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Currency intervention and the global portfolio balance effect:
Japanese and Swiss lessons, 2003-2004 and 2009-2010

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Currency intervention and the global portfolio balance effect: Japanese and Swiss lessons, 2003-2004 and 2009-2010

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Abstract

This paper shows that the Japanese and Swiss foreign exchange interventions in 2003/04 and 2009/10 seem to have lowered long-term interest rates in a range of industrial countries, including Japan and Switzerland. It seems that this decline was triggered by the investment of the intervention funds in US and euro area bonds and that a global portfolio balance effect made this decline in interest rate spread to other markets, thus easing monetary conditions at home and abroad.

Contents

1.   Introduction

Policy developments can require a rethinking of long-held propositions about policy. So it is with the effects of foreign exchange interventions, changes in official reserve management practices and large scale asset purchases.

These require us to rethink the proposition dating back to Joan Robinson's 1937 essay that currency depreciation (or resisting currency appreciation) is a beggar-thy-neighbour policy. This phrase condemns currency depreciation in a world of insufficient effective demand as a case of robbing the foreign Peter to pay the domestic Paul: cheaper exports of the home country increase output and employment at the expense of sales and jobs in competing countries.

However, policy developments mean that this analysis has become incomplete and misleading. Foreign exchange reserve management has shifted its investment focus from gold in the 1930s and Treasury bills in the 1950s to bonds today. We argue in this paper that as a result currency intervention today bears similarities to the large-scale asset (bond) purchases (LSAPs) that have recently become a popular unconventional monetary policy tool.

LSAPs targeted at bonds can ease monetary conditions through either market liquidity effects or portfolio balance effects. In the latter case, if market participants that have sold bonds to the central bank purchase substitutes (or are expected to do so), bond prices broadly go up and yields down (see e.g. Bernanke and Reinhart (2004), Bernanke et al (2004), Sack (2009) and Bernanke (2010)). This portfolio rebalancing can stimulate interest-sensitive investment and raise asset prices, inducing wealth effects.[1] Indeed, Neely (2010) documents a drop in international bond yields in response to LSAPs, suggesting a global portfolio balance effect.

To our knowledge, there is only one paper that examines the impact of interventions on the government bond yields of the target currency. Bernanke et al (2004) establish that US government bond yields declined during the period of Japanese foreign exchange intervention in 2003-04.[2] They argue that this happened because the Japanese Ministry of Finance (MoF) invested the freshly purchased US dollars in US government bonds.

We add to their analysis in two ways. First, we establish that the same intervention also caused a decline in other long-term interest rates. In particular, ten-year government bond yields in other industrialised countries declined, as did ten-year interest rate swap rates in a variety of currencies. This suggests a broadly based portfolio balance effect driven by close substitutability of similar bonds for the particular bonds purchased. Indeed, even Japanese interest rates seem to have decreased in response to the interventions. Second, we show that the same effects seem to have been at work during the Swiss currency intervention in 2009-10.

Our main conclusions is that a "beggar-thy-neighbour" charge, which concentrates on trade effects, overlooks the monetary easing caused by the investment of the proceeds of intervention both abroad and at home. In times when policymakers of different countries simultaneously attempt to loosen monetary conditions, this may be a welcome mechanism.

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[1]   This portfolio balance effect should work also at a policy rate well above the zero lower bound. See the argument over the "bills only" doctrine within the Federal Reserve in the 1950s in Ritter (1980).

[2]   Also related to our paper are Warnock and Warnock (2009) in their international perspective. They show that a broad range of US interest rates declines when foreigners purchase US government bonds.

The rest of the paper proceeds as follows. The next section presents a short macroeconomic backdrop to the interventions and the actual data we have. These are especially worth discussing in the Swiss case since no official intervention series is available. We then turn to the regressions that identify the impact of interventions on foreign and domestic government bonds yields and interest rate swap rates. The last section concludes.

## 2. Macroeconomic background and data

2.1 Japan

Japanese property prices began collapsing in 1991, and the economy has since been marked by low growth and phases of moderate deflation. The Bank of Japan cut interest rates to close to zero in 1999 and adopted quantitative easing in 2001. In January 2003, the MoF began to intervene in the foreign exchange market to counter an appreciation of the yen against the US dollar that had begun a year before. Its entry into the market was quiet – "stealth interventions" as market participants later dubbed them. Initially, market participants were left to infer the interventions from the monthly disclosure of a Bank of Japan account linked to currency operations (Ito, 2005, p 224). On 8 May 2003, the MoF published daily data for the first calendar quarter that showed the full extent of its dollar-buying.

Graph 1 shows the intervention data together with the JPY/USD exchange rate. The MoF managed to hold the yen roughly stable mostly in the 117-120 range against the US dollar until August 2003.[3] However, the exchange rate came under increasing upward pressure as international investors again began buying Japanese equities and in the process bid for yen.

Graph 1

MoF's interventions
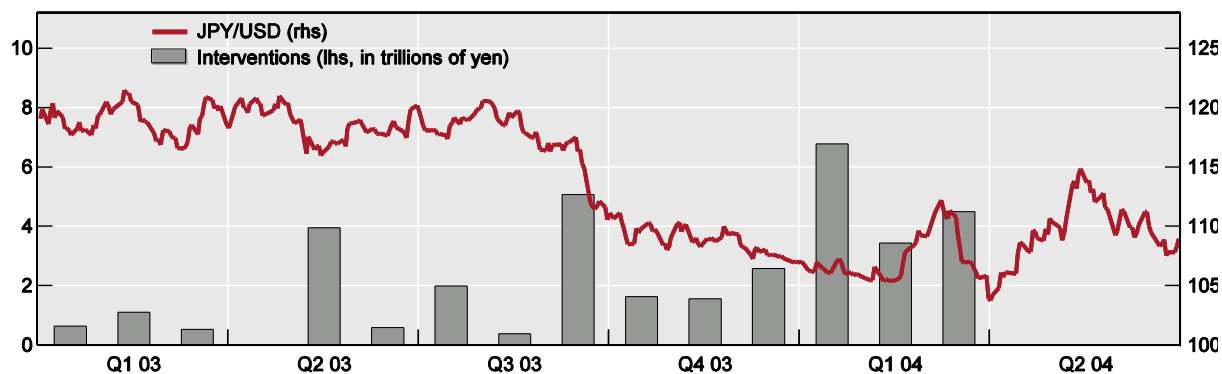
Source: Japanese Ministry of Finance; national data.

Moreover, the G7 called for more exchange-rate flexibility in September 2003, adding to the pressure for the yen to appreciate. On 16 March 2004, at an exchange rate of 106, the MoF

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[3] There is a large number of papers studying whether the interventions successfully influenced the exchange rate. See Fatum (2010), Fatum and Hutchison (2003, 2005 and 2006), Ito (2003, 2004 and 2005), Ito and Yabu (2007) and Sarno and Taylor (2002) for the Japanese case and Neely (2005) for a general discussion.

quietly stopped intervening. By then, it had acquired JPY 35 trillion (USD 340 billion) over the fifteen months of intervention. This amounted to roughly 7% of Japanese GDP.

2.2 Switzerland

The global financial crisis hit Switzerland after years of moderate growth and price stability. Real GDP contracted, and prices seemed set to fall. The Swiss franc, in the meantime, appreciated, owing to a flight to safety and to the repayment of Swiss franc liabilities funding carry trades in high yielding currencies.[4] At its quarterly policy decision on 12 March 2009, the Swiss National Bank (SNB) announced that it intended to buy foreign exchange to prevent the Swiss franc from "any" further appreciation (SNB, 2009).[5]

This decision surprised market participants, notwithstanding an earlier warning of Hildebrand (2009). The Swiss franc jumped from 1.48 against the euro to 1.52, i.e. by more than 3 percentage points. The Swiss franc had not depreciated by this extent on a single day since October 1978, when the SNB announced that its intention to keep the Deutsche mark exchange rate at a level above 0.8 Swiss francs. Apparently, the SNB purchased mainly euros but also US dollars (Garnham, 2009).

At the end of 2009, it appeared that the balance of risks had shifted and deflation had become a more remote threat. As a consequence, the SNB changed its language to preventing "substantial" appreciation. Graph 2 shows that the Swiss franc began appreciating and that this trend became stronger when sovereign debt strains in the euro area intensified in April 2011. To counteract this in April to mid-June 2010, the SNB intervened at a rate of more than CHF 30 billion a month. On 17 June 2010, the SNB announced that the deflation risk had largely disappeared and ceased intervening. By then, the SNB had purchased an equivalent of USD 179 billion of euros and US dollars, amounting to 33% of Swiss GDP.

Swiss data on intervention are sparse. The SNB publishes a monthly balance sheet, and from this monthly intervention amounts can be inferred. Since the SNB discloses the currency composition of its foreign exchange reserves, we can adjust for exchange rate changes. That leaves investment returns (coupon receipts and bond valuation changes) included with intervention amounts in monthly changes in reserves, plotted as bars in Graph 2.

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[4] See Brown et al (2009) and McCauley (2010) on Swiss franc-denominated household mortgages in Central and Eastern Europe.

[5] The SNB also cut the policy rate, offered new long-term repos and announced the purchase Swiss franc bonds issued by domestic companies.

Graph 2

The SNB's interventions
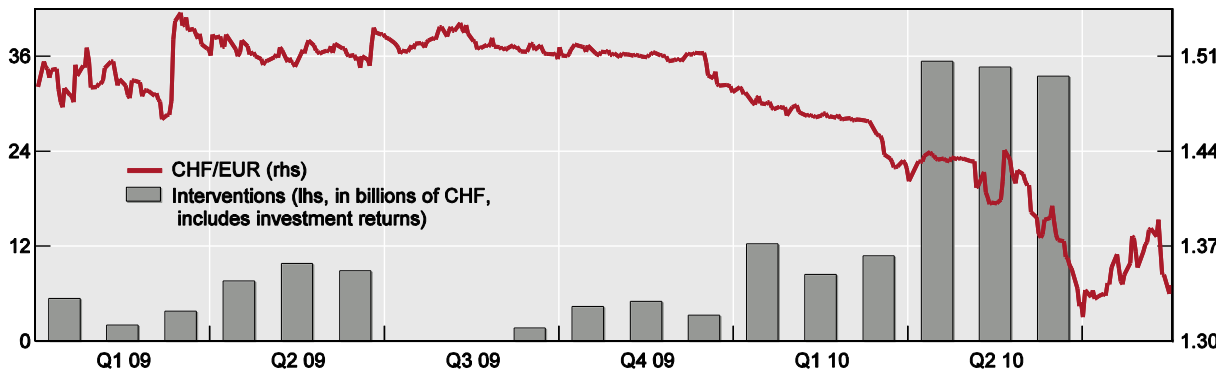
Sources: Swiss National Bank; national data, authors' calculations.

Graph 3

Inferred intervention days

Source: Various newspapers and wire services; UBS.

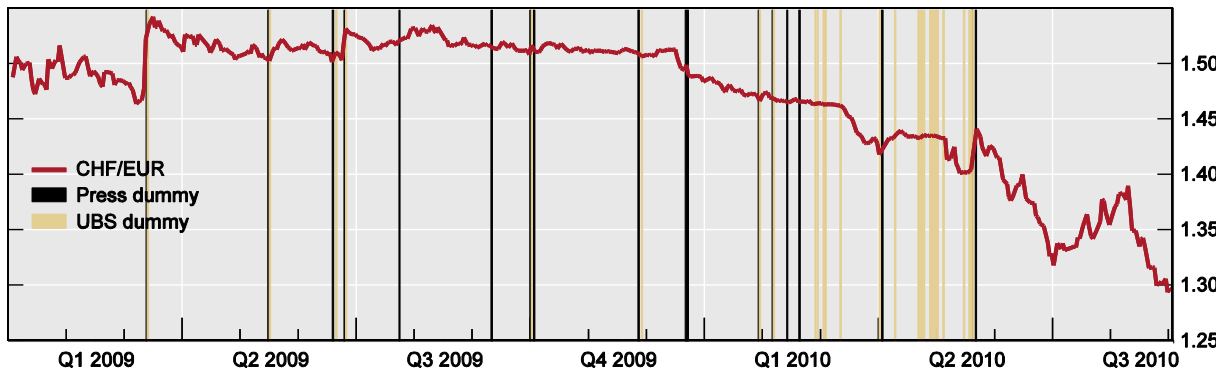For more granular data, we turn to market participants and the financial press. Graph 3 shows the intervention dates as identified by a press search and by UBS.[6] Close inspection shows that there are only five days when the press and UBS agree that there was an intervention. Below we use both series. It seems plausible that UBS, as a dealer on the EBS trading platform, on which the SNB traded extensively, had a better fix on interventions than the press. We code these inferred intervention days using dummy variables that take the value of unity on the days that the SNB was reported to have purchased foreign exchange and zero otherwise. We are unable to assess intervention amounts on a daily basis.

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[6] We thank Giovanni Staunovo for sharing the UBS data with us. For the press dummy, we searched for articles mentioning intervention using LexisNexis and Factiva in the English, French and German press and then concentrated on the news that referred to individual purchases. Fischer (2004) reports that Reuters news reports in the period 1989 to 1995 correctly identified SNB intervention days on 63 out of 69 occasions. There was no case of false reporting. See also Chang (2004).

3. Global monetary easing effects of the foreign exchange intervention

In this section we test whether the interventions lowered bond yields abroad and at home. We expect to find a direct effect for the currencies against which the interventions took place, i.e. the US dollar and the euro. If investors rebalanced their portfolios, or if market makers anticipated their doing so, we would also expect bond yields in other currencies, including the home currency, to decline.

For Japan, we follow the approach of Bernanke et al (2004) and regress the change in the ten-year US government bond yield on the intervention amount of the MoF. To account for the time that passes between the striking of the foreign exchange deal and its actual settlement and possible investment, Bernanke et al consider the change in yield from the day before the deal until two days after.[7] In contrast to them we consider not only the US government bond yield, but also that of Germany, France, Spain, the United Kingdom, Switzerland and Japan. Moreover, we estimate all equations using ten-year interest rate swap rates, which are yields from generic private-sector derivative contracts that are close substitutes to government bonds. With them, we can assess whether the rebalancing of portfolios is concentrated on government bonds or exerts broader effects on private yields.

We thus fit

$$i_{t+2} - i_{t-1} = c + a * intervention_t + e_t \tag{1}$$

where we measure the foreign exchange interventions in trillion yen. The sample period is 15 January 2003 to 16 March 2004. We also estimate

$$i_{t+2} - i_{t-1} = c + a * dummy_t + e_t \tag{2}$$

where $dummy_t$ is a dummy variable that takes the value of unity on intervention days and zero otherwise. While equation (1) estimates the impact of an additional trillion yen intervention on bond yields, equation (2) estimates the impact of the average daily intervention.[8] We present this regression for comparison with the Swiss case, for which we have only a dummy variable for reported intervention days but daily data on the actual amount of intervention.

As a robustness check, we also estimate:

$$i_{t+2} - i_{t-1} = c + a * intervention_t + b * (vix_{t+2} - vix_{t-1}) + e_t \tag{3}$$

and

$$i_{t+2} - i_{t-1} = c + a * dummy_t + b * (vix_{t+2} - vix_{t-1}) + e_t \tag{4}$$

These equations allow for changes in global risk aversion, as measured by the Chicago Board Options Exchange market volatility indicator VIX, to affect bond yields.[9,10]

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[7] We also ran regressions using $i_{t+1} - i_{t-1}$. The impact of the intervention is significant in this setup, too.

[8] One could also interpret the dummy as a poor measure of the actual intervention size. By the usual errors-in-variable argument, the coefficient estimate of a then would be biased downward and imprecise. Indeed, we find that the estimate of this coefficient tends to be smaller in equation (2) than in equation (1).

[9] The results are also robust to using only the percentage change in the VIX between *t-1 and t.*

For Switzerland, we fit equation (2), using both the press and the UBS dummy for interventions, over the period 12 March 2009 to 15 June 2010. We also estimate

$$i_{t+2} - i_{t-1} = c + a * dummy_t + b * (vix_{t+2} - vix_{t-1}) + f * (CDS_{t+2}^{Greece} - CDS_{t-1}^{Greece}) + e_t \qquad (5)$$

to control for the effect of flight to safety during the European sovereign debt crisis on government bond yields. We measure changes in market participants' sovereign debt concerns as the change in the Greek sovereign CDS spread.

Table 1 shows the estimation results using ten-year government bond yields. Table 2 shows the results using ten-year interest rate swap rates instead. Generally, we find that interventions drive down bond yields and swap rates abroad and at home. This is compatible with a broadly based global portfolio balance effect resulting from the authorities' purchase of foreign government bonds. Foreign exchange interventions thus seem to loosen monetary conditions abroad and at home, and thus should not be seen as only beggaring-thy-neighbour.

We next look at the results in more detail. For Japan, where we can use the actual intervention amounts, the response of US government bonds – which the MoF mainly purchased – clearly is strongest. The effect seems to have been transmitted, albeit to a smaller extent, to the other government bond markets. For Switzerland, we find responses around the world as well, with the strongest reaction again in US yields.[11]

Regarding the size of the intervention effect, it seems that one trillion yen of intervention lowered the US bond yield by 9.3 basis points in equation (1). This translates to an impact of roughly one basis point for a USD 1 billion intervention.[12] If we control for the impact of risk aversion (equation 3), the intervention amount continues to be significant with an estimated impact of 8.9 basis points per trillion. The estimated drop in the other bond yields ranges from 4.4 to 7.8 basis points, where the lowest value is for Japanese government bonds.[13]

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[10] Increased risk aversion often raises the demand for safe haven assets, driving up the value of safe havens like the yen and the Swiss franc and thus raising the probability of an intervention. Modelling these relations as a system involves estimating OLS and binary regressions jointly and goes beyond the scope of this paper.

[11] Market participants also contemporaneously reported an impact. Lack and Staunovo (2010) argue that SNB purchases of German government bonds in April and May 2010 contributed to a sharp drop in bund yields.

[12] Bernanke et al report an effect of 0.73 basis points. If we focus on the impact of interventions on bond yields the next day, we find a smaller effect that is only border-line significant. Thus, perceived intervention, as distinct from the subsequent investment of the proceeds, does not seem to be the whole story. Compare Gagnon et al, who find a 38-82 basis point effect from $1.7 trillion of bond purchases.

[13] Given that the cumulated intervention reached ¥35 trillion, this estimated impact suggests that the Japanese intervention lowered Japanese bond yields by some 1.6 percentage points, which would imply a negative 10-year bond yield Of course, the yield stayed positive. One explanation for this is that the intervention effect wore off over time.

Impact of interventions on ten-year government bond yields (in %)[1]														
Japanese interventions														
	United States		**Germany**		**France**		**Spain**		**United Kingdom**		**Switzerland**		**Japan**	
Intervention amount (trillion JPY)	-0.093*** (0.025)	-0.089*** (0.024)	-0.051*** (0.019)	-0.046** (0.019)	-0.050*** (0.019)	-0.046** (0.019)	-0.056*** (0.018)	-0.050*** (0.018)	-0.078*** (0.025)	-0.072*** (0.024)	-0.059*** (0.015)	-0.053*** (0.015)	-0.046*** (0.012)	-0.044*** (0.012)
VIX		-0.008* (0.004)		-0.009*** (0.003)		-0.008*** (0.003)		-0.011*** (0.003)		-0.012*** (0.004)		-0.009*** (0.002)		-0.003 (0.002)
Adjusted R^2	0.038	0.045	0.020	0.041	0.019	0.038	0.028	0.069	0.036	0.070	0.028	0.050	0.015	0.015
Intervention dummy	-0.024* (0.014)	-0.022 (0.014)	-0.009 (0.009)	-0.006 (0.009)	-0.008 (0.009)	-0.005 (0.009)	-0.015* (0.009)	-0.012 (0.009)	-0.022* (0.011)	-0.019* (0.011)	-0.022* (0.009)	-0.019** (0.009)	-0.018* (0.009)	-0.017* (0.009)
VIX		-0.008** (0.004)		-0.009*** (0.003)		-0.009*** (0.003)		-0.011*** (0.003)		-0.013*** (0.004)		-0.009*** (0.002)		-0.003 (0.002)
Adjusted R^2	0.008	0.016	-0.000	0.023	-0.000	0.020	0.006	0.050	0.010	0.046	0.014	0.039	0.010	0.010
Swiss interventions														
Press dummy	0.019 (0.023)	0.005 (0.026)	0.004 (0.022)	-0.060 (0.022)	-0.006 (0.018)	-0.013 (0.018)	-0.006 (0.019)	-0.000 (0.019)	0.002 (0.038)	-0.007 (0.037)	-0.022* (0.012)	-0.028** (0.014)	-0.011 (0.008)	-0.013* (0.008)
VIX		-0.013*** (0.002)		-0.010*** (0.001)		-0.007*** (0.001)		-0.003 (0.002)		-0.009*** (0.002)		-0.005*** (0.014)		-0.002*** (0.001)
CDS spread		-0.016 (0.011)		-0.030*** (0.007)		-0.013* (0.007)		0.112*** (0.012)		-0.023 (0.014)		-0.018*** (0.005)		-0.006** (0.003)
Adjusted R^2	-0.001	0.149	-0.003	0.261	-0.002	0.158	-0.003	0.298	-0.003	0.065	0.007	0.171	0.002	0.047
UBS dummy	-0.056*** (0.018)	-0.029* (0.016)	-0.036** (0.014)	-0.010 (0.010)	-0.033*** (0.013)	-0.018* (0.010)	0.026 (0.018)	0.002 (0.014)	-0.047** (0.022)	-0.025 (0.021)	-0.027*** (0.009)	-0.015* (0.008)	-0.014*** (0.005)	-0.009* (0.005)
VIX		-0.013*** (0.002)		-0.010*** (0.002)		-0.007*** (0.014)		-0.003 (0.002)		-0.009*** (0.002)		-0.005*** (0.001)		-0.002** (0.001)
CDS spread		-0.015 (0.011)		-0.030*** (0.007)		-0.013* (0.007)		0.112*** (0.012)		-0.022 (0.014)		-0.018*** (0.005)		-0.005* (0.003)
Adjusted R^2	0.017	0.154	0.014	0.262	0.018	0.161	0.002	0.298	0.007	0.068	0.017	0.162	0.010	0.045

[1] OLS regressions of equations (1) to (5), Japanese sample 15 January 2003 to 16 March 2004, Swiss sample 12 March 2009 to 15 June 2010. Constant included but not reported. CDS spread expressed in percentage points. Stars indicate significance at the ten percent level. White heteroskedasticity consistent standard errors in parentheses.

Sources: BIS, MoF and SNB.

Table 1

Impact of intervention on ten-year interest rate swap rates (in %)[1]									
Japanese interventions									
	USD		**EUR**		**GPB**		**CHF**		**JPY**
Intervention amount (trillion JPY)	-0.098*** (0.030)	-0.096*** (0.030)	-0.045** (0.018)	-0.041** (0.018)	-0.049** (0.020)	-0.045** (0.019)	-0.047*** (0.015)	-0.045*** (0.015)	-0.056*** (0.012)	-0.054*** (0.012)
VIX		-0.004 (0.005)		-0.008** (0.003)		-0.009*** (0.003)		-0.004 (0.003)		-0.003 (0.002)
Adjusted R^2	0.029	0.027	0.015	0.031	0.017	0.038	0.019	0.021	0.027	0.027
Intervention dummy	-0.022 (0.015)	-0.020 (0.015)	-0.001 (0.009)	-0.005 (0.009)	-0.011 (0.009)	-0.008 (0.009)	-0.019** (0.008)	-0.018** (0.008)	-0.019** (0.009)	-0.018** (0.009)
VIX		-0.004 (0.005)		-0.008** (0.003)		-0.009*** (0.003)		-0004 (0.003)		-0.003 (0.002)
Adjusted R^2	0.003	0.003	-0.001	0.016	0.008	0.023	0.012	0.015	0.012	0.013
Swiss interventions									
Press dummy	0.028 (0.027)	0.016 (0.028)	0.017 (0.017)	0.010 (0.018)	-0.004 (0.021)	-0.011 (0.020)	-0.009 (0.016)	-0.014 (0.016)	-0.006 (0.008)	-0.009 (0.008)
VIX		-0.014*** (0.002)		-0.006*** (0.001)		-0.008*** (0.001)		-0.004*** (0.001)		-0.003*** (0.001)
CDS spread		-0.005 (0.010)		-0.026*** (0.006)		-0.014 (0.009)		-0.034*** (0.006)		-0.009** (0.003)
Adjusted R^2	-0.000	0.124	0.000	0.193	-0.003	0.126	-0.002	0.214	-0.002	0.082
UBS dummy	-0.052*** (0.018)	-0.025 (0.017)	-0.020* (0.012)	-0.001 (0.008)	-0.032** (0.013)	-0.015 (0.010)	-0.025** (0.012)	-0.009 (0.009)	-0.017*** (0.005)	-0.010** (0.005)
VIX		-0.014*** (0.002)		-0.006*** (0.001)		-0.008*** (0.001)		-0.004*** (0.001)		-0.003*** (0.001)
CDS spread		-0.004 (0.010)		-0.025*** (0.006)		-0.013 (0.009)		-0.034*** (0.006)		-0.008** (0.003)
Adjusted R^2	0.011	0.126	0.005	0.192	0.011	0.128	0.013	-0.212	0.013	0.085

[1] OLS regressions of equations (1) to (5), Japanese sample 15 January 2003 to 16 March 2004, Swiss sample 12 March 2009 to 15 June 2010. Constant included but not reported. CDS spread expressed in percentage points. Stars indicate significance at the ten percent level. White heteroskedasticity consistent standard errors in parentheses.

Sources: BIS, MoF and SNB.

Table 2

The Japanese regressions suggest that using a dummy for the intervention instead of the intervention amount decreases the significance of the estimated coefficients considerably and often yields insignificant estimates. Regarding the size of the estimated coefficients, the results reported in Table 1 for the intervention dummy suggest that the average Japanese intervention decreased ten-year US government bond yields by 2.4 basis points.

Thus, the fact that we often do find a significant impact of the intervention dummies for Switzerland points to a distinct effect of the SNB's actions. It seems that the UBS dummy has higher explanatory power than the press dummy, which is perhaps not surprising given that UBS observed the SNB's offers on the EBS trading platform. If we interpret the dummies as measuring the impact of the average intervention, we find for Switzerland that the effect ranges between 0.2 and 5.6 basis points for the UBS dummy.

For interest rate swap, we estimate response coefficients between 4.1 and 9.8 basis points for Japan and between 1.0 and 5.2 basis points for Switzerland., These estimates lie in the range obtained for government bond yields and thus suggest a wide portfolio balance effect that reaches private sector yields and thereby affects the cost of debt for firms and households.

One last noteworthy observation is that Spanish bond yields seem to have responded to the Japanese, but not to the Swiss interventions. This could be interpreted to suggest that investors had ceased in the interval between the calm years of 2003-04 and the stressed years of 2009-10 to view Spanish bonds as close substitutes for those core euro area bonds that the SNB presumably purchased.

4.   Conclusions

This paper shows that the Japanese and Swiss foreign exchange interventions in 2003/04 and 2009/10 seem to have lowered long-term interest rates – both government bond yields and interest rate swap rates – in a range of industrial countries, including Japan and Switzerland. It seems that this decline was triggered by the investment of the intervention funds in US and euro area bonds and that the portfolio balance effect made this decline in interest rate spread to other markets.

These findings afford a new perspective on what has been called the currency wars. It seems that the Japanese and Swiss interventions helped ease monetary conditions at home as well as abroad. Certainly in 2009/10 this international effect would have been welcome.

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