1 Introduction

This note examines some issues raised by Giovanni (2003) regarding our paper "PPP Strikes back: Aggregation and the real exchange rate". In particular, we examine the robustness of the main results in alternative datasets. In each case, we find that *heterogeneity does matter. Pooled and aggregate estimators produce substantially higher half-lives than heterogeneous models.*

2 Theoretical Considerations/Main Point of the Paper

The central idea of the paper can be summarised as follows. There is every reason to expect relative prices of different goods to have heterogeneous dynamics. We show that if this heterogeneity is ignored, either by aggregating the data or by pooling, the resulting estimates of persistence are biased upwards. As explained extensively in the paper, the correct model in these circumstances is either the RCM or the Mean Group model (MG). Both models allow for slope heterogeneity, but it is assumed to be stochastic in former case and fixed in the latter.

The model that is actually used depends on whether the assumptions regarding the structure of heterogeneity are supported by the data. In particular, if the random coefficients are uncorrelated with the error term, it can be shown that RCM and MG are asymptotically equivalent. If this is not the case then MG is the preferred model[1].

It is important to note that our paper advocated the use of *heterogeneous panel data models* and not necesarily the RCM model which may be inappropriate in some circumstances.

3 Results

We now turn to the empirical results. We extend the nominal exchange rate sample as in Giovanni (2003).

3.1 Extended sample

We replace our nominal exchange rate data with data drawn from the IFS. This implies longer samples for some of the countries. Results for various lag lengths are in Table 1. Although our results are close to those reported in Giovanni (2003), we are unable to exactly replicate the estimates and confidence intervals.

Regardless of the lag length, Fixed effects estimation produces half-lives close to the concensus view. Similarly, using aggregate real exchange rate data leads to a half-life of 40 months.

[1] In this case RCM is biased and could differ significantly from MG.

Allowing for heterogeneity does matter. The RCM model produces half-lives close to two years when 5 or 12 lags are used in the estimation. The Mean Group model gives results quite similar to our original estimates. A model with 5 lags produces a half-life of 18 months.

Although these results are very similar to those reported in the paper, the large difference between MG and RCM is troubling. It is interesting to note that this difference disappears at higher lag lengths. This could suggest that a lag length of 12 is not appropriate for the RCM model. Infact, it can be shown that if the lag length is underestimated, the RCM model is biased upwards where the bias results both from the upward bias in sector specific OLS estimates of persistence and the downward bias in OLS variances.

A more compelling reason for the difference between the two estimators could be that the random coefficient assumption is not supported by the data. In other words, the heterogeneity indicated by the Hausman and Swami tests could be fixed rather than random. A formal test for the random coefficient assumption (devised by Stephen Pudney (1978)) produces a test statistic of 145.37(0.000) and rejects the RCM. This suggests that the MG model is more appropriate for this data. A*nd as shown in Table 1, MG estimates are very close to our original result.*

3.1.1 Other issues in Giovanni (2003)

Giovanni (2003) argues that heterogeneity bias may not be important for traded goods. We now investigate this claim. Decomposing the dataset into traded and non traded goods we find that the Hausman test for heterogeneity equals 100.46(0.000) for the latter and 7.5161 (0.18500) for the former. For traded goods, half-lives produced by MG and Fixed effects are 18 months and 29 months respectively. Again, *heterogeneity does matter.* Table 2 shows estimates of Engel's R computed using Fixed effects and the Mean Group model. The results are in line with those in the paper.

Giovanni (2003) raises an interesting point about the autocorrelation function of the RCM model and suggests that the assumption of a random intercept may imply a downward bias. Although, a theoretical possibility, this bias does not seem to be empirically important. To be more precise, the MG model which assumes fixed effects produces shorter half-lives than the RCM. Similarly, a standard Random Effects regression produces longer half-lives than a Fixed Effect model[2].

3.2 Conclusions

We have shown that once the correct heterogeneous panel data model is used, our results hold in the sample examined by Giovanni (2003). It is important to note that the issues raised are about the performance of the RCM model. The new sample has no impact on the central result, i.e. Assuming homogeneity

[2] The fact that this bias may not be important is acknowledged in Giovanni (2003)

results in a significant upward bias in the estimated persistence of the real exchange rate.

References

[1] Di Giovanni, Julian. The Return of the Half-Life. A Note on the Persistence of the Real Exchange Rate (2003). Mimeo University of California at Berkeley.

4 Tables

Table 1				
$P_{i,j,t} = \alpha_{i,j} + \sum_{k=1}^{K} \rho_k P_{i,j,t-k} + \varepsilon_{i,j,t}$				
Method	K	$\sum \rho$	Half-Life	CI
MG	5	0.9594	18	12,20
RCM	5	0.9702	24	16,31
FE	12	0.9735	30	22,35
RCM	12	0.9653	25	16,31
MG	12	0.9524	19	13,22
RCM	36	0.9260	16	14,18
MG	23	0.9439	17	14,18
FE	36	0.9652	28	16,30
FE*	11	0.9807	40	33,46
$H0 : \beta_i = \beta^a : 3065.7[0.000]$				
$H0 : \beta_i = \beta^b : 25.029[0.000]$				
$H0 : \alpha_i = \alpha^c : 2.1279[0.000]$				

Notes: "a" is the Swami test for homogeneity, "b" is the Hausman test for homogeneity and "c" is the test for fixed effects. * denotes aggregate real exchange rate data.

Table 2		
P	Fixed Effects	MG
6	0.579568	0.541169
12	0.582907	0.537955
24	0.588345	0.533224
60	0.596982	0.527781
100	0.599586	0.526987
180	0.600173	0.526918
240	0.600187	0.526918