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Abstract

The paper updates the answer to the question: what precisely is the exchange rate regime that China has put into place since 2005, when it announced a move away from the dollar peg? Is it a basket anchor with the possibility of cumulatable daily appreciations, as was announced at the time? We apply to this question a new approach to estimating countries' de facto exchange rate regimes, a synthesis of two techniques. One is a technique that has been used in the past to estimate implicit de facto currency weights when the hypothesis is a basket peg with little flexibility. The second is a technique used to estimate the de facto degree of exchange rate flexibility when the hypothesis is an anchor to the dollar or some other single major currency. Since the RMB and many other currencies today purportedly follow variants of Band-Basket-Crawl, it is important to have available a technique that can cover both dimensions, inferring weights *and* inferring flexibility. The synthesis adds a variable representing "exchange market pressure" to the currency basket equation, whereby the degree of flexibility is estimated at the same time as the currency weights. This approach reveals that by mid-2007, the RMB basket had switched a substantial part of the dollar's weight onto the euro. The implication is that the appreciation of the RMB against the dollar during this period was due to the appreciation of the euro against the dollar, not to any upward trend in the RMB relative to its basket.

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New Estimation of China's Exchange Rate Regime

In 2005, Chinese authorities announced a switch to a new exchange rate regime. The exchange rate would henceforth be set with reference to a basket of other currencies, with numerical weights unannounced, allowing a movement of up to+/- .3% within any given day. Although this step was originally accepted at face value in public policy circles, early statistical tests confirmed that skepticism was in order. The tests found that the basket assigned overwhelming weight to the dollar, and that the degree of flexibility had hardly increased at all. This paper conducts an updated evaluation of what exchange rate regime China has actually been following. The update consists of more than merely adding another year or two of data, as important as that is to the result.

The earlier RMB studies used a technique originally introduced by Frankel and Wei (1994) to estimate the weights in a currency basket. One regressed changes in the value of the local currency, in this case the RMB, against changes in the values of the dollar, euro, yen, and other currencies that may be in the basket. The equation is correctly specified to infer the weights in the case of a perfect basket peg, with an R^2 of 1, but is on less firm ground if the authorities allow even a relatively small band of flexibility around the central parity. This approach neglects to include anything to help make sense out of the error term under the alternative hypothesis that the country is not perfectly pegged to a major currency or to a basket, but rather has adopted a degree of flexibility around the anchor.

Meanwhile another branch of the regime classification literature is designed to uncover the true degree of flexibility of an exchange rate regime. It has the drawback that it is unable to infer what is the relevant anchor. This paper applies a new synthesis technique, which brings these two branches of the literature together to produce a complete equation suitable for use in inferring the de facto regime for the RMB across the spectrum of flexibility *and* across the array of possible anchors.

1 The new regime

The Chinese currency had been effectively pegged to the US dollarat the rate of 8.28 RMB/dollar from 1997 until July 21, 2005. [1] On that date, the People's Bank of China (PBoC) proclaimed – after a minor initial revaluation of 2.1% -- a switch to a managing float regime "with reference to a basket of currencies." The announcement was billed as a major regime change.

As is often the case with currency baskets, the Chinese weights were not made public. Speculation ensued after the announcement about which currencies were in the new reference basket and what their weights were. Jen (2005), for example, guessed that the weight on the dollar was 85%.[2] On August 9, 2005, PBoC Governor Zhou Xiaochuan (2005) disclosed a list of 11 currencies as constituents of the reference basket, in a speech in Shanghai marking

[1] Incidentally, however, China's official policy has never been a pegged exchange rate. This just goes to show the common divergence between de jure and de facto exchange rate regimes and the importance of inferring the true regime from observed data, a point that is by now well understood.

[2] According to a 2006 report, Governor Zhou put the dollar weight at "much less than 50 percent." http://www.forbes.com/markets/feeds/afx/2006/01/26/afx2481184.html .

the opening of the central bank's second headquarters. He revealed that the major currencies in the basket are the US dollar, the euro, the yen, and the Korean won. In light of this statement and in light of the earlier results in Frankel and Wei (2007), we will concentrate on these four currencies.[3] The governor said that these currencies were chosen because of their economies' importance for China's current account. Still not announced were the weights on these currencies, or the frequency and the criteria with which these weights might be altered.

The newly announced regime would allow a movement of up to +/- .3% in bilateral exchange rates within any given day (later widened to +/- .5%). In theory this daily band could cumulate, at the maximum, to a strong trend of 6.4% per month; this would require, however, both that movement among the major currencies is low and that the Chinese authorities make maximum use of the 0.3% band. In practice, the cumulative trend has been only a small fraction of hypothetical maximum. The trend has been dwarfed by movements in the dollar against the euro, yen, and other currencies.

Although the announced change in official policy was originally taken at face value in public policy circles, it soon because clear that, at least for the remainder of 2005, the currency remained closely linked to the dollar. Subsequently, in 2006, the RMB indeed started to give a little weight to some non-dollar currencies, but the process was very slow. In 2007 the RMB appreciated more against the dollar. This much is known, but public commentary usually fails to distinguish whether the appreciation was attributable to a shift in basket weights away from the dollar toward non-dollar currencies, or to a greater degree of exchange rate flexibility, or to a trend appreciation. In our econometric analysis of precisely what exchange rate regime China has followed since July 2005, we take account of the likelihood that the regime has evolved over the three years.

2 The old technique

If a country announces the adoption of a basket peg, and reveals a list of currencies that may be included in the basket, but does not reveal the exact weighting of the component currencies, how would one ascertain what is the true exchange rate regime? Previous studies of this question for other currencies have used a particular technique to estimate the implicit weights: Frankel (1993), Frankel and Wei (1994, 1995), Bénassy-Quéré (1999), Ohno (1999), Frankel, Schmukler and Servén (2000), and Bénassy-Quéré, Coeuré, and Mignon (2004).

The weight-inference technique is very simple: one regresses changes in the value of the local currency, in this case the RMB, against changes in the values of the dollar, euro, yen, and other currencies that are candidate constituents of the basket. In the special case

[3] In addition, Governor Zhou stated that the other seven currencies in the basket are the Singapore dollar, the British pound, the Malaysian ringgit, the Russian ruble, the Australian dollar, the Thai baht, and the Canadian dollar. Frankel and Wei (2007) found no significant role for these currencies, during most of the subsequent two years, with the partial exception of the ringgit. In this paper we do not bother to test for these currencies. We are very short of data points here, because the new synthesis technique requires the use of data on reserves and the monetary base with for China, as for most countries, are only available on a monthly basis.

where China in fact follows a perfect basket peg, the technique is an exceptionally apt application of OLS regression. It should be easy to recover precise estimates of the weights. The fit should be perfect, an extreme rarity in econometrics: the standard error of the regression should be zero, and $R^2 = 100\%$.

The reason to work in terms of changes rather than levels is the likelihood of non-stationarity. Concern for nonstationarity goes beyond the common refrain of modern time series econometrics, the inability to reject statistically a unit root, which in many cases can be attributed to insufficient power. One of the most important hypotheses we are testing is that the authorities have allowed the yuan to drift away from a basket, perhaps via an upward trend. Thus it is important to allow for nonstationarity. Working in terms of first differences is the cleanest way to do so. We should include a constant term to allow for the likelihood of a trend appreciation in the RMB, whether against the dollar alone or a broader basket. Algebraically, if the RMB is pegged to currencies *X1*, *X2*, … and *Xn*, with weights equal to *w1*, *w2*, … and *wn*, then

$$logRMB(t+s)-logRMB(t) = c + \sum w(j)\,[logX(j, t+s) - logX(j, t)] \qquad (1)$$

One methodological question must be addressed. How do we define the "value" of each of the currencies? This is the question of the numeraire.[4] If the exchange rate is truly a basket peg, the choice of numeraire currency is immaterial; we estimate the weights accurately regardless.[5] If the true regime is more variable than a rigid basket peg, then the choice of numeraire does make some difference to the estimation. Some authors in the past have used a remote currency, such as the Swiss franc.

A weighted index such as a trade-weighted measure or the SDR (Special Drawing Right, an IMF unit composed of a basket of most important major currencies) is probably more appropriate. Here is why. Assume the true regime is a target zone or a managed float centered around a reference basket, where the authorities intervene to an extent that depends on the magnitude of the deviation; this seems the logical alternative hypothesis in which a strict basket peg is nested. The error term in the equation represents shocks in demand for the currency that the authorities allow to be partially reflected in the exchange rate (but only partially, because they intervene if the shocks are large). Then one should use a numeraire that is similar to the yardstick used by the authorities in measuring what constitutes a large deviation. The authorities are unlikely to use the Swiss franc or Canadian dollar in thinking about the size of deviations from their reference point. They are more likely to use a

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[4] Frankel (1993) used purchasing power over a consumer basket of domestic goods as numeraire; Frankel and Wei (1995) used the SDR; Frankel and Wei (1994, 2006), Ohno (1999), and Eichengreen (2006) used the Swiss franc; Bénassy-Quéré (1999), the dollar; Frankel, Schmukler and Luis Servén (2000), a GDP-weighted basket of five major currencies; and Yamazaki (2006), the Canadian dollar. Bénassy-Quéré, Coeuré, and Mignon (2004) propose a modification of the methodology, with a method of moments approach; the advantage of the modification is that it does not depend on the choice of a numeraire currency.

[5] If the linear equation holds precisely in terms of any one "correct" numeraire, then add the log exchange rate between that numeraire and any arbitrary unit to see that the equation also holds precisely in terms of the arbitrary numeraire. This assumes the weights add to 1, and there is no error term, constant term, or other non-currency variable.

weighted average of major currencies. If we use a similar measure in the equation, it should help minimize the possibility of correlation between the error term and the numeraire. Similarly, if there is a trend in the exchange rate equation (a constant term in the changes equation) representing deliberate gradual appreciation of the currency, then the value of the RMB should be defined in terms of whatever weighted exchange rate index the authorities are likely to use in thinking about the trend. These considerations suggest a numeraire that is itself composed of a basket of currencies. Here, as in Frankel and Wei (2007), we choose the SDR.[6]

There is a good argument for constraining the weights on the currencies to add up to 1. However weak one thinks the link to the reference basket might be, or however large or small the weight on the dollar, the authorities must view movements in the RMB through the metric of distance from some reference rate or effective exchange rate. The easiest way to implement the adding up constraint is to run the regressions with the changes in the log RMB value on the left-hand side of the equation transformed by subtracting off the changes in the log value of one of the currencies, say the won, and the changes in the values of the non-won currencies on the right-hand side transformed in the same way.

To see this, we repeat equation (1):

$$\Delta \log RMB_t = c + \sum w(j)\,[\Delta \log X(j)_t]$$
$$= c + \beta(1)\,\Delta \log \$_t + \beta(2)\,\Delta \log ¥_t + \beta(3)\,\Delta \log €_t + \alpha\,\Delta \log won_t$$

We want to impose the adding up constraint $\alpha = 1 - \beta(1) - \beta(2) - \beta(3)$ …
We implement it by running the regression equation (2):

$$[\Delta \log RMB_t - \Delta \log won_t] = c + \beta(1)\,[\Delta \log \$_t - \Delta \log won_t] + \beta(2)[\Delta \log ¥_t - \Delta \log won_t] + \beta(3))[\Delta \log €_t - \Delta \log won_t] \qquad (2)$$

One can recover the implicit weight on the value of the won by adding the estimated weights on the non-dollar currencies, and subtracting the sum from 1. (This coefficient estimate is reported in the last row of the tables.) Imposing the constraint sharpens the estimates a bit.[7]

3. The old results

Shah, Zeileis, and Patnaik (2005) adopted the weight-inference methodology to study the Chinese currency basket after July 2005 and found that the RMB was still tightly pegged to the dollar, and no other currencies. However, the only candidate currencies that they considered in the RMB basket were the dollar, the yen, the euro, and the pound, probably unaware of the eleven-currency disclosure made by the Chinese central bank (with the won on the A-list). In addition, their sample covered only the initial few months after July 21, 2005. Frankel and Wei (2006) extended to 11 the components of the basket, but found that

[6] Among the extensions and robustness checks in that paper was a check whether the results were sensitive to the numeraire, as between the SDR and gold.

[7] The choice of which currency to drop from the righthand side in order to impose the adding up constraint, in this case the won, is completely immaterial to the estimates. The choice of which currency to use as numeraire, by contrast, *is* material to the estimates (to the extent that the true regime differs substantially from a perfect basket peg).

the RMB regime in the second half of 2005 was still a tight dollar peg – as tight as that of the Hong Kong SAR regime. Ogawa (2006) found the same. Eichengreen (2006, p. 22-25) had daily observations of data that ran from July 22, 2005, to March 21, 2006, and found a dollar weight around .9, but with no evidence of a downward trend in the weight, and no significance on non-dollar currencies.

Each of these four papers was too early to catch the evolution in 2006. Yamazaki (2006, p.8) updated the estimation, and found some weight had shifted to the euro, yen and won; but he estimated the equation in terms of levels rather than changes (risking non-stationarity), did not allow for a trend, did not allow for the other currencies on the list, and had a relatively small number of (bimonthly) observations.

Frankel and Wei (2007) found continued evolution of the Chinese exchange rate regime over the two-year period from July 2005 to August 2007. In the first six months following the announced shift by the Chinese central bank to a managed floating regime with reference to a basket of eleven currencies, China gave such heavy weight to the US dollar that it was indistinguishable from a dollar pegger. However, after February 2006, there were signs of increased flexibility. First, in the spring of 2006, some weight in the basket was temporarily shifted to other currencies: the Malaysian ringgit, the Korean won, the Russian ruble, and the Thai baht. Surprisingly, throughout the sample, there was not an iota of evidence of any positive weight assigned to the yen or the euro. Second, beginning in the fall of 2006, in addition to the lesser weight on the dollar (an estimated weight of 0.9 rather than 1.0 as in the earlier periods), the association between the RMB and the reference currency basket became slightly looser. There was a non-negligible trend of appreciation against the basket.

4. Updated results with daily data, using the traditional technique

Table 1 here updates through October 2008 the estimation of the RMB basket *using the traditional approach*, on daily exchange rate data. We take advantage of the abundance of daily data to estimate the parameters in a rolling regression by 3-month sub-periods, thereby allowing the regime to evolve rapidly over time. (Table A1 in the appendix estimates the parameters month by month, allowing for even more rapid evolution.) As in earlier studies, the weight on the dollar remains close to 1.0 throughout 2005 and 2006.[8] In some periods thereafter the dollar weight falls significantly below 1.0, in the range 0.8-0.9 from mid 2007 through early 2008. In some of these months the R2 does fall as low as .85 showing a – rather limited – degree of flexibility around the anchor. Flexibility also shows up in the form of a positive trend in the value of the RMB which, though very slight, is statistically significant in many months. In many of the estimation intervals, the Korean won or Japanese yen seem to be the currencies that make up the non-dollar share (particularly January-May, 2006, and September 2007-February 2008, respectively).

During the months July-October 2008, which are covered by the last three rolling regressions of the sample, the yen and won drop out, and the statistically significant weight instead shifts to the euro. Though the euro's estimated weight never rises above .07, the R2 returns to 1.0, suggestive of a basket peg.

[8] Excluding June 2005, the month of the discrete revalations.

Table 1: Updated Estimation of Weights in RMB Basket With Daily Exchange Rate Data

Evolution of RMB Basket Weights from 6-22-2005, 3-month windows, ending on the month shown

COEFFICIENT	(1) 8/2005	(2) 9/2005	(3) 10/2005	(4) 11/2005	(5) 12/2005	(6) 1/2006	(7) 2/2006	(8) 3/2006
usd	0.805***	0.968***	0.957***	0.980***	0.972***	0.996***	0.979***	0.965***
	(0.123)	(0.017)	(0.034)	(0.030)	(0.028)	(0.015)	(0.018)	(0.019)
eur	-0.146	-0.013	-0.019	-0.004	-0.001	-0.023**	-0.018	-0.015
	(0.100)	(0.019)	(0.028)	(0.025)	(0.025)	(0.011)	(0.016)	(0.015)
jpy	0.315	0.027	0.048	0.019	0.007	0.017	0.026**	0.031**
	(0.200)	(0.016)	(0.029)	(0.028)	(0.022)	(0.014)	(0.012)	(0.013)
Constant	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Observations	63	63	63	63	61	63	61	64
R-squared	0.84	0.98	0.95	0.96	0.98	0.99	0.99	0.99
krw	0.027	0.019	0.015	0.004	0.022	0.010	0.013	0.019

Evolution of RMB Basket Weights from 2-22-2006, 3-month windows, ending on the month shown

COEFFICIENT	(1) 4/2006	(2) 5/2006	(3) 6/2006	(4) 7/2006	(5) 8/2006	(6) 9/2006	(7) 10/2006	(8) 11/2006
usd	0.947***	0.932***	0.929***	0.895***	0.905***	0.895***	0.939***	0.965***
	(0.020)	(0.021)	(0.022)	(0.031)	(0.033)	(0.045)	(0.033)	(0.028)
eur	0.003	0.005	0.007	-0.020	-0.031	-0.007	-0.033	0.047
	(0.015)	(0.018)	(0.023)	(0.032)	(0.029)	(0.034)	(0.031)	(0.035)
jpy	0.008	0.009	0.020	0.051*	0.078***	0.037	0.041	-0.060
	(0.014)	(0.017)	(0.020)	(0.028)	(0.023)	(0.031)	(0.030)	(0.036)
Constant	0.000	0.000	0.000	0.000	0.000*	0.000	0.000**	0.000*
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Observations	62	63	62	62	62	61	62	63
R-squared	0.99	0.98	0.98	0.95	0.95	0.91	0.94	0.96
krw	0.042	0.054	0.044	0.074	0.048	0.075	0.053	0.048

Robust standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1

Evolution of RMB Basket Weights from 10-22-2006,
3-month windows, ending on the month shown

COEFFICIENT	(1) 12/2006	(2) 1/2007	(3) 2/2007	(4) 3/2007	(5) 4/2007	(6) 5/2007	(7) 6/2007	(8) 7/2007
usd	1.005***	0.973***	0.930***	0.814***	0.924***	0.947***	0.925***	0.796***
	(0.038)	(0.048)	(0.060)	(0.035)	(0.050)	(0.064)	(0.074)	(0.076)
eur	0.006	0.010	0.018	0.068**	0.071*	0.003	0.024	0.009
	(0.038)	(0.030)	(0.034)	(0.027)	(0.040)	(0.041)	(0.049)	(0.040)
jpy	-0.023	-0.019	0.007	0.020*	0.019	0.043	0.052	0.028
	(0.035)	(0.027)	(0.019)	(0.011)	(0.015)	(0.028)	(0.045)	(0.028)
Constant	0.000**	0.000**	0.000*	0.000	0.000	0.000**	0.000**	0.000
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Observations	61	63	61	64	61	64	63	64
R-squared	0.95	0.94	0.91	0.94	0.93	0.87	0.85	0.89
krw	0.011	0.036	0.045	0.098	-0.014	0.007	-0.001	0.167

Evolution of RMB Basket Weights from 6-22-2007,
3-month windows, ending on the month shown

COEFFICIENT	(1) 8/2007	(2) 9/2007	(3) 10/2007	(4) 11/2007	(5) 12/2007	(6) 1/2008	(7) 2/2008	(8) 3/2008
usd	0.869***	0.895***	0.886***	0.843***	0.824***	0.862***	0.878***	0.972***
	(0.060)	(0.042)	(0.078)	(0.061)	(0.065)	(0.055)	(0.041)	(0.034)
eur	0.032	0.004	0.034	0.044	0.054	0.045	0.019	0.003
	(0.042)	(0.037)	(0.035)	(0.031)	(0.040)	(0.030)	(0.026)	(0.023)
jpy	-0.012	-0.013	-0.002	0.037**	0.035**	0.040**	0.044***	0.026
	(0.021)	(0.016)	(0.019)	(0.017)	(0.015)	(0.015)	(0.017)	(0.018)
Constant	0.000*	0.000	0.000**	0.000**	0.001***	0.001***	0.001***	0.001***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Observations	63	62	63	63	62	63	61	64
R-squared	0.89	0.89	0.87	0.90	0.88	0.85	0.96	0.97
krw	0.111	0.114	0.082	0.076	0.087	0.054	0.059	-0.001

Evolution of RMB Basket Weights from 2-22-2008,
3-month windows, ending on the month shown*

COEFFICIENT	(1) 4/2008	(2) 5/2008	(3) 6/2008	(4) 7/2008	(5) 8/2008	(6) 9/2008	(7) 10/2008	(8) 11/2008
usd	0.959***	0.991***	0.949***	0.973***	0.958***	0.992***	0.989***	0.971***
	(0.027)	(0.027)	(0.026)	(0.029)	(0.034)	(0.027)	(0.026)	(0.039)
Eur	0.015	0.029	-0.012	-0.027	0.035	0.049**	0.052***	0.070**
	(0.034)	(0.032)	(0.031)	(0.032)	(0.024)	(0.020)	(0.019)	(0.028)
Jpy	0.026	0.009	0.063*	0.064*	-0.005	-0.030	-0.031	-0.022
	(0.022)	(0.030)	(0.035)	(0.033)	(0.028)	(0.019)	(0.021)	(0.027)
Constant	0.000**	0.000**	0.000**	0.000	0.000	0.000	0.000	0.000
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Observations	62	64	63	64	62	60	38	18
R-squared	0.97	0.96	0.97	0.96	0.99	1.00	1.00	1.00
Krw	0.001	-0.028	-0.000	-0.010	0.012	-0.011	-0.010	-0.019

Robust standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1

When we estimate month-by-month, in Appendix Table A1, the weight on the dollar more often drops statistically below 1.0. The yen, the won, and the euro are each occasionally significant, though none consistently so. When we include the full array of ten currencies in the basket, in Appendix Table A2, the Malaysian ringgit joins the list of those that are occasionally significant.

5. The new technique

Although the weight-inference technique is well-specified if the true regime is a tight basket peg, as noted, it may be less well specified if the true regime allows flexibility. For any currency it is very likely that in practice the basket peg is not perfect. If the basket peg is relatively tight, one can still expect to estimate the weights with fairly tight standard errors. One can also estimate a trend appreciation term with no problem. But one is also interested in estimating whether the authorities allow increased flexibility relative to the weighted basket, for example, how wide the band is. It stands to reason that the looser the link, the lower the R2. But in the event of substantial flexibility, there is no theorem that says that the equation is correctly specified, the weights accurately estimated, or the R2 an appropriate calibration of the degree of flexibility. Indeed, one can imagine a fall in the R2 resulting, from an increase in external shocks to economic fundamentals instead of from any further loosening of the exchange rate regime.[9]

There are by now many attempts to discern the true "de facto" exchange rate regimes that countries actually follow, along the spectrum from fixed to floating, with a continuum of flexibility in between. Among the most prominent are Calvo and Reinhart (2002) and Levy-Yeyati & Sturzenegger (2003, 2005). Their classification schemes count as a de facto floater a country that has high variability of the exchange rate, relative to variability of reserves, and count as fixed a country that has low variability of the exchange rate relative to reserves.

It is important when inferring the de facto flexibility of an exchange rate regime to look beyond the variability of the exchange rate in itself. One currency could show a higher degree of variability than another, and yet this might be because the former has been subject to larger shocks than the latter, rather than because the authorities intervene less and allow a given shock to show up more in the form of price movement. It is for just such reasons that the classification schemes of Calvo and Reinhart (2002) and Levy-Yeyati and Sturzenegger (2003, 2005) do not look at exchange rate variability alone (prices of currencies), but rather compare it to variability in reserves or money supplies (quantities of currencies). The question is: when there is a shock that increases international demand for the RMB, to what extent do the authorities allow it to show up as an appreciation, and to what extent as an increase in reserves. In this paper, we frame the issue in terms of the Exchange Market Pressure variable, which is defined as the percentage increase in the value of the currency

[9] One can see from graphs in Frankel and Wei (2008) how commodity producers tend to have higher variability in exchange market pressure, regardless whether they are peggers, floaters, or in between.

plus the increase in reserves (expressed as a fraction of the monetary base).[10] When this variable appears on the right-hand side of an equation and the percentage increase in the value of the currency appears on the left, a coefficient of 0 signifies a completely fixed exchange rate (no changes in the value of the currency), a high coefficient signifies a floating rate (few changes in reserves).

One possible limitation of these and other papers that estimate flexibility versus stability of exchange rate regimes is that they sometimes have to make arbitrary judgments regarding what is the major currency in terms of which flexibility and stability are to be defined. The dollar is the most common choice. This may be fine for most Western Hemisphere countries. But for many others, particularly in Asia and the Pacific, the relevant foreign currency is neither the dollar nor the euro, but some (possibly trade-weighted) basket. It would be better to let the data tell us what is the relevant anchor for a given country, especially for those that are not clearly in either the dollar or euro camp, rather than making the judgment subjectively or a priori.[11]

The new equation that we now apply is a synthesis of the inferred-weights technique (Frankel and Wei, 1994, etc.) and the flexibility criterion (Levy-Yeyati and Sturzenegger, 2003, 2005, etc.). Since the RMB and many other currencies today purportedly follow variants of Band-Basket-Crawl, it is important to have available a technique that can cover both dimensions, inferring weights *and* inferring flexibility.[12]

6. New estimation

Our equation is:

$$\Delta \log RMB_t = c + \sum w(j)\, \Delta \log X(j)_t + \delta \{ \Delta emp_t \} + u_t \qquad (3)$$

where Δemp_t denotes the percentage change in exchange market pressure, that is, the increase in international demand for the RMB, which may show up either in the price of the RMB or the quantity of the RMB depending on the policies of the Chinese monetary authorities (floating vs. fixed). Here we define the percentage change in total exchange market pressure by

$$\Delta emp_t \equiv \Delta \log RMB_t + \Delta Res_t / MB_t .$$

The $w(j)$ coefficients capture the de facto weights on the constituent currencies. The coefficient $\boldsymbol{\delta}$ captures the de facto degree of exchange rate flexibility : a high $\boldsymbol{\delta}$ means the currency floats purely, because there is no foreign exchange market intervention (no changes

[10] The progenitor of the Exchange Market Pressure variable, in a rather different context, was Girton and Roper (1977). We impose the a priori constraint that a one percentage increase in the foreign exchange value of the currency and a one percentage increase in the supply of the currency have equal weights in reflecting an increase in demand for the currency (rather than normalizing by standard deviations as the Girton-Roper literature sometimes does). Also, for simplicity, we do not include changes in interest rates as a third possible component of exchange market pressure (though we did explore this idea in Table 8 of the working paper version of Frankel and Wei, 2008).

[11] Clearly many of the authors of these papers are fully aware of the issue.

[12] Frankel and Wei (2008).

in reserves) ; $\delta = 0$ means the exchange rate is purely fixed, because it never changes in valu ; most currencies probably lie somewhere in between.

We repeat equation (3), with the major basket currencies made explicit:

$$\Delta\, logRMB_t = c + \sum w(j)\,[\Delta\, logX_t] + \delta\,\{\Delta\, emp_t\} + u_t \qquad (3')$$

$$= c + w(1)\,\Delta\, log\,\$_t + w(2)\,\Delta\, log\,€_t + w(3)\,\Delta\, log\,¥_t + w(4)\,\Delta\, log\, won_t + \delta\,\{\Delta\, emp_t\} + u_t\,.$$

We want to impose the adding up constraint $w(4) = 1 - w(1) - w(2) - w(3) - \ldots$
We implement it by running the regression equation (3):

$$[\Delta logRMB_t - \Delta log\, won_t] = c + w(1)\,[\Delta log\,\$_t - \Delta log\, won_t] + w(2)\,[\Delta log\,€_t - \Delta log\, won_t] + w(3)\,[\Delta log\,¥_t - \Delta log\, won_t] + \delta\{\Delta logEMP_t\} + u_t \qquad (4)$$

The results reported in Table 2 come from the estimation of this equation. Here the weight on the dollar falls more dramatically in 2007, to 0.6, and the weight on the euro rises more dramatically, to a highly significant 0.4. The significance is impressive in that there are so few data points in each of these regressions (only 12 per year). The coefficient on exchange market pressure is statistically significant and in excess of 0.2, in 2005 and again in 2007. This indicates a surprising degree of exchange rate flexibility.[13] But the upward trend is gone. In fact the constant term, though not usually significant, is always negative.

[13] For comparison, the coefficient exchange market pressure in the case of the Australian and Canadian dollars – two floaters -- only ever gets as high as 0.3 or 0.4 -- Frankel and Wei (2008). In theory, if changes in reserves precisely captured foreign exchange intervention and nothing else, the estimated δ should approach 1.0 in the case of pure floaters. In practice, reserves often change for reasons other than intervention.

Table 2: Rolling 12-month regressions of value of RMB against values of other currencies and Δ EMP

Δ (EMP) defined as [res(t)-res(t-1)]/mb(t-1) + [exr(t)-exr(t-1)]/exr(t-1)

12-month windows, ending on the month shown

COEFFICIENT	(1) 06M7	(2) 06M8	(3) 06M9	(4) 06M10	(5) 06M11	(6) 06M12	(7) 07M1	(8) 07M2
usd	0.710***	0.776***	0.749***	0.737***	0.909***	0.870***	0.786***	0.756***
	(0.105)	(0.132)	(0.154)	(0.150)	(0.147)	(0.213)	(0.175)	(0.105)
jpy	0.149*	0.090	0.107	0.122	-0.015	0.025	0.014	-0.095
	(0.069)	(0.096)	(0.103)	(0.109)	(0.098)	(0.140)	(0.124)	(0.085)
eur	0.109	0.124	0.120	0.118	0.029	0.034	0.056	0.116
	(0.086)	(0.125)	(0.127)	(0.116)	(0.117)	(0.131)	(0.094)	(0.096)
Δ emp	0.269**	0.215*	0.250*	0.254*	0.137	0.139	0.176	0.179***
	(0.095)	(0.108)	(0.114)	(0.113)	(0.100)	(0.157)	(0.104)	(0.047)
Constant	-0.005*	-0.003	-0.004	-0.004	-0.001	-0.001	-0.002	-0.003*
	(0.002)	(0.003)	(0.003)	(0.003)	(0.003)	(0.004)	(0.003)	(0.002)
Observations	12	12	12	12	12	12	12	12
R-squared	0.985	0.975	0.973	0.975	0.984	0.979	0.964	0.967
krw	0.031	0.010	0.024	0.023	0.077	0.070	0.144	0.222

COEFFICIENT	(1) 07M3	(2) 07M4	(3) 07M5	(4) 07M6	(5) 07M7	(6) 07M8	(7) 07M9	(8) 07M10
usd	0.756***	0.866***	0.860***	0.757***	0.788***	0.820***	0.746***	0.745***
	(0.067)	(0.167)	(0.151)	(0.159)	(0.192)	(0.130)	(0.146)	(0.148)
jpy	-0.140	-0.019	-0.007	-0.013	-0.037	0.013	0.028	0.033
	(0.089)	(0.092)	(0.097)	(0.103)	(0.079)	(0.074)	(0.101)	(0.102)
eur	0.169**	0.006	0.016	0.049	0.041	0.006	-0.063	-0.058
	(0.068)	(0.120)	(0.111)	(0.105)	(0.121)	(0.084)	(0.174)	(0.181)
Δ emp	0.187***	0.100	0.109	0.133**	0.118	0.116	0.067	0.078
	(0.029)	(0.073)	(0.058)	(0.056)	(0.078)	(0.064)	(0.080)	(0.073)
Constant	-0.004***	-0.000	-0.000	-0.001	-0.001	-0.000	0.002	0.002
	(0.001)	(0.003)	(0.003)	(0.003)	(0.004)	(0.003)	(0.004)	(0.004)
Observations	12	12	12	12	12	12	12	12
R-squared	0.975	0.913	0.917	0.877	0.875	0.925	0.924	0.930
krw	0.215	0.147	0.131	0.207	0.208	0.162	0.289	0.280

COEFFICIENT	(1) 07M11	(2) 07M12	(3) 08M1	(4) 08M2	(5) 08M3	(6) 08M4	(7) 08M5
usd	0.774***	0.944***	0.747**	0.633**	0.613***	0.515***	0.597***
	(0.165)	(0.176)	(0.242)	(0.182)	(0.171)	(0.111)	(0.130)
jpy	0.026	-0.086	0.054	0.053	0.059	0.042	0.030
	(0.126)	(0.113)	(0.109)	(0.094)	(0.081)	(0.082)	(0.083)
eur	0.153	0.228	0.212	0.375	0.357**	0.445***	0.397***
	(0.259)	(0.233)	(0.253)	(0.205)	(0.143)	(0.073)	(0.105)
Δ emp	0.123	0.108	0.198	0.280**	0.290***	0.281***	0.249**
	(0.088)	(0.087)	(0.117)	(0.087)	(0.076)	(0.063)	(0.097)
Constant	-0.001	0.000	-0.002	-0.006	-0.006	-0.006**	-0.004
	(0.004)	(0.004)	(0.005)	(0.004)	(0.003)	(0.002)	(0.003)
Observations	12	12	12	12	12	12	12
R-squared	0.922	0.930	0.895	0.926	0.967	0.970	0.966
krw	0.047	-0.086	-0.014	-0.061	-0.030	-0.002	-0.024

7. Conclusions regarding the recent Chinese exchange rate regime

Reporting in the financial press has focused on the 2005-2008 appreciation of the RMB against the dollar. The focus is understandable, both because this is the question of political interest, and because looking at a 2005-2008 graph of the dollar/yuan exchange rate seems to tell a clean story of an appreciation trend that, though starting out very small, gradually escalated in an exponential way. If this accelerating trend were in fact deemed part of the current regime, one could extrapolate it and predict more serious appreciation in the future.

Our results -- with the benefit of more recent data and a technique that allows for changes in currency weights as well as changes in the rigidity of the peg -- suggest that the regime probably is not best described as a dollar peg with a trend appreciation. Rather, the regime that has recently been in effect is better described as a basket peg with some weight on a non-dollar currency, the euro in particular. By mid-2007, the weight on the dollar had fallen to 0.6 and the weight on the euro had risen correspondingly to 0.4. The euro now apparently plays almost as important a role as the dollar. It follows that the appreciation of the RMB against the dollar in 2007 was attributable to the appreciation of the euro against the dollar, not to a trend effective appreciation of the RMB. The distinction in characterizations of the regime could make a big difference for the future. Our results suggest that if the euro in the future reverses its 2005-07 appreciation against the dollar, the Chinese currency may automatically do the same thing….unless the regime evolves again (necessitating further estimation).

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Appendix:
Estimation of weights with daily exchange rate data, but without EMP variable

Table A1: 5-currency basket month by month, June 2006 – September 2008

Evolution of RMB Basket Weights from 6-22-2005, window size: 1 month

COEFFICIENT	(1) 6/2005	(2) 7/2005	(3) 8/2005	(4) 9/2005	(5) 10/2005	(6) 11/2005	(7) 12/2005	(8) 1/2006
Usd	0.666***	0.980***	0.985***	0.952***	0.929***	0.973***	0.980***	1.000***
	(0.141)	(0.018)	(0.032)	(0.056)	(0.101)	(0.020)	(0.026)	(0.017)
Eur	-0.120	0.063	-0.103	-0.033	-0.012	-0.087***	0.018	-0.022
	(0.183)	(0.054)	(0.061)	(0.048)	(0.111)	(0.028)	(0.033)	(0.027)
Jpy	0.605***	0.035*	0.010	0.056	0.051	0.014	0.005	0.065***
	(0.191)	(0.019)	(0.022)	(0.052)	(0.087)	(0.015)	(0.015)	(0.012)
Krw	-0.121	-0.000	0.019	0.016	-0.005	0.008	0.037	-0.022
	(0.148)	(0.009)	(0.035)	(0.047)	(0.089)	(0.022)	(0.023)	(0.017)
Constant	0.001*	0.000	0.000	0.000	0.000	-0.000	0.000	0.000
	(0.001)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Observations	21	20	22	21	20	22	19	22
R-squared	0.88	0.99	0.99	0.99	0.96	1.00	0.99	0.99
Gbp	-0.031	-0.078	0.089	0.008	0.037	0.092	-0.040	-0.023

COEFFICIENT	(1) 2/2006	(2) 3/2006	(3) 4/2006	(4) 5/2006	(5) 6/2006	(6) 7/2006	(7) 8/2006	(8) 9/2006
Usd	0.945***	0.921***	0.929***	0.861***	0.940***	0.863***	0.861***	0.984***
	(0.044)	(0.039)	(0.027)	(0.045)	(0.032)	(0.077)	(0.059)	(0.045)
Eur	0.062	-0.026	-0.035	-0.003	-0.018	0.056	-0.056	0.108
	(0.052)	(0.034)	(0.023)	(0.042)	(0.039)	(0.160)	(0.039)	(0.080)
Jpy	0.027	0.024	0.008	0.078	0.086**	0.032	0.132***	-0.181**
	(0.024)	(0.031)	(0.015)	(0.050)	(0.034)	(0.061)	(0.023)	(0.081)
Krw	0.056*	0.079**	0.025**	0.120**	0.016	0.087	0.019	0.044
	(0.030)	(0.031)	(0.011)	(0.044)	(0.031)	(0.081)	(0.056)	(0.050)
Constant	0.000	0.000	-0.000	0.000	0.000	0.000	0.000**	0.000
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Observations	20	22	20	21	21	20	21	20
R-squared	0.99	0.99	0.99	0.98	1.00	0.97	0.99	0.97
Gbp	-0.090	0.002	0.073	-0.057	-0.024	-0.038	0.045	0.046

COEFFICIENT	(1) 10/2006	(2) 11/2006	(3) 12/2006	(4) 1/2007	(5) 2/2007	(6) 3/2007	(7) 4/2007	(8) 5/2007
Usd	0.958***	0.975***	1.238***	0.804***	0.828***	0.754***	0.996***	0.867***
	(0.074)	(0.053)	(0.117)	(0.062)	(0.053)	(0.074)	(0.078)	(0.201)
Eur	-0.070	0.018	0.007	0.037	0.102*	0.115**	-0.077	-0.246**
	(0.121)	(0.121)	(0.146)	(0.054)	(0.057)	(0.049)	(0.069)	(0.089)
Jpy	0.048	-0.047	-0.113*	-0.025	0.026	-0.004	0.185	-0.005
	(0.049)	(0.062)	(0.058)	(0.031)	(0.016)	(0.021)	(0.140)	(0.121)
Krw	0.045	0.032	-0.160	0.184**	0.008	0.146**	-0.109**	0.160
	(0.070)	(0.040)	(0.135)	(0.069)	(0.075)	(0.069)	(0.041)	(0.102)
Constant	0.000	0.000	0.000	0.000	0.000	-0.000	0.000	0.000
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Observations	21	22	18	23	20	21	20	23
R-squared	0.98	0.98	0.97	0.98	0.98	0.98	0.92	0.90
Gbp	0.019	0.022	0.028	0.001	0.036	-0.011	0.006	0.224

COEFFICIENT	(1) 6/2007	(2) 7/2007	(3) 8/2007	(4) 9/2007	(5) 10/2007	(6) 11/2007	(7) 12/2007	(8) 1/2008
Usd	0.855***	0.723***	1.012***	0.863***	0.711***	0.911***	0.855***	0.858***
	(0.100)	(0.112)	(0.124)	(0.085)	(0.138)	(0.084)	(0.115)	(0.101)
Eur	0.353*	0.035	-0.020	-0.016	0.034	0.088	0.050	0.042
	(0.172)	(0.075)	(0.095)	(0.056)	(0.085)	(0.085)	(0.075)	(0.065)
Jpy	0.028	0.050	-0.034	0.010	0.066*	0.049	-0.018	0.044
	(0.054)	(0.035)	(0.028)	(0.033)	(0.037)	(0.036)	(0.042)	(0.035)
Krw	-0.138	0.198***	-0.022	0.204	0.130	0.016	0.104	0.065
	(0.159)	(0.044)	(0.131)	(0.155)	(0.090)	(0.093)	(0.155)	(0.080)
Constant	-0.000	0.000	0.001	-0.000	0.000	0.000	0.001*	0.001**
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.001)	(0.000)
Observations	20	21	22	19	22	22	18	23
R-squared	0.87	0.97	0.94	0.94	0.97	0.96	0.90	0.98
Gbp	-0.099	-0.007	0.065	-0.061	0.060	-0.063	0.009	-0.009

COEFFICIENT	(1) 2/2008	(2) 3/2008	(3) 4/2008	(4) 5/2008	(5) 6/2008	(6) 7/2008	(7) 8/2008	(8) 9/2008
Usd	0.897***	1.014***	0.970***	0.983***	0.971***	1.147***	0.945***	0.925***
	(0.043)	(0.060)	(0.053)	(0.079)	(0.058)	(0.122)	(0.049)	(0.058)
Eur	0.005	0.064	0.166*	-0.081	-0.070	0.094	0.187***	0.023
	(0.032)	(0.087)	(0.079)	(0.059)	(0.102)	(0.086)	(0.056)	(0.030)
Jpy	0.081***	-0.026	0.001	0.066	0.173***	-0.072	-0.049	0.001
	(0.026)	(0.057)	(0.055)	(0.039)	(0.050)	(0.094)	(0.032)	(0.028)
Krw	0.115**	-0.070	-0.012	-0.039	0.014	-0.124	0.029**	-0.022*
	(0.044)	(0.047)	(0.067)	(0.049)	(0.024)	(0.075)	(0.013)	(0.012)
Constant	0.001**	0.000	0.000	0.001**	0.000	-0.000	0.000	0.000
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Observations	20	21	21	22	20	22	20	18
R-squared	0.99	0.95	0.95	0.96	0.93	0.95	0.99	0.98
Gbp	-0.098	0.018	-0.126	0.071	-0.089	-0.045	-0.112	0.074

Table A2: 10-currency basket by three-month periods, June 2006 – September 08

Evolution of RMB Basket Weights from 6-22-2005, 3-month windows, ending on the month shown

COEFFICIENT	(1) 8/2005	(2) 9/2005	(3) 10/2005	(4) 11/2005	(5) 12/2005	(6) 1/2006	(7) 2/2006	(8) 3/2006
usd	0.560**	1.066***	1.317***	0.649***	0.926***	0.865***	0.826***	0.726***
	(0.247)	(0.045)	(0.219)	(0.139)	(0.116)	(0.068)	(0.075)	(0.072)
eur	-0.091	-0.029	0.008	0.010	0.032	-0.040	-0.028	-0.015
	(0.068)	(0.034)	(0.042)	(0.033)	(0.042)	(0.024)	(0.017)	(0.019)
jpy	0.015	0.020	0.032	-0.001	-0.009	0.021	0.032**	0.029**
	(0.069)	(0.018)	(0.031)	(0.022)	(0.022)	(0.016)	(0.013)	(0.013)
sgd	0.653**	-0.023	-0.056	-0.010	-0.028	-0.057	-0.097***	-0.074
	(0.280)	(0.047)	(0.086)	(0.057)	(0.058)	(0.038)	(0.035)	(0.049)
myr	-0.043	-0.120**	-0.324	0.314**	0.094	0.132**	0.152**	0.264***
	(0.132)	(0.058)	(0.221)	(0.135)	(0.128)	(0.064)	(0.068)	(0.074)
rub	-0.058	0.050	-0.002	-0.018	0.009	0.059**	0.080***	0.070**
	(0.148)	(0.057)	(0.080)	(0.055)	(0.054)	(0.027)	(0.029)	(0.034)
aud	-0.091	0.019	0.018	0.039	0.007	0.010	-0.010	-0.019
	(0.068)	(0.017)	(0.030)	(0.025)	(0.025)	(0.015)	(0.016)	(0.015)
thb	0.021	-0.003	0.053	0.130*	0.025	0.003	0.020	0.017
	(0.082)	(0.028)	(0.051)	(0.071)	(0.067)	(0.023)	(0.018)	(0.017)
cad	-0.002	-0.015	-0.066**	-0.099***	-0.069*	-0.003	0.013	-0.003
	(0.041)	(0.015)	(0.027)	(0.026)	(0.036)	(0.022)	(0.016)	(0.016)
Constant	0.000*	0.000	0.000	0.000	0.000	0.000	0.000	-0.000
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Observations	63	63	63	63	61	63	61	64
R-squared	0.91	0.98	0.96	0.98	0.98	0.99	0.99	0.99
krw	0.035	0.036	0.020	-0.013	0.013	0.009	0.013	0.005

Evolution of RMB Basket Weights from 2-22-2006, 3-month windows, ending on the month shown

COEFFICIENT	(1) 4/2006	(2) 5/2006	(3) 6/2006	(4) 7/2006	(5) 8/2006	(6) 9/2006	(7) 10/2006	(8) 11/2006
usd	0.864***	0.912***	0.926***	0.899***	0.791***	0.748***	0.825***	0.921***
	(0.038)	(0.038)	(0.032)	(0.047)	(0.069)	(0.086)	(0.088)	(0.160)
eur	-0.012	0.033	0.013	0.011	-0.092**	-0.051	-0.056	0.043
	(0.028)	(0.026)	(0.027)	(0.041)	(0.038)	(0.060)	(0.053)	(0.163)
jpy	0.005	0.001	0.016	0.052	0.060**	0.009	0.028	-0.047
	(0.014)	(0.020)	(0.021)	(0.035)	(0.029)	(0.037)	(0.036)	(0.041)
sgd	0.002	0.010	0.057	0.007	0.059	-0.060	-0.135**	-0.075
	(0.042)	(0.044)	(0.050)	(0.067)	(0.054)	(0.073)	(0.062)	(0.063)
myr	0.062	0.087**	0.063**	0.062*	0.056*	0.180**	0.203***	0.092**

	(0.055)	(0.039)	(0.028)	(0.035)	(0.031)	(0.077)	(0.071)	(0.036)
rub	0.051	-0.071*	-0.057*	-0.078*	0.110	0.135	0.137	0.049
	(0.060)	(0.039)	(0.033)	(0.046)	(0.085)	(0.123)	(0.114)	(0.285)
aud	-0.009	-0.015	-0.006	-0.018	0.014	0.024	0.031	-0.021
	(0.014)	(0.013)	(0.018)	(0.022)	(0.023)	(0.028)	(0.026)	(0.025)
thb	0.005	0.010	-0.016	0.021	-0.027	-0.014	-0.050	0.003
	(0.023)	(0.034)	(0.034)	(0.050)	(0.036)	(0.045)	(0.038)	(0.022)
cad	0.016	0.007	-0.007	0.001	0.006	-0.007	-0.007	0.016
	(0.021)	(0.019)	(0.016)	(0.019)	(0.019)	(0.030)	(0.021)	(0.021)
Constant	-0.000	0.000	0.000	0.000	0.000	0.000	0.000**	0.000
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Observations	62	63	62	62	62	61	62	63
R-squared	0.99	0.98	0.98	0.96	0.96	0.92	0.95	0.96
krw	0.014	0.026	0.009	0.042	0.023	0.036	0.025	0.020

Evolution of RMB Basket Weights from 10-22-2006, 3-month windows, ending on the month shown

3-month windows, ending on the month shown	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
COEFFICIENT	12/2006	1/2007	2/2007	3/2007	4/2007	5/2007	6/2007	7/2007
usd	0.983***	0.953***	0.918***	0.814***	0.962***	1.080***	1.006***	0.802***
	(0.089)	(0.098)	(0.115)	(0.067)	(0.108)	(0.139)	(0.133)	(0.093)
eur	0.010	0.002	-0.030	0.075	0.024	0.083	0.080	0.014
	(0.062)	(0.053)	(0.059)	(0.053)	(0.089)	(0.101)	(0.093)	(0.062)
jpy	-0.030	-0.028	-0.008	0.008	0.013	0.050	0.055	0.033
	(0.037)	(0.029)	(0.023)	(0.015)	(0.022)	(0.033)	(0.047)	(0.037)
sgd	-0.016	0.037	0.068	0.063	0.021	-0.046	0.005	0.022
	(0.076)	(0.084)	(0.096)	(0.059)	(0.063)	(0.061)	(0.084)	(0.082)
myr	0.050	-0.007	-0.060	-0.059	-0.071	-0.019	-0.042	-0.058
	(0.036)	(0.040)	(0.079)	(0.054)	(0.105)	(0.064)	(0.061)	(0.051)
rub	0.055	0.047	0.106	0.032	0.027	-0.212	-0.124	0.008
	(0.094)	(0.079)	(0.100)	(0.056)	(0.154)	(0.170)	(0.129)	(0.088)
aud	-0.000	-0.023	-0.013	-0.031*	0.044	0.017	0.020	0.010
	(0.048)	(0.046)	(0.046)	(0.018)	(0.030)	(0.031)	(0.035)	(0.028)
thb	-0.034*	-0.026**	-0.023*	-0.002	0.006	-0.010	-0.008	-0.002
	(0.018)	(0.013)	(0.013)	(0.007)	(0.012)	(0.008)	(0.009)	(0.010)
cad	-0.020	0.004	-0.018	-0.018	-0.005	0.031	-0.003	-0.006
	(0.025)	(0.025)	(0.026)	(0.023)	(0.030)	(0.042)	(0.047)	(0.031)
Constant	0.000*	0.000**	0.000**	0.000	0.000	0.000	0.000**	0.000
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Observations	61	63	61	64	61	64	63	64
R-squared	0.96	0.94	0.92	0.94	0.93	0.87	0.85	0.89
krw	0.003	0.040	0.061	0.117	-0.021	0.026	0.011	0.178

Evolution of RMB Basket Weights from 6-22-2007,
3-month windows, ending on the month shown

COEFFICIENT	(1) 8/2007	(2) 9/2007	(3) 10/2007	(4) 11/2007	(5) 12/2007	(6) 1/2008	(7) 2/2008	(8) 3/2008
usd	0.900***	0.908***	0.971***	0.827***	0.893***	0.871***	0.909***	0.903***
	(0.074)	(0.070)	(0.098)	(0.134)	(0.113)	(0.100)	(0.105)	(0.094)
eur	0.043	0.035	0.136	0.034	0.219	0.133	0.102	-0.056
	(0.069)	(0.080)	(0.094)	(0.121)	(0.145)	(0.103)	(0.121)	(0.112)
jpy	-0.022	-0.019	-0.032	0.050	0.040	0.037	0.039	0.015
	(0.025)	(0.025)	(0.028)	(0.034)	(0.029)	(0.026)	(0.024)	(0.026)
sgd	0.107	0.061	0.042	-0.016	0.011	-0.028	-0.009	0.025
	(0.071)	(0.069)	(0.071)	(0.074)	(0.080)	(0.075)	(0.080)	(0.042)
myr	-0.129**	-0.092	-0.001	0.069	0.147*	0.198**	0.064	0.020
	(0.051)	(0.058)	(0.054)	(0.067)	(0.077)	(0.089)	(0.060)	(0.040)
rub	-0.005	-0.035	-0.150	-0.032	-0.360	-0.204	-0.141	0.117
	(0.100)	(0.127)	(0.142)	(0.207)	(0.225)	(0.158)	(0.184)	(0.182)
aud	0.006	-0.005	-0.046	0.001	-0.031	0.000	-0.014	0.024
	(0.027)	(0.029)	(0.033)	(0.033)	(0.032)	(0.029)	(0.027)	(0.025)
thb	0.008	0.003	-0.050	0.006	-0.005	-0.004	0.003	0.008
	(0.013)	(0.018)	(0.035)	(0.037)	(0.027)	(0.023)	(0.016)	(0.015)
cad	-0.039	-0.006	0.014	0.016	0.042	0.019	0.003	-0.046
	(0.032)	(0.027)	(0.028)	(0.026)	(0.026)	(0.029)	(0.029)	(0.028)
Constant	0.000*	0.000	0.000**	0.000	0.001***	0.000**	0.001***	0.000**
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Observations	63	62	63	63	62	63	61	64
R-squared	0.91	0.90	0.88	0.90	0.90	0.88	0.96	0.97
krw	0.131	0.150	0.115	0.046	0.043	-0.022	0.045	-0.012

Robust standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1

Evolution of RMB Basket Weights from 2-22-2008
3-month windows, ending on the month shown

COEFFICIENT	(1) 4/2008	(2) 5/2008	(3) 6/2008	(4) 7/2008	(5) 8/2008	(6) 9/2008	(7) 10/2008	(8) 11/2008
usd	0.837***	0.831***	0.868***	0.883***	0.852***	0.953***	0.921***	0.579
	(0.102)	(0.069)	(0.075)	(0.073)	(0.074)	(0.059)	(0.076)	(0.680)
eur	-0.043	-0.021	0.053	0.007	0.025	0.064	0.014	-0.236
	(0.144)	(0.076)	(0.097)	(0.063)	(0.058)	(0.046)	(0.057)	(0.517)
jpy	0.008	-0.008	0.036	0.027	-0.012	-0.050*	-0.052*	0.025
	(0.032)	(0.029)	(0.024)	(0.034)	(0.031)	(0.025)	(0.029)	(0.098)
sgd	0.118*	0.082	0.192	0.190*	0.179**	0.171***	0.196**	0.480
	(0.060)	(0.065)	(0.133)	(0.101)	(0.080)	(0.058)	(0.080)	(0.451)
myr	0.050	0.098*	0.077	0.069	0.006	0.063	0.021	0.004
	(0.045)	(0.051)	(0.054)	(0.073)	(0.070)	(0.057)	(0.051)	(0.132)
rub	0.069	0.048	-0.234	-0.166**	-0.096	-0.059	0.047	0.359
	(0.235)	(0.127)	(0.153)	(0.076)	(0.079)	(0.066)	(0.077)	(0.730)
aud	-0.007	-0.011	-0.020	0.005	0.004	-0.024**	-0.027**	0.001
	(0.031)	(0.033)	(0.039)	(0.036)	(0.028)	(0.011)	(0.011)	(0.025)
thb	0.006	0.015	0.045	-0.003	0.063	-0.096*	-0.096	-0.151
	(0.017)	(0.053)	(0.048)	(0.068)	(0.078)	(0.055)	(0.062)	(0.154)
cad	-0.008	0.029	0.020	0.019	-0.016	-0.001	-0.005	-0.036
	(0.030)	(0.026)	(0.029)	(0.038)	(0.036)	(0.026)	(0.031)	(0.067)
Constant	0.000	0.000**	0.001***	0.000**	0.000	0.000	0.000	0.000
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.001)
Observations	62	64	63	64	62	60	38	18
R-squared	0.97	0.97	0.97	0.97	0.99	1.00	1.00	1.00
krw	-0.030	-0.062	-0.036	-0.031	-0.006	-0.021	-0.019	-0.026

Robust standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1