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The Impact of Post-GFC Monetary Policy in the US on Capital Flows to the SEACEN Economies

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ABSTRACT

This paper examines the impact of unconventional monetary policy (UMP) in the US after the global financial crisis (GFC), represented by the expansion and contraction of the US Federal Reserve balance sheet, on capital inflows to SEACEN economies. The empirical results from panel data analysis of nine countries, namely Hong Kong SAR, India, Indonesia, Malaysia, Philippines, Singapore, Thailand, People Republic of China, and the Republic of Korea, since 2004 to 2018 point to the importance of portfolio inflows in transmitting the spill-over effects of the UMP / QE in core AEs, particularly in the US, on the SEACEN economies in the sample. The findings imply that SEACEN's real economy and financial system are prone to elevated risks that accompany global portfolio rebalancing, thus lead to a strong merit in strengthening the cooperation framework within SEACEN, as a platform for regional sharing of policy experiences in dealing with capital flow volatility.

Keywords: Capital inflows; unconventional monetary policy; monetary policy trilemma

JEL Classification: E22, F32, F36, F41

1. Introduction

Since the global financial crisis (GFC), research on the spill-over effects of US monetary policy on capital flows to emerging markets has proliferated considerably. Among the key contributions are inter alia Joyce et al (2012), International Monetary Fund (2013), Rey (2013, 2016, 2018), Miranda and Rey (2015), Passari and Rey (2015), Georgiadis (2016), and Anaya et al (2017). These studies argue that the post GFC UMP, i.e. the quantitative easing (QE) policy, in advanced economies (AEs), the US in particular, influences global credit condition and cross-border financial flows, including capital flows to emerging market economies (EMEs). This issue also has a significant policy relevance, particularly regarding the management of monetary policy trilemma (MPT) in EMEs. In practice, in line with the increasing integration of global financial markets, large capital flows from AEs put pressure and complications on the implementation of monetary policy in the EMEs, where there is a tendency for the monetary authority to shift its policy preferences from a “corner solution” to a “middle solution”.¹

Despite the proliferation of studies addressing the impact of UMP / QE after the GFC on capital flows to EMEs and the possible policy ramifications that follow, the empirical literatures are rather muted in terms of SEACEN economies as a group. Studies by Lim and Shrestha (2009) and Becker (2016) exhibits a series of discussions on individual country experiences with large and often volatile capital flows and their policy responses, including responses during the post GFC period. Siregar et al (2011) discuss capital flows to SEACEN countries after the GFC and their policy responses, including the management of MPT challenges. Recent study by Prabheesh et al. (2021) particularly examines to what extent the global capital flows or financial cycle in the post GFC can explain the variation in domestic economic cycles and macroeconomic stability in India and Indonesia and analyses the differences. This paper therefore adds to the empirical literatures on the effect of the US monetary policy on capital flows to the SEACEN economies.

This paper is set to accomplish two main tasks. First is to empirically study the effect of the changing size of the US Federal Reserve’s balance sheet, or the so called unconventional monetary policy (UMP) / quantitative easing (QE) during and after the global financial crisis (GFC), on capital flows to the SEACEN economies. Based on this empirical study, second, policy implications for central bank policy will be discussed.

Our specific contributions are as follows. First, our study is the first to empirically test the impact of US monetary policy, measured by the changes in the US Fed balance sheet, on a select panel of SEACEN member countries, i.e. People Republic of China, Hong Kong SAR, India, Indonesia, South Korea, Malaysia, Philippines, Singapore, and Thailand. We use annual data covering the period from 2004 until 2018, hence effectively capture the influence of the US UMP / QE immediately prior, during, and a decade after the GFC. Figure B1 – B9 in appendix B depict the dynamic of capital inflows to our sample economies. Second, the selected countries in the panel include countries at different stages of financial market development, which naturally add control to our empirical results in addition to other traditional pull factors. Using this empirical set up, we then derive policy implication for SEACEN member countries.

Given the aforementioned backdrop, this paper will conclude that the expansion and contraction of the US Federal Reserve balance sheet, as a direct measure of UMP / QE in the US, positively affects

¹ Rey (2013, 2016) contends that amidst the global financial cycle, induced by UMP / QE in AEs, the resulting cross border capital flows may have morphed the Mundell-Fleming monetary policy trilemma (MPT) challenges traditionally faced by small and open EMEs into an “irreconcilable duo”, where sovereign monetary policy is possible if and only if the capital account is managed, regardless the exchange rate regime. Built upon Rey’s hypothesis that floating exchange rate regime has no insulation property under the global financial cycle, Han and Wei (2018) show the possible asymmetric effects of monetary policy shocks from advanced economies. Specifically, they argue that without capital controls, a flexible exchange regime offers some monetary policy autonomy when the center country tightens its monetary policy, yet when the center country enters the loosening cycle Rey’s irreconcilable duo may reappear.

capital flows to SEACEN economies. The effect is robust across countries in terms of portfolio investment flows. This lends support to the complication of macroeconomic policy management, particularly the management of MPT in the SEACEN economies, which comprise of open and internationally integrated emerging economies (Warjiyo & Juhro, 2019).

For the ease of its presentation, this paper has been divided into several parts after this introduction. In Section two, we will discuss the hypotheses development related to the impact of UMP / QE in the US on capital flows to the SEACEN economies. Section three outlines the empirical design of empirical study. Section four presents the empirical results and discussion. Last section presents conclusion and policy implications.

2. Hypotheses Development

As explained in Rudebusch (2018), unconventional monetary policy (UMP) in the US conducted by the US Federal Reserve is a non-standard policy to address severe economic downturn during and in the aftermath of GFC, when the ultralow interest rates were not enough to revive output and employment growth sufficiently. There are two types of UMP. First is the forward guidance, through which the US Federal Reserve communicates future short-term interest rates; and second is the purchase of long-term government bonds or quantitative easing (QE). This paper analyses the impact of UMP in the US on capital flows to the SEACEN economies through the lens of QE. Despite some of the drawbacks to capture the US Fed's QE policy as noted by Rudebusch (2018) and Gagnon and Sack (2018), following Gambacorta et al (2014) and Anaya et al (2017), this paper uses the total assets of the Federal Reserve balance sheet as a proximate for QE by the US Federal Reserve.

As discussed in Rudebusch (2018) and Bauer and Rudebusch (2014), through liquidity effect QE may directly reduce the term premium on long term US Government bond yields as well as its expectation component by way of the (indirect) signaling channel. This initial impact on returns of the US Government bonds (safe haven assets), may then affect the long-term risk diversification benefits for global investors' portfolio combination, trigger global portfolio rebalancing, and lead to capital inflows to EME. Mensi et al (2014, 2016) for instance show that capital markets in EMEs provide risk diversification benefits for international investors.

Accordingly, Anaya et al (2017) show that the US UMP / QE shock significantly increases portfolio outflows from the U.S. and equivalently associated with increase in portfolio inflows to and pro-cyclical interest rate response in EMEs. As further noted in Anaya et al (2017) these impacts through capital flows complement the earlier findings by Fratzscher et al (2016b) that UMP has a direct effect on portfolio reallocation between advanced economies and EMEs.

Differ from Anaya et al (2017) and Fratzscher et al (2016b), we also include foreign direct investment (FDI) flows and other investment flows (OI) in our analysis. The link between UMP and FDI is less well established. In fact, FDI has been the less volatile component of capital flows to EMEs. Nonetheless, by nature, UMP / QE is a permanent addition to global liquidity, by which one might argue that it will significantly reduce global interest rate and ease global credit conditions, allowing sovereign and corporate borrowers to engage in risk taking in riskier EMEs by financing their next best positive net present value investment projects that would have not been feasible had the global interest rate and credit condition been much tighter. Passari and Rey (2015) show that the US monetary policy indeed influences the global financial condition, while Borio et al (2011) and Brauning and Ivashina (2019) show that there is rather tight linkages between global and domestic financial cycle. As with other investment (OI) flows, Bruno and Shin (2015a, 2015b) and Azis and Shin (2015) suggest the presence of macro-financial linkages involving risk taking channel and cross-border banking which may amplify the impact of global financial condition on credit availability in the EMEs.

Accordingly, this paper will test a hypothesis that UMP / QE, represented by the expansion and contraction of the US Federal Reserve balance sheet, will have a positive impact on all types of capital inflows, i.e. portfolio, direct and other investment flows, to the SEACEN economies.

3. Methodology and Data

To address the hypothesis and examine the impact of the US UMP / QE on capital flows to SEACEN economies, this paper will conduct empirical investigation by means of fixed effect panel data with country and time specific effect. This approach is in line with empirical studies on global push factors and domestic pull factors to capital flows, for instance as shown in Koepke (2015). The empirical relationship between capital inflows to the SEACEN economies in the sample and the corresponding push and pull factors can be expressed as follows:

$$y_{i,t} = \beta_{1i} + \beta_2 lbs_t + \beta_3 ix_{i,t} + \beta_4 gx_{i,t} + \beta_5 ms_{i,t} + \beta_6 to_{i,t} + \beta_7 hdi_{i,t} + \delta_i + \psi_t + \varepsilon_{i,t} \quad (1)$$

where: $y_{i,t}$ denotes capital inflows (or each of the component thereof, i.e. portfolio, direct investment and other investment flow), β_{1i} is intercept and lbs_t is the US Federal Reserve balance sheet (asset side) as the key determinant of capital flows to be examined. As control we include the following variables: $ix_{i,t}$ and $gx_{i,t}$ to capture nominal interest rate and real economic growth between the SEACEN countries in the sample and the US, respectively; $ms_{i,t}$ to account for *market size*, $to_{i,t}$ for *trade openness*, and $hdi_{i,t}$ for *human development index*. $\varepsilon_{i,t}$ is the *error terms*, i denotes *cross-section*, t stands for time, and $\beta_2 \dots \beta_7$ are regression coefficients.

In estimating equation (1) we include country specific effect, δ_i , to capture country specific heterogeneity, and time fixed effect, ψ_t , to capture common trends across countries. The use of panel fixed effect estimator with country and time specific effect is motivated by the fact that despite its simplicity, this estimator serves our purpose well as it can efficiently summarize our results. The countries in our sample are Hong Kong SAR (HK), India (IND), Indonesia (IDN), Malaysia (MYS), Philippines (PHI), Singapore (SGP), and Thailand (THA), and People Republic of China (PRC), and the Republic of Korea (KOR). We use this sample set to sufficiently control for various stages of financial sector development within the SEACEN given data availability our annual sample period (2004 – 2018). Using the recently launched Financial Development Index (IMF), the diversity of financial development in this sample of countries is reflected by the following values of individual country's aggregate index in 2018 (ordered from the highest to the lowest): KOR (0.81), HK (0.78), SGP (0.75), THA (0.74), MYS (.66), PRC (0.65), India (0.44), the Philippines (0.37), and Indonesia (0.37). Using this empirical set up, we then derive policy implication for SEACEN member countries.

Our hypothesis dictates that α_2 and β_2 should be significantly > 0 for both the total and each of the component of capital inflows. The coefficients for the control variables $\beta_3 \dots \beta_7$ are also expected to be significantly greater than 0. $\beta_3 > 0$ and $\beta_4 > 0$ may reflect benefits from risk diversification by combining EMEs' and AEs' assets in a portfolio combination. Standard Capital Asset Pricing Model (CAPM) shows that a combination of risky assets (a portfolio) is less risky than any of its components (see inter alia seminal work by Sharpe (1964) and Merton (1973)). $\beta_5 > 0$, $\beta_6 > 0$ and $\beta_7 > 0$ suggest the importance of idiosyncratic / country specific fundamental pull factors, i.e. market size, trade openness, and level of human capital. Overall, we expect that both the push factor, i.e. UMP / QE in the US as common global shock and the diversification benefits, and the pull factors, i.e. the country specific fundamentals, will affect capital inflows to the SEACEN economies in our study during the sample period. Appendix A Table A1 describes the variable definition, the corresponding data and their sources; while Appendix A Table A2 summarizes the descriptive statistics of the data.

4. Empirical Findings

To analyze the impact of the US Federal Reserve UMP / QE on capital inflows to the SEACEN economies in our sample, i.e. Hong Kong SAR (HK), India (IND), Indonesia (IDN), Malaysia (MYS), Philippines (PHI), Singapore (SGP), and Thailand (THA), and People Republic of China (PRC), and the

Republic of Korea (KOR), we estimate panel fixed effect regressions with country and time specific dummies as in Equation 1.

Table 1a – 1d below report the baseline results with no control variables, for total investment, portfolio, direct investment, and other investment inflows, respectively. Table 2a – 2d report the results of estimations that include all the control variables. We summarize the results of the estimations of the four different models in each table. Newey – West robust standard errors are used in all estimations to circumvent the problem of serial autocorrelations and heteroscedasticity. Model I includes all the 9 SEACEN countries in the sample (SEACEN-9), Model II excludes PRC from the sample (SEACEN-8), Model III excludes SGP and HK (SEACEN-7), and Model IV excludes PRC, HK and SGP (SEACEN-6).

These variations in the number of countries serve as an additional way to check for the robustness of our results to some possible extreme country characteristics. We check for three possibilities. First is the exclusion of PRC due to the fact that this country is a dominant export or re-export and direct investment hub in Asia (“the Factory Asia”). Hence we exclude PRC in Model II. Second is the exclusion of both HK and SGP as these jurisdictions are the two largest or dominant financial hubs in the region. This is represented by Model III. While Model IV combines the two exclusions.

Table 1 Baseline Estimations
(without Control Variables)

1a. Dependent variable: lai_{it} (all investment)

Variable	I	II	III	IV
lbs_t	0.7955*** (0.0469)	0.7468*** (0.0311)	0.7935*** (0.0610)	0.7282*** (0.0403)
Const	1.9624*** (0.6944)	2.6800*** (0.4525)	1.9836** (0.9031)	2.9439*** (0.5882)
Country fixed effect	YES	YES	YES	YES
Year effect	YES	YES	YES	YES
Observations	135	120	105	90
F	851.48***	1112.10***	256.52***	235.15***
R-squared	0.9882	0.9922	0.9832	0.9820

1b. Dependent variable: $lfdi_{it}$ (foreign direct investment)

Variable	I	II	III	IV
lbs_t	1.0339*** (0.0934)	1.0143*** (0.1039)	1.0409*** (0.1185)	1.0159*** (0.1379)
Const	-3.2467** (1.4240)	-2.9508* (1.5791)	-3.3749* (1.8081)	-3.0017 (2.0982)
Country fixed effect	YES	YES	YES	YES
Year effect	YES	YES	YES	YES
Observations	135	120	105	90
F	517.86***	490.10***	287.03***	119.81***
R-squared	0.9801	0.9757	0.9723	0.9318

1c. Dependent variable: lpi_{it} (portfolio investment)

Variable	I	II	III	IV
lbs_t	0.8990*** (0.0749)	0.8340*** (0.0648)	0.9543*** (0.0908)	0.8768*** (0.0830)
Const	-0.1436 (1.0993)	0.8042 (0.9492)	-0.9476 (1.3327)	0.1819 (1.2140)
Country fixed effect	YES	YES	YES	YES
Year effect	YES	YES	YES	YES
Observations	135	120	105	90
F	261.54***	317.77***	158.83***	162.36***
R-squared	0.9638	0.9657	0.9680	0.9676

1d. Dependent variable: loi_{it} (other investment)

Variable	I	II	III	IV
lbs_t	0.5529*** (0.0806)	0.4591*** (0.0734)	0.4862*** (0.0995)	0.3952*** (0.0854)
Const	4.3908*** (1.1866)	5.3222*** (1.0827)	4.9234*** (1.4712)	6.2540*** (1.2714)
Country fixed effect	YES	YES	YES	YES
Year effect	YES	YES	YES	YES
Observations	135	120	105	90
F	816.24***	1320.95***	141.05***	101.62***
R-squared	0.9748	0.9825	0.9569	0.9536

Notes: Newey-west robust standard errors are in parentheses (.), *, **, *** significant at 10%, 5%, and 1%, respectively.

The results reported in Table 1a – 1d show that, without additional control variables, the expansion and contraction of the US Federal Reserve’s balance sheet, lbs_t , as the proximate for QE policy in the US, significantly and positively affects capital inflows to SEACEN countries in all models (I – IV) both for the total measure of capital inflows (Table 1a) and all its components, i.e. portfolio inflows (Table 1b), foreign direct investment inflows (Table 1c), and other investment inflows (Table 1d). The robust standard error estimates show that the coefficients for lbs_t are significantly > 0 at 1%. The reported coefficients appear to be strongest for foreign direct investment inflows, followed by portfolio and other investment inflows, respectively.

A different picture emerges as we include the control variables in the regressions. lbs_t remains significant across all models for the estimation of total measure of capital inflows, i.e. lai_{it} (all investment), as reported in Table 2a. However, when we consider the components of capital inflows in Table 2b – 2d, it appears portfolio inflows, lpi_{it} , is the only measure of capital inflows that is consistently (and significantly) affected by lbs_t across the four different models. As to the other measures of capital inflows, i.e. $lfdi_{it}$ (foreign direct investment) and loi_{it} (others investment), the results are not consistent across Model I – IV. For $lfdi_{it}$, PRC tends to dominate the positive impact of lbs_t as shown by the results reported in Table 2b. In Model II and Model IV of Table 2 where PRC is excluded from the estimation, one can observe that the coefficient of lbs_t is not significantly different from 0, but significantly > 0 at 1% and 5% in Model I and III where PRC is included. A similar case is observed for loi_{it} . Comparing the four models in Table 2d, PRC dominates the impact of lbs_t on loi_{it} since the coefficient for lbs_t is found to be significantly > 0 in Model I and III, but = 0 in Model II and IV.

Next, we consider the contributions of other explanatory variables that were included as control. As can be observed in Table 2b, the coefficient for market size is significantly > 0 at 1% across the four

models. In Table 2d, level of human capital development, hdi_{it} , is a strong determinant of other investment flows as its coefficient is > 0 at 1% across Model I – IV. While, it is tempting to conclude that these two “pull factors” to capital inflows are robust indicators, we refrain from for taking such claim. Pull factors such as market size, trade openness, interest rate and growth differential might be positively affected by capital flows.

Table 2 Full Estimations
(with Control Variables)

2a. Dependent variable: lai_{it} (all investment)

Variable	I	II	III	IV
lbs_t	0.2265*** (0.0516)	0.40678*** (0.0681)	0.1515*** (0.0503)	0.3278*** (0.0731)
ix_{it}	0.0011 (0.0041)	0.0018 (0.0044)	0.0051 (0.0046)	0.0067 (0.0052)
gx_{it}	-0.0066 (0.0056)	0.0000 (0.0063)	-0.0023 (0.0075)	0.0097 (0.0094)
ms_{it}	0.4087** (0.1577)	-0.0596 (0.1587)	0.4827*** (0.1579)	0.0237 (0.1580)
to_{it}	0.0005 (0.0004)	0.0004 (0.0004)	-0.0000 (0.0007)	0.0002 (0.0007)
hdi_{it}	7.9919*** (1.5907)	7.9749*** (1.4062)	8.5921*** (1.6677)	8.7443*** (1.4158)
Const	-8.3930** (3.2861)	2.2255 (3.4668)	-9.9124*** (3.2226)	0.3194 (3.4768)
Country fixed effect	YES	YES	YES	YES
Year effect	YES	YES	YES	YES
Observations	135	120	105	90
F	1322.33***	1309.88***	1261.95***	601.78***
R-squared	0.9951	0.9949	0.9954	0.9916

2b. Dependent variable: $lfdi_{it}$ (foreign direct investment)

Variable	I	II	III	IV
lbs_t	0.4281*** (0.1443)	0.2581 (0.1630)	0.3580** (0.1693)	0.1711 (0.2119)
ix_{it}	-0.0012 (0.0063)	-0.0048 (0.0066)	0.0052 (0.0090)	0.0006 (0.0098)
gx_{it}	0.0067 (0.0110)	0.0014 (0.0133)	0.0223 (0.0140)	0.0153 (0.0201)
ms_{it}	0.9928*** (0.2543)	1.4535*** (0.3087)	1.1456*** (0.2767)	1.6505*** (0.3858)
to_{it}	-0.0015** (0.0007)	-0.0013* (0.0007)	-0.0001 (0.0019)	-0.0003 (0.0020)
hdi_{it}	3.5466 (2.6130)	3.8208 (2.502)	3.6862 (2.5461)	4.1265 (2.5223)

2b. Dependent variable: $lfdi_{it}$ (foreign direct investment)

Variable	I	II	III	IV
<i>Const</i>	-25.4713*** (6.0618)	-36.2413*** (7.3440)	-29.0490*** (6.5551)	-40.9546*** (8.7818)
<i>Country fixed effect</i>	YES	YES	YES	YES
<i>Year effect</i>	YES	YES	YES	YES
<i>Observations</i>	135	120	105	90
<i>F</i>	703.48***	545.34***	518.87***	136.50***
<i>R-squared</i>	0.9866	0.9830	0.9820	0.9543

2c. Dependent variable: lpi_{it} (portfolio investment)

Variable	I	II	III	IV
lbs_t	0.4855*** (0.1097)	0.6883*** (0.1228)	0.4861*** (0.1248)	0.6720*** (0.1369)
ix_{it}	0.0125* (0.0073)	0.0163** (0.0077)	0.0186* (0.0096)	0.0245** (0.0101)
gx_{it}	0.0152 (0.0100)	0.0195 (0.0122)	0.0169 (0.0126)	0.0254* (0.0151)
ms_{it}	0.8353*** (0.3025)	0.3036 (0.3535)	0.5138* (0.3077)	0.0279 (0.3607)
to_{it}	0.0009 (0.0007)	0.0006 (0.0006)	-0.0003 (0.0015)	-0.0002 (0.0015)
hdi_{it}	1.8000 (2.9620)	1.3571 (2.6567)	4.8787 (3.1212)	4.3812 (2.6944)
<i>Const</i>	-19.3815*** (6.5640)	-6.9250 (7.8560)	-12.9614* (6.6097)	-1.5437 (8.0723)
<i>Country fixed effect</i>	YES	YES	YES	YES
<i>Year effect</i>	YES	YES	YES	YES
<i>Observations</i>	135	120	105	90
<i>F</i>	315.55***	322.73***	258.52***	217.18***
<i>R-squared</i>	0.9730	0.9705	0.9769	0.9744

2d. Dependent variable: loi_{it} (other investment)

Variable	I	II	III	IV
lbs_t	-0.2534** (0.1028)	0.0658 (0.1227)	-0.3845*** (0.1147)	-0.0848 (0.1400)
ix_{it}	-0.0158*** (0.0058)	-0.0146** (0.0058)	-0.0099 (0.0077)	-0.0070 (0.0078)
gx_{it}	-0.0212*** (0.0081)	-0.0056 (0.0075)	-0.0227** (0.0103)	0.0024 (0.0112)

2d. Dependent variable: loi_{it} (other investment)

Variable	I	II	III	IV
ms_{it}	-0.0618 (0.2738)	-0.9192*** (0.3042)	0.3301 (0.2435)	-0.4740* (0.2705)
to_{it}	0.0017*** (0.0005)	0.0014*** (0.0005)	0.0003 (0.0013)	0.0007 (0.0013)
hdi_{it}	16.0470*** (2.5600)	16.3043*** (2.3520)	14.4958*** (2.4483)	14.9798*** (2.2891)
Const	3.1389 (5.8942)	22.4747*** (6.6735)	-4.5602 (5.2041)	13.2957** (6.1548)
Country fixed effect	YES	YES	YES	YES
Year effect	YES	YES	YES	YES
Observations	135	120	105	90
F	540.33***	884.29***	281.40***	254.36***
R-squared	0.9876	0.9896	0.9827	0.9716

Notes: Newey-west robust standard errors are in parentheses (.). *, **, *** significant at 10%, 5%, and 1%, respectively.

Accordingly, based on the above empirical results, we contend that the positive and significant impact of UMP / QE in the US on capital inflows to the SEACEN countries in our sample as a group is robust for portfolio inflows and less convincing for foreign direct investment and other investment inflows.² For the other components of capital inflows, i.e. foreign direct investment and other investment, determinants which are more related to the “pull factors” of capital flows, are found to more relevant vis a vis QE policy in the US (a “push factor”), namely market size and the level of human capital development, respectively. But capital inflows may have some positive feed-back impact on these “pull factors”. These findings have some policy implications for the SEACEN as a platform for regional cooperation in the region.

The overall findings of this paper can thus be summarized as follows. The implementation of UMP / QE by the US Federal Reserve has affected capital inflows to SEACEN members. This finding is particularly strong for portfolio inflows. Since our sample period for the empirical analysis covers mostly the period after the GFC, then as a corollary to this finding, one may further conclude that QE in the US has contributed to episodes of surges and retrenchment of portfolio inflows to SEACEN countries during the decade after the GFC. In other words, the SEACEN countries in our sample is sensitive to risk on / risk off phenomenon in the global financial markets, induced by the US Fed UMP / QE decision.³

5. Conclusion and Implication

This paper has empirically examined the impact of unconventional monetary policy (UMP) in the US after the global financial crisis (GFC), represented by the expansion and contraction of the US Federal Reserve balance sheet, on capital inflows to SEACEN economies. The empirical results from panel data analysis point to the importance of portfolio inflows in transmitting the spill-over effects of the UMP / QE in core AEs, particularly in the US, on the SEACEN economies in the sample. This adds to the existing

² Appendix B reports the expanded results of our estimations in Table 1 and 2.

³ Recent studies by Harahap et al., (2020, 2019) show that Indonesia’s key economic indicators are sensitive to global liquidity shocks. Moreover, studies by Rumondor and Bary (2020) and Rahman and Ermawati (2020) show that portfolio inflows is found to positively influenced risk-taking behavior in Indonesia’s banking system.

literatures on the subject that have somehow rather muted with regards to the SEACEN economies as a group.

The above findings imply that SEACEN's real economy and financial system are prone to elevated risks that accompany global portfolio rebalancing. A further risk and challenge to policy makers may arise if herding behavior comes into play in the global financial markets. In this regard, global sentiments may trigger such behaviour, which in turn exacerbate volatility in SEACEN's financial markets. In this regard, there is a strong merit in strengthening the cooperation framework within SEACEN, as a platform for regional sharing of policy experiences in dealing with capital flow volatility.

For open middle income SEACEN economies, capital flows volatility induced by the UMP in the US also adds to the complexity of managing monetary policy trilemma (MPT). A consensus view among policy makers and academics alike argues that UMP / QE in core AEs has induced boom and bust in the global financial cycle in post GFC, which may directly affect EMEs through cross-border capital flows. Given this consensus view, it is possible for monetary authority in an open emerging market economy to retain monetary policy sovereignty if and only if capital flows is managed, directly or indirectly, regardless the degree of exchange rate flexibility. Such feasibility rests upon the argument that monetary policy sovereignty depends more on the strength of the policy framework being implemented by monetary authority to address domestic policy objectives. Considering these policy perspectives, the implementation of central bank policy mix strategy provides such strength, and may serve as a lesson for other open lower middle income SEACEN members.

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APPENDICES

Appendix A The US QE and Capital Inflows Data

Table A1
Variable Definition and Data Sources for Estimating Equation 1

Variable Definition		Data Description	Source
Dependent Variables			
<i>Lai</i>	All investment	Represented by all investment in financial liabilities (BPM6), US Dollar (logarithmic form).	IMF, <i>International Financial Statistics (IFS)</i>
<i>Lfdi</i>	Foreign direct investment	Represented by direct investment in financial liabilities (BPM6), US Dollar (logarithmic form).	IFS
<i>Lpi</i>	Portfolio investment	Represented by portfolio investment in financial liabilities (BPM6), US Dollar (logarithmic form).	IFS
<i>Loi</i>	Other investment	Represented by other investment in financial liabilities (BPM6), US Dollar (logarithmic form).	IFS
Explanatory variables			
<i>lbs</i>	US Fed Balance Sheet	Measured as annual total assets in millions of US Dollars (logarithmic form).	Federal Reserve Economic Data (FRED)
<i>ix</i>	Interest rate	Measured using real interest rate differential relative to the US (in p.a.).	World Bank, <i>World Development Indicators (WDI)</i>
<i>gx</i>	Growth rate	Measured by the annual growth of real GDP differential with the US (%)	WDI
<i>ms</i>	Market size	Measured using PPP, GDP constant in 2017 international dollars (logarithmic form).	WDI
<i>to</i>	Trade openness	Measured by the ratio of merchandise trade (sum of imports and exports) to GDP constant at 2010 US\$.	WDI
<i>hdi</i>	Human development index	An index ranging from 0 to 1, representing average achievement in key dimensions of human development.	United Nations Development Programme (UNDP)

Table A2
Descriptive Statistics of the Data Used for Estimating Equation 1

Variable	Label	Mean	S.D.	Min	Max
Dependent Variable					
Lai	Log all investment	13.394	1.077	11.222	15.475
Lfdi	Log foreign direct investment	12.353	1.286	9.506	14.855
Lpi	Log portfolio investment	12.004	0.902	9.967	13.910
Loi	Log other investment	12.204	1.122	10.549	14.180
Explanatory variables					
lbs	Log US balance sheet	14.597	0.684	13.561	15.317
ix	Difference interest rate	0.722	2.933	-6.986	9.314
gx	Difference growth rate	3.533	2.544	-1.468	12.355
ms	Market size	27.916	1.169	26.308	30.686
to	Trade openness	150.044	129.002	36.857	442.620
hdi	Human development index	0.760	0.112	0.530	0.939

Number of observation for all variables is 135. This observation consists of nine countries: Hong Kong, India, Indonesia, South Korea, Malaysia, Philippines, Singapore, Thailand, China from 2004 – 2018.

Appendix B Capital Inflows to SEACEN Countries (Billion US\$)

Legend. AI = all (total) investment inflows (FDI+PI+OI), FDI = foreign direct investment inflow, PI = portfolio investment inflow, OI = other investment inflow.

Figure B1 Republic of Korea (KOR)

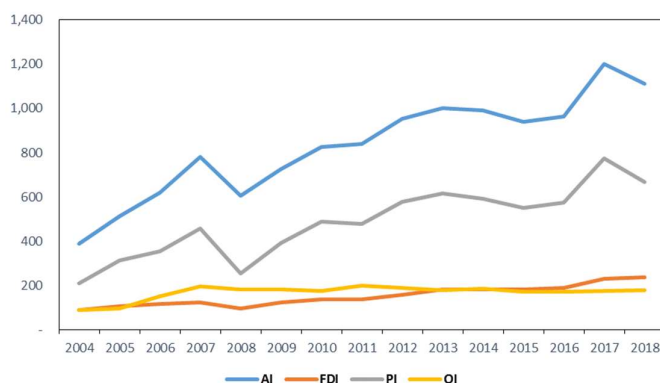


Figure B2 Hong Kong SAR (HK)

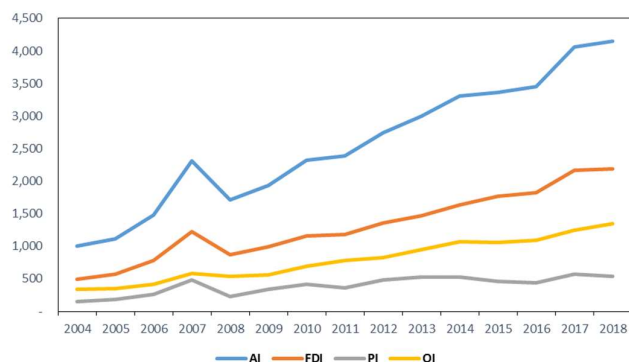


Figure B3 India ((IND))

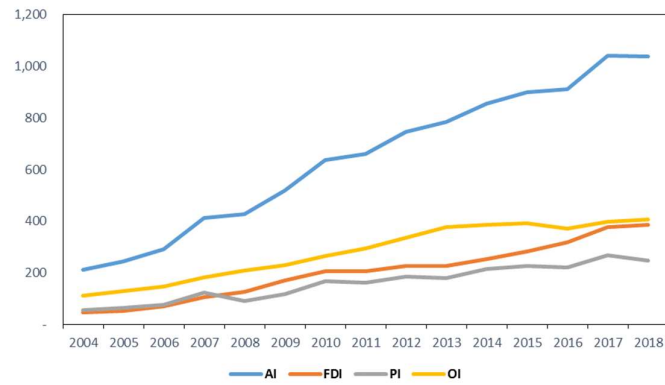


Figure B4 Indonesia (IDN)

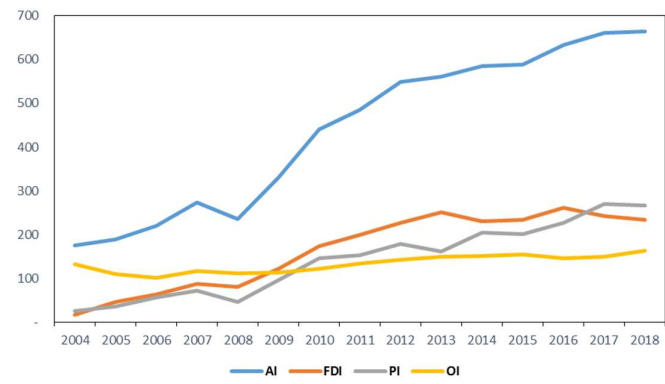


Figure B5 Malaysia (MYS)

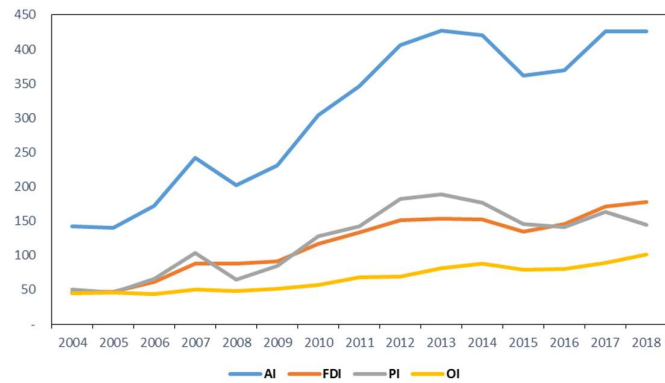


Figure B6 Philippines (PHI)

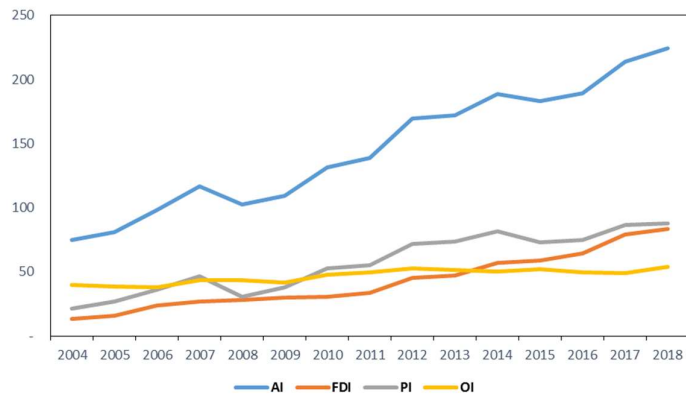


Figure B7 Singapore (SGP)

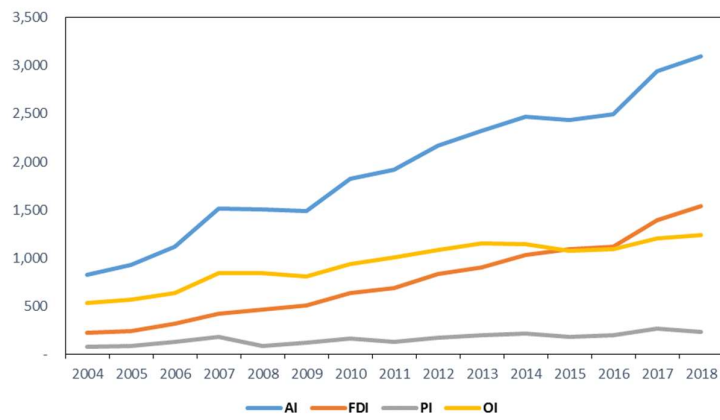


Figure B8 Thailand (THA)

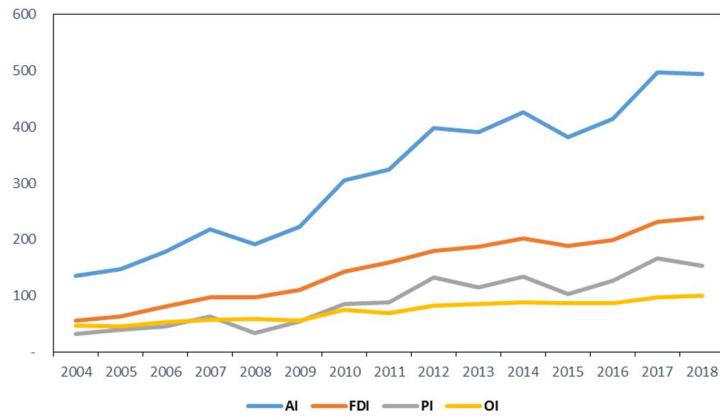


Figure B9 People Republic of China (PRC)

