IMF *Staff Papers*
Vol. 39, No. 1 (March 1992)

Comments

The Derivation of the Liquidity Ratio in the EMS

Comment on Kremers and Lane

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KREMERS AND LANE (1990) analyze the money demand in the European Monetary System (EMS) over the period 1978–87. They conclude that aggregate demand for M1 in countries participating in the Exchange Rate Mechanism (ERM) is a stable function of income, inflation, interest rates, and the ECU-U.S. dollar exchange rate. Therefore, a European central bank might be able to implement monetary policy more effectively than the individual central banks.

In this comment, I claim that Kremers and Lane made two errors in the derivation of their aggregate data. The first concerns the use of purchasing power parity (PPP) exchange rates. The second has to do with the procedure that has to be followed in aggregating and deflating data. I then assess the sensitivity of Kremers and Lane's cointegration results to the questions I raise.

I. Converting National Data Using PPP Exchange Rates

When estimating an ERM-wide money demand function, one has to find ways to convert national data in one currency. Kremers and Lane consider three methods. The first method uses current exchange rates.

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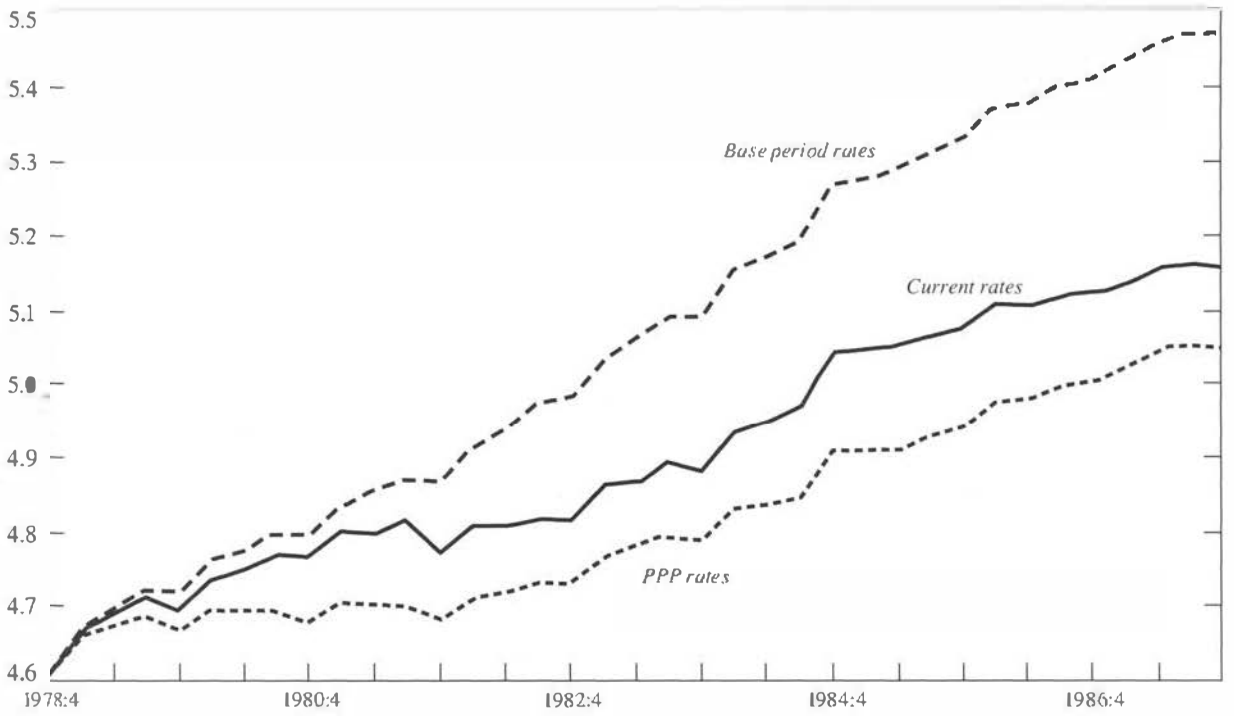
The author wishes to thank Jeroen J.M. Kremers for providing the aggregate series used in this paper, and Eduard Bomhoff and Dave Smant for useful comments.

Figure 1. *Nominal Money in the ERM*
(Log of Series Indexed to 1978:4 = 100)



In a system of fully floating exchange rates with large swings in the exchange rate, this method would cause equally large and undesirable swings in constructed aggregates. In a system like the EMS, this has not been much of a problem. In the second approach, which uses fixed base-period exchange rates, the measurement of aggregates is not influenced by nominal exchange rate fluctuations. This is a disadvantage when inflation differentials are large. The third method uses PPP exchange rates, which implies that national data are converted in proportion to the purchasing power of the national currency. The weight of each country in the aggregate thus reflects the size of the real economy. Because of this attractive property, Kremers and Lane prefer the PPP approach.

A comparison of PPP rates and current rates during the period investigated by Kremers and Lane shows both series to be very similar (see Organization for Economic Cooperation and Development (OECD) (1991)). Both the PPP rates and the current rates show a (nominal) depreciation of all ERM currencies vis-à-vis the deutsche mark. According to these observations, aggregates obtained using PPP rates should resemble aggregates obtained using current rates and should be quite different from aggregates obtained using fixed base-period rates. Inspection of Figure 2 in Kremers and Lane (1990, p. 787) shows the opposite to be the case.

In Figure 1, I present the results of my own calculations, which show that for nominal money the PPP aggregate lies far below the base-period aggregate and somewhat below the aggregate derived with current rates.[1] This is in line with what one expects in an exchange rate system where realignments (partly) compensate inflation differentials. The PPP aggregates in the paper by Kremers and Lane must be incorrectly calculated.

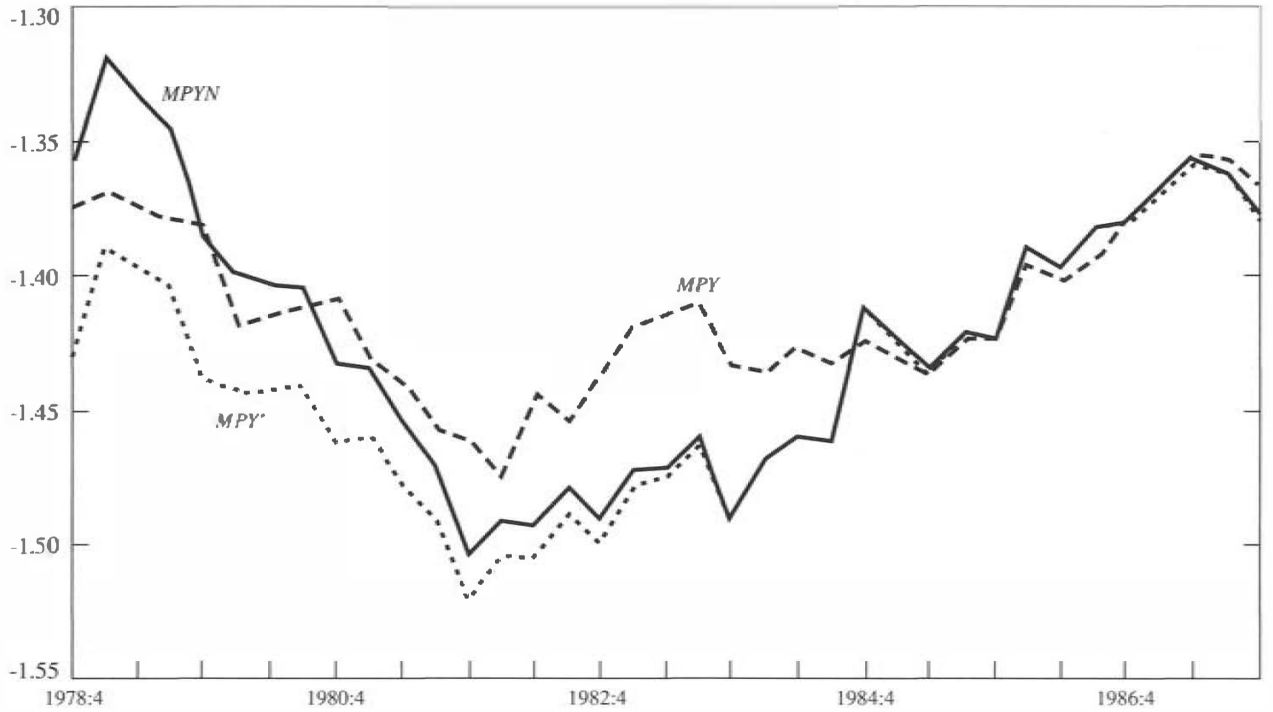
II. Aggregating Real Data

My second comment concerns the procedure that has to be followed in aggregating and deflating national data. The discussion will be restricted to aggregation using PPP rates.

As long as the right exchange rates and deflators are used, it doesn't matter whether one first equalizes purchasing power across countries or through time. The conversion into deutsche mark of nominal national

[1] I use the nominal money series as an example. The money series are taken from the *International Financial Statistics* (*IFS*) datatape (line 34b). I obtained quarterly PPP exchange rates by linear interpolation of the yearly OECD (1991) data. All other data are as in Kremers and Lane.

Figure 2. *Alternative Measures of the Liquidity Ratio*
(Log)



series using contemporaneous PPP rates and subsequent deflation using a *German* deflator yields the same result as the conversion into deutsche mark of real national series using a *fixed* PPP exchange rate of the base-year of the price indices (see the Appendix for a more formal discussion).

The procedure of Kremers and Lane is to convert into deutsche mark using contemporaneous PPP rates, the national *real* income series, and the national *nominal* money series (see Kremers and Lane (1990, p. 785)). The aggregate nominal money series is subsequently deflated using a weighted average of the national deflators (see Figure 3 in Kremers and Lane (1990, p. 788)). Finally, the liquidity ratio is derived as the ratio of real money and real income. The procedure of Kremers and Lane contains two deviations from the correct procedure. First, the aggregate nominal money series is deflated using an ERM-wide deflator instead of a German deflator. Second, the real income series are aggregated using contemporaneous PPP rates instead of a fixed base-year PPP rate.[2]

Figure 2 shows a comparison of the following three measures of the log of the ERM-wide liquidity ratio during the period 1978–87: (1) MPY: the original series used by Kremers and Lane; (2) MPY': my reconstruction of (1). First, national series for nominal money and real income are aggregated using PPP rates. The aggregate nominal money series is subsequently deflated, yielding an aggregate real money series. The deflator is computed as a weighted average of national consumer price indices (CPIs), the weights being GNP/GDP shares based on PPP rates (see OECD (1991)). Finally MPY' is calculated as the log of the quotient of the aggregated real income and real money series.[3]

(3) $MPYN$, the third measure, was obtained by first aggregating national series for nominal income and nominal money using PPP rates and then taking the log of the quotient of these two series. This is the correct procedure.

Differences between series (2) and (3) reflect the deviations discussed above. Differences between series (1) and (2) reflect the incorrect use by Kremers and Lane of PPP rates, as discussed in Section I.

[2] This error should be distinguished from the other error in the use of PPP rates, discussed in Section I.

[3] In footnote 18 in Kremers and Lane (1990, p. 794), the aggregate price level is defined as a four-quarter moving geometric average of ERM-wide CPI. I assume, in conformity with their Figure 3 (p. 788), that this definition applies only to the inflation variable in their equation (1) and not to the price level appearing in (1) as a deflator of nominal money.

Table 1. *Equation (1) Re-Estimated*
(1978:4–1987:4)

Endogenous Variable	Exogenous Variables				SEE (In percent)
	C	*RS*	*INFL*	*ECU*	
MPY	−1.31 (−167.0)	−0.67 (−4.12)	−1.4 (−2.49)	0.079 (10.47)	1.0
MPY'	−1.33 (−104.0)	−0.10 (−0.38)	−5.59 (−6.14)	0.064 (5.30)	1.6
MPYN	−1.29 (−72.0)	−0.68 (−1.85)	−3.09 (−2.44)	0.138 (8.14)	2.2

Note: See Note to Table 2.

III. The Error-Correction Model Re-Estimated

New estimates of equations (1) and (2) from Kremers and Lane's paper are presented in Tables 1 and 2, respectively, along with the original estimates.[4] Table 1 shows estimates for the level regression using the three different measures for the liquidity ratio discussed above. Table 2 presents the corresponding error-correction regressions.[5] It can be seen that coefficients and *t*-values vary considerably across equations, the coefficients for *RS*, *DY*, and *DRS3* being insignificant at a 5 percent level in the new equations. Furthermore, the standard errors of the new equations are much larger than for the original equations.

IV. Conclusion

The claim, made by Kremers and Lane, that European money demand is stable, is based on questionable treatment of the data. Re-estimating the original specifications using a better series for the liquidity ratio results in a large decrease in almost all *t*-values and a significant increase in standard errors of the equation. This new evidence provides no support for Kremers and Lane's claim to have identified a stable European money demand.

[4]The regressions with *MPY* and *DMP* as endogenous variables are Kremers and Lane's original estimates. The preferred regressions are those with *MPYN* and *DMPN* as endogenous variables.

[5]I followed Kremers and Lane in taking the growth rate of real money as an endogenous variable, although the growth rate of the liquidity ratio would be a more logical choice.

Table 2. *Equation (2) Re-Estimated*
(1979:1–1987:4)

Endogenous Variable	Exogenous Variables					SEE (In percent)
	C	*DY*	*DRL*	*DRS3*	*EC*	
DMP	0.002	0.67	−0.86	−0.46	−0.95	0.8
	(1.03)	(2.85)	(−3.18)	(−2.67)	(−5.87)	
DMP'	−0.007	0.65	−1.03	−0.22	−0.73	1.7
	(−1.95)	(1.43)	(−1.86)	(−0.62)	(−3.83)	
DMPN	0.002	0.71	−1.20	−0.08	−0.38	1.7
	(0.45)	(1.50)	(−2.20)	(−0.22)	(−2.73)	

Note: For *MPY*, *MPY'*, and *MPYN*, see text; *C* is the constant term; *RS* is the short-term interest rate; *INFL* is the lagged inflation rate; *ECU* is the U.S. dollar/ECU exchange rate; *DMP* is the change in the log of real money, as derived by Kremers and Lane; *DMP'* is the reproduction of *DMP* following the procedure of Kremers and Lane; *DMPN* is equal to *DMP'*, except for the use of a German deflator instead of an ERM-wide deflator; *DY* is the change in the log of real income; *DRL* is the change in long-term interest rate; *DRS3* is the change in short-term interest rate (three-quarters lagged); *EC* is the error-correction term (residuals from equation (1)); SEE is the standard error of the equation; *t*-values are given in parentheses.

APPENDIX

Deriving an Aggregate Deflated Series

Specializing to a two-country case, consider two ways to derive an aggregate deflated series of some nominal variable, X:

$$\frac{X_{1t} + (X_{2t}/e_{pppt})}{P_{1t}} \quad \text{(i)}$$

$$X_{1t}/P_{1t} + X_{2t}/(P_{2t}*e_{ppp85}), \quad \text{(ii)}$$

where

X = a nominal variable

P = price deflator

e_{ppp} = PPP exchange rate (currency country 2/currency country 1)

e_{ppp85} = the PPP rate in 1985, the base-year of the price deflators

t = time subscript

1, 2 = country subscripts.

It can easily be seen that both methods are equivalent if the definition of PPP rates is substituted in (ii):

$$e_{pppt} = e_{ppp85}*(P_{2t}/P_{1t}).$$

REFERENCES

Kremers, Jeroen J.M., and Timothy D. Lane, "Economic and Monetary Integration and the Aggregate Demand for Money in the EMS," *Staff Papers*, International Monetary Fund, Vol. 37 (December 1990), pp. 777–805.

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