



## Research Article

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# Economic Liberalization and Bank Fragility: Empirical Evidence from ASEAN Countries

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## Abstract

*This paper uncovers the effects of economic liberalization on bank fragility using the panel data of ASEAN countries. Economic liberalization is proxied by using the economic freedom index, whereas bank fragility is measured by the inverse of the z-score. Our empirical results show that economic liberalization reduces the likelihood of bank default. This effect becomes less evident when a country has a higher degree of financial development or confronts more severe uncertainty. Moreover, while financial liberalization plays a decisive role, the effect of trade liberalization is insignificant. Our findings are robust for various estimators, alternative measures of economic liberalization and bank fragility, and when taking into account the endogeneity problem. Our findings suggest several policy implications for the policymakers.*

**Keywords:** ASEAN economies; financial fragility; economic liberalization; financial openness; trade openness

## 1. Introduction

Economic liberalization implies the implementation of government policies to facilitate free trade, deregulation, the removals of subsidies and price controls, and the privatization of public services (Woodward, 1992). Governments in developing countries have been opening their economies to achieve economic growth and development. The Association of Southeast Asian Nations (ASEAN), including ten members, plays an essential role in driving the global economies' growth and free trade's engagements in the Asia-Pacific region. The foundation of the ASEAN Free Trade Area (AFTA) in 1992, followed by the 1998 ASEAN Investment Area and the recent ASEAN Economic Community, has been demonstrating the efforts to establish an Asian-based single market and production hub. However, the Asian financial crisis was attributed to the economic liberalization due to the weak control on the flow of cross-border capital (Bello, 1999) and the deterioration of the international liquidity position of the financial system (Chang & Velasco, 1998).

ASEAN countries have adopted bank restructuring and implemented regulatory changes in the banking sector. More specifically, the banking sectors in this area made regulatory reform in the forms of capital requirements, activity restrictions, market discipline, and official supervision based on their experiences of the early 1990s deregulation, 1998 Asian financial crisis, and 2008 global financial turmoil (Lee & Park, 2009). The post-crisis restructuring and deregulations foster the capital

base, risk management capability, and earning capability, which might reduce the financial fragility in the area. In addition, the Governors of ASEAN central banks decided to unify banking regulations as a prerequisite of the ASEAN Banking Integration Framework as a part of the ASEAN Economic Community. Hence, ASEAN countries provide an excellent case for investigating the effect of economic liberalization on financial fragility.

To conduct our study, we measure the bank fragility by using the Database on Financial Development and Structure and obtain the economic liberalization variable from Heritage Foundation. We have panel data of eight ASEAN countries from 1996 to 2017. To deal with the concurrent correlation and heteroscedasticity, both estimators of panel corrected standard error and feasible generalized least square estimators are applied. We first regress economic liberalization on bank fragility with a set of control variables. Next, we examine whether the relationship between economic liberalization and bank fragility is conditional on the degree of financial development, uncertainty, and crisis. For the robustness check, we use alternative measures of bank fragility and economic liberalization. Finally, we address the endogeneity problem by using an instrumental variable method.

Our paper departs from current literature in that we are primarily interested in aggregate outcomes rather than in individual bank performance, and we mainly concentrate on ASEAN. This focus is crucial, given that ASEAN countries have undergone substantial bank restructuring and regulatory changes in response to past economic challenges. Additionally, the unification of banking regulations under the ASEAN Banking Integration Framework, part of the ASEAN Economic Community, highlights the region's commitment to financial stability and integration. In this context, we investigate the impact of economic liberalization on banking stability in ASEAN. Our main finding is that economic liberalization lowers bank fragility. This effect becomes less pronounced when a country has a higher level of financial development or suffers uncertainty. In addition, we find that financial liberalization is a key driver, whereas the effect of trade liberalization is mute. Our findings are robust for various estimators, alternative measures of economic liberalization and bank fragility, and when taking into account the endogeneity problem. This study is significant because it highlights the complex dynamics between economic liberalization and financial stability within ASEAN, a region that has experienced significant economic transformations and financial crises in recent decades. By providing these insights, our research offers valuable implications for policymakers aiming to balance liberalization efforts with the need for financial stability in the region..

The remainder of this paper is organized as follows. Section 2 reviews the extant literature on economic liberalization and banking fragility and then develop hypotheses. Section 3 presents the data and methodology. Section 4 discusses the results. Section 5 concludes.

## 2. Theoretical Backgrounds and Hypothesis Development

### 2.1 Economic liberalization

Economic liberalization can be understood as the ability of individuals and families to make their own economic decisions. Economic freedom enables firms to compete freely with each other on an equal basis, governed by public administration and the rule of law, which are sometimes designed to the advantage of powerful groups that impede the freedom of others. With economic freedom, consumers have free choice, no one is hindered by the government or any powerful group. Of particular importance, the liberal economy must be protected by strong property rights and the rule of law that treats all people fairly and protects their freedoms. There are two sets of important indicators to assess the degree of liberalization of the market economy. The first set is the Index of Economic Freedom, developed by The Heritage Foundation in 1995. This index is monitoring and evaluating 186 economies, based on 12 sub-indices belonging to four groups: Rule of Law, Government Size, Policy Effectiveness, and Market Openness. Each of the four economic liberalization

within these categories is assessed on a scale ranging from 0 to 100. A country's overall score is calculated by averaging these components. The second set is the Economic Freedom of the World, developed by the Fraser Institute (Canada).

There are many studies that have analyzed economic liberalization from different angles. There is a wealth of evidence-based research showing that freedom promotes growth, prosperity, and other positive outcomes. Hall & Lawson, (2014) showed that economic freedom is expected to have a positive effect on economic growth because economic freedom creates an atmosphere that allows individuals and businesses to allocate their resources to their highest use. Easton and Walker (1997) found that changes economic freedom had a significant impact on income stability regardless of the technological and educational levels of the workforce. Furthermore, policymakers have often considered fighting poverty or social inequality to be the role of the state, and poverty can only be pushed back when there is extensive government intervention to help the poor or disadvantaged groups in society. However, there is ample empirical evidence that increased economic freedom reduces poverty (Gwartney et al., 2008). Also, there have been many researchers interested in the relationship between economic freedom and income inequality. Economists often view income inequality as a form of market failure and require state involvement in order to be remedied. This view, therefore, suggests that a higher degree of economic freedom will have the effect of increasing inequality in society (Okun, 1975). Carter (2007) suggested a nonlinear relationship between economic freedom and inequality. In the same vein, Bennett and Nikolaev (2017) investigated the relationship between economic freedom and income inequality with a dataset of 112 countries between 1970 and 2010. They used six different metrics to measure income inequality and both the Economic Freedom of the World (EFW) by the Fraser Institute and the Heritage Foundation's Index of Economic Freedom (IFF).

## 2.2 Bank fragility

The notion of bank fragility broadly implies the increase in bank risk-taking, causing a higher likelihood of default. To measure bank fragility, scholars make use of bank balance sheet data or the equity and bond market signals (Gropp et al., 2006). In particular, empirical studies use the z-scores and non-performing loans based on the accounting data (Boyd & Graham, 1986) or the Merton's distance to default (Kabir & Worthington, 2017) built on the market data as proxies of bank fragility. As a metric that evaluates the bank's distance from insolvency, the z-score combines financial ratios such as profitability and leverage to provide an overall measure of a bank's financial health and stability.

There has been extensive literature on the determinants of bank fragility. Iftikhar (2015) investigated the role of bank-level characteristics, macroeconomic environment, and financial reform. Kane and Rice (2001) showed that information asymmetry and government efforts to regulate bank solvency affect banking instability. Shehzad et al. (2010) documented the negative impact of foreign ownership concentration on banks' non-performing loans if the share of foreign ownership is greater than 50%. Demirgüç-Kunt and Huizinga (2010) pointed out the positive relationship between income diversification and bank fragility as banks become less dependent on interest income and increasingly contingent on fee-based income. Meanwhile, institutional quality is also a key driver of bank fragility because a well-developed financial system needs effective legal and regulation. La Porta et al. (1997) argued that nations with the proper protection to investors against expropriation by entrepreneurs tend to achieve a higher level of financial market development. Girma and Shortland (2008) indicated positive impacts of political institutions on financial development, and Bhattacharyya (2013) pointed out that democratization results in a more market-based financial system. Recently, several authors have indicated the role of natural disasters as a source of fragility (Klomp, 2014; Albuquerque & Rajhi, 2019).

### 2.3 Effects of economic liberalization on bank fragility

Economic liberalization can affect bank fragility in a number of channels. The first channel is through the role of financial liberalization in which bank profitability, credit risk, and bank liquidity can influence bank fragility. McKinnon (1973) indicated that financial liberalization enhances banking intermediation by increasing capital accumulation and fostering economic growth in less developed nations. Chari and Henry (2002) showed that financial liberalization raises effective functioning, financial savings, and productive investment in technological innovation, increasing in banks' profitability. Next, Demirgüç-Kunt and Detragiache (1998) and Cubillas and González (2014) pointed out that due to the deregulation and the lack of control and suitable supervision, banks tend to be more involved in speculative operations. For example, banks suffer extra risks when funding projects with poor quality, so they ask high rates of return. This condition will adversely influence the quality of firm investment and the solvency of these banks. Gruben et al. (2003) pointed out the liberalization as an origin of risk appetite. They indicated that the new liberalized framework enables banks to be more flexible to expand their expertise and diversify their operations. Furthermore, there exists a nexus between liberalization and banks liquidity (Hamdi et al., 2013). With the liberalization of capital account, huge capital inflows move into less developed countries (LDCs). The relaxation in capital constraints has boosted the transferring of funds from the advanced nations to LDCs, raising the liquidity of banks considerably. However, capital inflows in the ASEAN countries increased severely between 1990 and 1996, contributing to the overheating of the economy and leading to the Asian crisis. Concerning the liberalization time frame, Hamdaoui et al. (2016) documented that banking sector distress tends to happen after an intermediate degree of liberalization. The association between bank instability and liberalization depends on the stringency of capital regulation and supervision.

The second channel is the effects of trade liberalization on bank fragility. Ashraf et al. (2017) investigated the effect of trade openness on bank risk-taking behavior with panel data of 37 emerging nations for the period 1998-2012. They found that a greater degree of trade openness dampens bank risk-taking as trade openness enables banks to diversify lending activities, reducing overall bank risk. In addition, more trade openness allows domestic banks to smooth their income volatility, lowering the effects of a financial crisis on banks. In the same vein, Rahman et al. (2020) studied such relationships for banks in the BRICS countries from 2000 to 2017. They also showed that more trade openness reduces bank risk-taking in both the short and long run. Alamgir Hossain et al. (2020) provided the same result by using commercial banks data in Bangladesh over a period of 2000 to 2017.

Based on the above arguments, we propose the following hypotheses:

H1: Economic liberalization lowers bank fragility.

H2: Financial liberalization lowers bank fragility.

H3: Trade liberalization lowers bank fragility.

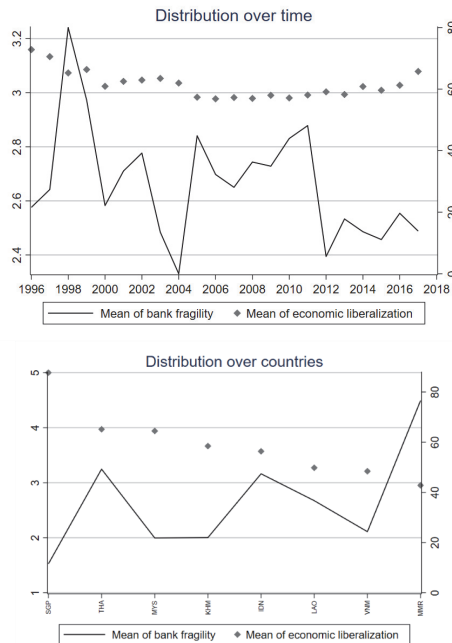
### 3. Data and Methodology

As our aim is to estimate the impact of economic liberalization on bank fragility, we have to quantify them both. Our measure for the bank fragility is built on the z-score of the whole banking sector within a particular country year. We define the z-score as the ratio of the sum of return-on-assets and capital-asset-ratio to the standard deviation of return on assets. More specifically, the z-score refers to the number of standard deviations that a bank's return on assets has to fall underneath its expected value before the bank runs out of equity and becomes insolvent. In order to interpret a rise in the index as a higher bank risk, we compute the natural logarithm of the inverse of the z-score (Berger et al., 2017). We collect the z-score variable from the World Bank Database on Financial Development and Structure.

Our main explanatory variable is economic liberalization that is proxied by using the overall score of Index of Economic Freedom (*OverallScore*) based on 12 quantitative and qualitative factors.

We also examine the two dimensions of economic liberalization: First, financial freedom (*FinOpen*) captures banking efficiency and degree of independence from government control and intervention in the financial market; Second, trade freedom (*TradeOpen*) reflects the removal of tariff and nontariff barriers that influence imports and exports of goods and services. The higher the indexes, the greater the degree of economic, financial, and trade openness. For robustness check, we also use Economic Freedom of the World, developed by the Fraser Institute (Canada). Regarding the specific dimensions, we use an alternative measure of trade openness as the sum of a country's exports and imports as a percentage of GDP from the World Bank database. We use a different measure of financial liberalization by employing international capital market controls from Chinn and Ito (2006) that capture a country's level of capital account openness.

Figures 1 and 2 display the means of bank fragility and economic liberalization to represent the dynamics in bank risk and economic liberalization across time and countries, respectively. Figure 1 shows that the bank default risk of ASEAN countries varies over time, with the peaks corresponding to the Asian crisis and recent financial crisis. The bank fragility tends to decrease in post-2011. Meanwhile, the economic liberalization decreases in the pre-2000, followed by an increase in the following four years until experiencing a decline again in 2005. After a substantial decrease in 2005, the economic liberalization was flat up to the year 2014 and tended to increase after that. Overall, the negative association between bank fragility and economic liberalization was observed in the pre-crises and especially in the post-2014. Figure 2 indicates that the distribution of bank risk and economic liberalization shows a negative association across countries. In particular, Singapore has the highest degree of trade and financial openness and the lowest level of bank fragility, whereas the opposite is true of Myanmar.



**Figure 1 & 2:** Distribution of bank fragility (*Fragility*) and economic liberalization (*OverallScore*) over time and countries

**Note:** The mean value of bank fragility is on the left-right scale, and the mean value of economic liberalization is on the right-hand scale.

### 3.1 Empirical model

In this section, we construct a model that allows us to estimate the linkage between economic liberalization and the risk of banks. We apply a model that is relied on panel data. Our data is cleaned by removing the omitted observations and winsorizing the data to solve outliers. Eventually, our data has 132 observations in 8 countries between 1996 and 2017<sup>1</sup>. We possess data for all ASEAN nations, excluding Brunei and Timor-Leste, due to the unavailability of z-score statistics for these countries. As the data in countries and years are unavailable, our panel data are unbalanced. The model is given as follows:

$$Fragility_{it} = \beta_0 + \beta_1 OverallScore_{it} + \beta_2 CONTROL_{it} + \varphi_t + \omega_i + \varepsilon_{it}, (1)$$

where subscripts  $i$  and  $t$  represent country  $i$  and year  $t$ , respectively.  $\varphi_t$  and  $\omega_i$ , respectively, denote year- and country-fixed effects.  $Fragility_{it}$  is the bank default based on the natural logarithm of the inverse of the z-score in country  $i$  at year  $t$ .  $OverallScore_{it}$  is the overall score of economic freedom in country  $i$  and year  $t$ .

To lessen the omitted variable bias, we add control variables,  $CONTROL_{i,t}$ , recommended by current literature on financial fragility. Similar to the specifications used by Klomp and De Haan (2009) and Klomp (2014), we incorporate variables linked to the macroeconomic context, monetary policy, and degree of financial development. First, we consider macroeconomic drivers by using real GDP per capita (GDPcapita) and inflation (Inflation) (Beck et al., 2006). In addition, we include the share of credit to GDP (CreditoGDP) as a proxy of the financial depth of the banking system in a country. Moreover, Demirgüç-Kunt and Detragiache (1998) argued that the likelihood of financial fragility is positively associated with institutions' poor quality. Nations with an incomplete legal structure and governance tend to suffer more financial system issues caused by corruption or inability to enforce law and regulation (La Porta et al., 1999; Barth et al., 2004). We incorporate the Polity IV score (Polity) from the Polity IV dataset, which reflects the democratic quality of the political institutions in a given country.

Regarding the feature of the banking system, we manage banking sector concentration (Concentration). The expectation of this variable is mixed. On the one side, Nicolás et al. (2004) revealed that extremely concentrated banking systems result in a greater degree of systemic risk due to the effect of competition. On the other side, Beck et al. (2006) documented that banking crises rarely occur in highly concentrated banking systems with high efficiencies. Finally, we take two variables into account that capture the operative efficiency of the banking system, including liabilities-to-assets (LTA) and cost-income ratio (COSTINC). Table A1 in the appendix displays a description of all variables, their definition, and their sources. Table 1 displays the statistical description of variables employed in our paper. Our final sample contains eight ASEAN countries for the period 1996-2017. Table 2 portrays the correlation coefficients between all variables. As the correlation coefficients are all smaller than 0.8, there may not exist the problem of multicollinearity in our model regressions (Hair et al., 2010).

We conduct some tests before running regressions. We use the panel unit root test to check for the stationarity of data. Because our data is unbalanced and with gaps in each individual time series, we are unable to use the Levin-Lin-Chu unit-root test proposed by Levin et al. (2002) and the Im-Pesaran-Shin unit root test initiated by Im et al. (2003). We, instead, make use of Fisher-type unit root test developed by Choi (2001) that enables unbalanced and time-gap data. We present the results in Table 3 that verify the stationarity of all variables at the level or the first difference. Hence, we apply the panel corrected standard error (PCSE) model to investigate a nexus between economic liberalization and bank fragility. Using the PCSE estimator allows us to deal with the concurrent

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<sup>1</sup> The data that support the findings of this study are available from the corresponding author upon reasonable request.

correlations between subjects in the full NxN cross-sectional matrix (Beck & Katz, 1995). To check the robustness of our main results, we apply the feasible generalized least square (FGLS) model to lower the heteroscedasticity (Canh & Thanh, 2020).

**Table 1:** Statistical description

	count	mean	sd	min	max
Fragility	132	2.61	1.13	1.28	6.82
OverallScore	132	61.83	14.20	36.70	89.40
GDPcapita	132	9.10	1.00	7.34	11.12
CreditoGDP	132	0.67	0.45	0.03	1.63
Polity	132	0.67	5.73	-8.00	9.00
Inflation	132	5.61	8.15	-0.90	58.45
Concentration	132	0.66	0.23	0.26	1.00
COSTINC	132	0.49	0.12	0.21	0.96
LTA	132	1.50	1.77	0.34	8.79
TradeOpen	132	72.74	10.30	44.60	90.00
FinOpen	132	45.45	18.51	10.00	80.00
OverallScore_Alter	132	61.56	15.26	29.02	84.70

**Table 2:** Correlation coefficients

	GDPcapita	CreditoGDP	Polity	Inflation	Concentration	COSTINC	LTA	TradeOpen	FinOpen
GDPcapita	1								
CreditoGDP	0.695***	1							
Polity	0.113	0.0973	1						
Inflation	-0.325***	-0.324***	-0.172*	1					
Concentration	0.144	-0.199*	-0.422***	-0.0399	1				
COSTINC	-0.395***	-0.275**	0.127	0.127	-0.0439	1			
LTA	-0.212*	0.184*	-0.452***	0.111	-0.241**	-0.0195	1		
TradeOpen	0.766***	0.603***	-0.231**	-0.309***	0.308***	-0.530***	0.0440	1	
FinOpen	0.490***	0.281**	0.0384	-0.141	-0.0286	-0.395***	-0.147	0.672***	1

\*  $p < 0.05$ , \*\*  $p < 0.01$ , \*\*\*  $p < 0.001$

**Table 3:** Cross sectional dependence tests and stationary tests

Variable (in level)	Fisher-type unit-root test (Z statistics)	Variable (in difference)	Fisher-type unit-root test (Z statistics)
GDPcapita	0.36	GDPcapita	-4.80***
CreditoGDP	-0.02	CreditoGDP	-2.12**
Polity	1.49	Inflation	-1.93**
Inflation	-1.35*	Concentration	-3.88***
Concentration	-0.72	Concentration	-2.14**
COSTINC	-2.02**	COSTINC	-3.65***
LTA	-2.04**	LTA	-2.74***
Tradeopen	-0.44	Tradeopen	-1.88**
FinOpen	1.76	Capitalcontrol	-1.73**

Note: Regarding CD test, the null hypothesis is that the cross-section is independent. P-value is closed to zero, implying that data are correlated across panel groups. Regarding Fisher-type test, the null hypothesis is "All panels contain unit root" and the alternative hypothesis is "At least one panel is stationary".

#### 4. Empirical Results and Discussion

##### 4.1 Baseline results

Table 4 displays the effect of bank economic liberalization (*OverallScore*) on bank fragility. The results of using the PCSE and FGLS estimators in columns (1) and (2) indicate, respectively, that *OverallScore* has a negative impact on bank fragility. It means that the increase in economic liberalization drives nations to have lower bank risks. In other words, the tendency of commercial banks to take less risky activities is directly associated with the increasing degree of economic liberalization of those countries. This result supports our hypothesis H1. Concerning the dimensions of economic liberalization, we re-regress the financial and trade liberalization on bank fragility and report the results in columns (3)-(4). It can be seen that financial openness dampens the bank risk that reinforces our hypothesis H2. Meanwhile, the coefficient of *TradeOpen* is negative but statistically insignificant. Our findings are consistent with McKinnon (1973) and Chari and Henry (2002) in the sense that a higher level of economic liberalization makes banks become safer as they can diversify their activities, and Hamdi et al. (2013) that document that banks in more economic liberalized countries have better liquidity.

Control variables have various impacts on bank risks. The coefficient of *COSTINC* is positive and statistically significant at 1% level suggests that when the banking sector operates inefficiently, it causes a higher likelihood of default. This result is aligned with Cetorelli and Goldberg (2016) in the aspect that when banks make use of internal capital markets and hence have more efficient liquidity management, banks have lower default's possibility. Bank concentration causes a higher bank risk. Our result corresponds to Nicoló et al. (2004) that highlighted the competition effect when the banking sector becomes extremely condensed. A negative sign of *GDPcapita* implies that the financial sector will be safer when the income level is higher. In advanced nations, banks have more chances to diversify their risk or have higher opportunities to re-insure their risk portfolios. By contrast, a negative sign of *CreditoGDP* means that a higher share of credit to the private sector raises bank risk. The effect of *Polity* is statistically significant only in columns (3) and (4). When a country becomes more democratic, banks suffer fewer financial system problems (La Porta et al., 1999; Barth et al., 2004). Other variables, including *Inflation* and *LTA*, are statistically insignificant in these regressions.

**Table 4:** The effects of economic liberalization on the bank fragility

	(1)	(2)	(3)	(4)
VARIABLES	PCSE	FGLS	PCSE	FGLS
GDPcapita	-0.69*** (0.231)	-0.69*** (0.204)	-0.53 (0.343)	-0.53* (0.279)
CreditoGDP	1.76*** (0.316)	1.76*** (0.341)	1.50*** (0.308)	1.50*** (0.345)
Polity	-0.02 (0.016)	-0.02 (0.014)	-0.03* (0.018)	-0.03** (0.014)
Inflation	-0.00 (0.009)	-0.00 (0.007)	-0.01 (0.009)	-0.01 (0.007)
Concentration	0.68* (0.364)	0.68 (0.487)	0.82** (0.332)	0.82 (0.504)
COSTINC	2.32*** (0.693)	2.32*** (0.472)	1.93*** (0.726)	1.93*** (0.487)
LTA	-0.09 (0.060)	-0.09 (0.11)	-0.13** (0.052)	-0.13 (0.122)
TradeOpen			-0.01 (0.009)	-0.01 (0.01)
FinOpen			-0.01** (0.006)	-0.01*** (0.005)



	(1)	(2)	(3)	(4)
VARIABLES	PCSE	FGLS	PCSE	FGLS
OverallScore	-0.07*** (0.020)	-0.07*** (0.016)		
Constant	8.69*** (1.901)	8.69*** (2.033)	5.53** (2.509)	5.53** (2.268)
Observations	132	132	132	132
R-squared	0.814		0.802	
Number of Reporter	8	8	8	8
Country FE	YES	YES	YES	YES
Year FE	YES	YES	YES	YES

Standard errors in parentheses, \*\*\* p<0.01, \*\* p<0.05, \* p<0.1

#### 4.2 Moderating role of financial development, uncertainty and crisis

So far, we find that economic liberalization has a significantly adverse impact on the default of the banking sector. In this part, we further examine whether this nexus is conditional on the level of financial development, uncertainty, and crisis occurrence. First, for the role of financial development, we employ the Financial Development Index Database (FDID) initiated by the IMF. This Financial Development Index (*FinDevelop*) captures how developed financial institutions and financial markets are in terms of their depth, access, and efficiency. While financial institutions include banks, insurance firms, mutual, and pension funds, financial markets cover bond and stock markets. Financial development is defined as a mix of depth (market size and liquidity), access (the ability of individuals and firms to approach financial services), and efficiency (ability of institutions to provide financial services at cheap cost, and the level of activity in capital markets). In our paper, *FI* is an aggregate index of the depth, access, and efficiency of financial institutions, whereas *FM* is those of financial markets. *FD* is the aggregate index of *FI* and *FM*. The higher the index, the more developed are the financial institutions and financial markets.

We incorporate interactions between these financial development variables and economic liberalization in equation (1) and then report the estimation results in Table 5. The coefficient of *FinDevelop* is negative and statistically significant, which suggests that financial development negatively impacts bank fragility. Concerning the moderation role of financial development, the coefficient of interactions term is positive and statistically significant at 1% level. The result reveals that a higher level of financial development in general and both financial institutions and markets, in particular, lower the effects of economic liberalization. The smaller reduction in default risk due to economic liberalization in more developed financial environments can be attributed to the fact that these banks already operate with lower baseline risks and highly efficient risk management practices. The additional benefits of liberalization are therefore marginal. In contrast, banks in less developed financial systems experience more substantial improvements from liberalization, leading to a larger reduction in default risk. This phenomenon is due to higher initial risk levels, substantial potential for regulatory and supervisory improvements, and increased benefits in terms of market liquidity and financial access.

**Table 5:** Financial development

	(1)	(2)	(3)	(4)	(5)	(6)
	FD		FI		FM	
VARIABLES	PCSE	FGLS	PCSE	FGLS	PCSE	FGLS
GDPcapita	-0.49* (0.277)	-0.49** (0.233)	-0.01 (0.383)	-0.01 (0.274)	-0.75*** (0.219)	-0.75*** (0.198)
CreditoGDP	1.67*** (0.289)	1.67*** (0.313)	1.87*** (0.312)	1.87*** (0.323)	1.69*** (0.282)	1.69*** (0.317)
Polity	-0.03* (0.016)	-0.03** (0.014)	-0.04** (0.017)	-0.04*** (0.014)	-0.02 (0.015)	-0.02 (0.013)

	(1)	(2)	(3)	(4)	(5)	(6)
	FD		FI		FM	
VARIABLES	PCSE	FGLS	PCSE	FGLS	PCSE	FGLS
Inflation	-0.01 (0.008)	-0.01 (0.006)	-0.01 (0.009)	-0.01* (0.006)	-0.00 (0.008)	-0.00 (0.006)
Concentration	0.86** (0.334)	0.86* (0.446)	0.86** (0.335)	0.86* (0.457)	0.74** (0.326)	0.74* (0.446)
COSTINC	1.89*** (0.627)	1.89*** (0.446)	1.41** (0.706)	1.41*** (0.491)	2.26*** (0.616)	2.26*** (0.432)
LTA	-0.07 (0.075)	-0.07 (0.103)	-0.04 (0.070)	-0.04 (0.110)	-0.15** (0.067)	-0.15 (0.103)
OverallScore	-0.13*** (0.028)	-0.13*** (0.021)	-0.10*** (0.025)	-0.10*** (0.022)	-0.12*** (0.025)	-0.12*** (0.018)
FinDevelop	-17.26*** (3.929)	-17.26*** (3.376)	-11.50*** (3.445)	-11.50*** (3.443)	-13.09*** (2.984)	-13.09*** (2.643)
OverallScore* FinDevelop	0.24*** (0.054)	0.24*** (0.049)	0.12*** (0.045)	0.12** (0.052)	0.19*** (0.042)	0.19*** (0.038)
Constant	12.35*** (2.463)	12.35*** (2.280)	6.15** (2.889)	6.15** (2.498)	13.62*** (2.247)	13.62*** (2.112)
Observations	132	132	132	132	132	132
R-squared	0.845		0.838		0.845	
Number of Reporter	8	8	8	8	8	8
Country FE	YES	YES	YES	YES	YES	YES
Year FE	YES	YES	YES	YES	YES	YES

Standard errors in parentheses, \*\*\* p<0.01, \*\* p<0.05, \* p<0.1

Next, in terms of uncertainty, we use the World Uncertainty Index (*WUI*), which employs frequency counts of the word “uncertainty” (*WUI\_Word*) or the number of pages including the word “uncertainty” (*WUI\_Page*) in the Economist Intelligence Unit (EIU). Crises contain systemic bank and currency crises. We collect crisis data from Systemic Banking Crises Database. We report the results in Tables 7 and 8, respectively. Table 7 shows the statistically significant and negative coefficients of both *WUI* and interaction between *WUI* and economic liberalization. This indicates that uncertainty decreases bank fragility and diminishes the impact of economic liberalization on bank fragility. However, Table 8 indicates that the occurrence of financial crises has no impact on the economic liberalization-bank fragility relationship. During high uncertainty times, the impact of economic liberalization on bank fragility is weaker because banks adopt more conservative practices, regulators tighten oversight, and enhanced due diligence is performed. These factors collectively lead to a more cautious and risk-averse approach, mitigating the potential negative impacts of economic liberalization on bank default risk.

Table 7: Uncertainty

	(1)	(2)	(3)	(4)
	WUI_Word		WUI_Page	
VARIABLES	PCSE	FGLS	PCSE	FGLS
GDPcapita	-0.75** (0.332)	-0.75*** (0.261)	-0.74** (0.334)	-0.74*** (0.271)
CreditoGDP	1.74*** (0.307)	1.74*** (0.341)	1.83*** (0.299)	1.83*** (0.341)
Polity	-0.02 (0.015)	-0.02 (0.013)	-0.02 (0.015)	-0.02 (0.013)
Inflation	-0.00 (0.008)	-0.00 (0.006)	-0.00 (0.008)	-0.00 (0.006)
Concentration	0.85** (0.385)	0.85* (0.480)	0.84** (0.381)	0.84* (0.473)
COSTINC	2.39*** (0.662)	2.39*** (0.464)	2.43*** (0.661)	2.43*** (0.459)

LTA	-0.12** (0.058)	-0.12 (0.108)	-0.17*** (0.056)	-0.17 (0.110)
OverallScore	-0.13*** (0.036)	-0.13*** (0.029)	-0.14*** (0.034)	-0.14*** (0.029)
WUI	-5.44*** (1.987)	-5.44*** (1.928)	-6.37*** (1.953)	-6.37*** (1.997)
OverallScore*WUI	0.08** (0.034)	0.08*** (0.032)	0.10*** (0.032)	0.10*** (0.032)
Constant	13.57*** (2.700)	13.57*** (2.783)	14.42*** (2.795)	14.42*** (2.990)
Observations	132	132	132	132
R-squared	0.825		0.828	
Number of Reporter	8	8	8	8
Country FE	YES	YES	YES	YES
Year FE	YES	YES	YES	YES

Standard errors in parentheses, \*\*\* p<0.01, \*\* p<0.05, \* p<0.1

Table 8: Crises

	(1)	(2)	(3)	(4)
	Bank crisis		Currency crisis	
VARIABLES	PCSE	FGLS	PCSE	FGLS
GDPcapita	-0.39 (0.316)	-0.39 (0.242)	-0.71*** (0.236)	-0.71*** (0.209)
CreditoGDP	1.39*** (0.386)	1.39*** (0.393)	1.83*** (0.316)	1.83*** (0.339)
Polity	-0.02 (0.015)	-0.02 (0.014)	-0.02 (0.016)	-0.02 (0.014)
Inflation	-0.00 (0.009)	-0.00 (0.006)	-0.00 (0.009)	-0.00 (0.007)
Concentration	0.62* (0.362)	0.62 (0.466)	0.65* (0.375)	0.65 (0.486)
COSTINC	2.06*** (0.637)	2.06*** (0.462)	2.34*** (0.676)	2.34*** (0.469)
LTA	-0.07 (0.060)	-0.07 (0.107)	-0.09 (0.061)	-0.09 (0.110)
OverallScore	-0.06*** (0.019)	-0.06*** (0.016)	-0.07*** (0.019)	-0.07*** (0.016)
Crisis	2.23 (1.663)	2.23** (1.076)	-0.96 (1.165)	-0.96 (0.746)
OverallScore*Crisis	-0.03 (0.027)	-0.03 (0.018)	0.01 (0.018)	0.01 (0.012)
Constant	6.37** (2.479)	6.37*** (2.229)	8.95*** (1.937)	8.95*** (2.051)
Observations	132	132	132	132
R-squared	0.830		0.819	
Number of Reporter	8	8	8	8
Country FE	YES	YES	YES	YES
Year FE	YES	YES	YES	YES

Standard errors in parentheses, \*\*\* p<0.01, \*\* p<0.05, \* p<0.1

### 4.3 Robustness check

So far, we use the overall score of freedom from Heritage Foundation as a proxy of economic liberalization. Now, we use the Economic Freedom of the World from Fraser Institute. The results reported in columns (1) and (2) of Table 9 are consistent with our main findings in the first two columns of Table 4. Next, we employ non-performing loans collected from the World Bank database to measure bank fragility. We re-regress equation (1) with the new measure of bank default and

display the result in columns (3) and (4). It can be seen that our main finding is still robust.

**Table 9:** Alternative measures

	(1)	(2)	(3)	(4)
	Fragility		NPL	
VARIABLES	PCSE	FGLS	PCSE	FGLS
GDPcapita	0.08 (0.471)	0.08 (0.348)	-4.79* (2.486)	-4.79** (2.152)
CreditoGDP	1.43*** (0.308)	1.43*** (0.342)	1.07 (1.600)	1.07 (1.768)
Polity	-0.03* (0.018)	-0.03** (0.014)	-0.15* (0.078)	-0.15** (0.072)
Inflation	-0.01 (0.010)	-0.01 (0.007)	-0.02 (0.050)	-0.02 (0.052)
Concentration	1.07*** (0.315)	1.07** (0.489)	3.39* (1.847)	3.39** (1.538)
COSTINC	1.92*** (0.707)	1.92*** (0.479)	6.19 (4.285)	6.19 (3.836)
LTA	-0.05 (0.051)	-0.05 (0.116)	0.58* (0.299)	0.58 (0.391)
OverallScore_Alter	-0.05*** (0.018)	-0.05*** (0.017)		
OverallScore			-0.05** (0.021)	-0.05** (0.024)
Constant	1.51 (3.261)	1.51 (2.501)	49.78* (26.773)	34.41* (18.089)
Observations	132	132	60	60
R-squared	0.803		0.718	
Number of Reporter	8	8	6	6
Country FE	YES	YES	YES	YES
Year FE	YES	YES	YES	YES

Standard errors in parentheses, \*\*\* p<0.01, \*\* p<0.05, \* p<0.1

#### 4.4 Endogeneity problem

Potential endogeneity could cause a biased estimate of economic liberalization. There may exist the reverse causality between economic liberalization and bank fragility. One possible reason is that countries suffering a high level of bank default may refrain from facilitating economic liberalization. Consequently, there potentially exists the endogeneity that may make our findings to be biased. Thus, we apply the Instrumental Variables (IVs) method to solve this issue. We use political corruption (*PolCorruption*) as an instrumental variable. Goldsmith (1999) pointed out that economic liberalization is related to a lower level of political corruption in developing and transitional countries. Johnston (2017) and Bardhan (2018) further indicated that political intervention and corruption hinder the liberalization process. We collect the corruption data from the Varieties of Democracy (V-Dem). The corruption variable includes measures of six various kinds of corruption that contain both different areas and levels of the polity realm, separating between executive, legislative, and judicial corruption. The higher the index, the more corrupt.

We now apply the IV method to address the endogeneity problem. We run endogeneity tests for the validity of instrumental variables and display the results in Table 10. First, the Hausman tests of endogeneity reveal significant  $\chi^2$  in the model with the economic liberalization (*OverallScore*). The results disclose that endogeneity of *OverallScore* may lead to a problem in our sample. Hence, the potential endogeneity should be addressed. Next, the LM statistics of under-identification tests indicate that  $\chi^2$  statistics are significant, meaning that the instrumental variables are appropriate. Lastly, we exhibit the significant Cragg-Donald Wald F-statistic, implying that our used instrumental variables are adequate in mitigating the endogeneity problem. These tests give evidence to support

the validity of our instrumental variable.

**Table 10:** Endogeneity test

OverallScore (First stage model)	Coefficient
	OverallScore
Hausman test of endogeneity ( $\chi^2$ )	8.7409
Kleibergen-Paap LM statistic (Under-identification test)	(0.003)
	37.743
	(0.000)
Cragg-Donald Wald F-statistic (Weak identification)	96.816
	(0.000)

Note: we report endogeneity tests of *OverallScore* on *Fragility* from the specification using 2SLS. p-values are in brackets.

We display the IV regression result in Table 11. When the endogeneity problem is taken into account, the effects of economic liberalization on bank fragility become more pronounced.

**Table 11:** IV estimation result

	(i)
VARIABLES	Fragility
OverallScore	-0.26***
	(0.09)
GDPcapita	-0.93***
	(0.33)
CreditoGDP	2.67***
	(0.66)
Polity	0.00
	(0.02)
Inflation	0.00
	(0.01)
Concentration	0.71
	(0.89)
COSTINC	3.21***
	(0.81)
LTA	0.21
	(0.23)
Constant	23.51***
	(6.24)
Observations	114
Number of Reporter	8

Standard errors in parentheses, \*\*\* p<0.01, \*\* p<0.05, \* p<0.1

## 5. Conclusion

This paper is one of the first efforts to investigate the impact of economic liberalization on the default risk confronted by commercial banks in ASEAN. We use a panel model including eight ASEAN countries in the period 1996 to 2017. Our measure of default risk is the natural logarithm of inverse z-score, whereas the overall score of economic freedom is used as a proxy for economic liberalization. A notable contribution of this study lies in its focus on aggregate outcomes rather than individual bank performance, offering insights into the broader implications of economic liberalization within the ASEAN context. This approach is particularly pertinent given the significant economic and regulatory transformations experienced by ASEAN countries in recent decades. By highlighting the complex dynamics between liberalization efforts and financial stability, our research provides valuable guidance for policymakers seeking to navigate these challenges in the region.

After extensive robustness checks of the results, our main findings reveal that economic liberalization dampens the probability of a banks' default. The result of our paper clearly indicates that liberalizing an economy may enhance the solvency of the commercial banking sector. In addition, it seems that the impact of economic liberalization depends on the level of financial development and uncertainty of a given country. First, the impact of economic liberalization on financial fragility becomes less evident when a country has a high level of financial development. This suggests that the governments in countries with a low level of financial development, such as Vietnam, Laos, Cambodia, and Myanmar, can enhance financial stability by supporting economic liberalization. Second, the impact of economic liberalization on bank fragility shrinks when a country suffers a high level of uncertainty. It means that the policy that aims at reducing economic uncertainty can magnify the effect of economic freedom on bank default.

Looking ahead, future research should delve deeper into the specific mechanisms through which economic liberalization influences bank stability, including the effects of monetary freedom, financial freedom, and trade openness. Such studies will provide further insights into the nuanced relationship between liberalization policies and financial stability, thereby informing more effective policymaking strategies in the ASEAN region and beyond.

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**Appendix:** Table A1: Definition of variables, measurements, and source

Variable	Definition	Measure	Source
Fragility	Bank fragility	Natural log of the inverse of the z-score	DFDS
OverallScore	Economic Freedom Index	Composite measure of 12 sub-indexes	Heritage Foundation
FinOpen	Financial freedom	Financial freedom index	Heritage Foundation
TradeOpen	Trade freedom	Trade freedom index	Heritage Foundation
GDPcapita	GDP per capita	Natural log of the real GDP per capita (constant 2010 US dollars)	WDI
Concentration	Banking sector concentration	Share of assets of a country's three largest banks	DFDS
COSTINC	Ratio of Costs to Income	Cost/income	DFDS
LTA	Ratio of Liabilities to Assets	Liabilities/assets	DFDS
CredittoGDP	Financial depth	Credit (% of GDP)	DFDS
Polity	Polity IV score		Polity IV
Inflation	Inflation rate	Growth rate of CPI	WDI
Tradeopen	Trade openness	Trade (% of GDP)	WDI
FinOpen	Openness of capital account	Chinn-Ito index (KAOPEN)	Chinn and Ito (2006)

Note: Database on Financial Development and Structure (DFDS)