Financial sector development and economic growth:

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Abstract: Among the 17 sustainable development goals (SDGs) of the United Nation, the 8th goal emphasises economic growth as an essential means of achieving other SDGs especially in developing countries. Therefore, this study empirically investigates the role of financial sector development, among other relevant factors, in the economic growth of five ASEAN economies over the 1994–2017 period. It uses Kao and Fisher-Johansen co-integration tests to examine the presence of a long-run association among the variables. Furthermore, FMOLS method is used to determine the long-run estimates of the predictors' influences on the economic growth of those countries. The long-run outcomes of the estimation suggest that financial sector development and human development index have significant positive impact on the economic growth of those countries. Based on the findings, this study recommends ASEAN countries to embrace additional robust measures to improve the financial sector and human development in order to realise sustainable economic growth.

Keywords: financial development; economic growth; co-integration; fully modified ordinary least square; FMOLS; ASEAN.

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1 Introduction

Sustainable development goals (SDGs) of the UN are comprised of 17 different goals, in which the 8th of these goals focuses on economic growth. Due to the importance of these goals, all countries are advised to formulate and implement necessary policies to achieve sustainable development by 2030. Such policies are expected to aim at enhancing economic growth, which is essential to meet other SDGs such as eradication of poverty and hunger, attainment of clean water, good sanitation, quality education, job creation, well-developed institutions, and natural environment protection. Consequently, the contemporary researchers have been attempting to unveil the essential factors of economic growth particularly in the context of developing economies.

In recent times, financial sector development (hereafter FSD) is assumed a decisive factor for enhancing economic growth (henceforth EGW) (Wamboye et al., 2014, 2013). Therefore, various developed and developing countries have embraced essential measures to develop their financial sectors in order to realise rapid and sustained economic growth (Adu et al., 2013; Wamboye and Sergi, 2019). In his seminal work, Schumpeter (1911) asserted that a substantially developed financial sector enhances corporate governance and facilitates investors to have access to *ex-ante* information to make appropriate investment decisions. Also, financial sector influences interest rate and therefore accelerates savings (Levine, 2004; Schumpeter, 1911). In a well-developed financial sector, the banking sector experiences comprehensive autonomy and the saving accumulated is used efficiently for capital formation, which consequently increases economic growth (Levine, 2005).

Economic growth of a country can also be improved when an economy is liberalised. According to an endogenous growth theory, a more liberalised economy experiences a rapid and substantial EGW due to the spill over effects from technological development and human capital investment (Romer, 1990). In line with the finance-led growth hypothesis, it is held that financial development enhances technological development through efficient resource allocation in an economy (Mckinnon, 1973; Schumpeter, 1911). It is not surprising Levine (1997) argued that in a well-developed and efficient financial system, financial intermediaries accelerate EGW through efficient and productive allocation of the resources. In the same vein, the neo-liberal economist such as Shaw (1973) notes that an adequately developed financial system with less financial

restrictions assists to realise a rapid economic growth. However, Lucas (1988) was somewhat of different view, pointing out that the significance of financial matters has been badly overemphasised.

Following the analysis of the theoretical link between FSD and EGW, some studies (Levine et al., 2000; Kargbo and Adamu, 2009; Chee-Keong and Chan, 2011; Anwar and Cooray, 2012; Bojanic, 2012; Adeel-Farooq et al., 2017; Soedarmono et al., 2019) have found significant positive relationship between the variables. On the contrary, a few studies for example, Adeniyi et al. (2015) found adverse consequence of financial development on economic growth while Narayan and Narayan (2013) found no significant association between the two variables. Although a plethora of studies on developed and developing economies have endeavoured to reveal the consequences of FSD on EGW, Association of Southeast Asian Nations (ASEAN) has been given less consideration in this respect. In addition, the inconclusive outcomes of the association between the two variables in the prevailing literature indicate the need for further empirical evidence based on recent data.

ASEAN was formed in 1967 and is considered one of the rapidly developing regions in terms of economic growth across the world. The region since 1990 has observed substantial economic growth due to robust macroeconomic performance. For example, in 2006, the economic growth rates of its member countries were impressive as compared to the developing countries and during the 2012, ASEAN's contribution to the global gross domestic product (GDP) accounted for 3.2% (Capannelli, 2014). Moreover, ASEAN's GDP (US$2.43 trillion) in 2015 makes it to be recognised as a global economic centre and by 2030 its GDP is anticipated to reach US$10 trillion (ASEAN, 2014, 2017).

During the same period, since the 1990s, the countries in the ASEAN region have persistently been developing their financial sectors and have experienced substantial capital flows within their countries and with the other countries of the world (Ibrahim and Raji, 2018). The banks in ASEAN are playing a vital role in order to facilitate financial integration. Nonetheless, it has been argued that the financial sector in ASEAN countries is still less developed as compared to the industrialised economies (Almekinders et al., 2015; Didier and Schmukler, 2014; Estrada et al., 2010). These rapid developing ASEAN countries have relatively homogenous financial and economic fundamentals as compared to other ASEAN economies. Therefore, in order to comprehend the significance of FSD to EGW in ASEAN, this paper deems it useful to examine their relation for these countries.

To realise this objective, the study extends the analysis of the relation of FSD with EGW for ASEAN countries by utilising endogenous growth paradigm as an underpinning theory. In the existing literature, it is discovered that limited studies have focused on the ASEAN region. For instance, Malarvizhi et al. (2019) investigated the linkage between the variables for selected ASEAN countries over the 1980–2011 period while the study of Lerohim et al. (2015) covered the 2002–2011 period for the same region. Other few studies on this relationship for selected ASEAN countries include Majid (2008) and Majid and Mahrizal (2007). Nonetheless, these studies considered the period until 2011 for their empirical analysis and employed distinct proxy variables for FSD as compared to the current study. In this study, we extent the period of analysis from 1992 to 2017 in order to provide insight into the effect of the current develpoments in the financial sector of those countries on their economic growth. Additionally, the current study employs an adequate proxy variable for the financial development (domestic credit to the private

sector by banks as a percentage of GDP), which previous relevant studies on ASEAN countries have not used over the specified period. Therefore, the outcomes of the current study are likely to be robust and reliable for policy purpose in those ASEAN countries.

Moreover, the existing literature on the finance-led growth hypothesis contains relatively fewer studies in the framework of endogenous growth model particularly in the context of ASEAN region. It is observed that those ASEAN countries have invested substantially in human development over the last few decades. Therefore, using endogenous growth model may be important in that it focuses on human capital as an indispensable factor of economic growth. In this study, we employ human development index (HDI) as a comprehensive proxy variable to indicate the quality of human capital in any country. HDI depicts the condition of education, health and standard of living. Therefore, it efficiently shows the quality of human capital in a country.

Finally, this study employs efficient and advanced panel data techniques such as Kao (1999) and Fisher-Johansen test developed by Maddala and Wu (1999) panel co-integration to examine the association between the explained and explanatory variables in the long-run. More so, the study employs the fully modified ordinary least squares (FMOLS) method to examine the long-run estimates of the influences of FSD and some other macroeconomic (controlled) variables on the economic growth of those countries under study. This estimation method considers and resolves the issue of autocorrelation, endogeneity and multicollinearity in the panel data. This study may be useful as it is likely to unfold the role of the less developed financial sector in the sustainable economic growth of ASEAN for the growth-oriented policies in the future.

2 Literature review

The analysis of financial intermediaries and EGW has earned enormous attention following the influential works of Mckinnon (1973), Schumpeter (1911), and Shaw (1973) that provided theoretical explanation about the link between the two variables. Subsequently, numerous studies have endeavoured to empirically examine the relationship, though the outcomes of those studies until date remain inconclusive.

For instance, Asteriou and Spanos (2019) measured the influence of FSD on the EGW of 26 european countries over the 1990–2016 period. The study discovered that FSD has significantly accelerated the EGW in those countries. It nevertheless, reduced the level of economic activity of the countries after the financial turmoil of 2008. In the same way, Jarrett et al. (2019) investigated the linkage between FSD and EGW in countries with extensive oil resources. The study concluded a positive and robust role of FSD in enhancing the EGW of these selected economies. In another study, Batuo et al. (2018) examined the relationship between FSD and EGW in 41 selected African countries covering the period from 1985–2010. The outcomes of the dynamic panel data estimation methods revealed that FSD enhanced the EGW in the selected African countries by reducing the financial instability. Similarly, in their study, Ibrahim and Alagidede (2018) showed that African countries with higher FSD accumulated substantial EGW as compared to those which have low level of FSD.. The study argued that those countries must develop their financial sector in order to acquire EGW in the long run. In another study, Bist (2018) measured the relationship between FSD and EGW in the context of selected 16 African countries over the 1995–2014 period. The study by

employing panel co-integration technique and FMOLS estimators discovered a positive relationship between the FSD and EGW in African countries.

Levine et al. (2000) employed distinct financial development indicators to observe their joint influences on the economic growth in a heterogeneous panel covering the 1965–1995 period. The empirical outcomes corroborate the notion that FSD enhances EGW. Likewise, Habibullah and Eng (2006) analysed the relationship for thirteen selected Asian economies over the 1990–1998 period and their outcomes indicated that FSD significantly accelerated EGW in those developing economies of Asia. In the same way, Kargbo and Adamu (2009) found an evidence that the finance-led growth hypothesis was valid in Sierra Leone and that through investment, FSD enhances EGW. Egbetunde and Akinlo (2015) have also observed in an empirical study that FSD enhances the EGW in Sub-Saharan African countries.

A study by Adeel-Farooq et al. (2017) developed an index of financial development by amalgamating its five essential indicators to analyse the consequence of FSD on EGW for two South Asian economies, Pakistan and India. The study concluded that FSD substantially improved EGW in those developing economies. In another study, Omri et al. (2015) empirically corroborated the notion of Schumpeter (1911) and Mckinnon (1934) that FSD led to an improvement in EGW. By developing a comprehensive financial development index for the ASEAN countries, Pradhan et al. (2014) provided evidence that FSD, particularly reforms in the banking sector and stock markets, significantly enhanced EGW. Estrada et al. (2010) analysed the influence of FSD on the EGW of Asian countries. The study argued that since 1990s Asian economies have developed their financial sectors which have helped them to accumulate substantial EGW. The study further highlighted that instead of the quantity, it is quality of investment which matters. Likewise, the empirical outcomes of Hassan et al. (2011) show that FSD is crucial but not a sufficient condition to improve the EGW of developing countries in the long run. Additonally, Gregorio and Guidotti (1995) in a large panel examined the effects of FSD on the EGW. The findings showed that FSD significantly enhanced the EGW of the countries in the panel except the Latin American countries.

Nonetheless, the existing literature contains numerous empirical evidences in contrary to the finance-led growth hypothesis. For instance, Bongini et al. (2017) unveil the consequences of financial development on EGW of the selected central, eastern and south-eastern economies of the europe by considering the period from 1995–2014. The results of the study indicated that FSD in these european economies has not accelrated the EGW. Ayadi et al. (2015) have also discovered a negative relationship between FSD and EGW in the context of mediterenean countries. Likewise, in their study of 21 African countries, Menyah et al. (2014) constructed a comprehensive financial development index using four distinct related indicators and found that FSD had no strong significant influence on the EGW of those countries. A similar finding was observed by the study of Adeniyi et al. (2015), which analysed the impact of the index of FSD on the EGW of Nigeria. The study found that FSD in Nigeria adversely contributed to EGW. It was argued that to accumulate economic gains from FSD, a country must exercise efficient governance, and should have a stable political system. They further showed that capital account liberalisation accelerated growth merely in the short run. However, in the medium term and long run, this positive effect of FSD diminished. Table 1 contains the literature review summary.

Table 1 Literature review summary

No.	*Authors*	*Country/time period*	*Methodology*	*Relationship B/W FSD and EGW*
1	Asteriou and Spanos (2019)	European countries/1990–2016	Fixed and random effects	+ve
2	Jarrett et al. (2019)	Oil rich countries/2006–2016	Synthic control method	+ve
3	Batuo et al. (2018)	African countries/1985–2010	Generallised method of momments (GMM)	+ve
4	Ibrahim and Alagidede (2018)	African countries/1980–2014	Hansen threshold tech	+ve
5	Bist (2018)	Africa/1995–2014	Panel co-integration technique/FMOLS	+ve
6	Habibullah and Eng (2006)	Asia/1990–1998	GMM	+ve
7	Bongini et al. (2017)	Eastern Europe/1995–2014	GMM	No impact
8	Ayadi et al. (2015)	Mediterranean countries/1985–2009	Random effects and GMM	–ive
9	Menyah et al. (2014)	Africa/1965–2008	Panel Granger causality test	No impact
10	Adeniyi et al. (2015)	Nigeria/1960–2010	ARDL	–ive

3 Data, model, and estimation procedure

3.1 Data and model description

This study estimates the influence of FSD on EGW for five developing economies of the ASEAN region over the period 1992 to 2017. It uses relevant variables for economic growth as controlled variables, such as trade openness (TO), HDI and the gross fixed capital formation (GFCF). The choice of the period for the current study depends on the data availability. For instance, the data for Vietnam are available since 1994 while the data for HDI are available until 2017. The data employed are acquired from world development indicators.

The study employs an endogenous growth paradigm ($Y = AK_T$) as a theoretical framework to gauge the finance-led growth hypothesis empirically. According to an endogenous growth model, EGW is the cosequence of the total factor of productivity, capital stock (human and physical capital) and a developed financial sector (Rebelo, 1991; Pagano, 1993; Jalil et al.2011). In an endogenous growth model, human capital is considered essential for accelerating EGW. Therefore, the study employs the following econometric model to investigate the effects of FSD, among other variables, on EGW as used in the prior studies such as Adu et al. (2013).

$$LEGW_{it} = \alpha_0 + \alpha_1 FSD_{it} + \alpha_2 LHDI_{it} + \alpha_3 TO_{it} + \alpha_4 GFCF_{it} + \in_{it} \quad (1)$$

Equation (1) is formulated in a panel form, containing time series and cross-sectional aspects of the data. In equation (1), the subscript i = 1, 2, 3, 4, 5 is used to show the cross-sectional dimensions of the data and t = 1, 2, 3, …, 23 indicates the time series dimension. $LEGW_{it}$ indicates the economic growth and is measured by GDP (constant 2010 US$).

FSD_{it} denotes the FSD and is estimated by domestic credit to the private sector by banks as a percentage of GDP. It measures the development of the financial sector in the ASEAN region. Boutabba (2014) pointed out that as compared to other proxy variables (e.g., M2/GDP, stock market capitalisation) employed for financial development, the domestic credit to the private sector by banks as a percentage of GDP is a more comprehensive variable to reveal the level of FSD within an economy. This proxy variable for FSD indicates the financial capital disbursement among the private investors in the form of the purchase of non-equity securities, trade credits and some other account receivables (Boutabba, 2014). In the prevailing literature concerning the FSD and EGW, various studies (Hassan et al., 2011; Shahbaz, 2012; Pradhan et al., 2017) have employed this proxy variable for the FSD.

In addition, like Chakraborty and Mukherjee (2013), this study employs the HDI as a proxy variable to show the level of human capital in the five selected ASEAN countries. Openness (TO_{it}) of the ASEAN economies is measured by trade as a percentage of GDP while GFCF is employed for physical capital in the selected five economies.

3.2 Estimation procedure

3.2.1 Unit root tests

The pre-condition to employ co-integration procedure is that all the explained and explanatory variables must be stationary at first difference. Therefore, before the commencement of the panel estimation, the integration order of the variables employed is examined in this study. For this purpose, three proficient panel unit root tests such as IPS (Im et al., 2003), ADF-Fisher (Maddala and Wu, 1999) and PP-Fisher type tests are employed. The three-panel unit root measures the stationarity of the series individually. Then by merging the individual outcomes of these tests, the panel results are accumulated. The null of the unit root tests (H_0: $\rho_i = 1$) assumes that the series has the non-stationary properties while the alternate hypothesis (H_1: $\rho_i < 1$) states that the series is free from the unit root problem. As compared to the time series, the panel unit root tests yield robust outcomes. In any case, the pre-condition to use co-integration test depends on the outcomes of the unit root tests. Once such condition is met, the panel co-integration methods could be employed.

4 Panel co-integration methods

In this study, Kao (1999) and Fisher-Johansen test developed by Maddala and Wu (1999) co-integration methods are employed. The Kao (1999) method is a residual based co-integration method within a single equation structure, and it is based on Engle and Granger (1987). Kao (1999) test estimates equation (1) for each of the cross section and then estimates the following equation:

$$\hat{\varepsilon}_{it} = \rho_j \hat{\varepsilon}_{it-1} + \sum_j^k \omega_{ik} \Delta \hat{\varepsilon}_{it-k} + \mu_{it} \tag{2}$$

The null hypothesis of no co-integration (H_0: $\rho_i = 1$) and the alternate hypothesis (H_1: $\rho_i < 1$) of co-integration are tested. The Kao (1999) co-integration test assumes homogenous coefficient of slopes in equation (1), which are considered constant across each cross-section of the panel. On the other hand, Johansen-Fisher method is a multivariate co-integration procedure, which is a panel version of the individual Johansen co-integration test. The test is relatively flexible, efficient and intuitively captivating. According to Hanck's (2009) simulation-based study, this co-integration test performs better as compared to Kao (1999), Pedroni (2004), and Larsson et al. (2001). This test, by relying on similar fundamentals as the Fisher-ADF unit root test, accumulates the p-values of the individual Johansen maximum eigenvalues and trace statistics (Lean and Smyth, 2010). For instance, under the null hypothesis for the panel, π_i is the p-values accrued from an individual co-integration procedure for each cross-section i:

$$\sum_{i=2}^{N} \log(\pi)_i \sim x_{2N}^2 \tag{3}$$

In equation (3), the values of chi-square are structured on the Mackinnon et al. (1999), which are the p-values of Johansen's (1988) co-integration trace and maximum eigenvalue tests. After confirming the existence of co-integration, the study obtains the long run estimates of equation (1) by employing the FMOLS.

5 FMOLS estimations

FMOLS estimation method is employed in this study to obtain the efficient and consistent estimates of the long-run relationship in the model 1. The use of FMOLS estimation is justified if a co-integration among the explained and explanatory variables exists in the long run (Azam et al., 2015). FMOLS estimation method (Phillips and Hansen, 1990) yields robust estimates of a co-integrated regression and it modifies the least squares method to take into account the issues of endogeneity and serial correlation that normally occur in a long run co-integrated panel (Peter and Phillips, 1995). In addition, this method also tackles the problem of multicollinearity that results from the cubic regression function (Bekhet and Othman, 2018; Raji et al., 2014). In the same way, Al-mulali (2012) is of the view that FMOLS is unbiased and contains an efficient combination of normal asymptotics, permitting the standard Wald tests employing asymptotics chi-square-based statistical inferences. FMOLS estimators are given as in equation (4):

$$\widehat{\varnothing} = \left[\frac{\hat{\alpha}}{\widehat{\beta 1}}\right] = \left(\sum_{t=1}^{T} X_{it} X_{it}'\right)\left(\sum_{t=1}^{T} X_{it} Z_{it} - T\left[\frac{\hat{\delta}_{12}}{0}\right]\right) \tag{4}$$

In equation (4) X_{it} indicates the deterministic trend and the stochastic explanatory variables.

6 Empirical outcomes and discussion

This section discusses the empirical outcomes of the panel data estimation. Initially, the study examines the order of integration of the variables by relying on three different panel unit root tests such as Im et al. (2003), ADF-Fisher type and PP-fisher type. The results as shown in Table 2 reveal that dependent and all the independent variables are integrated of order one I(1).

Table 2 Unit root test results

Variable	*IPS*		*ADF-Fisher*		*PP-Fisher*	
	Level	*1st diff*	*Level*	*1st diff*	*Level*	*1st diff*
EGW	0.1793	0.0000*	0.1004	0.0000*	0.3061	0.0000*
FSD	0.4429	0.0006*	0.6043	0.0200*	0.8764	0.0006*
TO	0.1322	0.0000*	0.0921	0.0000*	0.0479	0.0000*
HDI	0.5539	0.0000*	0.3290	0.0000*	0.5095	0.0000*
GFCF	0.7590	0.0002*	0.3811	0.0007*	0.9922	0.0000*

Note: *significant at the 1% level. Variables are as defined earlier.

Table 3 Co-integration tests results

	t-statistics		*Prob*	
ADF	–3.4173		0.003*	
	Johansen-Fisher co-integration test			
Hypothesised no. of CE(s)	*Fisher stat*[b]	*Prob*	*Fisher stat*[b]	*Prob*
	(Trace test)		*Max-Eigen test*	
None	82.95	0.0000	58.53	0.0000
At Most 1	34.79	0.0001	31.54	0.0005
At Most 2	12.15	0.2752	8.412	0.5887
At Most 3	10.16	0.4269	7.889	0.6396
At Most 4	15.78	0.1061	15.78	0.1061

Notes: *indicates that the parameter is significant at 1% while [b]shows that probabilities are computed using asymptotic Chi-square distribution.

Based on the results obtained from the panel unit root tests, the current study determines the long run association between the explained and explanatory variables by employing Kao (1999) and Fisher-Johansen test developed by Maddala and Wu (1999) methods of co-integration. The outcomes of the Kao and Johansen-Fisher co-integration methods are shown in Table 3. The results reveal that according to Kao (1999) method all the variables are highly co-integrated, implying that a long run association among EGW and explanatory variables exists. Likewise, the results of the Johansen-Fisher co-integration method also show co-integration among the variables. Hence, the study employs residual-based FMOLS method to observe the long-run influence of explanatory variables on the explained variable.

The outcomes of the FMOLS estimation are given in Table 4. The results obtained from FMOLS estimation indicate that all the variables have a significant link with the

economic growth in the five selected ASEAN economies. Specifically, the variable of interest, financial development is discovered to influence the economic growth positively and significantly. The results indicate that a 1% increase in financial development accelerates economic growth by 0.002%, suggesting that the finance-led growth hypothesis is valid in ASEAN developing countries. It implies that the domestic credit has enhanced the capital formation in ASEAN and thus, improved economic growth. Previous studies have also found a positive effect of FSD on EGW in the developing economies (see, for instance, Hassan et al., 2011; Shahbaz, 2012; Pradhan et al., 2017).

Table 4 FMOLS results (explained variable: LEGW)

	Coefficient	*t-statics*	*Prob*
FSD	0.002	5.35	0.00*
LHDI	5.020	31.41	0.00*
TO	0.003	6.78	0.00*
GFCF	–0.002	–1.24	0.21

Note: *, ** show the significant level at 1% and 5%, respectively.

In the same way, the result indicates the significance of human capital to the EGW of the ASEAN countries, as human development is revealed to exert a significant positive effect on the EGW. The coefficient of LHDI indicates that a 1% growth in human development positively influences economic growth by 5.02%. In addition, various previous studies (Ahmed, 2012; Hye and Lau, 2015; Fang and Chang, 2016) have shown similar positive influnece of human capital on economic growth.

Likewise, TO is also found to have a positive and significant affect on the economic growth of these countries. The findings demonstrate that as the trades of those ASEAN economies open to the rest of world by 1%, their economic growth increases by 0.003%. Lastly, the linkage of the GFCF with economic growth is discovered to be insignificant.

7 Concluding remarks

This study investigated the influences of FSD and some control variables, such as TO, HDI, and the GFCF on the EGW of five selected ASEAN countries over the 1994π2017 period. To realise this, the study employed Kao (1999) and Fisher-Johansen (Maddala and Wu, 1999) cointegration approaches for the long run association among the variables. It also employed FMOLS estimation to determine the impacts of the independent variables on economic growth.

The empirical outcomes suggest that FSD accelerates the economic growth of these five ASEAN economies, indicating the significance of credit provided to the private sector by banks in the region for investment purposes. Such investments have assisted in accumulating substantial economic gains in these emerging countries. The current study also concludes that FSD is inevitable for accelerating the EGW in the ASEAN countries. Moreover, the results show that human development and TO also accelerate the economic growth of these developing economies.

The results of this study suggest the need for these developing economies to formulate appropriate policies that may enhance further the financial development of this region. The financial sectors of these countries are relatively less developed compared to

developed countries. Therefore, by promoting policies that can improve the financial sector through enhancing the level of credit to the private sector, the countries are likely to experience more rapid and substantial economic growth. In addition, these countries should focus more on human development, as it is inevitable for the long run economic growth. In particular, they should design policies which may further improve the HDI score of these countries. By enhancing economic growth through FSD, these five ASEAN economies may achieve all the SDGs until 2030.

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