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Measuring the Average Marginal Tax Rate

Average marginal tax rates have increased steadily over the last six decades, reaching 30 percent in 1980, according to **Measuring the Average Marginal Tax Rate from the Individual Income Tax**, *NBER Working Paper No. 1060*, by **Robert J. Barro** and **Chalput Sahasakul**. A marginal tax rate is the proportion that the IRS takes on an additional dollar of income; thus, if your marginal tax rate is 30 percent and you earn an additional dollar, you keep only 70 cents of it. Marginal tax rates on income affect decisions to work, produce, save, or invest; they are therefore crucial to the study of the economic effects of taxation.

For that reason, Barro and Sahasakul construct a time series of average marginal tax rates from 1916–80 using data from the IRS. (They use the rates explicitly stated in the federal income tax schedules weighted by adjusted gross income—AGI.) “From a value of about 1 percent in 1916,” they find “the average marginal tax rate rises along with major increases in the tax rate schedule to a peak of 5 percent during World War I. Then, because of a series of rate reductions through 1929 and the declines in income for 1930–31, the marginal rate falls to a low point of less than 2 percent in 1931. Subsequently, the rate rises sharply to reach 5 percent by 1936.”

In 1940, the rate is still below 6 percent; it climbs to a peak of 26 percent during World War II. After the war, it declines to a low point of 18 percent in 1948–49.

During the Korean War, the average marginal tax rate peaks at 25 percent; it then moves from 22 percent in 1954 back to 25 percent in 1963. In 1965, what the authors refer to as “the famous Kennedy–Johnson tax cuts” reduce the rate to 21 percent. But the growth in nominal income and the Vietnam surcharge raise the rate to 25–26 percent again in 1968–69.

After the surcharge is removed, “the effects of

bracket creep increase the rate steadily from 24 percent in 1971 to 31 percent in 1978.” In 1979, the rate falls back to 29 percent, “apparently because of a widening in the tax brackets, although there are no changes in the lowest and highest tax rates.” For the final year of this study, 1980, the average marginal tax rate is 30 percent.

The authors go on to note the distinction between this series and the series of average tax rates. Average tax rates are the ratio of total federal income taxes levied to aggregate personal income. The average tax rate was 30–40 percent of the average marginal rate over the 1916–79 period. However, the bulk of movements in the two series are parallel.

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In the final section of the paper, Barro and Sahasakul discuss the dispersion of the marginal rates over the years. For example, they look at the fraction of AGI that accrues to families who face a marginal tax rate exceeding 35 percent. That figure was 8 percent in 1964 and 31 percent in 1981; in other words, the fraction of income marginally taxed at a rate of at least 35 percent quadrupled from 1964–80. To further exemplify this point, Barro and Sahasakul ask what percent of returns filed were marginally taxed at 35 percent or more. In 1964, 1.0 percent of returns faced those rates; in 1980, the fraction was 10.1 percent. Stated slightly differently, the fraction of returns “facing high marginal rates” rose by a factor of 10 from 1964 to 1980.

The Accuracy of Individual versus Group Forecasts

Group mean forecasts are more accurate, on average over time, than corresponding individual forecasts, according to *NBER Working Paper No. 1053* by Research Associate **Victor Zarnowitz**. In **The Accuracy of Individual and Group Forecasts from Business Outlook Surveys**, Zarnowitz examines a large number of series of individual and corresponding average forecasts taken from the quarterly NBER/ASA survey. Survey respondents are generally economists from business, consulting firms, government, and academic and research organizations. His study covers 79 individuals (or firms) who participated in at least 12 of the 42 surveys conducted between the fourth quarter of 1968 and the first quarter of 1979. The variables covered in the study include percentage changes in nominal and real GNP, the implicit price deflator (IPD), and consumer expenditures for durable goods, as well as the unemployment rate and change in business inventories.

First Zarnowitz compares individual forecasts with group average forecasts. The group means are generally more accurate than individual forecasts; this applies to all of the variables and predictive horizons covered in the study and is consistent with evidence from different periods and previous work.

Zarnowitz finds that it is difficult for individuals to predict consistently better than the group. The size and composition of minorities that do perform better than the group averages vary depending upon the variable predicted and the time horizon. "For most of the people, most of the time, the predictive record is spotty, but with transitory spells of relatively high accuracy. A series of group averages has the advantage that it is helped by the cancellation of individual errors of the opposite sign," he writes.

However, Zarnowitz also finds that a moderate degree of consistency does exist in certain individuals' forecasts. For example, individuals who do well at predicting changes in nominal GNP also tend to do well at predicting changes in real GNP. But for variables that are not so closely related, the correlations in the forecasts are much lower.

For any of the variables in Zarnowitz's paper, accuracy in predicting one quarter is associated with high accuracy in predicting the next quarter. But the further apart the target periods are, the less correlated are the values to be predicted, and therefore the ranking consistency (of individual forecasters) declines correspondingly.

"It is still true, as earlier reports also indicate," Zarnowitz continues, "that no single forecaster has been observed to earn a long record of superior overall accuracy, and indeed nothing in the study would

encourage us to expect any individual to reach this elusive goal. But a small number of the more regular participants in the NBER/ASA surveys did perform better in most respects than the composite forecasts from the same surveys."

When considering overall accuracy, Zarnowitz discovers that the means of the individual average forecast errors regularly exceed the corresponding errors of the overall group (mean) forecasts. He further finds that mean errors tend to be negative, except in predictions of real GNP. This reflects a tendency in most forecasts to underestimate change. "The average overestimation of real growth observed in our data," he continues, "is largely explained by the fact that after a decade of relative stability and an extraordinarily long business expansion, the 1970s gave rise to a novel phenomenon commonly called stagflation and an unexpectedly serious recession."

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Zarnowitz's observations confirm the findings in previous work that highly volatile series—such as consumer expenditures for durable goods, change in business inventories, growth in real GNP, and IPD inflation—are much more difficult to predict than relatively smooth, trend-dominated series such as the unemployment rate, and growth in nominal GNP.

Finally, Zarnowitz observes that "the uncertainty and difficulty (hence errors) of prediction tend to increase for the more distant future." The more distant the target quarter, the larger tend to be the prediction errors; however, the increases taper off with the length of the forecasting horizon.

Demand, Supply, and the Output-Inflation Trade-Off

Many economists and noneconomists alike believe that higher inflation brings an increase in economic activity and at least a temporary decline in unemployment. However, the relationships among inflation, unemployment, and economic activity have been changing in recent decades. From 1957 to

1968, for example, the correlation between the inflation rate and the unemployment rate was minus .86, meaning that an increase in inflation was associated with a decline in unemployment. Similarly, the correlation between the inflation rate and the rate of growth of real output was a positive .16 during those years. But for the period from 1969 to 1980, the correlation between the inflation and unemployment rates shifted to positive .44 and the correlation of the inflation rate with real growth changed to a minus .65.

Richard T. Froyen and Roger N. Waud, in *NBER Working Paper No. 1081, Demand Variability, Supply Shocks, and the Output-Inflation Trade-Off*, examine the shift in those relationships and assess the relative importance of three possible explanations for the change: the new classical view of the output-inflation trade-off, first described by Robert Lucas; the belief that supply-side shocks, such as the increases in energy prices, have played an important role; and the hypothesis put forth by Milton Friedman that the variability of inflation affects the natural rate of output. Froyen and Waud find support for the second and third theories, but not for the first.

Under the new classical view, only unanticipated changes in aggregate demand affect real output. Furthermore, the response of real output to unanticipated changes in demand declines as the variability of inflation and aggregate demand increase. Hence, the output-inflation trade-off could deteriorate, and even "twist" from a positive to a negative relation between inflation and output, as the variability of inflation and aggregate demand rise.

The supply-shock theory holds that, other things being equal, events such as the dramatic increases in the price of energy during the 1970s would cause an increase in the rate of inflation and a decrease in the rate of real output.

Friedman has hypothesized that an increase in the variability of inflation could cause a reduction in the efficiency of the price system that guides economic activity and, in turn, a drop in the natural rate of output. Greater variability of inflation, which accompanied the long-term rise in the inflation rate during the 1960s and 1970s, could have that effect because of institutional rigidities (such as multiyear labor contracts or wage-price controls) that impede adjustment to new rates of inflation.

Froyen and Waud test the three theories by means of a model of the economy that explicitly incorporates the effects of supply-side factors and allows for a variable natural rate of output, as suggested by Friedman's analysis. In the model, an increase in aggregate demand would cause both output and prices to rise, yielding the positive relationship between inflation and output that existed in the 1960s. However, if the variability of demand shocks is sufficiently high, the relationship will twist and become negative. Supply shocks within the model give rise to a negative correlation between inflation and real

output growth. Since high inflation rates and greater variability of inflation have gone together, a positive relationship between inflation and unemployment should show up as a positive correlation between the level of inflation and the level of unemployment.

In their empirical tests of the three theories, Froyen and Waud use the first quarter of 1959 through the fourth quarter of 1980 as the overall sample period. They break the sample into two subperiods, with the first ending in the fourth quarter of 1968 and the second beginning in the first quarter of 1969. The breakpoint separates the sample into an earlier subperiod with relatively low variability of inflation and a later subperiod with higher inflation variability.

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According to the new classical view, the increase in the variability of inflation from the first subperiod to the second should have caused output to become less sensitive to an aggregate demand shock and more sensitive to a supply shock. However, Froyen and Waud find no evidence of a decline in the coefficient for the aggregate demand term from the first period to the second. They also find no increase in the coefficient for supply shock measures. Overall, the coefficients in their equations are not consistent with the new classical view and do not show evidence of twisting of the output-inflation trade-off.

The estimates do indicate that supply shocks had a significant negative impact on output, at least during the second subperiod. The results, Froyen and Waud write, are consistent with the view that the large supply shocks of the 1970s in the energy sector and in the world market for other commodities were a significant factor behind the change in the relationship between inflation and output.

The empirical tests also suggest that the level of demand variability had a significant negative impact on output in the first subperiod while the level of supply variability had a significant negative effect in the second subperiod. Froyen and Waud interpret those results as being consistent with Friedman's hypothesis. However, the results were somewhat ambiguous when they included a proxy for the variability of inflation. It had a significant negative impact on output in the first subperiod, but not in the second. One explanation for this seemingly inconsistent finding could be that government intervention in the pricing process masked the real impact of the variability of inflation on output.

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