# Editors' Summary

THIS ISSUE of *Brookings Papers on Economic Activity* contains articles and reports presented at the thirty-first conference of the Brookings Panel on Economic Activity, which was held in Washington, D.C., on April 9 and 10, 1981. Four articles address economic issues of current importance: the causes of the slowdown in productivity growth, the impacts of various proposals for tax reform on investment and the stock market, financial innovations and their implications for monetary policy, and the importance of oil prices and other economic developments on current account balances and exchange rates. Two shorter reports examine the problems with traditional mortgages and retirement annuities in a period of inflation, and the characteristics of price expectations by business during the 1970s.

THE SLOWDOWN in productivity growth during the 1970s has added to the economic problems of the decade by eroding real income growth and adding to inflation. Despite numerous studies of the slowdown, its causes have remained largely a mystery. In the most comprehensive study to date, Edward Denison examined seventeen alternative hypotheses and concluded that alone or in combination they could explain no more than a fraction of the slowdown. In the first article of this issue, Martin Neil Baily reexamines the decline in productivity growth and offers an explanation of the mystery. He attributes a major portion of the productivity slowdown to economic developments that have accelerated the obsolescence of the existing capital stock and have diverted new investment to purposes that do not enhance measured productivity.

Baily confirms the conclusion of other researchers that conventional measures of the business capital stock do not suggest a capital shortage

is the cause of the poor performance of productivity. The growth of the net capital-labor ratio in the private business sector did slow to 1.3 percent in 1973–79 from 2.9 percent a year in 1968–73. But that slowdown of 1.6 percentage points should account for a reduction of less than one-half percentage point in labor productivity growth; it actually slowed by 1.3 points per year during that interval and by more than 2.0 points per year in the last part of the decade when productivity stopped growing altogether. In manufacturing, labor productivity growth slowed by 2 percentage points between these same periods, even though growth in the measured capital-labor ratio actually accelerated.

However, Baily argues that it is important to distinguish the flow of productive capital services from the stock of capital itself and presents evidence that suggests the flow of such services has declined relative to the measured capital stock. He notes that, in principle, the contribution of capital to production, and hence to productivity, comes from the services it provides. Because these productive services are not directly measurable, they are typically assumed to be proportional to the replacement value of the capital stock, allowing for retirements and depreciation, and the net stock is thus used as a proxy for its services. But in obtaining the net stock, retirements and depreciation are simply calculated from the estimated useful lives of different classes of capital goods. This calculation takes no account of the possibility of permanent reductions in the utilization rate of capital or accelerations in scrapping rates or, indeed, of increases in the extent to which capital spending is used to modify old plants to meet market or regulatory changes rather than to raise productivity. Baily believes that the stock market's valuation of capital provides an alternative measure of capital services and observes that market value has declined sharply relative to measures based on the conventional capital stock. By 1979, Tobin's $q$, which measures the ratio of market value to replacement cost for the business capital stock, had fallen to about one-half its value in the late 1960s.

Baily reasons that the decline in market values represents an unusually rapid obsolescence of the capital stock due to structural changes in the U.S. and world economies. The most obvious cause of such an acceleration in obsolescence was the increase in energy prices, which made operation of old, energy-intensive capital uneconomic and shifted consumer demand away from products with high energy requirements, such as fuel-inefficient automobiles. Besides higher energy prices, the author believes

that major shifts in world trade patterns, the large decline in the propor-
tion of GNP devoted to defense expenditures, the movement of industries
to the Sun Belt, and the need to meet consumer and safety regulations
also contributed to capital obsolescence by creating an imbalance be-
tween existing capital and market demands.

Baily recognizes that such structural changes will not affect the actual
use of old capital as promptly as they reduce its market value because the
latter will anticipate future reductions in utilization and retirements. Thus
a decline in market values will overstate the immediate reduction in the
effective capital stock that results from events such as the oil price shock,
even if it accurately measures the discounted value of those reductions,
and it will thus overstate the contemporaneous decline in capital services
and productivity that result from the shock. To allow for this, he relies
only partially on market values to measure capital services when he tests
his hypothesis quantitatively.

Market values have declined so much that if they are used alone to
measure capital services, they overexplain the productivity slowdown.
However, Baily finds that the slowdown can be explained by a measure
of capital services formed by averaging two parts conventional capital
stock and one part market values. Such a combined measure is justified
by two considerations: the fact, just discussed, that stock market values
decline before capital services do, anticipating reduced use of obsolete
capital before it occurs, and the fact that market values are volatile and
may have declined, in part, for reasons that do not affect productivity.
Baily's hypothesis that market values help measure capital services re-
ceives additional support from regressions estimating an aggregate pro-
duction function. In such regressions, his combined measure of capital
input gives results that are superior to those obtained using conventional
measures of capital alone.

Just as capital services may be mismeasured, conventional data on
hours worked may misstate the effective labor input being provided. Thus
Baily also explores the possibility that productivity may have slowed in
the 1970s in part because of a decline in effective labor input relative to
official hours worked, but concludes that any such effect is minor. He
finds that an adjustment for the changing demographic composition of
the work force, which helped analysts interpret productivity growth
through the early 1970s, does not explain any of the slowdown in
1973–79 because demographic effects, on balance, did not change fur-

ther. He also investigates and rejects the notion that the productivity slowdown can be blamed on low productivity of young workers entering the labor force compared with the productivity of their predecessors.

The decline in the market value of capital relative to its replacement cost that supports Baily's hypothesis of capital obsolescence also argues against an alternative hypothesis that productivity has declined because of a slowdown in technical progress embodied in new capital. If technical progress had slowed down, market value should have risen relative to replacement cost because old capital was maintaining its economic usefulness longer than it did previously. Similarly, the fact that investment spending has remained strong despite low values of $q$ supports Baily's interpretation that obsolescence of old capital rather than diminished technical progress is responsible for the productivity slowdown.

Baily does not attempt to allocate the decline in capital services and productivity among the different potential sources of structural change that he identifies. However, he does show that higher energy prices—one source of change that can be partially quantified—may have accounted for more than 0.4 percentage point of the slowdown in annual productivity growth. Both Baily and the discussants at the meeting suggested that more detailed study of structural change and obsolescence in individual industries would be useful to confirm their importance for the productivity slowdown.

THE GROWING CONCERN with the productivity slowdown and the political attention to supply-side economics as a means of combating inflation has rekindled the interest of economists and policymakers in stimulating growth, a topic that preoccupied both groups in the early 1960s. Even if, as Martin Baily argues in the first article of this issue, a reduced growth rate of net investment can only be responsible for a fraction of the slowdown in productivity, increasing the rate of capital formation is one of the few mechanisms available for improving productivity growth. In the second article of this issue, Lawrence H. Summers examines the relation of taxes and inflation to the rate of capital formation. Some have argued that the interaction between the tax system and inflation has greatly increased the tax on corporate capital, which not only adversely affects investment but could be responsible for the poor performance of the stock market. This combination of concerns and perceptions has led to a revival of proposals for stimulating investment. The proposals are nu-

merous—investment tax credits, accelerated depreciation, cuts in the corporate tax rate, reductions in the personal tax rate on unearned income, and indexation. But although these proposals are all generally thought to stimulate investment, economists have not provided theoretical and empirical analyses to understand their differences and to aid in the intelligent design of tax packages. Summers sets out to remedy this deficiency.

Summers begins with brief examinations of recent investment performance and of the corporate tax environment, using data from the newly revised national income and product accounts. He finds that the ratio of real gross fixed nonresidential investment to GNP has, if anything, actually risen since 1970. However, net investment has not fared as well; its share of GNP averaged 2.6 percent in the 1975–79 period compared with 3.1 percent during the entire 1948–79 period. As a result, the rate of net capital formation has fallen below the rate in the 1950s, which itself had created considerable concern. If expenditures on direct pollution control, which presumably do not increase measured output, are not counted as adding to the stock, net capital formation in recent years looks even worse.

Summers shows that the rate of taxation of corporate capital income, including taxes at both the corporate and personal level, did not rise in the 1970s, despite the substantial effects of inflation in increasing taxes because of the tax treatment of depreciation, inventory profits, and capital gains. On average, these effects were offset by the benefit that corporations received from their ability to deduct nominal interest costs, a portion of which is effectively repayment of principal during inflationary periods, and by statutory tax reductions in the form of accelerated depreciation, increases in the investment tax credit, and reductions in the corporate tax rate itself.

Summers then turns to his main objective, the development of a theory that will enable him to examine the impacts on investment and the stock market of various tax reform proposals. His theory follows the usual assumption that firms maximize their market value, but it incorporates several distinctive features that he believes are essential for examining the impact of tax policies. First, in contrast with most existing theoretical and empirical work, the author takes explicit account of both personal and corporate taxes. In his model the market value of the firm reflects the present value of dividends and capital gains to stockholders after all taxes

are paid. In effect, the firm takes into account the personal tax conse-
quences of retaining earnings rather than paying dividends. Second, he
assumes that firms have rational expectations and adapt rationally to
changes in policy. This permits him to study the effects of policy an-
nouncements and the differences between permanent and temporary
policy changes in the short run, and to take account of the endogenous
feedback of investment and output in the long run. Third, he directly
relates the market value of firms—and hence Tobin's $q$—to taxes and
investment. This has several advantages. It provides Summers with the
appropriate tax adjustments to Tobin's $q$ for use in investment equations;
it establishes the precise way in which the expectations of future events
should affect market values and investment; and it enables him to com-
pare the extent to which policies designed to stimulate investment differ
in their distributional consequences.

Although the author must make a number of simplifying assumptions
in order to make the theoretical model tractable—for example, that firms
finance a fixed fraction of new investment by debt—the model is rich in
insights that should be of interest to policymakers. For instance, it shows
that in equilibrium Tobin's $q$ should be less than 1 because the differ-
ential taxation of dividends and capital gains makes it optimal to forgo
more than a dollar of current dividends to increase the market value of
capital by just one dollar. It explains that the investment tax credit may
cause a decline in the stock market at the same time that it stimulates in-
vestment because a credit effectively reduces the replacement cost of
capital. It also shows that a cut in the corporate tax rate will unambigu-
ously raise stock market values in the short run, yet have ambiguous
effects on investment and on the long-run capital stock. The model par-
ticularly illuminates the effect that announcing a policy may have. An-
nouncement of a future corporate tax cut may have a greater initial effect
on investment than the actual cut has once it occurs because firms have
an incentive to invest sooner, taking advantage of the higher value of the
tax deductibility of costs and depreciation before the cut takes place. This
effect is magnified by the presence of accelerated depreciation. Similarly,
announcement of dividend tax cuts, which in the long run do not affect
capital intensity, may in the short run increase investment as firms post-
pone paying dividends until after the cut occurs.

The theoretical model indicates that even the qualitative effect of tax

changes are sensitive to the values of particular parameters. Summers therefore simulates a variety of tax changes using parameter values for the production function, depreciation rates, and interest rates that replicate actual U.S. experience. Because adjustment costs are not directly observable, Summers infers them from an estimated investment-$q$ equation. The simulations resolve the theoretical ambiguities in the model and demonstrate the quantitative importance of many tax effects. The simulations confirm, for example, that the announcement of a future corporate tax cut has a significantly greater short-run impact on investment than immediate implementation of the cut. The former raises the capital stock by 2.3 percent after four years; the latter by only 1.1 percent, even though immediate implementation has a greater initial impact on market value. Thus if the goal of corporate tax reduction is to increase capital formation, the reduction should be announced well in advance of the effective change.

The simulations also show that tax reforms with the same effect on investment have significantly different distributional consequences. The extreme case is a dividend tax cut, which has no effect on the capital stock in the long run but substantial effects on market values. Corporate tax changes also have relatively large windfall effects on the stock market compared to their incentive effects on investment because they benefit capital already in existence. Because increases in the investment tax credit apply only to new investment, they provide more stimulus to investment for any given effect on the stock market or per dollar of forgone revenue. Cutting the capital gains tax at the personal level appears to have the largest investment stimulus relative to its effect on the market.

Summers' model also provides an ideal framework for investigating the effects of inflation on capital accumulation and market values. According to his simulations, the interaction of inflation and taxes can have a great effect on both. With no change in tax laws, ten years of 8 percent inflation would reduce the market value of capital by 22 percent and gross investment by 16 percent. Although inflation, according to the model, would appear to explain the poor performance of the stock market in the 1970s, it does not explain the relatively strong performance of investment. Increases in the investment credit and other developments not modeled in the simulations may help explain the discrepancy. Summers also shows that indexing depreciation allowances and inventory valuation for tax

purposes, as has often been proposed, while continuing to permit the tax deductibility of nominal interest, actually makes inflation a net stimulus to investment.

FINANCIAL INNOVATIONS provide some of the most dramatic examples of the capacity of markets to respond to incentives, regulation, and changing economic conditions. During the past twenty years such innovations have substantially altered the nature of banking and financial institutions. In the third article of this issue, Donald D. Hester explores how the process of innovation and innovations themselves interact with the conduct of monetary policy. Most important, Hester stresses how innovations change the relation between the instruments and targets of policy, making stabilization more difficult. He examines the major innovations of the past two decades and the conditions that encouraged them, observing that innovations often provide desirable improvements in the efficiency of markets. And he offers suggestions for conducting policy in an inevitably changing financial world.

Some important changes in financial markets have occurred as a result of deliberate policy decisions. Thus government credit programs have been created or modified to redirect funds from one sector to another. However, most of the changes Hester examines have originated in the private sector. These innovations, initiated primarily by financial institutions, generally have occurred in response to competitive market conditions and frequently have been a method of circumventing attempts by the Federal Reserve to restrict the growth of credit. Banks began issuing negotiable certificates of deposit (CDs) by the end of the 1950s as a way of competing for funds during periods of tight money. After the rate they could pay on CDs was frozen in 1966, banks created one-bank holding companies as a vehicle for borrowing in the unregulated commercial paper market and established offshore branches whose deposits and borrowings are not subject to U.S. regulations and are not included in U.S. financial aggregates. Starting in the late 1960s, and increasingly during the 1970s after interest rates rose to unprecedented levels, banks have expanded their use of overnight funds purchased from corporations and governments—including repurchase agreements secured by government debt instruments and unsecured borrowings. These "net purchased funds" reduce the reserve requirements of banks by lowering their deposits at the end of the day. They provide overnight interest to the corporation or

government lending the funds while maintaining the lenders' transactions balances during the day when they are needed. More recently, money-market mutual funds have grown spectacularly by offering smaller investors a means to earn much higher interest rates than they receive through regulated intermediaries while still keeping funds in a highly liquid form. Finally, futures markets in financial instruments have become an important adjunct to the cash financial market since they were created in the mid-1970s in response to the large variations in interest rates that developed then and that have continued since. This summary of major innovations analyzed by Hester illustrates the three conditions he identifies as having encouraged or facilitated innovations in general: high and variable interest rates, regulation and regulatory change, and the ambiguity of Federal Reserve surveillance.

Hester gives a generally favorable verdict on the efficiency gains that these private innovations have brought. They have reduced distortions arising from interest rate ceilings, differential reserve requirements, and other regulations, and have put different sectors of the economy on a more equal footing in their ability to acquire funds. In general, he believes that they have improved the operation of money and capital markets by increasing the opportunities open to all groups of savers and investors. On the other hand, innovations have complicated the conduct of stabilization policy by altering the relations between the instruments of policy and the performance of the economy. The author argues that policy must be prepared to adapt to innovations, whether or not they represent desirable changes that improve efficiency. While they can erect barriers to change, policymakers cannot wholly prevent financial innovations, even if they want to. The financial system has been in continual transition and is likely to continue to be so in the years ahead. A major lesson Hester draws from his analysis is that innovations will only be recognized with a lag and that policy will typically be conducted with an obsolete and incomplete view of the financial system and the channels through which policy initiatives affect the economy. He urges policymakers to recognize these difficulties and to try to optimize with them explicitly in mind.

Hester argues that the recent policy emphasis on controlling the growth of conventional monetary aggregates is especially vulnerable to innovation. He notes that the velocity of money increased unusually during periods when innovations spurted. Yet the changes were largely unrecognized at the time they were occurring. And if a more vigilant Federal

Reserve recognizes change more quickly in the future, it will still have no way of knowing how much to alter its stabilization measures. More fundamentally, the financial system is capable of economizing on whatever monetary aggregate is in short supply. Under competitive pressures, financial institutions have shown they can continue to satisfy demands for credit despite the restraints of a policy that restricts money supply growth. Although the relations between interest rates and economic performance may also be altered by change, Hester believes they are likely to be more robust. Thus he urges a renewed emphasis on real interest rates as a guide to policy. In his view, rates should be allowed to vary in response to a broad range of evidence about economic performance, but they should be kept positive. By some measures, real rates were negative for much of 1974–78, a development that Hester regards as excessively expansionary and an inadvertent consequence of the Federal Reserve's attention to conventional monetary aggregates during a period of change in financial markets. By contrast, real rates have been very high in recent quarters; and Stephen Goldfeld, in his discussion of Hester's paper, warns that the pursuit of steadily reducing monetary targets may now keep real rates too high for too long.

In addition to his general prescriptions for stabilization policy, Hester urges increased attention to the surveillance and regulatory activities of the Federal Reserve, particularly in the more competitive environment that innovations are producing. The Federal Reserve's ability to pursue a restrictive policy will be compromised if that policy threatens failures and bankruptcies. To minimize the risk of such financial failures as competition increases, bank examinations need to be strengthened to assure that prudent financial standards are not ignored; and competition for funds may need to be constrained, especially when it leads to securing funds through channels such as repurchase agreements and overnight Eurodollar borrowing that seriously circumvent attempts to restrain the expansion of credit. Without such steps, the risk of bankruptcies and bank failures can ultimately restrain the Federal Reserve from pursuing a restrictive policy that may be needed for macroeconomic stabilization.

THE 1970s were turbulent years in international financial markets marked by widely fluctuating exchange rates and unprecedented current account deficits in many countries. In the fourth paper of this issue, Jeffrey D. Sachs analyzes the factors that have determined current account

deficits and surpluses during this period and the relation between cur-
rent accounts and exchange rate variations. The major shocks to inter-
national capital markets were the OPEC oil price increases in 1973–74
and 1979–80. These increases resulted in large OPEC surpluses. Not
surprisingly, many observers have attributed the deficits of individual
oil-importing countries to the same events. A major theme in Sachs'
paper is that the association of oil dependence and current account defi-
cits, country by country, is too facile. In his view the distribution of
deficits is at least as much a reflection of investment performance as of
oil dependence. Furthermore, shifts in investment are an important ele-
ment in determining changes in real exchange rates.

Sachs provides an important adjustment to published current account
data before conducting his analysis. He notes that these data are distorted
because they include inflation-induced increases in interest income and
expense, but do not take into account the corresponding reductions in the
real value of debt. The inflation adjustments to correct for these distor-
tions are large and are important to the interpretation of events. By 1978
over half of the conventionally measured $24.8 billion deficit of less-
developed countries (LDCs) was attributable to the inflation bias, and
the OPEC current account appears to be overstated by approximately
$11 billion.

Even after adjustment for inflation, the increases in oil prices appear to
be the predominant factor explaining surpluses in the OPEC current ac-
count and the corresponding deficit of the rest of the world. However,
more disaggregated data suggest oil is only part of the story. The current
account of the LDCs declined much more than the current account of
developed countries, even though their oil import dependence is compara-
ble. Among nonoil LDCs, the deficits and oil dependence were correlated
only for the years of major price rise, 1974 and 1979. In the intervening
years, deficits deepened from their 1973 levels more for oil exporters than
for oil importers. Similar results hold for the economies of the OECD.
In Norway, a country with large oil reserves, the current account deficit
rose from about 1 percent of GNP in 1965–73 to about 8 percent of GNP
in 1974–79, providing the most dramatic illustration that deficits need
not be related to oil dependence.

In Sachs' view, this pattern is not as puzzling as it first appears. His
explanation has two main elements. First, he believes that reductions in
real income that oil-importing countries had to make because of the oil

price increase should have resulted, after a brief period of adjustment, in offsetting reductions in consumption and hence should have had little effect on national saving or the current account. Second, he believes that shifts in investment, whether exogenous or induced by the oil shock itself, are the major disturbances to the current account, while output fluctuations or changes in relative prices are relatively unimportant. In support of these views, Sachs presents a theoretical model that assumes full employment, perfect foresight and rational behavior by agents, perfect international capital mobility, and no costs of adjustment of either consumption or investment. Sachs recognizes that his model abstracts from many features of reality in the short run, but believes it captures the important elements of the response to disturbances in the intermediate run.

In a model with perfect capital mobility and no costs of adjustment, the current account depends critically on intertemporal choices about saving and investment made by households, firms, and the government. Stressing this feature of his model, Sachs focuses on the fact that the current account is simply the difference between national saving and domestic investment. The importance of distinguishing permanent and transitory disturbances is then apparent. Permanent reductions in real income—arising, for example, from a permanent oil price increase— should not significantly affect saving and therefore should have little effect on the current account. Transitory reductions, on the other hand, should lead to substantial dissaving and a current account deficit. Similarly, transitory increases in government spending should have little effect on consumption and, since output is effectively fixed in the model, should produce a decline in the current account equivalent to the decline in government saving.

Shifts in investment, like transitory changes in government spending, have large effects on the current account under the author's assumptions. Because of international capital mobility, domestic markets need not squeeze out current consumption to take advantage of a productive investment opportunity; indeed, consumption may increase in anticipation of future returns from investment, thus producing a further decline in the current account. This mechanism provides a straightforward explanation of the Norwegian experience noted above, in which investment for oil extraction was stimulated by the oil price increases. The oil price shock may also have encouraged worldwide investment in the aggregate

by lowering real world interest rates as wealth was redistributed to OPEC with its relatively high propensity to save. Sachs notes that oil price increases can also work in reverse by decreasing the attractiveness of investment in energy-using capital. Hence permanent increases in oil prices could actually improve the current account of some oil-importing countries.

Consistent with his theoretical model, Sachs believes that most empirical explanations have placed too much emphasis on oil shocks and shifts in either public or private saving and failed to recognize the role of large shifts in the distribution of world investment among countries in explaining the distribution of deficits. Sachs reports data and regressions for the OECD countries suggesting that shifts in investment have typically dominated variations in saving rates in explaining their current accounts. He finds wide variations in the importance of saving and investment in explaining the current accounts among the LDCs. In some countries, particularly those with diversified export sectors and growing manufacturing bases such as Argentina and Brazil, increases in investment dominated; in others, such as Chile and Zambia, which suffered transitory reductions in terms of trade because of declines in prices of raw materials, declining saving rates were more important. Comparing the 1965–73 and 1974–79 periods, the current account declined considerably more for the LDCs than for the developed countries, mainly because LDC investment rose more. Investment relative to GNP increased in eight out of ten of the LDCs and declined in ten of fifteen of the developed economies. Sachs attributes the shift in the locus of world investment toward LDCs to a variety of causes: efficient development programs and increased receptivity to foreign investment, a boom in raw materials investments generally, and a worsening of investment opportunities in developed countries. The fact that a large fraction of LDC deficits can be attributed to strong investment helps explain why their growing debt has not made their borrowing more difficult. The author presents evidence that LDC borrowing rates are favorably affected by investment, a fact consistent with other evidence that high investment reduces the probability of default.

Sachs develops a simple monetary framework that can accommodate as special cases a wide variety of views about the mechanisms relating the current account and exchange rates. These include models of earlier authors that have stressed wealth effects, terms of trade, and portfolio

balance in both the long and short run. A major lesson of Sachs' model
is that the linkages between the exchange rate and the current account
are far from rigid and depend crucially on the nature of the shocks that
initiate a change in either. A rise in investment and the resulting decline
in the current account should typically be accompanied by a nominal and
real appreciation of the exchange rate. By contrast, a permanent increase
in foreign demand for exports may actually reduce the current account
at the same time it causes appreciation of the real exchange rate.

IN TIMES OF INFLATION, the payment structure of traditional mortgages
and retirement annuities imposes hardships on young and prospective
homeowners and on retirees. Michael C. Lovell examines this problem in
the first report of this issue. For both mortgages and annuities, the hard-
ship results from a "real-payment twist" that characterizes level-payment
instruments during inflation. Wtih constant nominal retirement payments,
inflation erodes the real incomes of retirees in their later years; with con-
stant mortgage payments, inflation makes the real cost of homeownership
high in the early years of a mortgage. Thus the annuity loses much of its
main purpose—the assurance of adequate retirement income over an un-
certain lifespan—and mortgages do not evenly spread the real cost of
homeownership over a large number of years. Indexed mortgages and
annuities, with payments that vary in proportion to the price level or to
some related measure, would eliminate the real-payment twist and restore
the desirable characteristics that the level-payment instruments have dur-
ing a time of stable prices.

Lovell observes that recent innovations in the mortgage market, such
as forms of variable interest rate mortgages and shared appreciation mort-
gages, are designed to protect the mortgage lender against inflation un-
certainty; but they do not deal with the problem caused for borrowers
by the payment twist. Lovell suggests that the simultaneous creation of
both indexed mortgages and pensions would exploit the symmetry be-
tween them, with financial intermediaries offering indexed pensions and
annuities on the basis of investments in indexed mortgages. Balancing
indexed mortgage assets with indexed retirement liabilities would elimi-
nate the risk of uncertain payment streams that otherwise inhibits the
creation of either indexed instrument alone.

IN THE SECOND REPORT of this issue, Frank de Leeuw and Michael J.
McKelvey analyze the price expectations data from the annual plant and

equipment survey of the Bureau of Economic Analysis. These data, available since 1970, report the average annual price changes businessmen expect for the capital goods they buy and for the products they sell. De Leeuw and McKelvey perform several statistical tests to determine the accuracy of price expectations in predicting actual price changes and examine alternative views about how these price expectations are formed.

The tests reject the hypothesis that price expectations are rational, a hypothesis that assumes expectations are both unbiased and efficient. For both capital goods prices and sales prices, expected price changes are a biased estimator of actual price changes. Furthermore, when either lagged capacity utilization or lagged changes in the money supply are added as explanatory variables, they contribute significantly to explaining actual price changes, indicating that price expectations are inefficient predictors that do not incorporate all available information about future price changes. The authors also test and reject a simple error-learning hypothesis, under which expectations are systematically adjusted for the error in the expectations of the previous year. When they augment the error-learning model with lagged changes in money or prices or with lagged capacity utilization as additional explanatory variables, they find that only capacity utilization contributes importantly to explaining expected changes in capital goods prices; and none of the additional variables is useful in explaining sales prices. In all their tests, they find a strong association between expected price changes and the most recently observed actual change in prices. But this association does not support any simple model of how expectations are formed, indicating that the process is a complicated and changing one.