

Does Dilemma Or Trilemma Hypothesis Exist? Evidence From Asean-5

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Abstract: This research aims at identifying the existence of trilemma or dilemma concept in ASEAN-5 countries. The data were taken from secondary data of the period of 2000-2016 in ASEAN-5 countries include Indonesia, Malaysia, the Philippines, Singapore, and Thailand. Vector Error Correction Model (VECM) was applied in the analysis. Trilemma hypotheses were evidenced in Indonesia, Malaysia and Singapore meanwhile dilemma circumstance occurred in the Philippines and Thailand either during the short or long term. The findings indicate different results on the regimes adopted by the countries.

Index Terms: Trilemma, Dilemma, Capital Flows, Financial Stability

1 INTRODUCTION

The global financial crisis in 2008 has brought essential implication to the shift of paradigm in monetary policy framework in most countries. The great moderation era marked by the implementation of inflation targeting framework by the application of interest rates instrument in most central bank in the world has not guaranteed macroeconomic stability particularly the one generated from financial shock. The limitless interconnection of world's financial system causes susceptible financial system that leads to crisis. The financial pro-cyclicality pattern indicates the existence of moral hazards among the economy actors to pursue excessive assets particularly credit without considering the risks. Moreover, the sudden and reversal capital flows amongst the countries contributed the financial risk and the exchange rate's stability. The existence of trinity impossible concept or trilemma has become the main focus in financial design configuration in every country to respond the instability. Therefore, this research is aimed at identifying the existence of trilemma or dilemma concept on ASEAN-5 countries. It is an essential study to determine monetary policy corresponding to the regime of exchange rate and international capital flow as well as countries' resilience to respond global financial cycle and international reserves adequacy.

2 LITERATURE REVIEW

The concept of trilemma hypothesis or impossible trinity by Mundell Fleming during Bretton Wood regime includes three objectives: monetary independence, exchange rate stability and financial integrity [1]. The objectives are crucial to maintain economy stability to face global economy turmoil despite its inability to be implemented in the same time referring to a concept called impossible trinity (trilemma) an impossibility to occur in the same time [2], [3]. Trilemma concept explains that the policy makers are not automatically able to run the three policy instrument in the same period. Consequently, one policy should be reduced.

In one particular circumstance and at specific time, when a central bank demanded to increase independent monetary policy and to maintain exchange rate's stability, it must reduce financial integration to reach the expected optimum condition. Mundell's hypothesis mentions that a strong frame work is based on the important exchange rate regime adopted. On fixed exchange rate system, when obstacles occur in the mobility of free capital flow, the role of control towards capital flow is very important to achieve monetary autonomy [4]. On the other hand, on flexible exchange rate system, the monetary policy is independent and there is not any barriers or restriction in capital flow mobility. The case of flexible exchange rate system is still being discussed by the policy makers and academicians since it is against Mundell's perspective. This is due to a change from trilemma to dilemma in which monetary policy independence occurs only if capital transaction is under control [5]. Several studies on trilemma concept have been done in a number of countries. One of them was [6] exposing countries with more open economy which preferred exchange rates stability and financial openness by holding fairly massive international reserves. It also occurred when crisis hit. In developing countries, generally, the monetary independence level and the economy openness are still low, but post crisis circumstance occurring in two decades encouraged the importance to maintain exchange rate stability. Global liberalization caused volatile susceptible of the capital flow. [6] mentioned that greater monetary independence lowered the volatile output where the greater mitigation of exchange rates. The level of financial openness accompanied by financial development could lower the volatile. The study by [7] mentioned the traditional perspective on exchange rate regime and capital flow openness which is called impossible trinity or trilemma with three possibilities of (1) open capital market, (2) monetary independence and (3) fixed exchange rates. The result demonstrated that trinity was not only possible but also optimal when central bank decreased the loss in implementing policy by doing three interventions. On the other hand, [2] highlighted trilemma concept in financial stability case. Financial stability based on trilemma could not be used in the same time within one particular period. A stable financial system, financial integration and national financial stability policy could not go hand in hand. The result shows that financial integration and financial stability policy in Europe was not able to guarantee the financial security optimally from the crisis in 2007/2008. Meanwhile, monetary policy interaction on

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developing countries had different focus compared to that of developed one such as Europe. [8] revealed that trilemma concept in developed and developing countries had different focuses to maintain economic stability in the countries. Every country has different the economic pattern, hence the monetary interaction also differs. Developed countries tend to optimize the policy from financial integrity but the developing ones focus on capital flow management. Study by [9] explained that monetary policy was influenced by financial liberation and capital flow that domestic policy inclined to be imperative such as price stability. Moreover, [9] included the global uncertainty component to highlight policy mix related to the capital inflow management. The findings emphasized that global uncertainty brought great effect to the increase of capital inflow. Financial integration marked by the capital increase particularly inter-country credit gave implication to monetary condition and financial vulnerability [10]. It also affected the stability of exchange rates and maturity mismatch on bank's and household's cash flow. This does not mean that capital flow is unimportant but what has to be paid attention is that the imbalance on-going transaction becomes the main factor for long period. On the other hand, [11] exposed that there was a positive loop feedback between the increased number of credit, asset price rocketing and compression spread. When risk premium is low, credit boom is likely to happen. Weak risk measurement and healthy cash flow occur when asset price rises. Such condition causes procyclicality of credit flow and financial vulnerability. Study by [2] emphasized that dilemma concept provided real contribution compared to that of trilemma concept. Furthermore, [2] proved that global financial cycle alter trilemma to dilemma concept that the result showed important highlight of mix policy focusing on three points (1) capital control targeting, (2) financial cycle policy, (3) transmission channel related to credit limit cycle. Meanwhile, trilemma concept is also important to deal with economy openness including financial integration which dominantly plays an important role in the economy movement.

3 METHODOLOGY

The data used in this research is secondary data within yearly period of 2000-2016 in five countries in ASEAN-5 with different exchange rate regime and diverse reserves system. ASEAN-5 includes Indonesia, Malaysia, the Philippines, Singapore, and Thailand. The endogenous variables consist of three months international US\$ Libor (IIR_libor) in percentage %, deposit interest rate (Dep_IR) in percentage, exchange rates (ER) in LCU per US\$ period average, Net Portfolio investment (Portfolio) in BoP current US\$, Domestic credit provided by financial sector (Domestic_Credit) in percentage of GDP. The method applied in the analysis is Vector Error Correction Model (VECM) to analyse relation pattern for the effect of international capital flow, the difference of domestic and international interest rates, exchange rates, domestic rates and portfolio investment. Such method also determines the influence of error correction of economy actors in adapting to long term and short term pattern. Below is the basic model of VECM [12].

$$\Delta z_t = \Gamma_i \Delta z_{t-1} + \dots + \Gamma_{k-1} \Delta z_{t-k+1} + \Pi z_{t-k} + u_t$$

is a specification system containing information on long term and short term adaptation to Z. Z is a number of set endogen variable (z_t) used in the model. Meanwhile, $\Pi = \alpha \beta'$, α is

the adaptation velocity towards imbalances and β long term coefficient.

4 RESULT AND DISCUSSION

4.1 The configuration of exchange rates regime and reserves system and financial dynamics in ASEAN-5

The stability of exchange rates becomes an indicator determining the overall macro economy stability. Exchange rates fluctuation in foreign exchange market does not only portray the interaction strength of foreign exchange rates demand and offer, but also indicates the adaptation velocity of exchange rates to a steady state which differs in each country. Below is exchange rates regime mapping, capital flow system and impossible trinity condition.

TABLE 1
THE MAPPING OF IMPOSSIBLE TRINITY CONDITION IN ASEAN-5

Countries	Impossible Trinity (Trilemma)			Trilemma Summary
	Free Capital flows	Fixed Exchange Rate	Independent Monetary Policy	
Indonesia	Managed Capital Flows	Managed Floating	Independent Monetary Policy	-
Malaysia	Managed Capital Flow	Managed Floating	Independent Monetary Policy	-
The Philippines	Managed Capital Flows	Managed Floating	Independent Monetary Policy	-
Singapore	Free Capital Flow	Managed Floating	Independent Monetary Policy	Trilemma
Thailand	Managed Capital Flows	Managed Floating	Independent Monetary Policy	-

Source: IMF (2016), processed

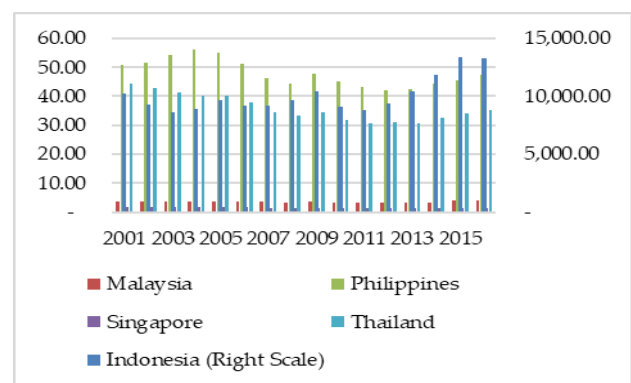


Figure 1. Official exchange rate (LCU per US\$, period average)

Source: <http://www.worldbank.org>

The movement of the exchange rates in ASEAN-5 countries is fairly dynamic in which the increase trend occurs accordingly in all ASEAN-5 in post 2008 financial crisis. The highest depreciation occurred in the Philippines with 7.5% and followed by Indonesia with 7.12%, Malaysia with 5.66%, Thailand with 2.92%, and the lowest percentage of Singapore

with 2.8%. Higher exchange rates fluctuation was experienced by Indonesia and the Philippines compared to other countries. This is due to floating exchange rate system applied by both countries which was also caused by external dynamics and fundamental domestic macro economy in each country. What seems interesting is that Thailand also applied floating system but the percentage of changes differs approximately 4.6% from that of the Philippines and Indonesia. On the other hand, Singapore has the lowest changes in the increase of lowest depreciation as a result of capital inflow particularly from fairly great number of net portfolio investment and the number of reserves to deal with the exchange rates fluctuation. Volatile portfolio investment is caused by the movement of financial instruments. Short term portfolio investment vulnerability and sudden reversal may cause crisis. However, with greater number of Foreign Direct Investment than portfolio investment, the vulnerability of reverse capital flow can be reduced.

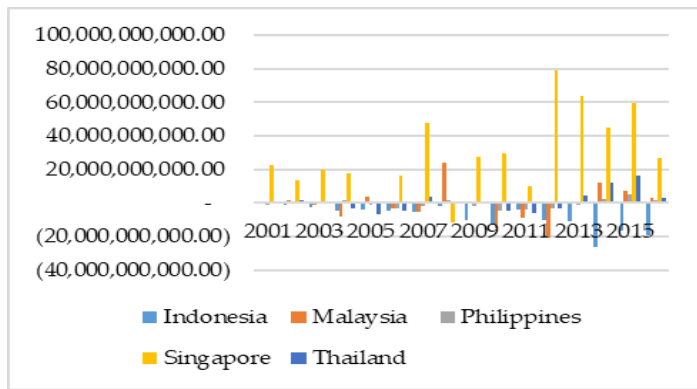


Figure 2. Portfolio Investment Net (BOP, Current US\$)
Source: <http://www.worldbank.org>

Singapore is a country which adopts both short term and long term free capital flow system with controlled exchange rates system. Besides portfolio investment, Singapore has a great number of Foreign Direct Investment (FDI) providing advantages for a country with few natural resources. The advantage of FDI are opening employment, providing tax incentives and political stability, which then in longer term, does not yield financial risks. Figure 2 shows that Singapore has the highest number of FDI compared to other countries. However, significant decrease occurred in 2001 where capital outflow reached S\$10 billion and it happened again in 2008 due to global economy crisis [13].

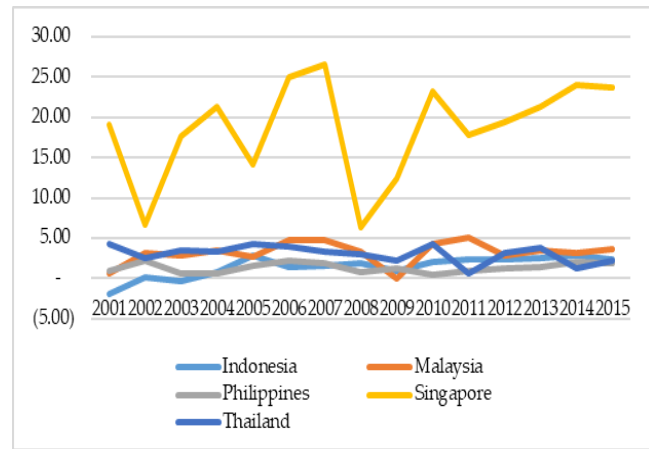


Figure 3. Foreign Direct Investment Inflow (% GDP)
Source: <http://www.worldbank.org>

In terms of numerous amount of capital flow, Singapore's total reserve is the highest among other ASEAN-5 followed by Thailand, Malaysia, Indonesia and the Philippines. Thailand experienced fairly significant increase of capital up to \$196 billion which then levelled up its external position. Meanwhile, Indonesia has \$129 billion reserves to support the import and to pay the loan for the period of 8.6 months. In contrast, Malaysia experienced inclining trend after 2013 caused by external shock resulted from the US policy of The Fed's interest rates' rise which generated capital flow. Philippines is in a relatively stable trend yet its position is the lowest among ASEAN-5 countries.

4.2 The Existence of Dilemma Hypotheses or Trilemma in ASEAN-5 countries.

4.2.1 Stationery Test

The unit root test or data stasionerity test is aimed at observing particular coefficient from the estimated autoregressive model whether it has 1 value or not. The application of unit root test using Dickey Fuller test has weakness particularly in its alternative hypothesis with unit root approaching 1.

TABLE 2
THE RESULT OF STASIONERITY ON LEVEL 1 (0) IN ASEAN-5 COUNTRIES

Variable	Indonesia	Malaysia	Philippines	Singapore	Thailand
Portfolio Investment (Portfolio)	-1.427	-5.689	-3.211**	-3.327**	-4.540
Exchange Rate (ER)	-1.109	-1.538	-1.524	-1.704	-3.619**
Domestic Credit (Domestic Credit)	-1.853	-3.464	-2.224	0.194	-2.124
Domestic Interest Rate (Dep_IR)	-2.051	-1.473	-2.156	-1.923	-1.678
International Interest Rate (IIR_Libor)	-2.245	-2.245	-2.245	-2.245	-2.245

Note: ***, **, * each shows the significance on $\alpha = 1\%$, 5% dan 10%

Source: Data processed, 2018

Based on stationery test on level $I(0)$, only variable of portfolio investment in the Philippines and Singapore and the exchange rate variable in Thailand are stationery in $\alpha = 5\%$. Meanwhile, other variables are not yet stationary on the level degree.

TABLE 3
STATIONARITY TEST RESULT ON THE DEGREE OF FIRST INTEGRATION $I(1)$ IN ASEAN-5 COUNTRIES

Variable	Indonesia	Malaysia	Phillippines	Singapore	Thailand
Portfolio Investment (Portfolio)	-7.607***	-5.797***	-5.187***	7.043* **	4.425 ***
Exchange Rate (ER)	-5.986***	-3.941***	-4.025***	3.029* *	3.989 ***
Domestic Credit (Domestic_Credit)	-3.252**	-4.106***	-3.103**	5.353* **	3.426 ***
Domestic Interest Rate (Dep_IR)	-5.509***	-4.657***	-5.109***	5.848* **	5.059 ***
International Interest Rate (IIR_Libor)	-4.493***	-4.493***	-4.493***	4.493* **	4.493 ***

Note: ***, **, * each shows significance at $\alpha = 1\%$, 5% dan 10%
Source: Data processed, 2018

Since all variables are not yet stationary on the same level, thus the test is done on integration degree $I(1)$. The stationarity test on $I(1)$ shows all variable stationary that they have the same integration degree for $I(1)$ as displayed on table 3.

TABLE 4
OPTIMUM LAG DETERMINATION

Country	Lag Optimum	Schwarz Information Criterion
Indonesia	1	80.548*
Malaysia	1	63.292*
The Philippines	2	65.726*
Singapore	2	60.647*
Thailand	2	67.654*

Note: *) Significant at $\alpha = 5\%$

Source: Data processed: 2018

Table 4 displays the optimum lag test based on Schwarz Information Criterion (SC) test indicates different lags. The length of lag determination is essential since longer lag will decrease degree of freedom, which implicates the loss of information needed. In contrast, shorter lag produces wrong model [14], [15], [16].

4.2.2 Cointegration Test

The next step is to identify the long term correlation or cointegration using Johansen Cointegration Test. The result demonstrated a number of diverse long term correlation in each country where the models are linear and has

deterministic trend in the data. There is an interception without a trend in the cointegration equation and Vector Autoregression (VAR). The result of Johansen test as demonstrated in table 5 shows cointegration in all ASEAN-5 countries. It is confirmed by the greater statistic trace value than critical one for each country Indonesia.

TABLE 5
JOHANSEN COINTEGRATION TEST

Countries	Trace Statistic	Critical Value	Summary
Indonesia	86.024	69.818*	Cointegrated
Malaysia	5.124	3.842*	Cointegrated
The Philippines	10.868	3.842*	Cointegrated
Singapore	72.534	47.856*	Cointegrated
Thailand	7.142	3.841	Cointegrated

Note: *) Significant at $\alpha = 5\%$

Source: Data processed, 2018

4.2.3 The Short Term and Long Term Estimation VECM Model

Hypothesis test for trilemma and dilemma can be seen from long term and short term effect of the indicators such as domestic and international interest rates, credit and portfolio investment flows towards the diverse exchange rate stability in each country. Below is long term estimation of VECM model.

TABLE 6
LONG TERM ESTIMATION RESULT OF VECTOR ERROR CORRECTION MODEL (VECM)

Independent Variable	Dependent Variables: Domestic Interest Rates				
	Indonesia	Malaysia	Countries Philippines	Singapore	Thailand
Domestic_Credit(-1)	-0.219**	0.044**	0.062* *	-0.119**	0.169**
Portfolio (-1)	$-6.11 \cdot 10^{-11}$	$7.09 \cdot 10^{-11}$	$1.87 \cdot 10^9$ **	$-7.24 \cdot 10^{-12}$	$-1.54 \cdot 10^9$ **
IIR_Libor (-1)	-0.753**	-0.722**	2.495* *	-1.731**	-0.860**
ER(-1)	1.921**	5.235**	0.250* *	2.183**	0.466**
Intercept	-17.690	-24.979	16.852	10.225	-41.254

Note: ***, **, * each shows significance at $\alpha = 1\%$, 5% dan 10%
Source: Data processed, 2018

Table 6 above displays the long term correlation (cointegrating equation) indicating several significant variables that influence the exchange rate at the error degree of $\alpha = 5\%$. Such variables are domestic credit, international interests and domestic interest, meanwhile the net portfolio investment variable is merely significant in several countries including the Philippines and Thailand. The international net capital flow in several countries such as Indonesia, Malaysia, and Singapore does not affect the exchange rates. Thus, it indicates that in Indonesia, Malaysia and Singapore, where managed floating exchange rate regime is applied, the international capital flow mobility does not affect the stability of the exchange rate. As a small and open economy country Indonesia, Malaysia and Singapore rely on their net export to generate economy growth

and to play an important role in the global market. Consequently, the control policy towards exchange rate is considered more important than the interest rates. Such policy was aimed preferred to overcome imported inflation (cost push inflation) instead of interest rates policy. On the other hand, the Philippines and Thailand, with their managed floating exchange rates regime affected by international capital flow such as short term net portfolio investment, are sudden and vulnerable toward the reverse. This means that control towards the interest rates becomes essential to control international capital flow mobility than control towards the exchange rates. The credit exposure on exchange rates stability occurred in Malaysia, the Philippines and Thailand as indicated by the positive parameter sign in which credit caused the rise of the exchange rates (depreciation). Such circumstance corresponds to the long term estimation that the Philippines and Thailand are countries with highly vulnerable financial system towards credit growth, which then leading to dilemma. Interesting phenomenon was spotted in Malaysia, which did not only experience trilemma but also was vulnerable to credit exposure resulting in trilemma and dilemma, where control to credit exposure is considered crucial. Postulated impossible trinity or trilemma, which is based on three elements including free capital mobility, independent monetary policies, can occur when the exchange rate is floating. The fixed exchange rate cannot make the monetary policy independent within free capital mobility. In contrast, postulated dilemma or irreconcilable duo mentioned that independent monetary policy can occur if the capital flow is well controlled directly or indirectly through micro prudential policy. The capital mobility system was measured by looking at portfolio investment effect to the exchange rates. When capital mobility affects the exchange rates, managed capital flows is needed. Conversely, when capital flow does not affect the exchange rate, free capital flow exists. The effect of domestic credit towards the exchange rates shows the vulnerable financial sector towards the exchange rates stability. When the increase of credit causes depreciated exchange rates, credit exposure occurred, and vice versa. Table 7 displays the result of the analysis on the fulfillment of trilemma or dilemma condition in ASEAN-5.

TABLE 7

SUMMARY OF IMPOSSIBLE TRINITY HYPOTHESIS TEST

Country	Long term		Short term	
	Conclusion	Indicators	Conclusion	Indicators
Indonesia	Trilemma	<ul style="list-style-type: none"> Portfolio does not affect the exchange rates Credit Exposure 	Trilemma	<ul style="list-style-type: none"> Portfolio does not affect the exchange rates Credit exposure
Malaysia	Trilemma	<ul style="list-style-type: none"> Portfolio does not affect the exchange rates Credit Exposure 	Trilemma	<ul style="list-style-type: none"> Portfolio does not affect the exchange rates Credit Exposure
The Philippines	Dilemma	<ul style="list-style-type: none"> Portfolio affects the exchange rates No Credit 	Dilemma	<ul style="list-style-type: none"> Portfolio affects the exchange rates

		Exposure		
Singapore	Trilemma	<ul style="list-style-type: none"> Portfolio does not affect the exchange rates Credit Exposure 	Trilemma	<ul style="list-style-type: none"> Credit Exposure Portfolio does not affect the exchange rates Credit Exposure
Thailand	Dilemma	<ul style="list-style-type: none"> Portfolio affects the exchange rates Credit Exposure 	Dilemma	<ul style="list-style-type: none"> Portfolio affects the exchange rates Credit Exposure

Meanwhile the error correction term or the adaptation of economy actors to imbalance circumstance indicates that several significant variables includes domestic interest rates in Indonesia and the Philippines, domestic credit in Malaysia and Singapore, international interest rates in Singapore and exchange rates in Thailand. Although in the long run, five countries have the difference of instrument adjustment.

TABLE 8
ERROR CORRECTION TERM MODEL VECTOR ERROR CORRECTION MODEL (VECM)

Variable	Countries				
	Indonesia	Malaysia	Philippines	Singapore	Thailand
D(ER)	-0.029	0.162	0.050	-0.042	0.129**
D(Domestic_Credit)	0.179	-23.767**	-0.408	8.730*	0.228
D(Portfolio)	6.22.10 ⁸	-3.77.10 ⁹	76960789	1.35.10 ¹⁰	3.52.10 ⁸ **
D(IIR_Libor)	0.166	0.746	-0.008	1.665*	0.032
D(Dep_R)	-2.189**	-0.301	0.083**	-0.177	0.058

Notes: ***, **, * each show significance at $\alpha = 1\%$, 5% and 10%
Source: Data processed, 2018

Meanwhile, long term estimation demonstrates the effect of international interest rates towards domestic interest rates in all ASEAN-5 countries. The increase of international interest rates resulted in decreasing domestic interest rates. It indicates that the change in international interest rates was indirectly responded by increased domestic rates. The highest coefficient seen in Philippines, followed by Singapore which indicates a more controlled exchange rates level than Malaysia with the smallest long term coefficient.

5 CONCLUSION

Postulation of dilemma occurs in the Philippines and Thailand, whereas trilemma was experienced by Indonesia, Malaysia and Singapore both in long term and short term. The result of the analysis of the Philippines and Thailand during the research period indicates different result from the regime adopted. It demonstrates that the economy dynamics replaces

the configuration of international capital flows and monetary policy in Negara ASEAN-5. Credit exposure is an important factor to affect the exchange rates. Hence, macroprudential policy is required as a buffer to strengthen monetary policy. Further research is expected to include a more comprehensive indicator such as foreign direct investment, current account balance and international loan as well as risk taking.

[17] International Monetary Fund, Annual Report on Exchange Arrangements and Exchange Restrictions 2016. IMF, Washington D.C, USA, 2016.

REFERENCES

- [1] Obstfeld, M., and Alan T, "Global Capital Markets: Integration, Crisis and Growth", Cambridge University Press, 2004.
- [2] Schoenmaker, D, "The financial Trilemma", Economics Letters, 111(13): 57–59, 2011.
- [3] Rey, H., Dilemma not Trilemma: The Global Financial Cycle and Monetary Policy Independence. Working Paper, National Bureau of Economic Research, 21162, Cambridge, 2015.
- [4] Farhi, E., and Ivan, W., Dilemma not Trilemma? Capital Controls and Exchange Rates with Volatile Capital Flows. 14th Jacques Polak Annual Research Conference, November 7-8, 2013.
- [5] Rey, H., Capital Flows: Assessing the Costs, Hunting for the Gains. IMF research conference on Rethinking Macroeconomic Policy, Washington DC, 2013.
- [6] Aizenman, J., Menzie D.C, and Hiro, I., The Emerging Global Financial Architecture: Tracing and Evaluating New Patterns of the Trilemma Configuration. Journal of International Money and Finance, Vol. 29, No. 4, p. 615–641, 2010.
- [7] Escude, Guillermo J., The Possible Trinity: Optimal Interest Rate, Exchange Rate, and Taxes on Capital Flows in a DSGE Model for a Small Open Economy, Economics, No. 2014-25, June 25, 2015.
- [8] Kohli, Renu, Managing Capital Flows in Intermediate Regimes: The Case of India, Journal of International Commerce, Economics and Policy, World Scientific Publishing Co. Pte.Ltd, Vol 2(02), pp. 351-371, 2011.
- [9] Gupta, P., Capital Flows and Central Banking The Indian Experience. Worldbank. Development Economics Vice Presidency Operations and Strategy Team, February, 2016.
- [10] Gourio, F.C.S., Michael and Verdelhan, A., Uncertainty and International Capital Flows, Federal Reserve Bank of Chicago and NBER, 2014. <http://sites.google.com/site/fgourio/>
- [11] Borio, C., and Piti D, Global Imbalances and the Financial Crisis: Link or no Link?. BIS Working Papers, No 346, 2011. <http://www.bis.org/publ/work346.pdf>
- [12] Brunnermeier, M.D.G, J., Banks and Cross-Border Capital Flows: Policy Challenges and Regulatory Responses. Committee on International Economic Policy and Reform, 2012.
- [13] Chow, H.K., Managing Capital Flows: The Case of Singapore. ADB Institute Discussion Paper, No. 86, February, 2008.
- [14] Gujarati, D.N., Basic Econometrics", the 4th eds., McGraw Hill, pp.275-276, 2003.
- [15] Enders, W., Applied Econometric Time Series. New York: John Wiley & Sons, 1995.
- [16] Harris, R., Cointegration Analysis in Econometric Modelling", Prentice Hall, 1995.