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### Liquidity and foreign asset management challenges for LATAM countries

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The Global Financial Crisis (GFC) validated the buffer value of international reserves and the active management of buffer funds.

- These issues are especially pertinent for commodity exporters, where the high volatility of their commodity terms of trade translates into large shocks impacting the real exchange rate, and the GDP.
- Intriguingly, 'this time has been different' for countries during the 2000s that followed the dictum of "save for a rainy day," opting for counter-cyclical macro policies, Chile being the prime example of it [Céspedes and Velasco (2012, 2014)].

Frankel (2011) found that since 2000, fiscal policy in Chile has been governed by a structural budget rule that has succeeded in implementing a countercyclical fiscal policy.

Furthermore, Frankel, Vegh and Vuletin (2011) found that, over the last decade, about a third of the developing world has become countercyclical.



Commodity Price Indices, (2005 = 100) WEO 2014-II

### Policy Goals and Challenges: Design exchange rate, foreign assets management, and counter-cyclical fiscal policy aiming at greater REER stability at times of ToT and capital flows instability

Aizenman and Riera Crichton (2008), Aizenman, Edwards and Riera-Crichton (2012)

- International reserves (IR) cushion the impact of termsof-trade (ToT) shocks on the real exchange rate (REER).
- This effect is especially significant for countries exporting natural resources.
- Financial depth reduces the buffer role of international reserves in developing countries.

- Active IR management not only lowers significantly the short run impact of commodity terms of trade (CTOT) shocks, but also lowers the long run REER volatility.
- Relatively small increases in the average holdings of IR/GDP, to levels still well below 15%, provided a policy tool as effective as a fixed exchange rate regime in insulating the economy from CTOT shocks [for IR/GDP above 20%, adding Sovereign Wealth Fund (SWF) with independent and transparent management makes sense].
- IR management could be an effective alternative to fiscal or currency policies for relatively trade closed countries and economies with relatively poor institutions or high government debt.

## Commodity price shocks have a significant impact on output and investment dynamics.

Céspedes and Velasco (2012)

- Economies with more flexible exchange rate regimes exhibit less pronounced responses of output to ToT shocks during these episodes.
- The impact of those shocks on investment tends to be larger for economies with less developed financial markets.
- IR accumulation, more stable political systems, and less open capital accounts tend to reduce the real exchange rate appreciation (depreciation) in episodes of commodity price booms (busts), respectively.

This paper revisits these issues, looking at the degree to which the more recent data (up to 2013), and the new institutional developments validate the earlier results that relied on pre-GFC data.

We analyze the degree to which the growing importance of sovereign wealth funds [SWFs], and the diffusion of inflation targeting and augmented Taylor rules have impacted the post crisis adjustment of LATAM to the challenges associated with terms of trade and financial shocks. Main results:

- We validate that active management of IR and SWF reduces the effects of transitory CTOT shocks on the real exchange rate.
- This "buffer effect" seems to work better against risks of real appreciation than against risks of depreciations.
- Fixed exchange rate regimes act as a substitute policy to reserve accumulation, and this buffering policy seems to work better under relatively high levels of external debt, and in economies that are less open to trade.
- SWFs buffers the REER from CTOT shocks with fixed exchange rate regimes in relatively closed economies, for relatively high external debt levels.

- The buffer effect showed its strongest influence during the 80's, 90's and the end of the Great Moderation (2003-2007).
- Yet, during the great recession (2008-2009) we observed disconnect between the CTOT – REER association, and the role of reserves.
- The REER-CTOT relationship resumes during the postgreat recession period (2010-2013) and reserve buffering returns but not at the levels observed previous to the crisis.
- We identify a "substitution" between the roles IR and SWF - SWFs take over the buffering of the REER and the real GDP during the Great Recession and the post-Great Recession period.

### SWF balances by Country





#### Figure A: CTOT shock volatility vs. Accumulation of Foreign Reserve Assets.

Figure B: CTOT shock volatility vs. Accumulation of Assets in Stabilization Sovereign Wealth Funds



### The trend of the past 30 years: the emergence of SWF





## Countries with older SWFs have more sovereign assets relative

to IR Source: Aizenman and Glick (2010)



- Inflation targeting (IT) matters, potentially diverting resources to the preservation of domestic price stability: IT countries seem to give up the use of reserves to buffer against CTOT shocks, possibly relegating this role to the SWFs.
- In countries that follow an augmented Taylor rule, their monetary authorities place larger weight on output gaps; while inflation gains importance for IT countries.
- The nature of the regime matters non IT countries switch from 'REER stabilization' to inflation targeting when committing to a formal IT rule.

### We focus on the twelve largest Latin American economies:

Argentina, Bolivia, Brazil, Chile, Colombia, Costa Rica, Ecuador, Mexico, Paraguay, Peru, Uruguay and Venezuela.

We cover 1980-2013, but focuse especially on the periods of

- 1. The end of the great moderation (2002-2007),
- 2. The great recession (2008-2009)
- 3. Post great recession (2010-2013).

The "commodity terms of trade" variable, CTOT, follows Ricci et. al (2008), includes only the relative prices of a country's commodity exports and imports, weighted by their country specific GDP shares (food, fuels, agricultural raw materials, metals, gold, and beverages), weighing the average shares of commodity *j* in country *i*'s exports and imports over GDP for the period 1980 through 2012, respectively.

Commodity prices are deflated by the manufacturing unit value index (*MUV*).

The definitions implies that CTOT shock = d long CTOT =

The first order approximation of the income shocks associated with CTOT shock; providing a direct link to effects on aggregate income and production. **Methodology:** Our basic framework is represented by (1):

 $\Delta Ln(X)_{it} = \alpha_i + \beta_1 \Delta Ln(X)_{it-1} + \beta_2 ECMX_{it-1} + [\theta_1 + \theta_2 Y_{it-1}] TCTOT_{it-1}$ 

X - measures of macroeconomic performance:

REER, the effective (trade weighted) real exchange rate or
Real GDP.

ECTX - the error correction term for  $\log X =$  the log deviations of X from its equilibrium value.

In order to compute the equilibrium/long-run REER, we use a cointegrating approach.

The long run value of output growth is obtained by applying an HP Filter to the original series (a smoothing parameter 1600).

TCTOT = transitory CTOT shocks = the log deviations of current CTOT from its long run value.

Y - liquidity measures: IR/ GDP, SWF/GDP ratios, & change of these ratios.

The buffer effect over different sample periods under different macroeconomic/policy structures or asymmetric underlying shocks, is studied by adding controls Z:

 $\Delta Ln(X)_{it} = \alpha_i + \beta_1 \Delta Ln(X)_{it-1} + \beta_2 ECMX_{it-1} + [(\theta_2 * Z) + (\theta_4 * Z)Y_{it-1}] TCTOT_{it-1} + \beta_2 Y_{it-1} + \varepsilon_{it-1} + \varepsilon_{it-1}$ 

Z = a vector of dummy variables that splits the regression by sample period or by different economic structures such as degree of trade openness, indebtedness or exchange rate regime.

Dynamic outlook of the effects of CTOT shocks on REER and Output, and the buffering effect under different conditions, are studied by means of accumulated impulse response functions (IRF). We follow the single-equation approach advocated by Jorda (2005) and Stock and Watson (2007), which does not impose the dynamic restrictions implicitly embedded in the SVAR methodology, and can conveniently accommodate non-linearities in the response function. We use these linear local projections (LP) of real appreciation and output growth on our dynamic error correction model:

$$\Delta Ln(X)_{it+h} = \alpha_{i,h} + \beta_{1,h} \Delta Ln(X)_{it-1} + \beta_{2,h} ECMX_{it-1} + [(\theta_{2,h} * Z_{it}) + (\theta_{4,h} * Z_{it})Y_{it}] TCTOT_{it} + \beta_{2,h}Y_{it-1} + \varepsilon_{it}$$

where

$$\Delta Ln(X)_{it+h} = Ln(X)_{it+h} - Ln(X)_{it-1}$$

We study the short run relationship between movements in the stock of reserves and movements in the balance of SWF applying two error correction models:

$$\Delta RES_{it} = \alpha_i + \delta_t + \beta_1 \Delta SWF_{it} + \sum_{k=1}^3 \beta_{k+1} \Delta SWF_{it-k} + \sum_{k=1}^3 \theta_k \Delta RES_{it-k} + \gamma_1 \Delta SWF_{it-1} + \gamma_2 \Delta RES_{it-1} + \varepsilon_{it}$$

$$\Delta SWF_{it} = \alpha_i + \delta_t + \beta_1 \Delta RES_{it} + \sum_{k=1}^3 \beta_{k+1} \Delta RES_{it-k} + \sum_{k=1}^3 \theta_k \Delta SWF_{it-k} + \gamma_1 \Delta SWF_{it-1} + \gamma_2 \Delta RES_{it-1} + \mu_{it}$$

## Figure 2: REER IRF to 1% CTOT shock under high and low stock of IR

Moving the stock of reserves from 5 % to 15 % decreases the REER volatility (the S. D. of the point estimates on the IRF) in 30 % over the following two years



Figure 3A: REER IRF to 1% CTOT after POSITIVE CTOT Shocks Increasing the IR accumulation from 1 % to 3 % of GDP decrease the volatility of the output after positive CTOT shocks by 26 % over the following two years.

**1 PERCENT INCREASE IN CTOT** 



Figure 3B: REER IRF to 1% CTOT after NEGATIVE CTOT Shocks De-accumulation of IR helps decrease the effect of negative CTOT shocks into output on impact, yet it seems to have an insignificant role in the following periods.



Figure 4: REER IRF to 1% CTOT under high and low stock of reserves by Periods:

large effects during 1980-2002; moderate during 2003-07; Inconclusive during the GFC, back to life 2010-2013







C- Post Great Recession (2010-2013)



**1980-2002:** Comparing the IRFs from holding 5% or 15% of GDP, the volatility in the IRF drops by 45%:

In the absence of credible inflation rules or other countercyclical fiscal policies, liquidity (through IR) management was one of the strongest tools for emerging LATAM economies to lower inherited macroeconomic volatility.

**2003 - 2007.** The relationship between CTOT shocks and real appreciation remains positive but we lose some significance. The buffer effect of reserves remained strong, delaying any reaction of REER to changes in CTOT by more than a year.

**2008-2009** The role for reserves to buffer the shocks disappears. **2010 - 2013**. The buffer story reappear during the years following the GR. Figure 5: REER IRF to 1% CTOT under high & low stock of SWF by Periods

While IR fails to smooth the transmission of CTOT shocks to REER during the GR, SWF stepps up as a potential substitute: Moving the stock of SWF assets from 1 to 3 % of GDP decreased volatility in the GR and the post GR period by 16 and 32 % respectively.



Figure 6: Dynamic relationship between DRES and DWF: 2003 to 2013

Figure 6A: A 1 % of GDP increase in SWF balances is associated with a negative and significant accumulated effect on IR by about .34 % of GDP on impact and a maximum effect of .56 % after one quarter.

Figure 6B: no reaction on SWF after changes of reserves.



### Figure 8: REER IRF to 1% CTOT under Inflation Rule Liquidity management efficient only in Non-IT countries, reducing CTOT - REER volatility by 35 % over two years. This buffer story disappears among IT countries.

Table 14 –SWF provides IT countries with an alternative form of liquidity management against foreign shocks. This is true for both REER and output growth stabilization.



# To conclude, our research supports the gains from the following possible policy assignments:

Managed exchange rate flexibility helps emerging markets facing ToT and financial instability – nominal ER appreciation and hoarding at times of plenty, and depreciation in bad times provide a valuable automatic stabilizer [Frankel (2010), Aizenman, Chinn, Ito (2011)].

- In times of plenty when export prices are well above a properly projected trend hoard IR and channel a share of revenue surpluses to the SWF.
- In lean times when export prices are well below properly projected trend de-cumulate IR and SWFs, buffering the fiscal shortfalls

associated with the negative income effects of weak ToT.

• Coordination between the various policies [IR and SWF management, IT, Fiscal Rule] may be essential for the stabilization efficacy at times of higher volatility.



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**<u>CTOT</u>**: Commodity terms-of-trade data set was constructed following Ricci et. al (2008):

$$CTOT_{i} = \prod_{j} (P_{j} / MUV)^{X_{j}^{i}} / \prod_{j} (P_{j} / MUV)^{M_{j}^{i}},$$

where Pj is the price index for six commodity categories (food, fuels, agricultural raw materials, metals, gold, and beverages), and  $(X_j^i, M_j^i)$  are the average shares of commodity *j* in country *i*'s exports and imports over GDP for the period 1980 through 2012, respectively. Commodity prices are deflated by the manufacturing unit value index (*MUV*). Sources: UN ComTrade, IMF, World Bank

**TCTOT:** Transitory CTOT shocks are defined as the log deviations of actual CTOT from long run values calculated through a HP filter.

**REER:** Real effective exchange rate is defined a trade based weighted average of nominal bilateral exchange rates deflated by the relative consumer price indexes. An increase in REER represents a real appreciation of the domestic currency. **DREER** represents the log change in REER. Sources: DataStream, IMF

**<u>RES</u>**: The stock of foreign reserve assets is measured in millions of us dollars and deflated by the five year moving average of the interpolated annual nominal Gross Domestic Product.

**DRES** represents the change in the reserves to GDP ratio. Global Financial Data, IMF

**ECMREER**: Error correction REER is the log difference between current REER and long term REER. In order to compute the equilibrium/long-run REER, we use a co-integrating approach. The methodology calls for a series of co-integrating regressors. Following Edwards (1989), Montiel (1999) and others, we estimate the following equation:

$$Ln(REER)_{t} = \alpha + B \begin{bmatrix} Ln(CTOT)_{t} \\ GOV_{t} \\ TradeOpen_{t} \\ USINF_{t} \\ TimeTrend_{t} \\ IntSpread_{t} \end{bmatrix} + \varepsilon_{ti}$$
(A-1)