Composition of Capital Flows and Valuation Effects in Emerging Market Economies

Dr. Ashima Goyal (Professor, IGIDR)

Vaishnavi Sharma (Research Scholar, IGIDR)

Indira Gandhi Institute of Development Research
Gen. Vaidya Marg, Santosh Nagar,
Goregaon (E), Mumbai-400 065. India

Abstract: *The increase in cross-border assets and liabilities of nations all across the world, with globalization, implies small price and currency movements can create large wealth transfers. The net external position of a nation is increasingly driven by valuation effects, which the current account does not capture. We analyze valuation effects for a group of seven emerging economies, namely Brazil, Colombia, India, Republic of Korea, Mexico, Peru and Turkey for the time period 2005: Q1-2015:Q4 by scrutinizing their external asset portfolio apart from country fundamentals. Both assets and liabilities categories of Direct Investment equity are found to positively impact the valuation channel. Equity liabilities and debt assets of Portfolio Investment positively influence the valuation channel. Debt liabilities of all kinds of investment negatively impact the valuation channel. Countries with stronger currency tend to gain through valuation effects. A higher real effective exchange rate is associated with higher valuation gains. We also found non-linear effects of the composition of external debt portfolio by interacting external portfolio and country characteristics. The external portfolio selection of emerging economies (with more in Direct Investment equity liabilities and Portfolio Investment debt assets) has enabled them to shield themselves from foreign contagion, and gain through their valuation channel, during periods of global uncertainty.*

Key Words: Capital flows, Current Account adjustment, Real exchange rates, Exposure risk, Valuation effects, Emerging economies, Volatility index

JEL Classification: F30, F40

1. INTRODUCTION

Prior to the early nineties wave of globalization, only a few nations held assets abroad and most others were indebted to them. With the major financial reforms of emerging economies they have experienced large cross-border capital flows. Most emerging economies now hold large financial assets abroad but also have huge foreign liabilities. These gross values dwarf net (external) assets or net (foreign) inflows.

Until recently, little was known about gross assets and gross liabilities of different countries, especially developing countries. It was only in the last decade that Lane and Milesi-Ferretti (2001, 2005, and 2007) made an important contribution by assembling a comprehensive data set for more than 100 countries from 1970 onwards. They found developed/industrial economies to be typically short debt, long equity and emerging/developing nations to be typically short equity with many having net liabilities in both debt and equity categories. For many of the industrial economies, they found the difference between the change in net foreign assets and the cumulative current account (CA) to be substantially positive due to large capital gains while most of the emerging economies had the difference between these two accounts as negative due to negative cumulative valuation effects. Historically, emerging/developing nations would have their foreign debt denominated in foreign currencies such that a depreciation of their own currency would lead to significant valuation losses. However, many of these nations, with time, have shifted to a more balanced foreign asset position with improvements in net currency exposure and an increase in the share of foreign liabilities that are in domestic currency (such as foreign portfolio (FPI) and foreign direct investment (FDI)). These facts make the study of valuation effects for emerging nations an interesting area.

1.1 Valuation effects

In open economy macro-models the CA measures the change in net foreign asset of a country. In the inter-temporal approach to the current account the dynamics of external debt was due to forward-looking decisions by households and investment decisions by firms, set in market structure of varying degrees of complexity (Gourinchas, 2007). As per this approach, any country's CA at time t is given by

$$CA_t = -E_t\left[\sum_{s=t+1}^{\infty} R^{-(s-t)}\Delta NY_s\right] \quad (1)$$

Here, E_t is the expectation operator, NY is the net income and $\Delta NY_s = NY_s - NY_{s-1}$, R is the gross real return on a one-period risk-free international bond. The current account reflects the smoothing motive given expectations. For example, if a country expects its future net income NY to rise in the next period then it would run a current account deficit in the current period and vice-versa. This approach is useful in studying short-run dynamic responses to shocks.

Recent studies have shown the inter-temporal approach explains only a small portion of the dynamics of the current account because of its focus on the flow concept of fluctuations in net income. Although it leads to a change in the net foreign asset position, the current account need not capture all the changes in the net foreign asset position. This is because it does not capture capital gains arising out of the currency movements, changes in the local currency asset prices and other factors. The stock of international assets minus liabilities of a country is its net foreign asset position.

Following Gourinchas (2007), let NA_t be the net foreign asset position of a country at the end of time period t, then NA in two consecutive periods is given by

$$NA_{t+1} = R_t NA_t + NX_t \quad (2)$$

Here, NX is the net trade balance representing goods, services and net transfers. And R_t is the gross return on the net foreign portfolio between the end periods of $t-1$ and t. When we add and subtract the net investment income balance NI_t we get

$$\begin{aligned} NA_{t+1} - NA_t &= R_t NA_t - NA_t + NX_t + NI_t - NI_t \\ &= \left[(R_t - 1)NA_t - NI_t\right] + \left(NX_t + NI_t\right) \\ &= VA_t + CA_t \end{aligned} \quad (3)$$

Here, VA_t is the valuation adjustment term. The change in the net foreign asset position is represented by the sum of current account $\left[\left(CA_t = NX_t + NI_t\right)\right]$ and the valuation adjustment term. This valuation term represents the capital gains on the foreign asset portfolio. The presence

of valuation effects implies that the composition of external assets and liabilities matters in addition to the level of the net foreign asset position (Tille, 2013). 'Valuation effects' consist of three main components.

Overall valuation effect = Valuation effect from exchange rates + Valuation effect from asset prices + other valuation effects (4)

There are two possible scenarios in this context. The first is when a country can borrow in its own currency and acquire external assets in foreign currency. This kind of situation is evident in the case of developed nations. For example, a large fraction of US gross assets is in foreign currencies while majority of the gross liabilities are in dollars. A depreciation of the dollar would boost the price of US foreign assets giving it valuation gains. Movements in local currency asset prices for US assets abroad also have substantial impact. On the whole, asset prices have risen over time. 'Other valuation effects' simply reflect the statistical revisions that cannot be linked to financial flows or to specific valuation gains.

The second scenario is one that considers a nation that can borrow mostly in foreign currency. This situation holds for a majority of developing and emerging nations who have to contend with '*original sin*'—the inability to borrow in their own currencies. While unanticipated dollar depreciation tends to improve the value of the US net foreign asset position, in case of emerging economies who have issued substantial foreign currency debt, dollar depreciation creates adverse balance sheet effects (Lane & Shambaugh, 2010).

1.2 Stylized facts

We consider seven emerging economies namely Brazil, Colombia, India, Republic of South Korea (Korea henceforth), Mexico, Peru and Turkey for the time period 2005:Q1 -2015:Q4[1]. Figure 1 reports the pronounced increase in international financial integration since 2005 implying sizeable expansion in their gross external portfolio. The measure of financial integration employed is the one most widely used in literature, i.e. the sum of gross assets and gross liabilities normalized by GDP (Gourinchas, 2007). Figure 2 reports gross assets and gross

[1] Data for disaggregated balance sheets of the countries are present from this period only in the IMF databases.

liabilities, both normalized by GDP. Except for Korea which shows a closing of imbalances, all the other countries of our sample exhibit much greater gross liabilities as compared to gross assets and this gap between the two gross positions has only increased with time. With greater access to global financial markets, the collective net borrowing of the emerging nations has grown over the years.

Figures 3A and 3B report the valuation gains/losses of these nations[2]. These have increased in magnitude over the years. Of the countries, Brazil had maximum valuation gains (or, losses) for this period while Colombia had the least. The Euro debt crisis period is marked in Figure 3A while figure 3B shows valuation effects for the 2013 taper talk. There are valuation gains as well as losses during these two major international events.

Figure 4 reports the correlation of valuation effects with the Debt to Equity ratio (DTE) this is gross debt assets of a country as percent of its gross equity assets) and exposure risk[3] (first lag). As can be seen, while DTE is positively correlated with the VE, exposure risk is negatively correlated with it. And this is true for a majority of countries over the years[4].

These insights from the external portfolio of these emerging economies pose interesting questions with respect to valuation effects. While at times, valuation effects improve the net foreign asset position of these countries (by dwarfing the adverse CA deficits), at other times it deteriorates the net foreign asset position.

1.3 Objectives and results

To understand the factors creating valuation gains/losses for these nations is an important research question. Domestic and international macroeconomic conditions as well as portfolio choices affect exchange rates and asset values and therefore valuation effects. Empirical estimation is therefore required to establish directions of causality. In a panel estimation

[2] This is calculated using the method employed by Gourinchas, Rey and Truempler (2012). Details are given in the methodology section.

[3] We define exposure risk as the ratio of external debt denominated in foreign currencies to that in domestic currency. So it is higher for countries whose foreign currency liabilities exceed domestic currency liabilities.

[4] Of the countries in the sample, it is only for Colombia that DTE is negatively correlated with valuation effects.

including their external asset portfolio, and other country fundamentals as controls, we address the following issues:

First, with improvements in the aggregate external positions of the emerging economies, how does the debt to equity ratio (DTE) affect the valuation channel? Second, how does exposure risk affect the valuation channel? Third, how do global volatilities and uncertainty affect the external balance sheet of these nations through their valuation channel? For this, we use the volatility index (VIX) (Miranda-Agrippino and Rey, 2012 and Rey, 2015), a measure of risk aversion and uncertainty, to capture the effect of global business cycles on valuation gains/losses. Fourth, we examine the impact of real exchange rate appreciation on the valuation channel. Last, we estimate the non-linear effects of the DTE. We use interaction models to analyze the effects of changes in DTE on the valuation channel and to investigate whether other country characteristics mitigate or amplify its effects.

We find DTE positively impacts the valuation channel implying that higher the gross DTE, higher would be the gains through the valuation channel. Checking the impact of disaggregated external balance sheet components on the valuation channel gives further clarity. Both asset and liability categories of Direct Investment (DI) equity positively impact the valuation channel. Portfolio Investment (PI) debt assets and equity liabilities also positively influence the valuation channel. But debt liabilities of all kinds of investment (DI, PI and other investment) lead to valuation losses. Exposure risk adversely impacts the valuation channel—greater the exposure larger is the valuation loss. A higher real effective exchange rate is associated with higher valuation gains suggesting net valuation effects of emerging economies are strongly driven by their terms of trade (exports as per cent of imports by value). There is a strong negative association between the terms of trade and valuation effects of these countries, since an improving terms of trade implies a fall (depreciation) in currency value.

Countries with higher foreign exchange reserves gain through valuation effects. This follows since they are a source of debt assets, and also act as cushion against any financial disturbance. Money supply growth rate in these emerging economies negatively impacts the valuation channel, since it could lead to a depreciation.

To find non-linear effects of the composition of the external debt portfolio, DTE, VIX and exposure risk are interacted with various country characteristics. The effects of the GDP growth rate and VIX increase, with increase in the DTE ratio and the effect of the terms of trade diminishes. As global uncertainty increases, effect of TOT and exposure risk on the valuation channel diminishes. We also find exposure risk to intensify the impact of TOT but diminish the role of growth rate on the valuation channel.

The results also suggest that during global uncertainty emerging economies tend to gain through their valuation channel in this period. This finding is in line with Gourinchas et al. (2012) who observe that during the global financial crisis of 2008, there was extensive wealth transfer from the developed to the emerging nations (especially those who were short equity, long debt) through the valuation channel. Also, the crises periods intensify the impact of DTE, VIX and exposure risk on the valuation channel.

Overall, the results suggest that countries that invest more in equity (both assets and liabilities) tend to gain through their valuation channel. Portfolio debt assets also have a positive and significant role. Debt liabilities lead to valuation losses. During times of global uncertainty, these characteristics (investing more in DI equity and PI debt assets) helps emerging nations shield themselves from foreign disturbances. During the East Asian crisis the economies were heavily exposed to short-term debt liabilities, explaining their large valuation losses.

The remainder of the paper is structured as follows: The next section has a brief review of the literature; section 3 describes our data. Section 4 provides the empirical strategy. The fifth section presents results before the last section concludes.

2. LITERATURE REVIEW

Gourinchas (2007) analyzed how due to increase in cross-border asset holdings, a small change in exchange rates or local currency asset prices can lead to huge wealth transfers and valuation effects. For a developed economy, valuation effects are stabilizing because the gross liabilities of the developed nation are in its own currency while gross assets are in foreign denomination.

Hence a depreciation of the exchange rate diminishes the nation's external debt proportionately to its gross asset holdings. In case of a developing country whose gross assets are in foreign denominations and gross liabilities are also in foreign currencies, depreciation of the domestic currency worsens the external position. Also, unlike in the developed nation case, foreign currency debt and nominal exchange rate move in inverse proportions. The exchange rate and the trade balance become more volatile since the initial depreciation makes the country poorer (unlike a developed country whose foreign debt position improves as a result of the initial depreciation). In case of emerging markets, given the currency composition of their external balance sheet, valuation effects can be very destabilizing.

Devereux and Sutherland (2009) also bring forward the inaccurateness of current account in measuring the changes in the net external position of any country. They argue that for most countries the net external assets is dominated by valuation gains and losses arising from the changes in the local currency asset prices and exchange rate movements which the measured current account fails to capture. They analyze unanticipated valuation effects by developing a two-country DSGE model of risk sharing based on optimal portfolio choice. They find their model gives a reasonable explanation of qualitative and quantitative aspects of valuation effects. They also analyze anticipated valuation effects and find these higher order valuation effects play a quantitatively smaller role in the movements of net foreign assets.

In addition to valuation effects arising from asset prices and exchange rates, Tille (2013) considers other valuation effect which primarily reflects statistical revisions that cannot be clearly linked to financial flows or specific valuation gains, to also be an important component of the overall valuation effect. He distinguishes between expected and unexpected valuation effects and unlike Devereux and Sutherland (2009), he argues that unexpected valuation gains play a large role in the change in a country's net foreign asset positions, though he explicitly mentions that this is at the time of shocks. Expected valuation effects play a more moderate role along the subsequent adjustment path.

Lane and Shambaugh (2010) analyze the financial impact of shifts in exchange rates on the valuation effects, i.e. they assess the impact of exchange rate movements on the capital gains (or

losses) on foreign assets and liabilities. They study these effects for 111 countries (developed, developing and emerging). They construct four types of indices: asset index, liability index, trade index and net financial index. Asset and liability indices are constructed by using the weights derived out of the external assets and liabilities attached to different currencies in a time period. Trade index is also constructed in a similar manner but by using weights that add exports and imports together. The net financial index takes the asset-weighted and liability weighted indices into consideration and captures the directional sensitivity of the external balance sheet to currency movements. They argue that trade index is not generally informative about the financial impact of currency movements. They find the liability index to be much more stable for developed nations since most of their liabilities are in domestic currencies. A depreciation in this case would improve the trade balance by increasing the net exports of a country while the valuation effect would depend on whether that country is long or short in a particular currency and that currency's relative importance in the aggregate external portfolio. Now, the financial impact of the depreciation would be ambiguous since the improvement in the trade balance would be accompanied by an increase in the value of its foreign currency liabilities. Hence, a country would experience double boost to its external balance only if both the trade balance and the financial index move simultaneously, not otherwise.

Gourinchas et al. (2012) study the geography of wealth transfer during the global financial crisis of 2008 by constructing valuation changes on disaggregated components of the foreign asset portfolio of countries. They term those countries as 'global insurers' who provided wealth transfers to other countries during the global financial crisis when the marginal utility of consumption was high. They find the US to be the main global insurer in addition to few other countries whom they call regional insurers. Developing countries during this period gained through their valuation channels.

Gourinchas and Rey (2013) question the belief that financial integration is the ultimate aspiration of all economies for better risk sharing. They find advanced economies financial systems suffered more from the global financial crisis, than those of emerging economies, and hence point towards the dangers of contagion inherent to large cross-border holdings.

Pistelli et al. (2008) find the composition of the net foreign asset portfolio to be the important determinant of current account reversals and sudden stops, also that a higher stock of net foreign assets reduces the likelihood of any financial crisis. They find cumulative valuation adjustments to significantly impact reversals and sudden stops. In the developing countries' context, they find the cumulative current account to be associated with real depreciation of the currency in the long run while valuation effects to be associated with real currency appreciation. They assert that certain categories of assets and liabilities, namely portfolio equity assets and FDI liabilities, and the flows associated with them, trigger important valuation effects that play a vital role in the mechanism to adjust to external shocks. To our knowledge there is no panel study of factors affecting emerging economy VE.

3. DATA

We employ quarterly data for 2005:Q1-2015:Q4[5] for our sample of seven emerging economies.

3.1 Data Sources:

Data for the external balance sheets of each nation is sourced from the IMF Balance of Payments statistics (BOP) except for Reserves (excluding gold) which is from International Financial Statistics (IFS). Other data sources are Federal Reserve Bank of St. Louis (FRED), Quarterly External Debt Statistics (QEDS) of the IMF, Reserve Bank of India (RBI), Central Bank (CB) of Colombia (Banco De La Republica), IFS and Chicago Board Options Exchange (CBOE).

3.2 Variables employed[6]:

We consider the following country specific macro-economic fundamentals: Economic growth rate (GDP growth rate), terms of trade (exports as per cent of imports, by value), money supply growth rate (growth rate of M2, except for India for which we take growth rate of M3). We also used inflation (based on consumer price index for all commodities) in regressions instead of money supply growth rate but it came out to be insignificant in almost all occasions. Other macro variables considered are:

[5] It differs for some countries of the sample. Data availability, time periods and their sources for each country are given in the Appendix.

[6] Detailed construction of variables is explained in the Appendix.

Exposure Risk: For capturing the exposure to foreign currency risk, we construct this variable as ratio of external debt in foreign currency to that in domestic currency for each country. This is important for the emerging nations as majority of them have their debt mainly in foreign currencies. It is expected to increase vulnerability to valuation losses.

Real effective exchange rate: Real appreciation (or, depreciation) of the local currency affects the capital inflows through an international risk taking channel affecting the valuation channel and asset prices. For example, when the local currency appreciates, the borrower country's balance sheet strengthens and the credit risk on the domestic banks' loan books falls, increasing the access to foreign capital (Bruno and Shin, 2015). This in turn would tend to create valuation gains.

Foreign exchange reserves excluding gold, act as a cushion against global disturbances, creating foreign assets vulnerable to valuation effects. Emerging nations have accumulated significant foreign exchange reserves.

We take the first lag of all the above mentioned variables for our analysis.

Debt to Equity (DTE): For considering the effect of different portfolio choices of these nations on the valuation channel, we construct a variable debt to equity (DTE) as gross debt assets of a country as percent of its gross equity assets. Over time emerging economies have increased the equity component in their external portfolio (Lane and Milesi-Ferretti, 2007). The impact of this increasing equity component on the valuation channel is an interesting issue to analyze.

Apart from these country-level macro variables, we consider VIX (volatility index) which is a measure of international investor sentiment and market volatility. The VIX measures the market expectations of near-term volatility conveyed by S&P 500 stock index option prices. Global financial conditions play a key role in the investors' perception of risk and hence VIX is expected to impact the valuation channel through its impact on the components of the external

balance sheet of the emerging economies (Rey, 2013). High frequency data of VIX is available which we average over the quarter and take logs.

Table 1 in the Appendix describes all the variables used in the empirical study and their sources. Summary statistics of the variables are presented in table 2. Valuation effects show a wide range. The lowest is a valuation loss of 37 per cent of GDP while the highest shows gains of 60 per cent of GDP. DTE also shows a wide range from 40 per cent of total equity assets to 230 implying debt assets are 2.3 times equity assets. The mean value for exposure risk is 2.35, which implies for most observations external debt in foreign currency exceeds that in domestic currency. Other variables also show large variation.

Table 3 presents the correlation matrix of the variables. Valuation effect is significantly correlated with most of the variables. Figure 4 shows correlation of valuation effects with DTE and lag of exposure risk. As we have already seen, while DTE is positively correlated with valuation effects, lag of exposure risk is negatively related with valuation effects.

For robustness checks, we construct two other variables. The first one is 'net debt to equity', which is net debt assets as per cent of net equity assets for any country. The second one is 'equity liabilities to total liabilities', which is equity liabilities as percent of total liabilities.

4. METHODOLOGY

First, following Gourinchas et al. (2012), we calculate valuation effects (valuation gains/losses) for each country in the sample as:

$$VE_t^i = NFA_t^i - NFA_{t-1}^i - CA_t^i \qquad (5)$$

Here NFA_t^i is the net foreign asset position at time t for country i[7]. CA_t^i is the current account balance of the country.

[7] It is constructed by taking the net of asset classes (Direct Investment, Portfolio Investment, Other Investment and Reserves excluding gold) and liabilities classes (Direct Investment, Portfolio Investment and Other Investment). We do not include financial derivatives as they are not available for all the countries of our sample.

To analyze the impact of these macro-economic variables on the valuations gains/losses, we employ the following baseline (additive) specifications:

$$VE_t^i = \alpha + \sum_{j=1}^{n} \beta_j X^i_{j,t-1} + \gamma DTE_t^i + \theta_i + \varepsilon_t^i \quad (6)$$

$$VE_t^i = \alpha + \sum_{j=1}^{n} \beta_j X^i_{j,t-1} + \gamma DTE_t^i + \delta VIX_t + \theta_i + \varepsilon_t^i \quad (7)$$

Here, VE_t^i represents valuation effects (gains/losses) of country i at time t, expressed as percentage of GDP. X_j are country specific macro-economic fundamentals, DTE_t^i is debt as per cent of equity of country i at time t. *VIX* is the risk aversion measure and ε is the error term. α, β_j, γ and δ are parameters to be estimated.

We employ lagged values of the independent variables except for DTE (since we are interested in seeing the valuation gains (or, losses) of these emerging nations as per their external portfolio choices) and VIX (since VIX is derived from conditions mainly in the developed world and is hence exogenous to the emerging countries) in order to guard against the biases arising from simultaneity or reverse causality.

Regression results of both fixed effects (FE) and random effects (RE) are presented. Both have their own advantages. FE estimation takes into account the unobserved heterogeneity among nations (all time-invariant country specific factors) that may otherwise lead to biased coefficients of the regressors. The advantage of using RE estimation is that this heterogeneity is regarded random, (*i.e.* uncorrelated with the regressors) resulting in (potentially) biased estimates but there is more efficient estimation of those variables, which do not move much through time but whose variation is mainly because of cross country differences (Ahmed and Zlate, 2013).

We also employ interaction models to analyze the effect of the portfolio choices of these nations on their valuation gains/losses conditional on their country-specific characteristics or the global financial cycle. We consider interaction models with DTE, VIX and exposure risk. C_t^i is one of the country-specific variables. The following sets of specifications are used for this:

$$VE_t^i = \alpha + \sum_{j=1}^{n} \beta_j X^i_{j,t-1} + \gamma' DTE_t^i + \delta VIX_t + \beta_k' C^i_{t-1} + \sigma\{DTE_t^i \times C^i_{t-1}\} + \theta_i + \varepsilon_t^i \quad (8A)$$

$$VE_t^i = \alpha + \sum_{j=1}^{n} \beta_j X_{j,t-1}^i + \gamma' DTE_t^i + \delta VIX_t + \beta_k' C_{t-1}^i + \sigma\{DTE_t^i \times VIX_t\} + \theta_i + \varepsilon_t^i \quad (8B)$$

$$VE_t^i = \alpha + \sum_{j=1}^{n} \beta_j X_{j,t-1}^i + \gamma DTE_t^i + \delta' VIX_t + \beta_k' C_{t-1}^i + \tau\{VIX_t^i \times C_{t-1}^i\} + \theta_i + \varepsilon_t^i \quad (9A)$$

$$VE_t^i = \alpha + \sum_{j=1}^{n} \beta_j X_{j,t-1}^i + \gamma' DTE_t^i + \delta' VIX_t + \beta_k' C_{t-1}^i + \sigma\{VIX_t^i \times DTE_t^i\} + \theta_i + \varepsilon_t^i \quad (9B)$$

$$VE_t^i = \alpha + \sum_{j=1}^{n} \beta_j X_{j,t-1}^i + \gamma DTE_t^i + \delta VIX_t + \omega CR_{t-1}^i + \beta_k' C_{t-1}^i + \varphi\{CR_{t-1}^i \times C_{t-1}^i\} + \theta_i + \varepsilon_t^i \quad (10A)$$

$$VE_t^i = \alpha + \sum_{j=1}^{n} \beta_j X_{j,t-1}^i + \gamma' DTE_t^i + \delta VIX_t + \omega CR_{t-1}^i + \beta_k' C_{t-1}^i + \varphi\{CR_{t-1}^i \times DTE_t^i\} + \theta_i + \varepsilon_t^i \quad (10B)$$

$$VE_t^i = \alpha + \sum_{j=1}^{n} \beta_j X_{j,t-1}^i + \gamma DTE_t^i + \delta' VIX_t + \omega CR_{t-1}^i + \beta_k' C_{t-1}^i + \varphi\{CR_{t-1}^i \times VIX_t\} + \theta_i + \varepsilon_t^i \quad (10C)$$

Here, CR is exposure risk in equations 10A-C. Equations 8A and 8B are interaction models for DTE. Equations 9A and 9B are interaction models for VIX and equations 10A-C are interaction models for exposure risk.

New parameters to be estimated are $\gamma, \delta, \sigma, \tau, \varphi, \gamma', \delta'$ and ω. Interpretation of coefficients from standard regression outputs including an interaction model differ from the usual one without an interaction model. For example, in equation 8A, the coefficient σ indicates whether there is a change in the relationship between an interaction variable (C) and the dependent variable (VE) with a one-unit change in the interaction variable (DTE). At the same time, the coefficient being symmetric also indicates if there is a change in the relationship between DTE and VE with a one-unit change in C. Another point to note is that the coefficients on the constitutive terms (both on C and DTE) are conditional marginal effects (Brambor, Clark, & Golder, 2005 and Nier, Sedik, & Mondino, 2014). The new coefficient β_k' on C only captures the coefficient of C when DTE is zero. Similarly, the new coefficient γ' on the DTE only captures the effect of the DTE when C is zero.

In order to analyze the role of euro debt crisis and taper talk on balance sheets of emerging economies through the valuation channel, we add dummies for these events in the baseline regressions. To see their non-linear effects on the valuation channel, we also utilize interaction models of the dummies with DTE, VIX and exposure risk.

5. EMPIRICAL RESULTS

5.1 Baseline Regressions

Tables 4 and 5 present the FE and RE estimation results of baseline regressions respectively.
The coefficients of exposure risk are significant and negative as expected. This implies that countries with greater exposure risk tend to have greater valuation losses. For most of the observations of the sample, exposure risk has values greater than one. This means that these countries have their external debt dominated in foreign currencies. This is true for the majority of emerging economies.

The results also suggest that net valuation effects of emerging economies are strongly driven by their terms of trade. There is a strong negative association between the terms of trade and valuation effects of these countries. Net importing countries (imports greater than exports) tend to gain through their valuation channel. The coefficients of money supply growth rate are negative and significant. Money supply in these emerging economies negatively influences valuation effects as it may be reducing the value of the currency.

A higher real effective exchange rate (real appreciation) is associated with higher valuation gains. The coefficients of the volatility index are positive and highly significant, implying that during periods of global uncertainty, these countries tend to gain through their valuation channel[8]. Reserves bear positive and significant coefficients implying changes in asset and currency values, on the whole, positively impact the value of reserves held in foreign currency.

The coefficients of DTE are highly significant and positive. This finding suggests that higher the DTE, greater is the gain through the valuation channel which means that as gross equity

[8] Gourinchas et al. (2013) found the developing economies to gain through their valuation channels during the global financial crisis of 2008 while the advanced economies mostly had valuation losses.

increases with respect to gross debt, valuation gains decrease (or, there are valuation losses). This result is puzzling in view of the large balance sheet losses of indebted emerging economies and observed improvements during 21st Century crises as they shifted towards equity liabilities.

5.2 Robustness checks

To check the robustness of the DTE result, we estimate two more regressions using alternative proxies for DTE (tables 6 and 7).

In the first test (table 6), we replace (gross) DTE with net DTE. But the coefficients of net DTE are also positive and significant which implies, as net equity increases with respect to net debt, valuation gains decrease (or, there are valuation losses).

In the second test (table 7), we employ equity liabilities as percent of total liabilities as an alternative to (gross) DTE. The coefficients associated with this variable are negative and significant indicating results on similar lines that increase in equity liabilities leads to valuation losses.

In view of continuing contradictory results we nest employ disaggregated components of external balance sheet in order to see their individual impact on the valuation channel, i.e. the effect of assets and liabilities of different debt and equity variables.

5.3 Effect of disaggregated components of external balance sheet on the valuation channel

We conduct this exercise in three stages[9]. In the first step, we take the four components of direct investment (DI). These are: (i) DI debt assets; (ii) DI debt liabilities; (iii) DI equity assets and (iv) DI equity liabilities. In the second analysis, we utilize the four components of portfolio investment (PI) which are (i) PI debt assets; (ii) PI debt liabilities; (iii) PI equity assets and (iv) PI equity liabilities. In the final stage, we employ two major components of other short-term debt

[9] We do this to avoid confusion and also because adding all these variables at one go in one regression would further add to endogeneity issues.

– other debt assets and other debt liabilities[10]. The results of these regression analyses are presented in table 8.

The results give deeper insights into the issue. We find that both assets and liabilities categories of DI equity influence the valuation channel positively. However, the coefficients of DI debt liabilities bear negative and significant values. This implies that while DI equity leads to valuation gains, DI debt liabilities leads to valuation losses. When it comes to PI debt, we find PI debt assets positively influence valuation effects while PI debt liabilities have negative influence on the valuation channel. PI equity assets come out to be insignificant but PI equity liabilities play a positive role in affecting the valuation channel. Other short-term debt assets do not play any significant role but other short-term debt liabilities negatively influence the valuation channel.

These results are consistent with the impact on emerging economies' balance sheets during crises events. Countries with higher DI equity assets had gained through their valuation channel while countries with higher PI debt liabilities (or other short-term debt liabilities) had suffered valuation losses. The baseline regressions and alternative robustness checks could not uncover these results due to the gross variables used. The large positive coefficients of PI debt assets perhaps accounted for the positive coefficient of DTE (both in case of gross and net variables).

5.4 Interaction Models

To study the non-linear effects of DTE, VIX and exposure risk on the valuation channel we use interaction models. Table 9 presents only the significant results.

I. *Non-linear effects of DTE*: The effect of the growth rate of the emerging economy on valuation effects is conditional on the level of DTE in its portfolio. The coefficient of their interaction term is positive and statistically significant. That is, DTE increases the effect of the growth rate of that country on its valuation channel. Second, the global uncertainty variable VIX is a strong determinant of valuation effects when the DTE ratio is high. This implies that for countries with higher DTE ratio, the effect of VIX increases.

[10] We construct other debt as the sum of (i) loans, (ii) currency and deposits and (ii) trade credit and advances as is standard in the literature.

Third, the coefficient of the interaction of DTE and TOT is negative and statistically significant. That is, as DTE increases, the effects of TOT on VE diminishes.

II. *Non-linear effects of VIX*: The coefficient of the interaction term of VIX and exposure risk is negative and significant. Therefore as VIX increases, the effect of exposure risk on the valuation channel decreases. Interaction term of VIX and TOT also has negative and significant coefficient implying that with increase in VIX, effect of TOT diminishes. The results suggest that as global uncertainty increases, effect of TOT and exposure risk on the valuation channel diminish.

III. *Non-linear effects of exposure risk*: The coefficients of the interaction of exposure risk and TOT are positive and significant. Therefore greater exposure risk intensifies the impact of TOT on an emerging economy's valuation channel. The coefficients of the interaction term of exposure risk and GDP are negative and significant. Therefore as exposure risk increases, the effect of the growth rate of that country on its valuation channel diminishes.

5.5 Crises and their non-linear effects

We next examine the effect of sovereign debt and taper talk on valuation effects of these emerging nations.

We create crisis dummies for these two events and put them in the baseline regressions. Both the dummies have positive and significant coefficients, suggesting emerging economies tend to gain through their valuation channel during times of global uncertainty (Table 10).

To see their non-linear effects we interact these dummies with DTE, VIX and exposure risk. During times of crises (both sovereign debt crisis and taper talk) the effect of DTE, VIX and exposure risk on the valuation channel increases. That is, crises magnify the impact of these variables on the valuation channel (Table 10).

6. CONCLUSION

With increase in international financial integration nations have large gross assets as well as gross liabilities abroad. With small price and currency movements (due to changes in

global/domestic financial conditions), therefore, there can be large wealth transfers. The current account of a nation alone fails to capture this evolution of its net external position. The short-term movements in the country's foreign asset portfolio increasingly seem to be driven by its valuation channel (Gourinchas, 2007).

We find that both assets and liabilities categories of DI equity positively impact the valuation channel. PI debt assets and PI equity liabilities also positively influence the valuation channel. Debt liabilities of all kinds of investment (DI, PI and other investment) negatively impact the valuation channel.

Currency composition of external debt matters as countries with higher exposure risk are more prone to suffer from valuation losses. Countries with stronger currency gain through their valuation channel. The results also suggest that net valuation effects of emerging economies are strongly driven by their terms of trade. There is a strong negative association between the terms of trade and valuation effects of these countries. Net importing countries (imports greater than exports) tend to gain through their valuation channel. A higher real effective exchange rate (real appreciation) is associated with higher valuation gains. It is also found that countries with higher foreign exchange reserves gain through valuation effects. This is in line with the existing economic literature that reserves act as cushion against any financial disturbance for the emerging economies. Money supply growth rate in these emerging economies negatively influence the valuation channel.

When checked for the non-linear effects of the composition of the external debt portfolio of these countries by employing interaction models of the DTE, VIX and exposure risk with various country characteristics, we find them to be non-linear. While on the one hand, with increase in the DTE ratio, the effect of the GDP growth rate and VIX increase, on the other hand the effect of the terms of trade diminishes. Another key finding is as global uncertainty increases, effect of TOT and exposure risk on the valuation channel diminish. Exposure risk of an economy intensifies the impact of TOT but diminishes the effect of growth rate on its valuation channel.

The results also suggest that during periods of global uncertainty the emerging economies tend to have valuation gains and these crises periods magnify the impact of DTE, VIX and exposure risk on the valuation channel.

Overall, the results suggest that countries that invest more in equity (both assets and liabilities) tend to gain through their valuation channel. Portfolio debt assets also play a positive and significant role in this context. Debt liabilities lead to valuation losses for these emerging nations. During times of global uncertainty, these characteristics of emerging nations (investing more in DI equity and PI debt assets) enabled them to reduce foreign contagion.

Appendix I: Construction of Variables

1. Valuation effects (VE) = Net foreign assets (t) - Net foreign assets (t-1) – Net current account (t)
   (i) Net foreign assets = Assets, Direct Investment + Assets, Portfolio Investment + Assets, Other Investment + Reserves (excluding gold) – Liabilities, Direct Investment - Liabilities, Portfolio Investment – Liabilities, Other Investment
2. Gross Debt to Equity (Gross DTE) = {Gross debt assets/Gross equity assets}×100
   (i) Gross debt assets= Assets, Direct Investment, Debt Instruments + Assets, Portfolio Investment, Debt Securities + Assets, Other Investment, Loans + Assets, Other Investment, Trade Credit and Advances + Assets, Other Investment, Currency and Deposits + Liabilities, Direct Investment, Debt Instruments + Liabilities, Portfolio Investment, Debt Securities + Liabilities, Other Investment, Loans + Liabilities, Other Investment, Trade Credit and Advances + Liabilities, Other Investment, Currency and Deposits
   (ii) Gross equity assets = Assets, Direct Investment, Equity and investment fund shares + Assets, Portfolio Investment, Equity and investment fund shares + Assets, Other Investment, Other equity + Liabilities, Direct Investment, Equity and investment fund shares+ Liabilities, Portfolio Investment, Equity and investment fund shares + Liabilities, Other Investment, Other equity
3. Exposure Risk = External debt in foreign currency/External debt in domestic currency
4. Terms of Trade (TOT) = {Value of exports/Value of imports}×100
5. Net Debt to Equity (Net DTE) = {Net debt assets/Net equity assets}*100
   (i) Net debt assets = Assets, Direct Investment, Debt Instruments + Assets, Portfolio Investment, Debt Securities + Assets, Other Investment, Loans + Assets, Other Investment, Trade Credit and Advances + Assets, Other Investment, Currency and Deposits - Liabilities, Direct Investment, Debt Instruments - Liabilities, Portfolio Investment, Debt Securities - Liabilities, Other Investment, Loans - Liabilities, Other Investment, Trade Credit and Advances - Liabilities, Other Investment, Currency and Deposits
   (ii) Net equity assets = Assets, Direct Investment, Equity and investment fund shares + Assets, Portfolio Investment, Equity and investment fund shares + Assets, Other

Investment, Other equity - Liabilities, Direct Investment, Equity and investment fund shares- Liabilities, Portfolio Investment, Equity and investment fund shares - Liabilities, Other Investment, Other equity

6. Equity liabilities to total liabilities = {Equity liabilities/Total liabilities}*100

   (i) Equity liabilities= Liabilities, Direct Investment, Equity and investment fund shares + Liabilities, Portfolio Investment, Equity and investment fund shares + Liabilities, Other Investment, Other equity

   (ii) Total liabilities = Liabilities, Direct Investment, Debt Instruments + Liabilities, Portfolio Investment, Debt Securities + Liabilities, Other Investment, Loans + Liabilities, Other Investment, Trade Credit and Advances + Liabilities, Other Investment, Currency and Deposits + Liabilities, Direct Investment, Equity and investment fund shares+ Liabilities, Portfolio Investment, Equity and investment fund shares + Liabilities, Other Investment, Other equity

Appendix II: Data Availability, Country-wise

1. Brazil – 2005:Q1-2015:Q4
2. Colombia - 2005:Q1-2015:Q4
3. India - 2006:Q1-2015:Q2
4. Korea- 2005:Q1-2015:Q4
5. Mexico – 2009:Q1-2015:Q4
6. Peru - 2005:Q1-2015:Q4
7. Turkey - 2006:Q1-2015:Q4

Appendix III: Tables and Figures

Table 1: Variables

Variable	Unit	Description	Source(s)
VE	percent GDP	Valuation effects, calculated	BOP, IMF; IFS
GDPgr	Percent	Growth rate of GDP, q-q % change	IFS, FRED, CB of Colombia
TOT	Percent	Exports as % of imports	IFS, FRED, CB of Colombia
MSgr	Percent	Growth rate of M2 (M3 for India), q-q percent change	IFS, RBI
Exposure Risk	Logarithm	Ratio of external debt in foreign currency to that in domestic currency	QEDS, IMF
VIX	Logarithm	Log of CBOE volatility index	CBOE
REER	Percent	Real Broad Effective Exchange rate, q-q % change	FRED
Inflation	Percent	CPI index, q-q % change	IFS
DTE	Percent	Gross debt as % of gross equity	BOP, IMF
NetDTE	Percent	Net debt as % of net equity	BOP, IMF
Equitytoliab	Percent	Equity liabilities as % of total liabilities	BOP, IMF
Reserves	Percent	Reserves as % of GDP	BOP, IMF

Table 2: Summary Statistics

Variable	Mean	Std. Dev.	Min	Max
VE	-1.33	14.05	-37.42	60.38
GDPgr	9.40	6.47	-8.00	28.00
TOT	97.45	15.46	60.00	160.00
MSgr	15.51	12.03	3.00	120.00
Exposure Risk	2.65	1.46	0.52	9.61
VIX	2.92	0.36	2.40	4.07
REER	0.81	9.56	-31.00	30.00
Inflation	5.12	2.82	0.41	15.32
Reserves	67.61	27.45	20.56	137.46
DTE	99.18	47.50	42.96	324.00

Table 3: Correlation Matrix

	VE	GDPgr	TOT	MSgr	Exp. Risk	VIX	RBEER	Inflation	Reserves	DTE
VE	1									
GDPgr	-0.06	1								
TOT	-0.203*	-0.073	1							
MSgr	0.1	0.392*	-0.095	1						
Exp.Risk	-0.018	0.175*	0.375*	0.223*	1					
VIX	0.196*	-0.073	-0.081	0.019	-0.129	1				
RBEER	-0.221*	0.202*	0.175*	-0.021	0.031	-0.229*	1			
Inflation	0.184*	0.311*	-0.625*	0.275*	-0.155*	0.186*	-0.074	1		
Reserves	0.004	-0.205*	0.243*	-0.187*	0.046	0.015	-0.182	-0.376	1	
DTE	0.2424*	0.0921	-0.3349*	0.357*	-0.046	0.028	-0.164	0.480*	-0.342	1

Note: * marks significance at 5%.

Table 4: Fixed Effects (FE) Estimation Results

Val. Effects as % of GDP	1	2	3	4	5	6
			Fixed effects			
Variables			2005Q1-2015Q4			
L.GDPgr	0.052	0.138	0.109	0.099	0.025	
	(0.151)	(0.156)	(0.156)	(0.155)	(0.156)	
L.TOT	-0.407***	-0.410***	-0.369***	-0.361***	-0.402***	-0.419***
	(0.071)	(0.071)	(0.074)	(0.073)	(0.074)	(0.090)
L.M3gr		-0.144*	-0.137*	-0.140*	-0.129*	-0.128*
		(0.075)	(0.075)	(0.074)	(0.074)	(0.071)
L.Exp.Risk			-2.243*	-1.532	-1.339	
			(1.143)	(1.176)	(1.166)	
VIX				5.058*	5.807**	6.537**
				(2.211)	(2.208)	(2.123)
L.REER					0.215*	0.226**
					(0.085)	(0.085)
L.Reserves						0.006
						(0.081)
DTE	0.259***	0.282***	0.300***	0.289***	0.301***	0.289***
	(0.037)	(0.039)	(0.04)	(0.04)	(0.04)	(0.039)
Constant	12.506*	11.895	12.353*	-3.868	-3.534	-6.606
	(7.358)	(7.327)	(7.291)	(10.127)	(10.024)	(14.852)
R^2	0.082	0.084	0.079	0.09	0.095	0.101
Observations	268	268	268	268	268	268

Robust Standard Errors in parentheses; ***significant at 1%, **significant at 5%, *significant at 10%

Table 5: Random Effects (RE) Estimation Results

Val. Effects as % of GDP	1	2	3	4	5	6
			Random effects			
Variables			2005Q1-2015Q4			
L.GDPgr	-0.063	-0.031	-0.047	-0.069	-0.122	
	(0.132)	(0.142)	(0.144)	(0.141)	(0.145)	
L.TOT	-0.180**	-0.177**	-0.198**	-0.192**	-0.208**	-0.187**
	(0.050)	(0.059)	(0.064)	(0.063)	(0.064)	(0.059)
L.M3gr		-0.048	-0.061	-0.071	-0.063	-0.053
		(0.078)	(0.080)	(0.079)	(0.079)	(0.071)
L.Exp.Risk			0.513	0.786	0.877	
			(0.650)	(0.645)	(0.646)	
VIX				7.230**	7.760**	7.149**
				(2.308)	(2.327)	(2.289)
L.REER					0.141	0.158*
					(0.090)	(0.090)
L.Reserves						0.060*
						(0.033)
GrossDTE	0.050*	0.054**	0.054**	0.054**	0.055**	0.066**
	(0.019)	(0.021)	(0.021)	(0.020)	(0.020)	(0.021)
Constant	11.819*	11.554*	12.568*	-9.477	-9.668	-13.983
	(6.815)	(6.837)	(6.962)	(9.819)	(9.793)	(9.846)
R^2	0.090	0.091	0.093	0.126	0.134	0.138
Observations	268	268	268	268	268	268

Robust Standard Errors in parentheses; ***significant at 1%, **significant at 5%, *significant at 10%

Table 6: Robustness Check I

Val. Effects as % of GDP	1	2	3	4
	Fixed effects		Random effects	
Variables	2005Q1-2015Q4			
L.GDPgr	-0.069		-0.264*	
	(0.153)		(0.141)	
L.TOT	-0.351***	-0.420***	-0.205***	-0.199**
	(0.072)	(0.088)	(0.059)	(0.061)
L.M3gr	0.039	0.020	-0.021	-0.060
	(0.070)	(0.066)	(0.071)	(0.069)
L.Exp. Risk	-0.945		0.776	0.594
	(1.132)		(0.622)	(0.618)
VIX	6.094**	6.435**	7.599**	7.267**
	(2.166)	(2.081)	(2.240)	(2.248)
L.REER	0.427***	0.410***	0.288**	0.245**
	(0.090)	(0.090)	(0.092)	(0.090)
L.Reserves		-0.073		0.008
		(0.080)		(0.031)
Net DTE	0.189***	0.188***	0.093***	0.087***
	(0.023)	(0.023)	(0.017)	(0.018)
Constant	-0.828	7.076	-11.983	-13.057
	(9.797)	(14.399)	(9.029)	(9.079)
R^2	0.169	0.164	0.197	0.187
Observations	268	268	268	268

Robust Standard Errors in parentheses; ***significant at 1%, **significant at 5%, *significant at 10%

Table 7: Robustness Check II

Val. Effects as % of GDP	1	2	3	4
	Fixed effects		Random effects	
Variables	2005Q1-2015Q4			
L.GDPgr	-0.070		-0.209	
	(0.153)		(0.144)	
L.TOT	-0.394***	-0.457***	-0.194**	-0.204**
	(0.072)	(0.088)	(0.062)	(0.063)
L.M3gr	-0.020	-0.039	-0.053	-0.074
	(0.070)	(0.067)	(0.075)	(0.072)
L.Exp.Risk	-1.107		0.994	0.857
	(1.131)		(0.637)	(0.628)
VIX	7.877***	8.286***	8.406***	8.084***
	(2.152)	(2.080)	(2.298)	(2.291)
L.REER	0.350***	0.336***	0.203*	0.196*
	(0.087)	(0.086)	(0.091)	(0.090)
L.Reserves		-0.060		0.041
		(0.080)		(0.031)
Equitytoliab	-1.276***	-1.256***	-0.385***	-0.375***
	(0.152)	(0.149)	(0.098)	(0.097)
Constant	85.253***	89.895***	13.271	10.606
	(13.386)	(17.206)	(9.504)	(9.437)
R^2	0.124	0.121	0.160	0.158
Observations	268	268	268	268

Robust Standard Errors in parentheses; ***significant at 1%, **significant at 5%, *significant at 10%

Table 8: Effect of disaggregated components of external balance sheet on valuation channel

Val. Effects as % of GDP	1	2	3	4	5	6
		Fixed effects			Random effects	
Variables			2005Q1-2015Q4			
L.GDPgr	-0.268	0.255	-0.054	-0.432	0.138	-0.139
	(0.309)	(0.174)	(0.168)	(0.285)	(0.183)	(0.153)
L.TOT	-0.405**	-0.253**	-0.352***	-0.406***	-0.242**	-0.248***
	(0.134)	(0.086)	(0.079)	(0.106)	(0.089)	(0.063)
L.M3gr	0.094	-0.011	0.078	0.264	-0.046	-0.002
	(0.245)	(0.075)	(0.077)	(0.238)	(0.077)	(0.076)
L.Exp.Risk	3.995	-3.664*	-0.465	0.801	0.085	0.709
	(2.589)	(1.557)	(1.276)	(1.416)	(0.933)	(0.677)
VIX	9.216**	6.608*	6.260**	7.645**	10.460***	7.639**
	(2.924)	(2.996)	(2.368)	(2.883)	(2.742)	(2.361)
L.REER	0.229*	0.378***	0.305**	0.237*	0.321**	0.147
	(0.117)	(0.104)	(0.098)	(0.113)	(0.109)	(0.093)
Asset DI Debt	1.911			-38.773		
	(54.396)			(46.564)		
Asset DI Equity	38.000*			24.557*		
	(15.939)			(12.324)		
Liab DI Debt	-56.085*			-12.291		
	(26.006)			(15.417)		
Liab DI Equity	34.391***			6.809*		
	(9.011)			(3.788)		
Asset PI Debt		181.855**			145.188***	
		(55.118)			(33.267)	
Asset PI Equity		0.443			0.388	
		(21.913)			(8.004)	
Liab PI Debt		-25.811*			-27.884***	
		(13.344)			(7.114)	
Liab PI Equity		78.766***			39.028***	
		(10.641)			(7.159)	
Asset Other Debt			2.565			0.563
			(9.801)			(3.348)
Liab Other Debt			-38.949***			-3.124
			(8.829)			(2.821)
Constant	14.266	35.405*	-12.563	12.217	-5.954	-2.609
	(20.231)	(16.664)	(11.539)	(13.349)	(11.276)	(9.580)
R^2	0.046	0.186	0.056	0.145	0.279	0.114

Observations	206	201	268	206	201	268		

Robust Standard Errors in parentheses; ***significant at 1%, **significant at 5%, *significant at 10%

Table 9: Interaction Models

Val. Effects as % of GDP	1	2	3	4	5	6	7	8
			Fixed effects				Random effects	
Variables			2005Q1-2015Q4				2005Q1-2015Q4	
L.GDPgr	-0.541*	-0.034	-0.026	-0.009	-0.123	0.015	-0.111	-0.134
	(0.319)	(0.157)	(0.157)	(0.155)	(0.163)	(0.154)	(0.145)	(0.144)
L.TOT	-0.359***	-0.016	-0.402***	0.836*	-0.887***	-0.409***	-0.219**	-0.218**
	(0.077)	(0.181)	(0.074)	(0.490)	(0.191)	(0.073)	(0.064)	(0.063)
L.MSgr	-0.163*	-0.161*	-0.128*	-0.103	-0.090	-0.120	-0.020	-0.051
	(0.075)	(0.074)	(0.073)	(0.074)	(0.074)	(0.073)	(0.083)	(0.079)
L.Exp.Risk	-1.662	-0.552	11.473*	-2.715*	-17.751**	-1.038	0.768	0.949
	(1.170)	(1.204)	(5.765)	(1.273)	(6.071)	(1.158)	(0.648)	(0.642)
VIX	6.618**	6.255**	18.718**	47.690**	5.616*	7.596**	0.989	9.204***
	(2.231)	(2.198)	(6.099)	(16.536)	(2.181)	(2.283)	(4.916)	(2.407)
L.REER	0.214*	0.193*	0.236**	0.178*	0.245**	0.586***	0.137	0.461**
	(0.085)	(0.085)	(0.085)	(0.086)	(0.085)	(0.163)	(0.090)	(0.174)
DTE	0.243***	0.728***	0.300***	0.300***	0.295***	0.300***	-0.136	0.049*
	(0.049)	(0.187)	(0.039)	(0.039)	(0.039)	(0.039)	(0.124)	(0.020)
DTE*GDP	0.006*							
	(0.003)							
DTE*TOT		-0.005*						
		(0.002)						
DTE*VIX							0.060*	
							(0.039)	
VIX*Exp.risk			-5.179*					
			(2.283)					
VIX*TOT				-0.440*				
				(0.172)				
Exp.risk*TOT					0.131**			
					(0.048)			
Exp.risk*GDP						-0.041**		-0.035*
						(0.015)		(0.016)
Constant	-3.398	-43.056*	-34.912*	-117.735*	54.244*	-8.250	12.094	-12.140
	(9.963)	(19.608)	(17.036)	(45.780)	(23.203)	(10.062)	(17.012)	(9.794)

R^2	0.098	0.096	0.094	0.095	0.088	0.103	0.142	0.149
Observations	268	268	268	268	268	268	268	268

Robust Standard Errors in parentheses; ***significant at 1%, **significant at 5%, *significant at 10%

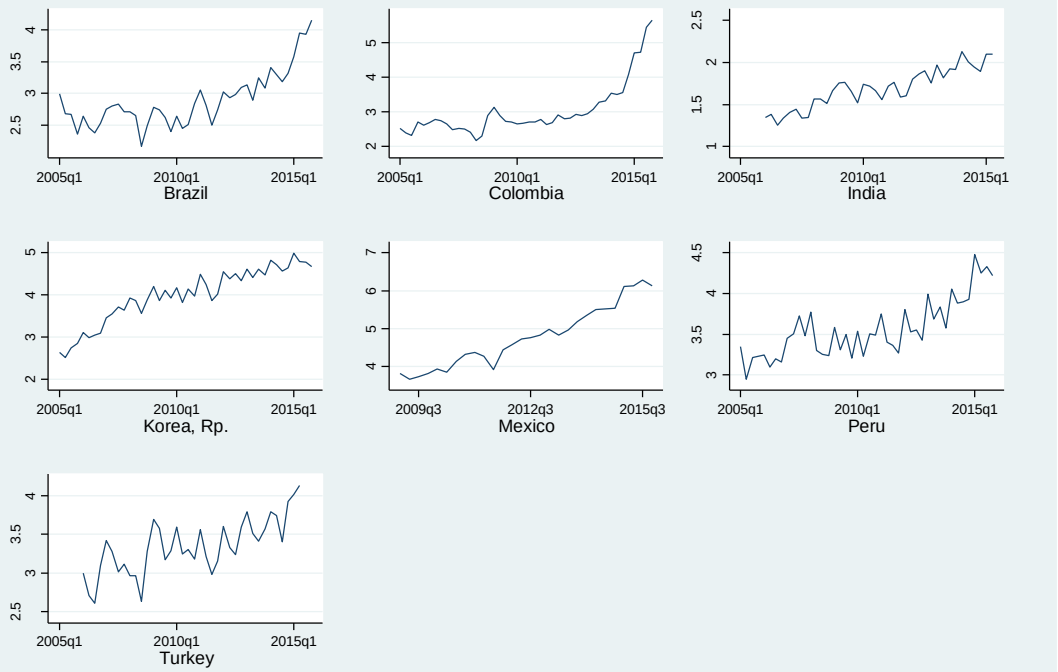
Table 10: Crises and their non-linear effects, Estimation Results

Val. Effects as per cent of GDP	1	2	3	4	5	6	7
		Fixed effects			Random effects		
Variables				2005Q1-2015Q4			
L.GDPgr	-0.007	-0.026	-0.015	-0.128	-0.133	-0.133	-0.129
	(0.156)	(0.157)	(0.156)	(0.145)	(0.146)	(0.145)	(0.146)
L.TOT	-0.389***	-0.388***	-0.389***	-0.195**	-0.194**	-0.195**	-0.190**
	(0.074)	(0.073)	(0.073)	(0.064)	(0.064)	(0.063)	(0.064)
L.MSgr	-0.114	-0.101	-0.113	-0.051	-0.045	-0.050	-0.057
	(0.073)	(0.073)	(0.073)	(0.079)	(0.079)	(0.078)	(0.079)
L.Exp.Risk	-1.056	-1.105	-1.076	0.958	0.952	0.964	0.726
	(1.165)	(1.159)	(1.162)	(0.642)	(0.643)	(0.641)	(0.650)
VIX	5.889*	5.959**	5.667*	8.173**	8.261***	8.010**	7.998**
	(2.254)	(2.235)	(2.258)	(2.367)	(2.360)	(2.373)	(2.369)
L.REER	0.238**	0.245**	0.241**	0.152*	0.148	0.155*	0.149
	(0.086)	(0.086)	(0.085)	(0.091)	(0.091)	(0.091)	(0.091)
Taper	6.382*			7.970*			
	(3.449)			(3.709)			
Euro debt	4.809*			2.971			
	(2.308)			(2.479)			
DTE	0.308***	0.308***	0.309***	0.057**	0.051*	0.058**	0.059**
	(0.040)	(0.040)	0.040	(0.020)	(0.020)	(0.020)	(0.020)
DTE*Taper		0.072*			0.075*		
		(0.033)			(0.035)		
DTE*Eurodebt		0.053*			0.023		
		(0.023)			(0.025)		
VIX*Taper			2.402*			3.001*	
			(1.283)			(1.381)	
VIX*Eurodebt			1.751*			1.152	
			(0.743)			(0.798)	
Exp.Risk*Taper							2.421*
							(1.426)
Exp.Risk*Eurodebt							0.714
							(0.910)
Constant	-7.324	-7.656	-6.809	-13.513	-13.101	-13.148	-12.606
	(10.225)	(10.109)	(10.206)	(9.955)	(9.908)	(9.953)	(10.014)

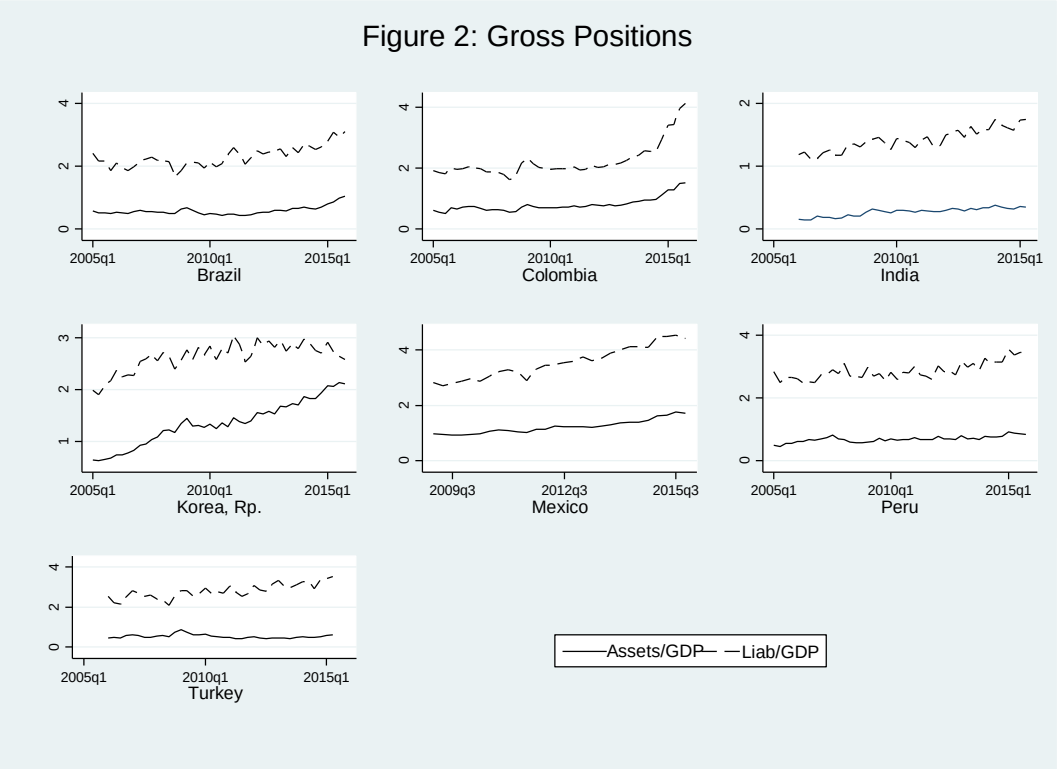
R^2	0.103	0.103	0.104	0.153	0.151	0.155	0.145
Observations	268	268	268	268	268	268	268

Robust Standard Errors in parentheses; ***significant at 1%, **significant at 5%, *significant at 10%

Figure 1: International Financial Integration



Source: Balance of Payments Statistics, International Financial Statistics



Source: Balance of Payments Statistics, International Financial Statistics

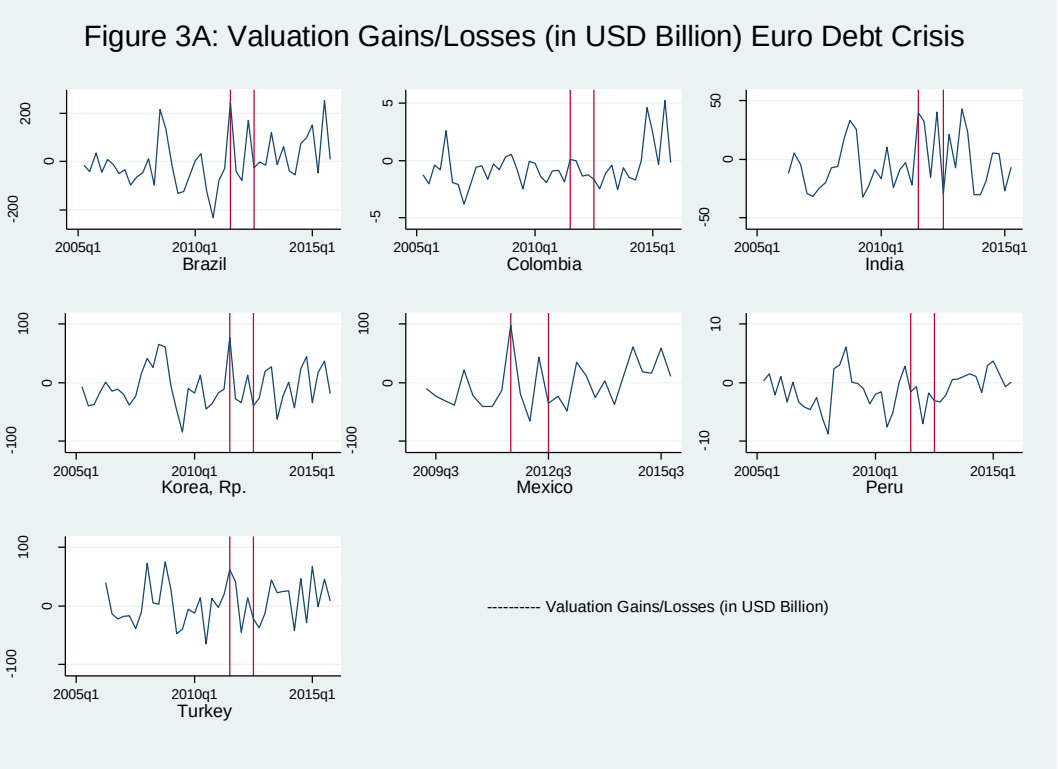


Figure 3B: Valuation Gains/Losses (in USD Billion), Tapering Talk

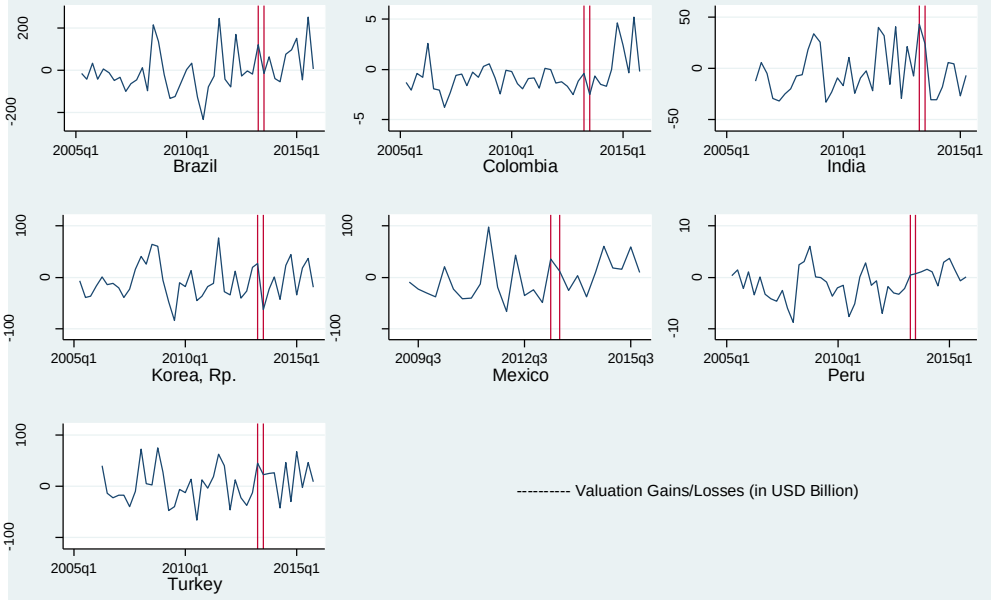
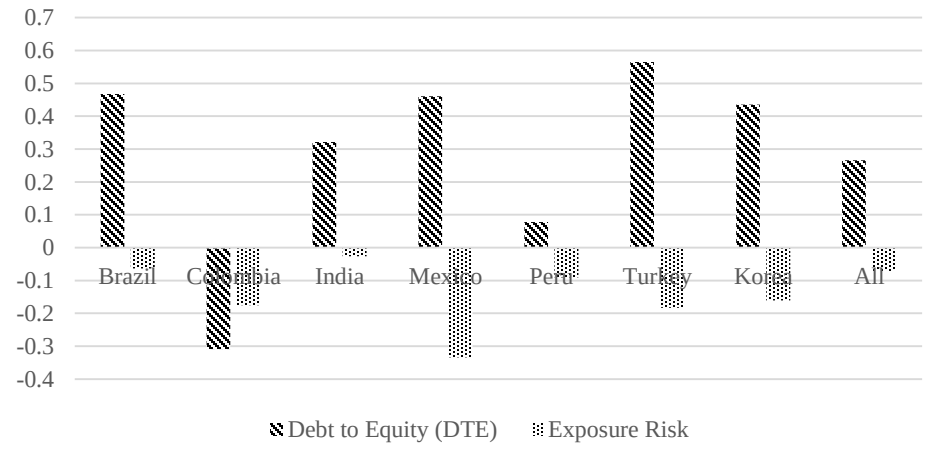


Figure 4: Correlation of VE with DTE and Exposure risk



REFERENCES

1. Ahmed, S., & Zlate, A. (2014). Capital flows to emerging market economies: A brave new world?. *Journal of International Money and Finance*, 48, 221-248. Retrieved from: www.federalreserve.gov/pubs/ifdp/2013/1081/default.htm
2. Bleaney, M., & Vargas, L. C. (2009). Real exchange rates, valuation effects and growth in emerging markets. *Open Economies Review*, 20(5), 631.
3. Brambor, T., Clark, W. R., & Golder, M. (2005). Understanding interaction models: Improving empirical analyses. *Political analysis*, 14(1), 63-82.
4. Bruno, V., & Shin, H. S. (2015). Capital flows and the risk-taking channel of monetary policy. *Journal of Monetary Economics*, 71, 119-132.
5. Devereux, M. B., & Sutherland, A. (2010). Valuation effects and the dynamics of net external assets. *Journal of international Economics*, 80(1), 129-143.
6. Gourinchas, P. O. (2007). Valuation effects and external adjustment: A review. In K. Cowan, S. Edwards, & R.O. Valdes (Eds.), *Current Account and External Financing* (12: pp. 195-236). Central Bank of Chile Retrieved from http://si2.bcentral.cl/public/pdf/documentos-trabajo/pdf/dtbc447.pdf
7. Gourinchas, P. O., & Rey, H. (2013). *External adjustment, global imbalances and valuation effects* (NBER Working Paper No. w19240). National Bureau of Economic Research. Retrieved from: http://www.nber.org/papers/w19240.pdf
8. Gourinchas, P.O., Rey, H., & Truempler, T. (2012). The Financial Crisis and the Geography of Wealth Transfers. *Journal of International Economics*, 88(2), 266-283.
9. Judson, R. A., & Owen, A. L. (1999). Estimating dynamic panel data models: a guide for macroeconomists. *Economics letters*, 65(1), 9-15.
10. Lane, P. R., & Milesi-Ferretti, G. M. (2001). The external wealth of nations: measures of foreign assets and liabilities for industrial and developing countries. *Journal of International Economics*, 55(2), 263-294.
11. Lane, P. R., & Milesi-Ferretti, G. M. (2007). The external wealth of nations mark II: Revised and extended estimates of foreign assets and liabilities, 1970–2004. *Journal of international Economics*, 73(2), 223-250.
12. Milesi-Ferretti, G. M., & Lane, P. R. (2005). Financial globalization and exchange rates. *International Monetary Fund*, Washington.
13. Lane, P. R., & Shambaugh, J. C. (2010). Financial exchange rates and international currency exposures. *The American Economic Review*, 100(1), 518-540.
14. Nier, E. W., Saadi-Sedik, T., & Mondino, T. (2014). *Gross Private Capital Flows to Emerging Markets: Can the Global Financial Cycle Be Tamed?* (IMF Working Paper No. 14/196). IMF: Washington.
15. Pistelli, A., Selaive, J., & Valdés, R. O. (2008). Stocks, Flows, and Valuation Effects of Foreign Assets and Liabilities: Do They Matter?. *Central Banking, Analysis, and Economic Policies Book Series*, 12, 237-277.
16. Rey, H. (2015). *Dilemma not trilemma: the global financial cycle and monetary policy independence* (Working Paper No. w21162). National Bureau of Economic Research.
17. Silvia, M. & Rey, H. (2012, February). World Asset Markets and Global Liquidity. Paper presented at the Frankfurt ECB BIS Conference, London Business School.
18. Tille, C. (2013). Valuation Effects, Capital Flows and International Adjustment. In Gerard Caprio Jr. (Ed.), *Handbook of Safeguarding Global Financial Stability*, 213-221.

Retrieved from: https://sites.duke.edu/malesky/files/2014/07/Handbook-of-Safeguarding.pdf