Larger for Longer:
Managing Large Central Bank Balance Sheets

Peter Stella

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contact: pstellaconsult@gmail.com or centralbankarchaeology.com

Five Bold Assertions

- *In the steady state, the **size** of the balance sheet has nothing to do with inflation or real economic growth—there is no "neutral" size balance sheet*
- *The **composition** of the central bank's assets and liabilities matters*
- *Conventional monetary operations work fine with "large" balance sheets, but rapid increases in central bank assets are often **financed** inefficiently*
- *Sovereigns sometimes figure out that the efficient way to finance asset accumulation is through the issuance of **treasury (not CB) securities***
- *If the Federal Reserve decides to keep its balance sheet larger for longer it should seriously consider adopting a **radically different financing plan***

Outline of the Presentation

- *Prior to the Great Recession, advanced country central banks employed very small monetary operations to implement **interest rate policy***
- *Large scale asset purchases have considerably expanded the size of advanced country central bank balance sheets and it appears they will remain larger than they customarily have been for some time*
- *A number of relatively sophisticated emerging market central banks have been managing "large" balance sheets for extended periods of time*
- *I discuss how those latter countries have actively managed their balance sheets and what useful lessons might be drawn for the Federal Reserve*

Why do central banks have balance sheets?

- *Primarily to….*

- *Facilitate the secure, rapid and robust operation of wholesale and retail payments systems*
- *Foreign exchange management and financing*

- *Those two functions accounted for 95+ percent of central bank balance sheets prior to Great Recession.*

Minimising Monetary Policy, BIS Working Paper # 330, Stella (2010)

At inception the treasury purchases a payments system infrastructure (public good) and provides it to the central bank against an equity claim

Image 1: Central Bank Balance Sheet Micro Foundations #1

Assets		Liabilities	
Payments System Infrastructure	P	Equity	P
Total Assets	P	Total Liabilities	P

In order to use the payments system, banks freely constitute reserves at the central bank (borrowing them from the central bank against collateral)

Image 2: Central Bank Balance Sheet Micro Foundations #2

Assets		Liabilities	
Repo Lending to Banks	R	Bank Reserves	R
Payments System Infrastructure	P	Equity	P
Total Assets	R + P	Total Liabilities	R + P

Retail payments are made with banknotes, the quantity demanded by the public is supplied by the central bank

Image 3: Central Bank Balance Sheet Micro Foundations #3

Assets		Liabilities	
Treasury Securities	B	CB Notes Outstanding	B
Repo Lending to Banks	R	Bank Reserves	R
Payments System Infrastructure	P	Equity	P
Total Assets	R + P + B	Total Liabilities	R + P + B

In the steady state, the treasury provides just enough additional equity (through provision of treasury securities) to ensure a "balanced budget"

Image 4: Central Bank Balance Sheet Micro Foundations #4

Assets		Liabilities	
Treasury Securities	B + **A**	CB Notes Outstanding	B
Repo Lending to Banks	R	Bank Reserves	R
		Operating Result (Σ)	$i(B + \mathbf{A}) - dP - W \equiv 0$
Payments System Infrastructure	P		
		Equity	P + **A**
Total Assets	R + P + B + A	Total Liabilities	R + P + B + A

The most expansionary "central bank policy"—Helicopter Money—leaves CB Balance sheet size unchanged

Image 5: Central Bank Balance Sheet with "Helicopter Money" aka Quasifiscal Spending

Assets		Liabilities	
Treasury Securities	B + A	CB Notes Outstanding	B **+ H**
Repo Lending to Banks	R	Bank Reserves	R
		Operating Result (Σ)	i(B + A) – dP – W **– H** = **– H**
Payments System Infrastructure	P		
		Equity	P + A
Total Assets	R + P + B + A	Total Liabilities	R + P + B + A

The most expansionary "central bank policy"—Helicopter Money—leaves CB Balance sheet size unchanged

Image 6: Central Bank Balance Sheet with the legacy of "Helicopter Money"

Assets		Liabilities	
Treasury Securities	B + A	CB Notes Outstanding	B
Repo Lending to Banks	R	Bank Reserves	R **+ H + iH**
		Operating Result (Σ)	i(B + A) – dP – W **– iH** = **– iH**
Payments System Infrastructure	P		
		Equity	P + A **- H**
Total Assets	R + P + B + A	Total Liabilities	R + P + B + A

Conventional operational framework

- *"Before the recent crisis, monetary policy implementation … converged on an approach in which the policy stance was defined exclusively in terms of a short term interest rate….[in which] liquidity management operations play a purely technical and supportive role…"*

  Borio and Disyatat (2010) *Unconventional Monetary Policies: An Assessment*

- *Currency and Bank Reserves—the monetary base—demand determined*

- *Demand for monetary base a function of the retail and interbank payments systems characteristics and required reserves ratio (if any)*

- *Monetary operations "defensive", sometimes frequent, but always small*

Canada Today—Less than C$ 1 billion in Reserves

Bank of Canada Balance Sheet

December 31, 2015

(in C$ billions)

Assets		Liabilities	
Canadian Government bills & bonds	94.0	Banknotes in Circulation	75.5
Liquidity Providing Repos	6.1	Financial Institution Deposits	.5
		Canadian Government Deposits	22.6
		Net Other Liabilities	1.0
		Equity	.5
Total Assets	100.1	Total Liabilities	100.1

Source: Bank of Canada Financial Statements (unaudited 2015) & author's calculations

(Note: Canada GDP approximately C$ 2 trillion, o/n policy rate target 50 bps 6/15/16)

Even as late as December 5, 2007……
Total US bank reserves and LPR very small

Table 1: Consolidated Balance Sheet of the Federal Reserve Banks

December 5, 2007

(in US$ billions)

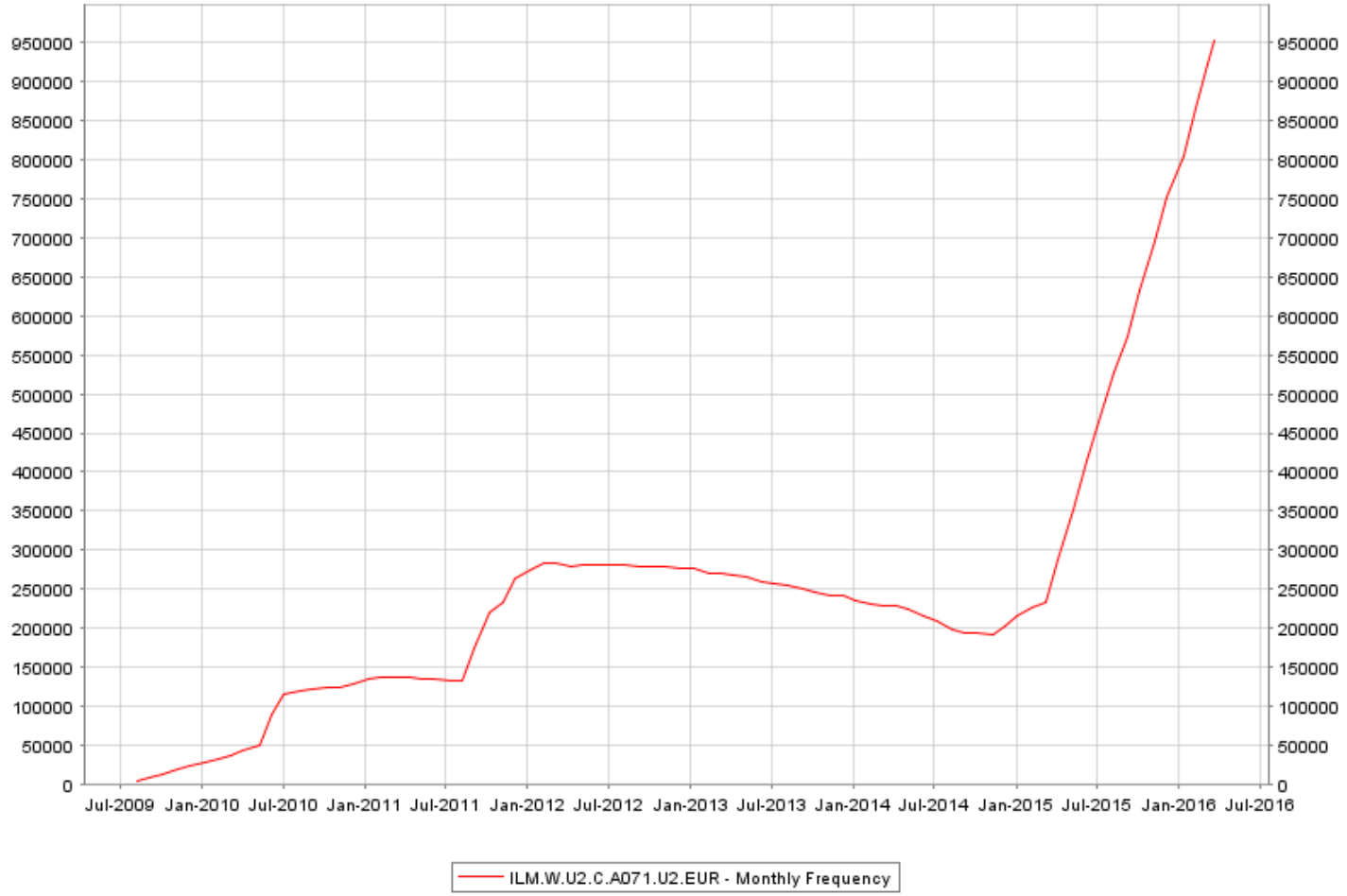
Assets		Liabilities	
US Treasuries	780	FR Notes Outstanding	782
Liquidity Providing Repos	47	Bank Deposits (Overnight)	16
Net Other Assets	50	Reverse Repos	37
		US Treasury Deposits	5
		Equity	37
Total Assets	876	Total Liabilities	876

Source: Stella(2015) *Exiting Well*; Federal Reserve Board Release H.4.1

Securities accumulation for monetary policy purposes is novel

Eurosystem: Securities held for Monetary Policy Purposes

(euro millions)



*Let us focus on how securities accumulation has been **financed** and its implications for the US financial system*

Table 3: Consolidated Balance Sheet of the Federal Reserve Banks

October 21, 2015

(in US$ billions)

Assets		Liabilities	
US Treasuries	2564	FR Notes Outstanding	1347
MBS and Federal Agencies	1863	Bank Deposits (Overnight)	**2676**
Net Other Assets	42	Bank Deposits (Term)	0
		Reverse Repos	331
		US Treasury Deposits	57
		Equity	59
Total Assets	4470	Total Liabilities	4470

Source: Stella(2015) Federal Reserve Board Release H.4.1 and Author's calculations

The degree of commercial bank balance sheet displacement caused by Large Scale Asset Purchases (LSAP) is truly astonishing

- Bank balances held at Federal Reserve Banks (FRBs) have increased from USD 20 billion to USD 2.7 trillion (+13,000 percent).
- Increased deposits at FRBs account for *57 percent* of the total growth of US bank assets since the onset of the Great Recession.

- In 2006, JP Morgan Chase (JPM) held USD 2.2 billion at FRBs.
  At end-March 2015, JPM held USD 447 billion (+ 20,000 percent).
- More than 21 percent of JPM total assets are now claims on FRBs.

- In 2006, State Street held USD 103 *m*illion at FRBs.
  At end-March 2015, State Street held USD 56 *b*illion (+ 53,000 percent)
- More than 20 percent of State Street total assets are now claims on FRBs.

The micro view…JPM balance sheet

Reclassified Change in Simplified JP Morgan Chase Balance Sheet

From 6/30/2008 to 3/31/2015

(in US$ billions)

Assets		Liabilities	
Balances due from FRBs	+444	Liabilities to Finance FRB Balances	+444
Other Assets	+274	Other Liabilities	+192
		Equity Capital	+82
Total Assets	+718	Total Liabilities and Equity Capital	+718

Source: FFIEC Reports # 031 “Consolidated Reports of Condition and Income” and Author's calculations

Banks must obtain financing from nonbanks (including equity) to finance their additional deposits held at FRBs—or reduce other assets

Table 5: Change in Simplified Aggregate Balance Sheet of US Commercial Banks

From 12/5/2007 to 8/26/2015

(in US$ billions)

Assets		Liabilities	
Loans and Leases	+1584	Nonbank Deposits	+4088
Treasury and Agency securities	+993	Borrowings	-227
Other Securities	-75	Other Liabilities	+245
Deposits at FRBs	+2666	Total Liabilities	+4106
Other Assets	-508	Equity and Residual	+554
Total Assets	+4660	Total Liabilities and Equity	+4660

Source: Exiting Well (2015) Federal Reserve Board Release H.8, H.4.1 and Author's calculations

The bulk of the change in US bank balance sheets has been in deposit growth at FRBs and associated financing

Table 6: Reclassified Change in Aggregate Balance Sheet of US Commercial Banks

From 12/5/2007 to 8/26/2015

(in US$ billions)

Assets		Liabilities	
Deposits at FRBs	+2666	Nonbank Deposits to Finance Reserves	+2666
Loans and Leases	+1584	Other Nonbank Deposits	+1422
Treasury and Agency securities	+993	Equity and Residual	+554
Net Other Assets	-601		
Total Assets	+4642	Total Liabilities and Equity	+4642

Source: Exiting Well (2015) Federal Reserve Board Release H.8, H.4.1 and Author's calculations

Liability Management: Central Bank of Chile

Balance Sheet of the Central Bank of Chile

December 31, 2012

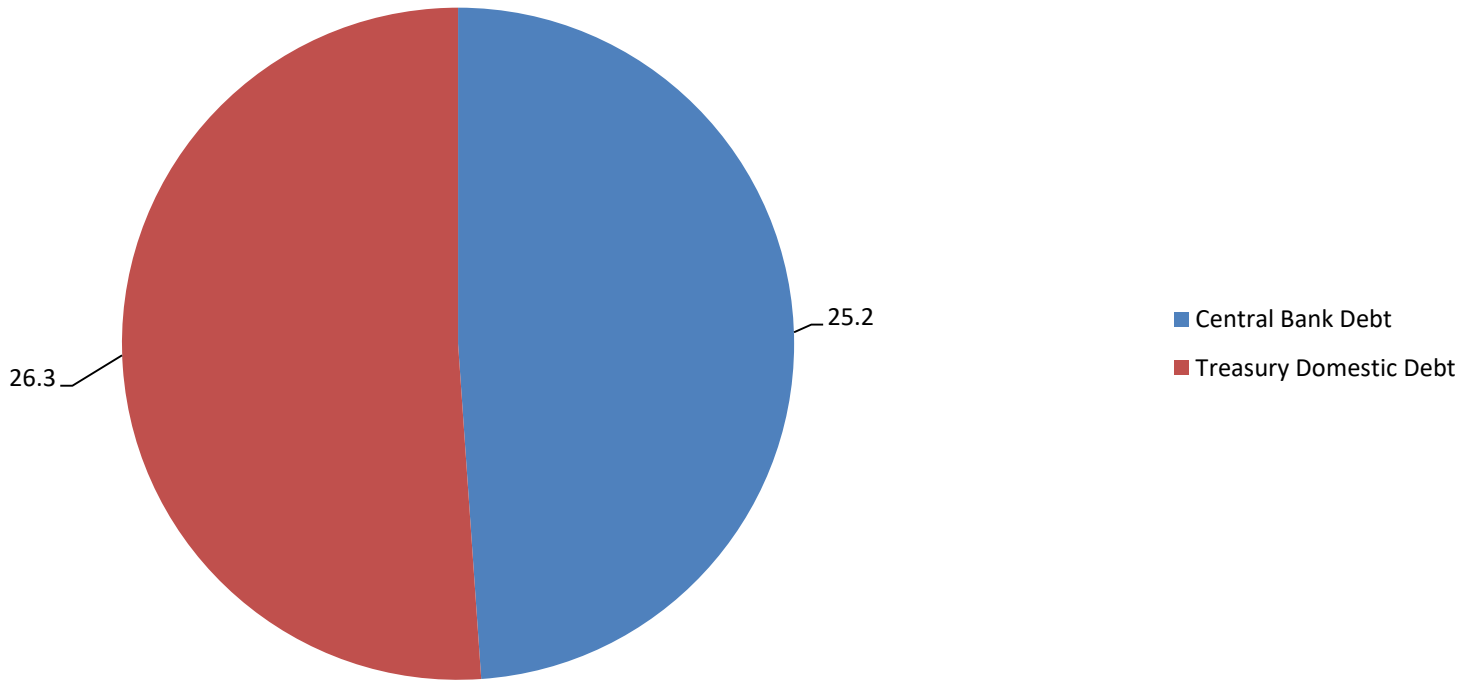
(in percent of GDP)

Assets		Liabilities	
Net Foreign Assets	14.9	Banknotes and Coin	4.7
Domestic Financial Assets	2.3	Financial Institution and other Deposits	5.4
Net Other Assets	0.0	Central Bank Debt	9.9
		Treasury Deposits	0.5
		Equity	-3.4
Total Assets	17.2	Total Liabilities	17.2

Source: Central Bank of Chile 2012 Memoria Anual, IMF WEO database and Author's calculations

Chile: Segmentation according to Issuer

Chile: Fragmentation of the Domestic Debt Market 2012
(debt in USD billions)



Source: Stella (2014) Unifying the Domestic Sovereign Debt Market and Harmonizing Foreign Exchange Management: The Case of Chile

Debt issued by the Central Bank of Chile: Fragmentation according to instrument

Composition of Central Bank of Chile Debt (in billions of pesos)	2012	2011	2007	2002
Discountable Promissory Notes (PDBC)		985	852	2983
Bonds in UF (BCU)	8535	8055	2556	227
Bonds in Pesos (BCP)	3906	3533	1935	374
Indexed Promissory Notes (PRC)	234	300	1488	4606
Optional Indexed Coupons in UF (CERO)	230	313	663	1149
Bonds in US Dollars (BCD)			198	1026
Indexed Promissory Notes USD (PRD)				2622
Optional Indexed Coupons in USD (CERO)				592
UF Promissory Notes Restructured (Res. 990)				327
Redenominated Forex Commercial Notes				112
CB Indexed Promissory Notes (PRBC)				60
USD CDs				4
UF Promissory Notes (Res. 1836)				1
Floating Interest Rate Promissory Notes (PFT)				1
Exchange Differential Notes	.021	.021	.021	.021
Total	12905	13186	7694	14084

Central bank of Chile debt management strategy

- *Some twenty years after the Chilean financial crisis, the CBC balance sheet remained large owing to the debt issued to absorb liquidity during that crisis; to finance subsequent CBC losses; and to finance the accumulation of foreign reserves which were severely depleted*

- *In 2002 the CBC embarked on a plan to rationalize and improve the structure of its debt by:*
  - *Reducing and eventually eliminating USD denominated debt*
  - *Consolidating CBC debt into fewer instruments and issues of those instruments thereby deepening the market*
  - *Eliminating long term debt consistent with Treasury's intention to eventually occupy that space*

Significant progress in reshaping the balance sheet

- *By end-2007, the CBC had reduced USD denominated debt by more than USD 5 billion and by end-2008 had eliminated it entirely.*

- *Had the reduction in overall CBC indebtedness witnessed during 2002-2007 continued at that pace for an additional 5 years, total CBC debt would have fallen by 2012 to less than the combined sum of central bank bills (PDBCs) and nominal peso debt (BCP) outstanding at end-2007. This would have allowed the CBC to reduce the number of its instruments to only two (one "monetary" and one "debt") with a good chance to eliminate its debt entirely by the end of the 2010s.*

Source: Liquidity Management of the Central Bank of Chile, Table 3, page 26.

An expansion of the balance sheet led to a partial reversal of previous achievements

Sizeable foreign exchange purchases in 2008 ($6 billion) and 2011 ($12 billion) interrupted the positive CBC debt trend.

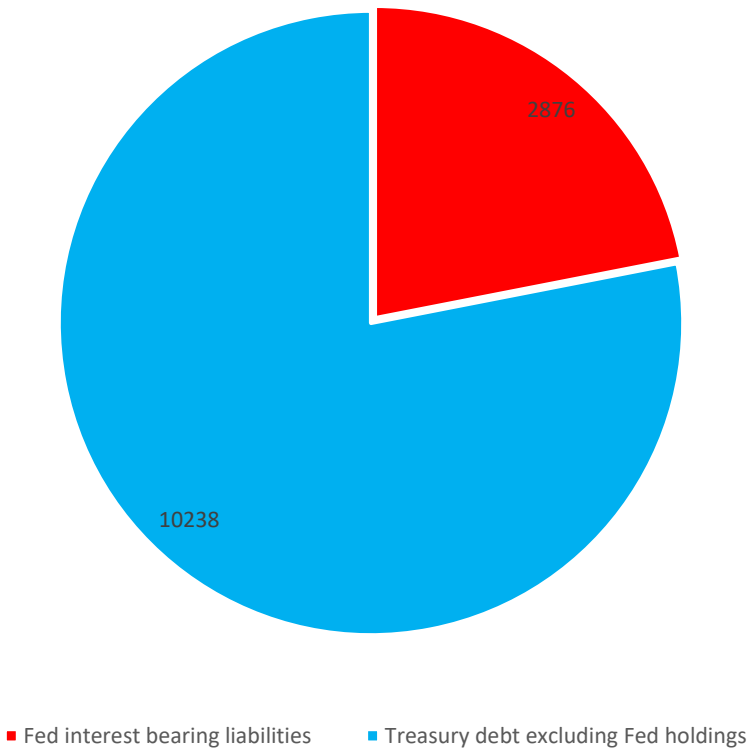
The 2008 intervention was financed by issuing BCUs in maturities of 2, 5, 10 and 20 years. Consequently, the proportion of long term debt denominated in nominal pesos fell (while indexed debt rose) and the average residual maturity of CBC long term debt rose from 3.3 to 4.8 years.

The 2011 intervention occasioned another jump in the stock of BCUs outstanding, and another decline in the share of long term debt in nominal pesos. The average residual maturity of CBC long term debt again jumped, this time from 4 to 6.4 years.

In contrast with Brazil (discussed later), the CBC decided to finance its forex position with long term debt rather than short term debt or bills.

Comparison with US Sovereign Debt

Figure 8: Share of Consolidated US Public Debt in the Hands of the Market by Obligor
(in $billions) as of end June 2015



Source: Stella (2015) Exiting Well

Bank of Israel: use of short term debt in monetary operations

- *The Israeli Short Term Debt Law allows the government to issue short term bills (Makam) to the Bank of Israel (BOI) for use in monetary operations. When sold by the BOI, the entire proceeds—the funds received by government—must be deposited at the BOI. These funds may be used only for the redemption of the Makam. (see México)*

- *BOI pays interest on the government deposit equivalent to the interest the government must pay on the Makam bills. Since Makam are short term discounted instruments, at maturity date, the BOI simply credits the government account with the difference between the par value of the debt and the proceeds received at the primary auction.*

- *In 2002, the ceiling imposed on the volume of Makam that could be issued was removed thereby enabling BOI to rely primarily on this instrument*

Bank of Israel: Use of Short-Term Treasury Debt (Makam)

Bank of Israel Balance Sheet
November 30, 2015
(in NIS billions)

Assets		Liabilities	
Net Foreign Assets	330	Banknotes and Coins	72
NIS Tradeable Securities	10	Bank Deposits	152
		Operational Government Deposits	27
		Makam	117
		Net Other Liabilities	3
		Equity	-31
Total Assets	340	Total Liabilities	340

Source: Bank of Israel Monthly Balance Sheet (unaudited) and Author's calculations

The Case of México—Asset and Liability Transformation

- *Although Banco de México has adopted a floating exchange rate regime, by law it must buy all of the foreign exchange earnings of the state petroleum company, PEMEX.*
- *The increase in petroleum product prices that began 10 years ago led to a large increase in foreign exchange inflows and, on the other hand, generated high peso liquidity in the Mexican financial system.*
- *The Banco de México used to issue its own bonds, called "BREMs" to conduct monetary policy, that is to say, to absorb the excess liquidity caused by the foreign exchange purchases.*
- *Since the interest rates that the central bank paid on its debt were much higher than the yield obtained on its foreign reserves, the central bank made large losses and suffered from negative equity.*

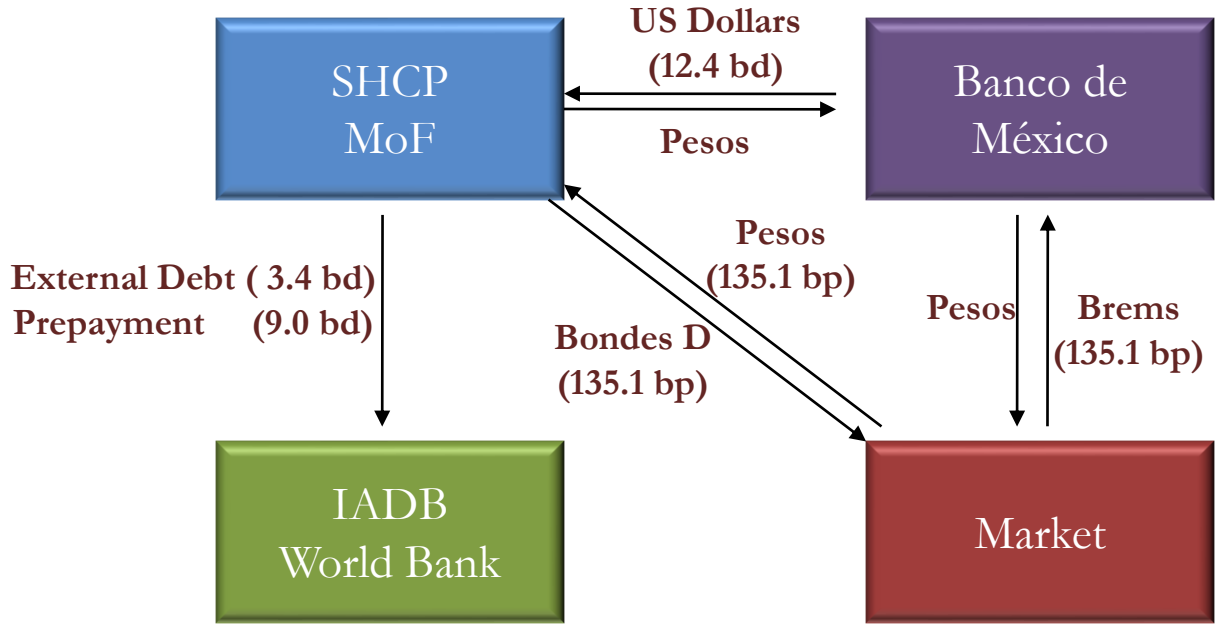
México: The Transaction

- *In June 2006, the Ministry of Finance bought US$12.4 billion from the Banco de México using pesos that it had obtained from a special auction of a series of the its main domestic financing instrument (BONDES D).*

- *The Ministry of Finance used the foreign exchange obtained from the central bank to prepay debt owed to the World Bank, the Inter American Development Bank (US$9 billion) and to buyback sovereign debt trading in the international capital market (US$3.4 billion).*

- *Simultaneously, the Banco de México used the pesos obtained from the Ministry of Finance to buy back an equivalent amount of its monetary policy bonds (BREMS), which had very similar characteristics to the BONDES D. Furthermore, the central bank announced that going forward, it intended to use only government debt in its monetary operations.*

Reshaping the central bank balance sheet to improve the efficiency of macroeconomic policy



Source: Julio Santaella, Banco de México, "Central Bank Capital and Earnings within a consolidated Public Sector Balance Sheet: the case of México" April 23, 2012 Washington, D.C.

México: The Results

- *The central bank realized a reduction in its sterilization costs greater than the reduction in interest income caused by its lower foreign reserves (sold to the treasury). Consequently, its losses fell. That is to say it saved the difference between the interest rate it paid on its domestic debt and the rate it received on its foreign reserves (multiplied by US$12.4 billion).*

- *The Ministry of Finance obtained a superior debt profile (in terms of exposure to exchange rate risk) and a reduction in the cost of its debt—the rates on its external debt were higher than the rate paid on its domestic debt (BONDES D).*

México: Current Mechanism dealing both with forex sterilization and monetary management

- *El Banco de México is provided freely with treasury bonds (BONDES D) and bills (CETES) to conduct sterilization operations*
- *The proceeds of the BdM auctions are placed in a blocked Treasury account…same mechanism as in Colombia and Israel*
- *Every quarter the Treasury and BdM hold a joint meeting announcing their issuance strategy for BONDES D and CETES*
- *BdM uses bond issuance primarily to sterilize foreign exchange purchases*
- *For short term operations, Banco de México uses bills (CETES)*

Brazil: origin of the balance sheet problem

- *The cost of sterilizing foreign exchange intervention and financing of government through money creation led to a large increase in interest expenses incurred by the central bank.*

- *During the years 2000 and 2001, the stock of central bank bonds in the market doubled, reaching 11 percent of GDP. The capital of the central bank was negative at the end of 1999 and 2000.*

- *The central bank also imposed a very high reserve requirement on commercial bank deposits—financial repression/taxation.*

Brazil: the response

- *Fiscal responsibility law (2000)*
- *The central bank was prohibited from issuing its own debt instruments two years after the passage of the law*
- *The law declared central bank debt to be "public debt" (with immediate effect) implying that issuing treasury debt to retire central bank debt did not result in an increase in public sector debt outstanding*
- *Established the National Treasury as the institution responsible for managing the public debt (domestic and foreign) but also required Treasury to provide BCB government securities on demand for monetary policy purposes (primarily to sterilize foreign exchange intervention)*

Brazil has relied heavily on short term liquidity absorbing repos to finance foreign exchange reserve accumulation

- *Since the end of 2006 the Central Bank of Brazil has sterilized approximately USD 291 billion using primarily reverse repos.*

- *These liquidity absorbing repos (USD 243 billion equivalent or 12 percent of GDP at end 2013) provided an enormous amount of collateral to the Treasury securities market facilitating secondary market trading and market deepening.*

- *The average maturity of the liquidity absorbing repos has reached as low as 18 days . (Compare duration of Chile's sterilization)*

Brazil: Effects of the measures

- *Established that the formulation, implementation, and responsibility for debt management resides in a single institution—the Treasury.*

- *Enabled the Treasury to determine the characteristics of all bonds in the domestic sovereign debt market in conformity with the national debt strategy. Yet central bank chooses which bills/bonds it receives from government to implement monetary policy as well as when to use them in conformity with the needs of monetary policy implementation.*

- *All costs of monetary and foreign exchange management were effectively transferred to the federal government. Semi-annual account settlement.*

Substitution of LAR (using treasury securities) for central bank debt

Balance Sheet of the Central Bank of Brazil

December 31, 2013

(in percent of GDP)

Assets		Liabilities	
Net Foreign Assets	18.0	Banknotes in Circulation	4.2
Federal Securities	19.7	Treasury Deposits	14.2
		Bank and Other FI Deposits	7.6
Net Other Assets	0.5	Liquidity Absorbing Repos	11.8
		Equity	0.4
Total Assets	38.2	Total Liabilities	38.2

Source: Central Bank of Brazil, IMF WEO Database, Author's calculations

Central banks with larger for longer balance sheets manage them actively by….

- *Designing and implementing a liability management strategy—often conceptually differentiating debt management and monetary management instruments. Issuance of sufficient debt management instruments enables the creation of an overnight liquidity shortage and thus a monetary operations framework where liquidity is usually provided.*

- *Restructuring the profile of liabilities in line with best practice regarding secondary market trading depth—a few standardized instruments, focal maturity dates, regularly determined auction schedule. Clear demarcation between "debt" and "monetary" operations. Cooperation and information exchange with treasury debt managers and coordination with primary auctions. Ideally, use only treasury instruments.*

- *Considering the structure of both assets and liabilities within a consolidated sovereign asset liability management framework; establishing ex ante responsibilities for various "unorthodox" interventions; orchestrating mutually beneficial asset and liability swaps between central bank and treasury*

Using a supplementary government account set aside for sterilization is not a novel idea in US

- *"….other tools are available…to improve control of the federal funds rate during the exit stage...the Treasury could resume its recent practice of issuing supplementary financing bills and placing the funds with the Federal Reserve; the issuance of these bills effectively drains reserves from the banking system,…"*

Federal Reserve Policies to Ease Credit and Their Implications for the Fed's Balance Sheet

Speech by Chairman Ben S. Bernanke at the National Press Club Luncheon

National Press Club, Washington, D.C., February 19, 2009

Asset swaps to strengthen the central bank's ability to implement policy have been proposed also in advanced countries

- *"I am intrigued by a simple proposal…[that] the Ministry of Finance would convert the fixed interest rates of the Japanese government bonds held by the Bank of Japan into floating interest rates"*

- *"…the approach could be extended to …other types of asset purchases that the government might want to encourage. For example, to facilitate expanded purchases of asset-backed commercial paper, the government might agree…to exchange government debt of the same maturity for the commercial paper…[then] the fiscal authority would assume the credit risk flowing from…nonstandard monetary policy…as seems appropriate."*

- Bernanke (2003) *Some thoughts on monetary policy in Japan* Remarks before the Japan Society of Monetary Economics, Tokyo, May 31.

Including in the United States

- *"In the longer term and as its authorities permit, the Treasury will seek to remove from the Federal Reserve's balance sheet, or to liquidate, the so-called Maiden Lane facilities made by the Federal Reserve as part of efforts to stabilize systemically critical financial institutions".*

- Source: The Role of the Federal Reserve in Preserving Financial and Monetary Stability Joint Statement by the Department of the Treasury and the Federal Reserve March 23, 2009

US Treasury Federal Reserve Coordination

- *Treasury could swap bills for a portion of the SOMA portfolio—enables FR to reduce balance sheet size in a more granular and rapid fashion—if desired. Reinvestment decision brought forward and SOMA portfolio could be smoothly adjusted through strategic choices of new bonds to purchase*
- *Treasury could resume SFP auctions and absorb reserves at low cost. US Treasury currently selling 91 day bills at 24 bps compared to IOR of 50 bps*
- *Treasury could swap FRN for portion of SOMA portfolio—hedges FR interest rate risk—or swap Treasuries for MBS*
- *FR could establish a maturity ladder for its reverse repos*
- *See "Exiting Well" for more discussion & motivation in US context*