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Asymmetric Effects of Global Liquidity Expansion on Foreign Portfolio Inflows, Exchange Rates, and Stock Prices*

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This paper examines the effects of global liquidity expansion on advanced and emerging economies by using panel VAR methodology. The results show that global liquidity expansion tends to boost economy by increasing GDP growth and stock prices. However, we find that the effects are asymmetric. The effects of global liquidity on GDP and stock prices are greater and more persistent in emerging economies than in liquidity recipient advanced economies. Moreover, global liquidity appreciates emerging economies' exchange rates more persistently than those of advanced economies. Lastly, while global liquidity expansion increases foreign portfolio investment inflows to Asian countries and liquidity recipient advanced economies, there is no evidence for Latin American countries.

Keywords: International Monetary Transmission Mechanism, Global Liquidity, Foreign Portfolio Investment Inflows, Quantitative Easing
JEL Classification: E51, F32, F42

I. Introduction

As international financial integration continues to deepen, we observe that a country's liquidity conditions are determined not only by its domestic monetary policy and financial conditions, but also by the international financial environments. Although there is no consensus on the definition, the concept of "global liquidity" describes the international aggregate of liquid assets, which are used in cross-border

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financial transactions.

Global liquidity has been an issue since the early mid-1990s; its importance grew particularly during the early 2000s, as the advanced economies intensified their expansionary monetary policies with persistently low interest rates. The United States lowered its federal fund rate from 6.5% (May 2000) to 1% (June 2003), where it remained until May 2004. The Bank of Japan also implemented its zero-interest rate policy and quantitative easing program from 2001 to 2006. The global financial crisis, which occurred in 2008, accelerated the growth of global liquidity. Advanced economies such as the United States, Eurozone, the the United Kingdom, and Japan engaged in quantitative easing monetary policy, along with effective zero interest rate policy. The expansionary monetary policies of the advanced economies generated extensive global liquidity that sought investment destinations all around the globe, and subsequently, a large part of it is believed to have flown into emerging markets.

Such abundant global liquidity appears to have contributed to the rapid growth of emerging economies in the early 2000s. Nevertheless, it raised some serious concerns regarding its adverse effect on emerging economies' financial markets and their economic stability. The surge of capital inflows can trigger bubbles in the asset markets, which increases financial vulnerability. It could also induce inflationary pressure and deteriorate terms of trade via exchange rate appreciation. Above and beyond all other considerations, if sudden capital outflows from the emerging markets were to occur, it could result in asset price collapses, sharp depreciation of exchange rates, and in the worst-case, cause a financial crisis. Since advanced economies cannot continue with their expansionary monetary policies, the rate of global liquidity expansion will gradually decrease in the near future. This is exactly what we have been observing recently; in December 2013, the Federal Reserve commenced its reduction of the third quantitative easing program, and as expected, it has provoked financial instability in some emerging markets like South Africa, Turkey, Brazil, India, and Indonesia. The current international economic circumstance is stressing the importance of carefully reviewing the effects of global liquidity expansion to understand the effects of its contraction in the near future.

This paper explores the effects of global liquidity expansion on liquidity recipient countries by using panel VAR methodology. The sample covers 34 countries, including 10 liquidity recipient advanced countries and 24 emerging countries, from the first quarter of 1995 to the first quarter of 2013. Our results show that a positive global liquidity shock boosts liquidity recipient economies' GDP, raises domestic

consumer price inflation, increases stock prices, and appreciates exchange rate. However, the results reveal that the effects are asymmetric: the effects of global liquidity on GDP and stock prices are greater and more persistent in emerging economies than in liquidity recipient advanced economies. Moreover, global liquidity appreciates emerging economies' exchange rates more persistently than those of advanced economies. Lastly, while global liquidity expansion increases foreign portfolio investment inflows to Asian countries and liquidity recipient advanced economies, there is no evidence for Latin American countries.

Our research relates to several strands of literature. First, there have been studies examining the effects of global liquidity on the price level. Using aggregated data for major OECD countries, Belke et al. (2010) analyze the effects of global liquidity shocks on goods prices and a variety of asset prices. Their empirical results with a VAR approach show that global liquidity could be a useful leading indicator on variables such as house prices, gold prices, commodity prices, and the GDP deflator. However, the response of stock prices to the liquidity shock is not positive. Chakraborty and Bordoloi (2012) attempted to establish the linkage between global liquidity and international commodity prices using a structural VAR model with time-varying parameters. They find that the excess global liquidity has a significantly positive impact on both spot and future commodity prices and the magnitude of such impact has been increasing ever since the global financial crisis. Several studies, such as Belke et al. (2010) and Anzuini et al. (2013), also validate the positive impact of global liquidity on the commodity prices.

Second, there are some studies investigating the effects of global liquidity expansion on emerging market economies. IMF (2010) performed fixed-effects panel least-square estimation to find the determinants of asset returns of 34 liquidity recipient countries. The increase in global liquidity is associated with rising equity returns and declining real interest rates. A test with four distinct groupings according to the exchange rate regimes shows that as exchange rate flexibility increases, the association of global liquidity with equity valuations decreases. Regarding the impact on capital inflows, global liquidity is found to be positively correlated with portfolio equity investment, whereas FDI, portfolio bond investment, and cross-border bank lending show no association with global liquidity. Brana et al. (2012) focus on the impact of global excess liquidity on goods and asset prices of 16 emerging economies by estimating a panel VAR model. The empirical analyses reveal that excess global liquidity generates significant spillovers to the emerging countries, contributing to the increase in GDP and consumer prices. However, the relationship between global liquidity shocks and stock prices or real

estate prices is less clear.

Finally, our study is also related to a set of literature that analyzes the effects of capital inflows on emerging markets and regards global liquidity as a driver of capital flows. Kim and Yang (2011) investigate the impact of capital flows on emerging East Asian economies. Their empirical results from a panel VAR analysis report that a surge in capital or portfolio inflows has a positive effect on asset (i.e., stock and land) prices in emerging East Asian countries. The exchange rate appreciates as capital inflow increases. Tillmann (2013) also uses a panel VAR approach to analyze the effects of capital inflows on asset markets in East Asia. A capital inflow shock, identified with sign restrictions, has a significant effect on the appreciation of house and equity prices.

The contribution of this paper is two-fold. First, we empirically analyze the asymmetric effects of global liquidity expansions on advanced vs. emerging economies and Latin American emerging vs. Asian emerging countries, which, to the best of our knowledge, has not been explored in previous studies. Second, we estimate the effects of global liquidity on foreign portfolio inflows, which enables us to track the transmission mechanism of global liquidity. Previous studies consider the effects on exchange rates and asset prices, but not one considers foreign portfolio investment which lie in the middle between global liquidity and domestic variables.

The rest of this paper is organized as follows. In Section II, we introduce the measures of global liquidity. Section III outlines the panel VAR model, data, and empirical strategy. In Section IV, we document our main findings and discussions. Section V concludes the paper.

II. Measure of Global Liquidity

Despite its recent growing importance to the international economy, there is no consensus on the definition of global liquidity. Global liquidity is defined in various ways according to its purpose and the empirical methodology of studies. CGFS (2011) categorizes global liquidity into *official* and *private* liquidity. Monetary authorities, through their conventional or unconventional monetary operations, create official or public sector liquidity. Official liquidity can also be accessed through foreign exchange reserves, swap lines between central banks, and dedicated facilities such as IMF programs or Special Drawing Rights (SDR).[1] Private liquidity is determined by the domestic or international private financial sector. Private financial

[1] CGFS(2011), p. 4

institutions provide liquidity through securities markets (market liquidity) or interbank lending (funding liquidity).[2] In addition, measures of global liquidity can be categorized into quantitative and price indicators. The monetary aggregates, such as monetary base and M2, credit aggregates, and reserve money belong to the *quantitative* measures, while the U.S. interest rate, risk premium, and so on, relate to the *price* measures.

Global liquidity frequently refers to the quantitative sum of key currencies in literature, while each study uses various definition of global liquidity. D'Agostino and Surico (2009) define global liquidity as the simple average growth rate of monetary aggregates in G7 countries. IMF (2010) defines global liquidity as the weighted average growth rate of monetary aggregates (i.e., M2 or monetary base) in G4 currencies such as the U.S. dollar, Euro, Japanese Yen, and U.K. Pound. The weights are calculated based on the real GDP levels of each G4 economy. IMF (2010) also defines excess global liquidity as the difference between the broad money growth and estimates for money demand in G4 economies. Belke et al. (2010) construct the global liquidity index by using the weighted average growth rate of major OECD countries. Chakraborty and Bordoloi (2012) assume excess global liquidity estimated as a deviation of the money supply from its trend estimate. In the paper, M1 (narrow money) and M3 of OECD countries are used for money supply, and their trends are estimated using the Hodrick-Prescott (HP) filter. Chen et al. (2012) consider the sum of private quantitative measures as global liquidity. They compute the global liquidity by aggregating the individual financial liability series across the G4 economies. Eickmeier et al. (2014) identify structural global liquidity factors by imposing sign restrictions on the factor model. Using a set of financial and macroeconomic variables from 24 advanced and emerging market economies, they identify global liquidity via three factors: global monetary policy, global credit supply and global credit demand.

In this study, we use two kinds of global liquidity measures. The first measure is the sum of the M2 for G4 currencies[3], which is the most general measure in the related literature. The second measure is the sum of domestic credit to the private sector for G4 countries, which refers to financial resources provided to the private sector by domestic financial institutions, for example, through loans, purchase of securities, trade credits, and other accounts receivable. We adopt the second measure to consider the effects of private investors and financial institutions so that it represents the economies' overall financial condition.

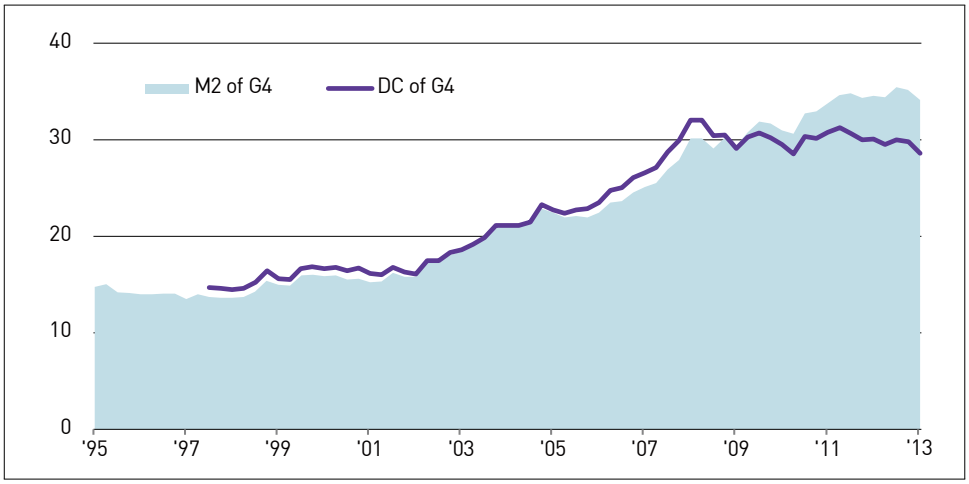
[2] CGFS(2011), p. 4

[3] The U.S. dollar, Euro, Japanese Yen, and U.K. Pound.

Figure 1 shows the sum of M2 and the domestic credit for G4 countries. Since 2000, the rate at which global liquidity has increased has accelerated mostly due to the expansionary monetary policies of the United States and Japan. The sum of M2 for G4 countries increased by 44.8% during 1991-2000 and saw a further increase of 116.5% throughout the following 10 years. As a result, by the first quarter of 2013, global liquidity was at a level of around $35 trillion. However, we also observe that global liquidity, measured by the domestic credit of G4 economies, did not increase after the global financial crisis, indicating that private global liquidity has not been recovered yet.

Figure 1. Trend of M2 and Domestic Credit for G4 Countries

(Unit: In trillions of U.S. dollars)



Source: Datastream DB; BIS.

III. EMPIRICAL ANALYSIS

1. Panel VAR Approach

We use a panel VAR model for our estimation. We add a cross sectional dimension to the traditional VAR model and construct a panel VAR model for 34 countries.

Assume that the following structural form equation explains country i's economy:

$$A_0 Y_{i,t} = A(L) Y_{i,t-1} + f_i + d_t + e_{i,t} \quad (1)$$

where *i* (*i*=1,...,34) denotes the country, and *t* (*t*=1,...,73) denotes the time (quarter). $Y_{i,t}$ is a 5×1 vector of endogenous variables, A_0 is a contemporaneous structural parameter, and $A(L)$ is a matrix polynomial in the lag operator *L*. f_i and $\mathrm{d_t}$ are 5×1 constant matrices that reflect the fixed effects for country and time, respectively, and $e_{i,t}$ denotes a vector of structural disturbances. $Y_{i,t}$ comprises global liquidity variables (e.g., monetary aggregate of G4 countries)[4], macroeconomic variables (e.g., aggregate output and price level), and financial variables (e.g., capital inflows in the form of portfolio investment and foreign exchange rates or stock prices) for a given quarter *t* and country *i*. We assume the variance-covariance matrix of structural disturbances, $\Lambda \equiv var(e_{i,t})$ as a diagonal matrix implying that the structural disturbances are mutually uncorrelated.

The following reduced-form equation is estimated to recover parameters in the above structural-form equation:

$$Y_{i,t} = B(L)\,Y_{i,t-1} + f_i' + d_t' + u_{i,t} \tag{2}$$

where $B(L) = A_0^{-1}A(L)$ is a matrix polynomial in the lag operator *L*, $f_i' = A_0^{-1}f_i$ and $d_t' = A_0^{-1}d_t$ are the transformed fixed effects matrices of country and time, respectively, and $u_{i,t} = A_0^{-1}e_{i,t}$ is the vector of disturbances. We estimate equation (2) using a system of generalized method of moments (GMM), proposed by Arellano and Bover (1995) and Blundell and Bond (1998) to obtain consistent coefficients in the dynamic panel model.

To recover the structural parameters from the parameters in the reduced form equation, we impose some restrictions on the contemporaneous structural parameters (A_0). We denote the variance-covariance matrix of the reduced-form disturbances, $var(u_{i,t})$ by Σ. Then we have $\Lambda = A_0\Sigma A_0'$. By applying the Cholesky decomposition to Σ, we impose recursive zero restrictions on contemporaneous structural parameters (A_0). Therefore, the ordering of variables indicates the relative exogeniety among the variables. The global liquidity variables are ordered before all other variables, assuming that it is contemporaneously exogenous to domestic macroeconomic and financial variables of individual countries. The macroeconomic variables, such as aggregate output and price levels, are assumed to be contemporaneously exogenous to the financial variables. It comes from the common identifying assumptions that the financial sector reflects all information immediately,

[4] Global liquidity variables represent the same value across the countries.

while the macroeconomic conditions change sluggishly. Among the financial variables, foreign portfolio inflows are assumed to be contemporaneously exogenous to foreign exchange rates or stock prices. However, exchange rates or stock prices can also affect portfolio inflows. High expected returns for domestic financial market can induce capital inflows. To control such simultaneity, we construct exchange rate and stock price data as the end-of-period value for each quarter.[5] With regard to quarterly data, we choose 4 lags as the lag length of the VAR system.

2. Data

We use quarterly data ranging from Q1 1995 to Q1 2013 for the 34 countries.[6] The sample includes 12 countries from the Asia-Pacific, 8 countries from the Western Hemisphere, 12 countries from Europe, and 12 countries from Middle East and Africa (see Table 1). The advantage of the panel data analysis is that we can categorize individuals into groups with similar characteristics and perform separate analysis. Comparing the results and considering the attributes of the groups would enable us to attain more meaningful implications. In this study, we divide individual countries into advanced and emerging countries according to per capita GDP. If GDP per capita exceeds $30,000, it is grouped under advanced countries. In addition, we divide emerging economies into countries from the Asia-Pacific

Table 1. List of Countries

	Advanced countries (10 countries)	Emerging countries (24 countries)
Asia-Pacific (12 countries)	Australia, Hong Kong, New Zealand, Singapore	China, India, Indonesia, Korea, Malaysia, the Philippines, Taiwan, Thailand
Western Hemisphere (8 countries)	Canada	Argentina, Brazil, Chile, Colombia, Mexico, Peru, Venezuela
Europe (12 countries)	Denmark, Iceland, Norway, Sweden	Bulgaria, Croatia, The Czech Republic, Hungary, Poland, Romania, Russia, Turkey
Middle East and Africa (2 countries)	Israel	South Africa

[5] Kim and Yang (2011), p. 307.

[6] The domestic credit data for the Eurozone starts from Q3 1997.

and Western Hemisphere, and compare their responses to changes in global liquidity.

We construct a five-variable panel VAR system, and the data vector $Y_{i,t}$ is {*GL, GDP, CPI, CAP, EX*} or {*GL, GDP, CPI, CPI, CAP, SP*}, where *GL* is global liquidity, *GDP* is each country's GDP, *CPI* is each country's consumer price index, *CAP* is each country's capital inflows in the form of portfolio investment, *EX* is each country's exchange rate to the U.S. dollar, and *SP* is each country's stock price. The most important variable, *GL* is defined as the monetary aggregate of G4 countries. We convert M2 of each G4 economy into U.S. dollars using the end-of-period exchange rates, and then sum them up. With regard to private global liquidity, we also define *GL_DC* as the sum of domestic credit (DC) of each G4 economy. We alternately use *GL_M2* or *GL_DC* as the global liquidity variable.

$$\text{i)}\ \ GL\_M2_t = \sum M2_{i,t} \times EX_{i,t}\ ,\ i = US, JP, EURO, UK$$
$$\text{ii)}\ \ GL\_DC_t = \sum DC_{i,t} \times EX_{i,t}\ ,\ i = US, JP, EURO, UK$$

The portfolio investment capital inflows (*CAP*) are expressed as a ratio to GDP. We use portfolio investment liabilities (gross portfolio inflow) data in the financial balance as the *CAP* variable. Also, we alternately used foreign exchange rates or stock price index as the last variable.

Before empirical analysis, we perform the panel unit root tests to examine the stationarity of time series variables. Since our panel data are unbalanced, Fisher-type unit root tests are performed. All variables except *CAP* are converted into logarithms. The results are shown in Table 2. For all variables except *CAP* and *EX,* the null hypothesis (H_0) cannot be rejected. Therefore, the first-differenced value of each variable, instead of the level value, should be used to obtain the stationary variables. We take year-on-year (yoy) growth rates of all variables except for *CAP* by differencing the value with its fourth lags to control seasonality.[7] After differencing, H_0 is rejected for all variables.

Table 3 shows the basic statistics of each variable. There are some outliers on *CPI* due to the hyperinflation that occurred in Latin America during 1980 - 1990. The data, including GDP, consumer price index, portfolio inflows, and exchange rates, are obtained from the *International Financial Statistics (IFS) Database* of IMF. The monetary aggregates of the G4 economies are retrieved from the '*Datastream'*- database of Thomson and Reuters and the domestic credit of the G4 economies are obtained from BIS. *Bloomberg Database* provides us with the stock price index of each economy.

[7] Boivin et al. (2009), p. 88.

Table 2. Results of Panel Unit Root Tests

Variables	*Test statistics*	Level Variables		Differenced Variables[2)]	
		statistics	p-value	statistics	p-value
GL_M2	P	2.4614	1.0000	146.623	0.0000
	Z	11.2063	1.0000	-6.6296	0.0000
	L	11.3878	1.0000	-6.1637	0.0000
	P_m	-5.8804	1.0000	5.9696	0.0000
GL_DC	P	30.6600	1.0000	178.1228	0.0000
	Z	2.0445	0.9795	-8.4837	0.0000
	L	1.8140	0.9643	-8.2015	0.0000
	P_m	-3.2019	0.9993	9.4430	0.0000
GDP	P	89.308	0.0200	216.8222	0.0000
	Z	0.4901	0.6880	-8.541	0.0000
	L	-0.1001	0.4602	-9.9196	0.0000
	P_m	2.2369	0.0126	13.1274	0.0000
CPI	P	89.1105	0.0614	246.6206	0.0000
	Z	2.9445	0.9984	-8.6053	0.0000
	L	2.3891	0.9910	-10.5511	0.0000
	P_m	1.6151	0.0531	14.5517	0.0000
CAP	P	180.5347	0.0000	-	
	Z	-7.2787	0.0000		
	L	-7.6997	0.0000		
	P_m	10.3003	0.0000		
EX	P	160.5535	0.0000	132.1239	0.0000
	Z	-3.5061	0.0002	-5.2289	0.0000
	L	-4.784	0.0000	-4.9977	0.0000
	P_m	7.1147	0.0000	4.7778	0.0000
SP	P	79.2082	0.3181	193.5257	0.0000
	Z	-0.2458	0.4029	-8.1673	0.0000
	L	-0.1958	0.4225	-8.2382	0.0000
	P_m	0.4281	0.3343	9.825	0.0000

Note: 1. H_0: Every panel has unit roots.
H_a: At least one panel does not have unit root.
2. For *GDP* and *CPI*, we use year-on-year growth rate (%), and for *GL_M2*, *GL_DC*, *EX*, and *SP*, we use the value after differencing it with its fourth lag. It means year-on-year growth, but it is not represented in percent.
3. Test statistics: $P=-2\sum_{i=1}^{N}\ln p_t$, $Z=\frac{1}{\sqrt{N}}\sum_{i=1}^{N}\Phi^{-1}(p_t)$, $L=\sum_{i=1}^{N}\ln\left(\frac{p_t}{1-p_t}\right)p_t$,
$P_m=\frac{1}{2\sqrt{N}}\sum_{i=1}^{N}(-2\ln p_t-2)$

Table 3. Basic Statistics of the Variables

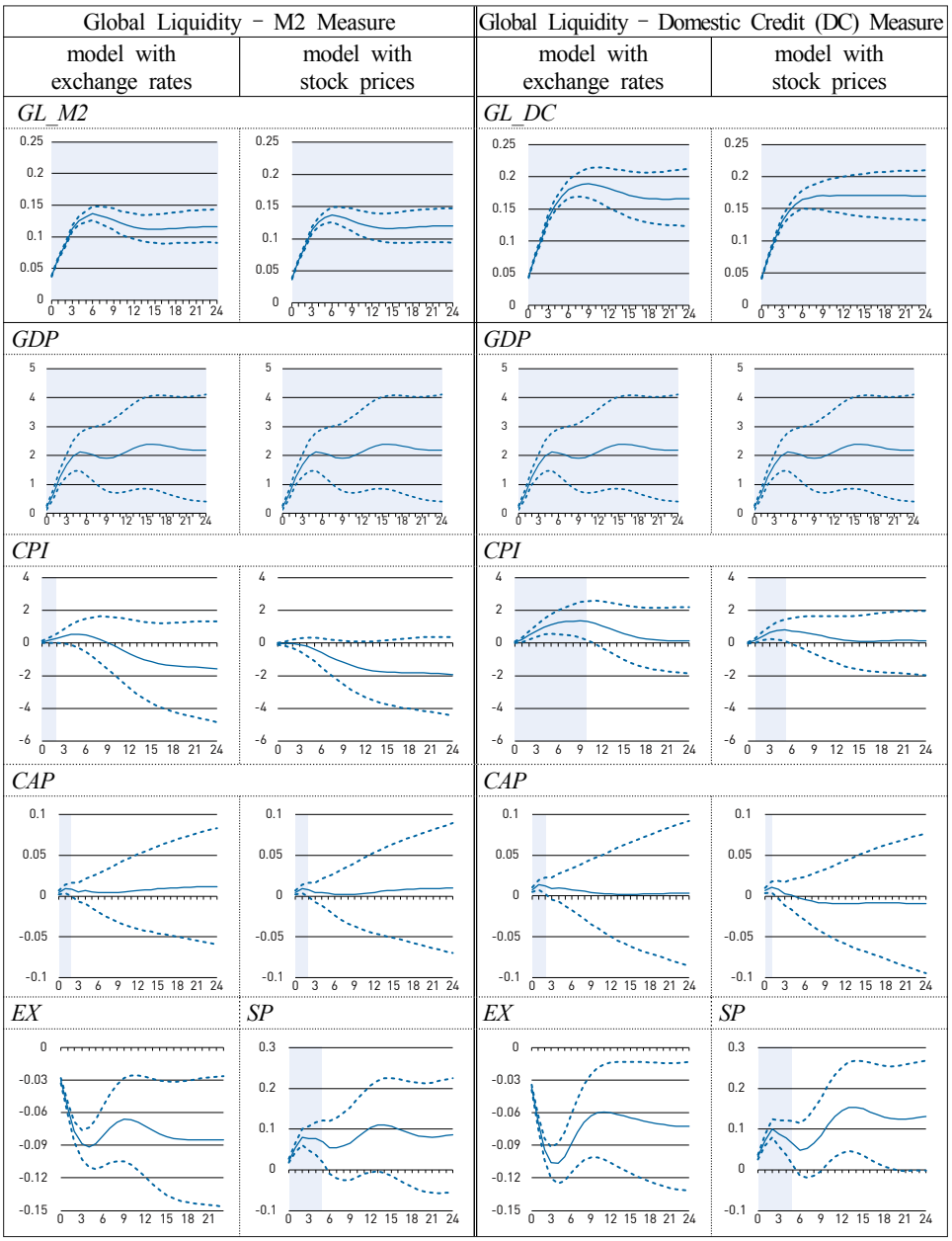
Variables	Mean	Median	Minimum	Maximum	Standard deviation	Skewness	Kurtosis
GL_M2	0.0535	0.0528	-0.0754	0.1818	0.0600	-0.0268	2.1705
GL_DC	0.0476	0.0563	-0.0965	0.1850	0.0655	-0.0280	2.0909
GDP	3.7916	4.1354	-26.2140	36.9040	4.3312	-0.6348	7.6104
CPI	10.3053	3.8715	-5.8040	1715.6360	55.1072	23.4857	637.7628
CAP	0.0205	0.0104	-1.3015	1.3837	0.1183	-0.6366	56.7037
EX	0.0405	0.0040	-0.7954	3.0034	0.2014	4.6624	45.4361
SP	0.0962	0.1193	-1.5952	1.7671	0.3369	-0.1809	5.0490

IV. EMPIRICAL RESULTS

Figures 2 - 6 show the cumulative impulse responses of liquidity recipient countries with 90% probability bands per 24-quarter horizon when there is a one-standard deviation shock in global liquidity. Figure 2 illustrates responses for all 34 countries. The first and second columns represent responses to *GL_M2* shocks, and the third and fourth columns show those to *GL_DC* shocks. The results indicate that global liquidity expansion shock boost economy by increasing GDP growth and stock prices in all four specifications. In addition, while increases in foreign portfolio investment inflows and stock prices are relatively temporary, appreciations of exchange rates are very persistent. The portfolio investment increases at a maximum of 1.3% of GDP after the first or second quarters. The exchange rate appreciates by about 9% to the global liquidity shocks.

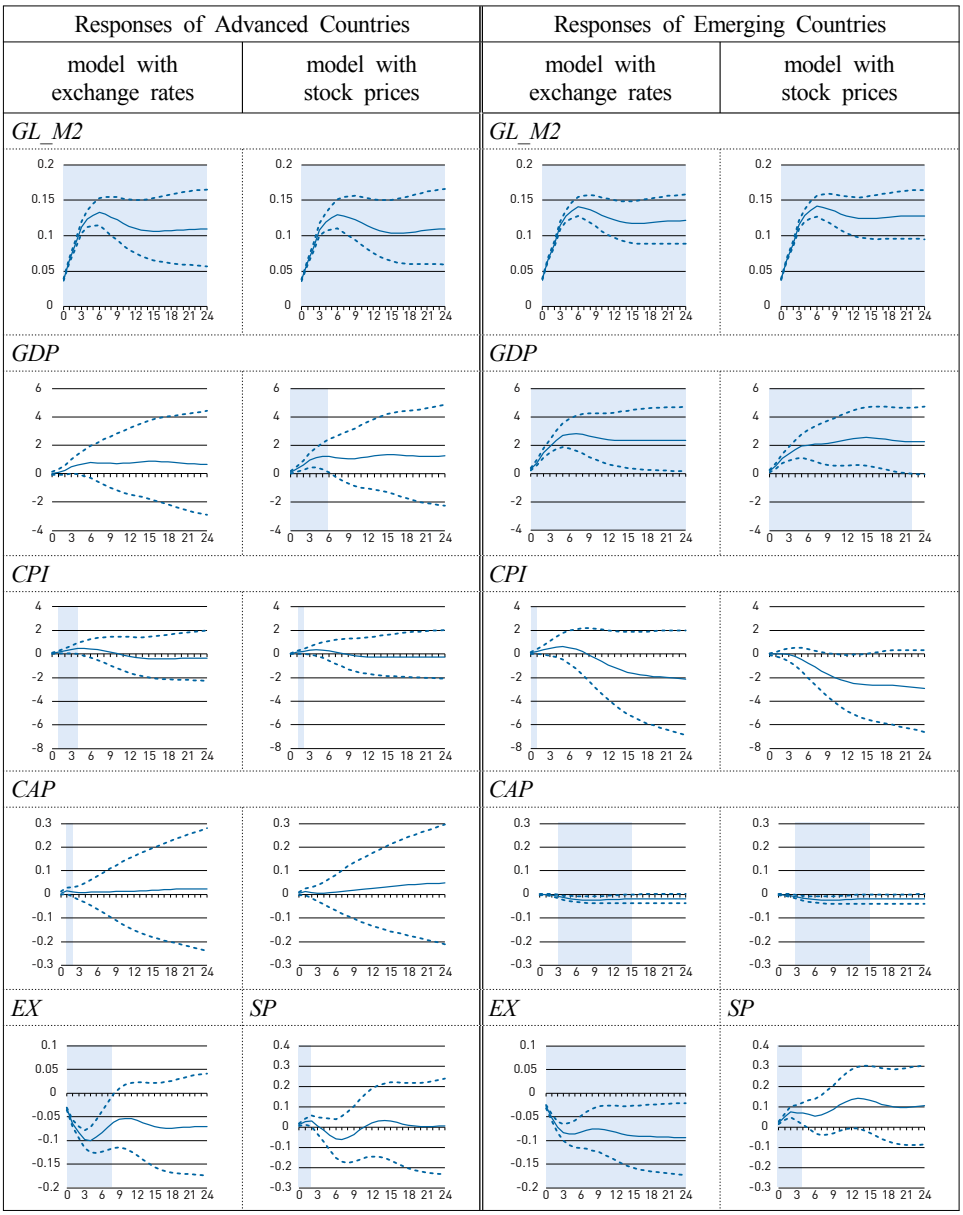
Figures 3 and 4 plot the impulse responses for the sub-samples of 10 advanced and 24 developing economies. The results show that the effects of global liquidity on two groups are asymmetric. The effect of global expansion on GDP growth is greater and more persistent in emerging countries than in advanced economies. In addition, the persistence of the responses of exchange rates is different for the two groups: the responses for advanced economies vanish after 8 quarters, but those for developing countries remain significant even through to the 24th quarter. The responses of foreign portfolio investment show the most sharp contrast between the two groups. The *GL_M2* and *GL_DC* shocks increase foreign portfolio investment inflows for advanced economies, but they decrease portfolio inflows for developing countries. However, it is not expected that global liquidity reduces foreign portfolio inflows in emerging markets.

Figure 2. Cumulative Impulse Responses of Liquidity-Receiving Countries to Global Liquidity Shock



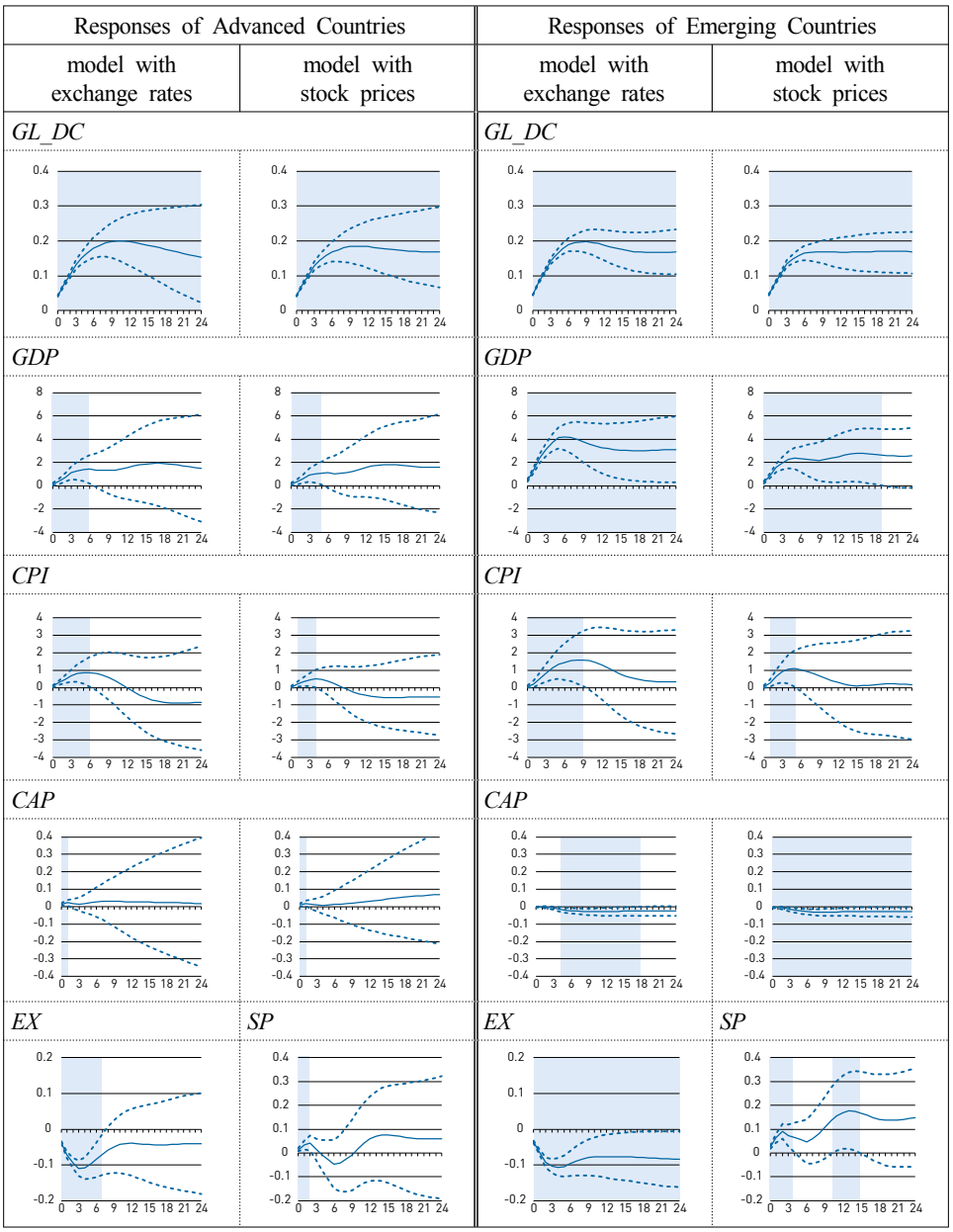
Note: 1. Dotted lines represent 90% confidence intervals based on 1000 Monte Carlo simulations.
2. Shaded areas represent statistically significant directions based on 90% confidence intervals.

Figure 3. Cumulative Impulse Responses of Advanced and Emerging Countries to Global Liquidity Shocks – M2 Measure



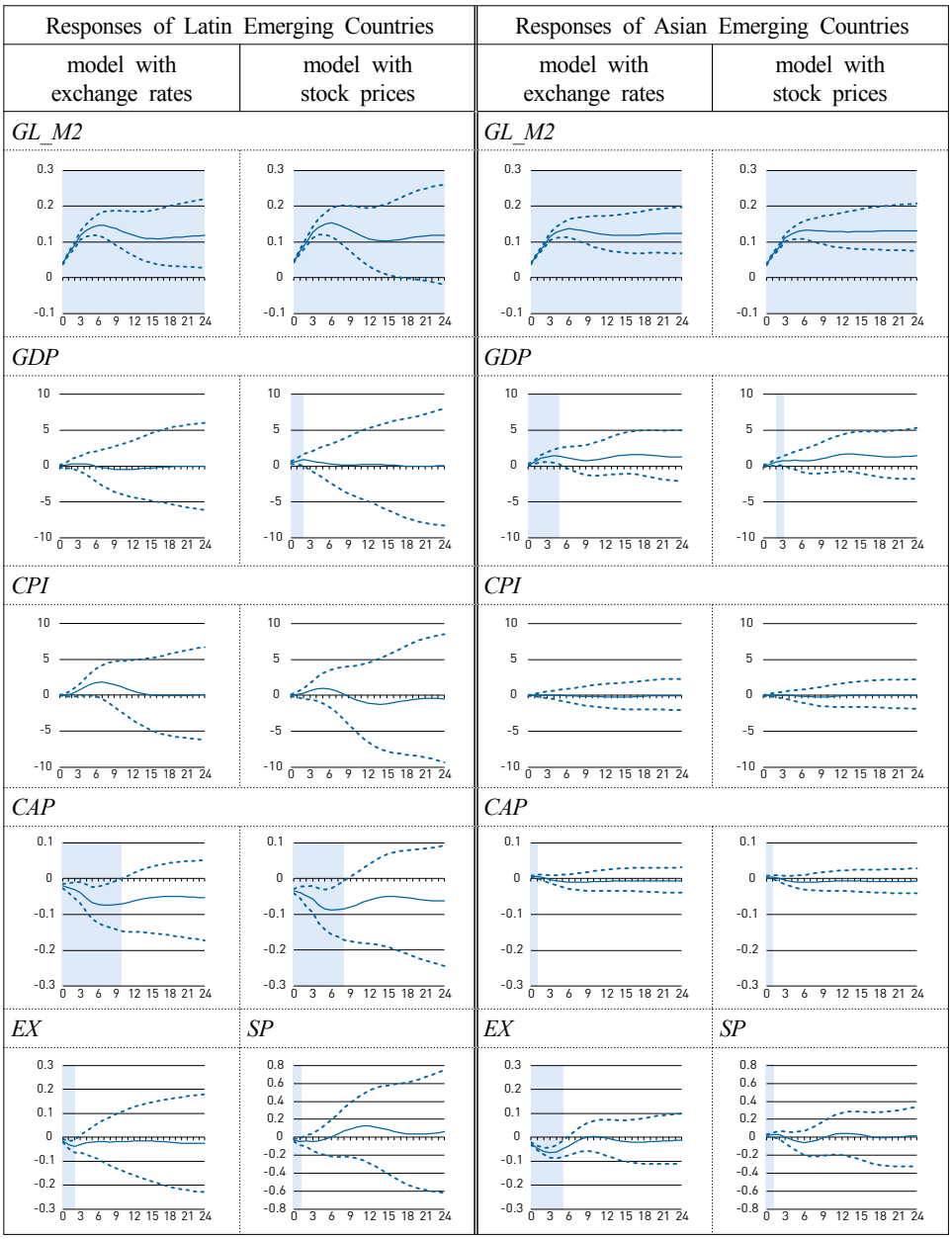
Note: 1. Dotted lines represent 90% confidence intervals based on 1000 Monte Carlo simulations.
2. Shaded areas represent statistically significant directions based on 90% confidence intervals.

Figure 4. Cumulative Impulse Responses of Advanced and Emerging Countries to Global Liquidity Shocks – Domestic Credit (DC) Measure



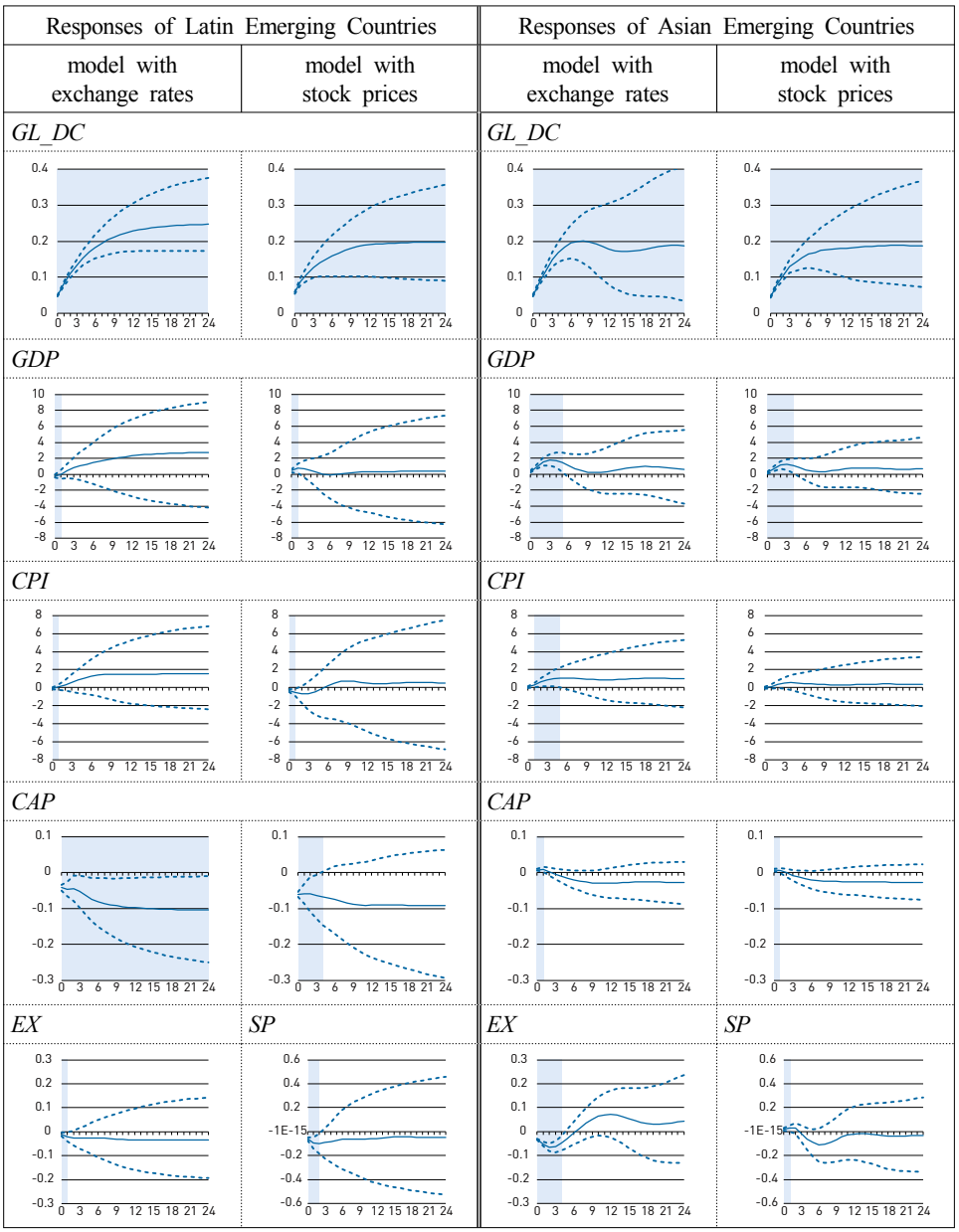
Note: 1. Dotted lines represent 90% confidence intervals based on 1000 Monte Carlo simulations.
2. Shaded areas represent statistically significant directions based on 90% confidence intervals.

Figure 5. Cumulative Impulse Responses of Asian and Latin Emerging Countries to Global Liquidity Shocks – M2 Measure



Note: 1. Dotted lines represent 90% confidence intervals based on 1000 Monte Carlo simulations.
2. Shaded areas represent statistically significant directions based on 90% confidence intervals.

Figure 6. Cumulative Impulse Responses of Asian and Latin Emerging Countries to Global Liquidity Shocks – Domestic Credit (DC) Measure



Note: 1. Dotted lines represent 90% confidence intervals based on 1000 Monte Carlo simulations.
2. Shaded areas represent statistically significant directions based on 90% confidence intervals.

We divide the emerging economy sample into Latin America and Asia[8] to assess the aforementioned abnormal responses of portfolio inflows for emerging economies. Figures 5 and 6 show the results for sub-samples of Latin American and Asian country groups. The results indicate that the Latin American sample is the reason behind the portfolio outflows in emerging country samples in Figure 3 and Figure 4. In the Latin American sample, the foreign portfolio investment outflows occur due to the *GL_M2* and *GL_DC* shocks, while the Asian country group shows portfolio inflows.

There are a few reasons for the foreign portfolio outflows for Latin American countries in the given sample periods.[9] Most importantly, the chronic financial vulnerability of Latin American countries deterred foreign investment in the era of global liquidity expansion. The currency crisis of Argentina in 2001 also affected neighbor countries such as Brazil and Mexico and was one of the main causes of stagnant foreign portfolio inflows. In addition, Brazil's capital control policies initiated in October 2009, which were originally designed to reduce volatility of capital inflows, but also lowered the volume of capital inflows.

V. CONCLUSION

We investigate the effects of global liquidity expansion on the receiving countries' financial conditions, focusing on foreign portfolio investment, asset prices, and exchange rates. We reaffirm that global liquidity expansion increases GDP growth and stock prices in liquidity recipient economies, as already examined in many empirical studies. However, we find that the effects of global liquidity are asymmetric. The effects of global liquidity on GDP and stock prices are greater and more persistent in emerging economies than in liquidity recipient advanced economies. Moreover, global liquidity appreciates emerging economies' exchange rates more persistently than those of advanced economies. Lastly, portfolio investments do not increase to global liquidity shocks for Latin American countries, whereas portfolio inflows increase for liquidity recipient advanced economies and

[8] We do not report the results from remaining 9 countries, since the group appears very heterogeneous. The impulse-responses of the remaining group are qualitatively similar to those of the Asian group in that foreign portfolio inflows increase to global liquidity shocks.

[9] The low economic growth rates and high inflation rates of Latin American countries in the given sample period are also very strong candidates for the cause of capital outflows in the region. However, since GDP growth and inflation rates are already considered in the VAR system, the factors are assumed to be controlled endogenously.

Asian developing countries.

This paper reveals that the effects of global liquidity expansion are not same for various country groups. Likewise, the effects of global liquidity reduction would be asymmetric. If the advanced economies should rewind the liquidity in the near future, (which has been maintained via expansionary monetary policies since the outbreak of the global financial crisis) the growth rate of global liquidity will decrease, and in the worst case, cause international financial contractions. Both Asian emerging economies, which experienced large portfolio investment inflows and exchange rate appreciation in the last decade, and Latin American countries, which have chronic financial vulnerability, must prepare for the negative effects that are associated with global liquidity contractions.

References

Anzuini, A., Lombardi, M. J. and P. Pagano. 2013. "The Impact of Monetary Policy Shocks on Commodity Prices," *International Journal of Central Banking*, vol. 9, no. 3, pp. 119-144.

Arellano, M. and O. Bover. 1995. "Another Look at the Instrumental- Variable Estimation of Error-Components Models," *Journal of Econometrics*, vol. 68, issue 1, pp. 29-52.

Belke, A., Bordon, I. and T. W. Hendricks. 2010. "Global Liquidity and Commodity Prices - a Cointegrated VAR Approach for OECD Countries," *Applied Financial Economics*, vol. 20, issue 3, pp. 227-242.

Belke, A., Orth, W. and R. Setzer. 2010. "Liquidity and the Dynamic Pattern of Asset Price Adjustment: A Global View," *Journal of Banking and Finance*, vol. 34, issue 8, pp. 1933-1945.

Blundell, R. and S. Bond. 1998. "Initial Conditions and Moment Restrictions in Dynamic Panel Data Models," *Journal of Econometrics*, vol. 87, issue 1, pp. 115-143.

Boivin, J., Giannoni, M. P. and B. Mojon. 2009. "How Has the Euro Changed the Monetary Transmission?" *NBER Macroeconomics Annual 2008*, vol. 23, Chicago: Univ. of Chicago Press. pp. 77-125.

Brana, S., Djibenou, M.-L. and S. Prat. 2012. "Global Excess Liquidity and Asset Prices in Emerging Countries: a PVAR Approach," *Emerging Markets Review*, vol. 13, issue 3, pp. 256-267.

Chakraborty, A. B. and S. Bordoloi. 2012. "International Commodity Prices-Volatility and Global Liquidity." Working Paper, Reserve Bank of India.

Chen, S., Liu, P., Maechler, A., Marsh, C., Saksonovs, S. and H. S. Shin. 2012. "Exploring the Dynamics of Global Liquidity," IMF Working Paper, no.

12/246.
Committee on the Global Financial System (CGFS). 2011. "Global Liquidity – Concept, Measurement and Policy Implications," CGFS Papers, no 45.
D'Agostino, A. and S. Paolo. 2009. "Does Global Liquidity Help to Forecast U.S. Inflation?," *Journal of Money, Credit and Banking*, vol. 41, issue 2-3, pp. 479-489.
Eickmeier, S., Gambacorta, L. and B. Hofmann. 2014. "Understanding Global Liquidity," *European Economic Review*, vol. 68, issue 1, pp. 1-18.
International Monetary Fund (IMF). 2010. "Global Financial Stability Report: Meeting New Challenges to Stability and Building a Safer System, April 2010."
Kim, S. and D. Y. Yang. 2011. "The Impact of Capital Inflows on Asset Prices in Emerging Asian Economies: Is Too Much Money Chasing Too Little Good?," *Open Economies Review*, vol. 22, issue 2, pp. 293-315.
Tillmann, P. 2013. "Capital Inflows and Asset Prices: Evidence from Emerging Asia," *Journal of Banking and Finance*, vol. 37, issue 3, pp. 717-729.

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