

Papers ESADE núm. 153
marzo, 1997

**INFLATION CONVERGENCE, WAGE
GROWTH, AND MONETARY POLICY: A
NOTE ON THE SPANISH CASE**

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Depósito Legal: B-4.761-1992

ISSN: 1132-7278

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Abstract

This note explores some aspects concerning the evolution of the inflation rate in the Spanish economy which may be relevant in the context of Maastricht convergence criteria. It concludes that whereas wage moderation may be a convenient anti-inflation strategy, a contraction in monetary policy may not.



1. Introduction

1997 is expected to be a crucial year with regard to Maastricht convergence criteria. As is well known, these criteria include requirements about the behavior of exchange rates, interest rates, inflation, and public debt and deficit. It is also well known that the fiscal dimension of the Treaty is being the most troublesome for basically all the Union members. However, for some countries the inflation requirement is a matter of serious concern too; and not only by itself, but mainly because the countries with a significant inflation differential still see room (and hope) to exploit the so-called virtuous circle: lower inflation, lower interest rates, lower deficit, higher growth, lower deficit, lower inflation. For these countries the key to convergence may be in the simultaneous path embedded in this circle, which is expected to be activated by lower inflation rates. Spain is among them.

The objective of this note is to report the results of some projections centered around the likely evolution of the Spanish inflation rate during 1997 under alternative scenarios for wage and monetary policy behavior. The projections are performed with a small macroeconometric model estimated for the period 1970-1995 and are presented in the next section. In the light of the evidence, the last section of the note assesses the recent calls for wage moderation.

2. Projections

The model¹ that underlies the projections reported in this section contains a small set of quarterly key indicators of the Spanish macroeconomy during the period 1970:1 to 1995:4. The selected variables measure the money stock, the price and wage levels, and real output and employment levels. Thus, the model includes three nominal and two real indicators. The appendix gives more detailed information about the data.

One important feature of the estimated model is that it incorporates a complete stochastic description of the included variables, which actually invites to use the model for characterizing aspects of the future stochastic evolution of the economy, as opposed to just performing deterministic simulations and focusing the discussion on statistically meaningless point forecasts. We want to make a clear-cut distinction between these two alternative uses of the model, and stress that, in our view, only the first is interesting. In fact, the interesting questions about the future always involve probability statements.

In this spirit, we present in Figures 1 and 2 the 96% levels and growth rates projected bands² of our model for 1996 and 1997, with information up to 1995:4. Tables 1 and 2 contain the corresponding numerical values for a set of selected periods. As can be seen, the model projects an average increase in real wages of around 1% along with average growth rates of close to 3% and employment creation rates slightly above 2.5%; money average growth is around 8.5%. Overall, these base-line projections look quite reasonable. Noteworthy is the rather large range of uncertainty they imply about the future, a standard feature of economic projections that highlights the convenience of thinking and talking in probability terms.

One aspect of the projections that has drawn the attention of economic agents in general and policy makers in particular is the likely evolution of the inflation rate of the economy; an indicator explicitly included, as we have already mentioned, in the Maastricht convergence criteria to qualify as a participant in the European Monetary Union process. We now focus on this indicator.

As a preliminary test, we first look at the 1996 projection. It will probably be remembered that at the end of 1995 the official target inflation rate for the end of 1996 was 3.5%. An interesting question then is how likely was that target to be met according to our model. Based on the inflation projection presented in Figure 2 we actually get a probability of 0.17 of ending 1996 with an inflation rate greater than 3.5%. Thus, the target was highly likely.

¹ This model is described in detail in Ballabriga (1997).

² These and the projections presented below are all obtained from stochastic simulations involving a thousand draws from the error term component of the model.

This probability is reported in Table 3 along with other probabilities to which we will refer next.

What about the projected probability for the end of 1997? Currently (beginning of 1997), it is widely considered as reasonable to target a rate of 2.5%. Again based on the projection in Figure 2 (and so with information up to 1995:4) our model's base-line probability for the event that the end of 1997 inflation rate will be above 2.5% is 0.44, which is actually rather large³.

Can something be done to reduce this probability? Well, let us compute some alternative projections of the model (see Table 3).

Consider first a projection that constrains the wage to grow at a rate of 3.5% during 1996:1,2 (which roughly coincides with published provisional data) and at a rate of 4.5% from 1996:3 to 1997:4. Under this scenario the end of 1997 inflation rate will be above 2.5% with probability 0.70. However, if we keep the rate of 3.5% for 1996:1,2 and constrain the wage to grow at 3% during 1996:3,4 and 2% during 1997 that probability is reduced to 0.15.

Another interesting projection is to consider a scenario characterized by a deceleration of money growth. Specifically, suppose we impose the observed growth rate for money during 1996:1,2,3 (see Table 3) and a rate of 6% from 1996:4 to 1997:4. The result is that the end of 1997 probability range for inflation is basically unaffected by the condition, and so we estimate that it will be above 2.5% with probability 0.46.

³ Notice that an average nominal wage growth of approximately 3.5% underlies this base-line probability.

3. Interpretation

What do these projections suggest? Policymakers have lately been asking for moderate wage increases. In their mind they may still consider that wage indiscipline would have to be offset by a tighter monetary policy. According to our model, wage moderation certainly is a crucial determinant factor of the future path of inflation. But a deceleration of the money growth does not seem to be an effective strategy.

Some clues for a possible interpretation of these results can be found in Figures 3 and 4. They contain the 96% projected effects on the complete system of the two anti-inflation alternatives considered in this note: wage and money growth deceleration. The wage strategy shifts down the projected probability structure for wage and price rates, implying a very slight shift downward of the real wage projection and upward of the output and employment projections. The money growth strategy, however, leaves the wage and price projections basically unaffected, but clearly shifts downward the probability projections for output and employment growth rates. Thus, the money strategy not only appears as ineffective in terms of price effects, but also costly in terms of real growth.

All this points to the conclusion that the average behavior of the Spanish economy during the period 1970-1995 is consistent with the following premises:

- (1) Autonomous wage evolution with clear impact on the evolution of prices
- (2) A weak direct impact of monetary policy on prices
- (3) Potential real effects of wage and monetary policy

These premises are also consistent with our recent economic evolution: an extremely tight monetary policy had to be implemented during the last decade in order to tame inflation. The degree of tightness was so strong because the impact on prices was limited by the autonomous wage behavior⁴, making the anti-inflation policy costly in terms of output and jobs. In fact, only when wage growth has decelerated has it been possible to loosen monetary policy and still get a significant reduction of the inflation rate.

In conclusion then, the empirical evidence presented in this note suggests that the power of monetary policy to affect prices may not lie in itself, but rather in its potential to affect, via credibility, the behavior of intrinsically inflationary factors. It is also consistent with the view that wage growth moderation would be an effective anti-inflation strategy that furthermore could incentivate aggregate economic activity at a very slight cost, if any, in terms of average purchasing power loss.

⁴ Fiscal behavior may certainly be part of the story too. But we do not have fiscal variables in our model.

References

Ballabriga, F.C. (1997): "Bayesian Vector Autoregressions". *Investigaciones Económicas*. Forthcoming.

García Perea, P.; Gómez, R. (1994): "Elaboración de series históricas de empleo a partir de la Encuesta de Población Activa (1964-1992)". *Working Paper* 9409. Madrid: Bank of Spain.

Appendix: Data

The following time series for the period 1970:1-1995:4 have been used in this paper.

- M → Broad Money (ALP). Average of monthly data. Millions of pesetas. Bank of Spain.
- W → Wage per Worker. Thousands of pesetas. Bank of Spain.
- P → Consumer Price Index. 1992 = 100. Average of monthly data. INE.
- Y → GDP at 1986 prices. INE.
- EMPL → Employment. Thousands of workers. INE and García Perea & Gómez (1994).

TABLE 1

BASE-LINE PROJECTIONS
(Levels. 96% bands in parenthesis)

	1996: 4	1997: 4
M	79308951 (± 1632868)	85949092 (± 2413854)
W	849.4 (± 13.2)	880.0 (± 19.0)
P	118.5 (± 2.2)	121.3 (± 3.4)
Y	10821 (± 108)	11165 (± 167)
EMPL	12463 (± 211)	12816 (± 294)

TABLE 2

BASE-LINE PROJECTIONS
(Growth Rates. 96% bands in parenthesis)

	1996: 4	1997: 4
M	8.51 (± 2.2)	8.37 (± 2.2)
W	3.64 (± 1.6)	3.54 (± 1.7)
P	2.52 (± 2.0)	2.35 (± 2.2)
Y	2.97 (± 1.0)	3.18 (± 1.1)
EMPL	2.64 (± 1.7)	2.82 (± 1.6)

TABLE 3

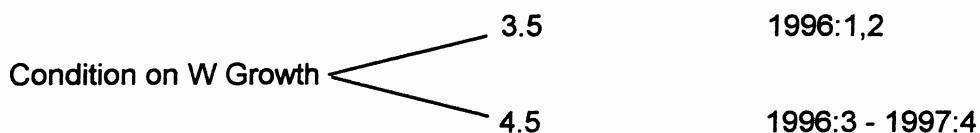
PROBABILITIES OF FUTURE EVENTS
(estimation period: 1970-1995)

Base-Line Probabilities

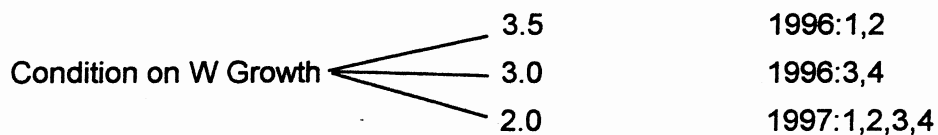
$$\Pr(\Pi_{96:4} > 3.5) = 0.1700$$

$$\Pr(\Pi_{97:4} > 2.5) = 0.4400$$

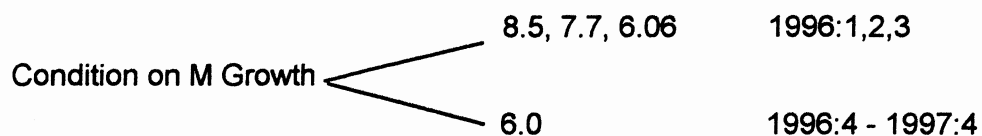
Conditional Probabilities



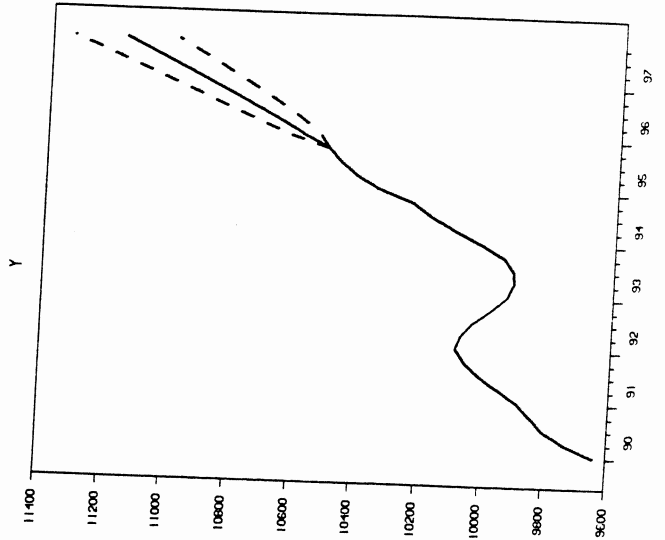
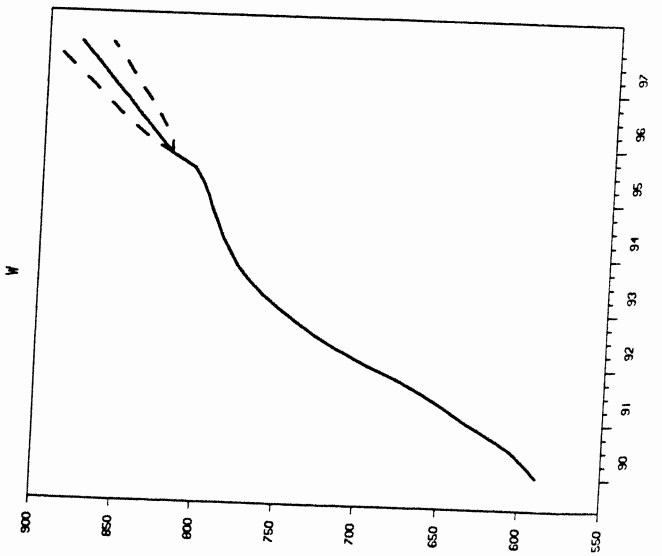
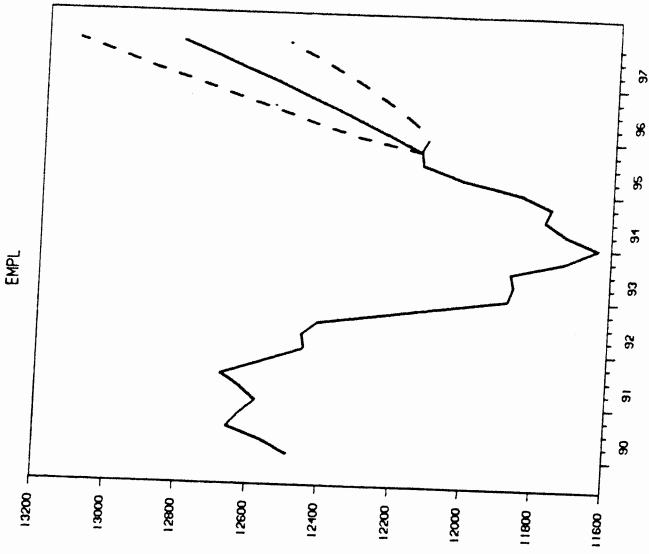
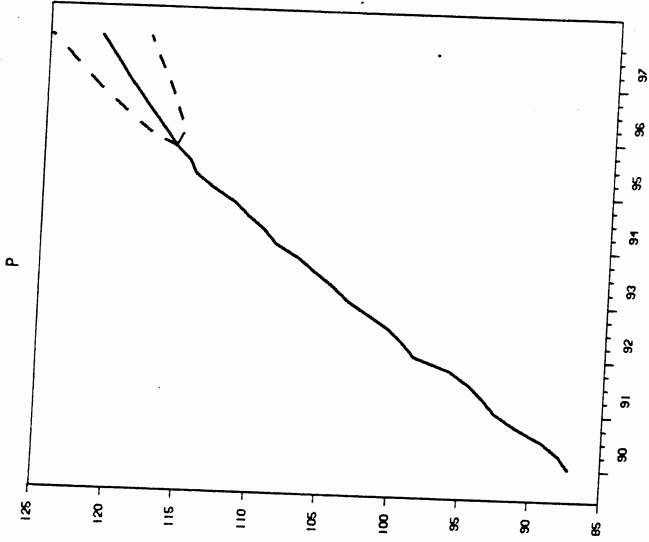
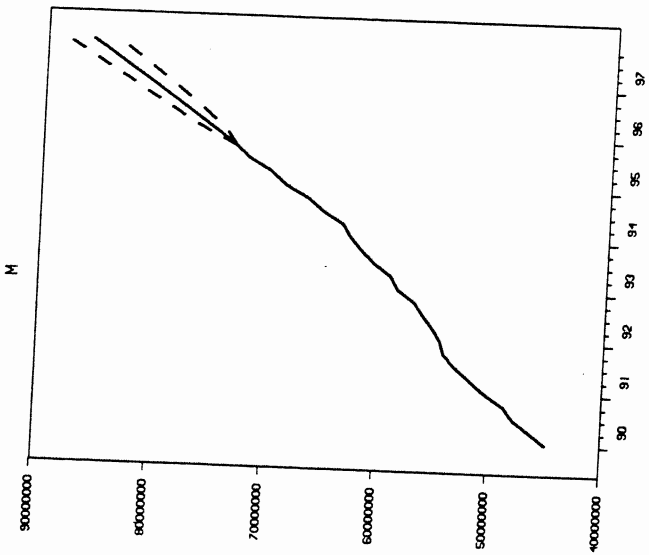
$$\Pr(\Pi_{97:4} > 2.5) = 0.7010$$



$$\Pr(\Pi_{97:4} > 2.5) = 0.1500$$

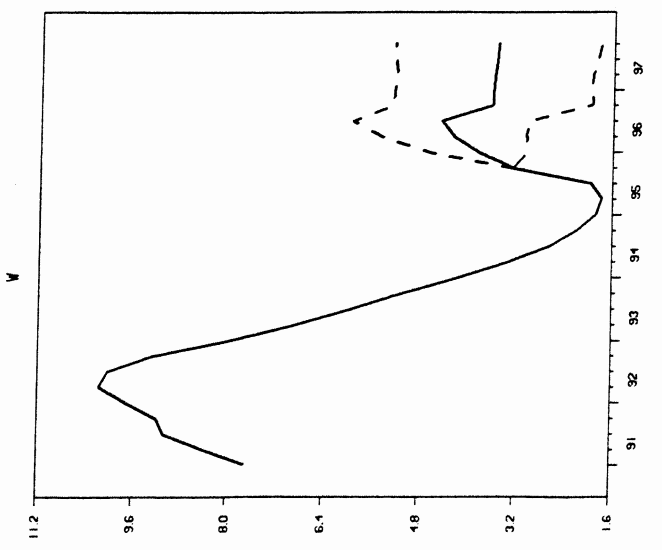
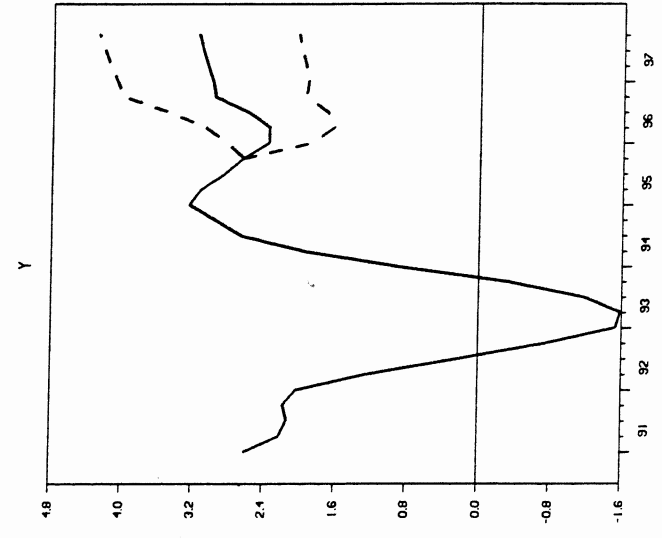
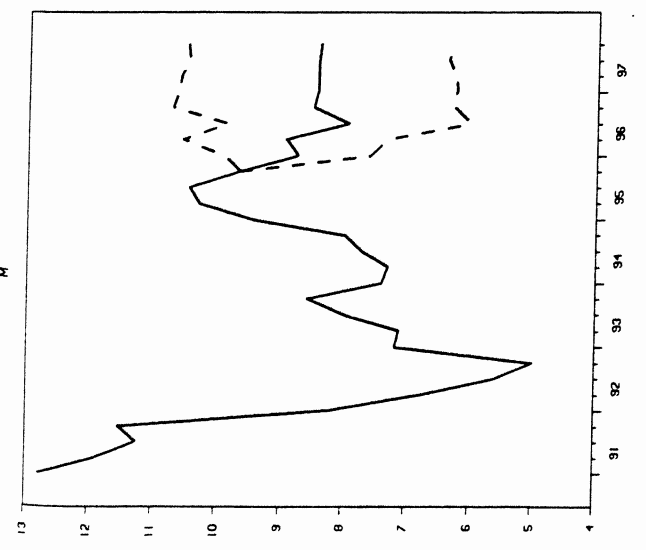
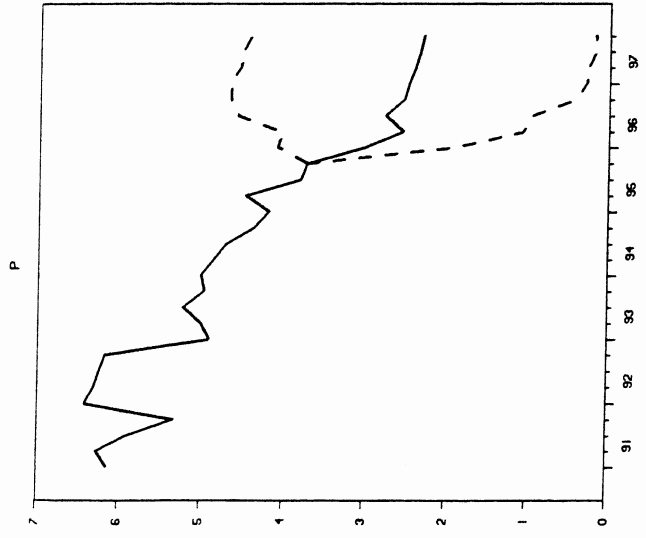
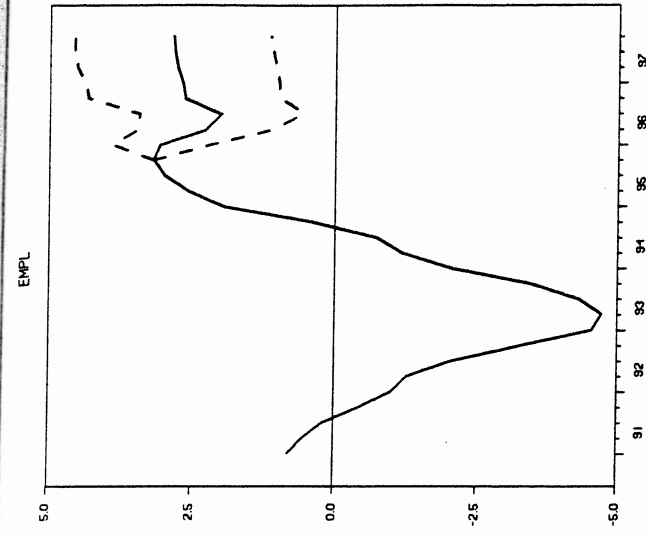


$$\Pr(\Pi_{97:4} > 2.5) = 0.4600$$



**FIGURE 1
BASE-LINE PROJECTIONS
(Levels)**

FIGURE 2
BASE-LINE PROJECTIONS
(Growth Rates)



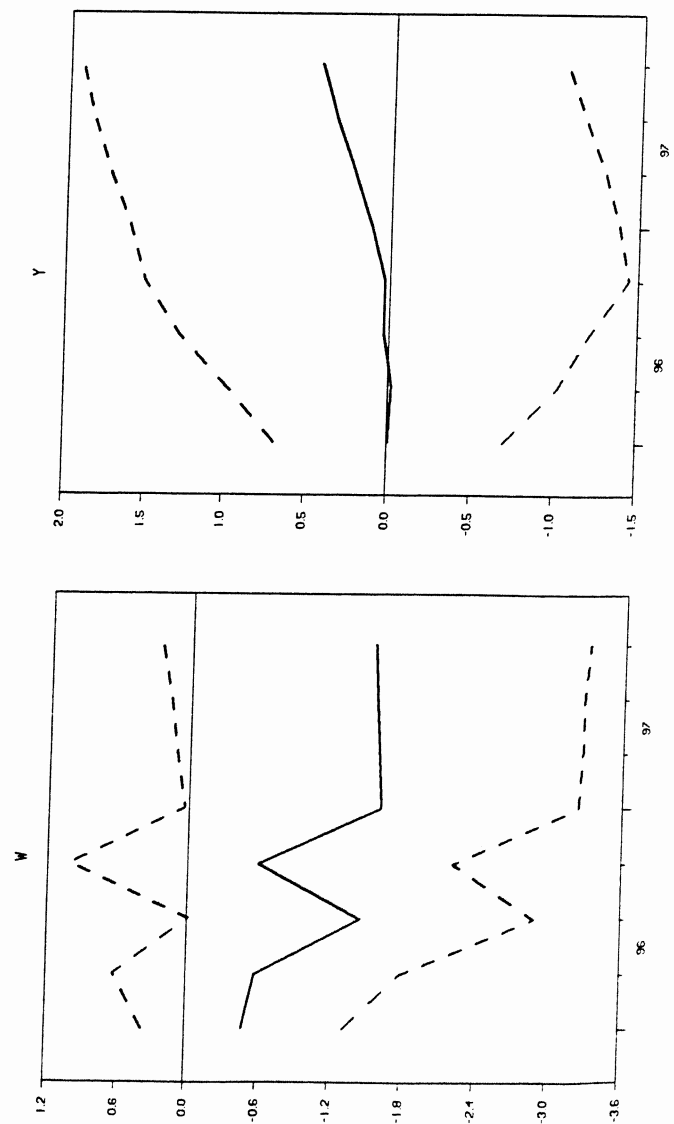
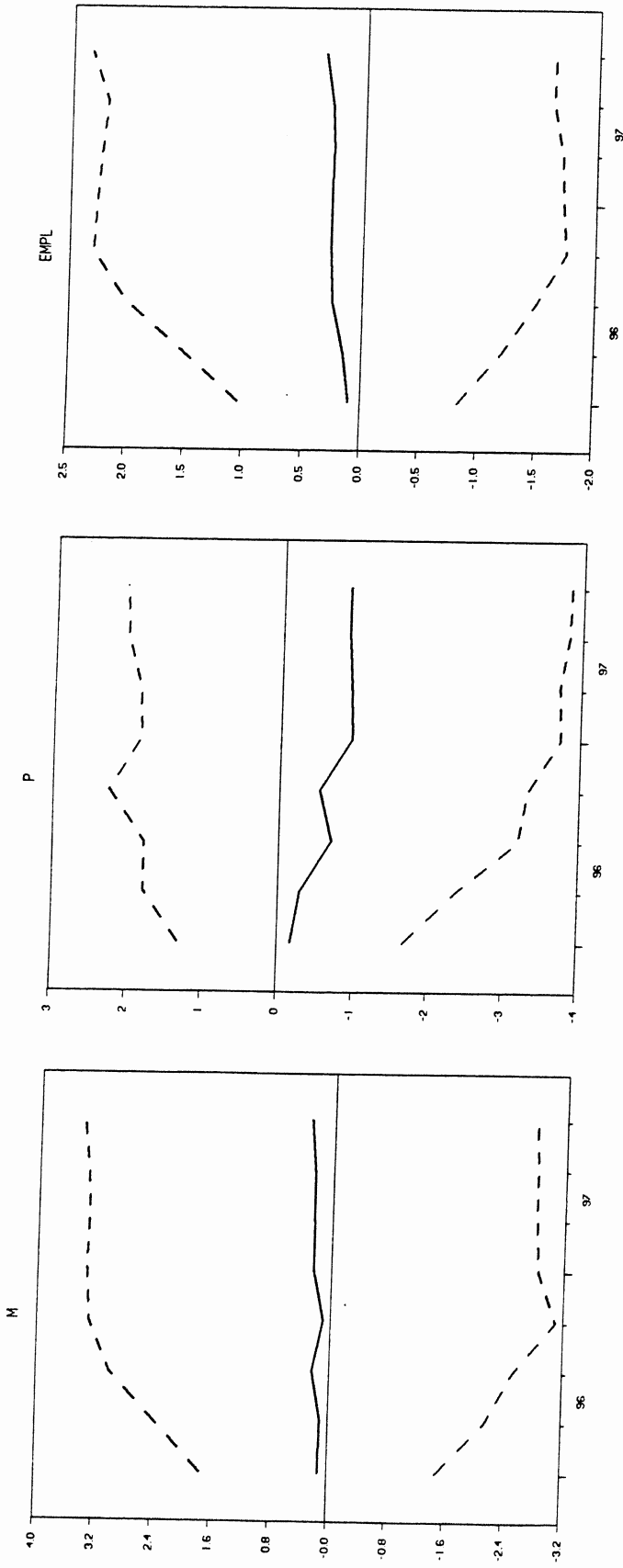


FIGURE 3
EFFECTS OF DECELERATING
WAGE GROWTH
(Growth Rates)

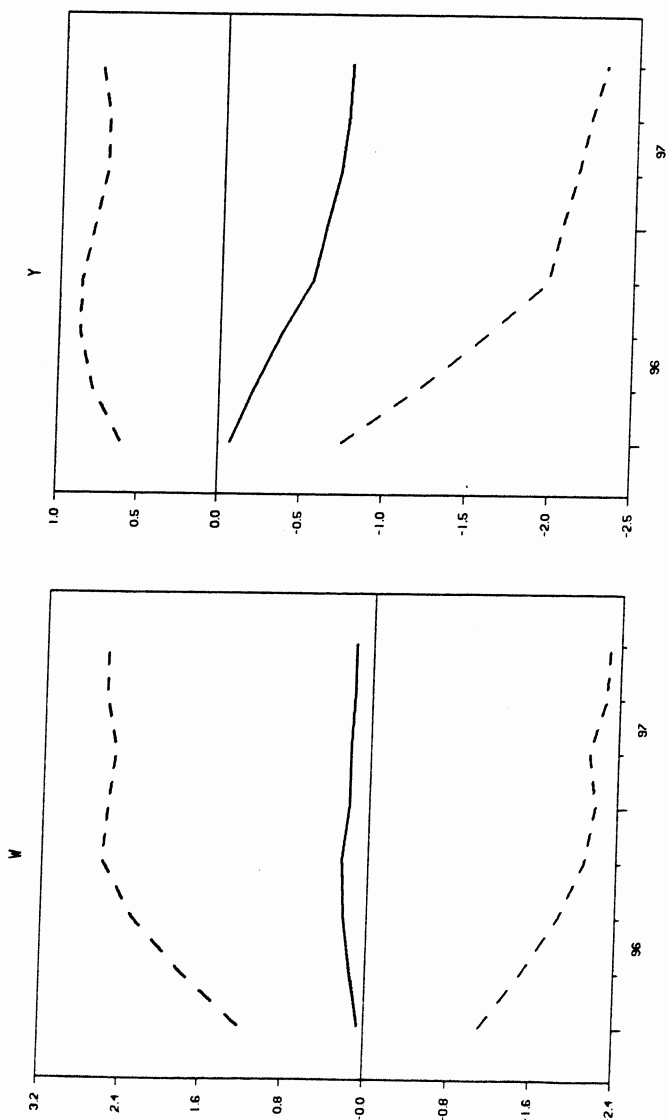
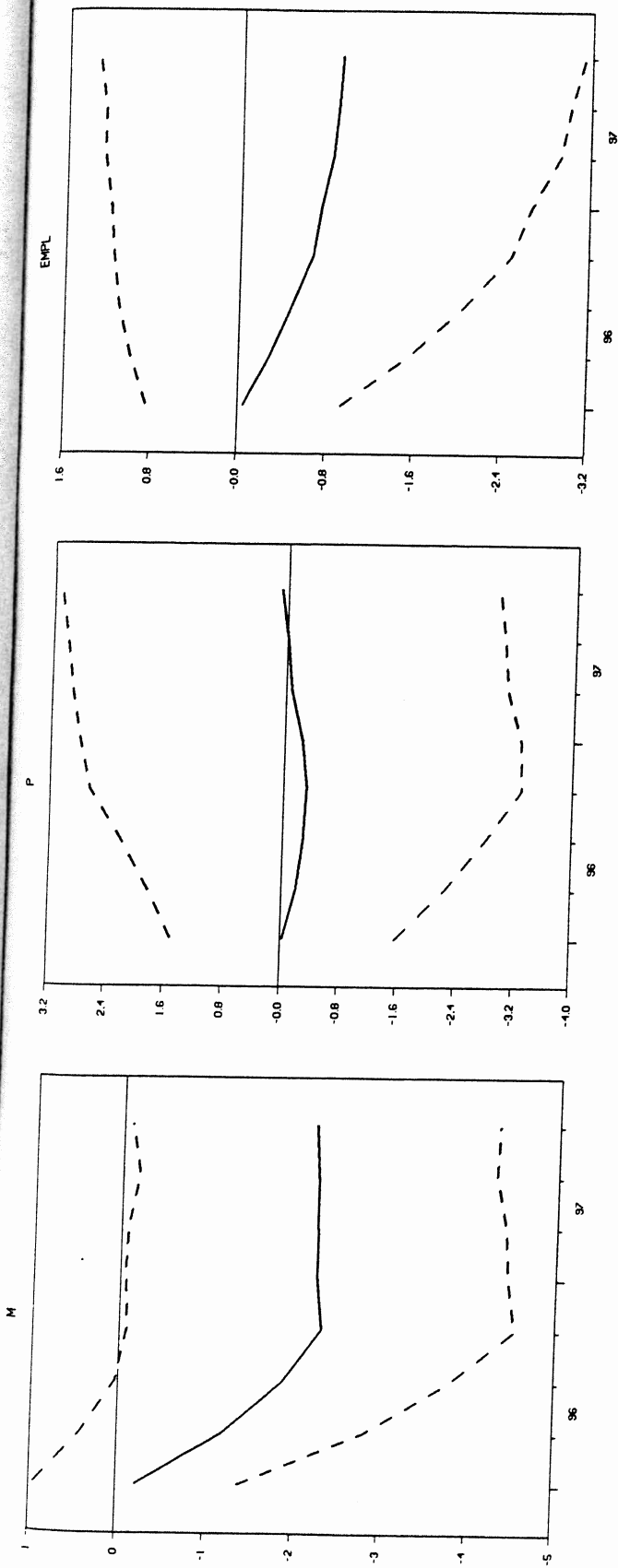


FIGURE 4
EFFECTS OF DECELERATING
MONEY GROWTH
(Growth Rates)