Advances in Economics, Business and Management Research, volume 179
Proceedings of the Sixth Padang International Conference On Economics Education, Economics, Business and Management, Accounting and Entrepreneurship (PICEEBA 2020)

The Interaction Between External Factor and Financial Cycle in Indonesia

Yollit Permata Sari[1], Isra Yeni[2], Doni Satria[3]*, Joan Marta[4], Melti Roza Adry[5], Dewi Zaini Putri[6], Urmatul Uska Akbar[7]

[1, 2,3,, 4, 5, 6, 7] *Universitas Negeri Padang, Padang, Indonesia,*
[*]*Corresponding Author. Email: dosat.2002@gmail.com*

ABSTRACT
After the global financial crisis in 2008, economists believe that global economic conditions are a source of instability for the domestic economy in developing countries such as Indonesia. These external factors include fluctuations in global financial markets, volatility in commodity prices and capital inflows into the domestic economy which are known to have an impact on the financial cycle. This study explores the interaction of the three external factors to determine which factor has the most dominant interaction with the financial cycle in Indonesia. The interaction between external factors and the Indonesian financial cycle also means understanding the factors that affect the contraction period and expansion of the financial cycle in Indonesia. The study used time series data. The data used are secondary data from official publications, namely Bank Indonesia for data on capital flows and bank credit, the International Monetary Fund (IMF) for international commodity price index data and the global financial market valatility index (VIX). The analysis period in this research is 1993 first quarter to 2018 fourth quarter. This data sample selection is based on the availability of the longest data series using the quarterly data frequency in Indonesia. The result shows that shows that the interaction of total capital inflow to Indonesia has a pro-cyclical movement pattern with commodity price cycles and has a counter-cyclical movement pattern with the global financial cycle. Furthermore, the credit cycle to non-business fields is the cycle with the strongest interaction with all capital flow cycles analyzed in this study. Meanwhile, the total credit cycle and the credit cycle to the business field show a stronger procyclical interaction with the equity-based capital flow cycle than the interaction with the debt-based capital flow cycle

***Keywords** : External factors , Financial cycle , Band-pass filter*

1. INTRODUCTION

The previous research prove that there is a close relationship between the capital flow cycle and the long-term commodity price cycle [1]. This empirical finding shows that capital inflows accompanied by a double bust are the most potential conditions to generate financial crises in many countries in the last two hundred years. For developing countries, apart from capital inflows [2], [3], the movement of commodity prices on international markets is also a source of financial sector instability. The implication of this finding is the increasing vulnerability of developing country economies which have an economic structure dominated by natural resources or primary commodities in the formation of Gross Domestic Product towards potential financial crises. According to [1] the condition of the world economy after the Asian crisis in 1997/98 was marked by large capital inflows to developing countries as well as rising commodity prices on international markets. Based on this argument, the flow of capital to developing countries which interacts with the increase in world commodity prices certainly has an instability impact on macroeconomic conditions and the financial sector. Capital inflows and increases in commodity prices share the same characteristics, they both lead to an influx of liquidity into developing country, and if on a large scale it is threaten the stability of domestic economy.

[4] shows that there has been a rapid increase in capital flows following the 2008 global financial crisis, particularly to developing countries in Asia, which raises concerns over the potential instability of the financial sector. The study found evidence of an increasing process of imbalance and misallocation of resources after the 2008 global economic crisis. Commodity price boom lead to economic expansion,

especially in countries with an economic structure dominated by primary commodities. This expansion has boosted demand for investment funds. With the scarcity of long-term funds available on international financial markets (especially during and after the 2008 global financial crisis), international short term debt inflow has become a substitute for long-term investment financing (FDI) using short-term debt that can be extended and converted in form of stock. This behavior can also trigger the emergence of a maturity mismatch problem such as in the Asian crisis in 1997/98. When there was a sharp decline in commodity prices, [5] found a significant relationship between negative shocks to commodity prices in 71 samples of commodity export-dependent countries and financial sector vulnerability.

The Asian financial crisis of 1997/98 provides valuable lessons on the importance of understanding the resilience of the financial system in Indonesia. The process of recovering the financial system after the financial crisis in 1997/98 in Indonesia was very complex and required very expensive fiscal costs. Apart from the contagion effect, it is believed that the fundamentals and structure of the Indonesian financial system are the main factors causing the scale of the impact of the Asian financial crisis to deepen on the economy. The structure of the Indonesian financial system which is dominated by the banking sector and the poor condition of the banking sector fundamentals are the main causes of the severity of the impact of the Asian financial crisis in 1997/98. After the Asian financial crisis, Indonesia's financial system was restructured and Indonesia adopted the independence policy of the central bank as the monetary authority.

During the global financial crisis in 2008, Indonesia's financial sector was relatively unaffected by the global crisis. Apart from the fact that the fundamentals of the Indonesian financial sector and economy are already better, it is also due to the relatively unintegrated Indonesian financial system with the global financial system. The development of Indonesia's financial sector is currently developing rapidly, but is still relatively lagging behind in comparison to emerging economies in Asia (IMF, 2010). The development of Indonesia's financial sector development can be analyzed using developments in the condition of the financial structure.

Table 1 provides information on changes in the asset structure of Indonesia's financial system since 2005, namely the period after recovery from the impact of the economic crisis in 1997/98. The structure of Indonesia's financial system after the Asian financial crisis in 1997/98 is still dominated by the banking sector. In 2005 the banking industry's assets amounted to 82.1 percent of the total assets of the Indonesian financial system, in 2015 it decreased to 77.3 percent of the total assets of the financial system. At the end of 2018, the ratio of banking assets to total assets of the Indonesian system slightly increased to 77.7 percent. These data indicate that the dominance of the banking industry in the Indonesian financial system is still high today. The ratio of assets managed by all financial institutions in the financial system in Indonesia after the 1997/98 Asian financial crisis experienced a rapid increase compared to the development of the Indonesian economy in general. This condition can be seen from the increase in the ratio of assets managed by the financial system to GDP from 63.4 percent in 2005 to 71.7 percent in 2015. After the global financial crisis in 2008, the role of the financial system fell to 59.9 percent of GDP in 2010 but has increased again in 2015. This data shows that there is an increasing role of the financial sector in the Indonesian economy. However, compared to other developing countries in the Asian region, the development of the financial sector in the Indonesian economy is still relatively lagging behind (IMF, 2017).

Table 1: Structure of Indonesia's Financial System

	% of PDB			% of the total assets of financial institutions			The Total of Financial Institution		
	2005	2010	2015	2005	2010	2015	2005	2010	2015
Financial Institution : Total Assets	63,4	59,9	71,7	100	100	100	3,258,0	3,103,0	3,671,0
Banks	52	45,6	55,4	82,1	76,1	77,3	2,143,0	1,828	1,755
Private Bank	51,3	44,9	54,5	81	75	76,1	134	122	1178
Public Bank	18,7	16,3	20	29,5	27,1	28	5	4	4
Financial Institution : Non Bank	11,3	14,3	16,3	17,9	23,9	27,7	1,115	1,275	1,916
Insurance	4,4	5,9	7,2	6,9	9,9	10	157	142	137
Pension	2,2	1,9	1,8	3,5	3,2	2,5	312	272	260
Mutual fund	1	2,2	2,4	1,5	3,7	3,3	293	559	1,091
financial institutions	3,3	3,4	4,1	5	5,7	5,7	236	194	266

financial institutions non banks	0	0,9	0,8	1,1	1,5	1,2	117	108	162
Financial Market									
the bonds are not yet due	15,5	14,1	15,7						
stock market capitalization	26	47,2	40,8						

Source: OJK, Bank of Indonesia and BPS, processed data

The rapid growth in the financial sector after 2005 stemmed from the development of non-bank financial institutions. The ratio of assets of non-bank financial institutions to GDP and to total assets in the financial system has increased quite well. From 2005 to 2015 there was rapid growth so that the asset portion of non-bank financial institutions in the Indonesian financial system continued to increase. The development of mutual fund assets experienced a relatively rapid increase in the period of 2005 to 2010, but after that the growth of mutual fund assets was relatively the same as economic development. So that the ratio to GDP becomes stagnant and the ratio to total assets of the financial system in Indonesia tends to decline. The components of assets of non-bank financial institutions that are experiencing rapid growth are the insurance industry and non-bank financial institutions.

Capitalization of stock market and the value of bonds that have not yet matured have increased rapidly from 2005 to 2015. The ratio of market capitalization in the stock market to GDP increased from 26.0 percent in 2005 to 40.8 percent in 2015, but bonds that have not matured was relatively constant. This data shows that the diversity of types of bond instruments as a source of financing is still underdeveloped. Debt instruments in the financing mechanism in Indonesia are dominated by debt securities issued by the central government. Only few domestic companies issue debt securities as their source of external financing in the country. Large companies in Indonesia are experiencing difficulties in issuing debt securities as an external financing instrument. The domestic bond market is not yet deep, so they choose to issue debt securities in the world's financial centers or global bonds (Satria, 2010). The stock market has developed more rapidly than the bond market. Due to the increasingly integration of Indonesia's financial system, the role of foreign investors in the development of the capital market in Indonesia has become dominant.

The description of asset structure of financial institutions and the development of the capital market capitalization in Indonesia raises the following facts:

First, until 2018 financial sector assets managed by Indonesian financial institutions and financial markets remained relatively unchanged from the conditions before the Asian financial crisis in 1997/98. Despite the increasing role of non-bank financial institutions, the role of banks as the main financial intermediary institutions in Indonesia is still dominant.

Second, the development of the Indonesian capital market is quite rapid, but this development is dominated by developments on the stock market. Meanwhile, the bond market is only dominated by government bonds. The depth of the market in these two capital market investment instruments plays an important role in ensuring the stability of the Indonesian economy as a result of the influx of foreign investment. Data shows that Indonesia's capital market conditions are still shallow and more lagging behind Asian countries (see IMF, 2018). The domination of foreign investors in the capital market makes Indonesia's financial system vulnerable to external shocks.

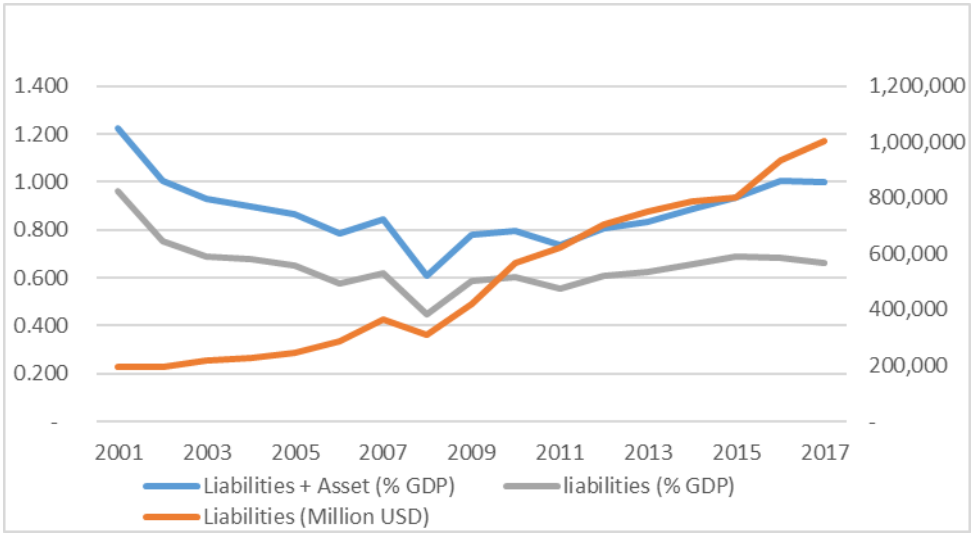
Third, the global financial crisis in 2008 relatively did not affect the development of Indonesia's financial structure due to the lack of integration of the Indonesian financial system with the global financial system. In 2010, after the global financial crisis, the assets of non-bank financial institutions in Indonesia played an important role than in 2005, although the trend of rapid development has not continued. The rapid development of the financial sector in the Indonesian capital market is dominated by the presence of foreign investors in both stock and bond markets. The role of domestic investors is precisely in the retail sector and not institutional investors. The results of this analysis indicate that global investors in the Indonesian economy choose liquid portfolio investment instruments (debt and equity participation) as their investment instruments.

The higher the level of development of a country's financial system, the greater the ratio of

assets of non-bank financial institutions to the economy. The dominance of banks as financial intermediary institutions is still high in the Indonesian financial system. This indicates that Indonesia's financial sector development is still lagging behind other countries (IMF, 2007, 2010). After the Asian financial crisis in 1997/98, in terms of the financial and trade systems, Indonesia was relatively poorly connected or integrated with the economies in the region. Indonesia's financial sector is even more connected to world financial centers outside the Asian region. This condition explains why the global financial crisis that occurred in 2008 did not have a significant impact on the condition of the financial system in Indonesia.

Since 2005 there has been a rapid growth in the non-bank financial institution sector. This condition shows the tendency for the Indonesian financial sector

to become increasingly connected (graph 5.1) with the global financial system. A more connected financial sector, but not accompanied by structural strengthening of the financial system, will raise the potential risk of financial system instability caused by the flow of financial assets from and into the financial system of developing countries such as Indonesia (Gu and Huang, 2011, Rey, 2015).



Source: Bank of Indonesia

Figure 1. Development of Indicators for the Openness of Indonesia's Financial System

Based on Graph 1, the integration of the Indonesian financial sector with the global financial system after the 1997/98 economic crisis has seen a tendency to decline and has become increasingly unintegrated with the world financial system. The development of foreign investment was relatively slower than that of the economy. Despite adhering to a free foreign exchange system, Indonesian economic actors tend to find it difficult to access the global financial system during the recovery period of Indonesia's financial sector after the 1998 Asian crisis. Towards the global financial crisis, the indicators of Indonesia's financial integration have increased from 2006 to 2007, but with the global financial crisis in 2008 led to another decline in Indonesia's financial integration indicators. The relatively unconnected Indonesian financial sector with the global financial system actually saved Indonesia from the negative impact of the 2008 global financial crisis. After the global financial crisis, Indonesia's financial system, which was still stable, was one of the attractions to become a destination for investment in international funds, so that the percentage of international liabilities have increased rapidly both in terms of the ratio to GDP (left scale) and in absolute value (right scale) in Graph 5.1

There is no consensus among economists on the correct definition of the financial cycle. Borio [6], stated that the definition of the financial cycle should be “There is no consensus on the definition of the financial cycle. In what follows, the term will denote self-reinforcing interactions between perceptions of value and risk, attitudes towards risk and financing constraints, which translate into booms followed by busts. These interactions can amplify economic fluctuations and possibly lead to serious financial distress and economic dislocations [6]

Based on the concepts presented by Borio [6] there are three important concepts to understand the financial cycle, namely (i) *perception of value and risk*, (ii) *attitudes towards risk* dan (iii) *financing contraint*. Based on these three concepts, economists use macroeconomic indicators of the financial sector to determine the characteristics of the financial cycle. Drehman, et.al [7]] argued that credit and property group prices are the most appropriate indicators to describe the concept put forward.

In general, the indicators used to analyze the characteristics of the financial cycle by current economists use two main methods. The first is turning point analysis such as that conducted by Claessens et.al [8], [9], which is also used by economists to determine business cycles. The second is analysis using a frequency-based filter as used by Drehmann et.al [7] (2012). The popularity of these two techniques is inseparable from the ease of use and application of analysis using both methods, and economists are relatively quite accustomed to using these analytical tools. However, both approaches are still considered descriptive because the turning point method requires a subjective rule (by researchers) which is applied to a data series to determine the local maximum and local minimum points. Furthermore, frequency-base filter techniques such as Band-pass filters require a certain time frequency range which is determined based on the assumed cycle length to be analyzed. Currently, the direction of research that is developing to analyze the financial cycle is more

towards a method for identifying and determining the financial cycle, using all available macro-financial indicator data in the economy.

Schuler, Hiebert and Peltonen [10],developed an analytical method to extract the components of the financial sector cycle. This analysis technique combines a multivariate spectral approach with time varying aggregation to describe systemic movements in data. The results show that credit and asset prices have similar cyclical characteristics which represent the financial cycle using quarterly data samples from 13 European countries from 1970 to 2013. Interesting findings in this study indicate that there is high heterogeneity in the financial cycle between countries in the sample used. Heterogeneity indicates the existence of exogenous factors that specifically influence the characteristic behavior of the financial cycle in each country.

Menden and Proano [11],used dynamic factor analysis method to extract cyclical components on twenty-five macro-financial indicators. The extraction results were then confirmed by performing the Granger causality to test the hypothesis of a causality relationship between the financial cycle and the business cycle. The results show that the financial cycle using a large number of cyclical components of macro-financial variables has the ability to predict the movement of the business cycle in the economy of United States. This study recommends using this new method to extract cyclic components against a large number of macro-financial variable indicators to identify financial cycles. The results of this study do not provide a different conclusion from the initial study that the financial cycle has a longer duration than the business cycle, and provides an alternative technique for identifying financial cycles.

Koopman, Lit and Lucas [12], developed a multivariate unobserved component model method for extracting cyclic components in macro-financial data to obtain financial cycles. This study found that property prices have different cyclical dynamics from other variables. This result is different from several previous studies which always include housing prices as one of the main indicators to calculate the financial cycle. This study concludes that including housing price indicators in the calculation of the financial cycle will bias the results of the financial cycle estimates obtained. Galati et.al [13] used the same analysis tools as Koopman et.al [13], their findings showed that financial cycles have varying duration and amplitude between time and between countries. The results of this study also show that the financial cycle in developed countries, especially the United States, has increased in magnitude since the 1980s, when the process of liberalizing the financial sector in the world began. These results support the finding that since 2000 the duration and maganitude of financial cycles in developed countries have been getting longer and bigger. The development and development of the financial sector has led to a longer duration and a stronger magnitude of the financial cycle. Economies in developing countries are still relatively underdeveloped, so that the financial cycle and business cycle in developing countries are assumed to be relatively small in magnitude and duration.

Grinderslev, Kramp, Kronborg and Pedersen [14]used the band pass filter method to extract financial cycles, as well as the unobserved component model method to estimate financial cycles in Denmark. Furthermore, this study compares the results of these estimates using a model based co-integration method [21]. The results of this study find that there is a cointegration in credit, GDP and housing prices. However, housing prices and GDP are more of a factor in the movement of the credit variable in the medium-term of financial cycle. The study of Grinderslev et.al [14] does not recommend using housing prices as an indicator to extract financial cycles. The results of a review of the financial cycle literature provide conclusions related to financial cycle research as follows:

a. Most attempt to determine the most appropriate macro-financial indicators for extracting the cyclical component of the data available between countries.

b. Research related to financial cycles is currently developing good cycle extraction methods using time series econometrics analysis techniques, spectral analysis, dynamic factor models, unobserved component based models and co-integration based models, showing that the overall results of these estimates support the findings of Drehmann et.al [7] dan Claessens et.al [8][9]. So that the financial cycle has a longer duration than the business cycle, and the credit variable is the most appropriate indicator for extracting the financial cycle.

c. Overall, analysis of financial cycle characteristics using relatively simple concepts and methods, either using the turning point method or band pass filter, can provide relatively good results. Furthermore, the most appropriate macro-financial aggregate indicator to use is the movement of credit numbers in the economy as stated by Grinderslev, Kramp, Kronborg and Pedersen [14].

2. METHODS

The study used time series data. The data used are secondary data from official publications, namely Bank Indonesia for data on capital flows and bank credit, the International Monetary Fund (IMF) for international commodity price index data and the global financial market valatility index (VIX). The analysis period in this research is 1993 first quarter to 2018 fourth quarter. This data sample selection is based on the availability of the longest data series using the quarterly data frequency in Indonesia.

This study uses a cyclic component extraction method from each external variable, namely the international commodity price index, fluctuations in global financial market movements, and capital flows, as well as domestic financial sector variables. The results of the cyclic component extraction from each of these variables were then analyzed further to understand the interactions between variables in this study. Analysis of the interactions between these cycles, namely the interaction of the commodity price cycle and the global financial cycle with the capital flow cycle, then the capital flow cycle with the credit cycle as an indicator of the financial cycle.

There are several methods for extracting cyclic components in a time series data, including band pass filters (Baxter and King, 1999) and Christiano and Fitzgerald (CF) [15], Hodric-Prescott (HP) Filter [16], and Model Based Filters based on Unobserved Component Time Series [12], [13]. This study uses the CF asymmetric band pass filter method to produce cyclic component data because according to Nilsson and Gyomai [17], this method is appropriate for extracting cyclic component data, while the HP filter method is more appropriate for determining cycle turning points which aim to determine the period of contraction and expansion. In the literature review section, it has also been explained that the use of simple analytical tools to extract cyclical components can give fairly good results. Extraction of the cyclic components of all the data in this study used the CF asymmetric band pass filter method.

CF asymmetric band pass filter can be calculated using the following formula :

$$c_t = B_0 y_t + B_1 y_{t+1} + \cdots + B_{T-1} y_{T-1} + \tilde{B}_{T-t} y_T + B_1 y_{t-1} + \cdots + B_{t-2} y_2 + \tilde{B}_{t-1} y_1 \quad (1)$$

Where:

$$B_0 = \frac{\sin(jb) - \sin(ja)}{\pi j}$$

$$B_j = \frac{b-a}{\pi} \qquad a = \frac{2\pi}{p_u},\ b = \frac{2\pi}{p_l}$$

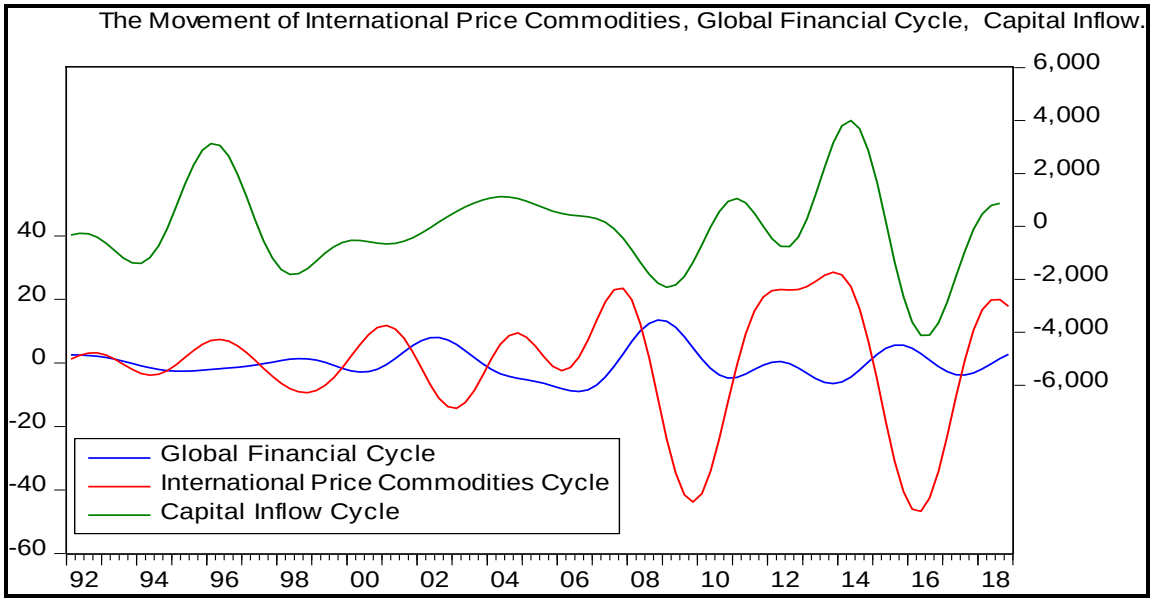
$$\tilde{B}_k = -\frac{1}{2} B_0 - \sum_{j=1}^{k-1} B_j$$

Parameters p_u and p_l are the cut off cycle or the upper and lower limits of the cycle, in this study using quarterly data and quarterly units. p_u is the upper limit of the cycle (high pass) which in this study is set for 10 years or 40 quarters. While p_l is the lower limit of the cycle (low pass) which in this study is set as 3 years or 12 quarters. The determination of the band cycle between 3 to 10 years follows the findings of Pontines [18], the financial cycle in developing countries has a higher frequency than in developed countries. So that in this study, it becomes relevant to use the cycle assumption in financial data in Indonesia to be between 3 and 10 years.

3. RESULT AND DISCUSSION

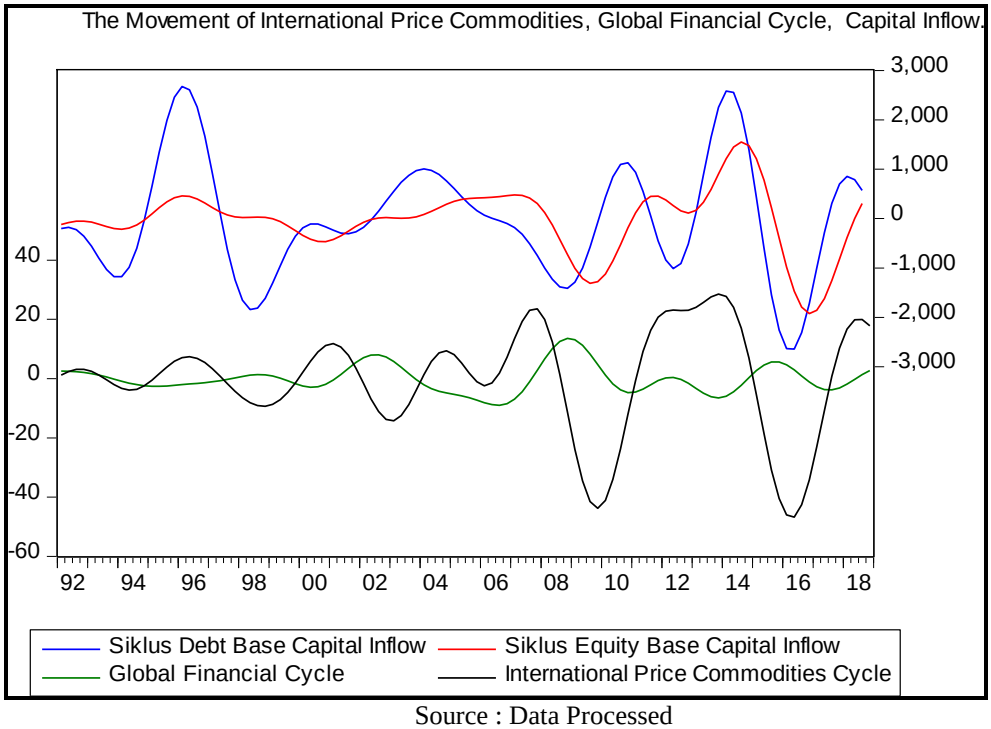
3.1 The Interaction of the Commodity Price Cycle and the Global Financial Cycle with the Capital Flow Cycle in Indonesia

Graph 2 and 3 are graphs of cyclic component extraction results from the VIX variable (the valatility of global financial markets) and the commodity price index and the cyclic component extraction results from gross capital inflow data in Indonesia. Based on Graph 2, it shows that the interaction of total capital inflow to Indonesia has a pro-cyclical movement pattern with commodity price cycles and has a counter-cyclical movement pattern with the global financial cycle. Graph 3 is a graph showing the interaction of debt-based and equity-based capital flow cycles with the global financial cycle and the cycle of Indonesian export commodity prices.



Source : Data Processed

Figure 2 Interaction of Indonesian Export Commodity Price Cycles, Global Financial Cycles and Indonesian Capital Flow Cycles



Source : Data Processed

Figure 3 The Interaction of Indonesian Export Commodity Price Cycles, Global Financial Cycles and Indonesian Capital Flow Cycles Based on Debt and Equity

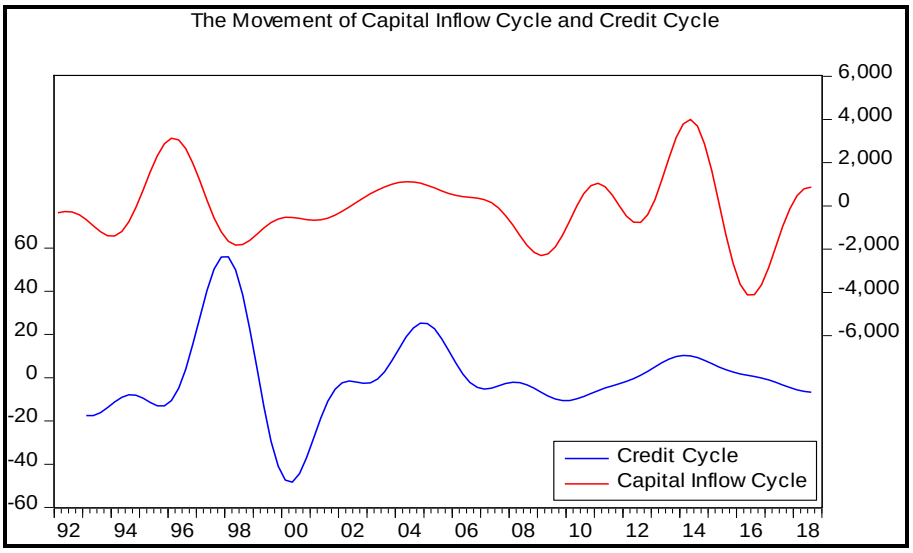
Based on Graph 2 and 3, it can be seen that the fluctuation of the cycle of Indonesian export commodity prices and the fluctuation of the debt-based capital flow cycle is greater than the other three cycles. The inflow of capital into Indonesia has a procyclical interaction with the price movements of Indonesia's export commodities, as we know debt securities are a global investment instrument for investors that channel their capital to Indonesia. The global financial cycle has interactions that tend to be counter-cyclical with capital inflows into the Indonesian economy. These results indicate that the increased risk on global financial markets is related to the outflow of foreign capital in the Indonesian economy and vice versa, capital inflows into the Indonesian economy during the period of the global

financial cycle experienced expansion. Associated with the theoretical analysis conducted by Gu and Huang (2011), in the global economic balance, capital inflows to developing countries will tend to be higher than the structural capacity of developing countries' economies to maintain economic stability as a result of capital inflows and outflows.

The global financial cycle and the commodity price cycle have a strong correlation with the Indonesian capital flow cycle. Furthermore, the cycle of capital flows to Indonesia also has a procyclical relationship with the two cycles of external factors. Compared to the global financial cycle, the capital flow cycle in the Indonesian economy has a closer correlation and interaction with the export commodity price cycle. The period of expansion in the global financial cycle and the cycle of Indonesian export commodity prices will be the main driving factors for the inflow of foreign capital into the Indonesian economy. The level of development of the financial system and the depth of the financial sector are important issues to deal with the negative impact of excessive capital inflows (out) to (from) the Indonesian economy. At the level of theoretical analysis, excessive inflows of capital into the Indonesian economy will trigger an increased chance of a reversal in the direction of capital outflows, which can trigger a financial crisis in the economy. At an empirical level, the findings of this study reveal that in addition to the global financial cycle, the cycle of Indonesian export commodity prices in the international market is more closely related to the capital flow cycle.

3.2 The Interaction of Capital Flow Cycles and Financial Cycles in Indonesia

At this stage we analyze the interaction between the total capital flow cycle, the equity-based capital flow cycle and the debt-based capital flow cycle to bank credit as an indicator of the financial cycle in Indonesia. Based on Graph 4 and Graph 5, the interaction between the three cycles of capital flows and the financial cycle has a procyclical pattern. Thus the capital inflow cycle to the Indonesian economy has the same direction as the financial cycle. Compared to the equity-based capital inflow cycle, debt-based capital inflow has a cyclical movement pattern that is closer to the financial cycle in Indonesia. This graphic analysis confirms the findings [19] which shows that the impact of debt based capital inflow is stronger on bank credit in Indonesia.



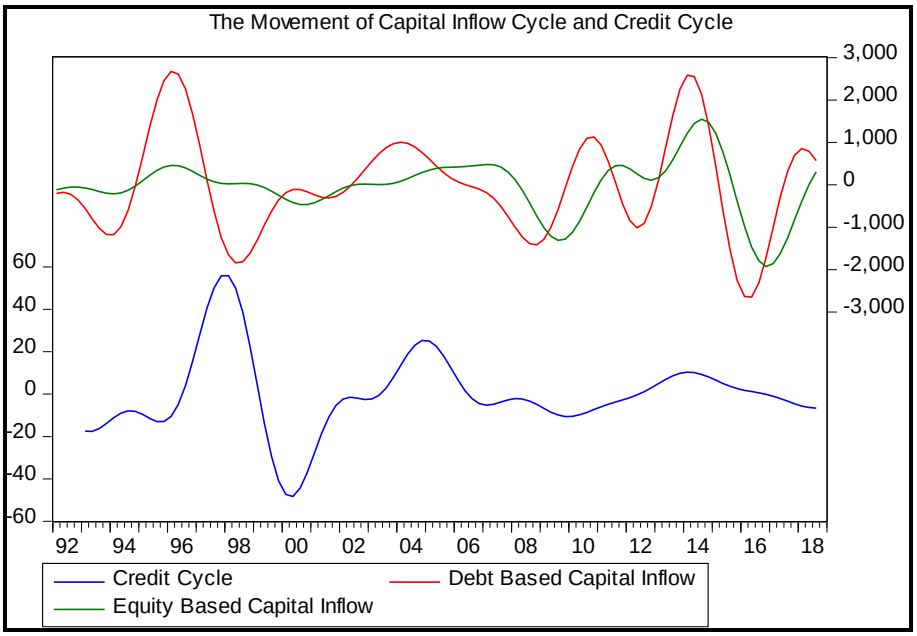
Source : Data Processed

Figure 4 The Interaction of the Indonesian Capital Flow Cycle with the Financial Cycle

Based on figure 4, it can be seen that the procyclicality of the total credit cycle is an indicator of the Indonesian financial cycle with the cycle of total capital flows into the Indonesian economy. The period of expansion and contraction of the capital flow cycle is seen to precede the period of expansion and contraction of the financial cycle, the expansion of the capital flow cycle is followed by expansion in the financial cycle, on the other hand, the contraction in the capital flow cycle is also followed by a contraction in the financial cycle. After the global financial crisis in 2008, the period of expansion and contraction in the capital flow cycle is increasingly similar to the period of expansion and contraction in the financial cycle (regardless of the period of contraction in the capital flow cycle in 2012). The interaction between the capital flow cycle and the Indonesian financial cycle can be one additional information to analyze the expansion and contraction movements of the Indonesian financial cycle. In this graphical analysis,

the Indonesian financial cycle is extracted from data on total bank credit to the economy, while total bank credit itself has two main components, namely credit to business fields and credit to non-business fields. Banking credit to a business is credit that will drive domestic output growth in the economy, on the other hand, credit to non-business fields is credit which tends to only increase aggregate demand, especially consumption in the economy. The interaction of the capital flow cycle with the two component cycles of bank credit was carried out using the concordance index analysis and correlation coefficient in this study.

The global financial cycle and the commodity price cycle have a strong correlation with the Indonesian capital flow cycle. Furthermore, the cycle of capital flows to Indonesia also has a procyclical relationship with the two cycles of external factors. Compared to the global financial cycle, the capital flow cycle in the Indonesian economy has a closer correlation and interaction with the export commodity price cycle. The period of expansion in the global financial cycle and the cycle of Indonesian export commodity prices will be the main driving factors for the inflow of foreign capital into the Indonesian economy. The level of development of the financial system and the depth of the financial sector are important issues to deal with the negative impact of excessive capital inflows (out) to (from) the Indonesian economy. At the level of theoretical analysis, excessive inflows of capital into the Indonesian economy will trigger an increased chance of a reversal in the direction of capital outflows, which can trigger a financial crisis in the economy. At an empirical level, the findings of this study reveal that in addition to the global financial cycle, the cycle of Indonesian export commodity prices in the international market is more closely related to the capital flow cycle.



Source : Data processed

Figure 5 The Interaction of Indonesian Capital Flow Cycles Based on Debt and Equity with the Financial Cycle

Graph 5 is the interaction of the debt-based and equity-based capital flow cycles with the Indonesian financial cycle. Based on Graph 5, the equity-based capital flow cycle does not appear to have a cyclical pattern that can be linked to movements in the Indonesian financial cycle. Meanwhile, debt-based capital flows have the same pattern as the total capital flow cycle, whose interactions with the Indonesian financial cycle are analyzed using Graph 4. These findings indicate that Indonesia's financial cycle interacts with the debt-based capital flow cycle. Using the concordance index analysis method in Table 5, it shows that the credit cycle to non-business fields is the cycle with the strongest interaction with all capital flow cycles analyzed in this study. Meanwhile, the total credit cycle and the credit cycle to the business field show a stronger procyclical interaction with the equity-based capital flow cycle than the interaction with the debt-based capital flow cycle.

4. CONCLUSION

The correlation between the capital flow cycle and the financial cycle in Indonesia shows a less tight correlation. The results of the calculation of the correlation coefficient between the capital flow cycle and the cycle for the three types of credit show that only credit to non-business fields has a relatively strong correlation. The analysis also shows that the capital flow cycle precedes the movement of the financial cycle in Indonesia. The implication of these

findings is that an increase in the prices of Indonesia's main export commodities in the long run will lead to long-term inflows of capital into the Indonesian economy. Furthermore, it will have an impact on the lengthening duration of the expansion of the financial cycle in Indonesia. Conversely, if there is a reversal of the direction of capital flows as a result of falling prices for Indonesia's main export commodities, it could result in a sharp financial cycle contraction in the Indonesian economy.

REFERENCES

[1] C. M. Reinhart, V. Reinhart, and C. Trebesch, "Global cycles: Capital flows, commodities, and sovereign defaults, 1815-2015," *Am. Econ. Rev.*, vol. 106, no. 5, pp. 574–580, 2016.

[2] H. Rey, "Dilemma not Trilemma," *NBER Work. Pap. Ser.*, 2015.

[3] K. J. Forbes and F. E. Warnock, "Capital flow waves: Surges, stops, flight, and retrenchment," *J. Int. Econ.*, vol. 88, no. 2, pp. 235–251, 2012.

[4] R. Balakrishnan, S. Nowak, S. Panth, and Y. Wu, "Surging Capital Flows To Emerging Asia: Facts, Impacts and Responses," *J. Int. Commer. Econ. Policy*, vol. 04, no. 02, p. 1350007, 2013.

[5] T. Kinda, M. Mlachila, and R. Ouedraogo, "Commodity Price Shocks and Financial Sector Fragility," 2016.

[6] C. Borio, "The financial cycle and macroeconomics: What have we learnt?," *J. Bank. Financ.*, vol. 45, no. 1, pp. 182–198, 2014.

[7] M. Drehmann, C. Borio, and K. Tsatsaronis, "Characterising the Financial Cycle: Don't Lose Sight of the Medium Term!," *BIS Work. Pap.*, no. 380, pp. 1–38, 2012.

[8] S. Claessens, M. A. Kose, and M. E. Terrones, "How do business and financial cycles interact?," *J. Int. Econ.*, vol. 87, no. 1, pp. 178–190, 2012.

[9] M. E. T. Stijn Claessens, M. Ayhan Kose, "Financial Cycles: What? How? When?," in *NBER Seminar on Macroeconomics 2010*, vol. 7, no. September, 2011, pp. 303–343.

[10] Y. S. Schüler, P. P. Hiebert, and T. A. Peltonen, "Characterising the financial cycle: a multivariate and time-varying approach," 2015.

[11] C. C. R. P. Menden, "Dissecting the Financial Cycle with Dynamic Factor Models and Christian R . Proaño," 126, 2017.

[12] S. J. Koopman, R. Lit, and A. Lucas, "Model-Based Business Cycle and Financial Cycle Decomposition for Europe and the U.S.," *SSRN Electron. J.*, 2018.

[13] G. Galati, S. J. Koopman, and M. Vlekke, "Measuring Financial Cycles in a Model-Based Analysis: Empirical Evidence for the United States and the Euro Area," *SSRN Electron. J.*, 2016.

[14] O. J. Grinderslev, P. L. Kramp, A. F. Kronborg, and J. Pedersen, "Financial Cycles: What are they and what do they look like in Denmark?," *Danmarks Natl. Work. Pap.*, vol. 115, no. 115, pp. 1–53, 2017.

[15] L. J. Christiano and T. J. Fitzgerald, "The Band Pass Filter," 1999.

[16] M. Drehmann and J. Yetman, "Why you should use the Hodrick-Prescott filter – at least to generate credit gaps," no. 744, 2018.

[17] G. Gyomai and R. Nilsson, "Cycle Extraction: A Comparison of Phase-Average Trend Method, The Hodric-Prescott and Christiano-Fitzgerald Filters," 2011/04.

[18] V. Pontines, "The fi nancial cycles in four East Asian economies," *Econ. Model.*, vol. 65, no. May, pp. 51–66, 2017.

[19] J. S. Davis, "The macroeconomic effects of debt- and equity-based capital inflows," *J. Macroecon.*, vol. 46, pp. 81–95, 2015.