

Foreword

This volume contains the papers presented at a conference on "Financing Economic Growth: The Problem of Capital Formation," held at the Center for the Study of American Business, Washington University on November 30, 1976. Cosponsored by the Center and the Federal Reserve Bank of St. Louis, the conference considered the problems of generating sufficient flows of saving and investment to finance economic growth and development in the future. Included here are the luncheon address by Lawrence Roos of the Federal Reserve Bank of St. Louis and the major papers presented by Robert Eisner of Northwestern University, Allen Sinai of Data Resources, Inc. and Massachusetts Institute of Technology, and Jai-Hoon Yang of the Federal Reserve Bank of St. Louis.

CAPITAL FORMATION AND THE FEDERAL RESERVE

Lawrence K. Roos

It is a real pleasure to be here as a co-sponsor, along with Murray Weidenbaum and the Center for the Study of American Business, of this important meeting on capital formation. I must admit to a certain feeling of apprehension in attempting to deal with a subject of this complexity in the company of so many distinguished members of the academic community.

As president of a Federal Reserve Bank, I think it appropriate that I direct my remarks to the role of the Federal Reserve System in the process of capital accumulation. Although the Fed is usually viewed as playing a relatively minimal part in that process, some of our actions in monetary policymaking do have significant long-term effects on capital accumulation.

First, some background. As we know, additions to the stock of human and physical capital have in the past produced a steadily rising standard of living for our people. In fact, our ability to accumulate and expand capital has brought us a standard of living rarely matched by others. As we look ahead to the future, however, there are serious grounds for concern as to whether our economy can match, much less surpass, the record of past accomplishment.

What has been the accomplishment of the recent past? From the late-1940's to the early-1970's, our economy's stock of human capital grew

Mr. Roos is president of the Federal Reserve Bank of St. Louis. He presented these remarks as the luncheon address at the conference.

rapidly as a result of advances in education and training, improvements in health care, enhancement of knowledge, and development of new technological know-how. During the same period, resources were allocated to the production of business plant and equipment (i.e., physical capital) to such an extent that growth of business physical capital far outstripped growth of the number of man-hours worked in the production of goods and services.

As a result of these two developments, overall productivity grew at an historically high rate. As a consequence, the average rate of increase in our standard of living more than doubled during the past three decades. Growth in output per capita rose from a 1.5 percent average annual rate of increase in the late-1940's to about a 3.5 percent rate in the early-1970's.

So much for the past. But what does the future hold in terms of the ability of our economy to sustain, or to exceed, the average rate of increase in output per capita of the early-1970's? A related question is whether past rates of growth in output can be sustained while at the same time achieving often asserted social objectives.

At this moment the answer to these two questions must be "NO" unless the influence of prospective demographic trends on output per capita are offset by other developments. Let me elaborate.

According to Census Bureau projections, growth in the labor force aged population, that is, the potential number of persons available for filling jobs, is expected to slow markedly over the balance of this century. At the same time, growth of the total population is projected

to increase somewhat. An implication of these two projections is that growth in output per capita will recede from its recent rate of increase unless there are compensating offsets, such as a marked rise in the growth of productivity. In turn, the extent of productivity growth will depend crucially on the potential rate of capital formation.

As economists, you are familiar with the economic considerations which influence the rate of capital formation. There are many and they are varied. As president of a Federal Reserve Bank, I shall direct my remarks to the contribution that the Federal Reserve System can make toward facilitating growth in the capital stock.

It might be appropriate to start by pointing out what the Federal Reserve cannot do to affect capital growth. It can neither directly increase the amount of resources available for production nor directly influence the allocation of these resources to capital formation. The Federal Reserve can only control the stock of money and, thereby exert an indirect influence on capital formation. How can the Fed do this?

One way is to avoid pronounced short-run changes in the growth rate of money. Many studies indicate that stop-and-go monetary actions in the post-World War II era produced alternating periods of short-term acceleration and deceleration of monetary growth, thereby, contributing in considerable measure to fluctuations in income, output, and employment. Such instability has the effect of generating uncertainty regarding returns to be expected from additions to capital and, thus, tends to discourage capital formation.

The other way the Federal Reserve can facilitate capital formation is by controlling the average growth rate of money over longer periods

of time so as to avoid inflation or deflation. A generally accepted proposition today is that the trend growth rate of money relative to the trend growth rate of output is the fundamental determinant of inflation. As rising price levels, given our institutional rigidities, are an important deterrent to capital formation and to the efficiency of the allocation of capital, it is appropriate to consider just how they impact capital markets.

First, inflation tends to shorten the maturity structure of debt. Lenders, to protect against the erosion of their investments caused by possible changes in the rate of inflation, opt for loans with shorter maturities. In such situations, firms engaging in longer-run capital formation, such as public utilities, face the necessity of constantly rolling over short-term debt. The resulting uncertainty with respect to borrowing costs again tends to reduce the incentive to invest.

Under the progressive income tax rate structure, conditions of inflation cause personal income tax liabilities to rise faster than income. As a result, the expected real return to individuals from adding to their human capital is reduced.

Given our present corporate income tax structure, inflation also has an adverse impact on business capital formation. Plant replacement costs rise, but depreciation deductions from corporate income for tax purposes are based on historical costs. As a result, reported profits are overstated, firms pay higher taxes than otherwise, and the incentive to invest in plant and equipment declines.

Firms in regulated industries find that during periods of inflation their regulated prices tend to rise more slowly than their market-

determined costs. As a result, they often are unable to compete for investment funds with firms in unregulated industries. Under such circumstances, the allocation of resources to capital formation is less efficient than if all firms were able to compete on an equal basis in the marketplace.

In addition, inflation often leads to calls for the imposition of formal or informal controls over *all* prices and wages. The possibility of wage and price controls leads to uncertainty regarding future expected returns from capital investment, and consequently, reduces the incentive to accumulate capital.

A similar situation prevails when ceilings are imposed on interest rates that thrift institutions may pay on time and savings deposits. It is well documented that rising market interest rates are the handmaidens of inflation. It is also well documented that when market rates rise above legally mandated ceiling rates, investable funds bypass thrift institutions for unregulated markets. The frequent result is a less efficient allocation of current resources available for capital formation.

All of those factors, I believe, underscore the role of Federal Reserve monetary policy in facilitating capital formation. Our mission is to promote a more stable economy and to prevent a persistent rise in the average level of prices. This role calls for relatively stable short-run growth of money, and long-run growth roughly in line with the trend growth of output. It is clear that monetary authorities should be primarily concerned with providing a stable monetary environment in the long-run, rather than engaging in attempts to solve sectoral problems. This is true particularly where capital formation is concerned.

Essential to the capacity of the Federal Reserve to fulfill its proper monetary policy role is its ability to function independently of influences which call for the use of monetary policy to solve short-run problems. The framers of the Federal Reserve Act wisely provided an independent status for the Fed whereby it would be able to function in the national interest independent of political or social pressures. Any lessening of this independence might indeed produce disastrous long-term results. In this respect, independence must be construed in both a legal and de facto sense. While it cannot be denied that even a legally independent system can make errors, problems are more certain to occur when a monetary authority tries to respond to public pressures to counteract short-term economic problems. We must resist both legal and de facto threats to Federal Reserve independence.

In summary, if we believe that one of society's goals is to foster continued growth in our standard of living at a rate commensurate with past experience, I suggest that continued capital formation is a necessary condition for the achievement of this goal. For this objective to be achieved, it is necessary that the Federal Reserve System remain legally and practically independent. While such independence does not assure that adequate capital formation will take place, it will at least increase the probability that some of the obstacles facing us will be minimized.

GOVERNMENT POLICY AND INVESTMENT

Robert Eisner

There is nothing that cripples business investment like a recession. From the beginning of 1974 to the third quarter of 1975, while unemployment rose from 5.2 percent to between 8.5 and 9 percent, real non-residential business fixed investments fell 17.5 percent. While gross national product in constant dollars declined 6.6 percent from the fourth quarter of 1973 to the first quarter of 1975, the total of fixed investment, including residential as well as nonresidential structures, dropped 23.6 percent from the first quarter of 1973 to the second quarter of 1975.

These facts should be an unforgettable reminder to all concerned with obtaining both a substantial and an optimal rate of business investment. The one major government responsibility in this area should be to provide a general climate of prosperity. Beyond that, I shall argue, government should leave investment decisions to the competitive processes of the free enterprise system, unless cogent reasons exist for doing otherwise. There should be no general presumption that government should encourage -- or discourage -- business investment.

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"Investment Needs" and Presumed Constraints

We are frequently told that productivity, prosperity, employment, and growth depend upon major business investment. There have then been many efforts to project "investment needs."

A New York Stock Exchange study [23] pointed to a capital "shortage" of some \$650 billion by 1985. As Treasury Secretary, William E. Simon [24] suggested a capital gap of over \$2.5 billion by comparing his estimates of capital requirements in current dollars over the next decade with actual expenditures in current dollars over the last decade, without noting the noncomparability of prices.

There have been many other comparisons of projected needs and requirements and anticipations of actual investment. Bosworth, Duesenberry and Carron [3] offered a projection for 1980 of 15.8 percent as the ratio of gross private domestic investment to gross national product. This particular figure was in fact just about the mean for that ratio in the 1950's and in the pre-recession year of 1973. A major study of capital requirements was undertaken for the Council of Economic Advisors under the direction of Beatrice N. Vaccara of the Bureau of Economic Analysis. It projected a figure of \$986.6 billion, in 1972 prices, for non-residential business fixed investment from 1975 to 1980, or 12.0 percent of cumulative gross national product, "in order to insure a 1980 capital stock sufficient to meet the needs of a full employment economy, and the requirements for pollution abatement and for decreasing dependence on foreign sources of petroleum." [22], p. 77

Frequently, financing has been seen as a major concern for the supply of business investment. Benjamin Friedman wrote in 1975, "To an unusually great extent, financial considerations may act during this

period [1977-81] as effective constraints on the amount of fixed investment which the economy in aggregate is able to do." [11, p. 52] In May 1976, however, Allen Sinai reported, "There are no financial shortages of any consequence." [20, p. 2]

Concern has also been expressed with regard to the rate of return on capital. A study by William Nordhaus [19] suggests a drop in the "genuine" rate of return on non-financial corporate capital. It appeared to fall fairly steadily from a high of 10.0 percent in 1965 to a plateau of around 5.5 percent in the 1970's, before the current recession. (This genuine rate of return involves a depreciation adjustment, akin to that now incorporated in the national income accounts, and the inclusion of net interest in the numerator and the total value of non-financial corporate capital, rather than net worth, in the denominator.)

Presenting a variety of measures, Holland and Meyers found that real rates of return were generally higher in the mid-1960's and lower since, but they note that non-financial corporations "are better off now than in the mid-1950's." They observed further, "operating profitability (ROC) is about the same now as then but the cost of capital is lower. If there is a capital 'shortage,' it has as yet had no observable effect on the cost of capital." [13, p. 38]

I have elsewhere offered critical reviews of some of these studies and reported findings. What I should like to do here, however, is to consider what the role of government has been in achieving the rate of investment that we have had and offer some thought as to what government

policy should be. I shall consider, in particular, the argument that government, with business and individual income taxation and with our social insurance system, discourages saving and investment. Hence, it is claimed, government should take special measures to encourage investment to compensate for this discouragement.

The Government Record on Tax Policy

With regard to the tax system a widespread argument by business spokesmen, politicians and some economists is that after-tax returns on capital and business investment are generally depressed by government policy. In its more sophisticated form the claim is that there is a "wedge," consisting of the rate of income taxation, between the marginal social return on saving and investment and the after-tax return perceived by investors. One presumes, by this reasoning, that there is no social cost to capital or to its accumulation which should be met by taxation. To the extent that national defense and police forces are used to protect capital or the cost of the future income, this is not true.

Further, business income taxation should not be viewed as taxes on capital, except in the Marxian sense of all capital, "constant" and "variable." For if business or corporate income taxation discourages business production, it does not generally distort the choice of input to achieve any given output. Taxation on one sector, of course, will discourage production in that sector. With less production in that sector there would be less employment of labor as well as less utilization of capital. If aggregate demand and output are unaffected, however, there would then be more production in other sectors, with the relative

utilization of labor and capital again unaffected.

We may view business taxation as so pervasive a tax on productive activity that it offers no alternative in the way of reallocation of resources to production outside of the business (taxed) sector to some other productive activity. In that case, we would have to assume that business taxation discourages productive activity generally, increasing the demand for leisure and reducing not only investment but the employment of labor and the production of market output.

A more sophisticated view of a possible role of business income taxation in discouraging investment begins with the acknowledgement that such taxation is a tax on profits and not on capital or any one factor of production except to the extent that the costs of non-capital factor services are more fully tax deductible than are capital services. Thus, in the so-called "neo-classical" formulation of the investment function, what becomes critical is whether tax depreciation equals economic depreciation, whether capital costs such as interest and dividends are deductible, and whether capital gains and losses are fully included in taxable income (See 147, for example). If all this were true, business income or profits taxation would be neutral with respect to the proportions of factors used in production and hence would not directly affect investment. It is hardly clear, when these elements are considered, that business income taxation has on balance discriminated against capital and investment.

First, despite the long hue and cry about the inadequacy of tax depreciation charges, there is considerable evidence that, except

for some of the last few years of extraordinarily rapid inflation, tax depreciation has in fact exceeded economic depreciation. This is largely confirmed by the new Bureau of Economic Analysis "capital consumption adjustment" for corporate enterprise. This adjustment is essentially the difference between depreciation charges calculated on a consistent straight-line basis but adjusted for inflation and the estimates of actual depreciation charges based largely on tax depreciation. It turns out that for each of the years from 1962 through 1973 the BEA capital consumption adjustment to corporate profits was positive, indicating that consistent straight-line depreciation (at 85 percent of Bulletin "F" lives) with adjustment for rising replacement costs was less than actually reported corporate depreciation charges. The similar adjustment for non-farm proprietors' income was positive for every single year from 1946 through 1975 (See 257 and 267, Table 1.13).

The reasons are not hard to find. The Congress, the Treasury and the Internal Revenue Services have been increasingly "liberal" on tax depreciation and amortization allowances over the years. Beginning with World War II, we had various "Certificates of Necessity" for five year amortization, renewed again during the Korean War. In 1954, sum-of-the-digits and double-rate declining balance depreciation were initiated for tax purposes. These entailed a major acceleration of depreciation and consequent increase in annual depreciation charges. Contrary to some confused or confusing interpretations, such acceleration does represent, in an economy growing as is ours in the annual money value of capital expenditures, a permanent increase in annual

depreciation charges.

In 1962, "guideline" depreciation was instituted, offering more acceleration of depreciation and increases in annual charges. In 1971 we acquired the "Asset Depreciation Range" system which permitted still further acceleration of depreciation by allowing shortening of tax lives by 20 percent beyond the already shortened guideline lives. Finally, over several decades, it turns out, the Internal Revenue Service has been acquiescing in a very considerable shortening of lives for tax depreciation purposes (so that by 1971 for much property there was indeed little to gain from the Asset Depreciation Range system).

With regard to the costs of raising capital for investment, interest expenses are fully deductible for tax purposes. What is more, as pointed out by George von Furstenberg, with continuing inflation, business borrowers may charge against taxes "not only 'real' interest but also the inflation premium in their interest payment." [21, p. 225.] Yet, with inflation, the real value of bonded indebtedness declines and businesses pay no tax on the implicit capital gain in their net worth.

Perhaps most important in recognizing overall tax effects on investment is our lack of effective taxation of capital gains. These are of course only taxed upon "realization," and then essentially at half of normal income tax rates. Taking into account the extent and timing of "realization," which still need not occur even at death, the effective rate of taxation of capital gains, frequently zero, is almost certainly

under 10 percent.¹

Inflation can lead to nominal capital gains which are not real. Even inclusion of only half of such nominal capital gains in taxable income could result in taxation of capital rather than true income, defined as the value of what can be consumed while maintaining real capital intact. The combination of tax deductibility of interest payments and limited taxability or non-taxability of capital gains, nominal or real, may lead, however, to quite different results. One can finance a great deal of investment in tangible assets by borrowing, with the interest costs contributing to a reduction of taxes on other income. Then, as the return on the investment accrues in the form of increased value of the assets, no taxes are paid. The net after-tax return on investment is thus raised.

Additional government encouragement of some forms of business investment stems, of course, from the so-called investment tax credit, which is in fact a reduction of taxes related to purchase of eligible equipment. That credit, introduced initially in 1962 and variously revised, suspended, reinstated, abolished, reenacted, and extended and increased, now stands at 10 percent for business generally, with an extra 1.5 percent related to corporate contributions to employee stock ownership plans.

Taking into account all of these factors -- accelerated depreciation for tax purposes, full deductibility of nominal interest costs, depreciation of the real value of business debt as a consequence of

¹Bailey [17] offered an estimate of 8 or 9 percent in 1969.

inflation, the non-taxation of capital gains, and the equipment tax credit -- I would charge that federal government tax policy has in fact slanted the economy to an overallocation of resources to business investment in physical capital. While I suspect that it is too early to be sure of a secular downturn, particularly with figures heavily influenced by the stagflation and recession of the last few years, one may wonder whether the declining rate of return on business capital suggested by Nordhaus and others perhaps relates to these government policies.

How Tax Incentives Influence Investment

Government tax incentives for business investment may be expected to increase investment and the capital intensity of production until the marginal after-tax return has again fallen to whatever is the required rate of return on investment. This would, in principle, leave the long run after-tax rate of return largely unaffected, while causing capital gains for owners of capital until the new equilibrium is reached.

In practice, however, there may well be some over-shooting. Individual firms perceive higher after-tax profits for themselves. They may not anticipate all of the ultimate effects for the economy as a whole as increases in other taxes counteract their own immediate tax gains. They then react largely to an expansion effect of apparently lower tax costs without recognizing that in the aggregate it is only a substitution effect which can apply. Hence they over-invest, at least given the width of markets, as perhaps they did in the late fifties and into

the sixties only to find excess capacity and excessive capital intensity in the seventies. Thus, not only have the marginal before-tax and social returns to business capital been reduced by the introduction and extension of tax incentives. The after-tax returns to business and to the owners of business capital may also have been reduced.

The issue of effects upon rates of return is in a fundamental analytical sense related to the considerable dispute as to the effectiveness of various government tax measures in increasing the rate of aggregate investment. Aside from influences on aggregate demand, which we may wish to rule out on the assumption that alternate taxes or reductions in government expenditures would replace any given business tax reductions, special tax measures for investment such as the equipment tax credit and accelerated depreciation must operate by lowering the relative price of capital. Consequences for investment then depend upon the elasticity of substitution between capital and other factors, or more generally among all factors of different durabilities, and upon costs of adjustment which dictate the time paths of capital and associated investment.

Early work within a "neo-classical" framework simply assumed perfect competition and a Cobb-Douglas production function, where the elasticity of substitution between capital and labor is, of course, unity. (See 14 and 15, for example.) All that was actually estimated was a set of distributed lag coefficients, and these were actually taken as constant and independent of the factors inducing investment. With discussion of the critical nature to the investment function of these underlying

assumptions (See 9 and 10), attention to parameters of production functions increased, both in themselves and in terms of their roles in investment. Forms of production functions proliferated, along with presumed empirical findings. Estimates of investment functions tended on balance to find elasticities of substitution between "capital" and "labor" less than unity but in many instances one could not pinpoint estimates sufficiently to reject the possibility of unitary elasticity and of the Cobb-Douglas form (Note 27). Differences tended to appear as between estimates from time series and from cross sections, with the former generally showing lesser elasticities of substitution (as observed in 17), and we have seen various arguments that the one or the other set of estimates was biased.

The connection of all this to investment is that, if firms minimize costs or maximize profits, the prime effect of government lowering of the after-tax cost of capital is, by lowering the relative price of capital in general or in some instances more durable capital in particular, to increase the capital intensity of production. The extent of this increase depends in equilibrium upon that critical elasticity of substitution.

Given non-zero elasticity of substitution, lowering the relative price of capital brings about an increased rate of gross investment. In an otherwise stationary economy, the capital intensity of production or the capital-labor ratio rises to a new equilibrium, at which point greater depreciation and retirements of capital are offsetting the permanently higher rate of gross investment. Net investment returns to zero. Maintaining a constant ratio of capital to output or capital

to labor, where output or labor are increasing, of course requires increasing capital, that is positive net investment. A higher capital intensity or a higher capital-labor ratio, in a growing economy, implies a permanently higher rate of net investment.

Government investment incentives may be perceived by individual firms as increases in cash flow and decreases in costs, with product demand unaffected. Positive investment responses in the short run may be related to these perceptions.

We may presume, however, that government policy aimed at increasing investment is independent of policies directed toward the maintenance of aggregate demand. If general considerations of fiscal policy, including real or imagined needs to combat inflation or meet balance of payment or exchange problems, are such as to maintain aggregate demand or its path invariant, the short run considerations that lead to increased business investment are in time overwhelmed by the underlying constraints of the production function. Thus, if the elasticity of substitution is low, any substantial short run increases in business investment may be followed by sharp reductions in experienced rates of return and evidence of an apparent over-supply of capital. As firms experience the inelasticity of the demand for additional capital with respect to its rate of return, our usual government incentives bring little bang for the buck. Many billion dollars of tax subsidies in the form of equipment credits and accelerated depreciation produce only modest increases in investment.

We may also wish to consider the differential impact of investment

tax incentives on large and small firms. A good argument can be made that the equipment tax credit and other business investment tax preferences are a disproportionate advantage to large business, with small business figuratively picking up the crumbs from the table. A major reason for this is simply that it is big business that tends to be most capital intensive and uses not only the largest amounts but the largest proportions of equipment in the productive process. Hence tax benefits for the purchase of business equipment are a much more substantial boon to large business than to small business, both absolute and relatively.

The consequence is not only that small business gets less relative benefit. There may also be a backwash in this instance which leaves small business altogether worse off. Aside from the fact that an alternative to reducing business taxes in a manner that gives peculiarly large benefits to big business might be a reduction in taxes of another form which would be of more benefit to small business, there are certain real and monetary effects of a tax credit and other investment tax subsidies which indirectly injure small business.

First, to the extent that large business does take advantage of the tax credit to order more equipment, it puts added pressure on supply, thus raising equipment prices which all business, including small business, must pay. Secondly, added business investment by large concerns may further tighten credit markets, raising interest rates and making credit more difficult to obtain by small business. The net gain to small business from these incentives would thus clearly be less than

the apparent gross gain which seems so attractive, and may even possibly be negative.

There is in fact a third manner in which the equipment tax credit and accelerated depreciation allowances are likely to be of less relative benefit to small than to large business. This relates to the rather obvious fact that the tax credits and increased tax depreciation deductions are essentially benefits to firms that are already making profits. With limited provision for loss offset, small firms and new firms which are showing little or nothing in the way of taxable profits hardly benefit from tax advantages which would reduce their profits tax liabilities.

Effects on Saving of Individual Income Taxes and Transfers

Some see the individual income tax as a deterrent to investment. It is claimed that saving for future consumption is taxed twice, once as current income is received and a second time as a return has been earned on the saving.² Thus, the relative price of future consumption and current consumption, or of saving and current consumption, is altered to the advantage of current consumption. As a consequence, individuals or households attempt to save less and, given a full employment economy, less saving occurs and hence there is less investment. With diminishing marginal returns to capital, we have a higher before-tax, social

²As suggested above, the availability of interest deductibility and largely untaxed capital gains, as well as explicit tax shelters, may in fact leave many forms of saving less heavily taxed than current consumption.

return on capital than there would be without income taxation. Presumably we have sacrificed investment with a social return which, except for tax considerations, would be warranted.

Given the assumption of full employment, taxes on income may not, however, reduce the rate of saving. We must distinguish income and substitution effects. If savers are concerned primarily with establishing a future consumption stream, say for their retirement, a tax on the return to cumulative wealth reduces permanent income and reduces current consumption, and thus increases current saving. A lower rate of return may induce individuals to save more in order to attain consumption goals in later years: the old Cassel effect. In a growing economy with a growing population, we then have increased saving of the relatively more numerous working young. If there are not compensating income transfers, this is supplemented by decreased dissaving of elderly retirees who, because of the lower rate of return on their past saving, must consume less.

It is frequently argued that government redistributive efforts, in the form of the whole tax and transfer payment package, encourage consumption and hence discourage saving. This argument may be questioned appropriately in terms of both the Friedman permanent income [12] and Modigliani life-cycle consumption functions [18]. Both the Friedman and the Modigliani models suggest that the marginal propensity to consume of poor transferees may be no higher than that of rich tax-paying transferers. Redistribution from rich to poor will not then necessarily raise consumption.

It has also been argued recently, particularly by Martin Feldstein, that our social insurance system and its method of financing reduce private saving below what it would otherwise be, and substitute no real public saving. One might suggest one contrary effect in the dominant component of taxes on the working young to finance transfer payments to the elderly retired. The propensity to leave estates may be such that, despite the need of many elderly to consume all of their pensions, our social security system adds more to private saving than it subtracts.

Except for this, it might be conceded that the guarantee by government of retirement benefits reduces a major motivation for saving. Consideration of historical alternatives to governmental guarantees of old age support, though, still leaves questions. What we had before "social" security at a government level, and what still exists in much of the world, is private support within the family, essentially by one's children. Before the advent of social security in the United States, it would appear that the bulk of the population found themselves unable or unwilling to save significantly during their working lives, and relied in large measure on the support of their children for sustenance in old age. The final word on empirical data is certainly yet to be said, but there may have been little loss in private saving as a consequence of the shift of support of the aged by their children from a private mechanism to one socialized by the state.

To the extent that the social commitment appears more reliable it may enable individuals to insure themselves more readily against risks and uncertainties of all kinds regarding retirement needs, including

the uncertain length of life itself, and future health and medical expenses. Social insurance may thus bring about a reduction in saving intended to meet risk and uncertainty. Such a governmentally induced reduction in saving is not necessarily a welfare loss. We may well prefer to save less and have a lower expected lifetime income when risk and uncertainty are reduced. We may prefer the lower-income-lower-risk combination which social insurance makes possible, to the higher income-higher risk combination, which we would be forced to seek through more saving if social insurance were not available.

Monetary Policy

Business investment is seen by many to depend considerably upon monetary policy. In general, easier monetary policy is viewed as bringing lower interest rates, although this is disputed by "monetarists." They argue that increases in the quantity of money will only temporarily lower interest rates but then raise prices, the expected rate of inflation and the nominal rate of interest as well. Clearly, higher expected rates of inflation bring on higher nominal rates of interest. It is hardly clear, however, that these prevent the lower real rates of interest which are what should be relevant to investment decisions. Further, one may well properly question whether expansionary monetary policy alone, that is the Federal Reserve system bringing about the exchange of non-interest bearing debt (money) for interest bearing debt, will generally cause much inflation.

The main body of economic thinking does perceive a negative relation between the rate of interest and investment and hence a positive relation

between easier money and investment. What that monetary policy will be is likely to depend considerably upon the political process. Despite the short run independence of the Board of Governors of the Federal Reserve system and of the Open Market Committee, one may anticipate that a Democratic administration will have some influence in implementation of its traditional policy of easier money. This would appear particularly likely as long as the rate of unemployment remains high and the economy has not completed its recovery from the sharp and deep recession that began in 1974.

Measures intended to affect investment are frequently poorly judged if one concerns oneself exclusively with business investment which, as we shall note further, is a small proportion of total capital accumulation. In fact, there is little evidence that tight money and higher interest rates have a direct impact on business investment. They do have profound effects, in large part because of governmental restrictions and institutional arrangements in mortgage markets, on investment in residential housing.

Tight money may choke off investment by relatively smaller and less credit-worthy unincorporated business. It may have very drastic effects on investment by state and local government and school districts. It may also make purchases of some consumer durables more difficult. In its impact on security prices it may importantly affect people's perception of their wealth and hence their own consumption and investment in human capital. Important indirect impacts on business investment may stem from the general movement of the economy in response to monetary policy.

Paradoxically, it is possible that tight money intended to discourage investment may actually increase business investment. For example, to the extent that construction resources are freed from residential housing and government building, they may become more readily available for the erection of new business plants. Corporate fund raisers may lament the higher interest rates that they pay and yet not note that lower construction costs (or less rapidly rising construction costs) or shorter delivery times are a consequence of the tax impact of tight money elsewhere in the economy.

A Broader View of Investment

These considerations should lead us to a much broader consideration of basic determinants and costs of business investment. One may be seriously misled by too narrow a view, particularly that of an individual firm. Here it may appear that the availability of funds is a simple, overwhelming determinant of the rate of capital expenditures. Even in this instance, one may readily document the fact that most large firms make capital expenditures to the extent that they appear sufficiently profitable. For the giants of American industry that do the bulk of capital spending, funds are available. The question is whether the profitability of their use is sufficient. And the expected profitability of use of funds varies considerably more than their cost.

Where profitable opportunities dwindle it may appear that the high cost of funds is discouraging investment. But were profitability high, that same high cost would not discourage investment. Even availability may be an evidence of expected profitability. Banks and other investors

will be reluctant to supply funds if investments do not appear sound, that is, profitable.

Ultimately the total amount of saving and investment in the economy may be seen to depend upon total income and output and proclivities to save for future consumption instead of consuming now. As long as employment is less than full and output and income are hence less than the total of which the economy is capable, saving and investment can and would be increased by coming closer to full employment. Given a situation of less than full employment, virtually any increase in output, whether of consumer goods or goods and services produced by or purchased by government, would also generate more saving and investment. The underlying economic relation, indicating that higher income implies more saving and investment, is relatively unassailable.

The financial counterparts to this underlying real relation may be varied. With a higher national income, there may be greater personal saving, more in the way of undistributed corporate profits, elimination of dissaving by the unemployed and financial flows in one way or another from the savers to those requiring real capital, to the extent those in these categories are not identical.

Once full employment is attained, the story is a different one. Any attempts now to increase investment, that is output not contributing to current consumption, must involve a reallocation of resources rather than merely the utilization of previously idle people and productive capacity. In such a situation, difficulties experienced by corporations in financing more investment may reflect simply the reluctance of

business or government, or non-business investors, to give up their shares of output.

While fiscal and monetary measures may well bring about some alteration in the mix of output for current consumption and investment for the future, much of their effect is rather to alter the composition of investment itself. Investment may properly and usefully be viewed more broadly as all current output or productive activity which contributes to future output. Alongside of the traditionally included business acquisition of plant, equipment and additional inventories, we should then place similar acquisitions by government, federal, state and local, and by non-profit institutions. We might also note that acquisitions of automobiles by households are as much investment as similar acquisitions by taxi companies or firms. Washing-machines and dishwashers acquired by households are as much investment as those acquired by laundromats or restaurants.

Not only are durable goods of households, government and non-profit institutions investment, so too are education and training, whether on-the-job, in school, or in the home. For these also contribute to future output. By many measures, the last dollars spent in education and training have been more productive than the last dollars spent on plant and equipment. In addition, we might include in investment child rearing expenses and provision for health and mobility, all of which make possible future output. And, of course, few deny that expenditures for research and development have contributed mightily to productivity. Our stock of knowledge is in many ways more valuable than our stock

of brick and mortar. Much of the brick and mortar, of course, is conventionally counted as part of gross private domestic investment in the form of residential construction, but relatively little of this residential construction will be included in business investment.

Hence we find business investment a quite minor proportion of total capital accumulation in the economy. In connection with certain on-going research on extended concepts of national income and output, utilizing in large part recent estimates by John Kendrick [16], we take total capital accumulation in the United States economy during 1969, excluding "net revaluations" or capital gains, to be \$671 billion. Against this we may note that all non-residential business investment, corporate and non-corporate, amounted to only \$98.5 billion for structures and equipment and \$7.8 billion more for change in inventories. Non-residential business investment was thus less than 16 percent of all investment in the economy.

For the great bulk of capital accumulation which takes place in tangible or human form, there are basic reasons to expect under-investment and hence higher marginal returns. Where a company constructs or buys plant and equipment, it can retain it and its benefits for itself. Where it invests in research, development, know-how and training, since knowledge and skills are generally freely disseminated in a free society, differences between marginal return to the investor and marginal social return may be substantial. Most particularly, since we are not a slave society, it does not pay individual private enterprise to invest in human beings for more than the expectation of returns from

their uncertain and usually short run employment.

Yet the serious imperfection in human capital markets, along with understandable individual risk aversion, makes it very difficult for people to invest adequately in themselves. Information and transaction costs curtail drastically the supply of finance for human capital. What youth with aspirations for business leadership or service as an engineer, political leader or economist can go to the bank and say, "Invest in me! My expected life-time earnings are high. I would be happy to give you a promissory note or sell you equity rights in my human capital"?

Attention to human capital may lead us to a large issue which perhaps underlies much of the heat in discussion of government policy towards investment. We are frequently told that we need more capital or investment for output, productivity, jobs and growth. Measures are devised presumably to increase the aggregate of business investment, of investment in housing and of various particular forms of capital accumulation. Protection and regulation of particular industries are put in terms of inducing desired investment.

Yet, aside from measures to bring about full employment and full utilization of existing capital, government policies may influence the aggregate of investment far less than widely supposed. Given full employment, we may find investment heavily dominated by people's desires to save. These latter may well be relatively inelastic with respect to parameters readily susceptible to control by government in a reasonably free economy in a democratic society. What much of the

argument may really relate to, therefore, is not how much investment but what kind of investment, and who should own the resultant capital. This comes down to the nitty-gritty of the distribution of income and particularly of wealth.

Thus, tax concessions to business, allegedly to encourage investment, offer ownership of additional capital to current equity holders. General cuts in taxes to stimulate demand, indirectly encouraging investment, give the additional capital to those who save more out of increased after-tax incomes. Government expenditures or subsidies to stimulate employment, or to further education and training, increase wealth primarily of those whose only capital is human.

Why do we hear so frequently that the business community is frightened by government spending which, it is suggested, may discourage "investment"? Is it perhaps because the government "spending" is not perceived as necessarily adding to business capital? Business rarely objects to government contracts to purchase its output. But government expenditures which might properly be directed to bringing literally millions of youths, minorities, women and many men into productive or more productive employment represent essentially investment in human capital. They increase most directly the wealth of those who are now owners of business capital.

What Government Policy Should Be

As I indicated at the outset, business investment suffers severely in situations of generally inadequate aggregate demand and unemployment. By far the greatest tonic for investment is full employment.

To attain this, one may best focus on measures not directly concerned with business investment. The government expenditure-transfer-tax-package should be such that effective demand is equal to the value of full employment output, whatever the implications for fiscal and monetary policy. In addition, appropriate measures should be undertaken in the way of employment credits, particularly for youths, blacks, new workers and generally those hard to employ. These should be supplemented by improved efforts at job training and placement. Well planned public employment is likely to prove a necessary and useful tool in the full employment arsenal.

If there is to be some kind of direct subsidy to plant and equipment investment in connection with efforts toward full employment, the most appropriate tool would be a variable but high, marginal credit or subsidy, which may be negative. Thus instead of a ten or twelve percent, permanent tax credit on all business equipment expenditures, we would be much better served in time of recession by a direct subsidy of say 50 percent for all investment over some reasonably high base figures. That base might be set equal to depreciation charges or, for example, 80 percent of the average of the past three years' investment. Ideally, the subsidy should be available not only to profit-making business but to unprofitable business, to non-profit enterprises, to government enterprises and government bodies, and indeed to households.

If the benefits were high at the margin and variable, their impact could be very great. Low elasticities of substitution, as suggested earlier, may preclude any major effect on investment, particularly in a

recession, from a permanent credit of ten or twelve percent. A marginal subsidy of 50 percent would cost the Treasury less and have less distributional effect and yet bring on more investment. But most important, if affected taxpayers and individuals recognize that the credits were temporary, they would have major motivation to proceed while it is in effect. For all would be forewarned that the 50 percent credit might turn to zero next year, or even to a 50 percent tax on marginal investment, if policy needs dictated discouragement of aggregate demand.

Prohibitions, restrictions and ceilings on the payment of interest by banks and financial institutions should be removed with all speed and in a manner consistent with orderly adjustment of portfolios. Particularly with continuing inflation, small savers would then have some opportunity at least to avoid negative net returns, as nominal rates of interest on demand and time deposits would rise to reflect expected rates of inflation. To the extent that substitution effects do dominate income effects, this would induce more saving. Under conditions of full employment one might then expect more investment.

Individual and corporate income taxes should be integrated. This would mean elimination of the corporate income tax with stockholders having to credit their full shares of corporate earnings, whether retained or paid out in form of dividends, to their own individual taxable incomes. I do not see this as a measure likely to offer general stimulus to business investment. It would rather improve the investment mix by forcing firms to compete in the marketplace for capital. It would eliminate the current major tax advantage of retaining earnings within the firm, regardless of profitable investment opportunities. Without

integration, the accumulation of retained earnings, perhaps invested in outside acquisitions, yields stockholders untaxed or little taxed capital gains instead of taxable dividends.

If no further exemptions or exclusions of capital gains were added, firms would be pressed to pay out earnings so that stockholders, having to pay tax on the earnings in any event, would not have an additional gains tax on the value of corporate retentions. This should not, however, reduce the supply of funds to business as a whole. Corporations could offer reinvestment options with dividend checks, as some firms do already. But with full integration, corporations would find themselves bidding against each other, in a vastly enlarged capital market, for the opportunity to reinvest their own earnings and those of their competitors.

There is still likely to be a major role for government in promoting investment with genuinely positive external economies, as well as a role for taxing or otherwise discouraging investment with negative externalities. There may be similar needs for intervention, ideally in the form of taxes or subsidies, where unavoidable imperfections in capital or other markets call for compensation. I have already pointed to the likelihood of needs for major investment in human capital. These do clearly relate most to imperfections in capital markets and to externalities. Society benefits from taking youths off the street, out of lives of dependence of crime, and getting them into productive jobs. And the relative nonexistence of private markets for investment in youths, particularly of minority groups, suggests that, even ignoring externalities, considerable investment of human capital may well be subsidized

in the interest of closing the gap between marginal private returns and cost.

More investment and moves closer to an optimum may be expected as well from removal of a host of government interferences with free competition. CAB-imposed high airfares, rather than stimulating investment by giving the airline industry funds to acquire additional planes, may be discouraging investment by reducing the rate of utilization of existing capacity. Protective tariffs or quotas on steel imports may eventually leave the United States steel industry with less demand for steel and less need for additional steel mills.

Beyond the achievement and maintenance of full employment, attention to externalities, and the removal of uneconomic government interferences in capital markets and elsewhere, our policy should be directed to the promotion of free competition. With such a thrust, I am confident that we would have more investment in business plant and equipment, in research and development, in human capital generally and in all forms of investment in all sectors of the economy. Whether they would give us the most capital or the greatest amount of investment, I am not prepared to say. But in closing I will return to some thoughts and words I have offered previously.

I see no reasons of state or religion why we must always more rapidly accumulate capital for future production. Such accumulation is, after all, at the expense of current, private and public goods and services. It is not necessary and desirable that we should always have more in the future than in the present. It is not axiomatic that we should sacrifice more when we are young in order to live better when we are

older, or that our generation should sacrifice in the prospect that our great-grandchildren would live better. Our golden rule need not be, "Jam tomorrow and jam the next day, but never jam today!"

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CAPITAL FORMATION
AND U.S. ECONOMIC PERFORMANCE

Allen Sinai

Three years ago the physical capacity, supply of labor, and financial resources of the U.S. economy were insufficient to satisfy demands. Symptoms of these capital shortages included sharply rising prices, peaks in factory operating rates, increased unfilled orders, long delivery delays, higher wages, low unemployment rates, rapidly accelerating interest rates, widening yield differentials between risky and "safe" financial assets, surging loan demands, decumulation of financial assets, and credit rationing.¹ Indeed, the unprecedented inflation of prices, wages and interest rates was the principal cause of the deep recession that followed.

A by-product of the 1973-75 slump has been a shift from capital "shortages" to surplus with great slack in productive capacity, labor, and financial markets.² However, the recession also induced a low rate

¹As used here, the term "capital" refers to physical capital, human capital and financial capital.

²Utilization rates, whether measured by the Bureau of Economic Analysis or as newly revised by the Federal Reserve Board, are far below peak 1973-74 levels and in a majority of cases are less than the average over 1960 to 1975. Excess supply in the labor market is indicated by a national unemployment rate of 7.5%, compared to the less than 5% of three years ago. Also, the current rate of unemployment, in an expansion that is two years old, exceeds the previous peaks of 7.4% in 1958:2 and 7% in 1962:1. Currently, there is also a large financial surplus; see Sinai (17).

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of capital formation, especially by business. The failure of business fixed investment to rebound significantly, even in the ensuing recovery, has raised numerous questions about the relationship of capital formation to future economic performance. Among them are:

- 1) will capital formation be adequate to support a full employment level of output in the years ahead, without a resurgence of inflation and subsequent bust?
- 2) what mix of policies would significantly raise capital formation? Should selective business tax incentives be used? Personal tax cuts? Easy money policy? Or, some combination of general monetary and fiscal measures?
- 3) will heavy doses of capital formation provide a large enough increase in productive capacity to ease inflationary pressures on prices and wages?

This study examines the role of capital formation in U.S. economic performance and, in particular, the effects of some alternative sets of policies that could stimulate the formation of capital. The Data Resources, Inc. (DRI) model of the U.S. economy provided the framework for analysis, with computer simulations of economic activity in response to policy changes through 1980.

In brief:

- the present rate of capital formation, broadly defined, is insufficient to achieve full employment. The primary causes are the deep recession of 1973-75, a sluggish economic expansion, caution engendered by the economy's instability over the past decade, and the desire of business to reduce financial risk by restructuring balance sheets. So far,

nonproductive investment, such as spending for pollution abatement equipment, has not been sizeable enough to bear a major responsibility for the weakness in physical capital formation;

- given the current surpluses in productive capacity, labor and finance, aggregate macroeconomic policies can be more effective in raising capital formation than specific business tax incentives.³ Of the policies considered here, a combination of permanent reductions in personal income taxes, minimal growth in Federal government outlays, and easier money would provide the greatest stimulus to capital formation. This "tight fiscal-easy money" approach, in the sense of keeping a tight rein on growth in government spending, would have little cost in terms of additional inflation, even with monetary growth between 8 and 9% per annum in 1977 to 1979;

³Brimmer and Sinai (2) studied the effects of several business tax incentives on capital formation and found significant, but only small impacts. The real case for changes in business taxation rests on grounds other than capital formation; it is to reduce the impact of higher prices on corporate taxes. Inflation reduces the real purchasing power of corporations much as in the case of households. Profits are overstated depending on the method of inventory accounting and historical cost depreciation does not keep pace with replacement costs. Thus, periodic reductions in business taxation may be necessary to prevent an "inflation drag" on corporate spending. This might take the form of indexing depreciation expenses to capital goods prices, a policy suggested by Brimmer and Sinai, or even as reductions in corporate income taxes. Integration of the corporate and personal income tax is also desirable, but on grounds of allocative efficiency. See Fellner-Clarkson-Moore (8) for a good discussion of tax indexation issues; also Tideman and Tucker (20).

- as the economy nears full employment, monetary and fiscal policies must become less stimulative so that growth in aggregate demand slows to balance that of potential supply. Business tax incentives would then provide a more appropriate means for increasing productive capacity further, since improvements in the financial position of business would accompany the additional capital spending. Also, the tax incentives would shift the mix of spending toward business fixed investment and away from other sectors. The share of total GNP in business fixed investment, vis-a-vis other sectors, is really an issue only at full employment;
- the capacity added through aggressive policies to stimulate capital formation can only bring small reductions in the inflation of wages and prices, given the relatively small impact of physical capital formation on potential output. The best insurance against a resurgence of inflation is a gradual approach to full employment with real GNP rising by 5 to 6% for the next few years, rather than any massive program of stimulus designed to increase capital formation.

The paper is organized as follows. The next section reviews the importance of capital formation and presents a simple framework for analyzing the effects of measures to enhance the formation of capital. The analytical model presented helps explain how different policies affect capital outlays, with resulting increases of business, housing, and labor capital. Subsequently, the outlook for capital formation to 1985 is briefly presented, using recent DRI forecasts of the U.S.

economy as a basis. The following section provides the results of computer simulations with the DRI model which show the effects of various policies that could stimulate capital formation. The policies considered are 1) sustained reductions in personal income taxes during 1977, 1978, and 1979; 2) these personal income tax reductions accompanied by accommodative monetary policy; 3) easier money in terms of accelerated M1 growth; 4) personal tax reductions and easier money; 5) personal tax reductions, slowed growth in Federal government spending, and easier money; 6) selective business tax incentives such as the investment tax credit or reductions in corporate profits taxes. The policy sets selected for study, while certainly not exhaustive, are those most likely to benefit capital formation. The variables studied include real GNP; inflation; the unemployment rate; interest rates; real business fixed investment; the tangible physical assets of households including housing, autos, and durables; the tangible physical assets of nonfinancial corporations including plant, equipment, and inventories; the employed labor stock and labor force; capacity utilization, productivity; and potential output. The final section then offers some concluding observations on the relation between capital formation, productive capacity, and inflation.

The Importance of Capital Formation

The recent concern with the pace of capital formation has primarily been focused on the business sector.⁴ One line of reasoning has the capital needs of the U.S. economy so great that adequate financing

⁴See (2), (7), (9), (10), (11), (14), (21), (23) and (25).

will not be forthcoming in the next decade. As a corollary, business fixed investment would be insufficient to create the necessary productive capacity for preventing a recurrence of the shortages that characterized the economy in 1973 and 1974.⁵ Labor productivity and growth in potential output also would be limited. Another serious round of accelerating inflation would result, then a deep recession as policymakers once again applied restrictive measures in order to contain the inflation.

Indeed, as Table 1 and Charts 1 to 4 show, the rate of business capital formation has been quite weak since the recession trough in March 1975. The ratio of business fixed investment to GNP was 9.3% in 1975 and only 9.0% last year.⁶ These figures compare with averages of 9.4% during 1955 to 1964 and 10.1% in 1965 to 1974. The only other years when the proportion of business fixed investment to GNP has been as low or lower were 1930 to 46, 1952 to 54, and 1958 to 64. Furthermore, the upswing in real business fixed investment since the trough of the recession in 1975:1 is the weakest in the postwar period. Real residential construction, on the other hand, has been near average in its expansion.

⁵Vaccara (23) presents the most extreme view. On the basis of a BEA study, she argues that fixed investment must average at least 12% of GNP in the next four years "to assure a 1980 capital stock sufficient to provide for increasing productivity, full employment levels of output, pollution abatement and decreasing dependence on foreign sources of petroleum". Most studies project a necessary ratio of 11.5% for fixed investment to GNP for 1977 to 1980. Sinai and Brinner (19, p. 44) are an exception, finding that ratios within historical ranges can be consistent with a full employment economy by 1981.

⁶These ratios are net of spending for pollution abatement equipment, estimated at 0.4% of nominal GNP in 1975 and 1976.

TABLE 1. Gross Private Domestic Investment:
Historical Profile and DRI Projections*

	(GPDI-PABE)/GNP	GPDI72/GNP72	IFIXNR/GNP	(IFIXNR-PABE)/GNP	IFIXNR72/GNP72	ICR/GNP	ICR72/GNP72	INVCH/GNP	INV72CH/GNP72	PABE/GNP
1953	14.5	13.7	9.4	9.4	9.0	5.0	4.4	0.1	0.2	0.3
1954	14.3	13.5	9.3	9.3	9.0	5.4	4.9	-0.4	-0.4	0.0
1955	17.0	15.0	9.6	9.6	9.4	5.9	5.3	1.5	1.2	0.0
1956	16.8	15.3	10.4	10.4	9.8	5.3	4.7	1.1	0.9	0.3
1957	15.5	14.2	10.5	10.5	9.7	4.7	4.3	0.3	0.2	0.0
1958	13.7	12.8	9.3	9.3	8.7	4.8	4.4	-0.4	-0.3	0.0
1959	15.8	14.2	9.3	9.3	8.7	5.4	5.2	1.1	0.9	0.0
1960	15.0	14.2	9.4	9.4	9.0	4.8	4.7	0.7	0.6	0.0
1961	14.1	13.6	9.0	9.0	8.7	4.7	4.6	0.4	0.4	0.0
1962	15.0	14.6	9.1	9.1	8.9	4.8	4.7	1.1	1.0	0.0
1963	15.1	14.9	9.0	9.0	8.9	5.0	5.1	1.0	0.9	0.0
1964	15.1	15.0	9.4	9.4	9.3	4.8	4.9	0.9	0.8	0.0
1965	16.2	16.1	10.4	10.4	10.3	4.4	4.6	1.4	1.2	0.0
1966	16.4	16.4	10.8	10.8	10.8	3.7	3.8	1.9	1.7	0.0
1967	15.0	15.1	10.3	10.2	10.3	3.5	3.6	1.3	1.2	0.1
1968	14.9	15.1	10.3	10.2	10.3	3.9	4.0	0.9	0.8	0.1
1969	15.4	15.5	10.6	10.4	10.6	4.0	3.9	1.0	1.0	0.2
1970	14.0	14.3	10.2	10.0	10.2	3.6	3.7	0.4	0.4	0.2
1971	14.8	15.0	9.8	9.5	9.7	4.6	4.6	0.6	0.6	0.3
1972	15.6	15.6	10.0	9.6	10.0	5.2	5.2	0.8	0.8	0.3
1973	16.4	16.7	10.4	10.0	10.6	5.0	4.7	1.4	1.3	0.4
1974	14.7	14.9	10.6	10.2	10.6	3.8	3.6	0.8	0.7	0.4
1975	11.6	11.5	9.7	9.3	9.3	3.3	3.1	-1.0	-1.0	0.4
1976	13.6	13.4	9.5	9.0	9.2	3.9	3.6	0.7	0.6	0.4
1977	14.9	13.8	9.5	9.1	9.2	4.3	4.0	0.6	0.5	0.4
1978	14.6	14.3	9.7	9.3	9.4	4.4	4.0	0.9	0.9	0.5
1979	15.0	14.5	10.1	9.6	9.6	4.4	4.0	1.0	0.9	0.5
1980	15.7	15.0	10.5	10.0	9.9	4.6	4.1	1.1	1.0	0.5
1981	15.9	15.2	10.6	10.2	10.1	4.7	4.1	1.0	1.0	0.5
1982	16.5	15.3	10.9	10.4	10.3	4.8	4.2	1.1	1.0	0.4
1983	16.7	15.8	11.1	10.7	10.6	4.8	4.2	1.1	1.1	0.4
1984	16.6	15.8	11.2	10.8	10.7	4.7	4.1	1.0	1.0	0.4
1985	16.3	15.6	11.2	10.8	10.7	4.6	3.9	0.9	0.9	0.4

GNP = Gross National Product
 GNP72 = Gross National Product in Constant Dollars
 ICR = Residential Construction
 ICR72 = Residential Construction in Constant Dollars
 IFIXNR = Fixed Private Nonresidential Investment
 IFIXNR72 = Fixed Private Nonresidential Investment in Constant Dollars
 INV = Change in Business Inventories
 INV72 = Change in Business Inventories in Constant Dollars
 PABE = Pollution Abatement Expenditures by U.S. Business on Capital Account
 Sources: Department of Commerce, Bureau of Economic Analysis, Data Resources, Inc.

* 1977-80 forecasts from DRI Control 2/23/77; 1981-85 figures from long-run projections of March 1977.

CHART 1. Real Business Fixed Investment in Recovery

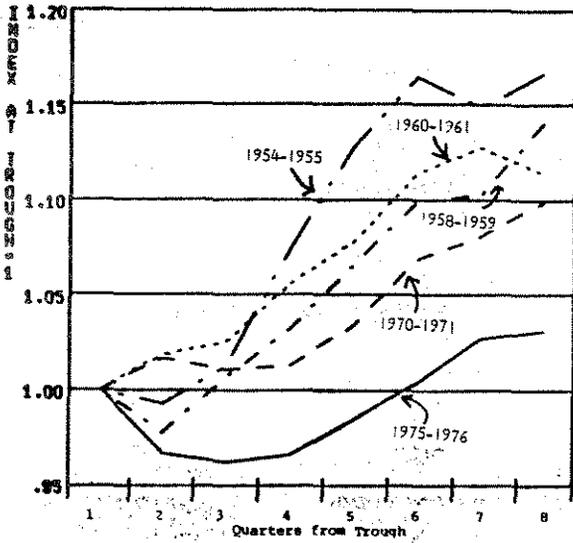


CHART 2. Real Producers' Durable Equipment in Recovery

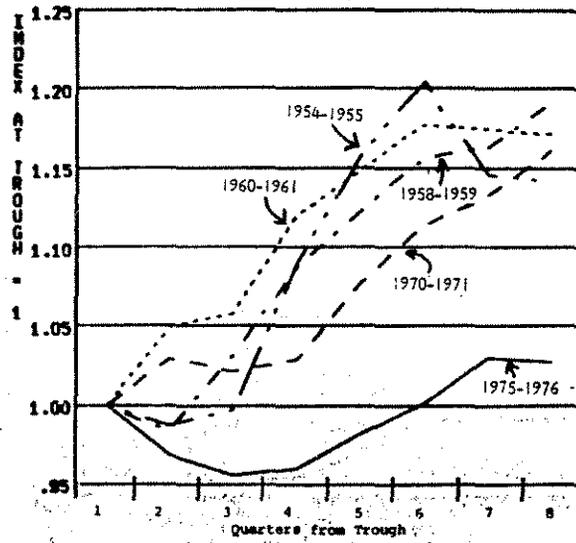


CHART 3. Real Plant Expenditures in Recovery

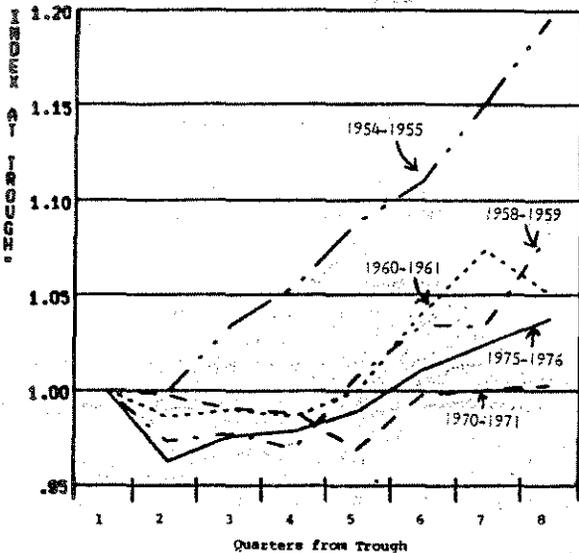
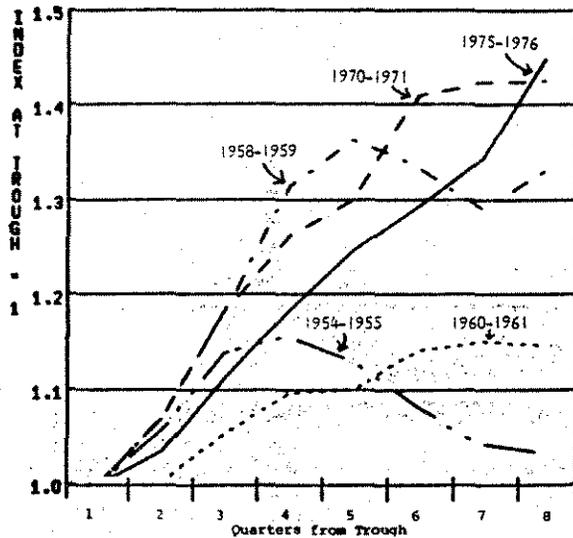


CHART 4. Real Residential Investment in Recovery



Several factors account for the recent poor record of capital formation by business. First, the 1973-75 recession was the most severe of the postwar period. Aggregate demand dropped sharply late in 1974, providing a sudden shock to business' sanguine expectations of future final sales. In addition, this episode, in contrast to others, was characterized by extraordinarily high interest rates, greatly diminished cash flow, and badly deteriorated balance sheets.⁷ Corporate leverage moved dangerously high, debt burdens became overwhelming, the average maturity of outstanding debt shortened considerably, and the ratio of financial assets to short-term liabilities reached a record low. Serious threats of bankruptcy and default arose for many corporations. Debt or equity finance became near impossible to obtain at any cost. Under these conditions, business spending had to be severely cut back.

Second, the expansion has been extremely weak since the 9.2% rise of real GNP in 1976:1. There is considerable slack in the labor market and capacity utilization rates have only slowly recovered, so that much excess capacity remains to be eliminated in relation to the same stage in other expansions. Without the pressure of increased final sales relative to utilization, probably the most important determinant of capital spending, business has had little incentive to invest. Furthermore, fears of continued instability in the economy, similar

⁷For a discussion, see (2), (11), (19), (25). Brimmer and Sinai (2, pp. 288-94) describe how deteriorated financial positions affect business fixed investment in the DRI model of the U.S. economy. A similar view appears in Minsky (13, ch's. 4 to 7).

to the ups and downs of 1965 to 1975, have kept businessmen cautious about commitments to heavy doses of capital outlays.

Finally, an unprecedented restructuring of balance sheets and strengthening of liquidity has prevented business capital outlays from sharply rebounding.⁸ With a resurgence of cash flow relative to capital outlays, business has increased financial assets relative to liabilities, retired a record amount of short-term debt, restructured debt maturities to a longer term, sharply reduced the burden of debt service, and lowered debt-equity ratios for the first time in many years. Much lower inflation and relatively easy monetary policy has helped by reducing interest rates and easing the external risk to balance sheets. The return to this process of corporate "reliquification" in terms of reduced risk, higher credit ratings, reduction of prior claims on income, returns on financial assets, and accumulation of the liquidity to finance future outlays, has far exceeded the expected rate of return on the acquisition of physical assets.

The current weakness in business fixed investment is not without precedent. As noted, similar patterns appeared during the 1930's, early 50's, and in 1958 to 1964. In particular, the 1958 to 1964 experience was characterized by an approach to full employment without any decided rise in the ratio of business fixed investment to GNP. Thus, full employment has not necessarily been precluded in the past because of weakness in business plant and equipment spending. In each case, however,

⁸See Sinai (17).

the process of getting to full employment took many years, and in this sense it can be argued that capital formation was inadequate.

Despite the focus of most researchers on capital formation by business, the problem is not limited to that sector. Tangible capital also is found in the household, financial, and government sectors.⁹ The stocks of housing, autos, and durables provide direct utility to households and make household production easier. Even household inventories probably matter for social welfare, if not for the productivity of labor. The equipment and buildings of financial institutions certainly provide an input to the production process. Social overhead capital or infrastructure such as railroads, urban mass transit, and highways is important to maximize economic productivity in the private and public sectors. And lately, the capital necessary for clean air and water, energy independence, and urban repair has attracted attention. Human capital, too, is now generally considered a part of the total capital stock, with spending for maintenance and improvement of labor perhaps as important for productivity as increases of physical capital. But the growth in these forms of capital also has slowed in recent years.

The preoccupation with business capital formation is understandable, since measurement has been concentrated on this category and traditional production theory includes only business capital. But it should be clear that the physical assets of households, labor capital, and social overhead capital are also critical to society's welfare and the productivity of labor. Accordingly, in this paper, concern with capital formation is not limited to the business sector, but includes the stocks of

⁹See Kendrick (12) who presents an exhaustive set of estimates for different types of capital in the U.S. economy.

housing, automobiles, and other durables in the household sector. The induced changes in the labor force and employed stock of labor also are considered. The resulting coverage of capital formation is still limited from a conceptual point of view, but this is only because of the scope of the DRI model.

The case for capital formation can be illustrated with a simplified analytical framework of the U.S. economy. Consider a model of a closed economy that focuses upon the short-run dynamic behavior of households, firms, bank and nonbank financial institutions, the monetary authority, and government. Uses and sources of funds behavior of the various sectors are explicitly recognized.¹⁰ Markets for output; money; non-monetary financial assets; the earning assets of banks; household, business, and government debt; and labor are included. Price inflation depends on wage costs, external elements such as OPEC oil price increases, and demand-pull pressures. Wage inflation depends on inflation expectations, the unemployment rate, and the existing framework of institutions. Employment depends on the demand for labor and real wages. Disequilibrium

¹⁰Funds can be used for acquisitions of physical or financial assets. For example, households purchase houses, autos, and consumer durable goods; but also increase holdings of money, deposits, bonds, or equity. Firms may accumulate inventories, plant, equipment, or labor; but also place funds in various financial assets. Debt repayment and retirements are a use of funds. Financial institutions use funds to acquire loans and investments. The government sector purchases considerable capital and labor. Sources of funds are current new money flows, borrowing, or the sale of assets (a negative use); where new money flows refer to current exogenous sources of funds such as disposable income (households); cash flow (corporations); deposit inflows, adjusted for reserve requirements, and loan repayments (financial institutions); contributions to retirement programs (pension funds); and tax receipts (Federal, state and local governments). Viewing the activity of the various sectors in a uses and sources of funds framework generalizes the more standard macroeconomic analysis that is based on physical asset purchases and current income flow financing. For some discussion of these notions, see Sinai (16) and (18).

is the usual state, with interrelated adjustments of spending and financial behavior as the various sectors move from existing to desired positions in assets and liabilities. Expectations are critical because certainty and perfect foresight are not assumed. Also, the risks of default and bankruptcy are recognized for households, business, and government. Taxes, too, are permitted. A large number of financial markets are assumed to exist for both short- and long-term securities. The demand and supplies of financial assets and liabilities interact to determine the structure of interest rates.

The equations describing this system can be summarized as (underlined variables are exogenous):¹¹

Real Sector

1. $c_t = f_1 [y_t^e; r_s^e; r_l^e; r_e^e; hfa_{t-1}^e; (cl/yd)_{t-1}; (ds/yd)^e; \underline{cs}_t; kc_{t-1}]$
2. $ifixed_t = f_2 [(py/r)^e; (db/cf)^e; \underline{u}^e k_{t-1}; k_{t-1}]$
3. $ires_t = f_3 [r_{mort_t}^e; \Delta mort_{t-1}; \underline{vac}_t^e; \underline{pop}_t; kres_{t-1}]$
4. $inv_t = f_4 [y^e; \underline{delay}^e; \underline{\Delta u}^e; (db/cf)^e; kinv_{t-1}]$
5. $i_t \equiv ifixed_t + ires_t + inv_t$
6. $t_t = f_6(y_t)$

¹¹These equations reflect the structure of the DRI model of the U.S. economy, although not exactly the model generating the simulations presented below. The conceptual framework that determines national income is represented, but some detail is omitted. For example, not all of the variables appear in the equations as specified and many of the exogenous variables are actually endogenous in the DRI model. See Data Resources, Inc. (5) and Eckstein-Green-Sinai (6) for a more complete discussion.

$$7. yd_t \equiv y_t - t_t$$

$$8. g = \underline{g}$$

$$8a) \text{def}_t \equiv \underline{g} - t_t$$

$$8b) \Delta gdebt_t = f_8(\text{def}_t; gdebt_{t-1})$$

$$9. y_t = c_t + i_t + g_t$$

Capital Stock Identities

$$10. kc_t \equiv c_t + \delta_1 kc_{t-1}$$

$$11. k_t \equiv ifixed_t + \delta_2 k_{t-1}$$

$$12. kres_t \equiv ires_t + \delta_3 kres_{t-1}$$

$$13. kinv_t \equiv inv_t + kinv_{t-1}$$

Financial Sector

$$14. md_t = f_{14} [y_t; rs_t^e; rd_t^e; re_t^e; rl_t^e; \Delta gdebt_t; td_{t-1}; usbonds_{t-1}; md_{t-1}]$$

$$15. ms_t = f_{15} (\underline{mb}; rsff_t^e; rloans_t^e; \underline{resreq}; \underline{curratio})$$

$$16. ms_t = md_t = m_t$$

Potential Output

$$17. y^p = f_{17} (nf_t; k_t; T)$$

Employment, Prices and Wages

$$18. n_t^d = f_{18} [y_t^e; k_{t-1}; (w/p)_t^e; (r/p)_t^e; (db/cf)_t^e]$$

$$19. n_t^s = f_{19} [\underline{lf}_t; \underline{pop}_t; \underline{lfpr}; (w/p)_t^e]$$

$$20. \quad n_t^d = n_t^s = n_t$$

$$21. \quad \dot{p}_t = f_{21}[(y_t - y^p); \dot{p}_{\text{struc.}}; \dot{w}_t] \quad \text{if } y_t - y^p > 0, \text{ then } \dot{p}_t > \dot{p}_{\text{struc.}}$$

$$\text{if } y_t - y^p < 0, \text{ then } \dot{p}_t < \dot{p}_{\text{struc.}}$$

$$22. \quad p_t \equiv \dot{p}_t + p_{t-1}$$

$$23. \quad \dot{w}_t = f_{23}[(1/ru)_t; \dot{p}_t^e; w_{t-1}]$$

$$24. \quad w_t \equiv \dot{w}_t + w_{t-1}$$

$$25. \quad ru_t \equiv f_{25} \left[\sum_{i=0}^{-3} (y^p/y)_{t-i} \right]$$

Definitions (superscript e refers to expectations or expected value):

c	=	real consumer expenditures
yd	=	real disposable income
rs	=	short-term interest rate
rl	=	long-term corporate bond rate
re	=	return on corporate stock
hfa	=	real household financial assets
cl	=	consumer installment credit liquidations
ds	=	debt service, defined as a weighted average of outstanding mortgages and consumer credit. The weights are arithmetic averages of the current and past interest rates for each debt instrument
<u>cs</u>	=	consumer sentiment
kc	=	stock of consumer goods
ifixed	=	real business expenditures on plant and equipment
p	=	price level of physical output
y	=	physical output of goods and services
r	=	rental price of capital
db	=	debt burden, defined as a weighted average of outstanding bank loans, commercial paper, and corporate bonds. The

weights are arithmetic averages of the current and past interest rates for each debt instrument.

cf	=	cash flow, after inventory valuation adjustment
<u>u</u>	=	capacity utilization rate
k	=	stock of plant and equipment
ires	=	real residential construction
r_{mort}	=	mortgage rate
mort	=	outstanding mortgages
<u>vac</u>	=	vacancy rate
<u>pop</u>	=	population
kres	=	stock of housing
inv	=	real inventory investment
<u>delay</u>	=	delivery delay, percent of companies reporting slower deliveries
kinv	=	stock of inventories
i	=	real gross private domestic investment
t	=	tax receipts
<u>g</u>	=	real government spending
def	=	Federal budget deficit (NIA basis)
gdebt	=	outstanding issues of Treasury debt
md	=	demand for money
rd	=	effective yield on passbook deposits
td	=	time deposits
usbonds	=	holdings of U.S. Treasury securities by households, firms, and state and local governments
ms	=	supply of money
<u>mb</u>	=	monetary base
rsff	=	Federal funds rate
rloans	=	prime rate on bank loans
<u>resreq</u>	=	reserve requirements on deposits
<u>crratio</u>	=	currency ratio
m	=	MI, narrowly defined stock of money
y^p	=	potential real output
nf	=	full employment
T	=	technology

n^d	=	demand for labor
n^s	=	supply of labor
lf	=	labor force
pop	=	population
$lfpr$	=	labor force participation rate
w	=	level of wages
\dot{p}	=	rate of price inflation
\dot{p}_{struc}	=	structural inflation
\dot{w}	=	rate of wage inflation
ru	=	unemployment rate.

The unexplained endogenous variables in equations (1) to (25) fall into three categories: interest rates (r_s ; r_l ; r_e ; r_{mort} ; r_d ; r_{sff} ; r_{loans}), the rental price of capital r , uses and sources of funds (hfa ; Δ_{mort} ; td ; $usbonds$), and balance sheet indicators of financial instability (cl/yd ; ds/yd ; db/cf). In the DRI model, the interest rates are determined in a segmented market framework where the demands and supplies for a particular instrument, across sectors, interact in stochastic equations. Full explanations of sectoral flows-of-funds, the holdings of financial assets, physical assets and liabilities for households, nonfinancial corporations, commercial banks, savings and loan associations, mutual savings banks, and life insurance companies are provided. This includes hfa , Δ_{mort} , td , $usbonds$, cl/yd , and db/cf . A total of 103 behavioral equations and 99 identities describe the financial system.¹²

¹²There is no need to present such detail here. See (5) for a full description.

The above system generalizes standard macroeconomic analysis to a more realistic framework in several ways. First, the model is dynamic. There are own stock adjustment processes in each of the major expenditure equations; but also interrelated dynamic adjustments in the other assets and liabilities of each sector.¹³

Second, there is considerable disaggregation. The DRI model has 718 equations; 379 behavioral and 339 identities. Some 170 exogenous variables also are included. The breakdown is final GNP demands (176); incomes (31); financial (202); supply, capacity, and operating rates (10); employment, unemployment, and the labor force (10); prices, wages and productivity (81); industry production, investment, capital stock, and employment (208).

Third, expectations play a major role in the economic behavior as modeled. In a world of uncertainty, almost all the right-hand side variables in the equations should be expected values. This is especially true for prices and other signal mechanisms. The formation of expectations is generally adaptive or extrapolative, and current period actual values are eschewed.¹⁴ Explicit survey measures of sentiment (cs) and delivery delays (delay) are used. Thus, distributed lag specifications are pervasive.

¹³See (2) for an example.

¹⁴There have been no attempts yet to incorporate rational expectations into the structure of large-scale econometric models. While the inadequacies of extrapolative methods for projecting expectations are well-known, it is not clear at this time whether implementation of rational expectations, even if possible, will improve upon the current formulations.

Fourth, disequilibrium is the normal state with equilibrium of the system a special case that is never attained. The flows of spending and financial activity describe quarterly behavior, a period that is too short for full equilibrium to be reached. The interrelated adjustments of real and financial activity within each sector, as actual states approach those desired, make disequilibrium dynamics the focus of the analysis. Steady state growth dynamics do not appear until many periods after a shock, but then show numerous familiar characteristics.

Fifth, there are many nonlinearities in the system. These range from ratio variables on the right-hand side of an equation to nonlinear specifications for the effects of capacity utilization, delivery delays, and financial constraints. Numerous on-and-off mechanisms exist and ceilings on variables such as interest rates are specified.

Sixth, there is a very detailed financial system, with explicit modeling of the balance sheets for households, firms, and financial institutions. Government financing is an endogenous result of spending and tax receipts, with effects on interest rates for municipal and U.S. Treasury securities. Interrelations between the spending and financial activities of each sector generate the balance sheet items and measures of bankruptcy or default risk that appear in the main spending equations. Financial markets are imperfect and almost all of the instruments in the portfolios of the various sectors are included in the analysis. Traditional interest rate linkages from finance to real final demands appear, but in addition, there are variables that reflect the supply of funds for markets in disequilibrium (mortgages and housing); recognize the interrelated adjustments of financial assets,

physical assets, and financial liabilities (consumption, investment); and capture the inhibiting costs of balance sheet instability, potential bankruptcy, or debt default on real final demands (consumption, investment and state and local government spending).

Seventh, potential output is endogenous, with changing stocks of labor and capital the major inputs. Given utilization rates and the state of technology, potential output affects the unemployment rate (equation 25); wages through the unemployment rate (equation 23); and price inflation directly via the relation between aggregate demand and supply (equation 21). Thus, business capital formation tends to ease inflation by increasing the capital input to production.

Finally, wage-price interactions heavily reflect inflation expectations. Inflation itself arises from external sources such as OPEC pricing policy, the existing institutional framework, the price setting practices of business, and commodity shortages. Thus, a base rate of inflation, $\dot{p}_{\text{struc.}}$ is assumed to exist at full employment, with deviations about $\dot{p}_{\text{struc.}}$ due to changes in unit labor costs and the relation of aggregate demand to potential output. Capital formation affects inflation to the extent productive capacity is increased.

Equations (1) to (25) can be collapsed to an IS-LM model by removing the dynamic elements; assuming certainty in order to eliminate expectations; treating the financial markets as perfect so there is only a single rate of interest; and eliminating the sectoral portfolio approach to finance. Thus, in a sense the macroeconomic model utilized here is an extension of IS-LM analysis, but its necessary realism makes difficult so simple a categorization.

By tracing through the effects of autonomous shocks to the macroeconomic system that is depicted, the case for capital formation can easily be seen. Consider an autonomous increase of business fixed investment, perhaps because of improved confidence in the stability of policies to emanate from the Administration. Aggregate demand rises, but so does potential output as business capital is formed (equations 11 and 17). Any resulting rise of inflation depends on the relation between actual and potential output (equation 21), and is less than if the rise in aggregate demand were due to another source. With no change in the monetary base, interest rates rise to provide a negative feedback effect on both consumption and investment.¹⁵ The constraining impact of the rates operates directly on consumption, raises the rental price of capital, and increases the debt service charges of households and firms. Higher interest rates also cause a decline in stock prices, a reduction in the market value of household financial assets, and reduced consumption. The higher rental price of capital and debt service burden facing corporations keep business fixed investment lower than under a regime of constant interest rates. Deposit flows to banks and nonbank financial intermediaries diminish with the increase of interest rates, reducing the supply of mortgage money and constraining residential construction. However, the net effect is still higher output; greater rates of investment and consumption; more employment; upward pressures on prices and wages; and increased stocks of consumer durable goods, business capital, and housing. Whether the housing

¹⁵Also state and local government spending.

stock rises or falls depends on the relation between the increased demand for housing and previously existing stock, as manifested in a measure of vacancies.¹⁶ A lower vacancy rate stimulates housing starts, as evidence that the backlog of housing demand is rising. But diminished funds flows lessen the availability of mortgage money as an offset. The increased capital stock of business raises the productivity of labor (equation 18), so there is a rise in the demand for labor.

Thus, the case for capital formation includes 1) increased productive capacity for the economy; 2) an easing of the inflationary pressures from aggregate demand against potential supply; 3) greater productivity of labor and increased employment; 4) and the enlarged purchasing power that goes with slower increases of prices.

Now, by equation (2), business capital formation will occur regardless of the cause of increased output. Thus, any measures to stimulate the economy would promote this type of capital formation. So would changes in tax incentives that affect r , the rental price.¹⁷ However, the relative size of the effects from different policies is uncertain. And, the tangible physical assets of households as well as labor capital also would be affected, but not always in the same direction.

Consider further the effects of several policies on capital formation -- a sustained reduction in personal income taxes; increased

¹⁶See Eckstein, Green, and Sinai (6, pp. 598-602).

¹⁷See Brimmer and Sinai (2).

government spending; easier monetary policy; changes in tax incentives; and a mix of restrained government spending and easier monetary policy. In assessing the effects of these policies, impacts on business, human and housing capital will be examined.

Reductions in personal income taxes raise expected disposable income (yd_t^e) and increase consumption. At the same time the tax reduction increases the deficit (def_t) and Treasury issues of debt ($\Delta gdebt$). The increased issues result in a higher demand for money (equation 14) and, in the absence of accommodating monetary policy, raise interest rates, especially short-term.¹⁸ The resulting rise in national income also increases the demand for money, hence interest rates.

The higher output and higher prices as demand closes on potential output cause an increase of business fixed investment. This enhances capital formation by business, raises capacity, increases productivity, and exerts downward pressure on prices. But the increases in debt service for households and firms as interest rates rise, a higher rental price, and the possible negative feedback effects on the market value of financial assets because of falling stock prices, all act as restraints on the increased spending. In particular, higher money market rates of interest draw funds out of financial institutions, lower the supply of mortgages, and cause a cutback in residential construction. Thus, housing capital would grow more slowly, or even drop, relative to business capital formation. Of course, an accommodating monetary policy could

¹⁸Accommodating monetary policy is defined as maintaining constant nominal interest rates in the face of a change in fiscal policy.

alleviate this problem. The only question is how severe the inflation reaction from an extra monetary stimulus. This is primarily an empirical question, depending on dp/dt when $\dot{y} - \dot{y}^p \neq 0$.¹⁹

In summary, sustained reductions in personal income tax rates increase real output, raise inflation, lower the unemployment rate, and cause a rise of interest rates. Consumption is higher, business fixed investment rises in response to the greater real output, and the rate of capacity utilization moves up. The tangible physical assets of households, including autos and durables, rise from the higher consumer spending. Business capital stock rises higher, too, though not so strongly as in a case where monetary policy is accommodating. The outcome for housing capital is less clear, however, with the positive effects on housing of demand-induced declines in the vacancy rate perhaps more than offsetting a reduced supply of mortgages. Finally, employment is increased because of a rising demand for labor.

A second policy for stimulating capital formation is increased Federal government spending. A higher rate of government expenditures directly affects output, employment, and income. An increase of disposable income stimulates spending on autos, other consumer durables and housing. Business fixed investment and inventory spending rise in response to the stronger utilization of existing capacity causing a rise in replacement spending for plant and equipment (equation 2). Thus, the capital formation of households and business is enhanced.

¹⁹No link of \dot{m} and \dot{p} through expectations is assumed.

However, the benefits of increased government spending are accompanied by some negative feedback effects. Most important are more rapid inflation and higher interest rates. The extent to which prices rise depends on the position of the economy relative to full employment output. The increased inflation restrains spending by reducing purchasing power. The rise in interest rates stems from the financing of a greater Federal government budget deficit and the effects of a worsened inflation. Higher interest rates directly restrain consumption and investment (equations 1 - 4) but also do so indirectly through a worsening of the debt burdens of households and business (equations 1 - 2). Further, higher interest rates tend to reduce stock prices and diminish the real value of household financial assets. Consumer spending is then weaker (equation 1). A higher financial cost of capital also causes a reduction in fixed investment through the rental price of capital goods (equation 2). Finally, higher market rates of interest draw funds out of financial institutions and reduce the supply of mortgages. The mortgage rate rises and a lack of funds causes housing outlays to weaken (equation 3).

The net impact effect from all of these factors, however, would be increased GNP, a higher rate of investment, lower unemployment, and greater capital formation throughout the economy. But the negative feedback effects restrain the beneficial impact of the government sector's expenditures, especially in housing. The closer to full employment of labor and physical capacity, the more substantial the negative impact of rising interest rates and accelerated inflation. In an extreme

situation, the increased expenditures by the government can totally "crowd-out" the gains to the private sector, with no real benefits for overall capital formation. Thus, there is a self-defeating element in using Federal government spending to enhance the capital formation of the private sector.

A third policy to increase capital formation is easier money. An increase in nonborrowed reserves raises the monetary base and the supply of money. The federal funds rate declines and other short-term rates follow a similar pattern, caused by commercial bank arbitrage of assets and nondeposit liabilities to minimize the costs of funding loans. The lower interest rates stimulate consumption and investment. Further, given a slow response of deposit rates at bank and nonbank financial institutions to the easier monetary policy, the returns on these deposits become relatively more attractive to households and businesses than the yields on money market instruments. Funds flow into financial institutions, substantially increasing the supply of mortgage money and raising expenditures on housing. Another effect is a reduction of debt burdens for households and business because of the lower interest rates, higher disposable income, and greater cash flows. The reductions of interest rates are initially associated with higher stock prices and an increased market value of household financial assets. In turn, consumer spending rises even further.

The easier monetary policy will have the net effect of increasing capital formation throughout the economy, in contrast to the policies of reducing personal income taxes or increasing government spending.

The housing stock, stocks of durable consumer goods and cars, and business plant and equipment all rise under the easier monetary policy. So does the employment of labor. The increased capital formation in the business sector leads to a higher potential output. There is an easing of pressure on prices from the increased supply, although to some extent offset by a lower unemployment rate, increased wage inflation, and subsequent cost-push effects.

There are several negative feedback effects associated with the stimulative monetary policy, however. The growing economy will raise inflation as actual output moves closer to potential. This greater inflation will tend to push interest rates higher and also reduce the purchasing power of households and business. The borrowing that is associated with the increased expenditures raises outstanding debt, hence the debt burdens of the various sectors. Of course, these negative feedback effects take time to develop, so that the economy could benefit considerably from the easier monetary policy for a number of quarters.

The main danger of the easier monetary policy approach is the possible resurgence of inflation and high interest rates if economic growth accelerates too rapidly. Another potential problem has to do with the formation of inflation expectations in response to the easier monetary policy, and whether in fact, a temporary speedup in monetary growth will cause a sharp enough rise in inflation expectations to defeat the thrust of the policy. These issues, like many others, are empirical. The results of the policy simulations in the section entitled "Simulation Results" give some quantitative responses.

A fourth policy to stimulate capital formation is through reductions of business taxes. Corporate profits taxes could be reduced, depreciation allowances increased, or the investment tax credit raised. These policies have been analyzed in Brimmer and Sinai (2). Only small impacts on business capital formation were found for these tax incentives unless monetary policy was accommodating. Modest increases in potential output and productivity occurred, but there was no real improvement in inflation. The tax incentives primarily shifted capital formation into the business sector from housing and improved the financial position of business. Thus, it is not clear that business tax incentives would be beneficial overall.

A final possibility is a "tight fiscal-easy money" approach. By tight fiscal policy is not meant decreased expenditures by the Federal government. More realistically, it refers to slower growth in Federal government spending than has been the case in previous years. The "easy money" component of the tight fiscal-easy money policy also does not refer to a radically extreme measure. By easy money is meant a Federal Reserve policy that permits money growth between 8 and 9% per annum, in recognition of the difficulty of reducing the core 5 to 6% inflation in the U.S. economy.²⁰

²⁰The Federal Reserve's long-run targets for monetary growth reflect a set of goals, explicit or implicit, for real economic growth, inflation, and unemployment. However, a target of 5-1/2% growth in M1 (the midpoint of the current long-run target range of the Federal Reserve) implies an inflation rate goal that is unrealistic, given the basic structural inflation that exists in the U.S. economy. This price inflation results from an institutionally determined wage inflation; (Continued...)

In order to highlight the effects of a "tight fiscal-easy money" policy on capital formation, consider an extreme case of reductions in Federal spending and a simultaneous easing of monetary policy. The decline of government expenditures will cause a drop in real output and employment. Consumption, investment, and inventory accumulation would decline via multiplier effects. Potential output would drop but there would be less inflationary pressure with the larger declines in spending relative to supply. The remaining effects would be the opposite of those described for the case of increased government expenditures.

Along with the reduction in Federal government spending would come a smaller budget deficit. The flow of new Treasury issues to the financial markets would drop, with a resulting easing of pressure on short-term interest rates. The lower output and easing of inflationary pressure reduce transactions demands for money, further lowering interest rates. In response, flows-of-funds to financial institutions would rise, mitigating the negative effects on residential construction from the weaker economy by increasing the availability of mortgage money.

20 (Continued) imported inflation, e.g., from OPEC; and the price-setting practices of business, which include rapid markups over short-run rises in costs. The DRI model suggests this "core" rate of inflation to be near 5 or 6%, with no perceptible near-term response to cyclical demand forces. Thus, current monetary growth targets can only result in a weakness of real output and high unemployment rather than sharp reductions in prices. On the other hand, too rapid monetary growth of 10% or more is potentially destabilizing, resembling the Federal Reserve's "stop-go" approach of previous years. Thus, the "easy money" of the "tight fiscal-easy money" policy combination will be taken to mean M1 growth of 8 or 9% per annum.

Most importantly, however, restraint on fiscal policy would enable the Federal Reserve to ease monetary policy. Sustained periods of heavy deficit spending by the Federal Government eventually constrain the monetary policy posture of the Federal Reserve by stimulating the economy too strongly. As a result, monetary policy is often tightened when fiscal policy is stimulative. A stimulative fiscal policy increases pressure on the financial markets directly, but also because of an induced expansion in the private sector. At the same time, a tighter monetary policy intensifies the rise in interest rates. The result has almost always been a credit crunch and recession because of the powerful effects of money and finance on the economy. A "tight fiscal-easy money" approach could lead to an opposite situation.

In the face of restrained growth in Federal Government spending, an easier monetary policy, defined in terms of higher targeted money growth rates, would lower interest rates, reduce debt burden impacts, increase flow-of-funds in markets where rationing occurs, improve the stock market and stimulate housing, consumption, and fixed investment. If sustained, a greater rate of capital formation would occur than under any other policy. Further, with a lower rate of growth in Federal Government spending, Treasury debt issues would comprise a smaller proportion of the total financing in the economy, lessening the chances of "crowding out".

Prospects for Capital Formation

Tables 2 and 3 provide the profile of the current outlook for capital formation over the next decade.²¹ The economy shows steady growth through 1980, the result of a moderately paced but well balanced expansion of real final demands. Real GNP grows at rates above the economy's

TABLE 2. Profile of the Economy to 1985*

	History			Forecast					
	1955-65	1966-75	1976	1977	1978	1979	1980	1976-80	1976-85
Rates of Change (%)									
GNP - Current Dollars	5.9	8.2	11.6	10.9	11.3	10.3	10.4	10.9	9.7
- Constant Dollars	3.8	2.6	6.1	4.8	5.2	4.4	4.5	5.0	4.2
Potential GNP	3.8	3.9	3.4	3.3	3.4	3.3	3.4	3.4	3.2
GNP Deflator	2.0	5.5	5.1	5.8	5.9	5.7	5.7	5.6	5.2
Wholesale Price Index	0.9	6.2	4.6	6.3	6.3	6.3	6.4	6.0	5.2
Average Hourly Earnings	3.6	6.5	7.2	7.1	7.1	7.0	7.2	7.1	7.0
Personal Savings	7.5	12.3	-8.9	11.4	3.9	9.9	12.6	5.8	6.5
Business Savings	5.7	8.8	16.6	11.8	13.0	11.6	11.4	12.9	10.3
Shares of Real Demand (%)									
Consumption/GNP	63.5	62.4	63.8	64.0	63.4	63.1	62.5	63.4	62.4
Business Fixed Investment/GNP	9.6	10.3	9.5	9.5	9.7	10.1	10.5	9.8	10.4
(Excl. Pollution Control Expenditures)	9.6	10.0	9.0	9.1	9.3	9.6	10.0	9.4	10.0
Pollution Control Expenditures/GNP	0.0	0.2	0.4	0.4	0.5	0.5	0.5	0.5	0.4
Residential Construction/GNP	5.0	4.1	3.9	4.3	4.4	4.4	4.6	4.4	4.5
Inventories/GNP	0.8	0.8	0.7	0.6	0.9	1.0	1.1	0.8	0.9
Government Purchases/GNP	20.1	21.9	21.6	21.3	21.1	21.0	20.9	21.2	21.2
Key Indicators of Activity (%)									
Unemployment Rate	5.3	5.0	7.7	7.4	6.4	6.0	5.6	6.6	5.9
Personal Savings Rate	5.8	7.0	6.5	6.5	6.1	6.1	6.3	6.3	6.3
Federal Government Deficit/GNP	-0.1	-1.2	-3.5	-4.0	-2.6	-1.7	-0.8	-2.5	-1.4
State & Local Government Deficit/GNP	-0.1	0.4	0.8	1.3	1.1	0.9	0.5	0.9	0.7
Prime Rate	4.25	7.10	6.84	6.56	7.01	6.55	6.90	6.77	6.55
New High-Grade Corp. Bond Rate	4.24	7.40	8.33	8.25	8.27	7.95	8.36	8.23	8.25

*Based on DRI Control of February 1977 and March 1977 long-run projections.

²¹Projections prior to 1980 are based on DRI analyses of short-run business conditions. The assigned probability to this baseline forecast is 60%. Beyond 1980, the forecasts are based on a balanced, near full employment path for the economy. Such a projection is primarily designed for planning exercises that require stable economic growth as an input, rather than as a "forecast" of expected actual conditions.

potential, although slowing somewhat in 1979-80. Relatively stable fiscal and monetary policies, the absence of any destabilizing external shocks, cautious spending attitudes in the private sector, and constant, although high, inflation rates are the principal determinants of the economy's performance. The greater than average inflation during the period restrains purchasing power, limiting economic growth and reductions in the unemployment rate. In 1980, the various price indices are still rising near 5-1/2 or 6% and the unemployment rate averages 5.6%.

Private sector savings flows are ample to finance the moderate pace of economic activity, especially in the business sector. The share of GNP going to business rises later in the decade, primarily

TABLE 3. Capital and Productivity Items

	Average Percent Changes			
	History			Forecast*
	57-66	67-76	57-76	77-85
Labor Force (Mils. of Persons)	1.3	2.3	1.8	1.6
Labor Force Calculated at Full Employment (Mils. of Persons)	1.4	2.3	1.9	1.6
Real Full Employment Level of GNP (Bils. of 1972 \$'s)	3.6	3.9	3.7	3.2
Gross Capital Stocks (Bils. of 1972 \$'s)				
Nonres. Producers Durable Equipment	4.1	4.9	4.5	4.7
Nonresidential Structures	2.6	2.7	2.7	2.2
Effective Capital Stocks (Bils. of 1972 \$'s)				
Nonres. Producers Durable Equipment	4.1	4.7	4.4	4.6
Nonresidential Structures	2.6	2.6	2.6	2.1
Net Capital Stocks (Bils. of 1972 \$'s)				
Nonres. Producers Durable Equipment	3.8	4.9	4.3	4.9
Nonresidential Structures	3.7	3.1	3.4	2.2
Capital Stock of Housing (Mils. of Units)	NA	1.6	NA	1.8
Capital Stock of Households (Bils. of \$'s)	NA	7.9	NA	8.9
Labor Productivity	3.3	1.8	2.6	2.9

*1977 to 1980 from DRI Control Forecast of February 1977; 1981 to 1985 figures from March 1977 Long Term Trend Forecast.

at the expense of government. Both the ratios of government purchases to GNP and the Federal budget deficit to GNP decline steadily over the next four years as the Carter administration seeks to balance the budget by 1981. The proportion of residential construction to GNP increases as interest rates do not rise enough to cause the severe disintermediation of deposit inflows to financial institutions that could disrupt housing.

Capital formation is not sufficient to achieve full employment of labor by 1980. The gross effective capital stock of producers' durable equipment (excluding the stock of pollution control equipment) shows a 3.9% average rate of growth to 1980, significantly below the high performance 4.7% rate of 1967 to 1976. The stock of plant grows even more slowly, at 1.8% per annum. This compares with a 2.6% average rate of increase from 1967 to 1976. The moderate growth in aggregate demand, slowly rising rates of capacity utilization, a high rental price of capital, and near 6% inflation prevent the kind of investment boom that has typified most business expansions since World War II. A further deterrent is a still high debt service burden as 1980 is approached. Diminished cash flow from eased profits growth, 8 to 9% long-term bond yields, and a rising volume of outstanding debt are responsible. The net capital stocks of plant and equipment behave similarly to the gross concepts, although the high business fixed investment to GNP ratio between 1981 and 1985 raises the average rate of increase to 4.9% for 1977-85, the same as in 1967-76.

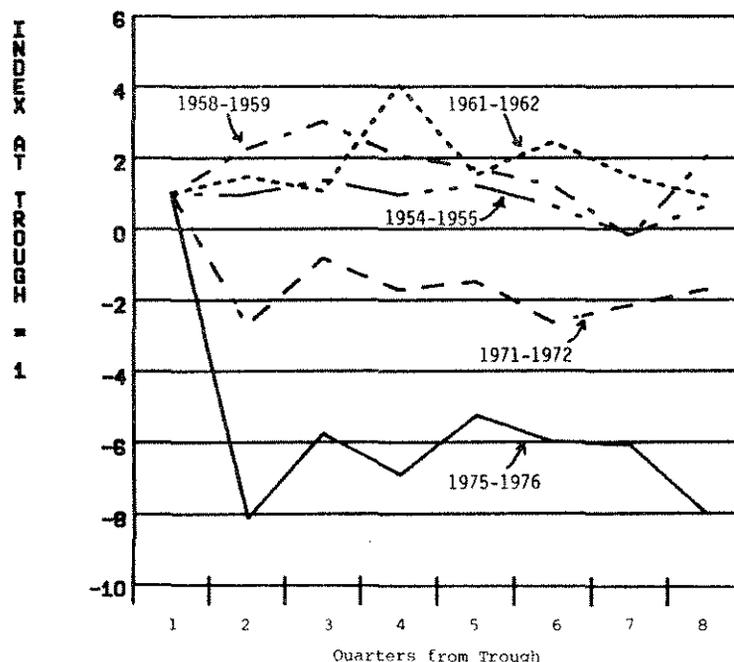
The effects of the slow growth in business capital formation to 1980 are threefold. First, potential output grows slowly, at 3.4%

per annum for the next few years rather than the earlier 3.7%, adding to the pressures for more inflation. Greater inflation lessens real purchasing power, aggregate demand, and hinders the reduction of unemployment. Table 2 shows that the GNP price deflator rises 5.6% per annum from 1976 to 1980. Second, the demand for labor increases less rapidly with a more slowly growing capital stock, so that slack in labor markets remains for a longer period of time. Finally, labor productivity rises less, causing higher unit labor costs and more inflation. All of these effects slow the economy's progress toward full employment.

The rate of capital formation by households is above the average of 1967 to 1976, given steady rises in durable consumer spending and housing. From 1977 to 1980, household physical assets rise by 9.5% a year with concentration in autos and houses. The corresponding figure was 7.5% for 1967 to 1976. Thus, the projections indicate the only real shortfall of capital, at least by historical standards, to be in the business sector. Nevertheless, there exists some more rapid growth rate for the capital stock of households that would cause full employment to be achieved.

What accounts for the insufficient capital formation, especially in the business sector? First, the recession of 1973-75 shook businessmen's expectations of future sales as real GNP dropped more sharply than in any other slowdown since World War II. Further, growth in real final sales since the March 1975 recession trough has been quite moderate relative to similar stages of previous expansions. Chart 5 shows that the rebound in real final sales during the recent expansion has been the weakest of the postwar period. Without the strong "accelerator"

CHART 5. Final Sales Growth (1972 \$'s)
During Postwar Recoveries



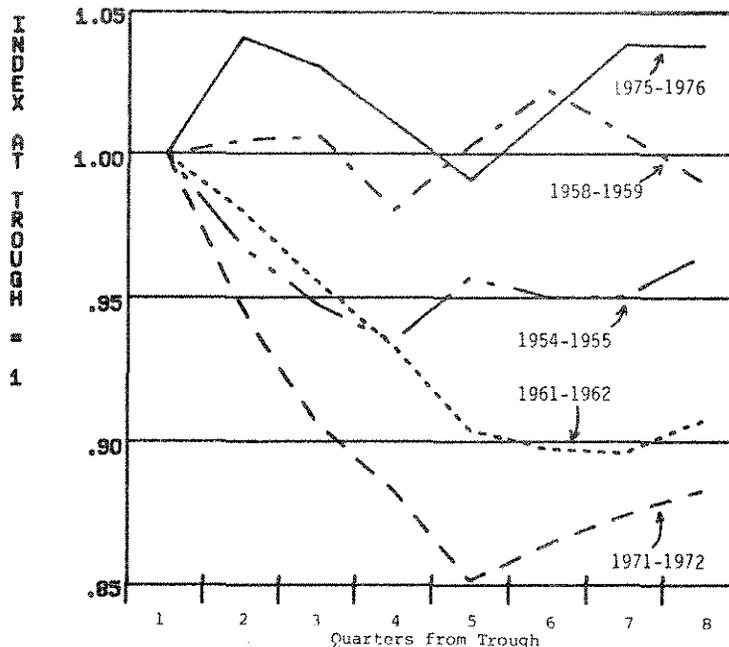
effect from permanent large increases of demand for firms' products, business spending on capital goods has been minimal.

Second, the deep recession left the economy with a considerable degree of underutilized physical capacity. At the trough of the recession in March 1975, the capacity utilization rate for All Manufacturing was 69.6%. The peak of 88%, reached in July 1973, was associated with severe bottlenecks in production. The moderate expansion since 1975 has produced a current rate for All Manufacturing of 80.7%, indicating the existence of considerable slack. Thus, replacement investment, which normally constitutes a large proportion of all new plant and equipment spending, has remained quite low (equation 2).

Third, the rental price of capital, especially for equipment, has remained quite high throughout the current expansion. Chart 6

shows that rises in rental price during similar stages of previous expansions have been smaller than in this episode. The principle reasons

CHART 6. Rental Price of Producers' Durable Equipment During Postwar Recoveries



for this high rental price are 1) increases in the supply price of capital goods that have ranged between 3 and 25.9%; 2) a high average cost of financial capital due to 8 and 9% nominal long-term bond yields and a relatively weak stock market; and 3) the failure to implement major new tax incentives for business.²² Changes in business taxation, including higher tax allowable depreciation rates, shorter lifetimes for capital goods, the investment tax credit, and a lower corporate profits tax rate can have a major effect on rental price. But the only measure

²²Significant business tax legislation was enacted in 1954, 1962, 1965, and 1971.

enacted so far in this episode has been an increase of the investment tax credit to 10% during 1975.

Finally, there has been an unprecedented restructuring of corporate balance sheets since mid-1974, the aftermath of the deteriorated financial position of business that had evolved.²³ Given the huge financial risk generated by balance sheets with top-heavy short-term debt relative to long-term debt, high leverage, a dearth of financial assets relative to short-term liabilities and exceptionally large debt repayment burdens to cash flow, the threat of default and bankruptcy within the business sector has been great. The potential variability in expected earnings created by this situation has proved unacceptable to business, causing increased demands for financial assets, reductions in the desired acquisitions of physical assets, and a decreased rate of debt accumulation. This process, known as reliquification, has proceeded for a much longer period and in a more intensified manner than during any previous postwar expansion. In essence, the returns to business from restructuring balance sheets have exceeded the expected returns from physical asset acquisitions as reduction of financial risk through reliquification have reduced the potential variability of future earnings. As of 1976:4, the process was still occurring, despite the fact that its duration had been twice as long as the typical experience. This desire by business to use funds for purposes other than fixed investment has been a key distinguishing factor of this expansion compared with other postwar business recoveries.

²³See Sinai (17).

Another factor affecting business capital formation has been the laws, regulations, and incentives for dealing with pollution control and new, less energy intensive production techniques. While no research yet has been able to clearly identify how much business capital formation is being affected, to some extent productive capacity is being hampered by the substitution of this "non-productive" investment for capacity creating capital spending. So far, however, the proportion of real business fixed investment devoted to pollution abatement equipment has only been near 5%, too small a figure to bear a major responsibility for the overall weakness in capital spending. Potential new programs for energy independence may increase spending for less energy intensive capital goods rather than for new capacity, thus hampering the rate of productive capital formation.

Simulation Results

This section examines the effects on capital formation and U.S. economic performance of several policies that could be used to accelerate the rate of capital formation. The simulations were performed with the Data Resources model of the U.S. economy, beginning in the first quarter of 1977 and ending in the fourth quarter of 1980. The baseline forecast described in Tables 2 and 3 was subjected to various policy shocks, with subsequent solutions of the model producing new time series for the major variables of interest. The amounts of stimulus for the policies were chosen to permit illustration of the effects, rather than as a matter of realism. Comparisons between the alternative policy and baseline solutions provide the differences from which can be determined

the policy impacts. Appendix Tables 8 to 14 contain the details of these simulations.

In what follows, the simulations are described, some of the more interesting results are presented, and supporting evidence for some conclusions about the policies most appropriate for stimulating capital formation are presented.

The policy simulations included:

1. Personal Tax Reductions

A permanent \$5 billion reduction in personal income taxes was assumed for 1977:2. There was \$20 billion of additional tax reductions in 1978 and \$25 billion in 1979. In effect, this simulation assumed that permanent tax reductions are legislated each year to eliminate an "inflation drag" on consumers' purchasing power because of the "bracket" effect on taxes from higher inflation. M1 growth was 7.2% in 1977, 8.2% in 1978, 8% in 1979, and 6.7% in 1980. The baseline had corresponding growth rates of 7%, 7%, 6.8%, and 6.8%.

2. Personal Tax Reductions and Accommodating Money

A permanent \$5 billion reduction in personal income taxes was assumed for 1977:2. There was \$20 billion of additional tax reductions in 1978 and \$25 billion in 1979. The distinguishing feature of this simulation from the previous one was the accommodating money. Short-term interest rates were kept constant through the provision of sufficient bank reserves by the central bank. M1 growth was 7.3% in 1977, 8.5% in 1978, 8.8% in 1979, and 7.4% in 1980. The baseline had corresponding growth rates of 7%, 7%, 6.8%, and 6.8%.

3. Easier Money

A 1% higher growth in M1 during 1977 and 1978 than in the baseline was assumed. The increased growth was achieved through central bank provision of nonborrowed reserves until the economy's performance generated the desired money growth. The result was M1 growth of 8% in 1977, 8% in 1978, and 7% in both 1979 and 1980. The baseline had corresponding growth rates of 7%, 7%, 6.8%, and 6.8%. Although this simulation is entitled easier money, the higher monetary growth rates were not so great as to destabilize the economy.

4. Personal Tax Reductions and Easier Money

A permanent \$5 billion in personal income taxes was assumed for 1977:2. There was \$20 billion of additional tax reductions in 1978 and \$25 billion in 1979. M1 growth was permitted to rise 1% above the monetary growth in the "Personal Tax Reductions" simulation during 1977 and 1978, 0.7% higher in 1979, and remained the same in 1980. The M1 growth rates were 8.2%, 9.2%, 8.8%, and 6.7% from 1977 to 1980. The baseline had corresponding growth rates of 7%, 7%, 6.8%, and 6.8%.

5. Tight Fiscal and Easier Money

A \$5 billion reduction in military spending was assumed for 1977, then a sustained decrease of \$10 billion from 1978 to 1980. A permanent \$5 billion reduction of personal income taxes occurred in 1977:2. There was \$20 billion of additional tax reductions in 1978 and \$25 billion in 1979. M1 growth was permitted to be 1% above the monetary growth in "Personal Tax Reductions" during 1977 and 1978, 0.7% higher in 1979, but remained the same in 1980. The resulting M1 growth rates were 8.2%,

9.2%, 8.8%, and 6.7% from 1977 to 1980. The baseline had corresponding growth rates of 7%, 7%, 6.8%, and 6.8%.

6. Investment Tax Credit

A permanent increase of 2%, from 10 to 12%, in the tax credit for producers' durable equipment, was assumed to begin in 1977:1. Monetary policy was not accommodating; other tax and spending parameters remained the same as in the baseline.

7. Corporate Profits Tax Reductions

A two-stage reduction in the statutory tax rate on corporate profits was assumed. The rate was lowered from 48 to 45% in 1977 and then to 42% in 1978-80. Monetary policy was not accommodating; other tax and spending parameters remained the same as in the baseline.

Table 4 summarizes the effects of the various policies on real GNP, inflation, and the unemployment rate.²⁴ All changes are expressed relative to the baseline solution. The policies that most stimulated the economy involved either more rapid money growth or accommodative monetary policy.

TABLE 4. Policies to Stimulate Capital Formation: Effects on Real GNP, Inflation, and Unemployment*

Simulation No.	Real GNP (% chg.)				Inflation (% chg.)				Unemployment Rate (%)			
	77	78	79	80	77	78	79	80	77	78	79	80
1	0.2	1.2	1.0	-0.6	-	0.1	0.3	0.5	-	-0.3	-0.7	-0.6
2	0.2	1.3	1.5	-0.3	-	0.1	0.4	0.7	-	-0.4	-0.8	-0.9
3	0.5	0.9	0.5	0.1	0.1	0.2	0.3	0.2	-0.1	-0.4	-0.3	-0.3
4	0.7	2.1	0.9	-0.7	0.1	0.3	0.6	0.8	-0.1	-0.7	-1.0	-1.0
5	0.4	1.9	1.1	-0.5	0.1	0.2	0.5	0.7	-	-0.6	-0.9	-0.9
6	0.1	0.1	-	-0.1	-	-	-	-	-	-0.1	-0.1	-
7	-	0.1	-	-0.1	-	-	-	-	-	-	-	-

*Differences Relative to Baseline

²⁴The rate of inflation is for the Implicit GNP Deflator.

The "Personal Tax Reductions and Accommodating Money" simulation (2) was characterized by a sharp rise in real economic growth and sizeable declines in the unemployment rate. However, the inflation rate was accelerated, especially later, reaching a 1:1.3 tradeoff with the unemployment rate by 1980. The higher inflation, its derivative effects on purchasing power and interest rates, and the normal stock adjustment processes of the economy caused real GNP to drop below the baseline by 1980. The "Personal Tax Reductions and Easier Money" scenario (4) had a powerful stimulative impact on economic growth, but also was associated with a large rise of the inflation rate. The effect of the 1 to 2% additions in monetary growth relative to simulation (2) was a much greater early impact on real economic growth and unemployment, with little extra inflation cost (0.1%) by 1980. The "Easier Money" scenario (3) produced steady rises in real economic growth to 1980, with more improvement in unemployment than a worsening of inflation. Maintaining the permanent tax cuts and the same monetary growth as in "Personal Tax Reductions and Easier Money," but restricting government spending (the "Tight Fiscal and Easier Money" solution 4) only reduced real growth slightly (from the 2.1% increase of 1978 to 1.9%). The gain was a more stretched out stimulation of the economy, lasting well into 1980. This occurred because the tighter fiscal policy permitted the central bank to provide more reserves to maintain a given rate of monetary growth.

The simulations highlight the important effects of monetary policy on economic performance. The provision of bank reserves lowers interest rates; raises the flows-of-funds to housing markets; increases

stock prices and the real value of household financial assets to stimulate consumption; reduces the rental price of plant and equipment to stimulate business fixed investment; lowers the debt burdens of households, business, and state and local government to stimulate sectoral spending; and reduces the financial risk of greater expenditures.

The resulting spending increases are not accompanied by much additional borrowing by the private sector until some quarters later, when inflation and sustained expansion cause a deterioration of the internal financial position of households and firms. The "Easier Money" simulation demonstrates that the extra inflation from a moderate relaxation of Fed policy is not great. The greatest acceleration in prices occurs when tax reduction is combined with greater monetary growth than is necessary only for accommodation.

Table 5 summarizes the effects of the seven policy simulations

TABLE 5. Policies to Stimulate Capital Formation:
Effects on Capacity Utilization, Federal Budget Deficit,
Monetary Growth, and Interest Rates*

Simulation No.	Capac. Util. (%, Mftg.)				Federal Deficit, NIA (\$ Bils.)				M1 Growth (%)			
	77	78	79	80	77	78	79	80	77	78	79	80
1	0.1	1.2	2.1	1.5	-2.5	-15.3	-30.5	-30.5	0.2	1.2	1.1	-0.1
2	0.1	1.3	2.8	2.6	-2.4	-14.1	-24.1	-18.8	0.2	1.4	1.9	0.6
3	0.3	1.9	0.7	1.1	4.2	11.8	9.9	12.9	1.0	1.0	0.2	0.2
4	0.5	3.0	3.2	2.8	1.5	-3.3	-16.1	-14.1	1.2	2.2	2.0	-0.1
5	0.1	2.3	2.8	2.7	4.4	1.9	-10.6	-8.2	1.2	2.2	2.0	-
6	0.1	0.3	0.3	0.1	-1.9	-1.3	-1.3	-2.1	0.1	0.1	-	-
7	-	0.2	0.2	-	-4.8	-10.1	-11.0	-12.5	-	0.1	-	-
		Federal Funds Rate (%)				AAA-Corporate Bonds (%)						
		77	78	79	80	77	78	79	80			
1		.04	.52	1.13	1.22	-.01	.01	.15	.37			
2		-	.01	-.01	.01	-.01	-.03	.09	.39			
3		-1.94	-.24	-2.10	-.63	-.17	.12	-	.15			
4		-1.80	.14	-1.93	.76	-.17	.09	.10	.63			
5		-2.23	-.57	-2.22	-.05	-.24	-.07	-.05	.40			
6		.02	.15	.29	.26	.01	.01	.03	.04			
7		-.01	.06	.23	.30	.01	-.01	-.03	-.03			

*Differences Relative to Baseline

on capacity utilization (All Manufacturing), the Federal budget deficit, monetary growth, the Federal funds rate, and a AAA-equivalent long-term corporate bond yield. The "Personal Tax Reductions and Easier Money" and "Tight Fiscal-Easier Money" solutions speed the economy most rapidly toward full capacity, with increases of the utilization rate for All Manufacturing ranging between 2.3 and 3.2% from 1978 to 1980. The cost to the Federal Government in lost tax revenues is less in the "Tight Fiscal-Easier Money" simulation, with actual declines of the deficit in 1977 and 1978. Only the "Easier Money" solution is associated with continuous reductions in the deficit, as the strong economy and sharply rising inflation increase tax receipts. The extra M1 growth relative to the baseline is the same in both the simulations (4) and (5).

Interest rates are lower in each of the simulations where easier monetary policy is implemented. Rates rise in the solutions where a fiscal stimulus is applied without offsetting monetary policy. Both the short- and long-term rates are lowest in the "Tight Fiscal-Easier Money" solution, as Treasury financing is reduced at the same time the central bank is providing more bank reserves. The Federal funds rate is down anywhere from 5 to 225 basis points as a result of the money growth targets selected in this simulation. The low interest rates have much to do with the strength of the real economy since the effects of monetary policy on expenditures are so wide ranging. The Federal funds rate is particularly volatile as the central bank maneuvers to keep money growth constant at a higher rate.

Table 6 shows the effects of the various policies on capital formation; in particular, business fixed investment, the gross plant and equipment of the business sector, household physical assets, and housing starts. Of the seven policy simulations, the "Tight Fiscal-

TABLE 6. Policies to Stimulate Capital Formation: Effects on Business Fixed Investment; Capital Stocks of Business and Households; Housing*

Simulation No.	Business Fixed Investment (72 \$'s; Bils.)				Gross Plant & Equipment (72 \$'s; Bils.)			
	77	78	79	80	77	78	79	80
1	0.1	0.8	1.7	0.9	-	0.6	2.1	3.3
2	0.1	1.0	2.8	3.1	-	0.7	2.9	6.1
3	0.6	2.6	2.4	2.7	0.3	2.4	4.7	7.0
4	0.6	3.4	4.6	4.4	0.3	2.8	7.0	11.4
5	0.6	3.5	5.3	6.0	0.3	2.9	7.6	13.4
6	0.6	1.9	3.0	3.1	0.3	1.9	4.5	7.3
7	0.7	2.1	2.8	2.7	0.4	2.1	4.7	7.2
	Household Physical Assets (\$ Bils.)				Housing Starts (Mils. of Units)			
	77	78	79	80	77	78	79	80
1	-0.1	11.6	40.2	70.6	.007	.023	.004	-.034
2	-1.0	1.5	30.6	92.5	.010	.063	.133	.115
3	-34.6	43.2	21.0	74.6	.156	.151	.155	.049
4	-32.5	49.9	49.7	189.4	.153	.179	.251	.011
5	-39.9	37.3	48.6	171.6	.191	.240	.317	.058
6	0.3	3.6	6.1	3.9	-	-.008	-.027	-.028
7	-0.6	0.6	4.0	4.1	-.040	-.079	-.089	-.083

*Differences Relative to Baseline

Easier Money" policy has the biggest impact on the capital formation of business and the second greatest effect on household physical assets. The rise in housing starts relative to the baseline is far above the other simulations.

The reasons are straightforward. First, rapid real economic growth and sharp rises in capacity utilization have a major "accelerator" effect on business fixed investment. Plant and equipment spending

is \$5.3 and \$6 billion above the baseline for 1979 and 1980 in the "Tight Fiscal-Easier Money" solution. Second, the lower interest rates reduce debt service charges and the debt burden of corporations, reducing the financial risk that is associated with the acquisition of physical assets. Further, the rental price of capital is decreased because the cost of financial capital drops, favoring the substitution of capital for labor. Third, cash flow is greater with the higher profits of a stronger economy, making purchases of plant and equipment easier. The resulting increases of business fixed investment are translated into a greater stock of gross plant and equipment, so that by 1980 the "Tight Fiscal-Easier Money" simulation gives a cumulated \$24.2 billion rise in business capital formation. The next largest increase is \$21.5 billion under the "Personal Tax Reductions and Easier Money" scenario. Fourth, the low profile of short-term interest rates induces flows-of-funds from households to the major mortgage lenders, as deposits remain an attractive investment compared with other alternatives. The financial intermediaries quickly lend out these funds, given a wide spread between the returns on mortgages and other loans or investments. Housing starts in the "Tight Fiscal-Easier Money" simulation are 25 to 60% greater than in the baseline, far exceeding the differential impact arising from any of the other policies.

How costly is the capital formation under the "Tight Fiscal-Easier Money" policy? Table 4 shows that the extra inflation that is generated ranges between 0.1 and 0.7%, so that M1 growth of between 8 and 9% does not reignite a runaway inflation. The gains include a near 1% reduction of unemployment by 1980, in addition to the new

capital that is accumulated. An equivalent rise in national output that was not accompanied by as much capital formation would be more inflationary, e.g., simulation (4) - the "Personal Tax Reductions and Easier Money" policy.

Finally, Table 7 shows how the various policies affect productivity, the sectoral shares of GNP, and the capital-output ratio.

TABLE 7. Policies to Stimulate Capital Formation: Effects on Productivity, Sector Shares of GNP, and the Capital Output Ratio*

Simulation No.	Labor Productivity (% chg.)				Federal Gov. Share of GNP (%)			
	77	78	79	80	77	78	79	80
1	0.2	1.4	1.3	-0.7	-	-0.3	-0.6	-0.5
2	0.2	1.5	2.0	-0.1	-0.1	-0.4	-0.8	-0.8
3	0.5	2.0	1.3	0.5	-0.2	-0.4	-0.3	-0.4
4	0.6	3.3	0.5	-0.2	-0.2	-0.7	-1.0	-0.9
5	0.2	3.0	0.8	-	-0.4	-1.1	-1.3	-1.3
6	0.1	0.3	0.1	-0.1	-	-	-0.1	-
7	-	0.2	-	-0.2	-	-	-	-
	Real Business Fixed Investment to Real GNP (%)				Capital Output Ratio (1) (%)			
	77	78	79	80	77	78	79	80
1	-.01	-.07	-.10	-.12	-0.2	-1.0	-1.6	-1.1
2	-.01	-.07	-.09	-.07	-0.2	-1.1	-2.0	-1.7
3	-.01	.05	.08	.08	-0.4	-0.9	-0.4	-0.3
4	-.02	-.02	-.03	-	-0.5	-1.9	-2.2	-1.5
5	.01	.04	.06	.13	-0.3	-1.4	-1.9	-1.2
6	.04	.12	.19	.19	-	-	0.1	0.3
7	.05	.14	.19	.18	-	0.1	0.3	0.5

*Differences Relative to Baseline
(1) net capital stock as a proportion of real GNP

Again, the policies that involve accommodating or easier money contribute most to improvement in the variables of concern. Labor productivity is up sharply in the "Personal Tax Reductions and Easier Money" and "Tight Fiscal-Easier Money" solutions, although diminishing subsequent

to 1978. Steady increases appear in the "Easier Money" solution, the result of a sustained period of lower interest rates, higher capital formation, and increased output. The share of Federal government spending to GNP is lower in all the simulations, especially in the "Tight Fiscal-Easier Money" solutions. This declining share for the Federal government frees resources to the private sector, especially late in the decade. Also, Treasury financing is much less with the lower budget deficit. The result is significant increases in the ratio of business fixed investment to GNP. The greatest rises in this ratio occur in the business tax incentive solutions, however, induced by a shift in sectoral shares from housing to business capital formation.

Which policies are most effective in promoting business capital formation? The simulations clearly indicate the program of permanent reductions in personal income taxes, slower growth in Federal Government spending, and easier money in terms of higher targeted rates of growth of M1 has the greatest impact, at least cost, in terms of the economy's goals. Over the four years of the simulation, the gross plant and equipment of business rises by \$24.2 billion in the "Tight Fiscal-Easier Money" scenario. The next largest increase occurs in the "Personal Tax Reduction-Easier Money" solution. All of the other simulations show substantially lower rises in the capital stock of business. In addition, there is a strong rise of housing in the "Tight Fiscal-Easier Money" solution as well, with accumulated increases in housing starts for the four years at 806,000 units, compared with the next largest increase of 594,000 units in the "Personal Tax Reductions and Easier Money" scenario. Also household capital formation is much

larger than in all of the other scenarios. Thus, the "Tight Fiscal-Easier Money" policy has gains in all the forms of capital, with only a moderate rise of inflation as the major cost.

The reasons for the stronger capital formation under the "Tight Fiscal-Easier Money" policy include:

- 1) a sustained period of low interest rates which stimulates consumption, reduces the rental price of plant and equipment to stimulate business fixed investment, and reduces the costs of outstanding debt to minimize financial risk and encourage spending by all sectors;
- 2) increased flows of funds from the household sector to financial intermediaries, who, in turn, make mortgage money available to stimulate housing;
- 3) a reduced share of total economic activity for the Federal Government sector due to the slowed growth in Federal spending. Financial market pressure is eased due to the resulting drop in Treasury financing and a response by the Federal Reserve of more bank reserves.

The trading of an easier monetary policy for a tighter fiscal policy thus appears to offer the greatest potential benefits for capital formation in the U.S. economy.

The business tax incentives provide less aggregative stimulus, because of a much lower impact than accelerator and capacity utilization influences on fixed investment. The tax incentives directly induce some spending on plant and equipment and ease the financial position

of corporations. However, at the same time, the revenue loss to the Federal government is equivalent to an easier fiscal policy; raising pressure on the financial markets, causing increases of interest rates, diminishing the flows-of-funds into housing, and eventually, reducing housing starts.

These last results appear clearly in Tables 6 and 7, where the share of business fixed investment to real GNP rises the most in the tax incentive simulations, but housing starts decline. Thus, the business tax incentives would probably be more appropriate to apply as the economy approached close to full employment, shifting sectoral shares but not exerting much demand pull pressure on the economy. With the considerable slack in the economy that exists at the start of the simulations, the increased national output from the stimulative macro-oriented policies have a major impact on business fixed investment through accelerator effects. Later in the expansion, when there is much less slack, the increased output would be translated into inflation, diminishing the purchasing power and spending of the private sector. Hence, the appropriateness of the permanent tax reductions, easier money, and slowed Federal government spending is particular to the current stage of the business expansion, where there is considerable slack and a large "gap" to be eliminated before severe demand-side inflationary pressures are generated.

Capital Formation, Productive Capacity, and Prices

A major element in the case for capital formation is the potential beneficial effect on inflation of an increased capital stock. The

mechanism by which capital formation can affect inflation is twofold. First, the construction of badly needed capital would prevent bottlenecks from arising, as was the case in 1973-74. The bottlenecks and shortages in productive capacity for meeting demands was a prime cause of industrial inflation during that period. Second, increased capital formation raises the productivity of labor and increases the potential output of the U.S. economy. Through a reduction in unit labor costs and rise in potential real GNP, aggregate demand pressures on prices would be reduced.

Most of the policies considered for stimulating capital formation have both demand and supply effects with the problem one of creating a balance between demand and supply so that inflation does not rise too rapidly. The aggregative policies in simulations (1) (2) and (5) cause inflation to rise because of a more rapid increase in demand than in supply. But the increase in productive capacity that occurs does serve to mitigate the inflationary pressures created by the macro policies. The business tax incentives do not raise inflation by as much as the general macroeconomic policies. However, the disadvantage is that the overall economic stimulus from these policies is minimal. Thus, the appropriate mix of the two kinds of policies, general macroeconomic stimulus and business tax incentives, depends on the position of the economy relative to full employment. The farther from full employment is the economy the more appropriate would be the macroeconomic policies to stimulate capital formation. But when the economy reaches full employment, it would be more appropriate to rely heavily on the business tax incentives to minimize the inflationary impact of rises in demand.

In all cases, the impact on inflation from increased capital formation is not great because 1) the additional capital that is created is only a small portion of the existing capital stock, and 2) the impact on potential output from a greater rate of capital formation is relatively small. Most production function studies indicate that increases in the quantity and quality of labor have the biggest impact on potential output. The role of increases in the capital stock, although not insignificant, is much less. Therefore, the capacity added through aggressive policies to stimulate capital formation would only bring small reductions in the inflation of wages and prices.

To prevent a resurgence of inflation then, capital formation should not be the principal focus of policy. The best insurance against such a reacceleration would be a gradual approach to full employment, with real GNP rising steadily by 5 to 6% for the next few years. Indeed, growth in real output must slow in later years to insure a "soft landing" at full employment rather than a collision with the capacity ceiling of the economy. Major attempts to reduce inflation through the route of increased capital formation are doomed to failure, if only because the demand-side stimulus required for appreciable increases in capital formation would be too massive and the required size of business tax incentives too great to raise capital formation high enough for significant reductions in prices. Inflation must be attacked in another manner than through policies to raise capital formation. Increased capital formation can help fight inflation, at the margin, by raising productivity and potential output, but should not constitute the major bastion against the still high inflation that remains in the U.S. economy

Appendix: Simulation Results

Description of Simulations:

Personal Tax Reductions: A permanent \$5 billion reduction in personal income taxes was assumed for 1977:2. There was \$20 billion of additional tax reductions in 1978 and \$25 billion in 1979. In effect, this simulation assumed that permanent tax reductions are legislated each year to eliminate an "inflation drag" on consumers' purchasing power because of the "bracket" effect on taxes from higher inflation. M1 growth was 7.2% in 1977, 8.2% in 1978, 8% in 1979, and 6.7% in 1980. The baseline had corresponding growth rates of 7%, 7%, 6.8% and 6.8%.

Personal Tax Reductions and Accommodating Money: A permanent \$5 billion reduction in personal income taxes was assumed for 1977:2. There was \$20 billion of additional tax reductions in 1978 and \$25 billion in 1979. The distinguishing feature of this simulation from the previous one was the accommodating money. Short-term interest rates were kept constant through the provision of sufficient bank reserves by the central bank. M1 growth was 7.3% in 1977, 8.5% in 1978, 8.8% in 1979, and 7.4% in 1980. The baseline had corresponding growth rates of 7%, 7%, 6.8%, and 6.8%.

Easier Money: A 1% higher growth in M1 during 1977 and 1978 than in the baseline was assumed. The increased growth was achieved through central bank provision of nonborrowed reserves until the economy's performance generated the desired money growth. The result was M1 growth of 8% in 1977, 8% in 1978, and 7% in both 1979 and 1980. The baseline had corresponding growth rates of 7%, 7%, 6.8%, and 6.8%. Although this simulation is entitled easier money, the higher monetary growth rates were not so great as to destabilize the economy.

Personal Tax Reductions and Easier Money: A permanent \$5 billion in personal income taxes was assumed for 1977:2. There was \$20 billion of additional tax reductions in 1978 and \$25 billion in 1979. M1 growth was permitted to rise 1% above the monetary growth in the "Personal Tax Reductions" simulation during 1977 and 1978, 0.7% higher in 1979, and remained the same in 1980. The M1 growth rates were 8.2%, 9.2%, 8.8%, and 6.7% from 1977 to 1980. The baseline had corresponding growth rates of 7%, 7%, 6.8%, and 6.8%.

Tight Fiscal and Easier Money: A \$5 billion reduction in military spending was assumed for 1977, then a sustained decrease of \$10 billion from 1978 to 1980. A permanent \$5 billion reduction of personal income taxes occurred in 1977:2. There was \$20 billion of additional tax reductions in 1978 and \$25 billion in 1979. M1 growth was permitted to be 1% above the monetary growth in "Personal Tax Reductions" during 1977 and 1978, 0.7% higher in 1979, but remained the same in 1980. The resulting M1 growth rates were 8.2%, 9.2%, 8.8%, and 6.7% from

1977 to 1980. The baseline had corresponding growth rates of 7%, 7%, 6.8%, and 6.8%.

Investment Tax Credit: A permanent increase of 2%, from 10 to 12%, in the tax credit for producers' durable equipment, was assumed to begin in 1977:1. Monetary policy was not accommodating; other tax and spending parameters remained the same as in the baseline.

Corporate Profits Tax Reductions: A two-stage reduction in the statutory tax rate on corporate profits was assumed. The rate was lowered from 48 to 45% in 1977 and then to 42% in 1978-80. Monetary policy was not accommodating; other tax and spending parameters remained the same as in the baseline.

TABLE 8. Capital Formation and U.S. Economic Performance:
"Baseline" and "Personal Tax Reduction" Solutions

	75	76	77	78	79	80
ECONOMY						
FEDERAL GNP (% CHG.)						
BASELINE			4.8	4.7	4.0	4.4
LOWER PERS. TAXES (NON-ACCOM)	1.8	6.1	5.0	5.9	5.1	3.8
DIFF			0.2	1.2	1.0	-0.6
UNEMPLOYMENT RATE (%)						
BASELINE			7.3	6.4	6.1	5.5
LOWER PERS. TAXES (NON-ACCOM)	8.5	7.7	7.3	6.1	5.4	4.9
DIFF			-0.0	-0.3	-0.7	-0.6
INFLATION (% CHG.)						
GNP DEFLATOR						
BASELINE			5.2	5.3	5.1	4.8
LOWER PERS. TAXES (NON-ACCOM)	9.2	5.1	5.2	5.3	5.3	5.3
DIFF			0.0	0.1	0.3	0.5
WPI						
BASELINE			5.0	5.3	5.1	4.9
LOWER PERS. TAXES (NON-ACCOM)	9.3	4.3	5.1	5.6	5.8	5.6
DIFF			0.0	0.3	0.7	0.7
CPI						
BASELINE			5.0	5.2	4.8	4.9
LOWER PERS. TAXES (NON-ACCOM)	9.2	5.7	5.0	5.3	5.2	5.4
DIFF			0.0	0.1	0.3	0.5
AVG. HOURLY EARNINGS						
BASELINE			6.8	6.7	6.6	6.6
LOWER PERS. TAXES (NON-ACCOM)	8.9	7.2	6.8	6.8	6.9	7.2
DIFF			0.0	0.1	0.3	0.5
CAPACITY UTILIZATION (%)						
ALL MANUFACTURING						
BASELINE			75.3	77.7	78.7	79.5
LOWER PERS. TAXES (NON-ACCOM)	68.7	72.9	75.4	78.8	80.8	81.0
DIFF			0.1	1.2	2.1	1.5
PRIMARY PROCESSING						
BASELINE			79.6	81.3	82.6	85.0
LOWER PERS. TAXES (NON-ACCOM)	70.2	76.8	79.7	82.7	84.9	86.7
DIFF			0.1	1.3	2.4	1.7
FEDERAL TAX RECEIPTS (\$ BIL.)						
BASELINE			361.0	408.4	455.7	512.2
LOWER PERS. TAXES (NON-ACCOM)	286.5	328.9	358.5	392.7	424.8	482.6
DIFF			-2.5	-15.7	-30.9	-29.6
% DIFF			-0.7	-3.8	-6.8	-5.8
FEDERAL BUDGET SURPLUS (MIA) (\$ BIL.)						
BASELINE			-64.2	-55.7	-45.1	-26.7
LOWER PERS. TAXES (NON-ACCOM)	-71.3	-58.4	-66.7	-71.1	-75.7	-57.1
DIFF			-2.5	-15.3	-30.5	-30.5
% DIFF			-3.9	-27.5	-67.7	-114.3
MONEY AND INTEREST RATES						
NARROW MONEY SUPPLY (M1) (% CHG.)						
BASELINE			7.0	7.0	6.8	6.8
LOWER PERS. TAXES (NON-ACCOM)	4.2	5.1	7.2	8.2	8.0	6.7
DIFF			0.2	1.2	1.1	-0.1
BROAD MONEY SUPPLY (M2) (% CHG.)						
BASELINE			11.0	10.8	11.0	10.6
LOWER PERS. TAXES (NON-ACCOM)	7.7	9.7	11.2	11.3	11.3	10.3
DIFF			0.1	0.5	0.3	-0.3
FEDERAL FUNDS RATE (%)						
BASELINE			5.83	6.22	5.56	6.22
LOWER PERS. TAXES (NON-ACCOM)	5.82	5.05	5.87	6.73	6.69	7.45
DIFF			0.04	0.52	1.13	1.22
3-MONTH TREASURY BILLS (%)						
BASELINE			5.48	5.76	5.34	5.73
LOWER PERS. TAXES (NON-ACCOM)	5.78	5.01	5.52	6.18	6.20	6.62
DIFF			0.04	0.42	0.86	0.89
YIELD ON NEW ISSUES OF HIGH-GRADE CORP. BONDS (%)						
BASELINE			7.98	8.11	8.03	8.14
LOWER PERS. TAXES (NON-ACCOM)	9.01	8.34	7.97	8.12	8.17	8.51
DIFF			-0.01	0.01	0.15	0.37
VELOCITY (% CHG.)						
BASELINE			3.0	3.0	2.3	2.5
LOWER PERS. TAXES (NON-ACCOM)	2.9	6.2	3.0	3.1	2.5	2.5
DIFF			0.0	0.1	0.2	0.0

TABLE 8. - Continued

	75	76	77	78	79	80
INVESTMENT, CAPITAL FORMATION, AND						
POTENTIAL OUTPUT						
PLANT EXPENDITURES (BILS. OF 1972 \$'S)						
BASELINE						
LOWER PERS. TAXES (NON-ACCOM)	36.7	38.1	40.2	41.8	43.6	46.2
DIFF			0.0	0.2	0.5	0.4
% DIFF			0.1	0.6	1.2	0.9
EQUIPMENT EXPENDITURES (BILS. OF 1972 \$'S)						
BASELINE						
LOWER PERS. TAXES (NON-ACCOM)	74.7	77.9	83.6	89.5	95.4	103.7
DIFF			0.1	0.6	1.2	0.4
% DIFF			0.1	0.7	1.3	0.4
BUSINESS FIXED INVESTMENT (BILS. OF 1972 \$'S)						
BASELINE						
LOWER PERS. TAXES (NON-ACCOM)	111.4	116.0	123.8	131.3	139.1	149.9
DIFF			0.1	0.8	1.7	0.9
% DIFF			0.1	0.6	1.2	0.6
GROSS PLANT (BILS. OF 1972 \$'S)						
BASELINE						
LOWER PERS. TAXES (NON-ACCOM)	903.7	918.7	935.4	951.5	972.7	993.9
DIFF			0.0	0.2	0.6	1.1
% DIFF			0.0	0.0	0.1	0.1
GROSS EQUIPMENT (BILS. OF 1972 \$'S)						
BASELINE						
LOWER PERS. TAXES (NON-ACCOM)	812.3	839.1	869.8	904.8	943.0	986.7
DIFF			0.0	0.4	1.5	2.2
% DIFF			0.0	0.0	0.2	0.2
HOUSING STARTS (MILLIONS OF UNITS)						
BASELINE						
LOWER PERS. TAXES (NON-ACCOM)	1.163	1.543	1.802	1.795	1.910	2.058
DIFF			0.007	0.023	0.008	-0.034
% DIFF			0.0	1.3	0.2	-1.7
CAPITAL STOCK OF HOMES (MILLIONS OF UNITS)						
BASELINE						
LOWER PERS. TAXES (NON-ACCOM)	74.78	75.69	76.90	78.13	79.42	80.85
DIFF			0.01	0.03	0.04	0.01
% DIFF			0.0	0.0	0.0	0.0
REGISTRATION OF CARS (MILLIONS OF UNITS)						
BASELINE						
LOWER PERS. TAXES (NON-ACCOM)	106.9	110.2	112.9	115.6	118.6	121.6
DIFF			0.0	0.3	0.7	0.8
% DIFF			0.0	0.3	0.6	0.7
CAPITAL STOCK OF HOUSEHOLDS (BILS. OF \$'S)						
BASELINE						
LOWER PERS. TAXES (NON-ACCOM)	3534.6	3868.2	4240.8	4622.9	5009.7	5530.3
DIFF			-0.1	11.6	40.2	70.6
% DIFF			-0.0	0.3	0.8	1.3
LABOR FORCE (MILLIONS OF PERSONS)						
BASELINE						
LOWER PERS. TAXES (NON-ACCOM)	92.7	94.8	97.1	98.8	100.6	102.3
DIFF			0.0	0.0	0.2	0.4
% DIFF			0.0	0.0	0.2	0.4
AVERAGE PRODUCTIVITY (% CHG.)						
BASELINE						
LOWER PERS. TAXES (NON-ACCOM)	-8.7	8.3	5.7	6.0	4.5	5.8
DIFF			0.2	1.4	1.3	-0.7
POTENTIAL OUTPUT (BILS. OF 1972 \$'S)						
BASELINE						
LOWER PERS. TAXES (NON-ACCOM)	1365.4	1405.9	1447.8	1491.3	1536.9	1584.2
DIFF			0.0	0.1	0.5	1.0
% DIFF			0.0	0.0	0.0	0.1

TABLE 8. - Continued

	75	76	77	78	79	80
RATIOS						

FEDERAL GOVERNMENT EXPENDITURES						
TO NOMINAL GNP (%)						
BASELINE	23.6	22.9	22.8	22.6	22.3	21.9
LOWER PERS. TAXES (NON-ACCOM)			22.7	22.3	21.7	21.4
DIFF			-0.0	-0.3	-0.6	-0.5
GAP (POTENTIAL LESS ACTUAL GNP)						
(BILS. OF 1972 \$'S)						
BASELINE	173.8	141.0	122.1	103.7	93.3	76.6
LOWER PERS. TAXES (NON-ACCOM)			119.4	85.0	60.0	51.0
DIFF			-2.6	-18.7	-33.3	-25.6
% DIFF			-2.2	-18.1	-35.7	-33.4
GROSS EFFECTIVE CAPITAL						
STOCK TO REAL GNP (%)						
BASELINE	142.0	136.8	133.8	131.3	129.8	128.3
LOWER PERS. TAXES (NON-ACCOM)			133.5	129.6	127.0	126.3
DIFF			-0.3	-1.7	-2.8	-2.0
NET CAPITAL STOCK TO						
REAL GNP (%)						
BASELINE	84.8	81.3	79.3	77.7	76.9	76.2
LOWER PERS. TAXES (NON-ACCOM)			79.1	76.7	75.3	75.1
DIFF			-0.2	-1.0	-1.6	-1.1
GROSS CAPITAL STOCK OF						
POLLUTION ABATEMENT EXPEND.						
TO REAL GNP (%)						
BASELINE	2.3	2.6	2.8	3.1	3.4	3.6
LOWER PERS. TAXES (NON-ACCOM)			2.8	3.1	3.3	3.6
DIFF			-0.0	-0.0	-0.1	-0.1
REAL BUSINESS FIXED INVESTMENT						
TO REAL GNP (%)						
BASELINE	9.35	9.17	9.34	9.46	9.63	9.94
LOWER PERS. TAXES (NON-ACCOM)			9.32	9.39	9.53	9.83
DIFF			-0.01	-0.07	-0.10	-0.12
REAL BUSINESS FIXED INVESTMENT LESS						
POLLUTION ABATEMENT EXPENDS. TO						
REAL GNP (%)						
BASELINE	8.93	8.75	8.91	8.99	9.16	9.48
LOWER PERS. TAXES (NON-ACCOM)			8.90	8.93	9.07	9.37
DIFF			-0.01	-0.06	-0.10	-0.11

TABLE 9. Capital Formation and U.S. Economic Performance:
 "Baseline" and "Personal Tax Reduction with Accommodating Money" Solutions

	75	76	77	78	79	80
ECONOMY						
REAL GNP (% CHG.)						
BASELINE	-1.8	6.1	4.8	4.7	4.0	4.4
LOWER PERS. TAXES (ACCOM)			5.0	6.0	5.6	4.2
DIFF			0.2	1.3	1.5	-0.3
UNEMPLOYMENT RATE (%)						
BASELINE	8.5	7.7	7.3	6.4	6.1	5.5
LOWER PERS. TAXES (ACCOM)			7.3	6.1	5.2	4.6
DIFF			-0.0	-0.4	-0.8	-0.9
INFLATION (% CHG.)						
GNP DEFLATOR						
BASELINE	9.2	5.1	5.2	5.3	5.1	4.8
LOWER PERS. TAXES (ACCOM)			5.2	5.4	5.4	5.6
DIFF			0.0	0.1	0.4	0.7
WPI						
BASELINE	9.3	4.3	5.0	5.3	5.1	4.9
LOWER PERS. TAXES (ACCOM)			5.1	5.6	6.0	6.1
DIFF			0.0	0.4	0.9	1.3
CPI						
BASELINE	9.2	5.7	5.0	5.2	4.8	4.9
LOWER PERS. TAXES (ACCOM)			5.0	5.3	5.3	5.6
DIFF			0.0	0.1	0.4	0.7
AVG. HOURLY EARNINGS						
BASELINE	8.9	7.2	6.8	6.7	6.6	6.6
LOWER PERS. TAXES (ACCOM)			6.8	6.8	6.9	7.4
DIFF			0.0	0.1	0.4	0.7
CAPACITY UTILIZATION (%)						
ALL MANUFACTURING						
BASELINE	68.7	72.9	75.3	77.7	78.7	79.5
LOWER PERS. TAXES (ACCOM)			75.4	78.9	81.5	82.2
DIFF			0.1	1.3	2.8	2.6
PRIMARY PROCESSING						
BASELINE	70.2	76.8	79.6	81.3	82.6	85.0
LOWER PERS. TAXES (ACCOM)			79.7	82.8	85.8	88.1
DIFF			0.1	1.5	3.3	3.2
FEDERAL TAX RECEIPTS (\$ BIL.)						
BASELINE	286.5	328.9	361.0	408.4	455.7	512.2
LOWER PERS. TAXES (ACCOM)			354.5	393.9	431.0	494.1
DIFF			-7.5	-14.5	-24.7	-18.1
% DIFF			-0.7	-3.5	-5.4	-3.5
FEDERAL BUDGET SURPLUS (NIA) (\$ BIL.)						
BASELINE	-71.3	-58.4	-60.2	-55.7	-45.1	-26.7
LOWER PERS. TAXES (ACCOM)			-64.6	-69.8	-69.3	-45.5
DIFF			-2.4	-14.1	-24.1	-18.8
% DIFF			-3.8	-25.2	-53.4	-70.5
MONEY AND INTEREST RATES						
NARROW MONEY SUPPLY (M1) (% CHG.)						
BASELINE	4.2	5.1	7.0	7.0	6.8	6.8
LOWER PERS. TAXES (ACCOM)			7.3	8.5	8.8	7.4
DIFF			0.2	1.4	1.9	0.6
BROAD MONEY SUPPLY (M2) (% CHG.)						
BASELINE	7.7	9.7	11.0	10.8	11.0	10.6
LOWER PERS. TAXES (ACCOM)			11.2	11.6	12.2	11.3
DIFF			0.1	0.8	1.2	0.7
FEDERAL FUNDS RATE (%)						
BASELINE	5.82	5.05	5.83	6.22	5.56	6.22
LOWER PERS. TAXES (ACCOM)			5.83	6.22	5.54	6.23
DIFF			-0.00	0.01	-0.01	0.01
3-MONTH TREASURY BILLS (%)						
BASELINE	5.78	5.01	5.48	5.76	5.34	5.73
LOWER PERS. TAXES (ACCOM)			5.49	5.81	5.41	5.82
DIFF			0.01	0.05	0.07	0.09
YIELD ON NEW ISSUES OF HIGH-GRADE CORP. BONDS (%)						
BASELINE	9.01	8.34	7.98	8.11	8.03	8.14
LOWER PERS. TAXES (ACCOM)			7.97	8.08	8.11	8.53
DIFF			-0.01	-0.03	0.09	0.39
VELOCITY (% CHG.)						
BASELINE	2.9	6.2	3.0	3.0	2.3	2.5
LOWER PERS. TAXES (ACCOM)			3.0	3.0	2.3	2.4
DIFF			0.0	0.0	0.0	-0.1

TABLE 9. - Continued

	75	76	77	78	79	80
INVESTMENT, CAPITAL FORMATION, AND						
POTENTIAL OUTPUT						
PLANT EXPENDITURES						
(BILS. OF 1972 \$'S)						
BASELINE	36.7	38.1	40.2	41.8	43.6	46.2
LOWER PERS. TAXES (ACCOM)			40.2	42.1	44.0	47.0
DIFF			0.0	0.3	0.8	0.8
% DIFF			0.1	0.7	1.7	1.8
EQUIPMENT EXPENDITURES						
(BILS. OF 1972 \$'S)						
BASELINE	74.7	77.9	83.6	89.5	95.4	103.7
LOWER PERS. TAXES (ACCOM)			83.6	90.2	97.0	105.9
DIFF			0.1	0.7	2.0	2.2
% DIFF			0.1	0.8	2.1	2.2
BUSINESS FIXED INVESTMENT						
(BILS. OF 1972 \$'S)						
BASELINE	111.4	116.0	123.8	131.3	139.1	149.9
LOWER PERS. TAXES (ACCOM)			123.8	132.3	141.8	152.9
DIFF			0.1	1.0	2.8	3.1
% DIFF			0.1	0.8	2.0	2.0
GROSS PLANT (BILS. OF 1972 \$'S)						
BASELINE	903.7	918.7	935.4	953.5	972.7	993.9
LOWER PERS. TAXES (ACCOM)			935.4	953.7	973.5	995.6
DIFF			0.0	0.2	0.8	1.7
% DIFF			0.0	0.0	0.1	0.2
GROSS EQUIPMENT (BILS. OF 1972 \$'S)						
BASELINE	612.3	639.1	669.8	704.8	743.0	786.7
LOWER PERS. TAXES (ACCOM)			669.8	705.2	745.1	791.0
DIFF			0.0	0.5	2.1	4.4
% DIFF			0.0	0.1	0.2	0.4
HOUSING STARTS						
(MILLIONS OF UNITS)						
BASELINE	1,163	1,543	1,802	1,795	1,910	2,058
LOWER PERS. TAXES (ACCOM)			1,812	1,857	2,043	2,173
DIFF			0.010	0.063	0.133	0.115
% DIFF			0.5	3.5	7.0	5.6
CAPITAL STOCK OF HOMES						
(MILLIONS OF UNITS)						
BASELINE	74.78	75.69	76.90	78.13	79.42	80.85
LOWER PERS. TAXES (ACCOM)			76.91	78.18	79.58	81.13
DIFF			0.01	0.05	0.16	0.28
% DIFF			0.0	0.1	0.2	0.3
REGISTRATION OF CARS						
(MILLIONS OF UNITS)						
BASELINE	106.9	110.2	112.9	115.6	118.6	121.8
LOWER PERS. TAXES (ACCOM)			112.9	116.0	119.4	122.7
DIFF			0.0	0.3	0.7	0.8
% DIFF			0.0	0.3	0.6	0.7
CAPITAL STOCK OF HOUSEHOLDS						
(BILS. OF \$'S)						
BASELINE	3534.6	3868.2	4240.8	4622.9	5009.7	5530.3
LOWER PERS. TAXES (ACCOM)			4239.9	4624.4	5040.3	5622.8
DIFF			-1.0	1.5	30.6	92.5
% DIFF			-0.0	0.0	0.6	1.7
LABOR FORCE						
(MILLIONS OF PERSONS)						
BASELINE	92.7	98.8	97.1	98.8	100.6	102.3
LOWER PERS. TAXES (ACCOM)			97.1	98.8	100.8	102.8
DIFF			0.0	0.0	0.2	0.5
% DIFF			0.0	0.0	0.2	0.5
AVERAGE PRODUCTIVITY (% CHG.)						
BASELINE	-8.7	8.3	5.7	6.0	4.5	5.8
LOWER PERS. TAXES (ACCOM)			5.9	7.5	6.5	5.8
DIFF			0.2	1.5	2.0	-0.1
POTENTIAL OUTPUT						
(BILS. OF 1972 \$'S)						
BASELINE	1365.0	1405.9	1447.8	1491.3	1536.9	1584.2
LOWER PERS. TAXES (ACCOM)			1447.8	1491.4	1537.6	1585.8
DIFF			0.0	0.1	0.7	1.7
% DIFF			0.0	0.0	0.0	0.1

TABLE 9. - Continued

RATION	75	76	77	78	79	80

FEDERAL GOVERNMENT EXPENDITURES TO NOMINAL GNP (%)						
BASELINE	23.6	22.9	22.8	22.6	22.3	21.9
LOWER PERS. TAXES (ACCOM)			22.7	22.2	21.5	21.1
DIFF			+0.1	-0.4	-0.8	-0.8
GAP (POTENTIAL LESS ACTUAL GNP) (BILS. OF 1972 \$'S)						
BASELINE	173.8	141.0	122.1	103.7	93.3	76.6
LOWER PERS. TAXES (ACCOM)			119.4	83.1	50.9	37.0
DIFF			+2.7	-20.6	-42.4	-39.6
% DIFF			+2.2	-19.9	-45.4	-51.6
GROSS EFFECTIVE CAPITAL STOCK TO REAL GNP (%)						
BASELINE	142.0	136.8	133.8	131.3	129.8	126.3
LOWER PERS. TAXES (ACCOM)			133.5	129.4	126.3	125.3
DIFF			+0.3	-1.9	-3.6	-3.0
NET CAPITAL STOCK TO REAL GNP (%)						
BASELINE	84.8	81.3	79.3	77.7	76.9	76.2
LOWER PERS. TAXES (ACCOM)			79.1	76.6	74.9	74.5
DIFF			+0.2	-1.1	-2.0	-1.7
GROSS CAPITAL STOCK OF POLLUTION ABATEMENT EXPEND. TO REAL GNP (%)						
BASELINE	2.3	2.6	2.8	3.1	3.4	3.6
LOWER PERS. TAXES (ACCOM)			2.8	3.1	3.3	3.6
DIFF			+0.0	+0.0	+0.1	+0.1
REAL BUSINESS FIXED INVESTMENT TO REAL GNP (%)						
BASELINE	9.35	9.17	9.34	9.46	9.63	9.94
LOWER PERS. TAXES (ACCOM)			9.32	9.39	9.54	9.87
DIFF			-0.01	-0.07	-0.09	-0.07
REAL BUSINESS FIXED INVESTMENT LESS POLLUTION ABATEMENT EXPENDS. TO REAL GNP (%)						
BASELINE	8.93	8.75	8.91	8.99	9.16	9.48
LOWER PERS. TAXES (ACCOM)			8.90	8.93	9.08	9.42
DIFF			-0.01	-0.06	-0.08	-0.06

TABLE 10. Capital Formation and U.S. Economic Performance:
"Baseline" and "Easier Money" Solutions

	75	76	77	78	79	80
ECONOMY						

REAL GNP (% CHG.)						
BASELINE	-1.8	6.1	4.8	4.7	4.0	4.4
EASIER MONEY			5.3	5.6	4.5	4.5
DIFF			0.5	0.9	0.5	0.1
UNEMPLOYMENT RATE (%)						
BASELINE	8.5	7.7	7.3	6.4	6.1	5.5
EASIER MONEY			7.2	6.0	5.8	5.2
DIFF			-0.1	-0.4	-0.3	-0.3
INFLATION (% CHG.)						
GNP DEFLATOR						
BASELINE	9.2	5.1	5.2	5.3	5.1	4.8
EASIER MONEY			5.3	5.5	5.3	5.0
DIFF			0.1	0.2	0.3	0.2
WPI						
BASELINE	9.3	4.3	5.0	5.3	5.1	4.9
EASIER MONEY			5.2	6.0	5.3	5.2
DIFF			0.2	0.7	0.2	0.4
CPI						
BASELINE	9.2	5.7	5.0	5.2	4.8	4.9
EASIER MONEY			5.1	5.4	5.1	5.1
DIFF			0.0	0.2	0.2	0.2
AVG. HOURLY EARNINGS						
BASELINE	8.9	7.2	8.8	8.7	8.6	8.6
EASIER MONEY			8.8	8.9	8.8	8.9
DIFF			0.0	0.1	0.2	0.3
CAPACITY UTILIZATION (%)						
ALL MANUFACTURING						
BASELINE	68.7	72.9	75.3	77.7	78.7	79.5
EASIER MONEY			75.6	79.5	79.4	80.6
DIFF			0.3	1.9	0.7	1.1
PRIMARY PROCESSING						
BASELINE	70.2	76.8	79.6	81.3	82.6	85.0
EASIER MONEY			80.1	83.7	83.5	86.4
DIFF			0.5	2.4	1.0	1.4
FEDERAL TAX RECEIPTS (\$ BIL.)						
BASELINE	286.5	328.9	361.0	408.4	455.7	512.2
EASIER MONEY			364.9	419.6	465.8	525.2
DIFF			3.9	11.2	10.1	12.9
% DIFF			1.1	2.7	2.2	2.5
FEDERAL BUDGET SURPLUS (NIA) (\$ BIL.)						
BASELINE	-71.3	-58.4	-64.2	-55.7	-45.1	-26.7
EASIER MONEY			-60.1	-43.9	-35.2	-13.7
DIFF			4.2	11.8	9.9	12.9
% DIFF			6.5	21.2	21.9	48.5
MONEY AND INTEREST RATES						

NARROW MONEY SUPPLY (M1) (% CHG.)						
BASELINE	4.2	5.1	7.0	7.0	6.8	6.8
EASIER MONEY			8.0	8.0	7.0	7.0
DIFF			1.0	1.0	0.2	0.2
BROAD MONEY SUPPLY (M2) (% CHG.)						
BASELINE	7.7	9.7	11.0	10.8	11.0	10.6
EASIER MONEY			12.1	12.0	11.7	11.4
DIFF			1.1	1.2	0.7	0.8
FEDERAL FUNDS RATE (%)						
BASELINE	5.82	5.05	5.83	6.22	5.56	6.22
EASIER MONEY			3.90	5.98	3.46	5.59
DIFF			-1.94	-0.24	-2.10	-0.63
3-MONTH TREASURY BILLS (%)						
BASELINE	5.78	5.01	5.48	5.76	5.34	5.73
EASIER MONEY			4.08	5.71	3.85	5.36
DIFF			-1.41	-0.05	-1.49	-0.37
YIELD ON NEW ISSUES OF HIGH-GRADE CORP. BONDS (%)						
BASELINE	9.01	8.34	7.98	8.11	8.03	8.14
EASIER MONEY			7.81	8.23	8.03	8.29
DIFF			-0.17	0.12	0.00	0.15
VELOCITY (% CHG.)						
BASELINE	2.9	6.2	3.0	3.0	2.3	2.5
EASIER MONEY			2.8	3.1	1.8	2.6
DIFF			-0.4	0.2	-0.5	0.1

TABLE 10. - Continued

	75	76	77	78	79	80
INVESTMENT, CAPITAL FORMATION, AND						
POTENTIAL OUTPUT						
PLANT EXPENDITURES (BILS. OF 1972 \$'S)						
BASELINE	36.7	38.1	40.2	41.8	43.6	46.2
EASIER MONEY			40.4	42.3	43.9	46.6
DIFF			0.2	0.5	0.3	0.4
% DIFF			0.4	1.2	0.7	0.6
EQUIPMENT EXPENDITURES (BILS. OF 1972 \$'S)						
BASELINE	74.7	77.9	83.6	89.5	95.4	103.7
EASIER MONEY			83.9	91.6	97.5	106.1
DIFF			0.4	2.1	2.1	2.4
% DIFF			0.5	2.3	2.2	2.3
BUSINESS FIXED INVESTMENT (BILS. OF 1972 \$'S)						
BASELINE	111.4	116.0	123.8	131.3	139.1	149.9
EASIER MONEY			124.3	133.8	141.4	152.6
DIFF			0.6	2.6	2.4	2.7
% DIFF			0.4	2.0	1.7	1.8
GROSS PLANT (BILS. OF 1972 \$'S)						
BASELINE	903.7	918.7	935.4	953.5	972.7	993.9
EASIER MONEY			935.5	954.0	973.6	995.1
DIFF			0.1	0.6	0.9	1.2
% DIFF			0.0	0.1	0.1	0.1
GROSS EQUIPMENT (BILS. OF 1972 \$'S)						
BASELINE	812.3	839.1	869.8	904.8	943.0	986.7
EASIER MONEY			870.0	906.5	946.8	992.5
DIFF			0.2	1.8	3.8	5.8
% DIFF			0.0	0.2	0.4	0.6
HOUSING STARTS (MILLIONS OF UNITS)						
BASELINE	1,163	1,543	1,802	1,795	1,910	2,058
EASIER MONEY			1,958	1,746	2,065	2,108
DIFF			0,156	0,151	0,155	0,049
% DIFF			8.6	8.4	8.1	2.4
CAPITAL STOCK OF HOMES (MILLIONS OF UNITS)						
BASELINE	74.78	75.69	76.90	78.13	79.42	80.85
EASIER MONEY			76.99	78.41	79.80	81.34
DIFF			0.08	0.28	0.38	0.49
% DIFF			0.1	0.4	0.5	0.6
REGISTRATION OF CARS (MILLIONS OF UNITS)						
BASELINE	106.9	110.2	112.9	115.6	118.6	121.8
EASIER MONEY			112.9	115.7	118.6	121.6
DIFF			0.1	0.1	-0.0	-0.2
% DIFF			0.1	0.1	-0.0	-0.2
CAPITAL STOCK OF HOUSEHOLDS (BILS. OF \$'S)						
BASELINE	3534.6	3868.2	4240.8	4622.9	5009.7	5530.3
EASIER MONEY			4206.2	4666.1	5030.7	5604.9
DIFF			-34.6	43.2	21.0	74.6
% DIFF			-0.8	0.9	0.4	1.3
LABOR FORCE (MILLIONS OF PERSONS)						
BASELINE	92.7	94.8	97.1	98.8	100.6	102.3
EASIER MONEY			97.1	98.9	100.8	102.5
DIFF			0.0	0.1	0.2	0.2
% DIFF			0.0	0.1	0.2	0.2
AVERAGE PRODUCTIVITY (% CHG.)						
BASELINE	-8.7	8.3	5.7	6.0	4.5	5.8
EASIER MONEY			6.2	6.0	5.8	6.4
DIFF			0.5	2.0	1.3	0.5
POTENTIAL OUTPUT (BILS. OF 1972 \$'S)						
BASELINE	1365.4	1405.9	1447.8	1491.3	1536.9	1584.2
EASIER MONEY			1447.8	1491.8	1538.2	1586.2
DIFF			0.0	0.5	1.3	2.1
% DIFF			0.0	0.0	0.1	0.1

TABLE 10. - Continued

RATIOS	75	76	77	78	79	80

FEDERAL GOVERNMENT EXPENDITURES TO NOMINAL GNP (%)						
BASELINE	23.6	22.9	22.8	22.6	22.3	21.9
EASIER MONEY			22.6	22.2	22.0	21.6
DIFF			+0.2	+0.4	+0.3	+0.3
GAP (POTENTIAL LESS ACTUAL GNP) (BIL. OF 1972 \$'S)						
BASELINE	173.8	141.0	122.1	103.7	93.3	76.6
EASIER MONEY			115.2	84.4	81.8	64.0
DIFF			+6.8	+19.3	+11.5	+12.6
% DIFF			+5.6	+18.6	+12.6	+16.4
GROSS EFFECTIVE CAPITAL STOCK TO REAL GNP (%)						
BASELINE	142.0	136.8	133.8	131.3	129.8	128.3
EASIER MONEY			133.1	129.6	124.0	127.5
DIFF			+0.7	+1.7	+0.8	+0.8
NET CAPITAL STOCK TO REAL GNP (%)						
BASELINE	84.8	81.3	79.3	77.7	76.9	76.2
EASIER MONEY			78.9	78.8	76.6	75.9
DIFF			+0.4	+0.9	+0.4	+0.3
GROSS CAPITAL STOCK OF POLLUTION ABATEMENT EXPEND. TO REAL GNP (%)						
BASELINE	2.3	2.6	2.8	3.1	3.4	3.6
EASIER MONEY			2.8	3.1	3.4	3.6
DIFF			+0.0	+0.0	+0.0	+0.0
REAL BUSINESS FIXED INVESTMENT TO REAL GNP (%)						
BASELINE	9.35	9.17	9.34	9.46	9.63	9.94
EASIER MONEY			9.33	9.51	9.71	10.03
DIFF			+0.01	0.05	0.08	0.08
REAL BUSINESS FIXED INVESTMENT LESS POLLUTION ABATEMENT EXPENDS. TO REAL GNP (%)						
BASELINE	8.93	8.75	8.91	8.99	9.16	9.48
EASIER MONEY			8.90	9.05	9.24	9.56
DIFF			+0.00	0.05	0.08	0.09

TABLE 11. Capital Formation and U.S. Economic Performance:
 "Baseline" and "Personal Tax Cuts and Easier Money" Solutions

	75	76	77	78	79	80
ECONOMY						

REAL GNP (% CHG.)						
BASELINE	-1.8	6.1	4.8	4.7	4.0	4.4
TAX CUTS & EASY MONEY			5.5	6.8	4.9	3.7
DIFF			0.7	2.1	0.9	-0.7
UNEMPLOYMENT RATE (%)						
BASELINE	8.5	7.7	7.3	6.4	6.1	5.5
TAX CUTS & EASY MONEY			7.2	5.7	5.0	4.5
DIFF			-0.1	-0.7	-1.0	-1.0
INFLATION (% CHG.)						
GNP DEFLATOR						
BASELINE	9.2	5.1	5.2	5.3	5.1	4.8
TAX CUTS & EASY MONEY			5.3	5.6	5.7	5.6
DIFF			0.1	0.3	0.6	0.8
MPI						
BASELINE	9.3	4.3	5.0	5.3	5.1	4.9
TAX CUTS & EASY MONEY			5.2	6.3	6.3	6.3
DIFF			0.2	1.0	1.2	1.4
CPI						
BASELINE	9.2	5.7	5.0	5.2	4.8	4.9
TAX CUTS & EASY MONEY			5.1	5.5	5.5	5.7
DIFF			0.0	0.3	0.6	0.8
AVG. HOURLY EARNINGS						
BASELINE	8.9	7.2	6.8	6.7	6.6	6.6
TAX CUTS & EASY MONEY			6.8	7.0	7.2	7.6
DIFF			0.0	0.2	0.6	1.0
CAPACITY UTILIZATION (%)						
ALL MANUFACTURING						
BASELINE	68.7	72.9	75.3	77.7	78.7	79.5
TAX CUTS & EASY MONEY			75.8	80.6	81.9	82.4
DIFF			0.5	3.0	3.2	2.8
PRIMARY PROCESSING						
BASELINE	70.2	76.8	79.6	81.3	82.6	85.0
TAX CUTS & EASY MONEY			80.2	84.9	86.4	88.3
DIFF			0.7	3.6	3.8	3.4
FEDERAL TAX RECEIPTS (\$ BILS.)						
BASELINE	286.5	328.9	361.0	408.4	455.7	512.2
TAX CUTS & EASY MONEY			362.2	434.2	439.3	499.3
DIFF			1.2	4.2	-16.4	-13.0
% DIFF			0.3	-1.0	-3.6	-2.5
FEDERAL BUDGET SURPLUS (NIA) (\$ BILS.)						
BASELINE	-71.3	-58.4	-64.2	-55.7	-45.1	-26.7
TAX CUTS & EASY MONEY			-62.7	-59.6	-61.3	-40.8
DIFF			1.5	-3.3	-16.1	-14.1
% DIFF			2.4	-5.9	-35.7	-52.9
MONEY AND INTEREST RATES						

NARROW MONEY SUPPLY (M1) (% CHG.)						
BASELINE	4.2	5.1	7.0	7.0	6.8	6.8
TAX CUTS & EASY MONEY			8.2	9.2	8.8	6.7
DIFF			1.7	2.2	2.0	-0.1
BROAD MONEY SUPPLY (M2) (% CHG.)						
BASELINE	7.7	9.7	11.0	10.8	11.0	10.6
TAX CUTS & EASY MONEY			12.2	12.6	12.8	11.1
DIFF			1.2	1.8	1.8	0.5
FEDERAL FUNDS RATE (%)						
BASELINE	5.82	5.05	5.83	6.22	5.56	6.22
TAX CUTS & EASY MONEY			4.04	6.36	3.63	6.98
DIFF			-1.80	0.14	-1.93	0.76
3-MONTH TREASURY BILLS (%)						
BASELINE	5.78	5.01	5.48	5.76	5.34	5.73
TAX CUTS & EASY MONEY			4.19	5.94	4.04	6.40
DIFF			-1.29	0.18	-1.30	0.67
YIELD ON NEW ISSUES OF HIGH-GRADE CORP. BONDS (%)						
BASELINE	9.01	8.34	7.98	8.11	8.03	8.14
TAX CUTS & EASY MONEY			7.81	8.20	8.12	8.76
DIFF			-0.17	0.09	0.10	0.63
VELOCITY (% CHG.)						
BASELINE	2.9	6.2	3.0	3.0	2.3	2.5
TAX CUTS & EASY MONEY			2.7	3.2	1.9	2.7
DIFF			-0.3	0.3	-0.4	0.2

TABLE 11. - Continued

	75	76	77	78	79	80
INVESTMENT, CAPITAL FORMATION, AND						
POTENTIAL OUTPUT						
PLANT EXPENDITURES (BILS. OF 1972 \$'S)						
BASELINE	36.7	38.1	40.2	41.8	43.6	46.2
TAX CUTS & EASY MONEY			40.4	42.5	44.6	47.1
DIFF			0.2	0.8	1.0	0.9
% DIFF			0.5	1.8	2.2	2.0
EQUIPMENT EXPENDITURES (BILS. OF 1972 \$'S)						
BASELINE	74.7	77.9	83.6	89.5	95.4	103.7
TAX CUTS & EASY MONEY			84.0	92.1	99.0	107.1
DIFF			0.4	2.6	3.6	3.4
% DIFF			0.5	2.9	3.8	3.3
BUSINESS FIXED INVESTMENT (BILS. OF 1972 \$'S)						
BASELINE	111.4	116.0	123.8	131.3	139.1	149.9
TAX CUTS & EASY MONEY			124.4	134.6	143.6	154.3
DIFF			0.6	3.4	4.6	4.4
% DIFF			0.5	2.6	3.3	2.9
GROSS PLANT (BILS. OF 1972 \$'S)						
BASELINE	903.7	918.7	935.4	953.5	972.7	993.9
TAX CUTS & EASY MONEY			935.5	954.2	974.3	996.5
DIFF			0.1	0.7	1.6	2.6
% DIFF			0.0	0.1	0.2	0.3
GROSS EQUIPMENT (BILS. OF 1972 \$'S)						
BASELINE	812.3	839.1	869.8	904.8	943.0	986.7
TAX CUTS & EASY MONEY			870.0	906.9	948.4	995.5
DIFF			0.2	2.1	5.4	8.8
% DIFF			0.0	0.2	0.6	0.9
HOUSING STARTS (MILLIONS OF UNITS)						
BASELINE	1.163	1.543	1.802	1.795	1.910	2.058
TAX CUTS & EASY MONEY			1.956	1.973	2.160	2.070
DIFF			0.153	0.179	0.251	0.011
% DIFF			8.5	10.0	13.1	0.6
CAPITAL STOCK OF HOMES (MILLIONS OF UNITS)						
BASELINE	74.78	75.69	76.90	78.13	79.42	80.85
TAX CUTS & EASY MONEY			76.99	78.43	79.90	81.44
DIFF			0.08	0.31	0.48	0.59
% DIFF			0.1	0.4	0.6	0.7
REGISTRATION OF CARS (MILLIONS OF UNITS)						
BASELINE	106.9	110.2	112.9	115.6	118.6	121.8
TAX CUTS & EASY MONEY			113.0	116.1	119.3	122.4
DIFF			0.1	0.4	0.7	0.6
% DIFF			0.1	0.4	0.6	0.5
CAPITAL STOCK OF HOUSEHOLDS (BILS. OF \$'S)						
BASELINE	3534.6	3868.2	4240.8	4622.9	5009.7	5530.3
TAX CUTS & EASY MONEY			4208.3	4672.8	5059.3	5719.7
DIFF			-32.5	49.9	49.7	189.4
% DIFF			-0.8	1.1	1.0	3.4
LABOR FORCE (MILLIONS OF PERSONS)						
BASELINE	92.7	94.8	97.1	98.8	100.6	102.3
TAX CUTS & EASY MONEY			97.1	98.9	101.0	102.9
DIFF			0.0	0.1	0.4	0.6
% DIFF			0.0	0.1	0.4	0.6
AVERAGE PRODUCTIVITY (% CHG.)						
BASELINE	-8.7	8.3	5.7	6.0	4.5	5.8
TAX CUTS & EASY MONEY			6.3	9.3	4.9	5.6
DIFF			0.6	3.3	0.5	-0.2
POTENTIAL OUTPUT (BILS. OF 1972 \$'S)						
BASELINE	1365.4	1405.9	1447.8	1491.3	1536.9	1584.2
TAX CUTS & EASY MONEY			1447.8	1491.2	1538.7	1587.5
DIFF			0.0	0.6	1.8	3.3
% DIFF			0.0	0.0	0.1	0.2

TABLE 11. - Continued

RATIOS	75	76	77	78	79	80
FEDERAL GOVERNMENT EXPENDITURES TO NOMINAL GNP (%)						
BASELINE	23.6	22.9	22.8	22.6	22.3	21.9
TAX CUTS & EASY MONEY			22.6	21.9	21.3	21.0
DIFF			-0.2	-0.7	-1.0	-0.9
GAP (POTENTIAL LESS ACTUAL GAP) (BILLS. OF 1972 \$'S)						
BASELINE	173.8	141.0	122.1	103.7	93.3	76.6
TAX CUTS & EASY MONEY			112.9	66.0	43.2	36.6
DIFF			-9.2	-37.7	-50.1	-40.0
X DIFF			-7.5	-36.4	-53.7	-52.3
GROSS EFFECTIVE CAPITAL STOCK TO REAL GNP (%)						
BASELINE	142.0	136.8	133.8	131.3	129.8	128.3
TAX CUTS & EASY MONEY			132.9	128.0	125.8	125.4
DIFF			-0.9	-3.3	-4.0	-2.9
NET CAPITAL STOCK TO REAL GNP (%)						
BASELINE	84.8	81.3	79.3	77.7	76.9	76.2
TAX CUTS & EASY MONEY			78.7	75.9	74.7	74.8
DIFF			-0.5	-1.9	-2.2	-1.5
GROSS CAPITAL STOCK OF POLLUTION ABATEMENT EXPEND. TO REAL GNP (%)						
BASELINE	2.3	2.6	2.8	3.1	3.4	3.6
TAX CUTS & EASY MONEY			2.8	3.0	3.3	3.6
DIFF			-0.0	-0.1	-0.1	-0.1
REAL BUSINESS FIXED INVESTMENT TO REAL GNP (%)						
BASELINE	9.35	9.17	9.34	9.46	9.63	9.94
TAX CUTS & EASY MONEY			9.32	9.44	9.60	9.95
DIFF			-0.02	-0.02	-0.03	0.00
REAL BUSINESS FIXED INVESTMENT LESS POLLUTION ABATEMENT EXPENDS. TO REAL GNP (%)						
BASELINE	8.93	8.75	8.91	8.99	9.16	9.48
TAX CUTS & EASY MONEY			8.89	8.99	9.14	9.49
DIFF			-0.02	-0.01	-0.02	0.01

TABLE 12. Capital Formation and U.S. Economic Performance:
"Baseline" and "Tight Fiscal and Easier Money" Solutions

	75	76	77	78	79	80
ECONOMY						

REAL GNP (% CHG.)						
BASELINE						
TIGHT FISCAL & EASY MONEY	-1.8	6.1	4.6	4.7	4.0	4.4
DIFF			5.2	6.6	5.1	3.9
			0.4	1.9	1.1	-0.5
UNEMPLOYMENT RATE (%)						
BASELINE	8.5	7.7	7.3	6.4	6.1	5.5
TIGHT FISCAL & EASY MONEY			7.3	5.9	5.2	4.6
DIFF			-0.0	-0.6	-0.9	-0.9
INFLATION (% CHG.)						
GNP DEFLATOR						
BASELINE	9.2	5.1	5.2	5.3	5.1	4.8
TIGHT FISCAL & EASY MONEY			5.2	5.5	5.5	5.5
DIFF			0.1	0.2	0.5	0.7
WPI						
BASELINE	9.3	4.3	5.0	5.3	5.1	4.9
TIGHT FISCAL & EASY MONEY			5.2	6.1	6.0	6.1
DIFF			0.1	0.8	0.9	1.3
CPI						
BASELINE	9.2	5.7	5.0	5.2	4.8	4.9
TIGHT FISCAL & EASY MONEY			5.1	5.4	5.3	5.6
DIFF			0.0	0.2	0.5	0.7
AVG. HOURLY EARNINGS						
BASELINE	8.9	7.2	6.6	6.7	6.6	6.6
TIGHT FISCAL & EASY MONEY			6.8	6.9	7.0	7.4
DIFF			0.0	0.2	0.5	0.8
CAPACITY UTILIZATION (%)						
ALL MANUFACTURING						
BASELINE	68.7	72.9	75.3	77.7	78.7	79.5
TIGHT FISCAL & EASY MONEY			75.4	80.0	81.5	82.2
DIFF			0.1	2.3	2.8	2.7
PRIMARY PROCESSING						
BASELINE	70.2	76.8	79.6	81.3	82.6	85.0
TIGHT FISCAL & EASY MONEY			80.1	84.6	86.3	88.4
DIFF			0.5	3.3	3.8	3.5
FEDERAL TAX RECEIPTS (\$ BILLS)						
BASELINE	286.5	328.9	361.0	408.4	455.7	512.2
TIGHT FISCAL & EASY MONEY			360.1	399.2	433.9	493.5
DIFF			-0.9	-9.2	-21.8	-18.7
% DIFF			-0.2	-2.2	-4.8	-3.7
FEDERAL BUDGET SURPLUS (MIA) (\$ BILLS)						
BASELINE	-71.3	+58.4	+64.2	+55.7	+45.1	+26.7
TIGHT FISCAL & EASY MONEY			+59.8	+53.8	+55.8	+34.6
DIFF			4.4	1.9	-10.6	+8.2
% DIFF			6.8	3.5	-23.5	+30.7
MONEY AND INTEREST RATES						

NARROW MONEY SUPPLY (M1) (% CHG.)						
BASELINE	4.2	5.1	7.0	7.0	6.8	6.8
TIGHT FISCAL & EASY MONEY			8.2	9.2	8.8	6.8
DIFF			1.2	2.2	2.0	-0.0
BROAD MONEY SUPPLY (M2) (% CHG.)						
BASELINE	7.7	9.7	11.0	10.8	11.0	10.6
TIGHT FISCAL & EASY MONEY			12.4	12.9	13.0	11.4
DIFF			1.3	2.0	2.0	0.8
FEDERAL FUNDS RATE (%)						
BASELINE	5.82	5.05	5.83	6.22	5.56	6.22
TIGHT FISCAL & EASY MONEY			3.80	5.65	3.33	6.17
DIFF			-2.23	-0.57	-2.22	-0.05
3-MONTH TREASURY HILLS (%)						
BASELINE	5.78	5.01	5.48	5.76	5.34	5.73
TIGHT FISCAL & EASY MONEY			3.86	5.42	3.86	5.82
DIFF			-1.62	-0.34	-1.49	0.09
YIELD ON NEW ISSUES OF HIGH-GRADE CORP. BONDS (%)						
BASELINE	9.01	8.34	7.98	8.11	8.03	8.14
TIGHT FISCAL & EASY MONEY			7.74	8.04	7.97	8.54
DIFF			-0.24	-0.07	-0.05	0.40
VELOCITY (% CHG.)						
BASELINE	2.9	6.2	3.0	3.0	2.3	2.5
TIGHT FISCAL & EASY MONEY			2.3	2.9	1.9	2.6
DIFF			-0.7	-0.0	-0.4	0.2

TABLE 12. - Continued

	75	76	77	78	79	80
INVESTMENT, CAPITAL FORMATION, AND						
POTENTIAL OUTPUT						
PLANT EXPENDITURES						
(BILS. OF 1972 \$'S)						
BASELINE	36.7	38.1	40.2	41.8	43.6	46.2
TIGHT FISCAL & EASY MONEY			40.4	42.5	44.6	47.2
DIFF			0.2	0.7	1.0	1.0
X DIFF			0.5	1.8	2.3	2.2
EQUIPMENT EXPENDITURES						
(BILS. OF 1972 \$'S)						
BASELINE	74.7	77.9	83.6	89.5	95.4	103.7
TIGHT FISCAL & EASY MONEY			84.0	92.2	99.8	108.7
DIFF			0.4	2.7	4.3	5.0
X DIFF			0.5	3.1	4.6	4.8
BUSINESS FIXED INVESTMENT						
(BILS. OF 1972 \$'S)						
BASELINE	111.4	116.0	123.8	131.3	139.1	149.0
TIGHT FISCAL & EASY MONEY			124.4	134.8	144.0	155.9
DIFF			0.6	3.5	5.3	6.0
X DIFF			0.5	2.7	3.8	4.0
GROSS PLANT (BILS. OF 1972 \$'S)						
BASELINE	903.7	918.7	935.4	953.5	972.7	993.9
TIGHT FISCAL & EASY MONEY			935.5	954.2	974.3	996.5
DIFF			0.1	0.7	1.6	2.7
X DIFF			0.0	0.1	0.2	0.3
GROSS EQUIPMENT (BILS. OF 1972 \$'S)						
BASELINE	812.3	839.1	869.8	904.8	943.0	986.7
TIGHT FISCAL & EASY MONEY			870.0	907.0	949.0	997.4
DIFF			0.2	2.2	6.0	10.7
X DIFF			0.0	0.2	0.6	1.1
HOUSING STARTS						
(MILLIONS OF UNITS)						
BASELINE	1,163	1,543	1,802	1,795	1,910	2,058
TIGHT FISCAL & EASY MONEY			1,994	2,035	2,227	2,114
DIFF			0,191	0,240	0,317	0,058
X DIFF			10.6	13.4	16.6	2.8
CAPITAL STOCK OF HOMES						
(MILLIONS OF UNITS)						
BASELINE	74.78	75.69	76.90	78.13	79.42	80.85
TIGHT FISCAL & EASY MONEY			77.01	78.51	80.04	81.63
DIFF			0.11	0.38	0.62	0.78
X DIFF			0.1	0.5	0.8	1.0
REGISTRATION OF CARS						
(MILLIONS OF UNITS)						
BASELINE	106.9	110.2	112.9	115.6	118.6	121.8
TIGHT FISCAL & EASY MONEY			112.9	116.0	119.2	122.2
DIFF			0.1	0.4	0.6	0.4
X DIFF			0.1	0.3	0.5	0.4
CAPITAL STOCK OF HOUSEHOLDS						
(BILS. OF \$'S)						
BASELINE	3534.6	3868.2	4200.6	4622.9	5009.7	5530.3
TIGHT FISCAL & EASY MONEY			4200.0	4660.2	5058.3	5701.9
DIFF			-39.0	37.3	48.6	171.6
X DIFF			-0.9	0.8	1.0	3.1
LABOR FORCE						
(MILLIONS OF PERSONS)						
BASELINE	92.7	94.8	97.1	98.8	100.6	102.3
TIGHT FISCAL & EASY MONEY			97.1	98.9	100.9	102.8
DIFF			-0.0	0.1	0.3	0.5
X DIFF			-0.0	0.1	0.3	0.5
AVERAGE PRODUCTIVITY (% CHG.)						
BASELINE	-8.7	8.3	5.7	6.0	4.5	5.8
TIGHT FISCAL & EASY MONEY			5.9	6.9	5.3	5.9
DIFF			0.2	3.0	0.8	0.0
POTENTIAL OUTPUT						
(BILS. OF 1972 \$'S)						
BASELINE	1365.4	1405.9	1447.8	1491.3	1536.9	1584.2
TIGHT FISCAL & EASY MONEY			1447.8	1491.8	1538.9	1588.0
DIFF			0.0	0.6	1.9	3.8
X DIFF			0.0	0.0	0.1	0.2

TABLE 12. - Continued

RATIOS	75	76	77	78	79	80

FEDERAL GOVERNMENT EXPENDITURES TO NOMINAL GNP (%)						
BASELINE	23.6	22.9	22.8	22.6	22.3	21.9
TIGHT FISCAL & EASY MONEY			22.8	21.5	21.0	20.7
DIFF			+0.4	-1.1	-1.3	-1.3
GAP (POTENTIAL LESS ACTUAL GNP) (BIL. OF 1972 \$'S)						
BASELINE	173.8	141.0	122.1	103.7	93.3	76.6
TIGHT FISCAL & EASY MONEY			117.4	78.2	48.7	39.9
DIFF			+4.7	+29.5	+44.6	+36.8
% DIFF			+3.8	+28.5	+47.8	+48.0
GROSS EFFECTIVE CAPITAL STOCK TO REAL GNP (%)						
BASELINE	142.0	136.8	133.8	131.3	129.8	128.3
TIGHT FISCAL & EASY MONEY			133.3	128.7	126.3	125.8
DIFF			+0.5	+2.6	+3.5	+2.5
NET CAPITAL STOCK TO REAL GNP (%)						
BASELINE	84.8	81.3	79.3	77.7	76.9	76.2
TIGHT FISCAL & EASY MONEY			79.0	76.3	75.0	75.0
DIFF			+0.3	+1.4	+1.9	+1.2
GROSS CAPITAL STOCK OF POLLUTION ABATEMENT EXPEND. TO REAL GNP (%)						
BASELINE	2.3	2.6	2.8	3.1	3.4	3.6
TIGHT FISCAL & EASY MONEY			2.8	3.0	3.3	3.6
DIFF			+0.0	+0.1	+0.1	+0.1
REAL BUSINESS FIXED INVESTMENT TO REAL GNP (%)						
BASELINE	9.35	9.17	9.34	9.46	9.63	9.98
TIGHT FISCAL & EASY MONEY			9.35	9.51	9.60	10.07
DIFF			0.01	0.04	0.06	0.13
REAL BUSINESS FIXED INVESTMENT LESS POLLUTION ABATEMENT EXPENDS. TO REAL GNP (%)						
BASELINE	8.93	8.75	8.91	8.99	9.16	9.48
TIGHT FISCAL & EASY MONEY			8.92	9.05	9.23	9.61
DIFF			0.01	0.05	0.07	0.13

TABLE 13. Capital Formation and U.S. Economic Performance:
"Baseline" and "Investment Tax Credit" Solutions

	75	76	77	78	79	80
ECONOMY						

REAL GNP (% CHG.)						
BASELINE	-1.8	6.1	4.8	4.7	4.0	4.4
INCREASED INVESTMENT TAX CREDIT			4.9	4.8	4.1	4.3
DIFF			0.1	0.1	0.0	-0.1
UNEMPLOYMENT RATE (%)						
BASELINE	8.5	7.7	7.3	6.4	6.1	5.5
INCREASED INVESTMENT TAX CREDIT			7.3	6.4	6.0	5.5
DIFF			-0.0	-0.1	-0.1	-0.0
INFLATION (% CHG.)						
GNP DEFLATOR						
BASELINE	9.2	5.1	5.2	5.3	5.1	4.8
INCREASED INVESTMENT TAX CREDIT			5.2	5.3	5.1	4.8
DIFF			-0.0	-0.0	0.0	0.0
WPI						
BASELINE	9.3	4.3	5.0	5.3	5.1	4.9
INCREASED INVESTMENT TAX CREDIT			5.1	5.3	5.1	4.9
DIFF			0.0	0.0	0.0	0.0
CPI						
BASELINE	9.2	5.7	5.0	5.2	4.8	4.9
INCREASED INVESTMENT TAX CREDIT			5.0	5.2	4.9	4.9
DIFF			0.0	0.0	0.0	0.0
AVG. HOURLY EARNINGS						
BASELINE	8.9	7.2	6.8	6.7	6.6	6.6
INCREASED INVESTMENT TAX CREDIT			6.8	6.7	6.6	6.7
DIFF			0.0	0.0	0.0	0.0
CAPACITY UTILIZATION (%)						
ALL MANUFACTURING						
BASELINE	68.7	72.9	75.3	77.7	78.7	79.5
INCREASED INVESTMENT TAX CREDIT			75.4	77.9	79.0	79.7
DIFF			0.1	0.3	0.3	0.1
PRIMARY PROCESSING						
BASELINE	70.2	76.8	79.6	81.3	82.6	85.0
INCREASED INVESTMENT TAX CREDIT			79.6	81.5	82.7	85.0
DIFF			0.0	0.2	0.2	-0.0
FEDERAL TAX RECEIPTS (% BIL.)						
BASELINE	286.5	328.9	361.0	408.4	455.7	512.2
INCREASED INVESTMENT TAX CREDIT			359.1	407.1	454.5	510.4
DIFF			-1.9	-1.3	-1.3	-1.9
% DIFF			-0.5	-0.3	-0.3	-0.4
FEDERAL BUDGET SURPLUS (MIA) (% BIL.)						
BASELINE	-71.3	-58.4	-64.2	-55.7	-45.1	-26.7
INCREASED INVESTMENT TAX CREDIT			-66.1	-57.0	-46.4	-28.8
DIFF			-1.9	-1.3	-1.3	-2.1
% DIFF			-2.9	-2.3	-2.9	-7.9
MONEY AND INTEREST RATES						

NARROW MONEY SUPPLY (M1) (% CHG.)						
BASELINE	4.2	5.1	7.0	7.0	6.8	6.8
INCREASED INVESTMENT TAX CREDIT			7.1	7.1	6.9	6.8
DIFF			0.1	0.1	0.0	-0.0
BROAD MONEY SUPPLY (M2) (% CHG.)						
BASELINE	7.7	9.7	11.0	10.8	11.0	10.6
INCREASED INVESTMENT TAX CREDIT			11.1	10.9	10.9	10.5
DIFF			0.0	0.0	-0.1	-0.1
FEDERAL FUNDS RATE (%)						
BASELINE	5.82	5.05	5.83	6.22	5.56	6.22
INCREASED INVESTMENT TAX CREDIT			5.86	5.37	5.84	6.48
DIFF			0.02	0.15	0.29	0.26
3-MONTH TREASURY BILLS (%)						
BASELINE	5.78	5.01	5.48	5.76	5.34	5.73
INCREASED INVESTMENT TAX CREDIT			5.51	5.87	5.53	5.90
DIFF			0.03	0.11	0.19	0.17
YIELD ON NEW ISSUES OF HIGH-GRADE CORP. BONDS (%)						
BASELINE	9.01	8.54	7.98	8.11	8.03	8.14
INCREASED INVESTMENT TAX CREDIT			7.99	8.12	8.05	8.18
DIFF			0.01	0.01	0.03	0.04
VELOCITY (% CHG.)						
BASELINE	2.9	6.2	3.0	3.0	2.3	2.5
INCREASED INVESTMENT TAX CREDIT			3.0	3.0	2.3	2.4
DIFF			0.0	0.0	-0.0	-0.1

TABLE 13. - Continued

	75	76	77	78	79	80
INVESTMENT, CAPITAL FORMATION, AND						
POTENTIAL OUTPUT						
PLANT EXPENDITURES (BILS. OF 1972 \$'S)						
BASELINE			40.2	41.8	43.6	46.2
INCREASED INVESTMENT TAX CREDIT	36.7	38.1	39.9	41.5	43.4	46.0
DIFF			-0.3	-0.3	-0.2	-0.2
% DIFF			-0.7	-0.7	-0.4	-0.5
EQUIPMENT EXPENDITURES (BILS. OF 1972 \$'S)						
BASELINE			83.6	89.5	95.4	103.7
INCREASED INVESTMENT TAX CREDIT	74.7	77.9	84.4	91.7	98.7	107.1
DIFF			0.9	2.2	3.2	3.4
% DIFF			1.0	2.5	3.4	3.3
BUSINESS FIXED INVESTMENT (BILS. OF 1972 \$'S)						
BASELINE			123.8	131.3	139.1	149.9
INCREASED INVESTMENT TAX CREDIT	111.4	116.0	124.4	133.2	142.1	153.0
DIFF			0.6	1.9	3.0	3.1
% DIFF			0.5	1.5	2.2	2.1
GROSS PLANT (BILS. OF 1972 \$'S)						
BASELINE			935.4	953.5	972.7	993.9
INCREASED INVESTMENT TAX CREDIT	903.7	918.7	935.2	953.0	972.0	993.0
DIFF			-0.2	-0.5	-0.7	-0.9
% DIFF			-0.0	-0.1	-0.1	-0.1
GROSS EQUIPMENT (BILS. OF 1972 \$'S)						
BASELINE			869.8	904.8	943.0	986.7
INCREASED INVESTMENT TAX CREDIT	812.3	839.1	870.3	907.1	948.2	994.9
DIFF			0.5	2.4	5.2	8.2
% DIFF			0.1	0.3	0.6	0.8
HOUSEHOLD STABLES (MILLIONS OF UNITS)						
BASELINE			1,802	1,795	1,910	2,058
INCREASED INVESTMENT TAX CREDIT	1,163	1,563	1,803	1,786	1,883	2,030
DIFF			0.000	-0.008	-0.027	-0.028
% DIFF			0.0	-0.5	-1.4	-1.4
CAPITAL STOCK OF HOMES (MILLIONS OF UNITS)						
BASELINE			76.90	78.13	79.42	80.85
INCREASED INVESTMENT TAX CREDIT	74.78	75.69	76.90	78.12	79.39	80.80
DIFF			0.00	-0.00	-0.03	-0.05
% DIFF			0.0	-0.0	-0.0	-0.1
REGISTRATION OF CARS (MILLIONS OF UNITS)						
BASELINE			112.9	115.6	118.6	121.8
INCREASED INVESTMENT TAX CREDIT	106.9	110.2	112.9	115.6	118.7	121.9
DIFF			0.0	0.0	0.0	0.1
% DIFF			0.0	0.0	0.0	0.0
CAPITAL STOCK OF HOUSEHOLDS (BILS. OF \$'S)						
BASELINE			4240.8	4622.9	5009.7	5530.3
INCREASED INVESTMENT TAX CREDIT	3534.6	3868.2	4241.1	4626.5	5015.8	5534.2
DIFF			0.3	3.6	6.1	3.9
% DIFF			0.0	0.1	0.1	0.1
LABOR FORCE (MILLIONS OF PERSONS)						
BASELINE			97.1	98.8	100.6	102.3
INCREASED INVESTMENT TAX CREDIT	92.7	94.8	97.1	98.8	100.6	102.3
DIFF			0.0	0.0	0.0	0.0
% DIFF			0.0	0.0	0.0	0.0
AVERAGE PRODUCTIVITY (% CHG.)						
BASELINE			5.7	6.0	4.5	5.8
INCREASED INVESTMENT TAX CREDIT	70.7	8.3	5.9	6.2	4.6	5.7
DIFF			0.1	0.3	0.1	-0.1
POTENTIAL OUTPUT (BILS. OF 1972 \$'S)						
BASELINE			1447.8	1491.3	1536.9	1584.2
INCREASED INVESTMENT TAX CREDIT	1365.4	1405.9	1447.8	1491.7	1538.1	1586.3
DIFF			0.0	0.4	1.2	2.1
% DIFF			0.0	0.0	0.1	0.1

TABLE 13. - Continued

	75	76	77	78	79	80
RATIOS						
FEDERAL GOVERNMENT EXPENDITURES TO NOMINAL GNP (%)						
BASELINE	23.6	22.9	22.8	22.6	22.3	21.9
INCREASED INVESTMENT TAX CREDIT			22.8	22.5	22.2	21.9
DIFF			-0.0	-0.0	-0.1	-0.0
GAP (POTENTIAL LESS ACTUAL GAP) (BIL. OF 1972 \$'S)						
BASELINE	173.8	141.0	122.1	103.7	93.3	76.6
INCREASED INVESTMENT TAX CREDIT			121.0	101.2	91.3	76.7
DIFF			-1.1	-2.5	-2.0	0.1
% DIFF			-0.9	-2.4	-2.2	0.1
GROSS EFFECTIVE CAPITAL STOCK TO REAL GNP (%)						
BASELINE	142.0	136.8	133.8	131.3	129.8	128.3
INCREASED INVESTMENT TAX CREDIT			133.7	131.2	129.9	128.6
DIFF			-0.1	-0.1	0.0	0.3
NET CAPITAL STOCK TO REAL GNP (%)						
BASELINE	84.8	81.3	79.3	77.7	76.9	76.2
INCREASED INVESTMENT TAX CREDIT			79.2	77.7	77.0	76.5
DIFF			-0.0	-0.0	0.1	0.3
GROSS CAPITAL STOCK OF POLLUTION ABATEMENT EXPEND. TO REAL GNP (%)						
BASELINE	2.3	2.6	2.8	3.1	3.4	3.6
INCREASED INVESTMENT TAX CREDIT			2.8	3.1	3.4	3.6
DIFF			-0.0	-0.0	-0.0	0.0
REAL BUSINESS FIXED INVESTMENT TO REAL GNP (%)						
BASELINE	9.35	9.17	9.34	9.46	9.63	9.94
INCREASED INVESTMENT TAX CREDIT			9.37	9.58	9.82	10.14
DIFF			0.04	0.12	0.19	0.19
REAL BUSINESS FIXED INVESTMENT LESS POLLUTION ABATEMENT EXPENDS. TO REAL GNP (%)						
BASELINE	8.93	8.75	8.91	8.99	9.16	9.48
INCREASED INVESTMENT TAX CREDIT			8.94	9.11	9.35	9.67
DIFF			0.04	0.12	0.19	0.19

TABLE 14. Capital Formation and U.S. Economic Performance:
"Baseline" and "Corporate Profits Tax Reduction" Solutions

	75	76	77	78	79	80
ECONOMY						

REAL GNP (% CHG.)						
BASLINE						
CORPORATE PROFITS TAX REDUCTION	4.8	6.1	4.8	4.7	4.0	4.4
DIFF			0.0	0.1	-0.0	-0.1
UNEMPLOYMENT RATE (%)						
BASLINE						
CORPORATE PROFITS TAX REDUCTION	8.5	7.7	7.3	6.4	6.1	5.5
DIFF			-0.0	-0.0	-0.0	0.0
INFLATION (% CHG.)						
GNP DEFLATOR						
BASLINE						
CORPORATE PROFITS TAX REDUCTION	9.2	5.1	5.2	5.3	5.1	4.8
DIFF			-0.0	-0.0	-0.0	-0.0
MPI						
BASLINE						
CORPORATE PROFITS TAX REDUCTION	9.3	4.3	5.0	5.3	5.1	4.9
DIFF			-0.0	-0.0	0.0	-0.0
CPI						
BASLINE						
CORPORATE PROFITS TAX REDUCTION	9.2	5.7	5.0	5.2	4.8	4.9
DIFF			-0.0	0.0	0.0	-0.0
AVG. HOURLY EARNINGS						
BASLINE						
CORPORATE PROFITS TAX REDUCTION	6.9	7.2	6.8	6.7	6.6	6.6
DIFF			-0.0	0.0	0.0	-0.0
CAPACITY UTILIZATION (%)						
ALL MANUFACTURING						
BASLINE						
CORPORATE PROFITS TAX REDUCTION	68.7	72.9	75.3	77.7	78.7	79.5
DIFF			0.0	0.2	0.2	0.0
PRIMARY PROCESSING						
BASLINE						
CORPORATE PROFITS TAX REDUCTION	70.2	76.8	79.6	81.3	82.6	85.0
DIFF			0.0	0.1	0.0	-0.2
FEDERAL TAX RECEIPTS						
(\$ BIL.)						
BASLINE						
CORPORATE PROFITS TAX REDUCTION	286.5	328.9	361.0	406.4	455.7	512.2
DIFF			-4.8	-10.1	-11.0	-12.5
% DIFF			-1.3	-2.5	-2.4	-2.4
FEDERAL BUDGET SURPLUS (MIA)						
(\$ BIL.)						
BASLINE						
CORPORATE PROFITS TAX REDUCTION	-71.3	-58.4	-64.2	-55.7	-45.1	-26.7
DIFF			-6.0	-6.7	-5.2	-39.6
% DIFF			-0.8	-10.0	-11.1	-12.9
			-7.5	-17.9	-24.5	-48.4
MONEY AND INTEREST RATES						

NARROW MONEY SUPPLY (M1) (% CHG.)						
BASLINE						
CORPORATE PROFITS TAX REDUCTION	4.2	5.1	7.0	7.0	6.8	6.8
DIFF			-0.0	0.1	0.0	-0.0
BROAD MONEY SUPPLY (M2) (% CHG.)						
BASLINE						
CORPORATE PROFITS TAX REDUCTION	7.7	9.7	11.0	10.8	11.0	10.6
DIFF			0.0	0.0	-0.0	-0.1
FEDERAL FUNDS RATE (%)						
BASLINE						
CORPORATE PROFITS TAX REDUCTION	5.82	5.05	5.83	6.22	5.56	6.22
DIFF			-0.01	0.06	0.23	0.30
3-MONTH TREASURY BILLS (%)						
BASLINE						
CORPORATE PROFITS TAX REDUCTION	5.78	5.01	5.46	5.76	5.34	5.73
DIFF			0.02	0.08	0.17	0.21
YIELD ON NEW ISSUES OF HIGH-GRADE CORP. BONDS (%)						
BASLINE						
CORPORATE PROFITS TAX REDUCTION	9.01	8.34	7.98	8.11	8.03	8.14
DIFF			0.01	-0.01	-0.03	-0.03
VELOCITY (% CHG.)						
BASLINE						
CORPORATE PROFITS TAX REDUCTION	2.9	6.2	3.0	3.0	2.3	2.5
DIFF			0.0	0.0	-0.1	-0.1

TABLE 14. - Continued

	75	76	77	78	79	80
INVESTMENT, CAPITAL FORMATION, AND						
POTENTIAL OUTPUT						
PLANT EXPENDITURES (BILS. OF 1972 \$'S)						
BASELINE	36.7	38.1	40.2	41.8	43.6	46.2
CORPORATE PROFITS TAX REDUCTION			40.5	42.3	43.9	46.2
DIFF			0.3	0.5	0.3	0.0
% DIFF			0.7	1.3	0.7	0.1
EQUIPMENT EXPENDITURES (BILS. OF 1972 \$'S)						
BASELINE	74.7	77.9	83.6	89.5	95.4	103.7
CORPORATE PROFITS TAX REDUCTION			84.0	91.1	98.0	106.3
DIFF			0.4	1.6	2.5	2.6
% DIFF			0.5	1.8	2.7	2.5
BUSINESS FIXED INVESTMENT (BILS. OF 1972 \$'S)						
BASELINE	111.4	116.0	123.8	131.3	139.1	149.9
CORPORATE PROFITS TAX REDUCTION			124.5	133.4	141.9	152.6
DIFF			0.7	2.1	2.8	2.7
% DIFF			0.6	1.6	2.0	1.8
GROSS PLANT (BILS. OF 1972 \$'S)						
BASELINE	903.7	918.7	935.4	953.5	972.7	993.0
CORPORATE PROFITS TAX REDUCTION			934.6	954.2	973.7	994.9
DIFF			0.2	0.7	1.0	1.1
% DIFF			0.0	0.1	0.1	0.1
GROSS EQUIPMENT (BILS. OF 1972 \$'S)						
BASELINE	612.3	639.1	669.8	704.6	743.0	786.7
CORPORATE PROFITS TAX REDUCTION			670.1	706.2	746.7	792.7
DIFF			0.2	1.4	3.7	6.1
% DIFF			0.0	0.2	0.4	0.8
HOUSING STARTS (MILLIONS OF UNITS)						
BASELINE	1.163	1.543	1.802	1.795	1.910	2.058
CORPORATE PROFITS TAX REDUCTION			1.767	1.716	1.821	1.975
DIFF			-0.040	-0.079	-0.089	-0.083
% DIFF			-2.2	-4.4	-4.7	-4.0
CAPITAL STOCK OF HOMES (MILLIONS OF UNITS)						
BASELINE	74.78	75.69	76.90	78.13	79.42	80.85
CORPORATE PROFITS TAX REDUCTION			76.87	78.03	79.24	80.59
DIFF			-0.03	-0.09	-0.17	-0.26
% DIFF			-0.0	-0.1	-0.2	-0.3
REGISTRATION OF CARS (MILLIONS OF UNITS)						
BASELINE	106.9	110.2	112.9	115.6	118.6	121.6
CORPORATE PROFITS TAX REDUCTION			112.9	115.6	118.7	122.0
DIFF			0.0	0.0	0.1	0.2
% DIFF			0.0	0.0	0.1	0.2
CAPITAL STOCK OF HOUSEHOLDS (BILS. OF \$'S)						
BASELINE	1534.6	3868.2	4240.8	4622.9	5009.7	5530.3
CORPORATE PROFITS TAX REDUCTION			4240.2	4623.4	5013.7	5534.4
DIFF			-0.6	0.6	4.0	4.1
% DIFF			-0.0	0.0	0.1	0.1
LABOR FORCE (MILLIONS OF PERSONS)						
BASELINE	92.7	98.8	97.1	98.8	100.6	102.3
CORPORATE PROFITS TAX REDUCTION			97.1	98.8	100.6	102.3
DIFF			0.0	0.0	0.0	0.0
% DIFF			0.0	0.0	0.0	0.0
AVERAGE PRODUCTIVITY (% CHG.)						
BASELINE	8.7	8.3	5.7	6.0	4.5	5.8
CORPORATE PROFITS TAX REDUCTION			4.6	6.1	4.5	5.7
DIFF			0.0	0.2	0.0	-0.2
POTENTIAL OUTPUT (BILS. OF 1972 \$'S)						
BASELINE	1365.0	1405.9	1447.8	1491.3	1536.9	1584.2
CORPORATE PROFITS TAX REDUCTION			1447.8	1491.7	1538.2	1586.3
DIFF			0.1	0.5	1.3	2.1
% DIFF			0.0	0.0	0.1	0.1

TABLE 14. - Continued

	75	76	77	78	79	80
PAYIDS						

FEDERAL GOVERNMENT EXPENDITURES TO NOMINAL GNP (%)						
BASELINE	23.6	22.9	22.8	22.6	22.3	21.9
CORPORATE PROFITS TAX REDUCTION			22.8	22.6	22.3	21.9
DIFF			-0.0	-0.0	-0.0	0.0
GAP (POTENTIAL LESS ACTUAL GNP) (BILS. OF 1972 \$'S)						
BASELINE	173.8	141.0	122.1	103.7	93.3	76.6
CORPORATE PROFITS TAX REDUCTION			121.8	102.8	93.6	79.2
DIFF			-0.3	-0.9	0.3	2.6
% DIFF			-0.2	-0.8	0.4	3.4
GROSS EFFECTIVE CAPITAL STOCK TO REAL GNP (%)						
BASELINE	142.0	136.8	133.8	131.3	129.8	128.3
CORPORATE PROFITS TAX REDUCTION			133.8	131.3	130.1	128.6
DIFF			-0.0	0.0	0.2	0.5
NET CAPITAL STOCK TO REAL GNP (%)						
BASELINE	84.8	81.3	79.3	77.7	76.9	76.2
CORPORATE PROFITS TAX REDUCTION			79.3	77.8	77.2	76.7
DIFF			0.0	0.1	0.3	0.5
GROSS CAPITAL STOCK OF POLLUTION ABATEMENT EXPEND. TO REAL GNP (%)						
BASELINE	2.3	2.6	2.8	3.1	3.4	3.6
CORPORATE PROFITS TAX REDUCTION			2.8	3.1	3.4	3.6
DIFF			-0.0	-0.0	0.0	0.0
REAL BUSINESS FIXED INVESTMENT TO REAL GNP (%)						
BASELINE	9.35	9.17	9.34	9.66	9.63	9.94
CORPORATE PROFITS TAX REDUCTION			9.39	9.60	9.82	10.12
DIFF			0.05	0.14	0.19	0.18
REAL BUSINESS FIXED INVESTMENT LESS POLLUTION ABATEMENT EXPENDS. TO REAL GNP (%)						
BASELINE	8.93	8.75	8.91	8.99	9.16	9.48
CORPORATE PROFITS TAX REDUCTION			8.96	9.14	9.35	9.66
DIFF			0.05	0.14	0.19	0.18

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MONETARY POLICY AND CAPITAL FORMATION

Jai-Hoon Yang*

The year 1776 gave birth not only to a great nation but also to a great book which shaped our science. In his Wealth of Nations, Adam Smith made growth in income the central explanandum of his inquiry and identified capital formation as the prime mover of growth in income. It is most fitting, therefore, that the subject matter of this conference in this bicentennial year of the Wealth of Nations is capital formation.

I do not believe, however, that the theme of this conference was chosen merely, or even primarily, to commemorate the bicentennial of the locus classicus of our science. The choice of the theme reflects, I believe, the widely held concern about the adequacy of capital formation.¹ The precise nature of the sources and significance for monetary policy of such concern, however, does not appear to be well delineated. Accordingly, the purpose of this paper is to provide a diagnosis of the sources of such concern and what such concern implies for the conduct of monetary policy.

¹For an expression of "official" concern, see Economic Report of the President, January, 1976, pp. 34-47. For a summary of diverse views, see the Introduction by Eli Shapiro and William L. White to Capital For Productivity and Jobs, edited by E. Shapiro and W. White (forthcoming, Prentice-Hall).

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The first section of the paper identifies the three analytically separable sources of the widespread concern about the adequacy of capital formation. The sources of concern are organized along the traditional dual roles that capital formation (or investment) play in augmenting productive capacity and generating income. The second section frames the issue associated with capital formation in an explicit intertemporal utility maximization paradigm. In such a paradigm, the issue of how, or even whether, to specify an aggregate utility functional looms paramount. The third section explores the possible role monetary policy may play in deepening the steady state capital intensity. This section draws liberally upon neoclassical monetary growth theory and the theory of money bearing on the technology of exchange.

Monetary policy would serve the cause of capital formation best by being directed toward the attainment of full capacity output. The implications of such a thrust of policy for the knowledge required to define an appropriate monetary policy will be considered later. A catalogue of unresolved issues is provided whose resolution is essential for improving the quality of advice given to the monetary policymakers. Much attention is devoted, in this section, to the different concepts of stabilization policy and the feasibility of discretionary stabilization policies. In the concluding section, the optimum monetary policy, in a world of costly information and possible "coordination failures," is identified as one which is systematically free of

policy innovations.² Such a "surprise-free" policy regime would minimize the risk of superimposing policy-induced shocks on non-policy shocks and enable the homeostatic capacity of the price system to respond more effectively to the changes in the non-policy sources of shocks. A brief discussion of the appropriate empirical proxy for such an ideal monetary policy concludes the paper.

Sources of Concern: A Diagnosis

The widespread concern with the recent and prospective pace of output growth and capital formation appears to have three analytically separable sources. The first source of concern is the possibility of not attaining capacity (full equilibrium) output. This failure may be attributable either to the emergence of a capital shortage-labor surplus economy (to be defined) due to the "putty-clay" nature of the capital stock, or to the emergence (and persistence) of an unemployment state due to the standard effective demand failure. Here the focus is on the income and employment generating function of investment, or with the role of capital formation in attaining the full employment objective.

How can the "putty-clay" nature of capital stock induce the emergence of a capital shortage-labor surplus economy? One can always explain such a possibility by resorting to the Keynesian labor supply function. A temporary excess supply of labor, or its dual, capital

²For the concept of "coordination failures," see Axel Leijonhufvud, "Effective Demand Failures," Swedish Journal of Economics, Vol. 75 (1973).

shortage, would emerge in response to a reduction in the capital stock, as such a reduction decreases the demand for labor.³ Of course, such a phenomenon would not persist unless the price level and the relative rental prices of factors do not adjust to eliminate the implied notional, excess demand for commodities.⁴ However, in a putty-clay world, one does not have to resort to this trivial Keynesian case. One gets the same theoretical result even with a classical labor supply function. The decline in the demand for labor (consequent to the reduction in the capital stock) in conjunction with fixed factor proportions in a Cobb-Douglas world would yield such a result.⁵ The key point to remember is that in such a world, the marginal product of labor is a function only of factor proportions and, hence, even in the

³Such a reduction in the capital stock may be induced by war or by an accelerated capital obsolescence or abandonment induced by unexpected changes in the relative prices of factor inputs, such as the energy input. In a putty-putty world, capital obsolescence, of course, could not occur.

⁴For the concept of notional excess demand, see R. Clower, "The Keynesian Counterrevolution: A Theoretical Appraisal," in The Theory of Interest Rates, edited by F. Hahn and F. Brechling (London: Macmillan & Co., Ltd., 1965).

⁵For theoretical discussions of the possible emergence of the unemployment state due to a shortage of capital in a putty-clay world, see Kenneth J. Arrow, "The Economic Implications of Learning by Doing," Review of Economic Studies (June 1962) and Leif Johanson, "Substitution versus Fixed Production Coefficients In the Theory of Economic Growth: A Synthesis," both reprinted in Readings in the Modern Theory of Economic Growth, edited by J. Stiglitz and H. Uzawa (M.I.T. Press, 1969); also R. Eckaus, "The Factor Proportion Problems in Underdeveloped Areas," American Economic Review (September 1955).

presence of an excess supply of labor, the real wage would not decline! The long-run adjustment would entail augmenting or replacing the capital stock with a capital stock embodying different technology.

A second source of concern with capital formation arises from its capacity-augmenting function. It derives from dissatisfaction with the full equilibrium capacity growth path generated by the decentralized market process. Here the actual (or prospective) capacity growth path is compared to some desired growth path. The determination of such a desired growth path may be based on some implicit criteria or, more formally, on the solution values of a full-blown multiperiod optimization problem involving the Ramsey-type functional,⁶

$$\int_0^T u_t(c, t) dt = \int_0^T F_t(K, \dot{K}, t) dt.$$

The market-determined growth path is often judged to be suboptimal or inconsistent with the target path, even when full employment is continuously maintained. Myopia, identified by Pigou as "defective telescopic faculty," is often singled out to explain why the market-determined equilibrium capital intensity stops short of the desired (deeper) capital intensity. The capital intensity associated with the

⁶For Ramsey Economics concerned with optimal economic growth, see S. Chakravarty, Capital and Development Planning, especially Chapters I - IV (M.I.T. Press, 1969) and the forward by Paul Samuelson; also M. Intriligator, Mathematical Optimization and Economic Theory, Chapter 16 (Prentice-Hall, 1971). For a discussion of a functional, which defines a real number for any given function defined over a domain, see R. G. D. Allen, Mathematical Analysis for Economists (St. Martin's Press, 1934).

golden rule of accumulation may be identified as the target intensity.⁷ In this paradigm, the "required" policy actions are envisioned as steering the economy toward a higher growth path of consumption at a cost of reduced consumptions during the transition periods. Given the impossibility theorem of Arrow regarding the derivation of consistent aggregate preference orderings, it is clear that the choice of the utility functional to be maximized poses a fundamental challenge to the solution of this "inappropriate equilibrium capital intensity" problem. The recent "capital shortage" controversy may be interpreted in this context as expressing the concern about the adequacy of saving to finance the "required" capital formation. The primary concern is about the potential "savings gap" as opposed to the (Keynesian) concern about the "investment gap" touched upon earlier.⁸

⁷ Along the golden rule balanced growth path, consumption per capita is maximum. See E. Phelps, "The Golden Rule of Accumulation," American Economic Review (September 1965) and J. Robinson, "A Neo-classical Theorem," Review of Economic Studies (June 1962).

⁸ There are two diametrically opposed approaches to viewing aggregate capital formation from a longer-run perspective. One is that of "optimization" or "utility-maximization" approach. Under this approach, aggregate capital formation is viewed as endogenous, that is, as the outcome of deliberate life-cycle consumption decisions made by the individual spending units in the economy, given their tastes and perceived market and productive opportunities. In this approach, the choice of future consumption paths and the current investment decisions are jointly and simultaneously made. The other approach is the "consistency" or "planning" approach. This approach underlies the recent concern for "capital shortage." Under this approach, the choice of a future consumption (and growth) path is made outside the market process, presumably by reference to some collective preference ordering. The "required" capital formation is then computed to achieve such a path. The concern for capital adequacy in this context is really for the concern for the potential "saving gap" to achieve the "required" capital formation and such a concern can arise only under the consistency (continued)

The third source of the recent concern with capital formation appears to be associated with the general realization that the size of current and prospective capacity output has fallen short of what was expected. This shortfall is due partly to those measures, such as increased regulatory constraints which tend to increase the capital-output ratio, and partly to those events, such as an increase in the relative price of energy, which accelerated obsolescence of existing capital stock.

The problem posed by this discovery appears to be essentially the same as the one associated with the second source discussed above. In both cases, capital formation is viewed as a problem involving intertemporal utility maximization by reshaping the time path of consumption. However, the urgency with which the problem is viewed may differ, inasmuch as the growth path is perceived to be permanently lower than that which was taken for granted earlier, in the absence of redoubled efforts at capital augmentation.

Intertemporal Choice and Equilibrium Capital Intensity

The concern for capital formation is a derived concern, that is, a concern derived from the desire to achieve a fuller utilization of scarce resources over time and/or to alter the time-shape of consumption flows, given the full resource utilization rates. The mode of analysis

⁸ (continued)
approach. For the distinction between the optimization and consistency approach, see Chakravarty, *op. cit.*, pp. 7-10; also K. Fox, J. Sengupta and E. Thorbecke, The Theory of Quantitative Economic Policy (North-Holland, 1973), pp. 448-449 and 465-466.

implied by the latter concern is necessarily intertemporal in character and collectivist in orientation. One posits an existence of an instrumentality, such as the state, through which public choice regarding the desired capital intensity is to be implemented. The objects of choice in this intertemporal decision framework are different consumption paths over time associated with different transformations of dated consumption options.⁹

From the constraints in this multiperiod decision problem, e.g., the initial endowments of resources, the expected technology of production and exchange and other initial conditions, one can in principle derive the feasible objects of choice. Abstracting from inevitable uncertainty, and possibly from the Strotz paradox as well, a choice which maximizes a utility functional may, in principle, be made.¹⁰ At this level of abstraction, all of the information required to define a set of technologically feasible consumption paths is assumed to be available without cost. Should a well-defined utility functional be available, except for the purely computational costs involved, the decision problem becomes trivial.

⁹For a modern extension of Irving Fisher's seminal work on investment viewed as a problem in intertemporal utility maximization, see J. Hirshleifer, Investment, Interest, and Capital, (Prentice-Hall, 1970).

¹⁰The Strotz paradox or phenomenon refers to the possibility that, even with perfect foresight, time perspective at any point in time distorts the choice of a consumption path over a time horizon in such a way that either the choice is revised or an occasion for regret arises subsequently. See R. Strotz, "Myopia and Inconsistency in Dynamic Utility Maximization," Review of Economic Studies (Vol. XXIII, No. 62, 1956); Chakravarty, op. cit., pp. 41-45; also R. Pollak, "Consistent Planning," Review of Economic Studies (April 1968).

The principal policy problem in such a full-information world is to define a collective preference ordering function over alternative full capacity consumption paths. In the event that the optimum consumption path so chosen differs from the market-generated path (evolving along a capacity path), the intertemporal resource allocation decisions will be centrally directed. Since, by assumption, the only argument appearing in the preference functional is the alternative consumption paths, the conflict over centralized direction and decentralized market direction of resource use does not arise in this paradigm. However, a question regarding the appropriate time horizon remains even at this level of abstraction inasmuch as the choice of any particular consumption path over a given horizon restricts the set of consumption possibility paths beyond the chosen horizon. It does this by predetermining the initial conditions in the future.

Underlying this view of optimal consumption choice over time are various strands of nonmonetary (optimal) growth theories.¹¹ Different rates of capital accumulation are associated with different equilibrium capital intensities and growth paths of income and consumption. However, along the balanced growth paths where capital intensities remains constant, growth rates of income and consumption remain invariant to the rate of capital accumulation. In the study of such comparative dynamics, it is generally assumed that full employment is obtained uniformly; the

¹¹For a survey of such theories, see F. Hahn and R. Matthews, "The Theory of Economic Growth: A Survey," Economic Journal, (December 1964); also H. Wan, Economic Growth (Harcourt Brace Jovanovich, Inc., 1971).

focus of analysis is on the consequences of different consumption-saving/investment decisions on the steady state paths of levels in income and consumption. Although the focus is generally on the characteristics of the steady state paths, the explicitly intertemporal framework enables considerations of such questions as (1) the feasibility of attaining a particular path such as the Golden Rule path via the competitive process and (2) the appropriateness of considering only the steady state values, but not the transient values, of consumption in devising growth policies. For example, it is now well known that a competitive solution may yield inefficient steady state paths should the rate of interest fall short of the rate of growth due to excessive capital deepening.¹²

The Nonneutrality of Money and Monetary Policy in the Long-run

The preference for a market-determined solution to the intertemporal resource allocation problem is yet another strand characterizing (optimal) growth theories. Such a preference is based on various efficiency and equity considerations. Accordingly, to deal with the question of whether the introduction of money alters the market-determined balanced growth path, money is introduced explicitly into growth theories both as a medium of exchange and a store of value.¹³

¹²See, for example, P. Samuelson, "An Exact Consumption-Loan Model of Interest With or Without the Social Contrivance of Money," Journal of Political Economy (December 1958); P. Diamond, "National Debt in a Neoclassical Growth Model," American Economic Review (December 1965) and D. Cass and M. Yaari, "Individual Saving, Aggregate Capital Accumulation, and Efficient Growth," in Essays on the Theory of Optimal Economic Growth, edited by K. Shell (MIT Press, 1967).

¹³See Samuelson, op. cit., pp. 481-482; J. Tobin, "Money and Economic Growth," Econometrica (October 1965); J. Stein, Money and Capacity Growth (Columbia University Press, 1971).

When the issue is joined in terms of comparative dynamics involving two economies, identical in every aspect but for the use of money, there is not likely to be much dispute about the nonneutrality of money, even in the long run. For example, with the social contrivance of durable money, the real rate of interest cannot be driven below zero with stationary or growing population. This fact alone will help forestall the emergence of inefficient steady state path, which is a logical possibility in some intergenerational consumption-loan models.¹⁴ However, there are likely to be as many different explanations for such nonneutrality as there are different diagnoses of the essential differences between money and barter economies.

The concept of the nonneutrality of money considered above is fundamentally different from that of the nonneutrality of monetary policy in the long run, given an on-going money economy. Here, monetary policy is to be construed broadly as a vector of actions which results in the differential growth rates in the nominal money stock. There is as yet no consensus in the answer given to the question of nonneutrality of monetary policy in the long run because the question regarding the effect of monetary policy on equilibrium capital intensity is unresolved.

The much-debated classical dichotomy appears to rule in favor of neutrality of monetary policy in the long run. However, under the classical paradigm, the neutrality of monetary policy is obtained under a specialized monetary policy regime, which insures portfolio balance at a stable price level. To clarify this statement, consider the usual

¹⁴See, for example, Samuelson, op. cit.

comparative static analysis of the effect of a one-shot change in the quantity of the nominal money supply on real variables of the stationary economy. The steady state values of the real variables, including the real balances per capita, remain invariant. At the new equilibrium, after the initial disturbance, the price level is higher but constant. The cost of holding real balances, therefore, remains unchanged and hence the equilibrium quantity of real balances held is unchanged. Consider now an alternative monetary policy which engineers a maintained increase in the nominal money supply at some constant rate. To the extent such a policy generates an expectation of inflation, the cost of holding real balances will rise and the initial portfolio balance will be disturbed. Whether this policy would induce a change in the equilibrium capital intensity is an open question. The same type of considerations are involved in the analysis of comparative dynamics of an economy growing steadily at the natural rate of growth.

Some tentative answers may be given to the question of the nonneutrality of monetary policy in the long run. In the event that the rate of increase in the nominal money supply is greater than the natural rate of growth, neoclassical monetary growth theories (characterized by the absence of an independent investment function and the presence of real wealth effect in the saving function) obtain capital deepening. The mechanism by which this nonneutrality is obtained, for a monetary policy which induces a non-zero rate of equilibrium inflation rate, is known as the inverse wealth-saving relationship. A consensus appears to have emerged on the theoretical foundation of the wealth-saving relationship induced by changes in monetary policy: both the change in x , the rate

of growth of the nominal money supply, relative to the rate of growth in output and also the way such a change in x is engineered are crucially important in determining the neutrality of monetary policy.¹⁵

In Metzler's exploration of the question, he obtained a "heretical" result of nonneutral monetary policy even in the context of fully employed stationary economy.¹⁶ The conclusion he drew from the analysis was that a one-shot open market operation altered (lowered) the equilibrium interest rate, even though the price level was unchanging in the new equilibrium, albeit at a higher level. Real balances in the new equilibrium were greater than in the initial equilibrium.¹⁷ This non-classical result is due to the capital levy aspect of the operation (analogous to an increased budget surplus), rather than being due to pure monetary policy operation.¹⁸ For example, such a pure monetary policy action as a once-and-for-all money injection through government transfers is not expected to alter the solution values of real variables.

¹⁵For a survey of extensive literature in this area, see A. Meltzer, "Money, Intermediation and Growth," Journal of Economic Literature (March 1969); also Stein, op. cit., pp. 21-22.

¹⁶L. Metzler, "Wealth, Saving and the Rate of Interest," Journal of Political Economy (April 1951).

¹⁷This conclusion on the new equilibrium real balances is not the one reached by Metzler himself. It is inferred from his conclusion about the lower equilibrium (real) interest rate and his assumption of fully employed economy. An additional assumption that the demand for real balances is invariant to the level of private real wealth is sine qua non.

¹⁸See Meltzer, op. cit., p. 28.

Such a policy would result in a once-and-for-all increase in the price level but would affect neither the equilibrium real wealth, including the real balances, nor the equilibrium market and real interest rates.

In contrast, a pure monetary policy designed to permanently increase the growth rate in nominal money relative to that of output has a nonneutral, positive effect on the capital intensity in the Tobin-type Neoclassical monetary growth models.¹⁹ In such models, the deepening in the equilibrium capital intensity is obtained through the following mechanism: (1) an increase in the anticipated rate of inflation engineered by a well-publicized permanent increase in the rate of monetary expansion increases, through the Fisher effect, the market interest rate; (2) the entailed increase in the cost of holding real balances reduces the equilibrium amount of real balances; (3) the fall in real wealth occasioned by the reduction in real balances increases the rate of saving and the rate of capital formation through the posited inverse wealth-saving relationship. The capital deepening and a lower real rate of interest are the results.

The logic of this line of thought points to the implementation of an accelerated target rate of anticipated inflation if accelerated capital formation is desired. This intuitively anomalous result stems from the

¹⁹The conclusion holds only for an on-going monetary economy. Relative to a barter economy, a monetary economy has a lower capital intensity in the Tobin-type Neoclassical monetary growth models. Such models are characterized by the absence of an independent investment function and the presence of real balances in the saving function. See Tobin, *op. cit.*, and Stein, *op. cit.*, pp. 6-9, 33-34 and 47-48; also M. Sidrauski, "Inflation and Economic Growth," Journal of Political Economy (December 1967).

invalid use of ceteris paribus. Systematic destruction of real money capital occasioned by the increased expected rate of inflation in the model merely shifts preferences regarding wealth portfolio composition, without affecting the attainable global production frontier. Money plays no real productive role in the model. Money is nonneutral only in the sense of altering the preferred asset compositions but very much neutral with respect to the attainable or "effective" global production possibility frontier.

Money, however, is a productive asset (i.e., it affects the attainable production frontier) fundamentally because, by reducing transactions cost, it increases the scope for division of labor. Derived financial innovations based on the existence of money, in the form of primary and indirect securities, further the extent of division of labor. Increased degree of specialization moves outward the attainable production frontier because the distribution of resource ownership and productive opportunities happen to be in general "non-coincident." From this perspective of the role of money in the technology of exchange, then, any attempt to promote capital deepening by engineering a programmed anticipated inflation must be judged quixotic.

What would be the effect of the open market operations of the type the central bank engages in, whereby the non-interest bearing base money is exchanged for interest bearing government debt? Whether or not an open market operation has a nonneutral effect on the equilibrium capital intensity and growth path depends crucially on the extent of tax discounting (the capital levy aspect) and upon whether the operation is part of a plan to permanently change the growth rate in money relative

to the growth rate in output.

With perfect discounting of future tax liabilities associated with interest bearing government debt, i.e., government bond is not a part of private net wealth, and a one-shot open market purchase, the effect on the equilibrium capital intensity would be as negligible as in the previous case where once-and-for-all increase in the nominal money stock was brought about by pure government transfers. In the event that tax discounting is imperfect, a one-shot open market purchase would be equivalent to the Metzler's capital levy case. In the event the open market purchase is part of a well-publicized program to engineer a change in the rate of anticipated inflation, such an attempt to induce capital deepening by monetary acceleration would again appear to be quixotic.

The two analytically separable questions regarding nonneutrality may be restated as:

- (1) Does money matter in the long run?
- (2) Does monetary policy matter in the long run?

The answers considered above in terms of the prevailing paradigms of comparative statics and comparative dynamics are atemporal. They deal only with the steady state solutions. Given that the objective of monetary policy is the optimization of a given objective functional over the relevant policy horizon, there is no presumption that the choice among the various policy options can be based solely, or even primarily, upon the characteristics of the steady state solutions. Nor is there any presumption that the focus should be on the characteristics of transient response to the chosen monetary policy action. The explicit inter-

temporal choice framework indicates that the policymaker must assess the characteristics of both the transient and steady state responses of the economy to the chosen policy action.

The above way of viewing the elements of an optimum policy appears to make the requirements for such a policy stringent. However, such a characterization is itself an oversimplification in the following fundamental sense: it implicitly assumes that a policymaker has reliable information about the past evolution and current state of the economy. That is, it is assumed that the characteristics of the initial conditions are known and the requirements for observability are met.²⁰ In the absence of such assumptions, the recent history of shocks to the system to which the economy has not yet fully adjusted, must be identified and allowed for in assessing the likely evolution of the economy, both with and without the contemplated policy action. In addition, the behavioral parameters of the model are implicitly assumed to be time- and policy-invariant. To the extent such assumptions do not hold, the efficacy of any policy action chosen on the basis of the projection of such a model will be attenuated.

²⁰In control system theory, observability or reconstructibility refers to the property of the model which enables one to determine uniquely the past states of the system from a set of currently available observation data. See M. Aoki, Optimal Control and System Theory in Dynamic Economic Analysis (North-Holland Publishing Company, 1976), pp. 108-11.

Is There a Role for Monetary Policy In Promoting Capital Formation?

Perusal of the recent literature dealing with the capital formation problem indicates that the focus placed on monetary policy is primarily from the perspective of nonneutrality of monetary policy in achieving the full capacity output.²¹ The question regarding the nonneutrality of autonomous monetary policy on equilibrium capital intensity is seldom raised explicitly in a policy context. The role designated for monetary policy, in achieving the full capacity output, is typically an accommodative one of keeping the market interest rate from rising, while a stimulative fiscal policy, such as accelerated depreciation and investment tax credit, is undertaken to promote investment.²²

The debate concerning the efficacy of such a policy revolves around different assessments of its likely effects. In the first instance, the debate is an empirical one arising from the absence of reliable or consensus scenarios for the evolution of the economy under alternative policy regimes. Also absent is a consensus reading of the true state of the economy. For example, is the underutilization of capital stock as widespread as the measured capacity utilization rates indicate?²³ If

²¹See, for example, B. Bosworth, "The Issue of Capital Shortages," and R. Eisner, "The Corporate Role in Financing Future Investment Needs," both in U.S. Economic Growth From 1976 to 1986: Prospects, Problems and Patterns, Vol. 3 - Capital, Studies prepared for the Joint Economic Committee, U.S. Congress, November 15, 1976, and the works cited therein.

²²See, for example, A. Brimmer and A. Sinai, "The Effects of Tax Policy on Capital Formation," Journal of Finance (May 1976).

²³Since this passage was written, the Federal Reserve Board published a substantially revised series on capacity utilization rates. The utilization rate for the third quarter 1976 was revised upward seven percentage points, from 74 to 80.9 percent.

the numbers are to be believed, would not policies designed to increase capacity utilization rates directly be more likely to be more effective in inducing investment than the policies designed to reduce the rental price of capital? If, on the other hand, the numbers are regarded as having substantial downward bias because of the underestimate of the extent of capital obsolescence (due to increases in relative price of energy, and more stringent regulatory requirements), would not policies designed to stimulate investment be more effective than otherwise?²⁴

Related uncertainty about the extent of policy effects on capital formation emanates from our incomplete knowledge about the effect of expectations on the way market participants perceive and respond to a policy measure. There appears to be an emerging consensus that the prevailing state of expectations plays an important role in shaping the response to certain policy measures. However, a successful modeling of the formation and revision of expectations (policy, price, income, etc.) has been elusive. Consider, for example, the problem of assessing the relative merits of interest rates and monetary aggregates as the targets of monetary policy. Recent analysis by Sargent and Wallace shows that Poole's apparently sensible results, that the choice depends on the structural parameters and the covariance structure of the disturbance terms, are conditional upon the implicit acceptance of the adaptive

²⁴For an analysis which adduces significant indirect evidence corroborating the view that there is such a downward bias, see D. Karnosky, "The Link Between Money and Prices - 1971-1976," Review, Federal Reserve Bank of St. Louis (June 1976).

expectation hypothesis.²⁵ Should expectations be generated rationally, Poole's results no longer hold.

Even when it is granted that our reading of the current state of the economy is accurate, i.e., that there is widespread, persistent unemployment of both capital and labor, we cannot formulate an appropriate policy in the absence of a correct diagnosis of the causes of such persistent unemployment. It would not be enough to single out deficient aggregate demand as the proximate cause, even if it were true. What is required is an analysis of how such a deficiency emerged and why it persists.

For example, consider Leijonhufvud's interpretation of Keynes' diagnosis of the root cause of the Great Depression. The persistent deficiency in aggregate demand was diagnosed as reflecting the "co-ordination failure" between the saver and the entrepreneur, due to a "low" price of capital goods relative to money wages.²⁶ In the latter phase of the Depression, this "low" price was due to the pessimistic state of entrepreneurial expectations. An implied policy prescription was fiscal policy à outrance, with an accommodative monetary policy, designed to

²⁵W. Poole, "Optimal Choice of Monetary Policy Instruments In a Simple Stochastic Macro Model," Quarterly Journal of Economics (May 1970); T. Sargent and N. Wallace, "Rational Expectations, the Optimal Monetary Instrument and the Optimal Money Supply Rule," Journal of Political Economy (April 1975).

²⁶A. Leijonhufvud, On Keynesian Economics and the Economics of Keynes (Oxford University Press, 1968), p. 409.

falsify the inappropriate entrepreneurial expectations. In the earlier phase of the downturn, it was based on a "high" market interest rate, that is, a market rate higher than Wicksell's natural rate, not the state of entrepreneurial expectations. Monetary policy à outrance would have been the prescribed response to bring the market rate down to the natural rate.²⁷

The following diagnosis of the causes of the current malaise is consistent with the relative price interpretation presented above. The initiating cause was the totally unforeseen reduction in the nation's wealth (productive capacity) occasioned by the rise in energy prices and various regulations. The implied reduction in capital intensity would cause a rise in the marginal productivity of capital and lower the real wage of the labor in a world of malleable capital. However, in a world of putty-clay capital, the downward adjustment of the real wage is delayed and follows the replacement investment of vintage capital as well as inter-industry shifts in employment. Further, since the initial reduction in wealth and increased uncertainty regarding income and employment prospects induces increased rate of saving, aggregate demand is reduced unless the implied increase in demand for future goods by savers is effectively transmitted to the entrepreneurs. In the absence of an effective price signal to devote a greater proportion of current resources for capital accumulation, the unemployment state emerges and persists.

²⁷ Ibid., pp. 409-416.

Complicating the adjustment process are (1) widely held non-homogenous inflation expectations, (2) the overhang of the threat of yet another bout with an incomes policy, (3) the putty-clay nature of capital which dampens the speed of adjustment toward new relative prices of capital and labor, and (4) an observed increase in the supply of labor induced by wealth and other effects. An additional factor which complicates and lengthens the adjustment in relative prices of capital and labor is the existence of indexed wage contracts, which became more prevalent as the legacy of previously unforeseen inflations. If labor bargained in terms of the real wage that prevailed in the wealthier period, the full equilibrium adjustment would not be obtained until the economy attains the previous wealth and capital intensity level via capital accumulation.

Given the diagnosis of wealth loss due to capital obsolescence, the case for policy actions which accelerate the rate of capital accumulation appears compelling. Unfortunately, such permissive policies may cause a delay in the market adjustment process. Stimulative policies might be interpreted as harbingers of either greater inflation, the imposition of an incomes policy, or both. But such possibilities would always exist in this uncertain world. So the central policy issue is, as always, a Bayesian one of constructing a useful state-and-time dependent decision matrix and assigning the best state-of-the-arts probability weights to state-and-event-spaces.²⁸ The task of assigning

²⁸For the Bayesian approach to decision-making under uncertainty, see H. Raiffa and R. Schlaiffer, Applied Statistical Decision Theory (MIT Press, 1961); also Fox et al., op. cit., Chapter 9.

utility weights to event-spaces would be that of the policymaker.

The requirements for an effective policy sketched above appear to demand an impossible prescience of the economist-advisor. Since the source of difficulty is our ignorance of the precise nature of the state and structure of the economy (inclusive of the error structure), it may be inferred that there is little that the economist can contribute. However, such an inference is unwarranted. Absence of precise quantitative or even qualitative knowledge²⁹ does not entitle one to invoke the principle of insufficient reason. Rather, it forces one to recognize the limited scope for discretionary stabilization policies. As a consequence, the focus is directed once again to the question fundamental to macroeconomic theory - namely, to what extent can the decentralized, real-world economy be regarded as a self-adjusting system?

This question was forcefully raised by Keynes in 1935, and reopened in 1969 by Leijonhufvud in his apt paraphrase of a question posed by a microbiologist:³⁰

²⁹We have not yet resolved such fundamental qualitative issues as the time- and/or policy- invariance of the parameters of the estimated model. See, for example, R. Lucas, "Econometric Policy Evaluation: A Critique," Journal of Monetary Economics (Supplement 1976).

³⁰J. Keynes, "A Self-Adjusting Economic System?" The New Republic (February 20, 1935); A. Leijonhufvud, Keynes and the Classics: Two Lectures on Keynes' Contribution to Economic Theory (The Institute of Economic Affairs, July 1969).

"An economy (organism) is an integrated unit of structure and functions. In an economy (organism), all transactors (molecules) have to work in harmony. Each transactor (molecule) has to know what the other transactors (molecules) are doing. Each transactor (molecule) must be able to receive messages and must be disciplined enough to obey orders. How has the economic system (organism) solved the problem of inter-transactor (molecular) communication?"

The importance of price information and price incentives as signals and disciplines in the coordination of activities of decentralized transactors is clearly captured in this paraphrase. The significance of questioning the homeostatic capacity of the economy is that it forces the analysis into an explicit general systems perspective, where time, history, and uncertainty play essential roles. It leads one to re-examine the theoretical and empirical foundations underlying various approaches to stabilization policies. Such a reexamination reveals that different approaches are based on different diagnoses of: (1) the dynamic properties of a particular economy, such as its stability, speed and amplitude of response, observability and controllability, and (2) the attained (or attainable) state of the arts in quantitative macro-economic policy. Consider the following alternative concepts of stabilization policy:³¹

³¹For a fuller discussion of the concept of stability used in economics and the alternative concepts of stabilization policy, see L. Andersen and J. Yang, 'The Economy as a Control System: Implications for "Inherent" Stability Issue,' in Modeling and Simulation, Volume 5 Part 2 (Instrument Society of America, 1974) and J. Yang, "The Inherent (In) stability of the Economy: An Interpretation," (unpublished paper, 1975).

1. The economy is unstable; hence, it must be made stable. Since stability is a concept associated with the nature of response of a given dynamic system to a given stimulus, the objective of the stabilization policy is to change the response characteristics of the system. Such a policy would be a subset of a so-called structural policy;
2. The economy is inherently stable but its speed of adjustment is unsatisfactory. The aim of policy again is to change the nature of the system's response to a given stimulus;
3. The nature of the response of the system to a shock is satisfactory. The root cause of difficulty lies, however, in the nature of disturbances impinging on the system. The thrust of policy is to neutralize the effects of such disturbances. Such a policy may be termed "purely compensatory" and its successful implementation limited only by our ability to forecast the arrival of shocks, and to neutralize them;
4. The quality of response of the economy to different sources and/or magnitudes of shocks is not uniform. It is useful to classify shocks along policy and non-policy origins and the former into monetary and non-monetary lines. The aim of monetary stabilization policy is the avoidance of policy-induced monetary shocks. Here, shocks are to be construed as "innovations" in the given time series.

These various concepts of stabilization policy provide a framework to assess different approaches to stabilization policy. Such approaches range all the way from Simon's constant money supply rule to the optimal

feedback control with stochastic time-varying coefficient model.³²

The recent rediscovery of the optimal control framework (pioneered by Ramsey in the 1920s) for stabilization policy has had the salutary effect of redirecting our attention to the fundamental normative and positive issues involved in policymaking. In this framework, policy decision problems are explicitly acknowledged as Bayesian and intertemporal. The policy horizon must be explicitly chosen. Uncertainty about the model structure, observational errors, and nonpolicy shocks must also be confronted by the decision maker. Even the problem of stochastic preference could be dealt with, at least formally. The control approach also gives content to the short-run and long-run distinctions, which are often left imprecise.

One may well argue that the control framework blurred the distinction between rule vs. authorities. Even the stochastic feedback control with filtering, which specifies a policy reaction function, may be construed as a form of rule. But, such an interpretation misses the essential distinction that a Rule is characterized by the absence of policy "innovations." In an uncertain world, even if the agents were privy to the same information set and the control law guiding the monetary authority, ex post evolution of policy will have "innovations" reflecting either the model or exogenous non-policy shocks.

³²H. Simons, "Rules vs. Authorities in Monetary Policy," Journal of Political Economy (February 1936); G. Chow, Analysis and Control of Dynamic Economic System (John Wiley and Sons, 1975), also J. Kalchbrenner and P. Tinsley, "On the Use of Optimal Control in the Design of Monetary Policy," Special Studies Paper, Federal Reserve Board (July 1975).

It is the inevitable lot of a decision maker to act, even in the presence of uncertainty. Acquisition of knowledge helps us to reduce uncertainty, but the inadequacy in the current state of our knowledge of both the model and error structure of the economy is considerable. The recent explorations into the potential role that modern optimal control theory could play in the conduct of stabilization policy helped to redirect our attention toward many of the unresolved normative and positive issues in policymaking. Aside from the fundamental problem of choosing the objective functional, the problems arising from delayed observations and the absence of a clearly dominant model have been thrust into the center stage where they properly belong. As a consequence, we have richer and better defined substantive issues to guide further research and base policy deliberations.

Unfortunately for policymakers, the clearest signal to be extracted from this exploration is that modeling the workings of the modern decentralized economy is more like modeling a biological system than an engineering system. The problem of stochastic time-varying coefficients naturally arises in such a context.³³ In addition, it has been forcefully impressed upon us that expectations must be modeled to understand and "control" economic behavior but the processes determining the formation and revision of expectations are only dimly understood. For

³³The time-varying parameter models include random-coefficient models and systematically time-varying models, depicting, for example, the motion of guided missiles over space. For many important aspects of modeling and estimating time-varying parameter systems, see the report on a recent symposium on such systems in Annals of Economic and Social Measurement (October 1973).

example, a prominent explanation of the phenomenon of stagflation runs in terms of divergent price expectations between the consumer and the producer.³⁴ The problem is that we do not as yet know how to reliably model and influence these expectations.

Outline of An Optimum Monetary Policy

This diagnosis of the state of the arts, in conjunction with the empirical judgments regarding the inherent stability of the economy, and the sources and effects of shocks, suggests an outline of the "optimum monetary policy" for stabilization.³⁵ Stabilization must be construed as the effect of policy which permits an approximation to a fully coordinated solution characterized by the absence of excess demands and excess supplies in all markets.

First, the optimum monetary policy must be an acomodative policy in the ultimate sense of permitting, more efficiently than any other feasible policy, a full coordination of temporal and intertemporal plans of decentralized transactor units. Second, given the observations that

³⁴K. Brunner and A. Meltzer, "Introduction," Journal of Monetary Economics (Supplement 1976).

³⁵For a fuller discussion of the competing diagnoses of the inherent stability of private enterprise economies, see J. Yang, op. cit. and works cited therein; in particular, see L. Andersen, "The State of the Monetarist Debate" and accompanying "commentary" by K. Brunner and L. Klein in Review, Federal Reserve Bank of St. Louis (October 1973) and K. Brunner's book review of Conference on Econometric Models of Cyclical Behavior, edited by B. Hickman, in Journal of Economic Literature (September 1973), pp. 926-33.

the money economy is particularly vulnerable to shocks which attenuate the use of "money conventions," the policy must be one that maximizes the probability of preserving money conventions in all planned transactions.³⁶ Third, the optimum policy must be "surprise-free," in order that monetary policy not constitute an additional shock to which the economy must respond. Subsumed under this requirement is that monetary policy be credible in the sense that an announced change in policy (for whatever reason) is believed. Fourth, the indicator of monetary policy must be chosen such that it is as free of false signals as feasible.

What would be the basis for identifying an empirical proxy for such a policy? The basis must be the accumulated understanding of the role which money and the price system play in coordinating the intertemporal consumption and production plans of decentralized decision units. The major elements of such understanding are:

1. Unanticipated inflations generate false trading and distribution effects. Mill and Fisher understood this, whereas the inflationists of the Birmingham School did not.³⁷

³⁶For the concept of money conventions, see A. Hart, Discussion in Proceedings of a Symposium on Inflation: Its Causes, Consequences and Control, edited by S. Rousseas (New York University, 1968), p. 56.

³⁷For Mill's surprisingly modern debunking of the inflationist argument (advanced by the Birmingham currency school) essentially in terms of the distinction between anticipated and unanticipated inflation, see J. S. Mill, Principles of Political Economy (Reprints of Economic Classics: Augustus M. Kelley, 1961), pp. 550-551; for further references to the Birmingham school advocacy, see J. Viner, Studies in the Theory of International Trade (Harper & Brothers Publishers, 1937), p. 281 and Lord Robbins, The Theory of Economic Development (MacMillan, 1968), p. 134. Fisher made a clear distinction between the effects of the anti-
(continued)

2. Inflation expectations, when present, are most likely to be non-uniformly held. Such expectations inhibit the formation of futures contracts, in loan and employment, defined in fixed monetary units. The function of money as the standard of deferred payments is attenuated and, as a consequence, the use of a money convention in evaluating futures contracts is discouraged.
3. Even the polar case of perfectly (uniformly and correctly) anticipated inflation has undesirable consequences. While it is a useful concept for some theoretical inquiry, its occurrence is not likely to be significant empirically.
4. Inflation expectations are not generated randomly, nor are they sustained in the absence of accommodating growth in the money supply.
5. Once inflation expectations are generated and incorporated in loan and wage contracts, vested interests would emerge to oppose the subsequent monetary evolution which would falsify the embodied inflation expectations. The reason that inflation expectations appear to decay slowly is that actual inflations tend to keep pace to validate the prevailing expectations.

37 (continued)

pated and unanticipated inflation, as illustrated in the following quotation: "...the real evils of changing price levels do not lie in these changes per se, but in the fact that they usually take us unaware. It has been shown that to be forewarned is to be forearmed, and that a foreknown change in price levels might be so taken into account in the rate of interest as to neutralize its evils," See I. Fisher, The Purchasing Power of Money, (Reprints of Economic Classics: Augustus M. Kelley, 1963), p. 321.

6. Indexing of time contracts generates problems of its own, especially with supply-induced shocks.³⁸
7. The concept of the optimum supply of money, or optimum rate of inflation, can only be defined relative to the attainable or effective global production possibility frontier. The "notional" global production possibility frontier is not attainable in the presence of transactions costs. The optimum money supply enables the attainment of the outer-most frontier inside the notional frontier, for any given financial technology. The reason is that, for a given financial technology, the optimum money maximizes the extent of specialization by minimizing the broadly-conceived transactions costs.³⁹
8. The distinctions between higher prices and rising prices on the one hand, and rising prices and a rise in inflation expectations on the other are seminal distinctions for understanding

³⁸A problem of "over-exhaustion" of the total product may emerge with an unanticipated reduction in the economy's productive capacity. For the problem associated with a transition into a regime of completely indexed economy, see J. Yang, "The Case for and Against Indexation: An Attempt at Perspective," Review, Federal Reserve Bank of St. Louis (October 1974), especially pp. 3 and 6; also M. Friedman, "Monetary Correction," in Essays on Inflation and Indexation (American Enterprise Institute for Public Policy Research, 1974), especially p. 45.

³⁹For a survey of the state of the arts, including references, related to "the new microfoundations of money," see R. Barro and S. Fischer, "Recent Developments in Monetary Theory," Journal of Monetary Economics (April 1976).

monetary phenomena.⁴⁰

Fisher, and Marshall before him, considered the property of an ideal monetary policy from the perspective of intertemporal coordination through the price system. Both prescribed a policy directed toward securing both ex ante and ex post stability in the monetary yardstick.⁴¹ Their prescription is consistent with the broad contours of the roles of money and the price system summarized above. They proposed the adoption of indexation, the tabular standard, to achieve their stability goal. Without the use of indexing, however, it would be difficult to achieve ex post stability continuously.

Since there are problems with indexing, and more fundamentally, because achieving ex ante stability would be sufficient to approximate ideal policy, my suggestion for an empirical proxy to the "optimum" policy outlined above would have two elements: First, specify a monetary aggregate as the indicator of policy on the relative controllability basis; second, direct the policy consistently toward the prevention of the emergence of inflation expectations. For a growing economy on a balanced growth path without technological progress, such a policy would

⁴⁰The various diagnoses of the causes of inflation in terms of the variants of market power hypotheses (such as the union monopoly or administered pricing) often do not make the distinction between higher and rising prices. The second distinction between the unanticipated and anticipated inflation is, of course, of pivotal importance.

⁴¹See A. Marshall, "Remedies for Fluctuation of General Prices," in Memorials of Alfred Marshall, edited by A. Pigou (New York: Kelly and Millman, Inc., 1956); I. Fisher, Stabilizing the Dollar (New York: MacMillan, 1920).

aim at providing nominal money stock growing at the natural rate.⁴²

Conclusions

This paper identifies the sources of the widespread concern about capital formation, primarily to uncover those aspects which monetary policy may successfully address. It has been shown that the usual focus is on the nonneutral effect of monetary policy on capacity output rather than the more intractable and speculative possibility that monetary policy may be nonneutral with respect to equilibrium capital intensity.

The proper framework in which to assess the impact of monetary policy on capital formation was judged to be intertemporal and, under uncertainty, Bayesian. Several concepts of the role of stabilization policy were explored, and different approaches to such a policy, ranging from Simon's constant money rule to the modern stochastic optimal control, were considered. The problems of formulating a policy were illustrated for a particular diagnosis of the genesis of the current economic malaise.

The outline of an optimum monetary policy was given in terms of an absence of policy innovations, for a world where uncertainties about observations, expectations, and model and error structures dominate. The perspective maintained throughout was that of coordinating intertemporal decisions through the market system. After briefly identifying the major elements of the accumulated evidence regarding the roles of

⁴²To help implement such a policy for a growing economy, where capital intensities, the rate of population growth and technologies change, poses a severe challenge to the economist-advisor.

money and the price system, an empirical proxy for the optimum monetary policy was specified in terms of the money supply and directed toward preventing the emergence of inflation expectations.