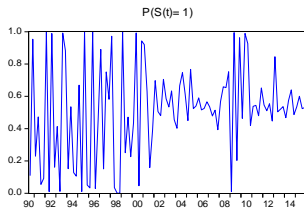
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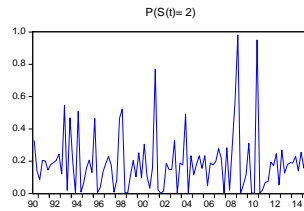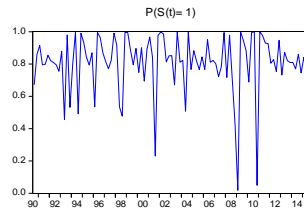
Appendix 1 Probability Regime Switching
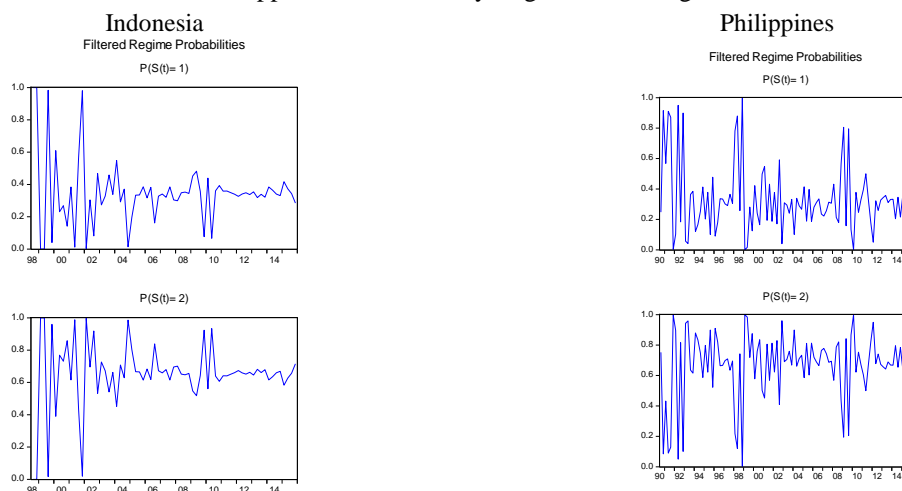
## Appendix 1 Cont.

### Malaysia
Filtered Regime Probabilities

P(S(t)= 1)



P(S(t)= 2)



### Singapore
Filtered Regime Probabilities

P(S(t)= 1)



P(S(t)= 2)



### Thailand
Filtered Regime Probabilities

P(S(t)= 1)



P(S(t)= 2)