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7 On the Effectiveness of Discrete Devaluation in Balance of Payments Adjustment

Louka T. Katseli

7.1 Introduction

> The realignment of exchange rates which have been disaligned for a long time can never be a precision job; it is usually a hit-or-miss business based on impressionistic guesses and hunches. . . . Economists who know that delays in adjustment are wasteful and that large adjustments cause unnecessary disruption have for years recommended that exchange rates be realigned without delay and by smaller changes . . . (F. Machlup 1970:69)

Almost twenty years ago, in his Horrowitz lectures, *The Alignment of Foreign Exchange Rates*, F. Machlup identified three important aspects of the process of exchange rate realignment that are still pertinent today: (*a*) that prolonged misalignment of the exchange rate is costly in real terms, that is, in terms of output and employment in an economy; (*b*) that realignment calls for an adjustment whose direction is usually known, but whose magnitude is not; and finally (*c*) that a system of frequent and small adjustments of the exchange rate is preferable to infrequent and large changes that are usually regarded as means of last resort.

The objective of this paper is to address itself to this last point, leaving aside such important methodological issues as the measurement

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of exchange rate misalignment in relation to alternative definitions of the equilibrium real exchange rate.

The starting point of my analysis is the fact that most countries at different times in history find themselves in a situation where they would like to pursue an active exchange rate policy, that is, to change through appropriate action their real exchange rate, with a view towards improving their balance-of-payments position.[1] In such cases, either by itself or as part of a broader policy package, nominal exchange rate adjustment is the usual course of action.

A devaluation of the exchange rate is expected to lead to a real exchange rate depreciation and thus to increased trade competitiveness that is sooner or later translated into an improved trade position.

It has long been recognized that under certain conditions, a nominal devaluation (or revaluation) of the exchange rate might be ineffective in changing the real exchange rate, that is, in improving trade competitiveness. Domestic prices might in fact adjust fully to the exchange rate change, leaving relative prices unaffected. This could be due to structural characteristics of the economy, to the presence of intermediate goods, and/or to full wage indexation in the labor markets.[2]

More recently, the second step in the causal relationship between nominal exchange rate adjustment and trade performance has been questioned. In the context of the new strategic trade literature (Krugman 1986), it has been pointed out that in the presence of an oligopolistic market structure and of high fixed costs in entering third markets, increased price competitiveness might not be as powerful a policy instrument as we once thought for improving the balance of trade. In that view, a prolonged misalignment of the real exchange rate can change the industrial and trade structure enough that there will be long lags before a reversal in price competitiveness affects actual trade performance.

On theoretical grounds, therefore, the link between the nominal exchange rate and balance of payments adjustment can be questioned from quite different perspectives. However, the importance of these considerations in evaluating actual policy options is an empirical matter that varies enormously across countries and across time.

This paper presents a new twist to the traditional arguments pertaining to the potential ineffectiveness of nominal exchange rate adjustment on trade competitiveness. The main conclusion can be summarized as follows: Exchange rate management can have real effects. In other words, not only what you do, but how you do it, will affect price behavior of individual firms and thus the real exchange rate of the economy. A discrete devaluation of the exchange rate acts as a signal in the economy, strengthening expectations that not only aggregate demand but also marginal costs will increase. This causes faster price adjustment in the economy than would be the case under a crawling-peg system.

The theoretical justification of the above argument is presented in section 7.2. It is shown that not only structural characteristics of the economy, but market structure itself, alters the price effects of a nominal devaluation. Under oligopolistic competition and price-setting behavior on the part of firms, a discrete devaluation which increases the variance of the exchange rate increases the overall price level. It also increases the markup of prices over costs, which depends not only on the usual considerations but also on the expected variance of other firms' pricing decisions.[3] The analysis of section 7.2 thus extends and provides more rigorous theoretical underpinnings to the main hypothesis that was first presented in an earlier paper (Katseli 1986).

Section 7.3 presents empirical estimates of price adjustment under regime switching, using Greek monthly data for the period 1981:1–1985:12. This period was characterized by two large discrete devaluations on 9 January 1983 and 10 October 1985, while a crawling peg was followed during the rest of the period. It is shown that the variance of exchange rate changes, that is, the variable that captures exchange rate management differences, is an important determinant of price adjustment.

These results seem to validate the main hypothesis that a discrete realignment of the exchange rate, as opposed to a smooth and continuous path of adjustment, can limit the effectiveness of exchange rate policy in improving trade competitiveness.

7.2 Imperfect Competition and the Effectiveness of Discrete Devaluation

Imperfect competition is a pervasive characteristic of modern industrial economies. It is even more so in semiindustrialized and/or developing economies. Different degrees of concentration in product markets, extensive product differentiation, and unionization give rise to price-setting behavior in both commodity and labor markets.

As Okun has noticed, "even firms with minuscule market shares put price tags on their commodities; in the short-run, they are never surprised by the price, and always subject to surprise about the quantities they sell" (Okun 1975, p. 360). Yet most macroeconomic models assume that markets are perfectly competitive. There are some notable recent exceptions that are still mostly limited to a closed-economy framework (Hart 1983; Rotemberg 1982; Sheshinski and Weiss 1983; Aizenman 1984, 1986).

In a recent paper, Dixon (1986) presents a simple closed-economy model of imperfect competition with Walraysian features that can be easily compared with more traditional macromodels. Imperfect competition in the product market is modeled by Dixon using conjectural-variations Cournot equilibrium that captures a wide range of possible market solutions encompassing perfect competition and Cournot and joint profit maximization as special cases.

While maintaining the simplicity of macromodeling provided by Dixon, the framework of imperfect competition adopted here is one of Bertrand competition with differentiated products, thus assuming differentiated prices and price-setting firms.

For each firm i in the market producing commodity i, there is an expected direct demand for output curve which is given by equation (1):

$$Ex_i = 1 - P_i + a\,E\tilde{P}_j. \tag{1}$$

The expected demand for each firm's output is a negative function of its own price, as well as a positive function of the expected, unobservable aggregate price that would be established in the market for substitute commodity j.

The expectations operator E refers to firm i's ex ante expectations, that is, before it finalizes its pricing decision, and a is the cross-price elasticity of demand, which is positive and smaller that unity ($0 < a \leq 1$) in the case where commodities are substitutes. Firm i forms its expectations about the aggregate market price of competitive output j by observing the pricing decisions of a neighboring firm j.

The overall price that will be determined by firm j, P_j, will depend on a firm-specific disturbance R_j with mean $\bar{R}_j$ and on the aggregate price component $\tilde{P}_j$ with mean $\bar{P}_j$. Thus,

$$P_j = R_j + \tilde{P}_j \text{ where} \tag{2}$$

$$R_j = \bar{R}_j + \epsilon_1 \text{ and}$$

$$\tilde{P}_j = \bar{P}_j + \epsilon_2.$$

Given the above, the expectational probability of other firms' pricing decisions can be expressed as a function of P_j. In other words,

$$E\tilde{P}_j = \vartheta P_j \text{ and} \tag{3a}$$

$$\vartheta = \frac{\sigma^2_{\tilde{P}j}}{\sigma^2_{Rj} + \sigma^2_{\tilde{P}j}}, \text{ where} \tag{3b}$$

ϑ is the ratio of the variance of the aggregate market component to the sum of the variance of the firm-specific and aggregate component. As the variance of the aggregate price component increases, ϑ and $E\tilde{P}_j$ increase, and this leads firm i to expect a positive increase in the demand for its output.

The expected demand for output curve as given by equation (1) relates expected output of firm i to the firm's own price and the expected aggregate price that would be established in the domestic market for substitute commodities. Import prices are not explicitly modeled here, but this can easily be done without changing the qualitative nature of the results. Alternatively, one can assume perfect substitution in demand between the imported good and commodity j and thus identify commodity j with the tradable commodity and commodity i with the nontradable.

The final step in the argument is to relate the variance of the aggregate price index to the variance of the exchange rate. In a previous article (Katseli 1984), I have shown that the two time series usually exhibit quite different time-series properties. Nominal exchange rate variability has been found to exceed domestic price variability, as there is relative sluggishness of domestic price adjustment in commodity markets as opposed to financial markets. However, in cases where the exchange rate is managed, the variability of the price index is apt to be positively correlated to nominal exchange rate variability. Under a crawling-peg regime, the smooth and continuous adjustment of the exchange rate to economic fundamentals eventually becomes fully anticipated by private market participants and is reflected in a gradual adjustment of prices. Alternatively, if large and discrete adjustments of the exchange rate take place, then there is apt to be price recontracting and thus fast adjustment of prices in response to the "information signal" received in the market about future cost and demand conditions (Katseli 1986). Thus, in cases of managed floating it is reasonable to expect a positive relationship between exchange rate and price variability. Hence,

(4) $$\sigma^2_{Pj} = f(\sigma^2_e) \text{ where } f' > 0.$$

Given the above, equation (1) can be rewritten as

(5) $$Ex_i = 1 - P_i + a\vartheta P_j \text{ where}$$
$$\vartheta = g(\sigma^2_e) \qquad \text{and } g' > 0.$$

According to equation (5), an increase in the variance of the exchange rate would give rise to a positive expected shock in demand for firm i's output.

If marginal costs for each firm are given and are equal to C, then under Bertrand-Nash competition the payoff function for each firm is given by (6):

(6) $$\Pi_i (P_i,P_j) = P_i \,.\, Ex_i - Ex_i \,.\, C = Ex_i (P_i - C).$$

Substituting (5) into (6), it follows that

(7) $$\Pi_i (P_i,P_j) = (1 - P_i + a\vartheta P_j) (P_i - C).$$

Profit maximization implies that the price charged by the firms P_i and P_j will depend positively on ϑ. Specifically,

$$P_i = \frac{1 + a\vartheta P_j + C}{2}. \tag{8}$$

If the two neighboring and competing firms are symmetric, then the Bertrand price is given by (9) and the price-cost margin, μ, by (10):

$$P^b = \frac{1 + C}{2 - a\vartheta}. \tag{9}$$

$$\mu = \frac{P^b - C}{P^b} = \frac{1 - C(1 - a\vartheta)}{1 + C}. \tag{10}$$

As ϑ increases, both P^b and μ increase.

The marginal cost structure of each firm can also be uncertain. Thus C_i can be specified to have a local component, W_i, that is, wages, with mean $\bar{W}_i$ and an unobservable aggregate market component, $\tilde{C}_j$. Expectations about that component of marginal costs can be formed as before through observation of the neighboring firm's marginal cost structure. In turn, firm j's marginal costs depend on W_j and the aggregate market component. Thus,

$$EC_i = W_i + E\tilde{C}_j \text{ and} \tag{11}$$

$$C_j = W_j + \tilde{C}_j. \tag{12}$$

From (11) and (12), it follows that

$$E\tilde{C}_j = \varphi C_j, \text{ where as before,} \tag{13}$$

$$\varphi = \frac{\sigma_{\tilde{C}_j}}{\sigma_{\tilde{C}_j} + \sigma_W}.$$

As the variance of the aggregate cost component increases, firm i anticipates an incipient increase in its marginal cost structure. The variance of the aggregate cost component can now be associated with the variance of the exchange rate, either directly through the cost of imported inputs or indirectly through the final price of domestically produced inputs j in an input-output framework. Thus,

$$\sigma_{\tilde{C}_j} = Z(\sigma_e^2), \text{ where } Z' > 0. \tag{14}$$

As the variance of the exchange rate increases, marginal costs are expected to increase, and this will be reflected in both the Bertrand price and the markup established in the market. Specifically, under a probabilistic distribution of marginal cost changes, equations (9) and (10) will be replaced by (15) and (16):

$$P^b = \frac{1 + \bar{W} + \varphi\bar{C}}{2 - a\vartheta} \tag{15}$$

$$\mu = \frac{P^b - E\bar{C}}{P^b} = \frac{1 - (1 - a\Theta)(\bar{W} + \phi\bar{C}}{1 + \bar{W} + \phi\bar{C}} \tag{16}$$

$$\text{where } \bar{W} = \frac{Wi + Wj}{2} \text{ and } \bar{C} = \frac{Ci + Cj}{2}.$$

An increase in the variance of the exchange rate raises both φ and ϑ, and P^b increases unambiguously. The effects on the price-cost margin, however, seem uncertain, since an increase in ϑ raises μ, while an increase in φ reduces it. It is easy to show, however, that for a given change in σ_e^2, $\frac{\partial\mu}{\partial\vartheta}$ will be larger than $\frac{\partial\mu}{\partial\varphi}$ since α, ϑ and φ are all smaller than unity. Thus not only P^b but also the price-cost margin is raised in the economy as the variance of the exchange rate increases.

This implies that in the context of oligopolistic competition and price-setting behavior, a policy of discrete devaluation which increases the variance of exchange rate changes will produce faster domestic price adjustment than a policy of crawling peg.

It will also lead to a higher markup in the economy and thus a shift in the income distribution towards profits. From the point of view of the effectiveness of exchange rate policy in balance-of-payments adjustment, a policy of discrete devaluation, as opposed to that of a crawling peg, will lessen the expected improvement in price competitiveness as a result of the devaluation. This is so because, ceteris paribus, the real exchange rate will not adjust as much to the nominal exchange rate change.

These propositions are tested empirically on Greek monthly data in section 7.3.

7.3 Empirical Evidence

Despite a significant drop in OECD inflation since 1981, inflation in Greece continued to be high during the early eighties. While it was slowly but steadily reduced from about 25% in 1981 to 16.7% in mid-July 1985, it accelerated again in 1985 as inflationary expectations were reversed during the second half of the year.

In a recent paper that analyzes the determinants of consumer price inflation in Greece on annual data spanning the period 1963–84, Alogoskoufis (1986) concludes that in the period 1980–84, the inflation performance can be largely attributed to exchange rate movements. Nominal wage inflation and the productivity slowdown made relatively small contributions to the rate of price adjustment, while excess monetary growth did not prove to be an important determinant of inflationary pressures.

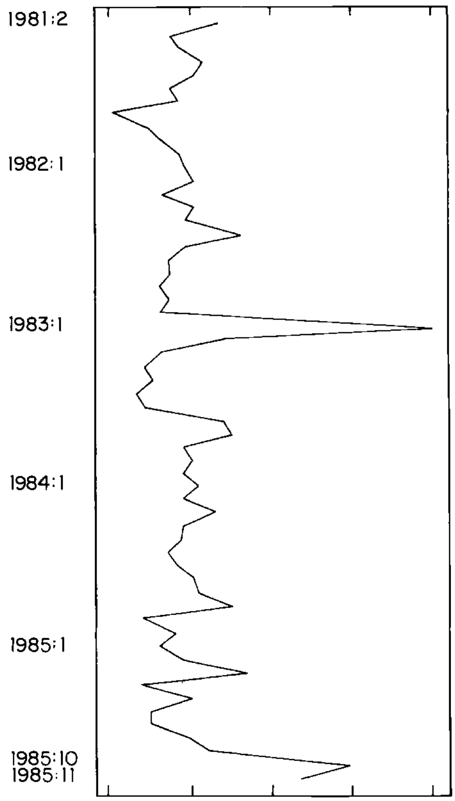

Fig. 7.1 Monthly rate of change of the nominal exchange rate (NNEER), 1981:2–1985:11.

The first part of the 1980s was in fact characterized by two discrete devaluations of the nominal exchange rate. The first took place on 9 January 1983 and the second two-and-a-half years later, that is, on 10 October 1985.

Figures 7.1, 7.2, and 7.3 present (*a*) the monthly rate of change of the nominal effective exchange rate (NNEER) based on the basket of 12 currencies that the Central Bank follows, (*b*) the variance of NNEER over the preceding three-month period (VR3) and (*c*) real exchange rate developments calculated on the basis of the nominal effective exchange rate and the relative consumer price indices of Greece and its main trading partners (REER).

The two episodes of discrete exchange rate adjustment are clearly evident from figures 7.1 and 7.2, while figure 7.3 highlights the reversal of real exchange rate depreciation within the first quarter of 1983 fol-

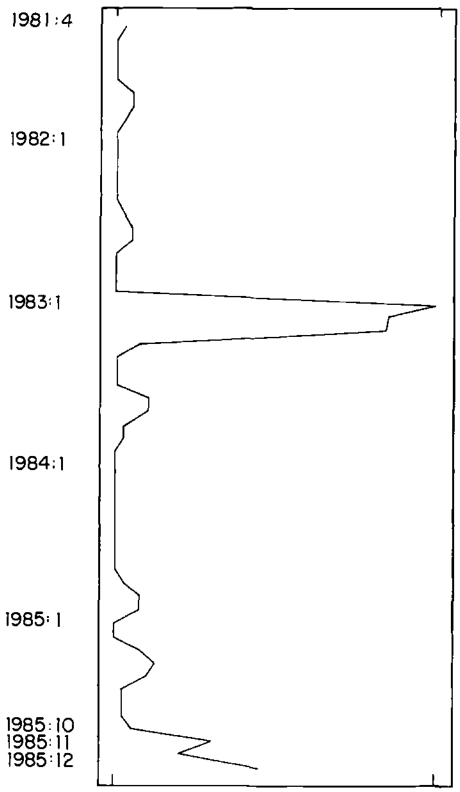

Fig. 7.2 Variance of NNEER over the preceding three-month period (VRT3).

lowing the January devaluation. The same thing actually occurred in the last quarter of 1985.

As can be seen in figures 7.4 and 7.5, what actually took place was a sharp acceleration of inflation as measured not only by the consumer price index (NPGRI) but also the wholesale price index for nontraded goods (NTELPR). The adjustment of prices was almost contemporaneous in 1983 and actually preceded the devaluation in 1985.

In light of this evidence and the theoretical analysis of section 7.2, the objective of the empirical section is to investigate the role of the variance of exchange rate changes in domestic price adjustment.

Following the eclectic approach provided by Alogoskoufis (1986), inflation is considered as both cost-push and structural, as well as demand-pull.

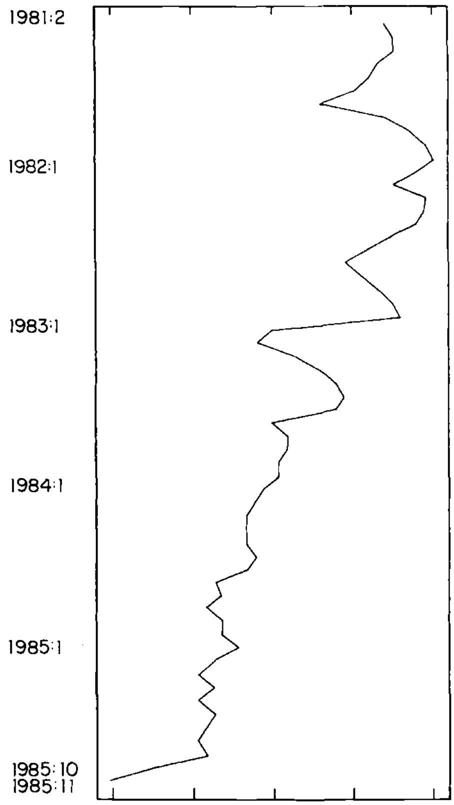

Fig. 7.3 Real exchange rate developments (REER), 1981:2–1985:11.

A cost-push structural interpretation of inflation can be easily modeled along the lines of the so-called Scandinavian model (Aukrust 1977; Edgren, Faxen, and Odhner 1973). As Alogoskoufis (1986) has shown, the underlying model can be extended in a number of ways to yield more general empirical specifications. Tradables can be allowed to be imperfect substitutes, so that their domestic price will depend on both international factors and domestic factors such as domestic labor costs and productivity. According to the structural view, demand factors do not affect domestic price inflation, which is determined solely by world price developments, exchange rate depreciations, wage increases relative to productivity, and changes in indirect taxes. One way to allow for an independent role for monetary influences on inflation is to assume that price increases in both the tradable and nontradable sectors are also due to excess monetary growth (Alogoskoufis 1986). This theoretical extension allows maximum flexibility of specification, and it can

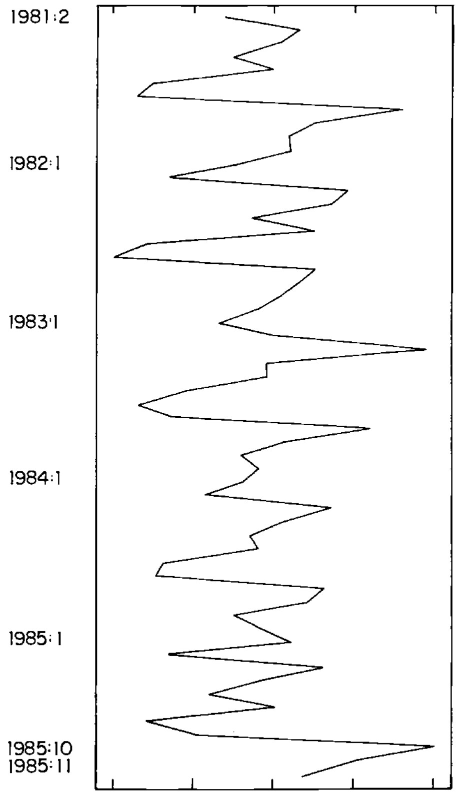

Fig. 7.4 Monthly rate of change of the consumer price index (NPERI), 1981:2–1985:11.

encompass under alternative restrictions not only a cost-push view of inflation but also simple monetary models of the inflationary process in small open economies. Finally, real wage adjustment can be assumed to depend on output market tightness and expectations of future price behavior.

Given the above, and following my analysis in section 7.2, where the variance of exchange rate changes is an important determinant of price adjustment, the following inflation equation was estimated:

$$(17) \quad \hat{P}_t = a_0 + a_1 \hat{W}_{t-i} + a_2 (\hat{P}_w + \hat{e}_t) + a_3 VR3 + a_4 \hat{q}_t + a_5 r_t + a_6 O_t + a_7 \hat{P}_{t-i} \text{ where}$$

$\hat{P}_t$ = the rate of change of the consumer price index (NPGRI), or alternatively, of the wholesale price index of nontraded goods (NTELPR) as estimated by the National Statistical Service.

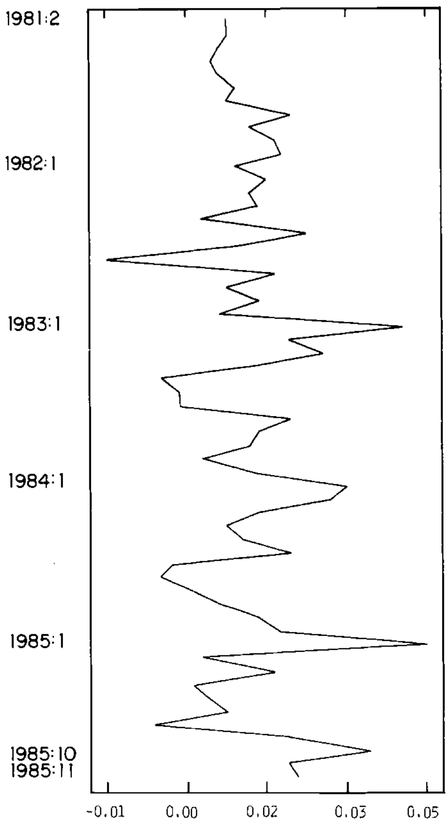

Fig. 7.5 Monthly rate of change of the wholesale price index for non-traded goods (NTELPR).

$\hat{W}_{t-i}$ = the rate of change of the wage rate in the manufacturing sector of the economy under alternative lag specifications.
$\hat{P}_w$ = the world rate of inflation.
$\hat{e}$ = the rate of change of the nominal effective exchange rate (NNEER).
VR3 = the variance of $\hat{e}$ over the past three months (including month t).
$\hat{q}_t$ = the rate of change of average labor productivity measured as industrial output over industrial employment.
r_t = deviations of output from trend calculated as the residual obtained from an estimated equation where industrial production is regressed against a constant and a time trend.
O_t = a proxy of excess monetary growth, that is, the rate of change of the nominal money supply minus the rate of change of long-run money demand as calculated by Alogoskoufis (1986). Specifically, $O = \hat{m} - \hat{y} + 6.57\,\Delta r$, where Δr is the change in the opportunity cost of $M1$.

$\hat{P}_{t-i}$ = the lagged dependent variable.

It should be noted that in equation (17) the variance of the exchange rate is assumed to have an influence on the domestic price separate from the influence of the exchange rate itself.

The main results are presented in table 7.1. All equations were estimated with a constant and monthly seasonal dummies using ordinary least squares.

The results appear markedly better in explaining variations of the consumer price index, as opposed to variations in the price of nontraded goods.

In both cases, contemporaneous wage inflation ($\hat{w}_t$) seems to be an important determinant of price movements. Productivity growth ($\hat{q}_t$) and deviations of output from trend (r_t) have the expected effect on NPGRI, while they do not seem to influence NTELPR. The opposite happens with excess monetary growth (O_t), which exerts a significant inflationary impact as this is measured by NTELPR.

World inflation and/or the contemporaneous change of the nominal effective exchange rate do not appear to be important independent determinants of monthly price adjustments during this period. The effect of these on the dependent variable is probably picked up by the constant term, which appears in all cases statistically significant. Instead, the variance of exchange rate changes over the past three months (VR3) proves to be a significant explanatory variable, as our theory would seem to indicate. The significance of VR3 is maintained even when the rate of change of the exchange rate ($\hat{e}_t$) is introduced as an independent explanatory variable.

As the variance of the exchange rate increased with the shift from a crawling-peg regime to that of a discrete devaluation, prices adjusted fast, as we would have expected. As was explained in section 7.2, the two discrete devaluations strengthened expectations that all prices in the market would be raised accordingly. This led to more rapid price adjustment which could be justified readily to potential customers as they themselves observed the signal. Thus, not only did the process of imperfect competition between firms lead to increased markups for the participants, but this was readily accepted by consumers, who were the net losers in the process.

Explaining monthly deviations of a price index which is highly volatile is not an easy task. Yet the analysis suggests that, traditional factors aside, the variance of exchange rate changes seems to play an important role in explaining price behavior. What this also indicates is that during the period under consideration, expectations about future price developments were the driving force behind price-setting behavior of firms. This is consistent with other evidence regarding speculative movements in the economy, such as hoarding of final consumer goods

Table 7.1 **Estimates of Alternative Specifications of Monthly Price Adjustments in Greece: 1981:1–1985:12**

LHS	$\hat{P}_t$ = NPGRI				$\hat{P}_t$ = NTELPR	
RHS	1.1	1.2	1.3	1.4	2.1	2.2
$\hat{W}_t$	.2284(3.6)	.2305(3.7)	.2182(3.4)	.2198(3.5)	.1684(1.6)	.1853(1.9)
$\hat{W}_{t-1}$			−.0699(1.1)	−.0711(1.1)	−.0919(0.9)	
$\hat{W}_{t-2}$					−.0192(0.2)	
$\hat{P}_w$					.3142(1.4)	.3110(1.6)
$\hat{e}_t$	−0.1338(0.4)		−.0109(0.3)		.0819(1.2)	.0744(1.3)
VR3	2.8920(3.7)	2.7588(4.0)	2.4591(2.9)	2.3478(3.1)	2.1009(1.4)	2.6806(2.2)
$\hat{q}_t$	−.0756(2.7)	−.0751(2.8)	−.0752(2.7)	−.0748(2.7)		
r_t	.0626(2.9)	.0617(2.9)	.0568(2.5)	.0559(2.5)	.0457(1.4)	.0463(1.5)
o_t	.0002(0.3)	.0002(0.3)			.0022(2.0)	.0022(2.1)
$\hat{P}_{t-1}$			.1098(0.8)	.1095(0.8)	.0963(0.7)	
R^2	.902	.902	.905	.905	.639	.6261
DW	1.8	1.8	2.0	2.0	1.9	1.8

Note: t-ratios in parentheses.

and highly volatile import behavior by firms. From a policy perspective, this confirms the view that macroeconomic performance depends not only on economic fundamentals but to a large extent on the psychology of the market. This can be easily upset by careless exchange rate management.

Notes

1. The real exchange rate is equivalent either to the terms of trade in the context of a simple trade model with two countries that completely specialize in production, or to the relative price of traded to nontraded goods in the case of a small-country two-good model.
2. For a review, see Katseli (1983).
3. The type of oligopolistic competition (Cournot vs. Bertrand), the share of each firm in the market, and the cross-price elasticity of substitution are important determinants of the size of the markup.

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Comment Alberto Giovannini

The paper by Louka Katseli raises the question of the effects of different exchange rate regimes on price dynamics. The paper asserts that a regime with large and infrequent exchange rate changes is suboptimal, since—among other problems—these exchange rate changes are more quickly transferred into domestic prices. In my comments I will not deal with these claims, nor with the details of Katseli's analysis. Rather, I will first concentrate on the empirical data we are offered. Then I will discuss the predictions of alternative models of price setting by firms on the transmission of large and discrete exchange rate changes to domestic prices.

The Evidence

Katseli presents the results of regressions where the CPI inflation rate (or the inflation rate of an index of nontraded goods) is projected on lagged wage inflation, contemporaneous foreign-price inflation measured in drachmas, a variable representing productivity growth, a variable proxying for the business cycle, and a variable representing "excess" money growth (see the paper for a detailed description of these variables).

I view these regressions as an exercise in data description rather than empirical implementations of specific models or frameworks to test hypotheses. Indeed, the choice of the explanatory variables and the lag specification prevent us from interpreting these equations as reduced forms (most of the right-hand side variables are endogenous), while the estimation technique suggests that they should not be viewed as structural equations either.

Katseli's estimates contain an interesting result: a variable which effectively represents a dummy for the five months following the December 1982 devaluation of the drachma has a positive and large coef-

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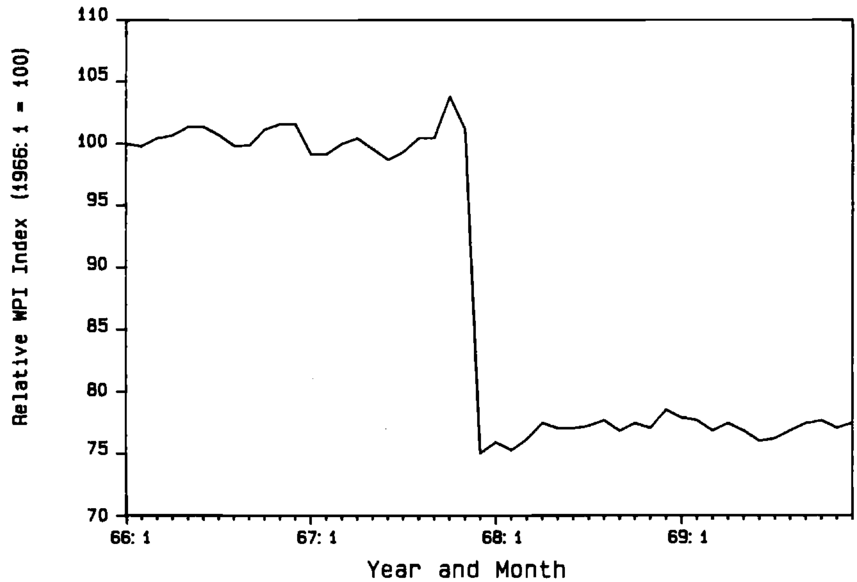

Fig. 7.6 Sterling devaluation in 1967; the U.K. WPI relative to the U.S. WPI.

ficient. In other words, after the 1982 devaluation the inflation rate increased over and above what was predicted by past wage inflation and all the other variables listed above. Figure 7.3 in Katseli's paper further illuminates the nature of the phenomenon described by these regressions. In the second half of 1982 there is a tendency for the real exchange rate to appreciate, a sign of acceleration of the inflation rate in Greece. In the five months following the devaluation, the real exchange rate recovers more than 50% of the initial depreciation, through an acceleration of domestic inflation.

Figure 7.1 reports the experience of the 1967 sterling devaluation. The figure reports an index of the U.K. wholesale price index relative to the U.S. wholesale price index. In correspondence of the devaluation of sterling, the index drops by about 25%. The difference in this case is that the fall in the relative price of domestic output caused by the exchange rate depreciation persists for two years after the devaluation. Both figure 7.6 and Katseli's figure 7.3, however, seem to be suggesting that the nominal exchange rate devaluations have large real effects and suggest that studying these experiences might illuminate the nature of price dynamics in these countries.

The Effects of Nominal Exchange Rate Changes: Nominal Contracts or Imperfect Information?

Can we interpret these experiences as evidence for or against alternative models of price dynamics? Models of price dynamics typically assume some departures from the standard neoclassical hypotheses and can be classified in two families. One family contains the sticky-prices models, stemming from Dornbusch (1976) and Taylor (1980).[1] They typically assume that transactions' imperfections prevent firms from fully adjusting to changes in demand and costs. This happens because firms set prices for more than one period, or because instantaneous price changes are costly. The second family contains the imperfect-information models originated by Lucas (1973) and Phelps (1969). Recent open economy applications of these models include Flood and Hodrick (1986) and Stockman and Koh (1986). The basic idea of these models is that individual agents, using the information at their disposal, cannot accurately tell relative demand fluctuations from aggregate nominal shocks.

These models have sharply different predictions of the channels through which a nominal exchange rate depreciation affects the real exchange rate. Consider the effects of an unanticipated, permanent nominal exchange rate devaluation that is not accompanied by any other exogenous shock. Sticky-prices models would predict a change in the real exchange rate whose size and persistence depends on the specific feature of the transactions' imperfections. In models with overlapping price setting, for example, the dynamics of the response depends on the distribution of the length of price setting across domestic firms.

What are the effects of unanticipated nominal exchange rate changes in imperfect information models? Clearly large nominal exchange rate devaluations are widely publicized events and are accurately perceived by all agents in the economy. Thus, misperceptions cannot justify any direct link between exchange rate realignments and the large observed fluctuations in relative prices. Nominal exchange rate changes, however, affect real wealth and spending by inducing fluctuations in the purchasing power of nominal money balances. In the two-sector model of Dornbusch (1973), for example, the decrease in real balance brought about by an exchange rate devaluation decreases domestic residents' spending. The decrease in total spending decreases the relative price of nontraded goods and thus the real exchange rate. The main channel of nominal exchange rate changes is in this case the real balance effect.

In conclusion, an analysis of large exchange rate devaluations coupled with a careful assessment of the empirical significance of these wealth effects should provide new and possibly illuminating evidence to help discriminate between these competing models of price dynamics.

1. See also the Aizenman paper in this volume.

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