# Does the Quantitative Easing Actually Help Improve the Stock Market Development in Emerging Countries? Another Evidence on the Spillover Effects of QE

# มาตรการผ่อนคลายทางการเงินเชิงปริมาณช่วยให้ตลาดหลักทรัพย์ในประเทศเกิดใหม่พัฒนามากขึ้นหรือไม่? หลักฐานเพิ่มเติมในแง่ของผลกระทบภายนอกจากมาตรการ QE

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## บทคัดย่อ

มาตรการผ่อนคลายทางการเงินเชิงปริมาณ (QE) ถูกนำมาใช้โดยธนาคารกลางของประเทศที่พัฒนาแล้ว เพื่อกระตุ้นเศรษฐกิจ เพื่อให้เศรษฐกิจหลุดพ้นจากภาวะถดถอย การดำเนินมาตรการ QE ผ่านการซื้อสินทรัพย์เสี่ยงเพิ่มเติมนอกเหนือจากการซื้อพันธบัตรรัฐบาลที่มีความเสี่ยงต่ำจะส่งผลให้ปริมาณเงินในระบบในประเทศนั้นเพิ่มสูงขึ้น อันจะช่วยกระตุ้นความต้องการสินค้าและบริการโดยรวม (Aggregate demand) รวมถึงการขยายตัวทางเศรษฐกิจในประเทศนั้นๆ อย่างไรก็ดี งานวิจัยที่ผ่านมาพบว่า มาตราผ่อนคลายทางการเงินเชิงปริมาณไม่เพียงแต่ส่งผลต่อประเทศที่ดำเนินมาตรการ QE เพียงเท่านั้น หากแต่ส่งผลกระทบต่อประเทศเกิดใหม่ที่ได้รับกระแสเงินทุนไหลเข้าจำนวนมหาศาลเข้ามายังประเทศอันเป็นผลจากมาตรการ QE ด้วย ดังนั้นกระแสเงินทุนที่ไหลเข้ามาจำนวนมหาศาลยังประเทศเกิดใหม่อันเป็นผลมาจากมาตรการ QE มีแนวโน้มส่งผลทำให้ตลาดหลักทรัพย์ในประเทศเหล่านี้พัฒนามากขึ้น จากการศึกษาพบว่า ตลาดหลักทรัพย์ 5 ประเทศจากทั้งหมด 11 ประเทศเกิดใหม่ในทวีปเอเชียและลาตินอเมริกามีการพัฒนาที่มากขึ้นอย่างมีนัยสำคัญในแง่ของขนาดตลาดในช่วงเวลาหลัง QE เมื่อเทียบกับช่วงเวลาก่อน QE นอกจากนี้เราพบว่า ตลาดหลักทรัพย์ 6 ประเทศจากทั้งหมด 11 ประเทศ มีการพัฒนาที่มากขึ้นอย่างมีนัยสำคัญในแง่ของขนาดตลาดในช่วงเวลา QE2 เมื่อเทียบกับ QE1 ทั้งนี้การศึกษาพบว่า สาเหตุหนึ่งที่ตลาดหลักทรัพย์ในประเทศเหล่านี้มีการพัฒนามากขึ้นเป็นผลมาจากพื้นฐานทางเศรษฐกิจของประเทศที่ดีขึ้นในช่วงเวลาที่มีมาตรการ QE จากการศึกษาพบว่า พื้นฐานทางเศรษฐกิจที่ดีเป็นปัจจัยหนึ่งที่ช่วยดึงดูดกระแสเงินทุนให้ไหลเข้ามายังประเทศเกิดใหม่และเป็นสาเหตุหนึ่งที่ส่งผลให้ตลาดหลักทรัพย์ในประเทศเกิดใหม่มีการพัฒนามากขึ้น โดยสรุปการศึกษาพบว่าตลาดหลักทรัพย์ในประเทศตลาดเกิดใหม่ส่วนหนึ่งมีขนาดใหญ่มากขึ้นอย่างมีนัยสำคัญหลังมาตรการ QE ถูกนำมาใช้โดยประเทศที่พัฒนาแล้ว ดังนั้นการศึกษาชิ้นนี้เปิดมุมมองใหม่ในแง่ของผลกระทบของมาตรการ QE ต่อการพัฒนาตลาดหลักทรัพย์ที่ยังไม่เคยมีใครกล่าวถึงมาก่อน

**คำสำคัญ:** มาตรการผ่อนคลายทางการเงินเชิงปริมาณ ผลกระทบภายนอก การไหลเวียนของเงินทุน การพัฒนาตลาดหลักทรัพย์

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# Abstract

The Quantitative Easing (QE) has been used by central banks in developed countries to help revive the economic growth and pull the countries out of recession. Through the large scale asset purchases that can involve the riskier assets in addition to usual low risk government bonds, this process will increase the money supply and therefore help stimulate the aggregate demand and economic growth in the country that has implemented the QE. However, previous literatures have found that QE does not only affect the country that implemented the QE but also has spillover effects to emerging countries that have received massive amount of capital inflows as a result of QE. As a results of these massive amount of capital inflows after the QE, we expect that QE is likely to positively affect the stock market development in emerging countries. Out of total of eleven countries in emerging Asia and emerging Latin America, we find five countries have significant higher degree of stock market development in terms of size after the QE is implemented comparing to before QE period. We also find that six out of eleven countries have significant higher degree of stock market development in term of size in QE2 period comparing to QE1. One of the reasons that the stock market development in these emerging countries are more developed is due to their economic fundamentals have been improved after the QE is implemented. We find the stronger economic fundamentals in these countries are one of the reason that helps attract the capital inflows which further result in higher degree of stock market development. In summary, we find the stock market in some of emerging market economies become larger after the implementation of the QE by advanced economy. Therefore, our paper sheds a new light in terms of another possible spillover effects of QE in terms of stock market development in emerging countries that no one has ever mentioned before.


**Keywords:** Quantitative Easing, Spillover Effects, Capital Flows, Stock Market Development

## 1. Quantitative Easing and its implications on domestic economy and its spillover effect to the other economies

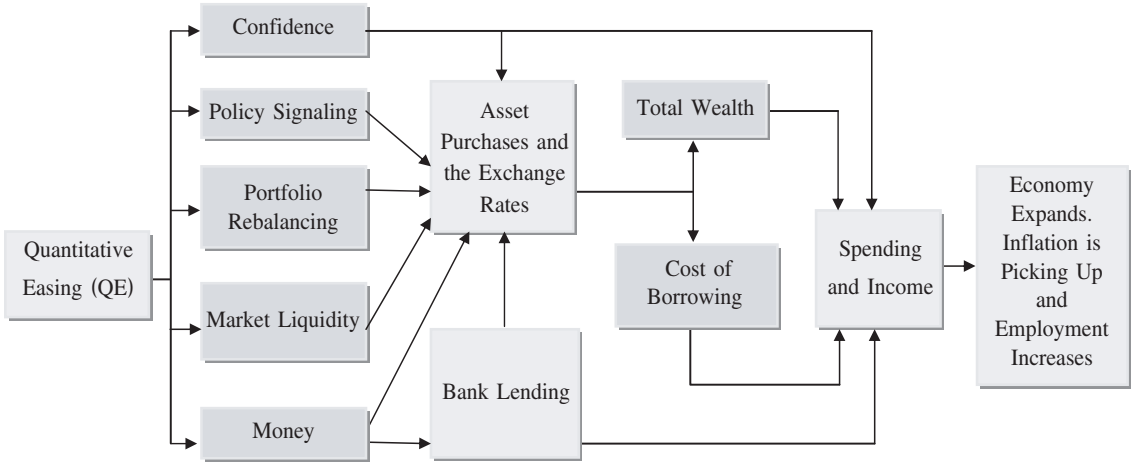
The financial crisis has sparked many central banks in developed countries to employ Quantitative Easing to pull the countries out of the financial crisis situation. The Quantitative Easing program or shortly known as QE is firstly adopted by Japan during the last decade when Japan has experienced stagnation along with deflation which make a usual conventional monetary policy ineffective in pulling the country out of recession (Girardin and Moussa, 2011). The QE is unconventional monetary policy aiming at injecting massive amount of money to stimulate economic growth. The policy is used at the time that the monetary policy rate is near zero. In other words, it is employed when the usual standard conventional monetary policy cannot make interest rate lower than zero and thus it is ineffective in stimulating economic growth. The QE program is conducted through a large scale asset purchase that can involve risky assets such as corporate bonds and mortgage-back securities in addition to the usual low-risk government bonds to increase the money supply and thereby stimulating the aggregate demand and economic growth. Through the purchase of financial assets, QE thus pushes up those asset prices and stimulates aggregate spending through lowering the borrowing costs and increasing wealth of the holders of those assets (Joyce, Tong, and Woods, 2011).

According to Joyce, Tong, and Woods (2011) and Fratzscher, Duca, and Straub (2013), there are five transmission channels which QE can affect the economy. Those channels are policy signaling effects, portfolio balance effects, liquidity premia effects, confidence effects, and bank lending effects. **The policy signaling effects** involve the market participants' expectation of an increase in future inflation rate after implementation of QE that helps lower real interest rate which further helps stimulate an aggregate spending. Through **the portfolio balance effects,** the central bank asset purchases will help pushing up those asset prices thus increase the wealth of the holders of those assets. This will further trigger the holders of those assets to rebalance their portfolios by further buying assets and so on. The higher asset prices could imply lower borrowing costs for firms and households therefore help stimulate aggregate spending. **The liquidity premia effects** occur when the liquidity in the market increases through the central bank asset purchases which further helps encourage more trading activities. **The confidence effects** work through an increase in consumer confidence through an expectation of improving in economic outlook after conducting large scale asset purchasing program by the central bank. This also helps stimulate willingness to spend and therefore an aggregate spending. The last effect is **the bank lending effects** in which the large scale asset purchases will help the banking sector gains new reserves and deposits which would encourage banks to extend more loans. This will help the private sectors to obtain sources of funds and also make it is easier for firms to raise funds by helping bring down cost of borrowings. Through this effect, the

liquidity on corporate credit markets increase and thereby encourage more investment in the economy (Joyce, Tong, and Woods, 2011). Thus, in overall, QE is likely to cause an increase in aggregate demand, induce economic expansion, reduce unemployment rate, and further cause an increase in inflation in the country that has implemented QE. These five transmission channels of the effects of QE on the economy (Joyce, Tong, and Woods, 2011) are summarized in Figure 1.

Nevertheless, it is found that QE does not only affect the country that has originally implemented QE but also has the spillover effects to the emerging market economies that received massive amount of fund flows after implementation of QE by advanced economies. According to Lim, Mohapatra, and Stocker (2014), the emerging market economies have attracted large amount of capital inflows after QE is implemented. These are due to these emerging market countries are

**Figure 1:** Summary of five Quantitative Easing (QE) transmission channels




*Source: Joyce, Tong, and Woods (2011), Bank of England*

good alternative investment as they have stronger economic growth comparing to the advanced economies along with stable political environment in the past decade. By looking into the gross capital inflows that consist of portfolios, loans, and FDI to the developing economies, they find that portfolio inflows to these economies significantly increase after the implementation of QE. Morgan (2011) argues that the most direct transmission impact of the U.S. QE on emerging Asia is through the increase in capital flows to that region. He finds that an increase in the US monetary base as a result of the U.S. QE implementation has caused an increase in the gross private capital outflows to emerging Asia countries especially during the first two quarters of the second phase of the U.S. QE period (a.k.a. QE2). In addition, previous literature that studies about the effects of QE on the emerging markets have supported the externalities effects of the QE on the emerging market economies in which they find QE has pushed up the asset prices in emerging countries (Fratzcher et al., 2013). Fratzscher, Duca, and Straub (2013) find that the second phase of the U.S. QE (QE2) has pushed up the asset prices worldwide. In other words, they find that the U.S. QE does affect the capital flows to the emerging market economies in a pro-cyclical manner and therefore raise the asset prices worldwide. Thus, through the portfolio balancing channel mentioned previously regarding to the transmission channels of QE that aim at revive domestic economic growth, the QE might, on the other hand, trigger a portfolio rebalancing toward the foreign assets instead of the riskier domestic assets (Frazcher et al., 2013). Thus, the QE is likely to have spillover effects toward the countries that received massive amount of capital flows after QE in addition to the originally anticipated effects on the domestic economy. A study by Brana, Djigbenou, and Prat (2012) confirm the spillover effects of global excess liquidity on output and price level in emerging countries. They find that global liquidity expands strongly since the beginning of the last decade and has accelerated after the Feds unconventional monetary policy is implemented to revive the U.S. economic growth. Although they find that the capital flows to emerging market reduce sharply in 2008 and 2009 which is during the first phase of QE (a.k.a. QE1) period, but the capital flows to emerging markets are found to increase sharply in 2010 or during the QE2 period. They argue that the reasons the capital flows sharply back to emerging market during the QE2 period is due to these countries are supported by stronger economic fundamentals when comparing to the advanced economies. Thus, the large amount of capital inflows to these emerging markets has affected their exchange rate and asset prices. As a result, some of those emerging market economies have to employ macro-prudential framework or capital controls to prevent their domestic currencies to sharply appreciate or their asset prices to rise too much. From their study, they find that the excess global liquidity has generated significant spillover effects to the emerging market economies and also find that those excess global liquidity has caused an increase in these emerging market economies' GDP and inflation. Therefore, their study has

confirmed the spillover effects of QE toward the emerging market economies since the QE is found to affect these countries' economic fundamentals.

Although, previous literatures (Fratzcher et al., 2013 and Brana, Djigbenou, and Prat, 2012) have found that QE causes the asset prices and economic growth in emerging market economies to increase, at the same time it causes inflation in these economies to rise as well. Even though the increase in asset prices in emerging market are likely to improve financial wealth of the people in emerging market economies thus further help stimulate more spending and economic growth, it would also bring uncertainty to these economies if those asset prices have risen too fast and are above their fundamental values. As a result, the emerging market policy-makers often blame that QE has triggered the financial imbalances in these emerging market economies as the massive amount of capital inflows have pushed up those countries' asset prices and caused those countries' domestic currencies to strongly appreciate (Fratzcher et al., 2013). Thus, it seems to us that QE has both benefits as well as costs to the emerging markets that received massive amount of fund flows after implementation of QE by advanced economies. Despite all previous arguments and findings regarding to the spillover effects of QE on the emerging market economies, we are interested in exploring another possible benefits of QE in which, to our knowledge, none of existing literatures have ever mentioned or focused about this possible benefit before. In other words, we would like to look into another possible spillover effect of QE in terms of the degree of stock market development in the emerging market economies after QE is implemented. We believe these massive capital inflows to the emerging countries as a result of QE are likely to positively affect the degree of stock market development in these countries.

## 2. Possible spillover effect of the Quantitative Easing on the stock market development in emerging countries. Why are we interested in such possible spillover effect?

Why are we interested in exploring another possible spillover effect of QE on the degree of stock market development in the emerging countries? This is because it is well established in the literatures that the stock market development is important to the country economic growth as a well-developed stock market helps to alleviate a firm financial constraints, enable them to access the source of fund needed for their investments and therefore helps enhance economic growth through higher level of investment. Levine (1991) finds that the stock market development measuring in terms of liquidity helps facilitate investments in the long run. Ndikumana (2005) finds that the developed and well-functioning stock market helps to promote higher level of investment and economic growth through helps identify profitable project and channel fund to the most profitable investment. Thus, if QE is found to cause the stock market development in emerging countries to be

more developed, this will explore another positive spillover effect of QE on the emerging market countries. We believe this will shed a new light to the literatures related to the spillover effects of the advanced economies QE to the emerging market economies as well as the stock market development literatures.

We use the common indicators in terms of the stock market size and liquidity to measure the degree of stock market development (Durmirgu-Kunt and Levine, 1996; Levine and Zervos, 1998). It is well established in the stock market development literatures that the larger and the more liquid stock market both indicate higher degree of stock market development. As the stock market becomes larger and more liquid, it will attract investors to trade more in the market which will further result in higher degree of stock market development. We focus on the spillover effects of the U.S. QE on the degree of stock market development in these emerging market economies. As shown in Figure 3 and 4, after QE is adopted in the U.S., there are massive amount of capital flows toward the emerging market countries. If the U.S. QE has triggered the portfolio rebalancing across the asset classes and fund flows into the emerging market countries which will further cause their asset prices to increase, this will cause the stock market in those countries to become larger and more liquid. Therefore, QE is likely to induce higher degree of stock market development in those emerging countries. Using the data from eleven emerging countries that have received massive amount of fund flows after the implementation of the U.S. QE, we would like to explore and find supporting evidence whether QE has actually triggered higher degree of stock market development in these countries. The process in which we expect that QE will cause the stock market in the emerging countries to be more developed is summarized in Figure 2. In other words, the surge in asset prices in the emerging market after massive amount of capital inflows as a result of the U.S. QE has further attracted capital flows to emerging markets and therefore resulted in higher degree of stock market development in these countries. Although we acknowledge that the massive capital flows to emerging countries after QE is implemented in the past years might not cause a sustain development in the emerging capital markets, however, as the common indicator of the stock market development

**Figure 2:** An economic linkage between the QE and the degree of stock market development in emerging market countries (EMEs).

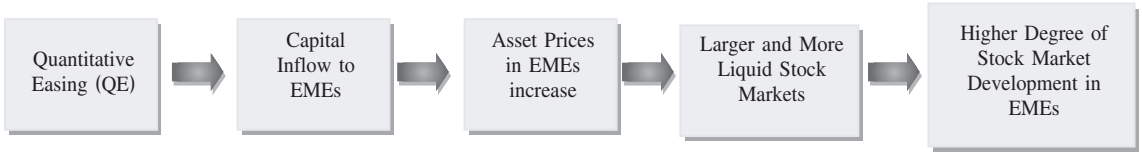


**Figure 3:** Monthly equity flows to Emerging Asia Countries from the U.S. from January 1990 to January 2014 (million US dollars)

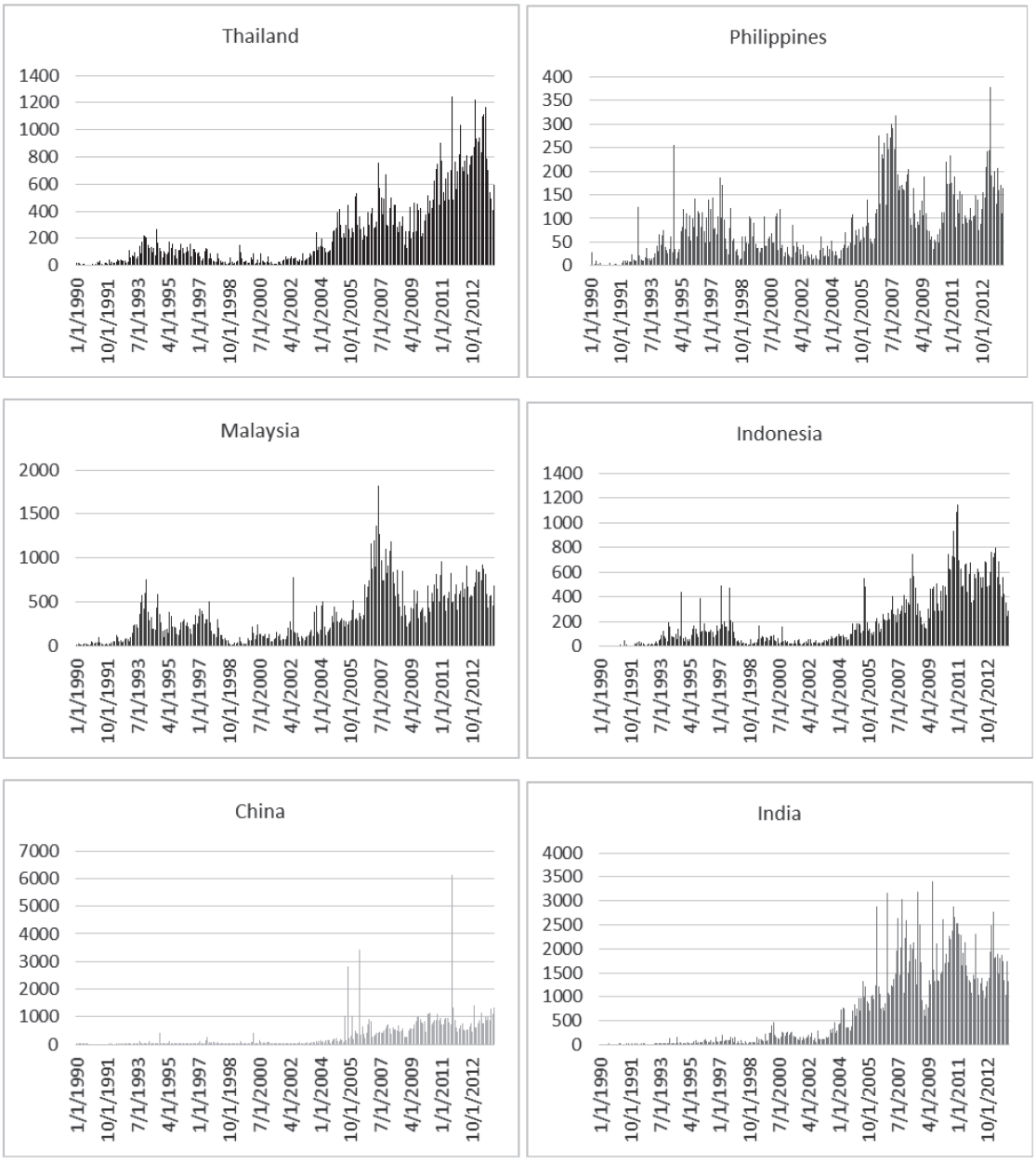
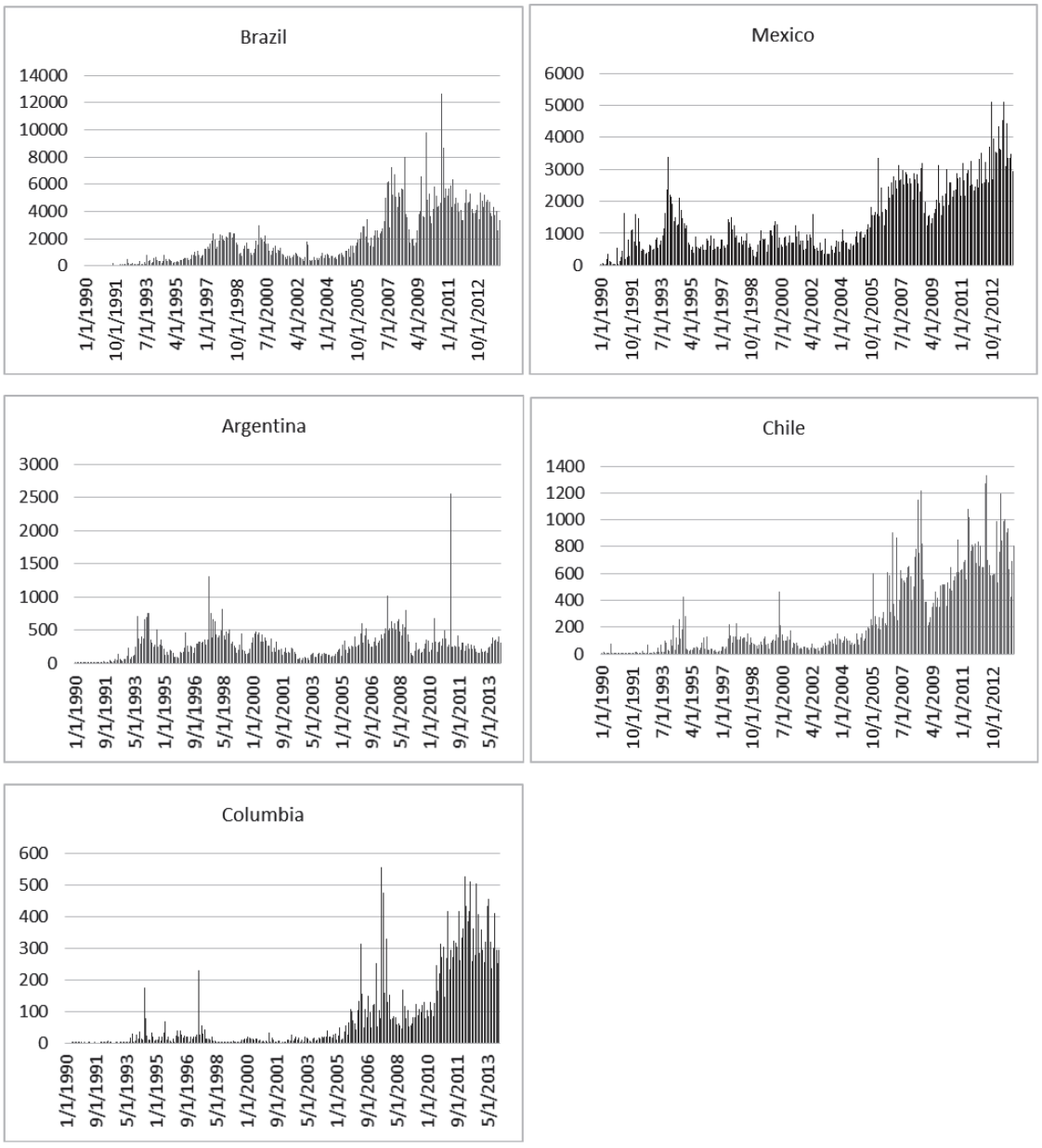


**Figure 4:** Monthly Equity Flows to Emerging Latin America Countries from the U.S. from January 1990 to January 2014 (million US dollars)



in the literatures are still in terms of size and liquidity, we use larger stock market size and higher liquidity as the indicators of higher degree of stock market development as the larger and more liquid stock all positively relate to degree of stock market development.

We have separated the time periods to investigate the effects of the U.S. QE on the stock market development in emerging countries into before and after QE periods, during and after QE1, and during and after QE2 periods. The reasons that we separate the periods of QE implementation into during and after QE1 and during and after QE2 periods in addition to just before and after QE periods because there are fundamental differences in QE1 and QE2 periods in terms of the capital flows toward the emerging market countries (Fratzcher et al., 2013). In other words, we would like to take into account the differences in those QE periods in terms of their effects on the degree of stock market development in emerging countries. According to Fratzcher, Duca, and Straub (2013), the QE1 is implemented at the period of subprime crisis starting from September 2008 after a collapse of Lehman Brother when many financial market segments have fell down. During those periods, the capital flows out of the emerging market countries back to the U.S. due to the high uncertainty surrounding those periods has created flight to safety phenomenon. The main objective of using QE at that time was to repair the trouble financial market and provide liquidity to financial institutions to avoid a credit crush in the U.S. economy. In other words, the Feds at that time acts as lender of last resources to ensure enough liquidity in the market. Therefore, after the announcement of QE1, a lot of uncertainty during those crisis period has triggered a portfolio rebalancing across countries in which capital has flowed mainly out of emerging countries and back to the U.S. equity and bond funds. Fratzcher, Duca, and Straub (2013) find that the portfolio rebalancing has occurred across countries rather than across the asset classes. Due to flight to safety phenomenon, the investors try to achieve their desired deleveraging by selling off foreign asset holdings in emerging countries. Therefore, the QE1 policies have induced mainly a portfolio rebalancing from the rest of the world back to the U.S. and lowered US bond yields significantly. Thus, throughout during and after QE1 period but before a starting of QE2 period, we believe the degree of stock market development in the emerging market countries is not likely to affected much by QE1.

The QE2 period which is the announcement period of the treasury purchases that has started on the second half of 2010, on the other hand, has triggered different effects in terms of capital flows to emerging market countries comparing to QE1 period. The implementation of QE2 has mainly triggered a portfolio rebalancing in an opposite direction, from the U.S. funds into the foreign funds, but also across asset classes, from bonds into emerging market equities (Fratzscher, Duca, and Straub, 2013). Since there are massive capital flows to emerging countries in these period, we expect to

see higher degree of stock market development in this period comparing to QE1 period. In this study, we will focus on emerging Latin America and emerging Asia countries since these countries have received massive amount of capital inflows after QE, especially in during and after QE2 period. Figure 3 and 4 show the equity flows from the U.S. to these emerging market economies. The selected emerging countries in our study are China, Indonesia, Malaysia, Philippines, Thailand, India, Argentina, Brazil, Columbia, Mexico, Brazil, and Chile respectively. We select these countries because they have received massive amount of fund flows after the implementation of QE as clearly shown in Figure 3 and 4. We use equity flows to emerging market countries from the U.S. as the measure of capital flows to track the capital inflows to these countries from the US investor perspective after the U.S. QE is implemented. From figure 3 and 4, it is clearly seen that there are massive amount of capital flows toward these emerging economies after the implementation of the U.S. QE especially during and after QE2 period.

Therefore, we are interested in exploring our belief that the U.S. QE is likely to positively affect the stock market development in emerging market countries. In addition, we also explore further what factors that likely to cause the stock market development in these countries to develop more. We focus on whether economic fundamentals matters for a degree of stock market development in these countries after QE. In addition, if the degree of stock market development among these countries are different, we are interested in exploring further what are the causes of those differences. According to previous literatures, it is found that the capital flows are positively related to the economic fundamentals (Lim, Mohapatra, and Stocker, 2014). The good economic fundamentals are likely to attract larger capital inflows to that country. Lim, Mohapatra, and Stocker (2014) find that the economic growth of developing countries positively affects the portfolio flows to those countries while the country risk appears to negatively affect the portfolio flows. Fratzscher, Duca, and Straub (2013) also find that the heterogeneity in the responses to the U.S. QE in emerging market countries are related to those country risks. Therefore, in addition to the differences in country risk, the fundamental of the economies should be the important factors that attracts capital flows to those countries. As we believe there should be a linkage between capital flows and degree of stock market development in emerging countries and the capital flows are found to positively related to the economic fundamentals of the countries, we believe the differences in degree of stock market development in emerging countries might be due to the differences in the economic fundamentals in those countries. Therefore, we expect to observe the countries that have stronger economic fundamentals (high GDP growth, low inflation, low unemployment) are likely to benefit more from the U.S. QE in terms of higher degree of stock market development. In other words, we expect the country that has stronger economic

fundamentals comparing to the past will benefits more from the QE as the portfolio flows to these economies are likely to be more sustainable. We believe that by knowing whether the U.S. QE positively affects the stock market development and also knowing the factors that help contribute to such differences in degree of development will provide new insights to the policymakers in emerging countries in terms of another possible spillover effect of the QE.

As mentioned previously that a larger size and more liquid stock market all indicate higher degree of stock market development, we therefore measure the degree of stock market development in these emerging countries in terms of size and liquidity. Following Demirguc-Kunt and Levine (1996) and Levine and Zervos (1998), we measure the stock market development in terms of size by using stock market capitalization to GDP and in terms of liquidity or activity by using the stock market total value traded to GDP. The larger stock market size indicates higher degree of stock market development as it is positively related to the ability of mobilizing the capital and diversifying risk (Levine and Zervos, 1998). By also measuring the stock market development in terms of liquidity, it helps complement the stock market size indicator since no single indicator can measure all dimensions of stock market development (Levine and Zervos, 1998). Levine and Zervos (1996) argue that liquidity which measures the degree of trading in the stock market helps ease firm access to source of fund and investment while Demirguc-Kunt and Levine (1996) argue that higher liquidity enables investors to alter their portfolios cheaply and quickly thereby helps improve the allocation of capital and helps enhance economic growth.

We use quarterly data from 2005 to 2014 to explore our belief that the U.S. QE positively affect the stock market development in emerging countries that received massive amount of capital flows after QE. We collect the emerging countries' market capitalization, stock market turnover, economic fundamental variables, and the equity flows from the U.S. to emerging countries from Thomsen Reuters DataStream and World Bank. Due to the unemployment rate data in India and Indonesia are available only yearly, we use Cubic Spline Interpolation to break those yearly data into quarterly data. We break the period of our study into before QE, after QE, during and after QE1 (QE1), and during and after QE2 (QE2) periods. As mentioned previously, following Fratzscher, Duca, and Straub (2013), we separate the QE period into QE1 and QE2 since there are fundamental differences in terms of the capital flows and their effects on the emerging market economies in these periods. We identify before QE period as the period from the first quarter of 2005 to the second quarter of 2008 and after QE period as the period from the third quarter of 2008 to the first quarter of 2014. For during and after QE1 period (QE1), we use the period from the third quarter of 2008 to the second quarter of 2010 while during and after QE2 period (QE2) we use the period from the third quarter of 2010 to the first quarter

of 2014. We calculate average market capitalization to GDP used to measure the stock market development in terms of size and average market turnover to GDP used to measure stock market development in terms of liquidity in before QE, after QE, QE1 and QE2 periods respectively. We expect to see higher degree of stock market development in emerging market countries in after QE period comparing to before QE period and also higher degree of stock market development in QE2 period comparing to QE1. Furthermore, in order to identify whether the degree of stock market development in these emerging market countries are statistically different before and after QE periods and in QE1 and QE2 periods, we calculate the significant differences of the average stock market development indicators across these periods using t−statistics to ensure that the degree of stock market development both in terms of size and liquidity are statistically different in the periods before and after QE and also in the QE1 and QE2 periods.

Furthermore, we also expect that the degree of stock market development in these emerging market countries are likely to be different based on their differences in economic fundamentals. We expect the countries that have stronger economic fundamental are likely to benefit more from QE in terms of degree of stock market development. We focus on three main economic fundamentals that are their economic growth measuring by GDP, their inflation levels measuring by CPI, and also their unemployment rates since these economic fundamentals are well−known indicators when investors evaluate the fundamentals of the country at a glance. We calculate the average value of the economic fundamental indicators in each emerging market country over the period of study (2005 to 2014) and using them as the country mean benchmarks. We then calculate the average economic fundamental values before QE, after QE, during and after QE1 (QE1), and during and after QE2 (QE2) for each country. Then we compare the average economic fundamental values in those QE periods to each country own mean benchmark values. Thus, the average economic fundamental values above the mean benchmarks illustrate the stronger economic fundamentals in QE periods comparing to the benchmarks while the average values below the mean benchmarks illustrate the weaker economic fundamentals in QE periods comparing to the benchmarks. In other words, the value above the benchmark illustrates better economic condition over QE periods comparing to the average while the value below the benchmark illustrates weaker economic condition. The reason that we compare the country economic fundamental values over QE periods to their mean benchmark values is because we believe the capital flows to emerging countries are interdependence and such interdependence should be related to those countries economic fundamentals. Gooptu (1994) finds that there are inverse relationship between the total portfolio flows to emerging Asian stock markets and the emerging Latin America. In other words, he finds the developing economies compete for the

capital flows from advanced economies. Therefore, we believe the country that has stronger economic fundamental in QE periods is likely to get more benefit from QE in terms of higher degree of stock market development. In addition, in order to prove that the economic fundamentals indeed matter for the differences in the degree of stock market development across these countries, we also calculate the significant correlations of the economic fundamental variables and the stock market development indicators both in terms of size and liquidity using t−statistics to ensure that the degree of stock market development in these countries are statistically significantly correlated to the economic fundamentals.

## 3. Our evidences of the effect of Quantitative Easing on the stock market development in emerging countries

From our simple statistical analysis, out of total eleven emerging countries in our study, we find that the degree of stock market development in terms of size in five countries are significantly improved after the U.S. QE is implemented (Table 1). Those countries are Philippines, Indonesia, Mexico, Chile, and Columbia (Table 1). We also find that the degree of stock market development in Thailand, Malaysia, and China have improved but the improvements are not statistically significant. When we look into the degree of stock market development in QE2 period comparing to QE1, we find that six out of total eleven countries in our study have significantly higher degree of stock market development in QE2 period comparing to QE1 (Table 1). Those countries are Thailand, Philippines, Malaysia, Indonesia, Mexico, and Columbia. Thus, the results are consistent with our expectation since we find the countries that received massive amount of capital inflow after QE have higher degree of stock market development especially in QE2 period.

When we look into the degree of stock market development in terms of liquidity after the QE is implemented, we find less evidence that the U.S. QE has induced higher degree of stock market development in terms of liquidity comparing to when we measure the stock market development in terms of size. We find that only Thailand has significant higher degree of stock market development in terms of liquidity after the U.S. QE comparing to before QE period and we find stronger evidence in the period of QE2 more than QE1 (Table 2). We also find that only India has significantly higher degree of stock market development in terms of liquidity in QE2 period comparing to QE1 (Table 2). Thus, even though we find evidences that the stock market development in terms of size are significantly larger after the U.S. QE is implemented, we cannot confirm from our results that the stock market development in these countries are better off in terms of liquidity after the U.S. QE. Therefore, only size dimension of stock market development can be found to be significantly improved after QE. In other word, the stock market in some of these countries become significantly larger as a results of the U.S. QE.

**Table 1:** Average Market Capitalization to GDP in Q1 2005 to Q1 2014

| Country | Average | Before QE | After QE | QE1 | QE2 | AfterQE–BeforeQE | QE2–QE1 |
|---|---|---|---|---|---|---|---|
| **Emerging Asia Countries** | | | | | | | |
| Thailand | 2.9575 | 2.7277 | 3.1037 | 2.1932 | 3.6241 | 0.3760 | 1.4309*** |
| T–test | | | | | | (1.6408) | (6.8679) |
| Philippines | 2.3287 | 1.8399 | 2.6398 | 1.7223 | 3.1640 | 0.7999*** | 1.4417*** |
| T–test | | | | | | (3.4182) | (8.4431) |
| Malaysia | 5.3837 | 5.3112 | 5.4298 | 4.5967 | 5.9059 | 0.1186 | 5.4120*** |
| T–test | | | | | | (0.4518) | (5.4120) |
| Indonesia | 1.5347 | 1.3520 | 1.6509 | 1.2133 | 1.9010 | 0.2989** | 0.6877*** |
| T–test | | | | | | (2.5187) | (7.7908) |
| China | 1.1119 | 1.0587 | 1.1457 | 1.2986 | 1.0583 | 0.3049 | –0.6832 |
| T–test | | | | | | (0.3049) | (–0.6832) |
| India | 3.0351 | 3.2180 | 2.9187 | 3.1258 | 2.8003 | –0.2994 | –0.3254 |
| T–test | | | | | | –1.2095 | –1.2924 |
| **Emerging Latin America Countries** | | | | | | | |
| Brazil | 2.3418 | 2.4885 | 2.2484 | 2.3025 | 2.2175 | –0.2401 | –0.0850 |
| T–test | | | | | | (–1.5788) | (–0.6697) |
| Mexico | 0.3452 | 0.3112 | 0.3668 | 0.3145 | 0.3968 | 0.0556*** | 0.0823*** |
| T–test | | | | | | (2.7733) | (5.3551) |
| Argentina | 0.1574 | 0.2250 | 0.1124 | 0.1285 | 0.1025 | –0.1126*** | –0.0260* |
| T–test | | | | | | (–9.5183) | (–2.0247) |
| Chile | 4.4566 | 4.2681 | 4.5766 | 4.3790 | 4.6895 | 0.3085* | 0.3106 |
| T–test | | | | | | (1.9622) | (1.4823) |
| Columbia | 1.9351 | 1.3064 | 2.3352 | 2.0013 | 2.5261 | 1.0289*** | 0.5248*** |
| T–test | | | | | | (9.0026) | (5.1590) |

**Note:** T–test is the test of mean differences of average market capitalization to GDP before and after QE and the differences of average market capitalization to GDP in during and after QE1 (QE1) and during and after QE2 period (QE2). *,**,** indicate a significant at 10%, 5%, and 1% respectively.

**Table 2:** Average Market Turnover to GDP in Q1 2005 to Q1 2014

| Country | Average | Before QE | After QE | QE1 | QE2 | AfterQE–BeforeQE | QE2–QE1 |
|---|---|---|---|---|---|---|---|
| **Emerging Asia Countries** | | | | | | | |
| Thailand | 0.1202 | 0.0701 | 0.1520 | 0.0751 | 0.1960 | 0.0819* | 0.1209* |
| T–test | | | | | | (1.8831) | (1.9028) |
| Philippines | 0.0309 | 0.0235 | 0.0356 | 0.0275 | 0.0403 | 0.0122 | 0.0128 |
| T–test | | | | | | (1.5403) | (1.1128) |
| Malaysia | 0.1111 | 0.0975 | 0.1197 | 0.0870 | 0.1384 | 0.0222 | 0.0514 |
| T–test | | | | | | (0.6903) | (1.6108) |
| Indonesia | 0.0273 | 0.0311 | 0.0248 | 0.0239 | 0.0253 | –0.0063 | 0.0014 |
| T–test | | | | | | (–0.6065) | (0.1036) |
| China | 0.1180 | 0.0877 | 0.1372 | 0.1605 | 0.1239 | 0.0495 | –0.0366 |
| T–test | | | | | | (0.9280) | (–0.4638) |
| India | 0.0396 | 0.0601 | 0.0266 | 0.0160 | 0.0452 | –0.0334*** | 0.0292** |
| T–test | | | | | | (–2.7526) | (2.6586) |
| **Emerging Latin America Countries** | | | | | | | |
| Brazil | 0.0598 | 0.0547 | 0.0629 | 0.0584 | 0.0656 | 0.0082 | 0.0072 |
| T–test | | | | | | (0.4174) | (0.2702) |
| Mexico | 0.0047 | 0.0038 | 0.0053 | 0.0065 | 0.0047 | 0.0015 | –0.0018 |
| T–test | | | | | | (1.0583) | (–0.8857) |
| Argentina | 0.0008 | 0.0012 | 0.0005 | 0.0008 | 0.0004 | –0.0007** | –0.0004** |
| T–test | | | | | | (–2.6948) | (–2.4942) |
| Chile | 0.0435 | 0.0521 | 0.0380 | 0.0281 | 0.0437 | –0.0141 | 0.0156 |
| T–test | | | | | | (–1.2213) | (1.0592) |
| Columbia | 0.0126 | 0.0102 | 0.0142 | 0.0133 | 0.0147 | 0.0040 | 0.0014 |
| T–test | | | | | | (0.6820) | 0.1826 |

**Note:** T–test is the test of mean differences of average market turnover to GDP before and after QE and the differences of average market turnover to GDP in during and after QE1 (QE1) and during and after QE2 period (QE2). *,**,** indicate a significant at 10%, 5%, and 1% respectively.

Since it is found in previous literatures that the capital flows are related to economic fundamentals (Lim, Mohapatra, and Stocker, 2014), we believe that the degree of stock market development in these countries is likely to be affected by the economic fundamentals in those countries as well. The results in Table 3 confirm that the stock market development indicators in all countries except China are significantly related to their economic fundamentals. We find stronger evidences when we look at the degree of stock market development in terms of size rather than liquidity. In seven countries out of eleven countries, we find that their stock market development indicators in terms of size are significant positively related to the economic growth measuring by GDP. In other words, we find higher GDP is significantly related to higher degree of stock market development in those countries. We also find that the degree of stock market development both in terms of size and liquidity in two countries out of eleven are significant negatively related to their inflation level. In other words, lower inflation is significantly related to higher degree of stock market development. We also find that the degree of stock market development especially in terms of size is significantly related to the unemployment rate in which we find five countries out of eleven that their unemployment rates are significant negatively related to the stock market development indicators. In other words, lower unemployment is related to higher degree of stock market development. Thus, we find the supporting evidences that the economic fundamental are one of the reasons why the stock market development in emerging countries have been improved after the implementation of the U.S. QE. In addition, the results in Table 3 also show that the equity flows are significant positively related to the stock market development in terms of size in eight out of total eleven countries. Thus, these findings help confirm our belief and expectation that QE has caused massive amount of capital inflows to emerging countries and these capital flows are positively related to the degree of stock market development in these countries. In other words, the massive capital flows to emerging market economies as a results of QE has caused the stock market in these emerging market countries to become larger and thus more developed.

In order to confirm the findings in previous literatures and further prove that the economic fundamentals are one of the reasons that help attract capital flows to emerging countries which further cause higher degree of stock market development in these countries, Table 4 shows that the economic fundamentals are significant positively related to capital inflows to these countries. From out of eleven countries, we find five countries that their GDP are significant positively related to the capital flows. In others words, higher economic growth in these countries have attracted the capital inflows to the countries. We also find that higher inflation in Brazil has induced higher capital inflows while we find seven countries that their unemployment rates are significant negatively related to capital flows. In other words, lower unemployment rates which also imply a better economic condition have attracted capital inflows to those countries.

**Table 3:** Correlations between the Equity Flows, Economic Fundamentals, and Stock Market Development Indicators Measuring in Terms of Size (Mktcap / GDP) and Liquidity (Turnover/GDP)

| Country | Stock Market Development | GDP | CPI | Unemployment | Equity Flow | Tumover/GDP |
|---|---|---|---|---|---|---|
| **Emerging Asia Countries** | | | | | | |
| Thailand | | | | | | |
| | Mktcap/GDP | 0.2567 | 0.1383 | −0.6424*** | 0.7551*** | 0.4625*** |
| | T−test | (1.5484) | (0.8143) | (−4.8879) | (6.7167) | (3.0415) |
| | Tumover/GDP | 0.0825 | 0.0324 | −0.2677 | 0.4779*** | |
| | T−test | (0.4829) | (0.1888) | (−1.6202) | (3.1727) | |
| Philippines | | | | | | |
| | Mktcap/GDP | 0.5026*** | −0.0573 | −0.4069** | 0.4270*** | 0.2653 |
| | T−test | (3.3898) | (−0.3345) | (−2.5971) | (2.7531) | (1.6047) |
| | Tumover/GDP | 0.1084 | 0.0530 | 0.0021 | 0.1896 | |
| | T−test | (0.6360) | (0.3097) | (0.0123) | (1.1262) | |
| Malaysia | | | | | | |
| | Mktcap/GDP | 0.4159** | −0.2385 | −0.4575*** | 0.5506*** | 0.4361** |
| | T−test | (2.4627) | (−1.3223) | (−2.7704) | (3.5522) | (2.6099) |
| | Tumover/GDP | 0.1537 | −0.3337* | −0.2140 | 0.1089 | |
| | T−test | (0.8374) | (−1.9065) | (−1.1798) | (0.5899) | |
| Indonesia | | | | | | |
| | Mktcap/GDP | 0.6540*** | 0.0710 | −0.6822*** | 0.7111*** | −0.1708 |
| | T−test | (4.7354) | (0.3898) | (−5.1111) | (5.5401) | (−0.9495) |
| | Tumover/GDP | −0.0190 | 0.2664 | 0.1554 | −0.0655 | |
| | T−test | (−0.1043) | (1.5141) | (0.8614) | (−0.3597) | |
| China | | | | | | |
| | Mktcap/GDP | 0.1352 | 0.0208 | −0.1155 | 0.1185 | 0.6233*** |
| | T−test | (0.7958) | (0.1212) | (−0.6781) | (0.6960) | (4.6477) |
| | Tumover/GDP | −0.1799 | 0.0018 | 0.0754 | 0.0949 | |
| | T−test | (−1.0666) | (0.0104) | (0.4410) | (0.5560) | |
| India | | | | | | |
| | Mktcap/GDP | 0.5465*** | 0.1770 | −0.0381 | 0.4798*** | 0.4004** |
| | T−test | (3.5143) | (0.9682) | (−0.2055) | (2.9447) | (2.3532) |
| | Tumover/GDP | 0.2645 | −0.0921 | 0.3614** | −0.1550 | |
| | T−test | (1.4771) | (−0.4982) | (2.0876) | (−0.8450) | |

**Note:** Mktcap/GDP is market capitalization to GDP and Turnover/GDP is market turnover to GDP. Equity flows is the equity flows from the U.S. to emerging market countries, *,**,** indicate a significant at 10%, 5%, and 1% respectively.

**Table 3:** Correlations between the Equity Flows, Economic Fundamentals, and Stock Market Development Indicators Measuring in Terms of Size (Mktcap/GDP) and Liquidity (Turnover / GDP) (Cont.)

| Country | Stock Market Development | GDP | CPI | Unemployment | Equity Flow | Tumover/GDP |
|---|---|---|---|---|---|---|
| **Emerging Latin America Countries** | | | | | | |
| Brazil | | | | | | |
| | Mktcap/GDP | 0.5015*** | 0.2415 | 0.1166 | 0.4838*** | −0.0149 |
| | T−test | (3.3803) | (1.4513) | (0.6846) | (3.2238) | (−0.0866) |
| | Tumover/GDP | 0.1080 | 0.0646 | −0.1367 | −0.1264 | |
| | T−test | (0.6333) | (0.3772) | (−0.8049) | (−0.7433) | |
| Mexico | | | | | | |
| | Mktcap/GDP | 0.1694 | 0.0003 | 0.4607** | 0.7864*** | −0.0250 |
| | T−test | (1.0022) | (0.0020) | (3.0271) | (7.4234) | (−0.1460) |
| | Tumover/GDP | 0.0297 | 0.0409 | 0.1590 | 0.1299 | |
| | T−test | (0.1733) | (0.2389) | (0.9393) | (0.7637) | |
| Argentina | | | | | | |
| | Mktcap/GDP | 0.5793** | 0.1021 | 0.8066*** | 0.1495 | 0.4016** |
| | T−test | (4.0822) | (0.5899) | (7.8381) | (0.8686) | (2.5189) |
| | Tumover/GDP | 0.2371 | 0.0103 | 0.1992 | 0.0737 | |
| | T−test | (1.4023) | (0.0590) | (1.1679) | (0.4244) | |
| Chile | | | | | | |
| | Mktcap/GDP | 0.2993* | 0.2308 | 0.0011 | 0.3287* | −0.0775 |
| | T−test | (1.8290) | (1.3832) | (0.0063) | (2.0293) | (−0.4533) |
| | Tumover/GDP | 0.0583 | 0.2675 | −0.0542 | 0.2753 | |
| | T−test | (0.3404) | (1.6187) | (−0.3164) | (1.6695) | |
| Columbia | | | | | | |
| | Mktcap/GDP | −0.2463 | −0.3457** | −0.4054** | 0.7021*** | 0.1833 |
| | T−test | (−1.4821) | (−2.1483) | (−2.5859) | (5.7494) | (1.0869) |
| | Tumover/GDP | −0.0263 | −0.2171 | 0.0438 | 0.0663 | |
| | T−test | (−0.1533) | (−1.2966) | (0.2558) | (0.3873) | |

**Note:** Mktcap/GDP is market capitalization to GDP and Turnover/GDP is market turnover to GDP. Equity flows is the equity flows from the U.S. to emerging market countries, *,**,** indicate a significant at 10%, 5%, and 1% respectively.

**Table 4:** Correlations of the Equity Flows from the U.S. to Emerging Market Countries and Economic Fundamentals in Q1 2005 to Q4 2013

| Country / Equity Flow | GDP | CPI | Unemployment |
|---|---|---|---|
| **Emerging Asia Countries** | | | |
| Thailand | 0.1798 | −0.0101 | −0.6287*** |
| T-test | (1.0660) | (−0.0586) | (−4.7147) |
| Philippines | 0.3312** | 0.1841 | −0.1249 |
| T-test | (2.0470) | (1.0922) | (−0.7340) |
| Malaysia | 0.3975** | 0.1576 | −0.3540* |
| T-test | (2.3326) | (0.8595) | (−2.0383) |
| Indonesia | 0.4758*** | 0.1463 | −0.7440*** |
| T-test | (2.9628) | (0.8098) | (−6.0982) |
| China | −0.2272 | 0.1568 | −0.0440 |
| T-test | (−1.3603) | (0.9258) | (−0.2569) |
| India | 0.4061** | 0.1538 | −0.4087** |
| T-test | (2.3928) | (0.8380) | (−2.4114) |
| **Emerging Latin America Countries** | | | |
| Brazil | 0.3230* | 0.3206* | −0.4623*** |
| T-test | (1.9899) | (1.9734) | (−3.0404) |
| Mexico | 0.1014 | −0.0897 | 0.3920** |
| T-test | (0.5943) | (−0.5252) | (2.4843) |
| Argentina | 0.2752 | 0.0378 | −0.0647 |
| T-test | (1.6447) | (0.2174) | (−0.3722) |
| Chile | 0.1985 | 0.0742 | −0.5258*** |
| T-test | (1.1810) | (0.4336) | (−3.6048) |
| Columbia | 0.1568 | −0.1401 | −0.4306*** |
| T-test | (0.9257) | (−0.8253) | (−2.7820) |

**Note:** Equity flows is the equity flows from the U.S. to emerging market countries. *,**,*** indicate a significant at 10%, 5% and 1% respectively.

Table 5 shows the comparison of the average economic fundamental values before QE, after QE, during and after QE1 (QE1) and during and after QE2 (QE2) periods to the average benchmark values for each country. We find that majority of the countries in our sample have better economic conditions in terms of inflation and unemployment comparing to the average benchmarks in after QE period. In addition, these countries also have better economic conditions all in terms of economic growth, inflation, and unemployment comparing to the benchmarks in QE2 period comparing to QE1. These findings also help support our belief that one of the reasons that degree of stock market development in the emerging market countries are higher after the QE and in QE2 period comparing to QE1 is partly due to the economic fundamentals in these countries are stronger or have been improved in the QE periods. Our findings are also consistent with the finding of Lim, Mohapatra, and Stocker (2014) who argue that the emerging market economies have attracted large amount of capital flows to the countries after QE as these countries are good alternative investment as they have stronger economic growth comparing to the advanced economies.

## 4. Conclusion

In summary, we find that the implementation of QE by advanced economies specifically the U.S. has positively affected the degree of stock market development in emerging countries that have received massive amount of capital inflows after the U.S. QE is implemented. We find that the degree of stock market development measuring in terms of size in these countries are significantly higher after QE period especially in QE2 period comparing to QE1. In other words, we find that the majority of stock markets in these economies are significantly larger after QE period especially in QE2. One of the reasons that the degree of stock market development in these countries are better after the U.S. QE is found to be significantly related to the economic fundamentals of these countries. We find that higher capital inflows to these countries are significantly related to higher degree of stock market development and also capital flows to these countries are significantly related to their economic fundamentals. In other words, we find that the stock markets in these emerging countries become larger and more developed as a result of massive capital inflows after the U.S. QE. The stronger economic fundamental in these countries are found to be one of the reasons that help attract those capital inflows. Our results have shown that the economic fundamentals of these countries have been improved in after QE period and in QE2 period comparing to QE1. Thus, strong economic growth, lower inflation, and lower unemployment all positively related to higher degree of stock market development in majority of these countries. Therefore, our findings shed a new light in terms of another possible spillover effect of QE to the emerging market economies that previously mainly focus on the effects of the QE on the asset prices in these countries. Our findings also shed a new light in the stock market development literatures since we focus on the effect of QE on the degree

**Table 5:** Economic Fundamental Comparison [Better (Y) than its own mean benchmark (average value over the period) in the Q1 2005 to Q4 2013

| Country | Economic Fundamentals | Before QE | After QE | QE1 | QE2 |
|---|---|---|---|---|---|
| | **GDP** | | | | |
| **Emerging Asia** | | | | | |
| Thailand | | Y | | | |
| Philippines | | Y | | | Y |
| Malaysia | | Y | | | Y |
| Indonesia | | Y | | | Y |
| China | | Y | | | |
| India | | Y | | | |
| | | | | | |
| **Emerging Latin** | | | | | |
| Brazil | | Y | | | |
| Mexico | | Y | | | Y |
| Argentina | | Y | | | |
| Chile | | Y | | | Y |
| Columbia | | Y | | | Y |
| | **CPI** | | | | |
| **Emerging Asia** | | | | | |
| Thailand | | | Y | Y | Y |
| Philippines | | | Y | Y | Y |
| Malaysia | | | Y | Y | Y |
| Indonesia | | | Y | Y | |
| China | | Y | | Y | Y |
| India | | Y | | Y | |
| | | | | | |
| **Emerging Latin** | | | | | |
| Brazil | | Y | | Y | |
| Mexico | | | Y | | Y |
| Argentina | | | Y | Y | |
| Chile | | | Y | Y | Y |
| Columbia | | | Y | Y | Y |
| | **Unemployment** | | | | |
| **Emerging Asia** | | | | | |
| Thailand | | | Y | | Y |
| Philippines | | | Y | Y | Y |
| Malaysia | | | Y | | Y |
| Indonesia | | | Y | | Y |
| China | | Y | | Y | Y |
| India | | | Y | | Y |
| | | | | | |
| **Emerging Latin** | | | | | |
| Brazil | | | Y | | Y |
| Mexico | | Y | | | |
| Argentina | | | Y | Y | Y |
| Chile | | | Y | | Y |
| Columbia | | | Y | | Y |

of stock market development that no one has mentioned about this before. Thus, our study helps confirm the findings of existing literatures that QE does not only affect the country that implements QE, but also has spillover effects to the countries that have received massive amount of fund flows after the implementation of QE by advanced economies as well. Nevertheless, even though we find QE has positively affect the stock market development in term of size in six out of eleven countries that have received massive amount of capital inflows after the U.S. QE, the strong volatility of these type of capital flows might have some harmful effects in terms of financial stability in these emerging countries as well (Brana et al., 2012). This is because high level of capital inflows might cause the domestic currency to appreciate sharply which might further hurt the export competitiveness of the countries especially the one that has relied heavily on export as the main source that drive the economic growth. In addition, the high volatility of these type of capital flows might also raise a concern of sudden stop of capital flows after the advanced economies are back on track and might also limit the usefulness of monetary policy in emerging economies as a tool to stabilize the economic growth (Brana et al, 2012). In other words, the central bank in these emerging market economies might fear to raise the interest rate to cool down the asset price appreciations as a result of global excess liquidity because they do not want to further attract capital inflows to the country. Nevertheless, despite those negative impacts of QE, we show in our study that there are some positive impacts of QE to these emerging market economies in terms of higher degree of stock market development. The stock markets in these economies become larger after QE and have gradually become the important source of fund to finance investment and economic growth for these economies in the future. As mentioned previously, although the massive capital inflows to emerging countries as a results of QE cause the stock market in emerging countries to become larger which is one of the indicator of higher degree of stock market development according to the literatures, questions still remain whether these massive capital inflows as a results of QE actually cause a sustainable stock market development in emerging countries in the long run.

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