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Early Warning System Financial Crisis: Economic Factors and Political Factors

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Abstract

This study aims to determine the right indicators in making a financial crisis early warning system by combining economic and political factors. This research is descriptive research with a quantitative approach. The data used are secondary data collected through the official website of the institution and data publications, with variables Financial Crisis, GDP, inflation, interest rates, and political stability. The scope of this study is annual data from Indonesia, South Korea, Malaysia, the Philippines, and Thailand from 1996 to 2022. The data was analyzed through the logit method, with dependent variables 0 and 1. The results showed that the variables inflation, GDP, and domestic credit had a significant effect on the occurrence of the financial crisis.

Keywords: Early Warning System, Financial Crisis, Inflation, GDP, Interest Rates, Political Stability.

INTRODUCTION

Financial system stability has become the main focus of monetary authorities both in Indonesia and the world. Maintaining the stability of the financial system is very important to avoid a financial crisis (Al Haq &; Sakti, 2019) because the financial crisis has a large cost to a country's economy. Financial crises are generally used to describe the loss of most of the value of various financial institutions or assets, such as stock market crashes, excessive currency fluctuations and financial bubbles. One of the major financial crises that occurred was the 1997/98 Asian financial crisis.

The 1997/98 Asian financial crisis began in July 1997 in Thailand, then spread to Malaysia, Indonesia, the Philippines, and South Korea. These five countries were among the most affected countries during the 1997/98 Asian financial crisis. This crisis caused currency depreciation in Asian countries, not only that GDP growth in five countries also fell. In addition, inflation in all five countries soared and interest rates also rose. In addition to the economic impact, the crisis also has a political impact. The political impact in Indonesia and Thailand was the resignation of the Thai prime minister and the Indonesian president, in South Korea the first democratic sorting was held, and in Malaysia there was the dismissal of its deputy prime minister. The cost of financial crisis made policy makers and economists aware of the importance of creating a system that can detect future economic events.

Early Warning System (EWS) is an approach to identify vulnerable factors of financial crises in an economy and predict economic events that will occur in the future. There are several crisis generation models in making an EWS, the first generation by Krugman (1979), the second generation by Obstfeld (1986,1996) and the third generation by Radelet and Sachs (1998). In all three generations the crisis model that has been developed, political variables are not used, although only a few disagree that politics plays a role in the crisis (Leblang &; Satyanath, 2008).

Through this study, the author wants to apply an early warning system (EWS) model that not only uses economic factors but also political factors to see whether these factors can provide signals to predict economic events and financial crises in the future. Using the last developed model created by Kamin et al., (2001) by testing variables added with the political stability index as a proxy for political factors.

LITERATURE REVIEW

Foreign Exchange Market Theory

Foreign Exchange (Forex) is the currency of other countries and other means of payment used to conduct and or finance international economic and financial transactions which usually have an official exchange rate record at the Central Bank (Hady, 2020). The forex market is defined as a place or transaction system where individuals, companies, and banks can conduct international financial transactions by buying or asking and selling or offering foreign exchange (Hady, 2020). The movement of forex values in the forex market is influenced by forex rates. There are several factors that affect foreign exchange rates, namely supply and demand of foreign currency, inflation, interest rates, and gross domestic product.

Exchange Market Preassure

Exchange Market Preassure (EMP) is an index that measures international economic pressure on a country's finances. This pressure refers to disequilibrium in the money market. The basic equation for looking at EMP is explained by the rate of change in foreign exchange reserves and exchange rates. The most widely used EMP calculation method is the method proposed by Aizenman et al., (2012). This method uses the growth of the exchange rate and the growth of foreign exchange reserves of a country. Here is the EMP calculation formula by Aizenman et al., (2012):

$$EMP_t = \left(\frac{kurs_t - kurs_{t-1}}{kurs_{t-1}} - \frac{cadev_t - cadev_{t-1}}{cadev_{t-1}}\right) \times 100$$

When the exchange market pressure value is positive, there is depreciation pressure in the forex market or it can be said that the EMP value with a positive sign indicates that the domestic currency is depreciating, and / or depreciation of foreign exchange reserves. Conversely, if the EMP value is marked negative, it indicates that there is appreciation pressure on the domestic currency, and / or an increase in foreign exchange reserves.

Political Factor

In political economy, it is explained that the relationship between politics and economics is considered as an interrelated system. In the political economy literature, many studies explaining the good value of democracy can help create a stable investment climate. Although the political economy literature does not directly talk about the debate within the EWS, it does show how regime type can contribute to overall economic health. In addition to the type of regime, government stability, and corruption are also factors that are expected

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to influence the crisis. Expectations of increased political stability are predicted to support investment interests, which affect investor behavior and confidence in investing in a country.

METHOD

This research is quantitative research. This study consists of bound and independent variables. The dependent variable of this study is the Financial Crisis. Meanwhile, independent variables use GDP, inflation, interest rates, and political stability. The scope of this study is the annual data of Asian countries (Indonesia, South Korea, Malaysia, the Philippines, and Thailand) from 1996 to 2022. The type of data used is secondary data obtained from various official websites of institutions and publications. The data used is annual panel data from Indonesia, South Korea, Malaysia, the Philippines, and Thailand during the period 1996-2022. The model used is a logit regression with two variables bound. The dependent variable is a financial crisis that is proxied with EMP (Exchange Market Preassure) provided that it is worth 1 (crisis period) if the EMP value is more than 1.5 standard deviations plus the average EMP of conditions in the crisis period is met and is 0 (non-crisis period) if the EMP value is less than 1.5 standard deviations plus the average EMP.

$$LI = \ln\left(\frac{Pi}{1-Pi}\right) = ß1 + ß2Xit + ß3Xit + ß4Xit + + ß5Xit$$

X_{it} = Independent Variables
ß1 = Intercept
ß2 = Coefficient of economic growth
ß3 = Inflation coefficient
ß4 = Interest rate *coefficient*
ß5 = Coefficient of Political Stability

RESULTS AND DISCUSSION

Crisis Period

Determination of the crisis period using the provision of value 1 (crisis period) if the EMP value is more than 1.5 standard deviations plus the average EMP of conditions in the crisis period is met and is 0 (non-crisis period) if the EMP value is less than 1.5 standard deviations plus the average EMP. Based on these provisions, crisis periods were found in five Asian countries as follows:

Table 1. Crisis Period of five Asian countries

Year	Indonesian	South Korea	Malaysia	Philippines	Thailand
1996	0	0	0	0	0
1997	0	**1**	**1**	**1**	**1**
1998	**1**	0	0	0	0
1999	0	0	0	0	0

2000	0	0	0	0	0
2001	0	0	0	0	0
2002	0	0	0	0	0
2003	0	0	0	0	0
2004	0	0	0	0	0
2005	0	0	0	0	0
2006	0	0	0	0	0
2007	0	0	0	0	0
2008	0	**1**	0	0	0
2009	0	0	0	0	0
2010	0	0	0	0	0
2011	0	0	0	0	0
2012	0	0	0	0	0
2013	0	0	0	0	0
2014	0	0	0	0	0
2015	0	0	**1**	0	0
2016	0	0	0	0	0
2017	0	0	0	0	0
2018	0	0	0	0	0
2019	0	0	0	0	0
2020	0	0	0	0	0
2021	0	0	0	0	0
2022	0	0	0	0	0

From the table above we can see the crisis occurred in Indonesia in 1998, in South Korea occurred in 1997 and 2008, in Malaysia the crisis occurred in 1997 and 2015, while in the Philippines and Thailand the crisis occurred in 1997. These findings are in accordance with existing research and facts that in 1997/1998 there was the 1997/98 Asian financial crisis. While in 2008 based on calculations, GFC only occurred South Korea, the loss of investor confidence and capital account deficit at that time made South Korea experience the 2008 crisis (Lee &; Rhee, 2012). The 2015 crisis period in Malysia occurred due to the magnitude of the impact of the global economic slowdown at that time (Fernandez, 2015).

Model Accurancy Test

The model accuracy test shows the predictive power of a model using the expectation-prediction table. The results of the model accuracy test have a correct estimate value of 99.21% which means that the sample can be predicted correctly by the logistic regression model of 99.21%

Table 2. Model Accuracy test results

% Correct	% Incorrect	Total Gain
99,21	0,79	-0,79

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Hosmer Lemeshow Test

Hosmer and Lemeshow's as measured by chi square probability values, model feasibility tests are used to determine whether the model is correct or not. Based on the results of the feasibility test of the model, a Prob Chi-Square value of 0.8691 is obtained which is greater than the significance value of 0.05, which means that the model is able to predict the value of its observance and there is no need for modification.

Table 3. Model Feasibility Test Results

Prob. Chi-Sq	Sig
0,8691	0,05

Coefficient Determination (R2)

Based on the results of the coefficient of determination test, R2Mcfadden has a value of 0.607 or 60.7%, which means that the independent variable affects the dependent variable by 60.7% while the remaining 39.3% is explained by other variables that are not studied.

Table 4. McFadden R Square Test Results

McFadden R-squared	LR Statistics	Prob (LR Statistic)
0,607846	33,40407	0,000003

Logit Regression Result

Tabel 5. Logit Regression Result

Variable	z-Statistics	z-Table	Prob.	Conclusion
GDPC	-1,992014	- 1,96	0,0464	Reject H0
INF	1,836893	1,65	0,0662	Reject H0
LR	-1,403194	- 1,96	0,1606	Receiving H0
PSI	1,30164	1,96	0,193	Receiving H0

1. Partial Test

   This test is used to see the magnitude of the influence of the independent variable on the dependent variable individually. This test looks at the z value with a significance level of 5% with the following hypothesis:

   H0: No significant effect

   Ha: Significant effect

   By Decision making criteria:

   - If the value of z-table ≤ z-statistic ≤ z-table and p-value > 0.05 then H0 is accepted, which means that the independent variable has no significant effect on the independent variable individually.
   - If the z-statistic value < -z-table or z-statistic > z-table and p-value < 0.05 then H0 is

rejected, meaning that the independent variable has a significant effect on the dependent variable individually.

Based on the above criteria and hypotheses, it can be concluded that the variables of economic growth and inflation have a significant effect on the occurrence of crises. Meanwhile, variable interest rates and political stability do not significantly affect the occurrence of crises.

2. Simultaneous Test

Table 6. Simultaneous Test Results

McFadden R-squared	LR Statistics	Prob (LR Statistic)
0,607846	33,40407	0,000003

Based on table 7, the value of Prob-LR is less than the signification level of 5%, which means that all independent variables affect the dependent variable together.

The effect of GDP on financial crises

GDP variabels have a significant negative effect on financial crises, this line with the forex market theory where when when there is an increase in GDP, it will increase foreign exchange reserves which will have an impact on the appreciation of the domestic currency against foreigners. It's also in line with the finding of Kamin et al., (2001) dan Kaminsky et al., (1998) where the variable GDP has negative effect on financial crises because GDP decrease exchange market pressure and increase reserve, so the local currency appreciates.

The effect of inflation on financial crises

Inflation variable in partial has a significant positive effect on the occurrence of a financial crisis. This result is in line with research conducted by Kaminsky et al., (1998) where the study found that inflation had a significant positive effect on the occurrence of the crisis. Forex market theory explains, the high rate of inflation in a country compared to lower foreign inflation is the main cause of depreciation of domestic exchange rates against foreign exchange rates. This led to higher exchange market pressure in increase the probability of financial crisis.

The effect of interest rate on financial crises

Interest rate variables have no significant effect on the occurrence of a financial crises, which is in line with research by Kaminski et al, (1998). Interest rate has no significant effect on the occurrence of financial crisis because interest rate is responded from the authority to the fall of exchange rate. Ratnasari and Widodo (2017) find that in crisis, the increase of interest rate will decrease the exchange market pressure and lower the probability of financial crises.

The effect of Politic on financial crises

Political stability did not significantly affect the occurrence of the financial crisis. The data political stability index describes subjective perceptions of political stability of

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households, firm, commercial business information providers, non-governmental organizations, and public sector organization might not the best data to describe political data for financial crises. The role of political variables is not easy to measure, it does not mean that political stability is not an irrelevant factor to the occurrence of a financial crisis but rather the overall political context in a country and not just a factor that can help predict the occurrence of a crisis (Biglaiser et al., 2011)

CONCLUSION

Variables that significantly influence the occurrence of financial crises in Asia (inflation, GDP, and domestic credit) can be used as leading indicators in forming an early warning system of financial crises. The variable of political stability did not significantly affect the occurrence of financial crises in Asia. Although political variables do not have a significant influence in predicting the occurrence of a crisis, it does not mean that political factors should be excluded in the formation of EWS.

REFERENCES

Aizenman, J., Lee, J., & Sushko, V. (2012). From the Great Moderation to the Global Crisis: Exchange Market Pressure in the 2000s. Open Economies Review, 23(4), 597–621. https://doi.org/10.1007/S11079-011-9228-Y

Al Haq, Muh. A., & Sakti, R. K. (2019). Analisis Penerapan Sistem Deteksi Dini (EWS) Terhadap Perbankan di Indonesia. Universitas Brawijaya.

Biglaiser, G., DeRouen, K., & Archer, C. C. (2011). Politics, early warning systems, and credit rating agencies. Foreign Policy Analysis, 7(1), 67–87. https://doi.org/10.1111/j.1743-8594.2010.00123.x

Hady, H. (2020). Ekonomi Internasional. Teori dan Kebijakan Perdagangan Internasional (3 ed., Vol. 2). Ghalia Indonesia

Kamin, S. B., Schindler, J. W., & Samuel, S. L. (2001). The Contribution of Domestic and External Factors to Emerging Market Devaluation Crises: An Early Warning Systems Approach. International Finance Discussion Papers (IFDP). https://www.federalreserve.gov/econres/ifdp/the-contribution-of-domestic-and-external-factors-to-emerging-market-devaluation-crises-an-early-warning-systems-approach.htm

Kaminsky, G., Lizondo, S., & Reinhart, C. (1998). Leading Indicators of Currency Crises. International Monetary Fund Staff Papers, 45(1). https://www.imf.org/external/pubs/ft/staffp/1998/03-98/pdf/kaminsky.pdf

Krugman, P. (1979). A Model of Balance-of-Payments Crises. Journal of Money, Credit and Banking, 11(3), 311. https://doi.org/10.2307/1991793

Leblang, D., & Satyanath, S. (2008). Politically generated uncertainty and currency crises: Theory, tests, and forecasts. Journal of International Money and Finance, 27(3), 480–497. https://doi.org/10.1016/J.JIMONFIN.2008.01.006

Lee, H., & Rhee, C. (2012). Lessons from the 1997 and the 2008 crises in the republic of Korea. ADB Economics Working Paper Series, 298. https://doi.org/10.2139/ssrn.2018682

Obstfeld, M. (1986). Rational and Self-Fulfilling Balance-of-Payments Crises on JSTOR. The American Economic Review, 76(1), 72–81. https://www.jstor.org/stable/1804128

Obstfeld, M. (1996). Models of currency crises with self-fulfilling features. European Economic Review, 40(3–5), 1037–1047. https://doi.org/10.1016/0014-2921(95)00111-5

Radelet, S., & Sachs, J. (1998). The Onset of the East Asian Financial Crisis. NBER Working Paper. https://doi.org/10.3386/W6680