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THE SHORT-RUN PHILLIPS CURVE OF THE CURRENT
SPANISH ECONOMY

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ABSTRACT

Some economists have advocated an expansionary demand policy to reduce unemployment in Spain. This means accepting a negatively sloped short-run Phillips curve that would allow the exploitation of the celebrated trade-off between inflation and unemployment.

This paper gives a qualitative characterization of the Spanish short-run Phillips curve. We argue that this curve is currently vertical and the apparent trade-off shown by the data is misleading, as it is caused by an increase in the equilibrium rate of unemployment. Consequently, the effects of an expansionary demand policy would mainly go into prices and the reduction of unemployment would be small.

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1. Introduction

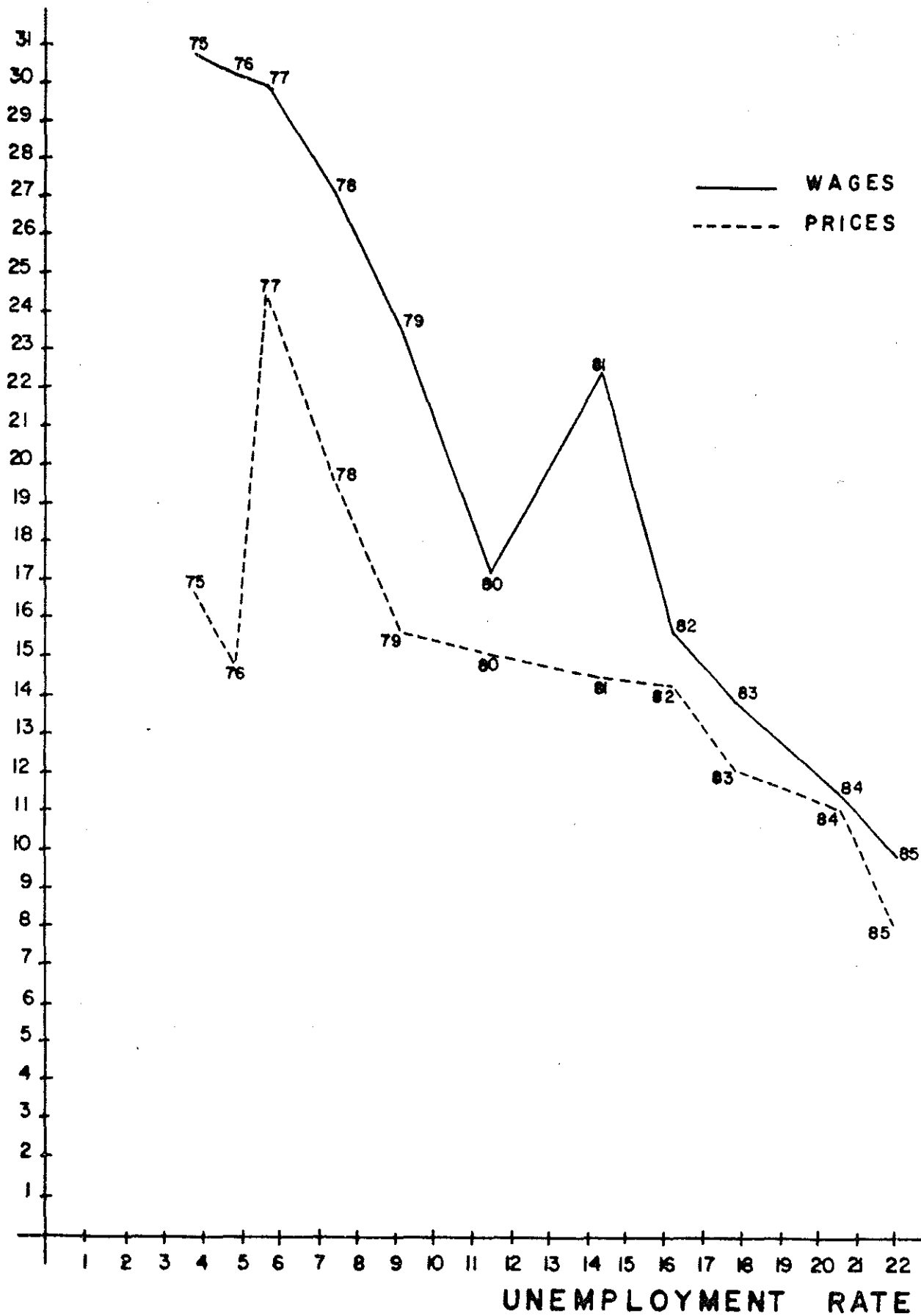
The most negative feature of the current state of the Spanish economy is its very high rate of unemployment (22% in 1985). Even the prospects of an imminent recovery that would put an end to the present crisis does not bring reasonable hopes for a substantial reduction in the number of unemployed.

A natural question to ask in this context is whether an expansionary policy could be helpful in reducing unemployment without jeopardizing the success which has been achieved in curing inflation. This kind of policy has recently been recommended for Europe by the CEPS Macroeconomic Policy Group (see Layard et al. (1984)) and the aim of this paper is to discuss the main consequences that would result should it be applied to the Spanish economy.

Is there a negatively sloped short-run Phillips curve that allows for the exploitation of the celebrated trade-off between inflation and unemployment in Spain? Figure 1 depicts the observations of inflation and unemployment in Spain from 1975 to 1985: there is an obvious negative correlation between both variables and it would be an easy task to fit regressions with reasonably high R^2 aimed to "quantify" the increase in

FIGURE 1

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inflation needed to reduce unemployment by one per cent. We will argue, though, that expansionary policies built on this basis would not yield the desired result.

This paper aims to give a qualitative characterization of the Spanish short-run Phillips curve. We put forward an argument showing that this curve is currently vertical and that the apparent trade-off shown in Figure 1 is misleading, as it is caused by an increase in the equilibrium rate of unemployment that is not directly related to demand problems. The rest of the paper is organized as follows. In Section 2 we analyze the real and price effects of variations in the rate of growth of nominal aggregate demand in a set up that leads easily to the conclusion that the short-run Spanish Phillips curve is vertical. In Section 3 we give an explanation of why Figure 1 does not contradict the verticality of the curve. Section 4 contains conclusions and comments. Computation of trend output and data are given in the Appendix.

2. The effects of changes in nominal aggregate demand

The effectiveness of expansionary policies which are implemented by means of sustained increases in aggregate

nominal demand depends crucially on the speed of adjustment of inflation to changes in nominal GDP. The slower the response of prices, the larger will be the room for an expansionary policy to have real effects. On the other hand, the faster the adjustment, the less costly it would be in terms of lost output to stop inflation by slowing down the growth of nominal demand.

The following set up is taken from Gordon (1982), who applied it to studying the costs of stopping inflation in several historical settings. Let NGDP and RGDP denote nominal and real Gross Domestic Product respectively. Let P denote the GDP deflator. Then, for every t we have the identity

$$\text{NGDP}_t = P_t \cdot \text{RGDP}_t \quad (1)$$

If we denote rates of growth by dots, we have from (1)

$$\dot{\text{NGDP}}_t = \dot{P}_t + \dot{\text{RGDP}}_t \quad (2)$$

Let T_t be the trend rate of growth of real output. Then we have from (2)

$$\dot{\text{NGDP}}_t - T_t = \dot{P}_t + (\dot{\text{RGDP}}_t - T_t) \quad (3)$$

Equation (3) states that any deviation of the rate of growth of nominal GDP from the rate of growth of trend real GDP splits into a price movement \dot{P}_t , and a real fluctuation $(\dot{RGDP}_t - \dot{T}_t)$. In the long run, this last term must be zero and the rate of growth of prices matches exactly any permanent movement in $(NGDP_t - T_t)$. In the short run, however, fluctuations in aggregate nominal demand may have real effects. Define¹ α_t , for every t , by

$$\alpha_t (NGDP_t - T_t) = P_t \quad (4)$$

Then we have

$$(1-\alpha_t)(NGDP_t - T_t) = (RGDP_t - T_t) \quad (5)$$

From (4) and (5) we see that values of α_t close to one imply that the effect of a deviation of nominal demand from real trend will fall mainly on prices. Conversely, values far from one imply large real effects. In terms of policy, stopping inflation by means of controlling the growth of nominal demand will be less costly the closer are the α_t to unity; the exploitation of the trade-off implied by a short-run Phillips curve will only be possible if the values of α_t are far enough from one.

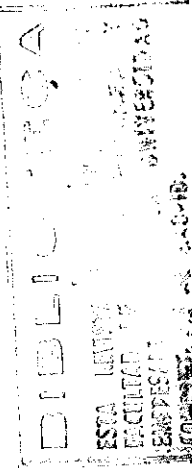
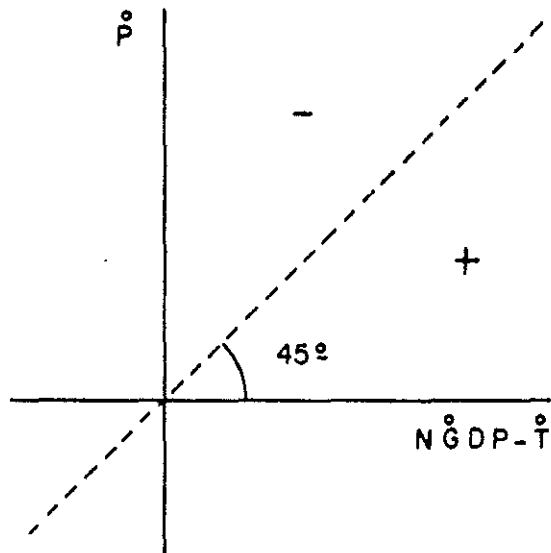


FIGURE 2



The question of whether or not the α_t values are close to one is an empirical one. Gordon (1982) shows evidence of a very large variance across countries and time periods and puts forward a graphic analysis which we adopt to study the Spanish case.

In Figure 2 we represent the values of $(NGDP - T)$ on the horizontal axis, and the values of P on the vertical one. For α_t close to one, the observations would lie close to the 45° line. Observations under this diagonal correspond to values of α_t smaller than one and, consequently, rates of growth of real GDP above trend, as can be deduced from (5). This acceleration in output growth implies some reduction in unemployment². In the same way, observations above the diagonal correspond to α_t values larger than one, rates of growth of real GDP less than trend, and increases in unemployment.³

The translation of these facts into terms of output won or lost is not obvious and it depends on the definition of trend GDP: if we fit a trend by Least Squares (See Appendix 1), the sum of deviations from trend is going to be zero; that is to say, we incorporate a strict "natural rate hypothesis" in which there is no such thing as output won or lost in the long run. In the short run, however, there may exist real fluctuations and there is no reason why short-run Phillips curves could not be negatively sloped.

FIGURE 3

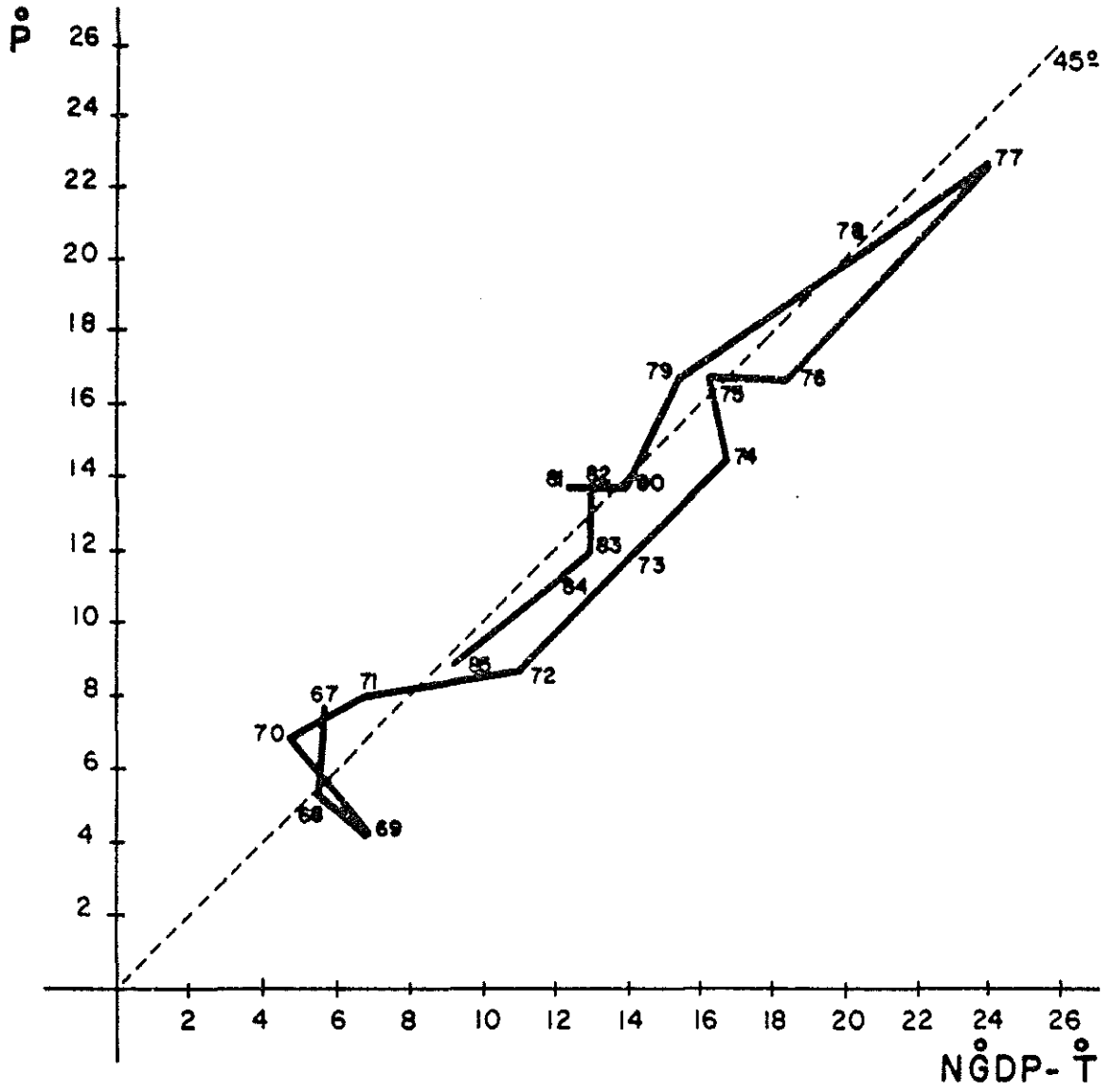


TABLE 1

		<u>Mean and Standard Deviation of α_t</u>		
	$\left\{ \begin{array}{l} 1967-74 \\ 1974-85 \end{array} \right.$	$\dot{T} = 6.56$	$\dot{T} = 6.56$	$\dot{T} = 6.56$
		$\dot{T} = 1.66$	$\dot{T} = 2.66$	$\dot{T} = 3.66$
1967-85	$\left\{ \begin{array}{l} \text{MEAN} \\ \text{STD.DEV.} \end{array} \right.$	1.00	1.04	1.10
		.19	.19	.21
1967-74	$\left\{ \begin{array}{l} \text{MEAN} \\ \text{STD.DEV.} \end{array} \right.$	1.01	1.02	1.03
		.29	.29	.30
1974-85	$\left\{ \begin{array}{l} \text{MEAN} \\ \text{STD.DEV.} \end{array} \right.$.985	1.06	1.14
		.07	.08	.10

		<u>Values of α_t for the estimate \dot{T}</u>							
		<u>1967</u>	<u>1968</u>	<u>1969</u>	<u>1970</u>	<u>1971</u>	<u>1972</u>	<u>1973</u>	<u>1974</u>
α_t		1.33	.91	.61	1.48	1.18	.79	.84	.99
		<u>1975</u>	<u>1976</u>	<u>1977</u>	<u>1978</u>	<u>1979</u>	<u>1980</u>	<u>1981</u>	<u>1982</u>
α_t		1.03	.90	.90	.97	1.09	.99	1.09	1.05
		<u>1983</u>	<u>1984</u>	<u>1985</u>					
α_t		.91	.93	.95					

Figure 3 and Table 1 show the Spanish case from 1967 to 1985⁴. The observations are tightly grouped along the main diagonal and the values of α_t are close enough to one to indicate a quick response of prices to variations in the rate of growth of nominal demand. This implies great difficulty in inducing real fluctuations by means of expansionary policies. In other words, the short-run Phillips curve consistent with Figure 3 is vertical.

It is remarkable that the standard deviation of α_t is much smaller in the period 1974-85, in which high inflation was experienced, than it is in 1967-73. This supports the scenario of people learning quickly to live with inflation, as can also be seen in Figure 4 and which we will discuss below.

Since the choice of trend plays a crucial role in determining the α_t , it could be argued that the estimated rate of growth of real output from 1974 to 1985 is too low and it may reflect underutilization of resources rather than an actual slowdown in real output trend growth. Without trying to discuss this issue in any depth, we have done a small sensitivity analysis by considering rates of growth T one and two points larger than the estimated rate of 1,66% for the period considered. The results of this exercise are also presented in Table 1: The effect of increasing T is a small increase in

FIGURE 4

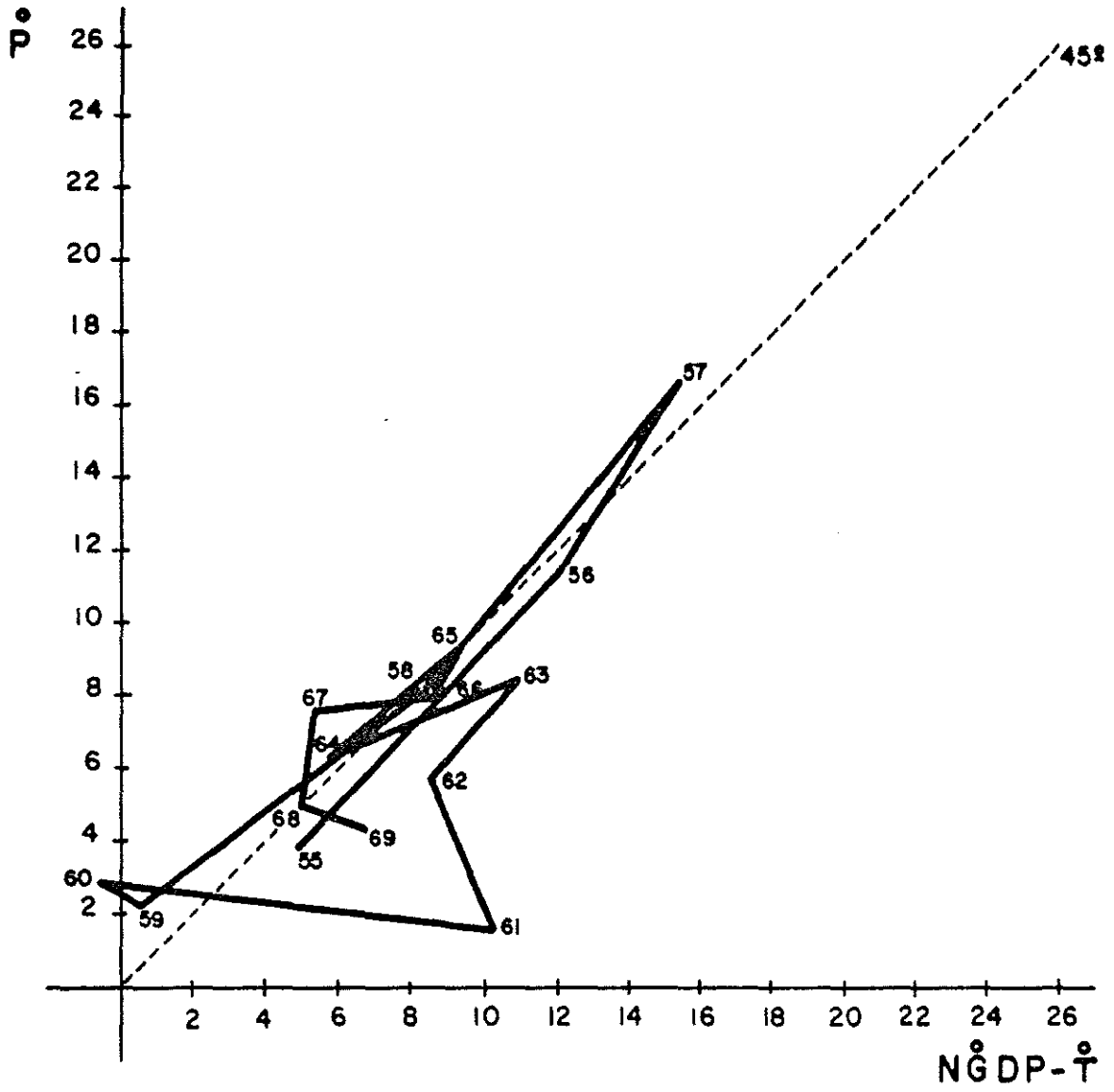


TABLE 2

		<u>Mean and Standard Deviation of α_t</u> (\$5)	
1955-70	}	MEAN	.80
		STD.DEV.	1.71

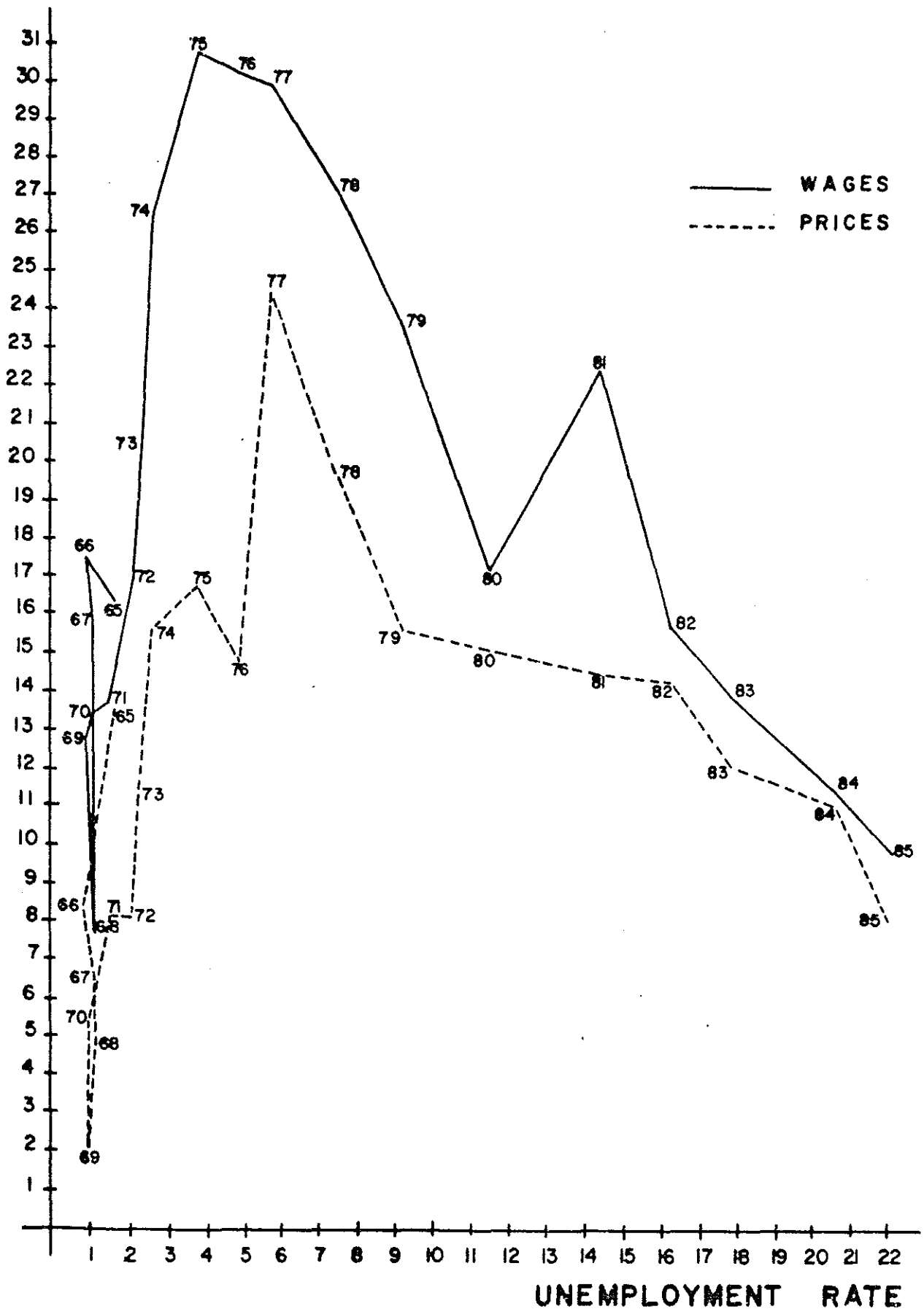
		<u>Values of α_t</u>							
		<u>1955</u>	<u>1956</u>	<u>1957</u>	<u>1958</u>	<u>1959</u>	<u>1960</u>	<u>1961</u>	<u>1962</u>
α_t		.80	.95	1.09	.98	4.31	-4.66	.16	.67
		<u>1963</u>	<u>1964</u>	<u>1965</u>	<u>1966</u>	<u>1967</u>	<u>1968</u>	<u>1969</u>	<u>1970</u>
α_t		.77	1.08	1.00	.93	1.45	.99	.64	1.60

the variance of α_t . This last increase is quite negligible, specially if one takes into account that claiming a rate of growth of 3,66% in the period considered is probably far beyond plausibility. The effect of an increased rate of growth of trend output on Figure 3 is a translation parallel to the x-axis: As observations move to the left the short-run cost of fighting inflation increases, and the trade-off between inflation and unemployment becomes more exploitable. However, in our case, the basic grouping of the observations along the main diagonal is not changed by small variations in the estimated T . We conclude that our claim of verticality of the short-run Phillips curve is quite robust with respect to alternative estimations of trend output.

The values of α_t being close to one is not merely a result of the statistical method used to fit the trend. By using the same technique we show next that things have been different in the past. Figure 4 and Table 2 are the equivalents of Figure 3 and Table 1 for the period 1954-70³. The observations no longer lie along the diagonal and the variance of α_t is very high. It is not the aim of this paper to discuss what might have been going on in the late fifties and early sixties in the Spanish economy. We want just to stress the fact that the α_t as a sequence have not always been close to unity, and therefore, the verticality of the short-run Phil-

FIGURE 5

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lips curve is a phenomenon that has appeared in the last decade.

3. Unemployment and Inflation in the Spanish Economy

In Figure 5 we have plotted the observations of unemployment and inflation for the Spanish economy from 1964 to 1985. This plot has two different parts: The first one, from 1964 to 1975, depicts a vertical oscillation that has nothing to do with the negative correlation between inflation and unemployment that should be shown by a Phillips curve of the kind described in many Macroeconomics textbooks. This part, of course, is well in line with the claims made in the previous Section about the verticality of the short-run Phillips curve.

On the other hand, the second part of the plot (the one that corresponds to Figure 1) does show this negative correlation. However we are going to argue that there is no contradiction between this fact and a vertical short-run Phillips curve as was claimed in Section 2.

The crucial question to ask is whether the sustained increase in unemployment that Spain has experienced in the last decade has been caused by policies aimed at reducing inflation. A more general question of the same kind would ask about the role of the demand side of the economy in the destruction of employment in the recent past. This is a largely unexplored issue in Spain. Some light is shed on this issue by Dolado, Malo and Zabalza (1986) who provide some evidence about the role of the cyclical component of demand in preventing industrial unemployment from reaching higher levels until 1979. But from then on it has acted as a recessive factor at least until 1984. However, when they compute the equilibrium rate of unemployment (NAIRU) that results from their model, they find it to be almost equal to the observed rate in the period 1980-84, leaving very little room for departures of demand from its equilibrium level to play any significant role.

In 1974 trend real output bent sharply in Spain (See Figure 6). Since then, more than 2,5 million jobs have been destroyed in the private sector in a process that nowadays barely seems to be contained. Figure 1 depicts the history of this process: The equilibrium rate of unemployment has been pushed to the right by deep structural causes that it would be just too naive to interpret as demand problems or the result of the evolution of prices. The empirical negative

correlation between inflation and unemployment stems from this displacement of the NAIRU and not from the short-run effect on employment of a reduction in the rate of growth of prices. Should it have been otherwise, i.e., should the increase in unemployment have corresponded to a short-run real fluctuation caused by a drop in the rate of growth of nominal demand, the values of α_t would have been further away from unity in the period 1974-84 than in former years. Table 1 shows that just the contrary has happened.

Of course, we are not trying to prove anything about Figure 1. We do not have a model for it. What we just have is a plausible story that makes it consistent with the empirical results of Section 2, i.e., with the present verticality of the short-run Phillips curve in Spain.

4. Conclusion

In this paper we have defended that the short-run Phillips curve for the Spanish economy has become vertical. We have not put forward a model for the curve: we have limited ourselves to analyze empirically how quickly prices respond to variations in aggregate nominal demand. This has yielded a kind of qualitative result that, should probably not be pushed too far, i.e., it does not provide an instrument

for quantifying responses of unemployment to inflation. But, on the other hand, it states clearly the kind of consequences we might expect from an expansionary policy: most of its effects would go into prices and the induced reduction in unemployment would be, even in the best of cases, very small.

Appendix: The estimation of trend real output

The basic reference for the estimation of the trend of Spanish real GDP is Espasa (1984). In this work he uses quarterly data and he discusses the relative merits of a battery of statistical techniques. In our work we depart slightly from his conclusions, first because we use annual data, which we believe to be far more reliable, and second because we stick to the idea of trend GDP growing at constant rates within periods in which there has been no structural change. We favour, then, the use of splines which have the additional advantage of permitting the distinction between permanent and transitory shocks by means of the selection of knots.

Equation(6) shows the results of estimating the trend in the period 1966-1985 with a unique spline with knot in 1974.

$$\log \text{RGDP} = 7.48 + 0.064 \text{ TREND} - 0.047 \text{ SPLINE 1} \quad (6)$$

(49.3) (24.1)

$$R^2 = .997$$

Equation(7) shows the estimation corresponding to 1954-1974 with one spline with knot in 1960.

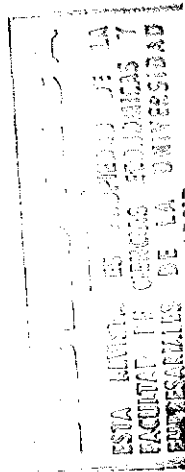
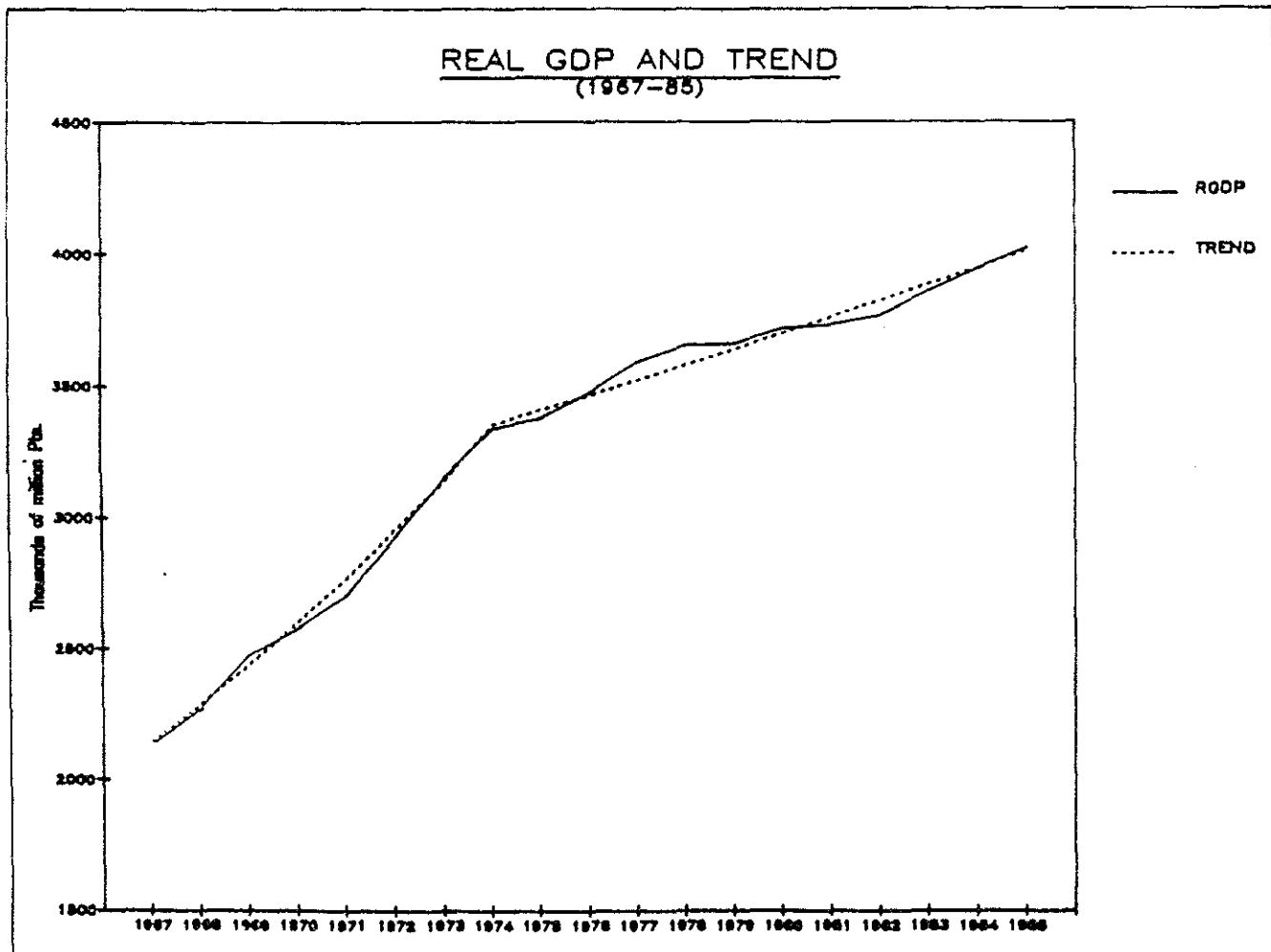
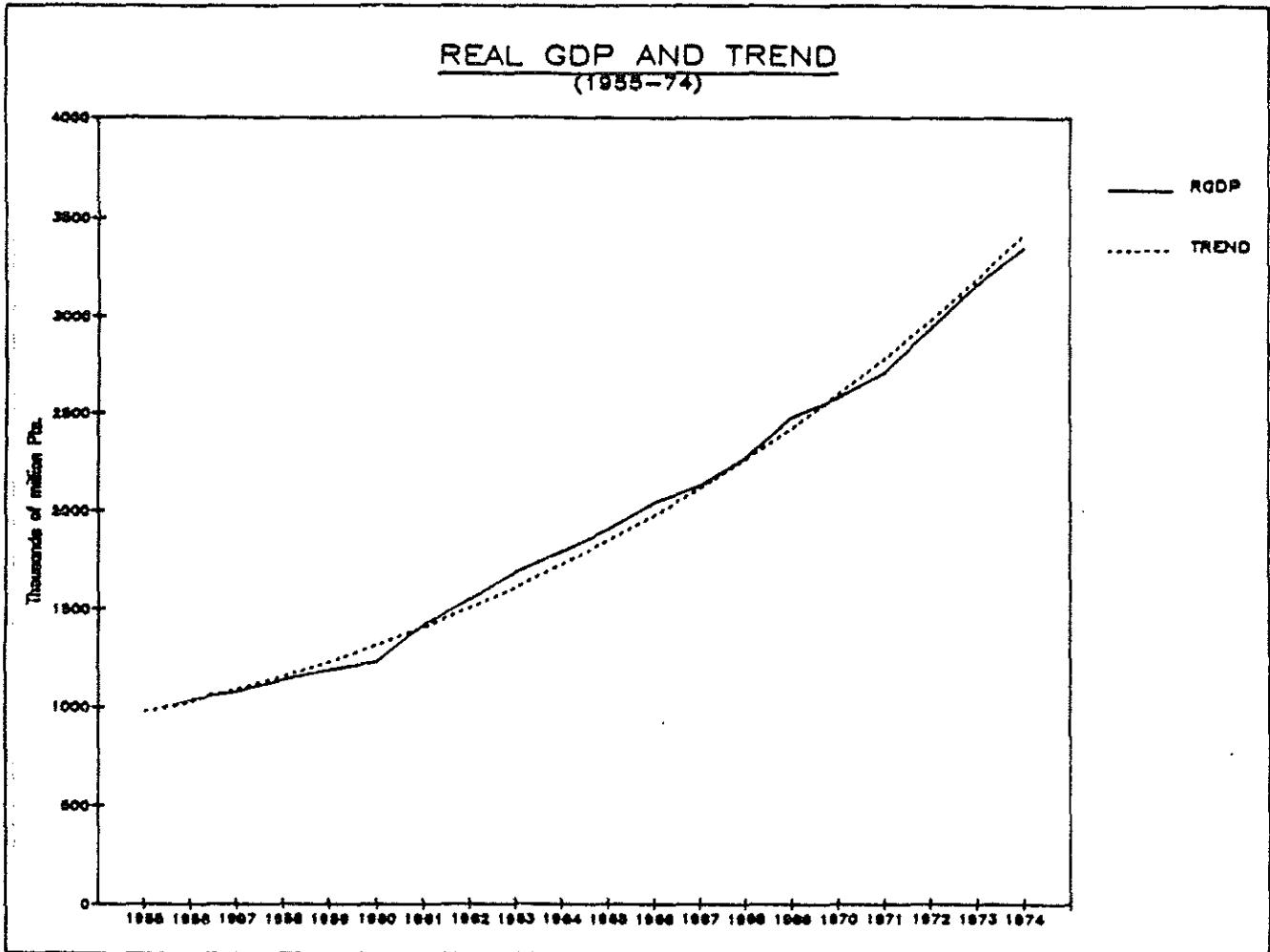


FIGURE 6



$$\log \text{RGDP} = 6.76 + 0.058 \text{ TREND} + 0.009 \text{ SPLINE 2} \quad (7)$$

(11.6) (1.6)

$$R^2 = .996$$

The rate of growth of trend real output implied by equation (7) are 6% from 1955 to 1959 and 7% from 1960 to 1974.

Real output and trend are depicted in Figure 6.

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NOTES

We are grateful to Antonio Zabalza and the participants of the Seminars at the Bank of Spain and the Universities of Bilbao, Barcelona and Autonomia of Barcelona for very helpful comments.

(¹).- We depart from Gordon in the definition of α_1 . Since his data are quarterly, he specifies a dynamic adjustment process by means of a price adjustment equation in which α is a structural parameter. This equation happens to be a hidden short-run Phillips curve in which the estimation of α is hazardous, to say the least. With annual data we do not feel so much constrained to specifying a dynamics. Moreover, our definition of α_1 allows for a less formal treatment of adjustment of prices without assuming its stability over time or making it depending directly on real fluctuations as in Gordon (1984).

(²).- We do not need, and we do not claim, a stable transmission from output to employment. On the other hand, it seems natural to think of an equilibrium level of unemployment -corresponding to trend growth of real output- over which reductions and increases are implied by $\alpha_1 > 1$ or $\alpha_1 < 1$.



- (³).- Supply shocks enter in our analysis in two different ways. Those considered permanent modify the trend growth of real output and do not cause any particular movement in figure as (3) or (4). Transitory ones imply departures of α_t from unity and will cause vertical or north-west movements in the graphics.
- (⁴).- The availability of data of uniform quality determines the selection of the period 1967-1986.
- (⁵).- Data are taken from Schwartz (1976) for the period 1954-1964. This data come from a revision of the National Accounts for their period and they are widely considered to be the more reliable ones.
- (⁶).- As the rate of growth of trend output is estimated differently in Table 2 than in Table 1, the values of α_t for 1967-70 have small differences with those presented in Table 1.