HOW CLOSE ARE THE CO-MOVEMENTS OF MAIN CURRENCIES?

Since the collapse of the Bretton Woods system in the early 1970s, exchange rates have fluctuated, often in an unpredictable manner. However, careful observation of exchange rate behaviour suggests that some currencies may co-move in a systematic fashion. For instance, the Swiss franc and the euro often co-move closely against the US dollar, whereas the Canadian and US dollars have historically tended to move in similar directions against the euro. As a result, the exchange rate of the Swiss franc, for example, vis-à-vis the euro exhibits far lower volatility than its dollar exchange rate, while the opposite holds true for the Canadian dollar. In other words, some free-floating currencies may systematically co-move and exhibit very different levels of volatility against different currencies.

One way of measuring the degree of co-movement of currencies is to compute the elasticity to movements in the dollar and the euro using a third currency as the numeraire. Using the Japanese yen as the reference currency, it is possible to estimate the regression:

$$\Delta \ln(e_{¥/x,t}) = \alpha + \beta \Delta \ln(e_{¥/€,t}) + \gamma \Delta \ln(e_{¥/\$,t}) + \varepsilon_t \tag{1}$$

where $e_{¥/x,t}$ is the exchange rate of currency x, for which the association with the euro and the US dollar is to be computed. The coefficient β indicates the sensitivity of the currency to changes in the euro exchange rate. The closer this coefficient is to 1, the stronger the co-movement of currency x with the euro.[1] The same interpretation holds for γ: the closer this coefficient is to 1, the stronger the co-movement of currency x with the dollar. Estimating equation (1) via ordinary least squares for the euro vis-à-vis the currencies included in the euro effective exchange rate, namely the currencies of 23 of the main trading partners of the euro area, provides estimates of β and γ for all these currencies.

The sample period, from January 1999 to March 2006, was split down the middle and equation (1) was estimated over both sub-samples. The results, as presented in the chart, show a relatively strong association between the euro and most of the other European currencies over

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1 A coefficient close to 1 does not necessarily imply that the exchange rate was stable against the euro (or the US dollar) over the sample. Such a measure of "stability" is rather given by the coefficient of determination (or R-square) in the estimated regression, which indicates what proportion of the variability in the exchange rate of interest can be "explained" by the exchange rates of the numeraire currency against the euro and the US dollar. Indeed, R-square values very close to 1 were observed for the Danish krone, the Estonian kroon, the Hong Kong dollar and the Chinese yuan.
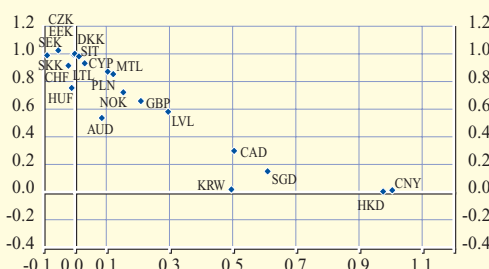
**ECONOMIC
AND MONETARY
DEVELOPMENTS**

Exchange rate
and balance
of payments
developments

Sensitivity to euro and dollar movements

(monthly data)

January 1999-August 2002

x-axis: sensitivity to US dollar
y-axis: sensitivity to euro
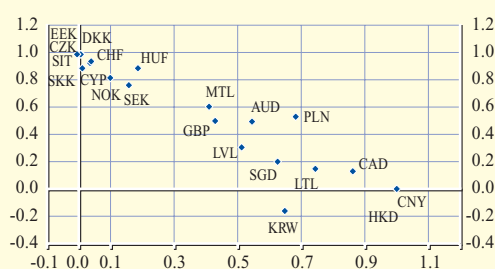
September 2002-March 2006

x-axis: sensitivity to US dollar
y-axis: sensitivity to euro

Source: ECB staff calculations.

both sub-sample periods.[2] By contrast, the Asian currencies included in the EER-23 as well as the Canadian dollar tend to move much more closely with the US dollar. Finally, since the launch of the euro, the pound sterling has, on average, tended to move midway between the euro and the US dollar.

The table shows developments in the sensitivity of currencies to movements in the euro exchange rate. It illustrates that for most currencies, the extent of the co-movement remained largely unchanged during both sub-sample periods. Nevertheless, in some cases, the association with the euro increased over the later period. This is most notably the case for the Lithuanian litas after Lithuania switched its currency board from the US dollar to the euro in 2002. It is also

Sensitivity of currencies to movements in the euro exchange rate

		Jan. 99-Aug. 02	Sep. 02-Mar. 06	Change in coefficient
Australian dollar	AUD	0.49	0.54	0.04
Canadian dollar	CAD	0.13	0.30	0.17
Swiss franc	CHF	0.92	0.91	-0.01
Chinese yuan	CNY	0.00	0.01	0.01
Cyprus pound	CYP	0.93	0.93	0.00
Czech koruna	CZK	1.06	1.03	-0.04
Danish krone	DKK	0.99	1.00	0.01
Estonian kroon	EEK	0.99	1.00	0.01
Pound sterling	GBP	0.50	0.66	0.16
Hong Kong dollar	HKD	0.00	0.00	0.00
Hungarian forint	HUF	0.88	0.75	-0.13
Korean won	KRW	-0.16	0.02	0.18
Lithuanian litas	LTL	0.15	1.00	0.85
Latvian lats	LVL	0.30	0.58	0.28
Maltese lira	MTL	0.60	0.87	0.27
Norwegian krone	NOK	0.81	0.72	-0.09
Polish zloty	PLN	0.53	0.85	0.32
Swedish krona	SEK	0.76	1.04	0.28
Singapore dollar	SGD	0.20	0.15	-0.05
Slovenian tolar	SIT	0.99	0.98	-0.01
Slovak koruna	SKK	0.88	0.99	0.11

Note: Data in the first two columns indicate the sensitivity of each currency to movements in the euro exchange rate (coefficient β in equation 1) in each period. The figures in the last column indicate the change in the sensitivity coefficients between the two periods.

2 When looking at these estimates, it should be kept in mind that they are surrounded by statistical uncertainty.

the case for the Polish zloty, the Swedish krona, the Latvian lats, the Maltese lira and the pound sterling. However, the degree of co-movement between the pound sterling and the euro has also remained lower than that of most other European currencies in recent years. For the Norwegian krone and the Hungarian forint, the association with the euro fell in the later period.