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Why Has Inflation in the United States Remained So Low? Reassessing the Importance of Labor Costs and the Price of Imports

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Abstract

This paper examines some of the factors that have been influential in keeping inflation low in the United States during 1995–98, despite strong growth and high levels of employment. Our results identify three important variables: declines in import prices, a slowdown in the growth of nonwage labor compensation, and a decline in labor costs. We also reassess the role of labor costs and import prices in determining price inflation.

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I. INTRODUCTION

1. Since the second half of 1996, consumer price inflation in the United States has slowed noticeably. At the same time, growth in real output has accelerated, and the unemployment rate has declined to historically low levels. The confluence of these developments has raised a number of questions about how strong growth in output and employment can coexist without igniting stronger upward pressure on consumer prices. The purpose of this paper is to identify and quantify the importance of some factors that have played a role in keeping inflation low since 1996, namely, the slowdown in the growth of non-wage labor compensation, the decline in the price of imports, and real marginal labor costs.

2. While the current literature acknowledges the importance of the decline of the price of imports in keeping inflation restrained,[2] there exists some controversy about the role that declining labor costs have played. In a recent paper, Lown and Rich (1997) augmented a traditional price Phillips curve with variables that capture changes in real unit labor costs and found that they were strongly significant in explaining the behavior of inflation since 1996. In contrast, a recent study by Hogan (1998) found that changes in unit labor costs were not significant in explaining inflation, but the decline in import prices played a key role. In light of the conflicting evidence, we reexamine the importance of changes in import prices and labor costs using a framework similar to the one used by the authors cited above. However, we introduce a different proxy for labor costs—labor's share of national income in the corporate sector—since, as shown by Rotemberg and Woodford (1999) and Gali and Gertler (1998), this variable is a measure of real marginal costs of production under a number of reasonable assumptions about the production technology, namely, constant returns to scale and zero overhead costs. We find that the inclusion of the labor share variable helps to explain U.S. inflation over the period from 1995 through 1998. The inclusion of this variable helps improve the performance of a traditional price Phillips curve because it captures the significant decline in labor's share—and hence, marginal costs of production—that has occurred between 1991 and 1997. Analysis presented here also suggests that, while there have been no fundamental changes in the way in which wages have been determined over the course of the current business cycle, the significant reduction in the rate of increase in non-wage labor compensation since 1995 has played an important role in restraining consumer price inflation. Other factors, such as declines in import prices, have also played a role. The acceleration in real wage growth that has occurred since 1995 has resulted from slower consumer price inflation, a declining trend in benefits and non-wage compensation, and faster growth in labor productivity.

3. The rest of the paper is organized as follows. The next section discusses trends in wages and presents the results from estimating a wage Phillips curve. Section III reviews some explanations of the inflation puzzle. Section IV discusses the theory behind including

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[2] See Gordon (1997) and Hogan (1998).

the labor share variable in the price Phillips curves and presents the results. Section V presents the conclusions.

II. Behavior of Labor Costs over the Business Cycle

4. One important factor driving the slowdown in price inflation since 1996 has been the behavior of labor costs over the current business cycle.[3] In particular, Figure 1 shows that growth in wages and salaries, as measured by the Employment Cost Index (ECI), was tempered during the initial phases of the current expansion in 1992, relative to the initial phases of the previous expansion. Since the last quarter of 1996, growth in wages and salaries has picked up, and it now more closely resembles the pattern exhibited over the previous cycle, although recent growth rates are still slower than in the previous cycle.

5. Real wages and salaries (as measured by nominal changes in the wage and salary component of the ECI less inflation) have exhibited strong growth in the current cycle relative to the previous one (Figure 2). Since the latter part of 1996, actual real compensation has exceeded expected compensation (nominal changes in the wage and salary component of the ECI less expected inflation) as a result of the fact that actual inflation was less than anticipated inflation. This stronger-than-expected growth in real wages may have served to temper demands for larger nominal wage increases since 1996. Also, workers may have agreed to accept smaller nominal wage increases in return for enhanced job security, but Kramer (1997) found no strong econometric support for this hypothesis.

6. To assess whether there has been a fundamental change in the way in which wages and salaries are determined over the current business cycle, a wage Phillips curve was estimated over the period from 1983Q2 to 1994Q4. In this equation, changes in the wage and salary component of the ECI were regressed on lagged consumer price inflation and the level of the unemployment gap, defined as the NAIRU less the actual rate of unemployment (Table 1).[4] Using the estimated equation, an out-of-sample forecast was generated for the period 1995Q1 to 1999Q2 and the results were compared to the actual changes over the specified period (Figure 3). In general, the estimated wage Phillips curve predicts actual wage inflation fairly well, but the equation tends to underpredict actual wage inflation somewhat over the period between 1997Q2 and 1999Q2. Over this period, the unemployment gap

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[3]The current business cycle is defined to be the period from March 1991 to the present, while the previous business cycle is taken to be the period from November 1982 through July 1990. These business cycle dates are taken from definitions adopted by the National Bureau of Economic Research (NBER). The beginning date of each cycle refers to the trough of the cycle. The figures used in the paper depict the behavior of each labor-market indicator six quarters prior to the trough of the cycle and 32 quarters after the trough.

[4]This specification follows the work of Kramer and Li (1997).

was rising, which would suggest higher wage inflation; however, this effect was offset by the decline in consumer price inflation, proxying inflation expectations.

7. While nominal wages and salaries, as measured by the ECI, have behaved in a similar fashion over the current cycle, relative to the previous cycle, growth in overall labor costs has been much slower over the current cycle as a consequence of the sharp slowdown in the growth of non-wage costs (benefits) and faster productivity growth. As shown in Figure 4, the benefit component of the ECI has increased at a substantially slower rate since 1995, compared to the same period of the previous business cycle. This slowdown is mainly attributable to smaller rates of increase in expenditures by employers on health insurance benefits (Table 2), workers' compensation, state unemployment insurance costs, and lower costs of funding employee pensions.[5] Growth in labor productivity (Figure 5) has quickened since 1995, compared to the same period of the previous cycle, owing to the effects of strong capital investment and faster technological progress. This acceleration in labor productivity growth has also contributed to restraining the growth in unit labor costs.

8. As a result of these factors, labor's share in national income has declined quite sharply relative to the previous cycle (Figure 6), and business profitability (as measured by capital's share in national income) has increased. After reaching a peak of more than 74 percent six quarters into the current cycle, labor's share in national income has declined to about 71 percent. This behavior is somewhat uncharacteristic, as the average value of labor's share in national income over the course of the current cycle has fallen below the average value of labor's share in the five previous business cycles.[6] Slower growth in labor costs, as reflected in a declining share of labor income, have contributed to significant restraint on consumer price increases since 1996.

III. The Inflation Puzzle: Some Possible Explanations

9. Until recently, the behavior of inflation in the United States could be explained quite well using modified versions of a standard price Phillips curve. This curve demonstrates that there exists a negative relationship between inflation and excess aggregate demand pressures in the economy, the latter proxied by either the output gap or the unemployment gap. However, the usefulness of this type of Phillips curve has been questioned since the mid-1990s, as predicted inflation has consistently exceeded actual inflation. This phenomenon has come to be known as the inflation puzzle: given the strong excess aggregate demand

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[5]See U.S. Department of Labor (1998). Data on health insurance costs were obtained from unpublished estimates of the Bureau of Labor Statistics.

[6]The last five business cycles and the average value of labor's share over the cycle was: November 1970 to November 1973 (74.2); March 1975 to January 1980 (73.1); July 1980 to July 1981 (73.7); November 1982 to July 1990 (72.5); and the current cycle (71.7).

pressures in the economy, inflation has failed to rise in a manner suggested by traditional models.

10. In order to illustrate the inflation puzzle, we adopt the following baseline Phillips curve:

$$\pi_t = \alpha(L)\pi_{t-1} + \beta_1 UGAP_{t-1} + \beta_2 \Delta UGAP_{t-1} + \varepsilon_t \qquad (1)$$

where π is inflation measured by the annualized percentage change in the CPI for urban consumers excluding food and energy costs, or core CPI, *UGAP* is the unemployment gap as measured by the difference between the non-accelerating inflation rate of unemployment, NAIRU, and the civilian unemployment rate, $\Delta UGAP$ is the first difference of the unemployment gap, and ε is a mean zero, serially uncorrelated random disturbance term. The inclusion of the unemployment gap measures excess aggregate demand pressures in the economy while lagged inflation serves as a proxy for expected future inflation. Including the quarterly change of the unemployment gap implies that the pressure on prices depends also on how quickly the gap narrows or widens. Equation (1) was estimated by ordinary least squares (OLS) using quarterly data from the third quarter of 1975 to the last quarter of 1994. The results are shown in the first column of Table 3 while the out-of-sample forecasts from the first quarter of 1995 to the second quarter of 1999 are shown in Figure 7. Clearly, the traditional Phillips curve overpredicts inflation during that period. This bias is evident also in the bias proportion of the forecast, which measures how far the mean of the forecast is from the mean of the actual series. The bias proportion takes values in the interval from 0 to 1, and a good forecast would have a bias proportion close to zero. In the case of the baseline model, the bias proportion is equal to 0.621 (Table 4, column1), indicating a poor fit. This breakdown of the empirical relationship captured by the Phillips curve has generated a substantial amount of work trying to explain why inflation has remained very low despite strong economic growth in the United States. A selective review of work directly related to our analysis follows.[7]

11. One possible explanation of the low levels of inflation experienced in the United States during the last years is that fundamental changes in the determination of wages have changed the relationship between wage pressures and inflationary pressures. One strand of research has focused on whether increasing job insecurity has kept wage pressures down and, hence, has kept consumer price inflation restrained. At the microeconomic level, recent research has not found evidence of a decline in job security (Neumark *et al.* 1997 among others). Kramer and Li (1997) showed that various measures of job uncertainty did a poor job explaining the recent deceleration of inflation. In addition, the analysis in the preceding section found no fundamental change in the determination of wages and salaries and provides

[7] Readers interested in a comprehensive survey of the literature should refer to the articles published in the winter 1997 issue of the *Journal of Economic Perspectives* and Gordon (1998).

indirect evidence against job insecurity as an important explanatory factor. A different perspective was adopted by Lown and Rich (1997). Since 1990, the wage component of the ECI and unit labor costs have been declining. Lown and Rich asked whether a temporary slowdown in labor compensation growth played an important role in restraining price inflation. Once changes in unit labor costs were included as explanatory variables in an otherwise traditional Phillips curve, Lown and Rich (1997) found that their model was able to explain the behavior of inflation during the period 1992 to 1996.

12. Gordon (1997) and Staiger *et al.* (1997) among others, argue that declines in the NAIRU are mostly responsible for the observed low inflation in the United States. Though their empirical results replicated well the pattern of inflation in recent years, their models do not identify the causes of any change in the NAIRU. In fact, the authors cited forced the NAIRU to follow adhoc specified processes. In other words, we can interpret their work as a restatement of the low inflation puzzle in terms of a declining NAIRU puzzle. Gordon (1998) extended the framework of his 1997 work to allow for feedback effects between wages and prices and supply shocks, but he still did not attempt to identify the causes of changes in the NAIRU. Hogan (1998) also asked whether changes in the NAIRU were the main factor in the restrained behavior of inflation. In contrast to the work described above, he did not assume that the NAIRU obeyed an exogenous process, but stated that it should be a function of structural and cyclical variables. Although he found that the NAIRU has fallen since 1994, it had not fallen enough to explain the observed pattern of low inflation.

13. During the decade of the 1990s, the United States has benefited from a steep decline in import prices that has played a key role in restraining price inflation. Hogan (1998) explored this hypothesis by including changes in the relative price of imports and unit labor costs in an otherwise standard Phillips curve, since these variables captured supply-shock effects. His results validated the intuition that the temporary decline in the price of imports has helped to keep inflation under control. Interestingly, the effects of unit labor costs were not significant, in sharp contrast to the results reported by Lown and Rich (1997).

IV. Reexamining the Role of Labor Costs and Import Prices

14. In light of the seemingly contradictory results obtained by Lown and Rich (1997) and Hogan (1998), it is important to reassess the role of labor costs and import prices in determining price inflation. In particular, it appears that the conflicting results regarding the importance of the decline in labor costs in explaining inflation obtained by the authors cited above hinges on the proxy of labor costs used, namely, unit labor costs. By definition, unit labor costs provide a measure of compensation that controls for the effects of productivity in the manufacturing sector. Consequently, previous work has examined the relationship between inflation and the behavior of labor costs only in the manufacturing sector, implicitly assuming that labor costs in sectors other than manufacturing do not have an impact on price inflation. Therefore, assessing the impact of labor costs on inflation requires an economy-wide measure of real marginal labor costs.

15. Recent work by Galí and Gertler (1998) and Rotemberg and Woodford (1998) suggest that the share of labor income in national income is a better proxy for real marginal cost of output than unit labor costs. By definition, the real marginal cost of output is equal to the ratio of the wage rate to the marginal product of labor, and it already controls for the effects of productivity. Assuming that aggregate output is produced by a constant returns-to-scale production function, it can be shown that the real marginal cost of output is equal to labor's share in nominal output divided by the share of labor in the production function. If the latter is constant, as in the case of a Cobb-Douglas production function with constant returns to scale, labor's share is proportional to real marginal cost. Hence, changes in real marginal cost are equal to changes in labor's share. This fact is exploited by Galí and Gertler (1998) to estimate a structural model of inflation. In this paper, we do not attempt to derive a structural model of inflation from first principles, as in Galí and Gertler (1998), but limit our analysis to the estimation of reduced-form Phillips curve equations using labor's share as a proxy for labor costs. In fact, as Figure 6 shows, one striking development during the current expansion has been the steady decline in labor's share of national income[8] which may suggest that lower labor costs have been a factor in restraining consumer price inflation.[9] It should be emphasized that this decline in real marginal costs can be attributed to increased productivity and the decline in benefit costs, since the analysis in section two showed that wage compensation has not undergone a fundamental change.

16. Intuitively, labor's share measures real marginal costs because under a constant returns-to-scale production technology, if all inputs are increased by the same proportion, output will increase by the same proportion. As a result of this structure, total costs of production equal the cost of producing one unit of output multiplied by the level of output—that is, total cost is just the cost of producing one unit "scaled up" by the level of output. Consequently, total cost is simply a linear function of the level of output, so marginal cost and average cost are both constant and equal to each other. Under the additional assumption that labor is the only variable input, the marginal cost of production, which equals average cost, is just labor costs (the wage rate multiplied by the level of employment) divided by the level of output. Real marginal costs are obtained by dividing this fraction by the output price, so real marginal costs can be represented by labor's share—labor cost divided by the value of output.

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[8]Labor's share was estimated as the ratio of the compensation of employees to the revenue received by firms, the latter being equal to the value of output net of indirect taxes. See Rotemberg and Woodford (1997) for details.

[9]Lipschitz and McDonald (1991) propose, in a different context, that comparing labor's shares in value added across trading partners yields useful information about price competitiveness. They propose using a profit-based indicator of competitiveness based on real unit labor costs, i.e., labor's share in valued added.

17. To reexamine the role that declining labor costs and import prices may have played in restraining consumer price inflation, we modify the baseline model described in equation (1) by including proxies for the latter variables among the traditional set of regressors. Our first modified Phillips curve tries to measure the effect of external factors by including the change in the relative price of imports as an explanatory variable. The second modified Phillips curve examines the role of decreasing costs of labor, including the slower rate of growth in non-wage benefit compensation and the important acceleration in labor productivity that has taken place over the current business cycle using changes in labor's share of income in the corporate sector as a proxy. The third modified Phillips curve examines the role of external shocks and labor costs by including both changes in the relative price of imports and labor's share of income in the corporate sector as regressors. Finally, in order to illustrate the differences obtained when unit labor costs are used as a proxy for marginal costs instead of labor's share in the corporate sector, we estimate an augmented Phillips curve that includes changes in the relative price of imports and unit labor costs among its regressors. All the modified Phillips curves were estimated using quarterly data from the third quarter of 1975 to the fourth quarter of 1994. Out-of-sample forecasts were generated from the first quarter of 1995 to the second quarter of 1992. The results are presented in Tables 3 and 4 and Figures 7 and 8.

18. The results in Table 3 show that in all of the Phillips curve specifications, the coefficients on the lagged consumer price term and the unemployment gap have the expected signs and are statistically significant. The magnitudes of these coefficients also are broadly similar to those obtained in the studies by Hogan (1998) and Staiger, Stock, and Watson (1996).[10] In addition, the coefficients corresponding to the constant term are not different from zero with high probability and the sum of the coefficients corresponding to lagged inflation plus the change in the output gap is close to one, as expected from economic theory. Import prices and the labor share variables also enter the consumer price Phillips curve with the expected signs. In our Phillips curves specifications that include changes in import prices as explanatory variables, we found that a 1 percent increase in import prices corresponds roughly to a 0.04 percent increase in inflation, a result similar to that obtained by Hogan (1998).[11] More importantly, whether marginal labor costs do matter or not depends on the variable used as a proxy. If unit labor costs are used, the effects of changes in labor costs are approximately half of those corresponding to import prices and they appear to be insignificant, a finding previously reported by Hogan (1998). However, when labor's share of income in the corporate sector is used, the effects of labor costs are approximately twice

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[10]For example, on the unemployment gap variable, Hogan (1998) obtains a coefficient of about 0.26 and Staiger, Stock, and Watson (1996) obtain a coefficient between 0.22 and 0.41, depending on the specification.

[11] Hogan uses a different Phillips curve specification as well as a different measure of the NAIRU. Therefore, the estimate of the effects of import prices appears to be very robust across different specifications.

the effects of import prices and they are not insignificant anymore. Thus, the use of labor's share as a proxy for labor costs support the hypotheses that both temporary declines in labor costs and import prices have played important roles in restraining price inflation.

19. Table 4 evaluates the out-of-sample forecasts of the different augmented Phillips curve specifications. Clearly, any of the augmented curves outperform the traditional specification, and among them, the best specification is the one that allows for supply shocks and uses the labor share variable as a measure of labor costs, since it outperforms all the other specifications in every single statistic, exhibiting less bias and lower forecasting errors. The second best specification includes supply shocks, but substitutes unit labor costs for the labor share variable. In terms of forecasting, these two equations do a good job of predicting inflation until the second quarter of 1998, as seen in Figure 8. Afterwards, they tend to overpredict inflation, but by less than the baseline model.

V. Conclusions

20. This paper has examined a number of factors that have played a role in restraining consumer price inflation in the United States over the period from 1995 through 1998 and has identified the two most important factors, besides excess aggregate demand pressures, as declines in import prices and declines in labor's share in national income. As shown in the paper, the inclusion of the labor share variable in a consumer price Phillips curve improves the inflation forecast because it takes into account the significant decline in labor costs that has occurred over the period from 1995 through 1998, partly as a result of the faster productivity growth that has occurred over this period. This paper also helps to reconcile conflicting evidence about the importance of labor costs found in previous studies, which can be attributed to the fact that the labor share variable captures labor costs across all sectors of the economy, while the proxy for labor costs used by previous researchers—unit labor costs—only measure changes in labor costs in the manufacturing sector.

Table 1: United States: Estimate of a Wage Phillips Curve 1/

(1984Q1–1994Q4)

Variable	Coefficient	p-value
Constant	0.333	0.032
Lagged change of wage inflation	0.901	0.000
Lagged inflation	0.009	0.807
Unemployment gap	0.078	0.019
R^2	0.918	
Adjusted R^2	0.904	
Root Mean Squared Error	0.192	
Mean Absolute Error	0.160	
Mean Absolute Percentage Error	4.734	
Theil Inequality Coefficient 2/	0.029	
Bias proportion 3/	0.001	
Variance proportion 3/	0.000	
Covariance proportion 3/	0.999	
Serial Correlation LM Test 4/	2.259	
	(0.323)	

1/ Wage inflation is defined to be the four-quarter rate of increase in the Employment Cost Index for wages and salaries. The unemployment gap is defined as the staff's estimated natural rate of unemployment less the civilian unemployment rate. The annual data for the natural rate were interpolated to quarterly frequency.

2/ The Theil inequality coefficient is defined as the square root of the sum of the differences between the actual change in the dependent variable and the change in the predicted value of the dependent variable divided by the sum of the actual change in the dependent variable, and it takes values in the interval [0,1]. If this coefficient is zero, then the forecast is "perfect." The closer the Theil coefficient is to zero, the better the forecast.

3/ The bias proportion measures how far the man of the forecast is from the mean of the actual series. The variance proportion measures how far the varioan of the forecast is from the variation of the series. The covariance proportion measures the remaining unsystematic forecasting errors. The three proportions add up to one. If the forecast is "good", the bias and variance proportions should be small so that most of the bias should be concentrated in the covariance proportion.

4/ The serial correlation test is based on the Breusch-Godfrey Lagrange multiplier test for general, high-order, ARMA(2) errors. The statistic in parenthesis is the probability of rejecting the null hypothesis that the residuals are serially correlated.

Table 2. United States: Employer Costs per Hour Worked
For Health Insurance, Private Industry, from the Employment Cost Index

(In percent change from previous year)

Year	March	June	September	December
1981	14.5	15.6	16.0	17.1
1982	14.7	16.2	18.1	18.3
1983	23.5	22.4	21.3	20.4
1984	17.6	15.9	13.1	12.5
1985	8.5	6.7	6.5	5.2
1986	3.9	3.5	3.6	4.1
1987	4.7	6.1	5.5	6.3
1988	10.5	12.2	13.9	14.7
1989	13.6	13.4	13.7	12.8
1990	12.2	12.0	11.5	11.3
1991	11.5	11.1	10.9	11.2
1992	10.3	9.6	9.2	8.6
1993	8.1	7.8	7.2	6.9
1994	5.7	5.0	4.3	3.9
1995	1.6	0.6	-0.1	0.1
1996	-0.3	0.1	0.7	0.4
1997	0.2	0.7	0.8	0.9
1998	2.2	2.6	2.2	2.3

Source: U.S. Department of Labor, Bureau of Labor Statistics (1998), unpublished estimates.

Table 3. United States: Estimates of Price Phillips Curves 1/

(1975Q3–1994Q4)

Model	(1) Basic	(2) Supply Shocks	(3) Labor Share	(4) Labor Share + Supply Shocks	(5) Unit Labor Costs
Constant	0.286	0.419	0.247	0.381	0.373
	(0.534)	(0.357)	(0.588)	(0.398)	(0.407)
Unemployment gap	0.468	0.373	0.424	0.327	0.491
	(0.001)	(0.012)	(0.004)	(0.029)	(0.014)
Change in unemployment gap	-2.097	-2.002	-2.223	-2.131	-1.799
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Lagged inflation	0.966	0.971	0.970	0.945	0.933
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Change in relative price of imports	---	0.047	---	0.048	0.042
		(0.043)		(0.038)	(0.080)
Change in labor share	---	---	0.074	0.076	---
			(0.147)	(0.128)	
Change in unit labor cost	---	---	---	---	0.022
					(0.691)
Adjusted R^2	0.754	0.764	0.758	0.769	0.764
Serial correlation LM test 2/	0.292	2.387	0.369	2.391	2.002
	(0.864)	(0.303)	(0.831)	(0.302)	(0.368)

1/ Core inflation is defined as the annualized quarter to quarter rate of change in the core CPI (the CPI excluding food and energy). The unemployment gap is defined as the staff's estimated natural rate of unemployment less the civilian unemployment rate. The annual data for the natural rate of unemployment were interpolated to quarterly frequency. The change in the relative price of imports is equal to the change in the ratio of the implicit import price deflator to the GDP deflator. The change in the labor's share variable is defined as two quarter lagged value of the ratio of total labor costs to the value of output in the corporate sector. The statistic in parentheses is the p value from a Wald test of the hypothesis that the sum of coefficients of the variable is zero. The lower the p value, the lower the probability that the variable has no effect on inflation.

2/ The serial correlation test is based on the Breusch-Godfrey Lagrange multiplier test for general, high-order, ARMA(2) errors. The statistic in parenthesis is the probability of rejecting the null hypothesis that the residuals are serially correlated.

Table 4. United States: Forecast Evaluation of Price Phillips Curves 1/

(1995Q1–1999Q2)

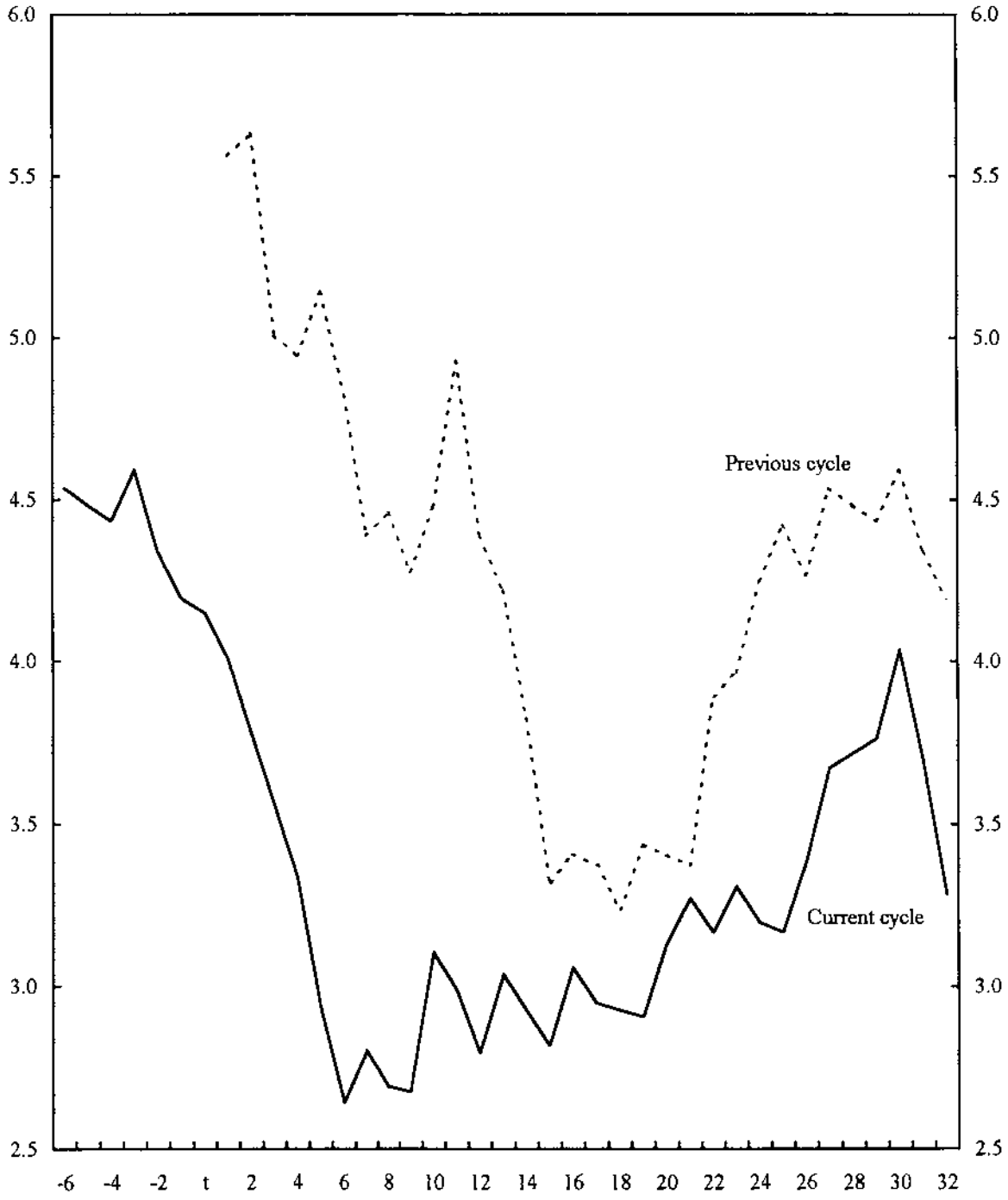
Model	(1) Basic	(2) Supply Shocks	(3) Labor's Share	(4) Labor's Share + Supply Shocks	(5) Unit Labor Costs
Root mean squared error	1.792	1.200	0.670	0.625	0.634
Mean absolute error	1.426	0.947	0.466	0.466	0.464
Mean absolute percentage error	66.47	44.22	22.93	22.07	22.15
Theil Inequality Coefficient 1/	0.275	0.201	0.123	0.117	0.118
Bias proportion 2/	0.621	0.556	0.342	0.183	0.229
Variance proportion 2/	0.043	0.014	0.015	0.000	0.000
Covariance proportion 2/	0.336	0.430	0.643	0.817	0.770

1/ The Theil inequality coefficient is defined as the square root of the sum of the differences between the actual change in the dependent variable and the change in the predicted value of the dependent variable divided by the sum of the actual change in the dependent variable, and it takes values in the interval [0,1]. If this coefficient is zero, then the forecast is "perfect." The closer the Theil coefficient is to zero, the better the forecast.

2/ The bias proportion measures how far the man of the forecast is from the mean of the actual series. The variance proportion measures how far the varioan of the forecast is from the variation of the series. The covariance proportion measures the remaining unsystematic forecasting errors. The three proportions add up to one. If the forecast is "good", the bias and variance proportions should be small so that most of the bias should be concentrated in the covariance proportion.

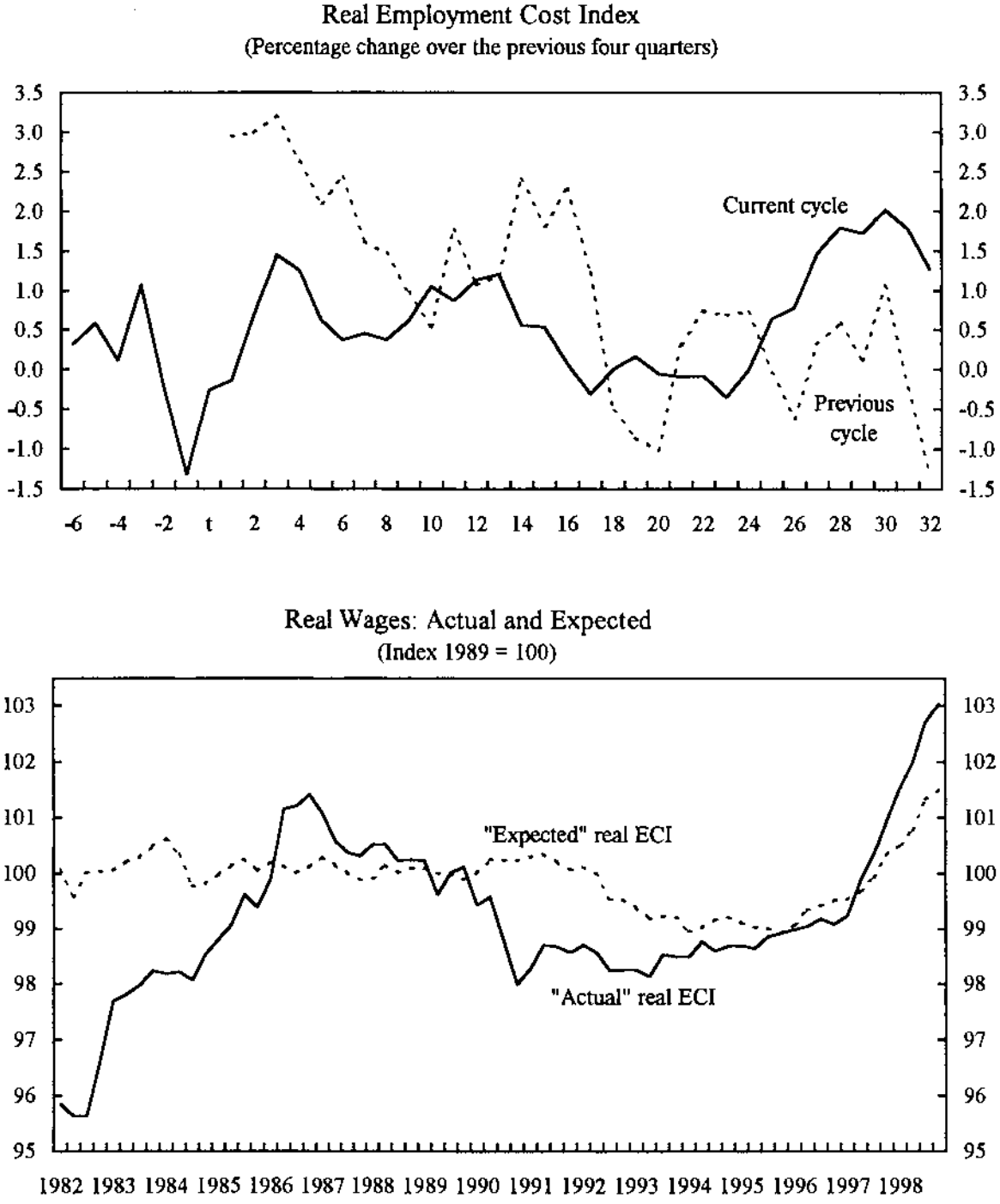
Figure 1. United States: Wage and Salary Component of the Employment Cost Index (ECI)

(Percentage change over the previous four quarters)



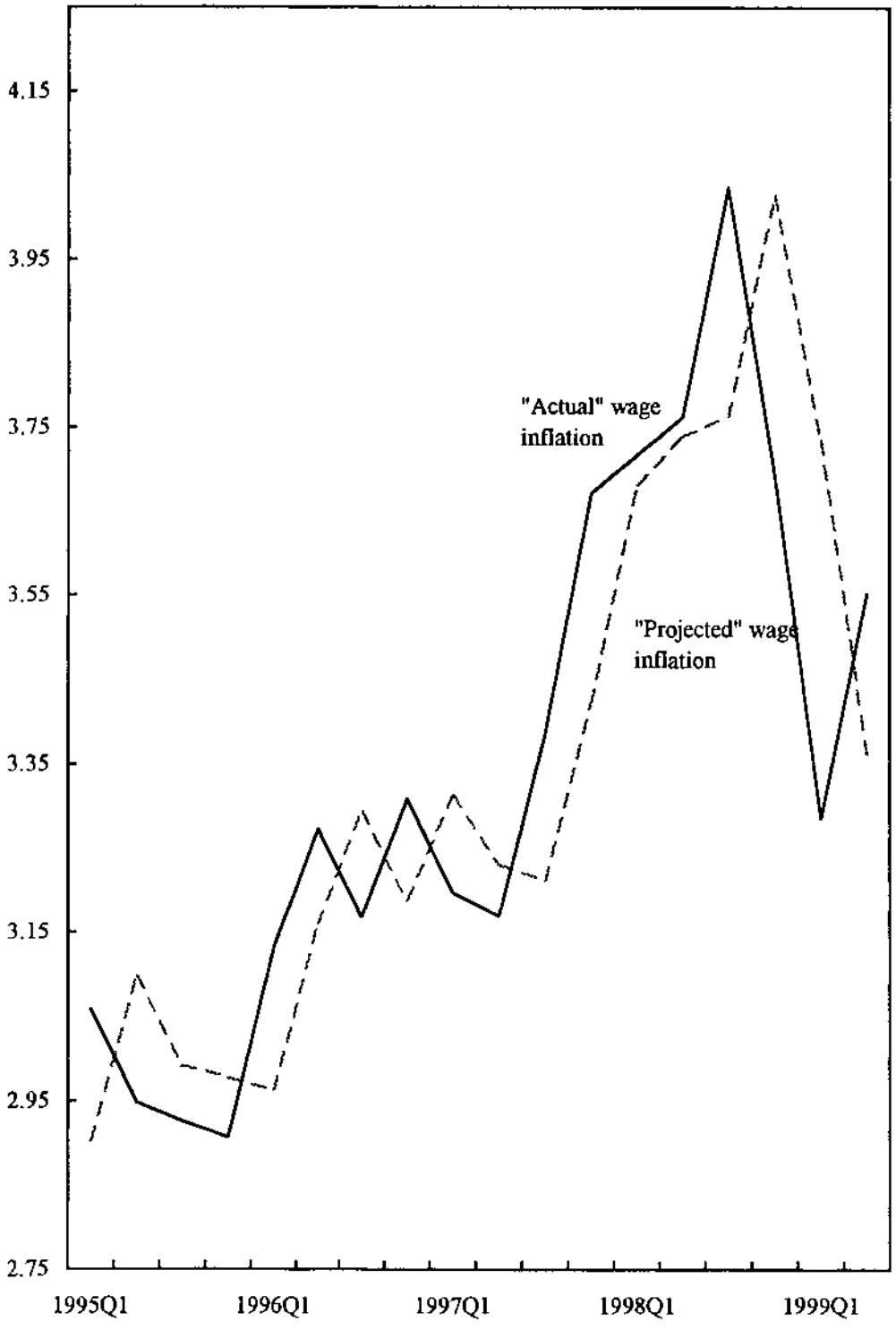
Sources: IMF staff estimates; and Bureau of Labor Statistics.

Figure 2. United States: Real Employment and Real Wages



Sources: IMF staff estimates; Bureau of Labor Statistics; and Livingston Survey.

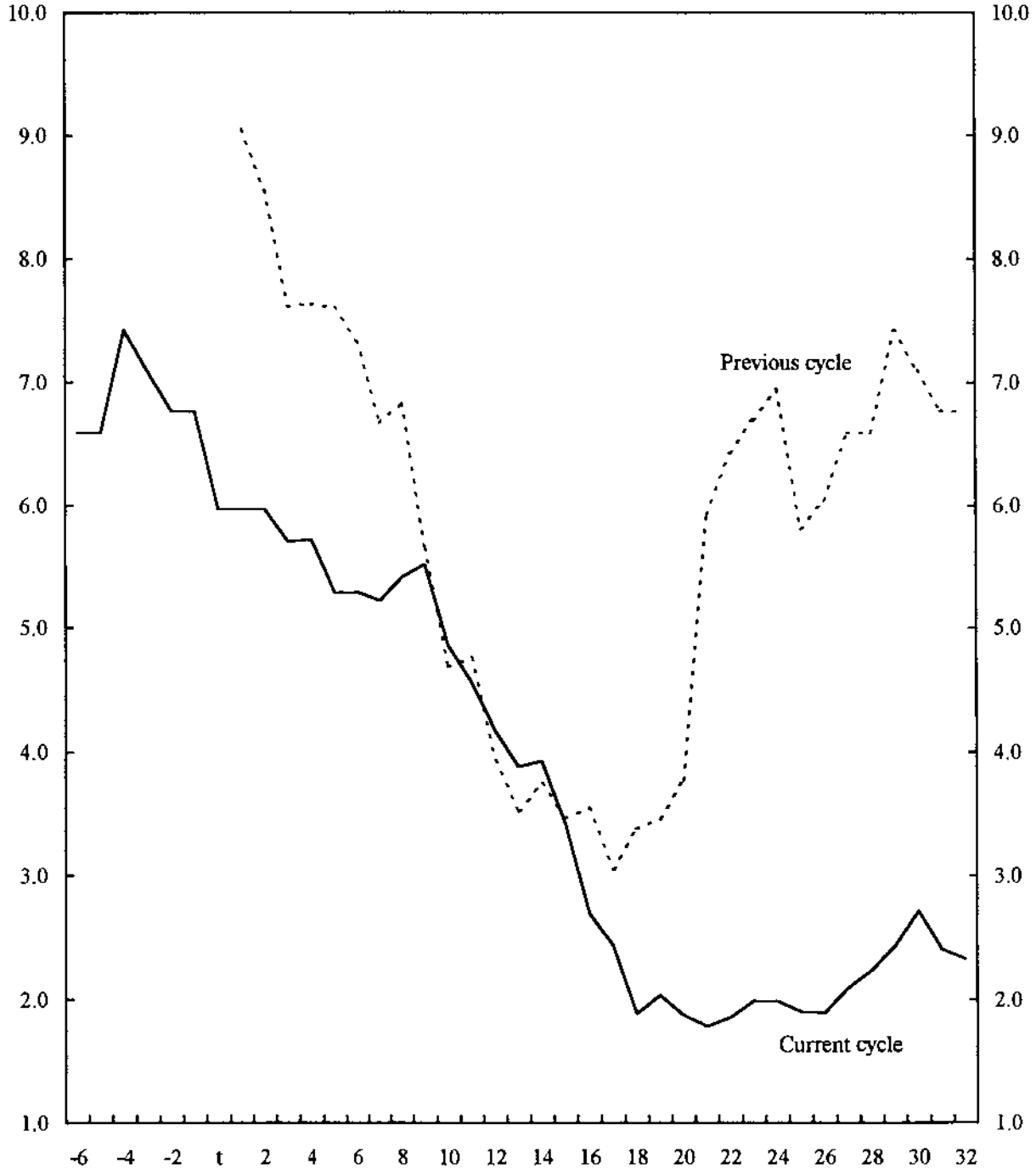
Figure 3. United States: Actual and Projected Wage Inflation
(percentage change over the previous four quarters)



Source: IMF staff estimates.

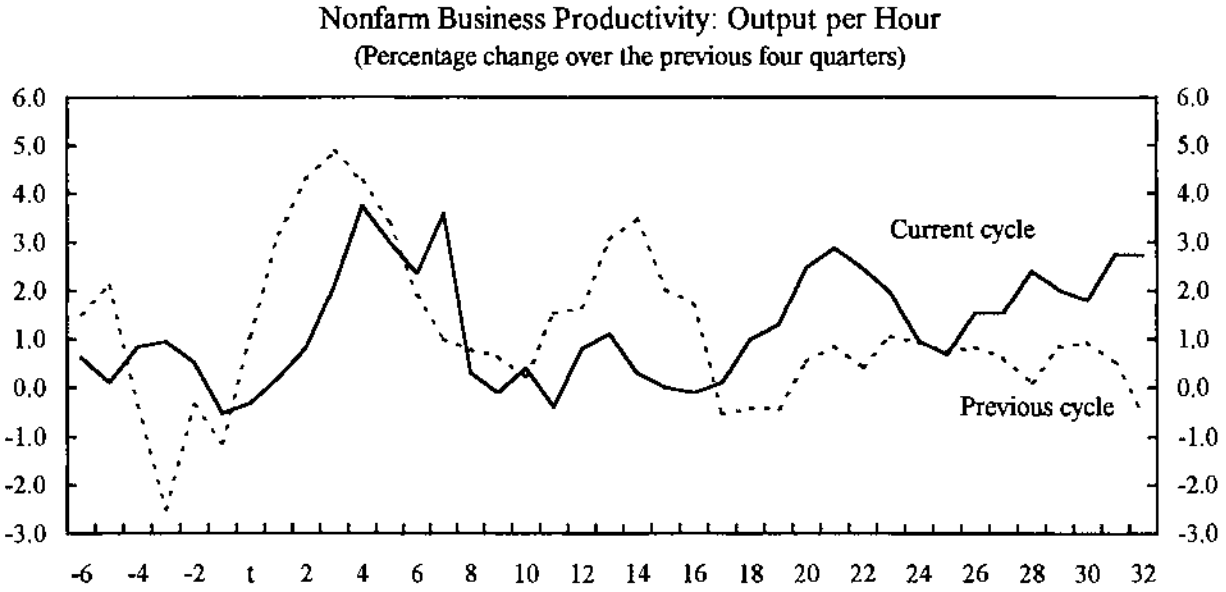
Figure 4. United States: Benefit Component of the Employment Cost Index

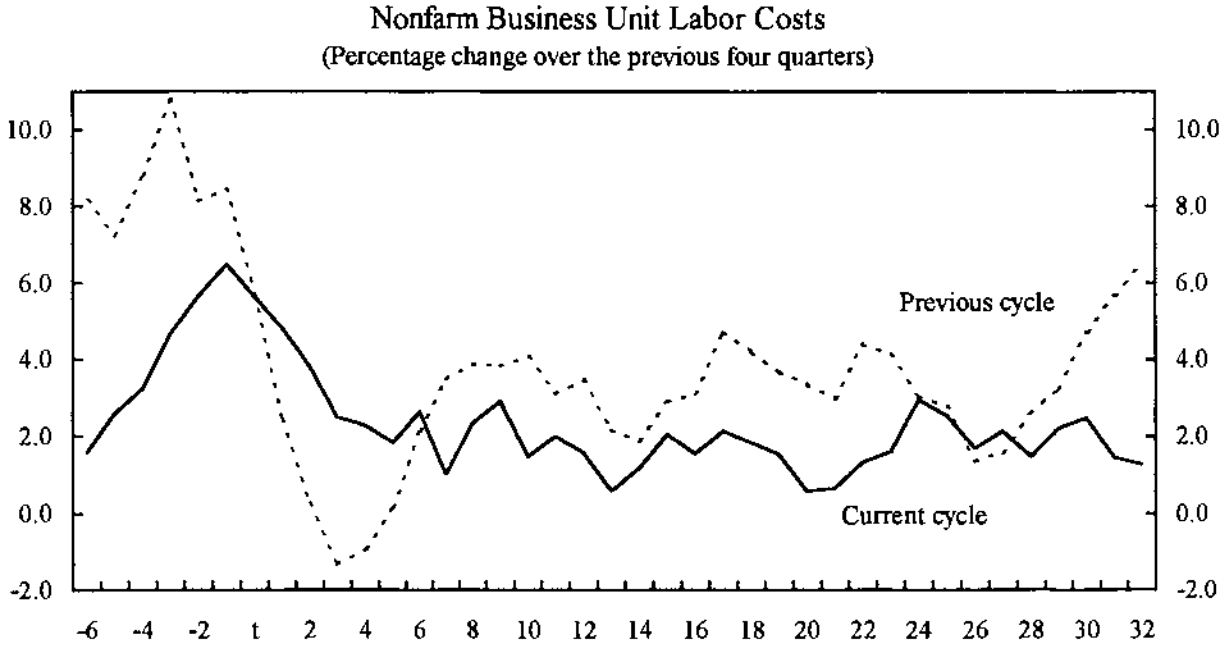
(Percentage change over the previous four quarters)



Sources: IMF staff estimates; and Bureau of Labor Statistics.

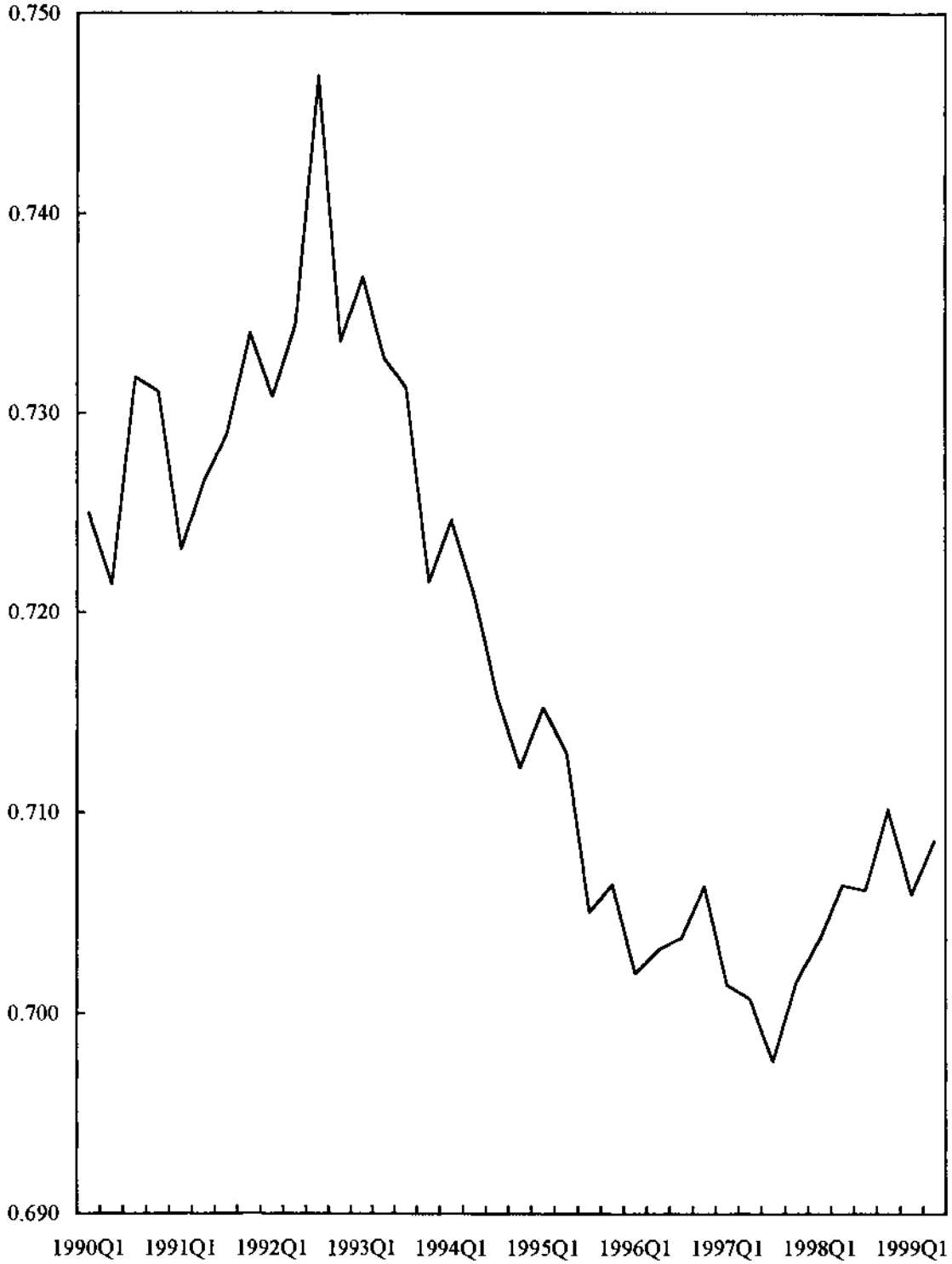
Figure 5. United States: Productivity and Unit Labor Costs





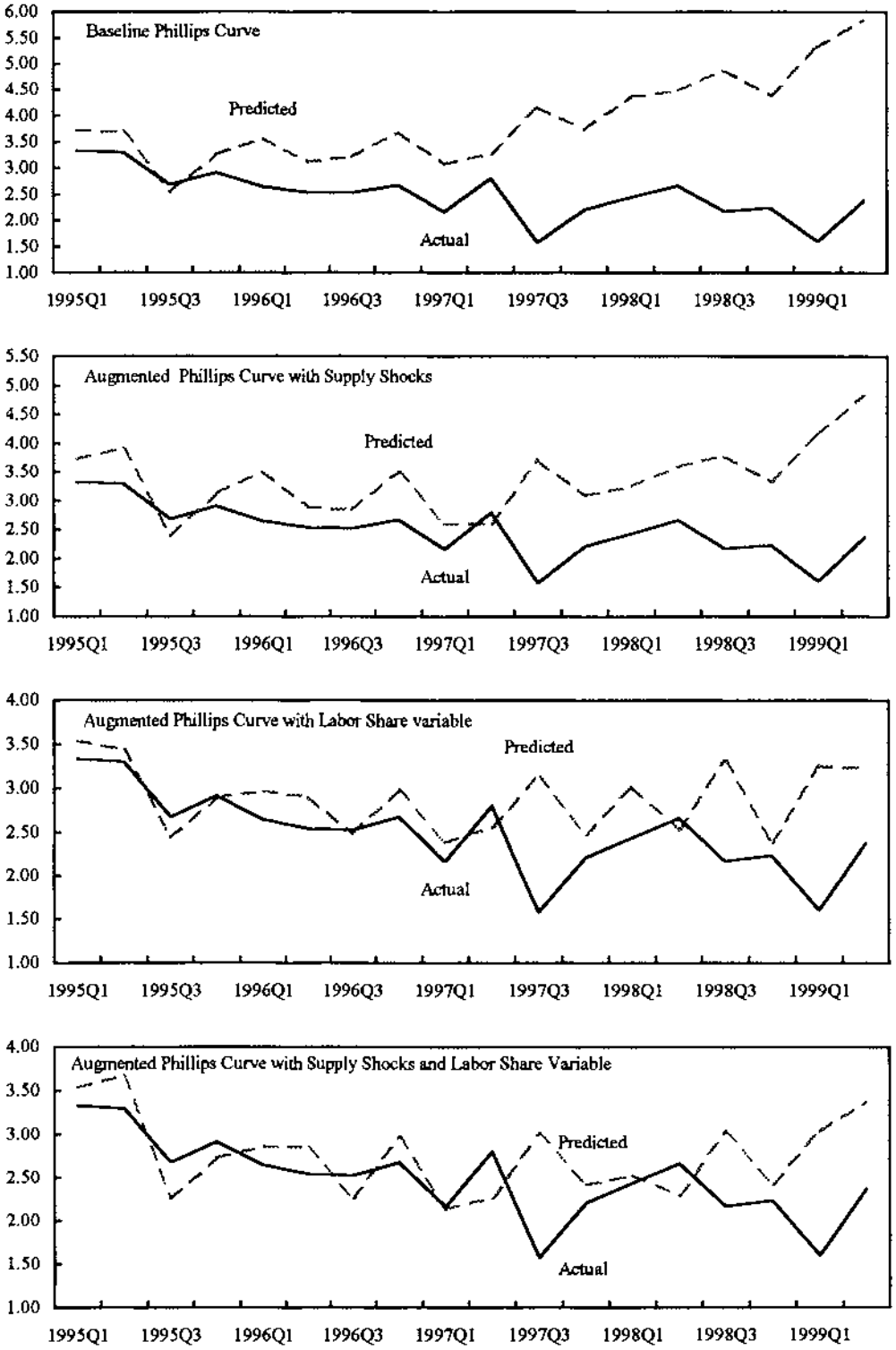
Sources: IMF staff estimates; and Bureau of Labor Statistics.

Figure 6. United States: Labor Share in the Corporate Sector



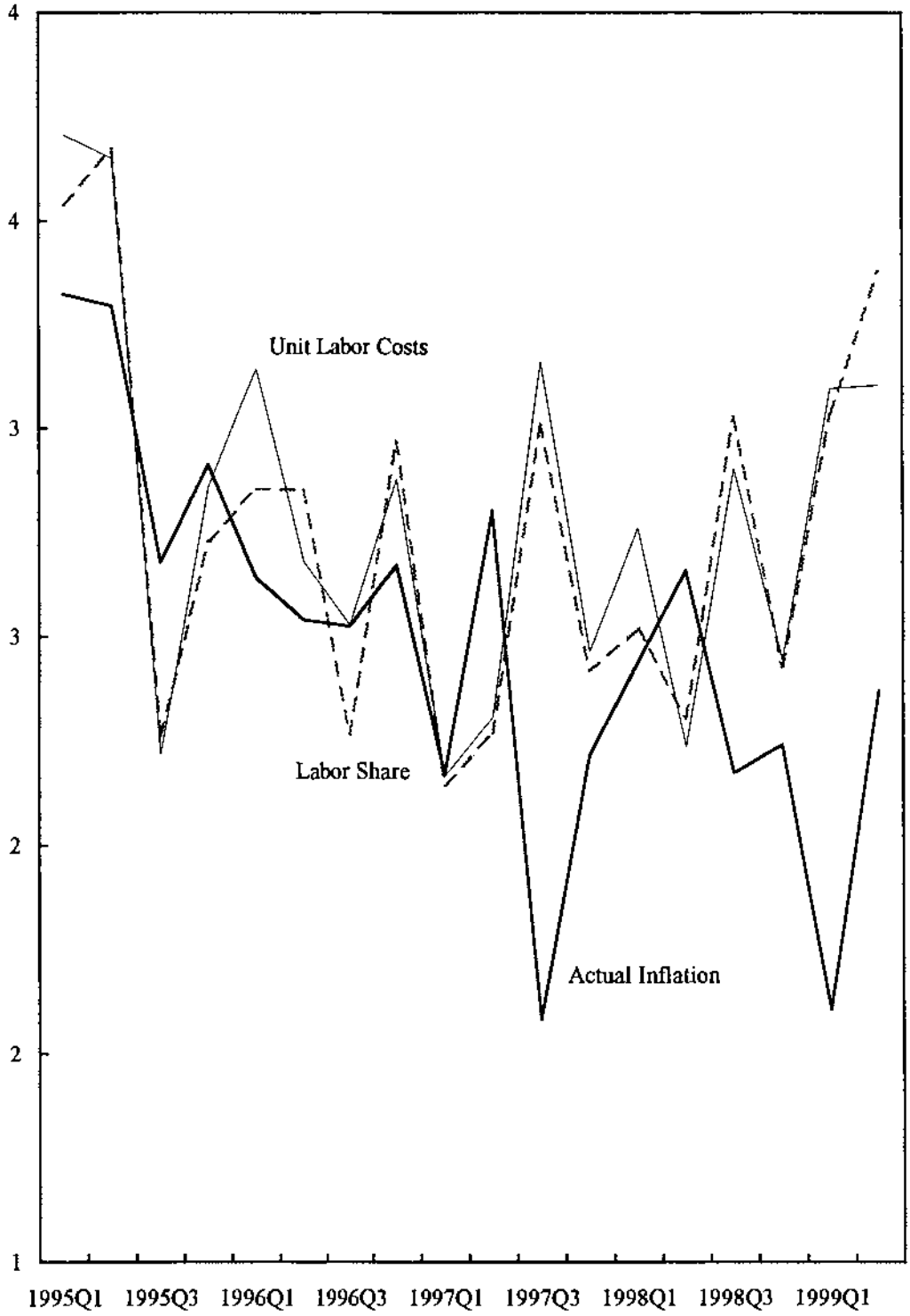
Sources: IMF staff estimates; and Bureau of Economic Analysis.

Figure 7. United States: Actual and Predicted Core CPI Inflation



Sources: IMF staff estimates; and Bureau of Economic Analysis.

Figure 8. United States: A Comparison of Predicted Inflation Using Labor Share vs. Unit Labor Costs as Proxies for Marginal Labor Costs



Sources: IMF staff estimates; and Bureau of Economic Analysis.

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