

The NBER Digest

NATIONAL BUREAU OF
ECONOMIC RESEARCH, INC.

March/April 1980

Inflation, Taxes, and Stocks

The interaction of tax rules and expected inflation is likely to have a substantially negative effect on stock prices, according to **Inflation, Tax Rules, and the Stock Market**, *Working Paper No. 403*, by **Martin Feldstein**, president of the National Bureau of Economic Research. Feldstein's analysis assumes a realistic ratio of retained earnings to dividends and explicitly recognizes that households invest in a wide range of assets. Extending an earlier model, he incorporates the effect that the deductibility of nominal interest expense from corporate taxes will have on share prices.

The study shows that the interaction of inflation and tax rules affects share prices in diverse ways: (1) historic cost accounting for depreciation and inventories exaggerates reported profits and thus raises corporate taxes; (2) the deduction of nominal interest payments overstates borrowing costs and thus lowers corporate taxes; (3) the net increase in corporate tax payments leaves less for dividends and retained earnings and thus lowers shareholder taxes; (4) the nominal increase in the value of corporate capital induced by inflation raises the liabilities shareholders have under the capital gains tax; (5) personal taxes on nominal interest income lower the real net yield on bonds; and (6) favorable tax rules for alternative assets such as land, gold, and housing imply that the opportunity cost of holding shares does not fall as much as does the real net yield on bonds.

Feldstein's analysis examines the principal channels through which these interactions of inflation and tax rules affect share prices. He begins by distinguishing between equity ownership by households and by tax-exempt institutions in order to separate the effects of inflation on corporate taxes from its effects on personal taxes.

Feldstein uses two methods to derive an estimate of the extent to which the net effect of inflation on depreciation, inventories, and the deductibility of corporate interest expense increases corporate taxes and reduces

net earnings. He concludes that in an economy in which all shares are owned by tax-exempt institutions, a 6 percent rate of inflation would reduce the rate of return at the corporate level by approximately one sixth, reduce the short-run share price by 29 percent, and reduce the ultimate capital stock by 18 percent.

Households, however, also pay income tax on dividends and capital gains tax on increased share values. And households pay tax on nominal interest income, so that higher inflation (and therefore higher nominal interest rates) lowers the real aftertax yield on bonds. Because households have many alternative investments (housing, consumer durables, precious metals, and so on), there is no close link between yields on stocks and bonds. Inflation and the tax rules have varied effects on these alternative assets, in some cases making them relatively attractive compared to equity yields.

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In addition to the effects of inflation in reducing corporate aftertax income, the taxation of households' dividends and nominal capital gains further depresses the share price unless households will settle for a significantly lower yield on equities (which implies an implausible decline in institutional shareholding). Assuming that the required rate of return on equities remains unchanged, Feldstein estimates that a 6 percent rate of inflation lowers the price that households are willing to pay for shares by more than 40 percent.

The combined equity of institutional and household

markets determines the equilibrium price of shares and the distribution of shares among households and institutions. In one illustration, a permanent increase of 6 percent in the expected rate of inflation reduces share prices by 26 percent and increases institutional ownership from 12.5 percent to 15.3 percent of total equities. Feldstein shows that results like these are not very sensitive to changes in the total of initial yield on alternative assets (in the absence of inflation) plus the risk premium required for equities.

In the long run, a decline in demands for equity by both households and institutions must reduce the capital stock of nonfinancial corporations. For likely values of tax and financial variables, Feldstein estimates that a fall in the capital stock of 8 to 18 percent will result from the interaction of taxes and an expected 6 percent rate of inflation.

Feldstein explains why other studies have reached the opposite conclusion — that the interaction of taxes and inflation does not affect share prices. Some researchers have looked only at corporate gross income and taxes rather than at the case of equity income where all taxes are paid by equity investors. Others have seriously underestimated the effect of inflation in reducing the real value of depreciation allowances.

Feldstein's calculations, in contrast, suggest that because of existing tax rules, a permanent increase in the expected rate of inflation will lower the level of share prices immediately, although continued inflation at any expected rate causes share prices to rise continually to maintain their real value. AR

Productivity Behavior at the End of an Expansion

During the first three quarters of 1979, productivity (that is, U.S. aggregate labor productivity in the non-farm sector) declined at an annual rate of 2.3 percent. However, this may not be cause for alarm, since productivity generally performs poorly in the last stages of a business expansion, according to a recent NBER study.

In work recently published in the *Brookings Papers on Economic Activity* (2:1979) and included in the NBER Working Paper Series (No. 427), **The "End-of-Expansion" Phenomenon in Short-Run Productivity Behavior**, Robert J. Gordon of NBER and Northwestern University examines quarterly productivity data back to 1954, the trough of the first recession after the Korean War. He calculates a disturbing slowdown in the cyclically adjusted trend growth of productivity from 2.48 percent annual rate in 1954-65 to only 1.06 percent in 1973-77.

In addition, he observes an interesting short-run phenomenon that he labels the end-of-expansion (EOE) effect: in 1956, 1960, 1969, 1973, and 1979 a productivity shortfall developed. And, at least prior to 1979, that productivity shortfall was always subsequently made up. The EOE effect occurs during the last phase of a business cycle expansion after the ratio of real to potential output (GNP) has reached its peak. Until this peak in the "growth cycle" occurs, output rises faster than its long-run trend; business sales tend to outstrip expectations; and firms revise their hiring and capital investment plans upward. But this hiring momentum persists after the growth cycle peaks. With more workers hired and a cyclical slowdown in GNP growth, productivity declines.

"...firms tend consistently to hire more workers in the last stages of the business expansion than is justified by the level of output."

Gordon tests three possible reasons for the EOE effect: (1) that increased capital investment spurs firms to hire employees to install new equipment and adds overtime work for experienced employees who must train new employees; (2) that firms maintain some slack in their labor force during expansionary times when the quit rate is high; and (3) that the real wage decreases during the expansion, making labor cheap and encouraging new hiring. None of these explanations proves to be statistically significant, according to Gordon's calculations.

He then asks whether the sluggish response of returns to labor during the EOE represents the behavior of employment or hours (worked) per employee. According to Gordon's estimates, "the EOE phenomenon primarily involves the maintenance of an excessive number of employees relative to output, with hours per employee making a minor additional contribution." Gordon's results suggest "that firms tend consistently to hire more workers in the last stages of business expansion than is justified by the level of output."

He attributes the end-of-expansion effect to "inertia and overoptimism in business personnel policies." However, some of this overstaffing may result from a lag between business decisions on personnel budgets and the actual hiring, training, and promotion that takes place. While businesses may gradually recognize this overstaffing, they may be unable to correct it rapidly.

Based on the historic data and the incidence of an EOE effect, Gordon feels that standard equations may overpredict productivity growth during the period following a cyclical peak in the economy. Therefore,

Gordon concludes, "current forecasts based on conventional productivity equations may be unduly pessimistic about the increase in unemployment that will occur during late 1979 and early 1980, but overly optimistic for subsequent periods."

Dynamic Adjustment and International Reserves

Theories about the ways central banks manage their international reserves usually assume that countries have "target" levels they want to maintain and that they respond to deviations from these targets by acquiring or selling reserves. A number of empirical tests have shown that the demand for reserves is quite stable. However, estimates of the speed with which central banks adjust reserves when they deviate from target levels have been very low. Indeed, the estimates often have been insignificantly different from zero (that is, they have been consistent with the notion that central banks take no action at all to bring reserves back to the desired levels).

These findings about the speed of adjustment have been disturbing because they cast doubt on the usefulness of the entire theory of target levels. Evidence of a stable demand for reserves is of little value in assessing international monetary policy if central banks do not act to eliminate discrepancies between the actual and desired reserves. But two NBER researchers have developed new evidence suggesting that central banks do have target levels and that they adjust actual reserves toward the targets quite rapidly. The new evidence, reported in **Dynamic Adjustment and the Demand for International Reserves**, Working Paper No. 407, was developed by **John F. O. Bilson** and **Jacob A. Frenkel** of the University of Chicago.

Bilson and Frenkel's study departs from earlier research by recognizing that individual countries may have different reserve preferences. Some countries may prefer to hold relatively large reserves and others may prefer relatively small ones. The authors find that not taking these preferences into account may have caused earlier estimates of the speed of adjustment to be biased downwards.

In their tests, Bilson and Frenkel first estimate both desired reserves and country-specific factors affecting actual reserve levels. They assume that desired reserves are a function of three variables: the variability of international receipts and payments, reflecting the role of reserves as a buffer stock to accommodate fluctuations in transactions; a measure of scale, reflecting the absolute value of international transactions; and the average propensity to import, reflecting the openness of the economy.

Bilson and Frenkel estimate desired reserves for twenty-two developed and thirty-two less developed countries (LDCs) for the period from 1964 through 1972, when exchange rates were pegged under the Bretton Woods system. The authors find that all three of the variables are statistically significant and that they explain 80 percent of the variance in average reserve holdings across countries. Developed countries are more sensitive to the first variable—the volatility of international receipts and payments—possibly because they are more reluctant to contend with balance-of-payments disturbances by imposing trade controls or other restrictions.

Bilson and Frenkel then use the estimates of deviations from desired reserves (the difference between actual and estimated desired reserves) to estimate the parameters of the adjustment function. They find that adjustment comes very quickly when the country-specific factors are included in the equations. In developed countries, 54 percent of the deviation from desired reserves is eliminated within a year; in the LDCs 42 percent of the deviation is made up within a year. In contrast, dropping the country-specific factors lowers the estimated first-year adjustment to 13 percent in developed countries and 12 percent in LDCs. After four years, 90 percent of the adjustment to desired reserve levels is completed when country-specific factors are included, but only 40 percent is completed when country-specific factors are ignored.

"...the greatest change in reserve-holding behavior under the managed float is that LDCs act more like developed countries than they did in the past."

These estimates assume that the adjustment factor is constant and is not affected by individual circumstances. Bilson and Frenkel also test three hypotheses that could lead to varying speeds of adjustment. First, countries may hold relatively large reserves so that they can adjust slowly to deviations from the desired level. In that case, countries with relatively large reserves would adjust more slowly than others. Second, countries may adjust more rapidly to shortfalls in reserves than to unwanted reserves. Third, they may adjust faster to large deviations than to small ones. The statistical tests suggest that the first and second hypotheses are correct in the case of developed countries, but the third is not. For the LDCs, on the other hand, the statistical results support the third hypothesis but not the first and second.

Finally, Bilson and Frenkel examine the behavior of reserves from 1973 through 1977, after the collapse of

the Bretton Woods system. It has often been argued that the move to flexible or "managed floating" exchange rates would bring about a significant change in the role of international reserves. Bilson and Frenkel find, however, that any structural change in the desired level of reserves has been extremely small. Moreover, they find that the adjustment function is essentially unchanged as well, except in the case of the LDCs. The LDCs appear to respond far more rapidly to devi-

ations from desired reserve levels than they did in the Bretton Woods era. This change may reflect their greater access to world capital markets. In addition, they appear to adjust rapidly to small as well as to large deviations, while they adjusted rapidly only to large deviations when exchange rates were pegged. In other words, the greatest change in reserve-holding behavior under the managed float is that LDCs act more like developed countries than they did in the past. AE



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