# 7 Imports

For forecasting purposes, explaining the level of imports is of somewhat less importance than explaining the other expenditure variables discussed above. Short-run fluctuations in imports are for the most part small and not too difficult to forecast from the point of view of the accuracy expected of the overall model.

The level of imports is likely to be a function of current and lagged values of income, and the problem again arises of estimating the appropriate lag structure. In line with the discussion in Chapter 1, only two simple lag structures were estimated. For the first, the level of imports was taken to be a linear function of current and one-quarter-lagged income, and for the second, the level of imports was taken to be a linear function of current income and the level of imports lagged on quarter.

Branson [4] in a detailed study of imports has found the level of imports to be a function, among other things, of cyclical variables such as capacity utilization. An attempt was made in the initial phases of this study to include capacity utilization variables in the import equation, but the results were not very good. No effect of capacity utilization on total imports could be found, and so the capacity utilization variables were dropped from further consideration.

Serial correlation of the error terms was very pronounced in the import equations, with some of the estimates of the serial correlation coefficient being slightly greater than one. The most meaningful results seemed to occur when the serial correlation coefficient was constrained to be one (constraining the serial correlation coefficient to be one is equivalent to estimating the equation in first differenced form), and this constraint was used for the final equation estimates. The two estimated equations, using respectively lagged income and lagged imports, were:

$$\begin{aligned} IMP_t = \underset{(2.09)}{.050}\,\widehat{GNP_t} &+ \underset{(1.31)}{.030}\,GNP_{t-1} \\ r &= 1.0 \\ \text{SE} &= .608 \\ R\Delta^2 &= .499 \\ &\text{45 observ.} \end{aligned} \tag{7.1}$$

$[1, IMP_{t-1}, GNP_{t-1}, GNP_{t-2}, CD_{t-1}, CD_{t-2}, CN_{t-1}, CN_{t-2}, CS_{t-1}, CS_{t-2}, V_{t-1}, V_{t-2}, G_t, MOOD_{t-2}, PE2_t, PE2_{t-1}]$.

$$IMP_t = \underset{(5.59)}{.078\ \widehat{GNP_t}} - \underset{(0.06)}{.009\ IMP_{t-1}}$$

$$\begin{aligned} r &= 1.0 \\ \text{SE} &= .644 \\ R\Delta^2 &= .437 \\ &\text{45 observ.} \end{aligned} \tag{7.2}$$

[variables same as for (7.1) less $GNP_{t-2}$ and plus $IMP_{t-2}$].

$IMP_t$ is the aggregate level of imports of goods and services during quarter $t$ seasonally adjusted at annual rates in billions of current dollars.

The current GNP variable in both equations (7.1) and (7.2) is significant, but neither the lagged GNP variable in equation (7.1) nor the lagged import variable in equation (7.2) is significant. The equations have no constant term estimates since they were estimated in first differenced form.

Since neither lagged income nor lagged imports was significant, the import equation was reestimated using only the current GNP variable, with the following results:

$$IMP_t = \underset{(8.70)}{.078\ \widehat{GNP_t}}$$

$$\begin{aligned} r &= 1.0 \\ \text{SE} &= .637 \\ R\Delta^2 &= .437 \\ &\text{45 observ.} \end{aligned} \tag{7.3}$$

[variables same as for (7.1) less $GNP_{t-2}$].

No explanatory power has been lost by dropping the lagged import variable from equation (7.2), but a slight loss of power has resulted from dropping lagged GNP from equation (7.1). There is actually very little to choose between equations (7.1) and (7.3), and so both of these equations were tested within the context of the overall model in Chapter 11 below. It turned out that equation (7.3) gave slightly better results on this basis, and so it was taken as the basic equation explaining the level of imports.

Note that less than half of the variance of the change in imports has been explained in equation (7.3). Also, the fact that the error terms were so strongly serially correlated in all of the import equations that were estimated in this study may indicate that the lag structure has not been adequately specified or that many relevant variables have been omitted from the equation. The standard error of the estimate of equation (7.3) is small relative to the errors in the other expenditure equations of the model, however, and the equation appears to be accurate enough for present purposes.