Quantifying the effect of a Tobin tax: The case of the Brazilian IOF

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- **We use the cross-market premium to measure the effective wedge between offshore and onshore returns introduced by quantitative controls in Argentina and the Tobin tax (IOF) in Brazil.**
- **We find small but realistic one-off effects from the latest incarnation of the IOF: a 1.2% fall in BRL and a 3.0% decline in the local stock market.**

The cross-market premium: A gauge of the intensity of capital controls

The debate over the effectiveness of Tobin taxes on capital flows has often been plagued by dubious counterfactuals. The conventional wisdom is that controls do little to reduce appreciation pressures, and that they are easily circumvented by sophisticated investors. Of these two premises, only the first one seems to be supported by the evidence.

American depositary receipts (ADR) in international markets are often cited by academics and market participants as a standard vehicle to circumvent controls. Investors can purchase a stock domestically and sell the ADR (at a discount) in New York, thereby moving funds abroad, bypassing the control on outflows. Conversely, controls on capital inflows can be bypassed by buying the ADR abroad and selling the stock domestically. Generally, the premium of the local price of the underlying stock over the price of its ADR (the cross-market premium) measures the intensity of capital controls as the price investors are willing to pay to circumvent them. The premium would be positive if controls on outflows are binding (i.e., if the inflows materialize), negative if controls on inflows are binding, and zero otherwise.

Two examples illustrate this approach. Chile in the 1990s phased in an unremunerated reserve requirement (URR) on virtually all inflows, which was ultimately drawn down with the capital flight episode following the Asian crises (at a time when they were no longer binding). The cross-market premium over the period of controls oscillated between 2% and 4% (Figure 1), roughly the Tobin tax equivalent of the URR (which indeed could be paid up front in cash by the investor, as an alternative to the central bank deposit required by the URR). Again, the premium should be seen as an alternative toll on inflows – benefitting financial intermediaries, as opposed to the government as in the case of the tax. Reassuringly, a Chilean central bank study by De Gregorio et al. (2000) found that the difference between the forward discount and the interest are differential for the same period also moved within a 2-4% range.

By contrast, Argentina imposed a succession of quantitative controls on bank deposit withdrawals, FX purchases, and capital outflows in late 2001. The ADR loophole was then seen as the vehicle of choice for transferring domestic savings abroad – and as a popular argument for the ineffectiveness of controls.

Investors did use ADRs to move money out of the country in late 2001 and early 2002, but at a very steep price that, judging by the cross-market premium, reached 50% at the peak of devaluation expectations prior to the abandonment of the peg. Importantly, the transfer involved no loss of reserves because the ADR trade essentially entailed selling an asset abroad in exchange for dollars abroad.

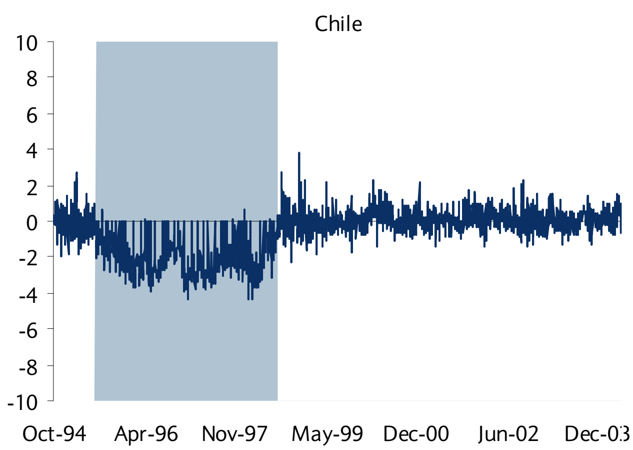
Two preliminary conclusions could be drawn from these examples: 1) the fact that capital continues to flow does not mean that investors elude the tax; rather, they pay it through the cross-market premium; 2) although the actual cost of quantitative controls depends on the direction and intensity of flows (trivially, controls on outflows can be very costly during a run but become ineffective in times of inflows), [1] a Tobin tax is bound to cost, at most, the size of the tax.

More recent evidence

In light of the above, if capital inflows are driven by some fundamental view of equilibrium asset prices, a 2% tax would depress local prices by no more than 2% to keep after-tax expected returns constant, with a marginal effect on flows. If, by contrast, capital inflows are driven by non-fundamental momentum dynamics, the tax could have a larger – and arguably welcome – deterrent effect on inflows. The contrast between two recent cases of capital controls in LatAm, Argentina and Brazil, help clarify this argument.

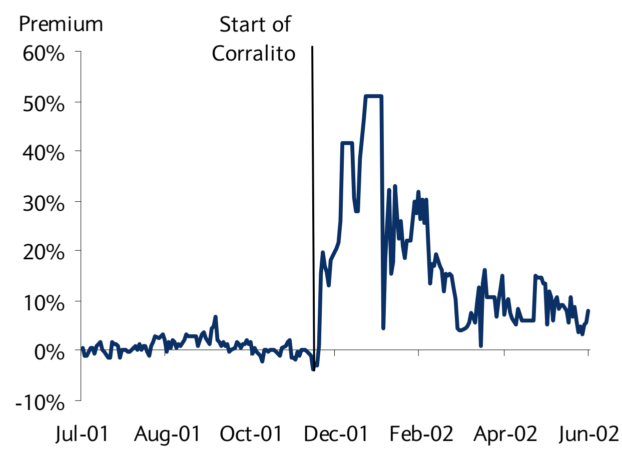
Argentina offers a neat alternative to ADR as a measure of the cross-market premium: the ratio between the price of sovereign debt (typically the USD-denominated Discount bond) offshore and onshore, commonly known as the blue chip" FX premium.[2] In post-crisis Argentina, capital tended to move out of the country owing to both a structural lack of viable domestic investment vehicles (particularly after the intervention of INDEC, the statistics bureau that marked the decline of the market for CPI linkers) and, more critically, to devaluation or confiscation fears triggered now and then by unexpected policy swings.

Figure 1: The effect of the Chilean tax was roughly 2% (the size of its Tobin equivalent)



Source: Levy Yeyati et al. (2006).

Figure 2: Investors did flee from Argentina in early 2002, but at a very steep price



Source: Levy Yeyati et al. (2004)

[1] This explains the endogeneity of controls to the direction of flows, as Cardoso and Goldfajn (1998) have shown for Brazil.

[2] In fact, the premium is computed as the difference between the FX implied by the local ARS price and the external USD price. Similar results can be obtained by computing the cross market premium using the ADR of a few liquid stocks, and alternative vehicle for capital flows.

To illustrate how the blue chip premium reacts to these drivers of FX pressure, we regress it against macro risk (proxied by the country 5y CDS spread), and central bank FX intervention (defined here as dollar purchases).[3] We replicate the exercise for Brazil during the period in 2008 when the IOF was in place, substituting the local equity returns (a key proxy for high frequency capital flows and FX pressure) for the local CDS.

The cost of Argentina's quantitative controls peaked at 17%; by contrast, those of Brazil's Tobin tax remain modest.

Figure 3 shows the results. As expected, the premium is positive for Argentina (where controls leaned against outflows) and negative in Brazil. Also as expected, quantitative controls are more sensitive to flow intensity: the blue chip premium was higher on average, and peaked at 17% during episodes of capital flight, whereas in Brazil the premium oscillated within a narrow range. Finally, we find a good fit with significant and realistic coefficients in both cases: the (positive) premium on outflows increased with risk in Argentina, and the (negative) premium on inflows became more negative as equity returns attracted capital inflows to Brazil. In turn, the premium was partially offset by dollar sales in the first case, and by dollar purchases in the second.

The latest incarnation: Brazil's IOF

Controlling for local and global factors…

Unfortunately, a similar exercise cannot be done for the recent IOF because of insufficient data points: too much have been going on simultaneously during the past few weeks to draw any meaningful conclusion from a standard regression. However, we still can conduct a pseudo-event study by testing whether the tax implied a deviation from the appreciation trend, and whether this deviation was permanent or was reverted over the next days as the market learned how to circumvent the tax.

…we find the IOF was associated with a 1.2% depreciation in the BRL, a 3% decline in stock prices…

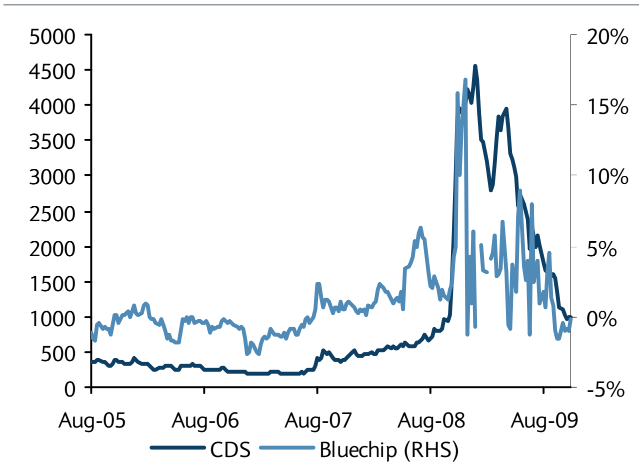
Specifically, borrowing from our FX model on global drivers (see "Go with the flow: Stay long" EM FX, 5 June 2009), we run a regression of changes in BRL on changes in the DXY, local equity returns and central bank FX intervention, plus a dummy for the week in which the IOF was introduced (Figure 5).[4] After controlling for other local and global factors, the BRL depreciated about 1.1% with the introduction of the tax and another 0.9% percent the following day as the market digested the measure, but the effect was partially undone later on. All in all, this exercise indicates that the IOF depreciated the currency by roughly 1.2%.

Figure 3: FX pressure and the cross-market premium: Argentina's blue chip FX premium and Brazil's IOF

	Blue Chip ARS	BRL Premium
FX intervention	-0.025**	0.007**
MSCI Brazil		-0.039**
CDS Arg	0.014**	
R2	0.40	0.36
Frequency	Weekly	Weekly
Period	Aug 05 - Oct 09	Mar 08 - Oct 08
Observations	220	35
Mean	0.9%	-0.007%
Max.	17%	1.7%
Min.	-2.7%	-1.4%

Note: FX intervention is expressed in USD, while MSCI and CDS are log changes. * and ** denote significance at the 1% and 5% levels. Source: Barclays Capital

Figure 4: ARS blue chip and CDS



Source: Barclays Capital

[3] Alternatively, we used the 3m forward points as a measure of FX market pressure, with similar results.
[4] We can ignore the endogeneity of local equity returns and FX intervention because we are only interested in the coefficient of the dummy, which would still be consistent.

Replicating the test for the local stock market index (after replacing the MSCI Brazil by the MSCI EM as control variable) yields comparable results: a one-off net fall in the index of about 3%.

…and a 0.5% cross-market premium…

A similar test for the cross-market premium would be problematic given the large daily volatility of the premium, but in a weekly version the regression identifies a significant albeit small 0.5% premium as a result of the tax. Note that, although this premium should disappear if the recently announced IOF on ADR conversions materializes, the elimination of the premium would not indicate that the tax is no longer effective, but rather that investors are switching to alternative vehicles, or simply paying the tax.

…with only a marginal impact of inflows

Ex post, these results should not come as a surprise. If capital inflows are motivated on supportive fundamentals, a 2% Tobin tax is a cost to the roundtrip of capital flows that needs to be compensated by higher expected returns (hence, the one-off price correction), with only a marginal effect on flows.[5]

Indeed, these developments confirm the view we expressed three months ago (see *FX Weekly Brief*: "No more global surfing," 13 August 2009) when we expected "the USD adjustment to follow the path of less central bank resistance" and "BRL appreciation to slow thanks to an interventionist BACEN and to weaken relative to more flexible commodity currencies such as the AUD" – a pattern illustrated by the recent evolution of the BRLAUD.

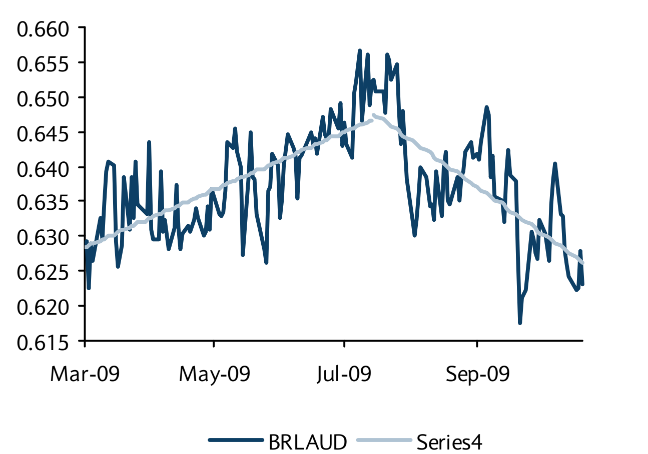
At any rate, tax-like measures such as the IOF should be seen as an alternative to FX intervention whenever the latter entails a sizeable fiscal cost owing to the high carry (see Brazil fiscal policy outlook: Where the real trouble lives). Despite their modest success, as easing cycles in EM are undone in 2010 in a context of historically low interest rates in the developed world, we expect capital controls in general (and the more civilized Tobin tax in particular) to remain under careful consideration by policy makers.

Figure 5: Effect of the recent IOF

	BRL	MSCI Brazil	ADR Premium
Interv. dummy	0.011**	0.0009	-0.005**
Interv. dummy 1 lag	0.009**	-0.04**	
Interv. dummy 2 lag	-0.009**	0.01**	
DXY	0.58**	-0.62**	0.039
MSCI Brazil	-0.19**		0.006
MSCI EM		0.67**	
CDS Brazil	0.07**	-0.20**	0.008
BCB intervention	0.001*	0.002	
Equity Flows			-0.002
R2	0.64	0.67	0.23
Frequency	Daily	Daily	Weekly

Note: sample is Mar 27, 2009 to Nov 13, 2009. BRL, DXY, MSCI Brazil, MSCI EM, and CDS Brazil are log changes. Equity flows and central bank intervention are USD. * and ** denote significance at the 1% and 5% levels, respectively.
Source: Barclays Capital

Figure 6: BRL/AUD



S Source: Bloomberg, Barclays Capital

[5] Running the weekly test on capital inflows (as captured by the weekly flows from dedicated equity funds) yield no significant impact from the tax once we control for flows to EM as a whole.

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