Philippine Management Review (*Special Issue*), 2010, Vol. 18, 83-95.

International Liquidity, Monetary Spillovers and Asset Prices

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In this paper, we attempt to determine if international liquidity affects asset prices in three particular markets, namely: the United States (U.S.), the Euro area and the ASEAN (5 countries) region. Our study attempts to test whether there are monetary spillovers from one market to another that affect asset prices using quarterly data covering these markets from 1995 to 2005. We begin by finding an appropriate measure and definition for international liquidity. This definition is used to determine an appropriate variable that is combined with other control variables to form a regression equation for the real asset returns of the three particular markets. Based on our results, there is evidence that excess liquidity in the US and Euro area has a "push" effect on asset prices of both markets. We find that asset prices in the ASEAN 5 region are unaffected by international liquidity.

Keywords: international liquidity transmission, asset pricing

1 Introduction

The study of liquidity encompasses a broad range of macro and microeconomic considerations. This is due to the reality that liquidity is such a vague term and numerous definitions abound. How then do we define liquidity? Is liquidity an aggregate concept influenced by monetary policy? Is liquidity an asset-specific term measured on a micro-level?

If liquidity is a macroeconomic concept, most likely it will be related to monetary conditions. Previous researches have focus on the relationship between monetary conditions, as a consequence of monetary policy, and asset valuation. These researches have explored the effect of whether adopting restrictive or expansive polices tend to influence asset prices, more specifically equity prices, on a domestic level and international markets as well. Conover, Jensen and Johnson (1999) delved into this area of research by looking at whether monetary policies of selected developed countries affect domestic returns and whether the US monetary environment affects international returns. They defined restrictive and expansive monetary policies based on discount rate changes and tested stock price movement during the periods where these changes occur. Chen (2005) investigated whether US monetary policy has asymmetric effects on stock returns by using alternative measures of monetary policy. These measures include the use of the growth of a monetary aggregate (M2 in this case), changes in interest rates (the Federal funds rate and discount rates) and VAR-based measures taking into consideration the Federal funds rate. Bernanke and Kuttner (2005) likewise studied the response of equity prices on changes in monetary policy by observing federal funds rate surprises.

On the other hand, other macroeconomic researches have focused on some aggregate asset to debt relationship as their concept of liquidity. These researches probed into the ability of paying off international commitments using "liquid" resources. Moreover, micro-level analyses are varied in focus. These analyses were done in different levels: market-based, instrument-based, etc.

According to previous studies, the link between changes in liquidity and changes in real equity prices at frequencies beyond very short term appears to be tenuous at best[1] but most of these previous studies consider long periods. Financial globalization may be changing the links between monetary conditions and asset prices. The process of liberalization and financial globalization observed these past years supply better conditions of arbitrage between the markets of the different countries that lead to greater synchronization of markets. So, if an economic sector or a market in general seems undervalued (relative to other markets) due to restrictive local monetary policy,

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[1] For example, Bernanke and Kuttner (2005) find that stock prices do exhibit an immediate reaction to monetary policy surprises.

investors of another country benefiting from a more expansive monetary policy will try to take advantage of this undervaluation. So, a possible excess of liquidity observed in this other country will not affect its market but another market. In this case, any market may be driven by monetary spillovers (Baks & Kramer, 1999).

This paper is an empirical study on the relationship between liquidity and asset prices. This relationship can only be explored if an appropriate definition of liquidity is identified. This chosen liquidity concept will then be used to examine whether it influences asset prices in an international context. Specifically, we center our attention on three regional markets, namely: the US market, the Euro area and the ASEAN region. We test whether excess liquidity in each market of study creates monetary spillovers that affect asset prices in the other markets.

The search for a suitable definition of liquidity coupled with the task of finding its relationship with asset prices lead us to organize the paper as follows: Section two discusses the different definitions and measures of liquidity. Section three includes the methodology chosen for our study and the basic characteristics of our data. Section four contains the results of our tests and our findings. Section five reveals our conclusion.

2 Definitions of Liquidity

Previous studies have identified different definitions and measures of international liquidity and liquidity in general. These concepts differ in terms of concept and measure. Baks and Kramer (1999) identify two concepts of liquidity. Differentiating market liquidity and monetary liquidity, they define market liquidity as the capacity of financial markets to absorb temporary fluctuations in demand and supply. Monetary liquidity, on the other hand, is associated with short-term interest rates or the aggregate quantity of money. Baks and Kramer focus on global monetary liquidity of G-7 countries defining it in terms of money growth. Money (broad and narrow) growth was determined based on three methods of measure: a weighted growth rate series, simple sum US dollar aggregates and Divisia indices. Also, excess money growth was determined by deducting the average growth rate of nominal GDP.

European Central Bank's Monthly Bulletin (ECB) (2001) identifies various measures of excess liquidity or liquidity shortfalls based on the level of M3. A nominal money gap is measured by selecting a base period and determining the deviation of the observed nominal money stock from the equilibrium level, while a real money gap is measured by determining the deviation of the actual real money stock from an equilibrium real money stock. Moreover, the ECB discusses the concept of a monetary overhang/shortfall. This overhang/shortfall is determined by considering macro-economic determinants of money demand which include output, prices and opportunity costs. These factors are used in developing a model-estimated equilibrium money stock from which the observed level of the nominal money stock is compared.

Gouteron and Szpiro (2005) mention that the only economic theory which establishes a direct link between money and price is the Quantity Theory of Money and they suggest that the definition of excess liquidity takes support from this theory. Based on the accounting identity: $M + V = P + Y$ where the variables (in logarithm) include money, money velocity, output and prices, they said it is money velocity that necessarily adjusts to keep the identity. Thus, excess liquidity exists when money supply substantially exceeds the volume of transactions on goods, services and assets. The theoretical level of the monetary gap discussed earlier (ECB, 2001) then is derived from the quantity theory of money. The problem with this definition is the arbitrary process of selecting the reference period. This is partly addressed by focusing on the definition of a monetary overhang/shortfall because of its non-dependence on the quantity theory of money.

Following the liquidity ratio computed for firms, Filho (2001) defines international liquidity as the ratio of the net foreign reserves against the net foreign interest-bearing debt of a particular country. A critical liquidity ratio is determined below which the country experiences speculative attacks. A stock-flow model is used to connect changes in the real growth rate with liquidity.

Caballero and Krishnamurthy (2001) discuss international liquidity based on assets and commitments used to obtain needed external resources. In their work, they call these assets and commitments "collateral" which can be used to repay debt and implement new investments.

International collateral is primarily composed of claims on tradable goods and measured by some fraction of exports while domestic collateral represents mostly assets issued by producers of non-tradable goods. The importance of determining the optimal level of precautionary reserves is highlighted in their work. Precautionary reserves are defined as reserves over imports or reserves over external debt. External debt for developed countries include debt securities and other investments (including loans, deposits and trade credits) while for emerging economies these include debt securities issued abroad, Brady bonds, bank loans, trade credit and multilateral claims. Caballero and Krishnamurthy (2001) extend this work by developing a Liquidity-based model of domestic interest rate determination as shown below:

$$i^{p_1} = \left(\frac{rk}{w - d_{0,f}}\right) - 1 \tag{1}$$

i^{p_1} cost of capital is determined by considering $w - d_{0,f}$, international liquidity and rk domestic collateral (r output per plant multiplied by the k size of plant) with w defined as the units of a single (tradable) good that have full collateral value to foreigners and $d_{0,f}$ is the amount borrowed from foreigners to finance investment.

Fernandez (1999) classifies measures of liquidity into macro and micro-based levels. Aggregate measures include the measurement of free liquidity defined as the growth in the money supply in excess of the amounts required to satisfy the transaction's demand for money. Excess liquidity is measured by deducting GDP growth from M2 growth assuming that the difference is the inelastic demand for financial assets and with money velocity constant. Fernandez stresses the problems with this measure stating that the definition of money changes over time and turnover rates of financial assets that can be used as collateral need to be considered. Other aggregate liquidity measures are related to the credit available for securities markets or the degree of leverage wherein liquidity and credit are simultaneously determined. The difficulty with this definition as mentioned in his work is that market risk and counterparty risk must be measured. Fernandez defines liquidity on a micro-level by considering the three dimensions of depth, breadth and resiliency. He defines depth as: a) the availability of counteroffers; b) the volume of trades possible without affecting prices, or c) the amount of orders held by market makers or specialists, the size of the float maintained by market makers. He mentions that this could be measured by simply using average turnover as a proxy for market impact or alternatively computing for the ratio of dollar volume of trades divided by daily price changes. He is quick to point out the problems with these measures which include the failure to recognize transaction costs, the possibility of double counting and that the alternative ratio may capture size trades more than liquidity. Fernandez defines breadth as the width of the bid/offer spread or the distance from mid-market prices that transactions actually occur while resiliency is the speed with which price fluctuations resulting from trade dissipate or how markets quickly clear order imbalances.

Given the different definitions and measures of liquidity, there is a consensus that no particular definition encapsulates the various facets of liquidity into one concept. It will be cumbersome to use micro-level definitions for the purpose of our study since the effects of monetary conditions as well as policy cannot be easily associated with market liquidity. Likewise, we cannot easily utilize the "asset-debt" liquidity ratio as our definition since its usefulness on a market or a more macro level has not been strongly established compared to its use for specific firms. Given that our focus is on defining international liquidity and whether this liquidity affect asset prices in certain regional markets, we will also define liquidity in terms of excess money growth as explored by Baks and Kramer (1999) and mentioned by Fernandez (1999). This definition is simple to relate to monetary conditions and its study can be easily integrated with an analysis of economic fundamentals.

3 Methodology

Following Baks and Kramer (1999), we explore their discussion on the possible relationship of liquidity and asset prices. They mention several possible relationships between monetary liquidity and asset prices. First, liquidity increases the demand for a fixed supply of assets leading to asset

price inflation. Second, improving economic prospects may lead to both excess liquidity and asset price inflation. Third, asset values are affected by the decrease in the discount rates. These relationships are their basis in suggesting two possible channels of liquidity transmission. A "push of money" may occur if excess liquidity causes capital flows from one country to seek out other markets causing asset price inflation in foreign assets and reducing foreign interest rates. Alternatively, the coincidence between money growth and improved economic prospects may attract foreign investors to invest in an overseas market drawing away capital from their domestic markets. This "pull of capital" may lower asset prices in their domestic markets because of the decrease in the demand for domestic assets.

Following this discussion, we collect data on money growth and asset returns for the United States, the Euro area and five ASEAN countries (namely Indonesia, Malaysia, Philippines, Singapore and Thailand) from the first quarter of 1995 to the last quarter of 2005. Our data includes information on M1, M3, real and nominal GDP, short-term interest rates, share price indices, consumer price indices and exchange rates for the respective countries or regions (with seasonal adjustment, if available). We obtain this information from Datastream.

Quarterly growth rates and returns were computed using the following formula:

$$x_t = \frac{P_t - P_{t-1}}{P_{t-1}} \tag{2}$$

where: P_t = price/level at quarter t, and P_{t-1} = price/level at quarter t – 1

Table 1. Basic Characteristics of the Money Aggregate Series (Growth Rates)

	M1$US	**M1€EU**	**M1$AS***	**M1$AW****
Mean	0.005145	0.021456	0.013897	0.018998
Median	0.004956	0.013301	0.023172	0.021759
Maximum	0.050020	0.102536	0.164231	0.190074
Minimum	-0.039306	-0.059288	-0.184359	-0.186554
Std. Dev.	0.017930	0.037726	0.062937	0.068216
Skewness	0.099620	0.013762	-1.147019	-0.546966
Kurtosis	3.540245	2.691363	5.627334	5.718626
Jarque-Bera	0.607862	0.152023	22.30340	15.74396
Probability	0.737912	0.926806	0.000014	0.000381
Sum	0.226385	0.815313	0.611472	0.835901
Sum Sq. Dev.	0.013823	0.052659	0.170328	0.200097
Observations	44	38	44	44
	XM1$US	**XM1€EU**	**XM1$AS***	**XM1$AW****
Mean	-0.007697	0.009977	0.003045	0.003979
Median	-0.005252	0.021525	0.003937	-0.001516
Maximum	0.080395	0.147591	0.142475	0.163757
Minimum	-0.062783	-0.149877	-0.137194	-0.120424
Std. Dev.	0.028935	0.064287	0.050859	0.049411
Skewness	0.372623	-0.338699	-0.005113	0.613320
Kurtosis	3.308475	3.208726	4.427432	5.502665
Jarque-Bera	1.192672	0.774588	3.735722	14.24129
Probability	0.550826	0.678892	0.154454	0.000808
Sum	-0.338683	0.369160	0.133980	0.175060
Sum Sq. Dev.	0.036001	0.148782	0.111224	0.104983
Observations	44	37	44	44

** ASEAN 5 using simple summations ** ASEAN 5 using a weighted series.*

Aggregate data are computed by converting local-currency information into US dollar or Euro using market exchange rates then getting their summations. Since regional data for ASEAN is not available for the relevant period of our study, we use two methods to compute for the regional growth rates based on the growth rates of the individual countries. The first method is a simple sum aggregation wherein we convert ASEAN country data into US dollars and sum them up before computing the regional growth rates. In the second method, we develop weighted growth rates wherein national growth rates for the ASEAN 5 were weighted by the quarterly GDP of each country in US dollars. We deduct the quarterly growth rate of nominal GDP from quarterly money growth to obtain excess money growth and we subtract consumer price inflation from share price returns and interest rates to get their real returns.

Table 1 shows some basic characteristics of the money aggregate series for the three markets. The ASEAN money growth rates computed using both simple sum aggregation and the weighted series methods are highly correlated with one another. Money growth rates for ASEAN are more volatile than the US and Euro area but when excess money growth rates are considered, Euro area growth rates become more volatile.

We study the relationship of money growth and asset prices through a real asset return regression of the form:

$$R_{i,t} = c + A(L)m_{i,t} + B(L)m_{j,t} + C(L)m_{k,t} + D(L)v_{i,t} + \varepsilon_{i,t} \tag{3}$$

where $R_{i,t}$ is real stock return of market i and m is money growth of markets i, j, and k. Money growth is expressed in dollars for both the US and ASEAN 5 regression and in euros for Euro area regression. Both M1 and M3 are considered for money growth. In contrast with previous studies where the velocity of money is assumed constant, we included the velocity (v) of money as a control variable. We defined velocity of money as the ratio of nominal GDP and broad money (M3). We believed that this assumption is an improvement in the model specification. We observed a significant change in money velocity in the three areas during this period justifying this assumption.

To test monetary spillovers, we examine the relationship between excess money growth in the three markets and the real asset returns in each individual market. We add additional control variables to this regression and vary the number of lags appropriate for each variable. We use the information gathered to construct a regression of real asset returns of the form:

$$\begin{aligned} R_{i,t} = c + aR_{i,t-1} + B(L)xm_{i,t} + C(L)r_{i,t} + D(L)y_{i,t} + E(L)p_{i,t} + F(L)v_{i,t} \\ + G(L)xm_{j,t} + H(L)xm_{k,t} + \varepsilon_{i,t} \end{aligned} \tag{4}$$

where $R_{i,t}$ is real stock return, $xm_{i,t}$ is excess money growth, $r_{i,t}$ is the real short-term interest rate, $y_{i,t}$ is the growth rate of real GDP, $p_{i,t}$ is the inflation rate and $v_{i,t}$ is the velocity of money. i (= A, E, US) is the area index and t the time index. Lag polynomials $B(L)$, $C(L)$, $D(L)$, $E(L)$, $F(L)$,$G(L)$ and $H(L)$ are used in the regression. The figures used in determining the variables in the regression for the real asset returns of the US and ASEAN 5 are expressed in US dollars. The variables used for the Euro area are expressed in euros although the same regression form is used.

Moreover, two money aggregates are alternatively used: narrow money M1 and broad money M3.

Because of our small sample size and the use of quarterly data, we introduce only two lags for the excess money growth variables.

The independent variables that we selected include the excess money growth of the three relevant areas as a proxy for excess liquidity and the others are proxies for the effect of monetary and fiscal policies in the particular areas. Bordo and Wheelock (2006) find that stock market booms reflect both real macroeconomic phenomena and monetary policy. Based on their study, booms occurred during period of above-average growth of real output and during periods of low and falling inflation. The introduction of restrictive monetary policies often coincide with the end of these stock market booms. It is for these reasons that the growth of real GDP, the inflation rate and the short-term interest rate are included as control variables to consider the effect of macroeconomic fundamentals on real asset returns.

4 Results and Findings

The regression of the real asset returns for each market gave interesting results. The results using narrow money are more robust than the regression results using broad money (M3 results are shown as part of the Appendix). This confirms Baks and Kramer's (1999) results that may indicate that demand deposits are more readily used to purchase assets than time deposits. Also, regressions for the ASEAN 5 using a weighted series and simple summations gave similar results.

The results of Table 2 reveal that the money growths of the three markets are not statistically significant in determining US real asset returns. The velocity of money has the expected sign and is statistically significant. In contrast, Euro area money growth affects Euro area real asset returns. The velocity of money for the Euro area carries the unexpected sign and is not statistically significant. This can also be gleaned from the results for the ASEAN 5 where domestic money growth is significant and money velocity has a negative coefficient but insignificant as well.

Table 2a. Regression Results (Using a Weighted Series for ASEAN 5)

Area: **Period:**	**US** **95.1 - 04.2**	**EURO** **98.2 – 04.2**	**ASEAN 5** **95.1 – 04.2**
C	-0.334 (-1.953)	0.185 (0.414)	0.388 (1.119)
$m_{US,t}$	-0.006 (-0.007)	0.456 (0.789)	-1.887 (-1.270)
$m_{E,t}$	0.039 (0.165)	2.475 (3.115)	0.119 (0.278)
$m_{A,t}$	0.262 (1.244)	0.573 (1.602)	2.362 (6.041)
$v_{i,t}$	0.245 (2.092)	-0.202 (-0.594)	-0.379 (-1.244)
R-squared	0.147	0.540	0.566
Adjusted R-squared	0.044	0.448	0.514
F-statistic	1.424	5.876	10.77
Durbin-Watson stat	2.174	1.653	2.454

Table 2b. Regression Results (Using Simple Summations for ASEAN 5)

Area: **Period:**	**US** **95.1 - 04.2**	**EURO** **98.2 – 04.2**	**ASEAN 5** **95.1 – 04.2**
C	-0.324 (-1.856)	0.104 (0.236)	0.695 (1.812)
$m_{US,t}$	0.099 (0.115)	0.269 (0.420)	-2.027 (-1.196)
$m_{E,t}$	0.054 (0.225)	2.774 (3.694)	0.343 (0.712)
$m_{A,t}$	0.130 (0.553)	0.690 (1.633)	2.204 (4.661)
$v_{i,t}$	0.240 (2.003)	-0.143 (-0.427)	-0.639 (-1.895)
R-squared	0.115	0.542	0.449
Adjusted R-squared	0.008	0.451	0.382
F-statistic	1.077	5.923	6.726
Durbin-Watson stat	2.228	1.571	2.597

The regression results for the US market using excess money growth and the extended set of control variables are shown in Table 3. Real GDP and inflation carry the expected signs although only inflation is statistically significant. The real interest rate has a positive coefficient, which is

inconsistent with the expectation that interest rates negatively affect real asset returns because of the reduction in the discount rates but this variable is not statistically significant. Money velocity remains a statistically significant factor.

Table 3a. Monetary Spillover Regression Results (Using Weighted Series for ASEAN 5)

Area: **Period:**	**US** **95.4 – 04.2**	**EURO** **98.3 – 04.2**	**ASEAN 5** **95.4 – 04.2**
C	-0.452 (-1.868)	-0.178 (-0.256)	0.442 (0.855)
$R_{i,t-1}$	0.062 (0.336)	0.327 (0.902)	-0.300 (-1.992)
$xm_{i,t}$	0.239 (0.382)	4.450 (2.806)	2.775 (3.449)
$GDP_{i,t}$	0.047 (0.139)	4.413 (2.643)	2.411 (3.030)
$CPI_{i,t}$	-9.310 (-2.372)	0.525 (0.072)	2.561 (0.706)
$v_{i,t-1}$	0.376 (2.051)	0.076 (0.130)	-0.431 (-0.970)
$r_{i,t-1}$	-1.069 (-0.837)	-0.678 (-0.126)	0.968 (0.840)
$xm_{A,t}$	0.365 (1.217)	0.858 (1.034)	
$xm_{A,t-1}$	0.497 (1.672)	0.160 (0.155)	
$xm_{A,t-2}$	-0.148 (-0.509)	0.246 (0.355)	
$xm_{E,t}$	-0.203 (-0.596)		-0.239 (-0.260)
$xm_{E,t-1}$	-0.038 (-0.085)		-0.924 (-0.882)
$xm_{E,t-2}$	0.894 (2.430)		0.118 (0.132)
$xm_{US,t}$		-0.001 (-0.001)	-0.502 (-0.377)
$xm_{US,t-1}$		2.000 (1.934)	1.226 (0.852)
$xm_{US,t-2}$		-0.876 (-0.679)	0.181 (0.143)
R-squared	0.639	0.716	0.653
Adjusted R-squared	0.442	0.407	0.464
F-statistic	3.240	2.314	2.117
Durbin-Watson stat	2.027	1.763	3.456

Our results showed that domestic excess money growth is not a statistically significant factor that affects real asset returns which is consistent with Table 2. The positive coefficient of the Euro area excess M1 growth presents evidence of a push channel from the Euro area to the US market.

For the Euro area, the coefficients of real GDP growth and Euro area excess M1 growth are statistically significant and positive. The results are consistent with the regression results of Table 2 where Euro area M1 money growth is significant. There is econometric evidence of transmission through a push of money from the US to the Euro area given the positive and significant coefficient for excess US money growth. The spillover effect is transmitted by the next quarter as shown in the regression results. This transmission is quicker compared to the spillover effect from the Euro area to the US market.

For the ASEAN 5 market, coefficients for excess money growth of the other two markets are not statistically significant. Based on the regression results, real asset returns in the ASEAN 5 market are affected by fiscal and monetary policies within the domestic area as evidenced by the positive and significant coefficients for ASEAN excess money growth and real GDP growth. Money velocity in the ASEAN 5 region remains to be a statistically insignificant variable.

Our results are consistent with previous studies that there are liquidity spillovers between the largest economic areas in the world: the US market and the Euro area. However, our results show that the liquidity transmission to and from the two markets have dissimilar pace.

Table 3b. Monetary Spillover Regression Results (Using Simple Summations for ASEAN 5)

Area:	**US**		**EURO**		**ASEAN 5**	
Period:	**95.4 – 04.2**		**98.3 – 04.2**		**95.4 – 04.2**	
C	-0.399	(-1.692)	-0.292	(-0.442)	0.618	(1.133)
$R_{i,t-1}$	0.156	(0.897)	0.336	(1.172)	-0.352	(-2.188)
$xm_{i,t}$	0.575	(0.942)	5.184	(3.966)	2.320	(2.711)
$GDP_{i,t}$	0.048	(0.141)	5.226	(3.686)	2.828	(3.052)
$CPI_{i,t}$	-9.625	(-2.495)	-2.076	(-0.278)	4.539	(1.119)
$v_{i,t-1}$	0.335	(1.871)	0.175	(0.318)	-0.610	(-1.305)
$r_{i,t-1}$	-0.666	(-0.520)	-1.706	(-0.321)	0.944	(0.750)
$xm_{A,t}$	0.196	(0.636)	0.443	(0.612)		
$xm_{A,t-1}$	0.464	(1.539)	0.169	(0.242)		
$xm_{A,t-2}$	-0.271	(-0.987)	0.602	(0.902)		
$xm_{E,t}$	-0.240	(-0.692)			-0.373	(-0.377)
$xm_{E,t-1}$	0.046	(0.1015)			-0.718	(-0.635)
$xm_{E,t-2}$	1.083	(2.996)			0.474	(0.503)
$xm_{US,t}$			-0.277	(-0.235)	-0.227	(-0.159)
$xm_{US,t-1}$			1.828	(1.783))	0.756	(0.497)
$xm_{US,t-2}$			-0.959	(-0.732)	0.297	(0.219)
R-squared	0.651		0.718		0.600	
Adjusted R-squared	0.461		0.411		0.381	
F-statistic	3.422		2.339		2.746	
Durbin-Watson stat	1.873		1.751		2.158	

Note: Regressions for the ASEAN 5 using simple summations.

The ASEAN 5 market's asset returns are not significantly affected by excess liquidity in the bigger markets based on the regression results. Given that only domestic variables are significant for the ASEAN 5, there is econometric evidence of asset return autonomy from excess international liquidity.

Conover, et al. (1999) suggests that countries with the same economic stature have more cooperation in terms of monetary policies. Specifically, they mentioned that US monetary policy and foreign stock returns may be expected because return patterns are identified in the US market, a global asset pricing model dictates that changes in investor required returns translate into similar stock return patterns across various asset classes available to an investor. Furthermore, they reasoned out that a policy change is linked to changes in expected cash flows and the discount rate ascribed to foreign firms. It is not surprising that some of the countries where they observed this phenomenon are part of the Euro area.

Why then is this phenomena not observed in the ASEAN 5 market? Although the ASEAN 5 countries were not part of their study, Conover, et al. (1999) suggests that similarities of patterns are limited by the presence of market imperfections that increase the cost of trading and the volatility of country specific factors. These market imperfections are marks of emerging markets. The ASEAN 5 countries are classic examples of emerging economies.

It is worthy to point out that the results show that the US market is the only market where real asset returns are not affected by domestic excess liquidity. Reasons for this incidence could be varied. A possible explanation is that excess liquidity in the US is quickly transmitted to other markets (e.g., the Euro area). Another reason could be that US investors are already utilizing financial innovations in acquiring assets. The use of leverage and other sophisticated channels and instruments to acquire assets may already be predominantly used in the US.

5 Conclusion

Our results for the Euro and ASEAN 5 areas are consistent with the expected effect of local excess liquidity on domestic asset prices. In contrast, the results for the US market are not consistent with this expectation. This can be explained by the fact that the derivative markets are more developed in the US and that the search for leverage effects is done through these markets. As certain studies highlight, the excess liquidity in the US market channel more to the real estate market.

With regard to spillovers effects, they appear significant reciprocally between the American market and the Euro area. These appear in a positive way (i.e., that the "push" effect would override the "pull" effect). The capital transfers between the US market and euro area would not be justified by re-allocations of international portfolios. Debt would be a means of betting simultaneously on the two areas.

On the other hand, there is no spillover effect to the ASEAN 5, from either the US market, or the Euro zone area. This result seems counter-intuitive but this can be partly explained by the fact that over the period of analysis the "push" and "pull" effects tend to be compensated. The traditional "push" effects would be accompanied by strategies of international portfolio re-allocations.

The focus of our methodology is on the basic relationships between real asset returns and our independent variables. Our aim is to see the effect of excess liquidity as measured by excess money growth in certain markets combined with the control variables introduced in our regression equation on real asset returns. It is crucial to point out that other definitions and measures of liquidity are available in analyzing whether international liquidity transmission exists. These include other traditional measures and broader measures as well.

We restricted our analysis to three specific markets. It is also interesting to employ our methodology on other regional markets. Likewise, the three markets that we chose were also defined restrictively based on the availability of relevant data. Further studies could encompass a bigger European conglomerate that could include other members of the European Union. Studies on the ASEAN market could include other Southeast Asian emerging economies or could even extend to the whole East Asian region. Aside from the intricacy of defining the regional markets, the study of international liquidity and its effect on asset prices presents other complications (including the effect on specific financial instruments and market segments) that await supplementary research using more sophisticated methods.

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Appendices

Results using M3

Appendix A
Regression Results

Area: **Period:**	**US** **95.1 - 04.2**	**EURO** **98.2 – 04.2**	**ASEAN 5** **95.1 – 04.2**
C	-0.257 (-1.531)	0.476 (0.814)	0.593 (1.472)
$m_{US,t}$	0.476 (0.259)	0.483 (0.729)	-1.561 (-0.409)
$m_{E,t}$	-0.282 (-0.888)	2.876 (1.412)	-0.685 (-1.127)
$m_{A,t}$	0.430 (1.817)	0.807 (1.622)	2.502 (5.172)
$v_{i,t}$	0.187 (1.680)	-0.418 (-0.939)	-0.524 (-1.581)
R-squared	0.194	0.435	0.502
Adjusted R-squared	0.0965	0.322	0.442
F-statistic	1.991	3.852	8.326
Durbin-Watson stat	2.054	1.826	2.492

Note: Regressions for the ASEAN 5 using a weighted series

Appendix B
Monetary Spillover Regression Results

Area: **Period:**	**US** **95.4 – 04.2**	**EURO** **98.3 – 04.2**	**ASEAN 5** **95.4 – 04.2**
C	-0.539 (-1.729)	-1.357 (-1.534)	1.322 (2.274)
$R_{i,t-1}$	-0.094 (-0.464)	0.266 (0.936)	-0.328 (-2.024)
$xm_{i,t}$	0.161 (0.133)	6.256 (1.871)	3.790 (2.857)
$GDP_{i,t}$	-0.002 (-0.003)	5.638 (1.594)	1.572 (1.991)
$CPI_{i,t}$	-8.088 (-1.772)	1.986 (0.212)	-3.788 (-0.928)
$v_{i,t-1}$	0.454 (1.976)	-9.087 (-1.152)	0.347 (0.312)
$r_{i,t-1}$	-2.159 (-1.473)	1.095 (1.481)	-1.102 (-2.213)
$xm_{A,t}$	0.498 (0.963)	2.118 (1.214)	
$xm_{A,t-1}$	0.491 (1.058)	-1.397 (-0.743)	
$xm_{A,t-2}$	-0.397 (-0.842)	-0.303 (-0.258)	
$xm_{E,t}$	-0.343 (-0.800)		-0.704 (-0.796)
$xm_{E,t-1}$	-0.374 (-0.705)		-0.631 (-0.575)
$xm_{E,t-2}$	0.558 (1.337)		0.400 (0.445)
$xm_{US,t}$		-1.329 (-0.713)	-2.419 (-1.103)
$xm_{US,t-1}$		0.859 (0.415)	-1.914 (-0.843)
$xm_{US,t-2}$		-1.764 (-0.746)	-0.718 (-0.394)
R-squared	0.515	0.552	0.650
Adjusted R-squared	0.250	0.063	0.460
F-statistic	1.943	1.129	3.410
Durbin-Watson stat	1.795	2.140	1.723

Note: Regressions for the ASEAN 5 using a weighted series

Appendix C

Correlation Matrix: Money Growth Rates (M1 and M3)

M1

	US	EURO	ASEAN 5 (sum)	ASEAN 5 (wt)
US	1.000	0.052	0.273	0.248
EURO	0.052	1.000	(0.064)	0.041
ASEAN 5 (sum)	0.273	(0.064)	1.000	0.943
ASEAN 5 (wt)	0.248	0.041	0.943	1.000

M3

	US	EURO	ASEAN 5 (sum)	ASEAN 5 (wt)
US	1.000	0.204	(0.218)	(0.175)
EURO	0.204	1.000	0.199	0.266
ASEAN 5 (sum)	(0.218)	0.199	1.000	0.967
ASEAN 5 (wt)	(0.175)	0.266	0.967	1.000

Correlation Matrix: Excess Money Growth Rates (M1 and M3)

M1

	US	EURO	ASEAN 5 (sum)	ASEAN 5 (wt)
US	1.000	0.178	0.380	0.386
EURO	0.178	1.000	(0.125)	(0.125)
ASEAN 5 (sum)	0.380	(0.125)	1.000	0.951
ASEAN 5 (wt)	0.386	(0.125)	0.951	1.000

M3

	US	EURO	ASEAN 5 (sum)	ASEAN 5 (wt)
US	1.000	0.384	0.351	0.340
EURO	0.384	1.000	0.097	0.130
ASEAN 5 (sum)	0.351	0.097	1.000	0.949
ASEAN 5 (wt)	0.340	0.130	0.949	1.000