

CREDIT ALLOCATION
TECHNIQUES
and
MONETARY POLICY

BRANNON

DAVID

FORTUNE

HODGMAN

KAMINOW

LINDBECK

LINTNER

MAISEL

MANN-FRIEDMAN

MILLER

SAMUELSON

SMITH

SOLOMON

WAUD-PICOU

PROCEEDINGS OF A
CONFERENCE
HELD IN
SEPTEMBER 1973



FEDERAL RESERVE BANK OF BOSTON

CREDIT ALLOCATION
TECHNIQUES
and
MONETARY POLICY

Proceedings of a Conference
Held at
Melvin Village, New Hampshire
June, 1973

Sponsored by
THE FEDERAL RESERVE BANK OF BOSTON

THE FEDERAL RESERVE BANK OF BOSTON
CONFERENCE SERIES

- NO. 1 CONTROLLING MONETARY
AGGREGATES JUNE, 1969
- NO. 2 THE INTERNATIONAL
ADJUSTMENT MECHANISM OCTOBER, 1969
- NO. 3 FINANCING STATE and LOCAL
GOVERNMENTS in the SEVENTIES JUNE, 1970
- NO. 4 HOUSING and MONETARY POLICY OCTOBER, 1970
- NO. 5 CONSUMER SPENDING and
MONETARY POLICY: THE LINKAGES JUNE, 1971
- NO. 6 CANADIAN—UNITED STATES
FINANCIAL RELATIONSHIPS SEPTEMBER, 1971
- NO. 7 FINANCING PUBLIC SCHOOLS JANUARY, 1972
- NO. 8 POLICIES for a MORE COMPETITIVE
FINANCIAL SYSTEM JUNE, 1972
- NO. 9 CONTROLLING MONETARY AGGREGATES II:
THE IMPLEMENTATION SEPTEMBER, 1972
- NO. 10 ISSUES IN FEDERAL DEBT MANAGEMENT
JUNE, 1973
- NO. 11 CREDIT ALLOCATION TECHNIQUES
and MONETARY POLICY SEPTEMBER, 1973

FOREWORD

The papers and comments in this volume were presented at a conference sponsored by the Federal Reserve Bank of Boston in September of 1973. The conference explored "Credit Allocation Techniques and Monetary Policy" during two days of meetings.

This volume is the eleventh in a series published by this bank. The proceedings of previous conferences have been widely distributed and have contributed to the debate on monetary policy issues. We hope this volume will contribute to a better understanding of some of the issues involved in the perennial debate over credit allocation.



Frank E. Morris
President

CONTENTS

Monetary Policy and Credit Allocation – The Basic Issues	
EZRA SOLOMON	9
Improving Our System of Credit Allocation	
SHERMAN J. MAISEL	15
Controlling Lender Behavior: Asset and Liability Restraints	
MAURICE MANN	
and	
HARRIS C. FRIEDMAN	31
Discussion	
PETER FORTUNE	42
Controlling the Terms on Consumer Credit	
PAUL F. SMITH	51
Discussion	
IRA P. KAMINOW	60
A Variable Investment Tax Credit	
GLENN C. PICOU	
and	
ROGER N. WAUD	65
Do We Know Enough to Adopt a Variable Investment Tax Credit?	
JOHN LINTNER	113
Credit Controls in Western Europe: An Evaluative Review	
DONALD R. HODGMAN	137
Discussion	
JACQUES H. DAVID	162
Discussion	
MARCUS H. MILLER	173
Some Fiscal and Monetary Policy Experiments in Sweden	
ASSAR LINDBECK	179
Discussion	
PAUL A. SAMUELSON	224
Discussion	
GERARD M. BRANNON	229

Monetary Policy and Credit Allocation -- The Basic Issues

EZRA SOLOMON*

The financial system of the United States contains two large sub-systems. The function of the first, generally referred to as monetary policy, is to control the total volume of credit for the purpose of aggregate economic stabilization. The second sub-system, which has no name, consists of a maze of regulations, institutions and tax practices designed to influence the allocation of credit, and hence of resources, among different classes of potential users.

The two sub-systems interact in complex ways. In its attempt to control the volume of credit, monetary policy inevitably influences the cost and allocation of credit. Similarly, the existence of an allocative sub-system and changes in it, have an important influence on the conduct of monetary policy. A third form of interaction arises because the monetary authorities exercise control over part of the allocative sub-system and use this control in conjunction with their more general powers over the volume of credit.

As its title indicates, this conference deals with issues in all three areas: the conduct of monetary policy, the allocation of credit, and the actual and potential influence of each on the other. While the title does not so indicate, the origin of the conference itself lies in the growing dissatisfactions with the performance of the system as a whole, particularly during periods of credit restraint such as 1966, 1969-70 and 1973.

*Professor, Graduate School of Business, Stanford University

The Issues

My assigned task is to introduce the subject by making a few preliminary skirmishes around the interrelated whole for the purpose of isolating the principal issues.

At first glance it would seem that the major problem area to be explored is the *interface* between monetary policy and credit allocation; this is where the principal source of dissatisfaction seems to lie and where the chief suggestions for innovation and change seem to concentrate. Along these lines, the relevant questions would be:

Can the use of direct controls over credit allocation improve the way the present system functions? If so, what form should these direct credit controls take?

A second look at the problem suggests that this approach is too narrow, and being too narrow it could lead too easily to answers favorable to direct credit controls — answers which may not follow if the problem itself is viewed in its entirety. Although the stream of dissatisfaction with the functioning of the present system is large, it does not flow from a single source. Even an incomplete listing of the sources from which dissatisfaction does flow would show that they are numerous, diverse and by no means confined to the *interface* as such. While all of us, including the Federal Reserve, are dissatisfied to some extent, each has a different diagnosis of what really is wrong and each has a different axe to grind. In this conference, confining the discussion to the *interface* alone is too constrictive. The relevant questions should be couched more broadly:

What is wrong with the present system and how can it be improved? What role should explicit or direct controls over credit allocation play in this improvement?

If the case for direct controls is a good one it should be able to survive the broader approach outlined above.

The Present System

It is useful to classify the real sources of dissatisfaction with the present system into three broad categories: Those primarily related to the stabilization objective; those primarily related to resource-allocation priorities; and those that arise entirely from the interface between the two.

Stabilization Policy

(1) For many people, including myself, the real root of the system's recent and present problems can be found in the unwillingness or inability, or both, of the Executive and the Congress to recognize that fiscal policy is an essential tool for disinflationary policy. Consequently, too large a burden for disinflation has been placed on monetary policy, and this has repeatedly resulted in very sharp increases in market interest rates, serious disintermediation, and the credit allocation problem. Direct credit controls can help alleviate the credit allocation symptoms, but in themselves they can do little to solve the root of the problem itself.

(2) For others, again including myself, a secondary root of the system's difficulty stems from the fact that increases in interest rates, which are wholly or largely due to inflation itself, do not serve to reduce the demand for credit in a world of tax-deductibility. Indeed in some situations their effect can be perverse. Assume for example that the nominal rate of interest is 5 percent in a world that perceives zero inflation. At a 50 percent tax rate the real cost of credit is 2.5 percent. Assume that expected inflation rises to 4 percent per annum and that the nominal rate rises to 9 percent. The after-tax nominal cost would be 4.5 percent, but the real after-tax cost *falls* to 0.5 percent! To the extent that earnings are subject to the full 50 percent tax rate the expected rate of return measured on a real after-tax basis also falls. However if part of earnings is subject to a lower rate of tax the fall is not commensurate and the effect of higher inflation-induced interest can be perverse. Thus with rising inflation, at least one engine of monetary policy is likely to be churning its wheels ineffectively upon a very slippery slope!

The Structure of the System

For other groups of people, and once again I am happy to be counted in their number, a good part of the problem lies within the *structure* of the financial system, especially in the fact that credit allocation depends on the existence of narrowly-specialized and restricted institutional practices and the adjacent fact that one form of direct regulation — Regulation Q and its cousins — provides a vulnerable dike between the protected lagoon and the open sea. Whether you like my mixed metaphor or not, what this group is saying is clear: Regulation Q cannot prevent disintermediation into the open market and the only real safety lies in developing a far

less-specialized set of financial institutions which can adjust on both the asset and the liability sides of their ledgers. If housing has to be protected, society should do so explicitly. If Hunt Commission-type changes can be introduced, the worst of the *interface* problem, as such, will virtually vanish.

The Allocation-by-Social-Goals Objective

An altogether different source of dissatisfaction with the present system arises because some people believe that the marketplace does not allocate the right to credit, and hence the right to real resources, in an appropriate way. At its mild end this group would argue that social priorities may differ from those expressed through a free market for credit — and hence that direct intervention via taxes or controls is necessary to ensure that credit is somehow reallocated in a way more consonant with social priorities. At its un-mild end the group would assert that the power to create credit is a social grant in the first place and that social priorities should have a clear right over priorities determined by the untampered marketplace.

Each of these views takes two forms — one defensive and the other assertive. Both are interesting and important, but only the former is relevant to the present discussion. It says: (a) “Tight money” may have to be used from time to time; (b) “Tight money” hurts good social uses of credit more than it hurts less-worthy uses; (c) Therefore direct controls should be used to insulate and protect the worthy uses.

In contrast the assertive form of the proposition has little to do with the subject of this seminar. It says: Whether or not there is any interconnection between monetary policy and credit allocation, i.e. during periods of loose or tight money, both sub-systems should be actively used to assign credit in conformity with politically-determined and expressed priorities.

The Role of Direct Credit Controls

Viewed against the large and diverse background of those who are dissatisfied with the present system, the size of the group which looks to direct controls as a solution to the *interface* issue, as such, is not as large as it might have appeared at first glance. The question of the need for direct credit controls and the accompanying question of which and how, still remain, but the level of both their urgency and support become contingent on other solutions.

- (1) Will the United States come round to using fiscal means to suppress excess demand? The answer is surely “yes”. It took a whole generation of economists and millions of words to demonstrate that fiscal policy can, and should, be used when it is necessary to stimulate aggregate demand. Unfortunately this effort somehow left the wrong impression that monetary policy alone, although not sufficient to induce expansion, *was* sufficient to hold down demand. Another whole generation has been at work trying to persuade society that fiscal policy is also an essential tool on the restrictive side of the equation. Devising a simple system through which the Executive and the Congress can jointly trigger a temporary, self-terminating program of fiscal restraint without the usual ritual of delay and debate is not an impossible task, and very soon, it must succeed.
- (2) Eliminating the full tax-deductibility of interest is possibly a more difficult venture. It will require the corresponding elimination of interest as income, and this, in time will require other adjustments. But it is at least as feasible as giving the Federal Reserve System a genuine set of differential powers over credit allocation.
- (3) The adoption of the Hunt Commission recommendations, as revised by the Administration, will also take debate and time. However these recommendations do provide viable alternatives to direct credit controls.
- (4) Finally, provisions can and will be made to alter the basic pattern and allocation of credit flows — although this is a continuing, rather than a one-shot, process.

Where does all this leave the basic questions: Are direct credit controls necessary? Are they desirable? Are they feasible? What form should they take?

These are questions the conference will try to answer. My purpose is to set the context within which they should be approached. Given the availability of alternative solutions my own guess is that the answer to the first three questions on direct credit controls is “No”. Given the fact that every single form of credit not now controlled has had support as a “priority item” from some segment of society, I will make one further guess: If the question of just *how* direct credit controls should be applied is answered first, the support for the idea of using direct credit controls at all will fall by at least one-half.

Improving Our System of Credit Allocation

SHERMAN J. MAISEL*

Many observers are dissatisfied with our current system of credit allocation. Short-term nominal interest rates have reached record levels, yet their impact on demand for resources in short supply has not been obvious. What monetary policies would be required to halt inflation and who would suffer if such policies were put in place is extremely unclear. If monetary policy is effective, we shall almost certainly experience again situations in which potential home-buyers, small businessmen, or local officials find either that no loan can be found or only limited sums are available at very high rates. At the same time, others will be able to borrow because of their situation in the market or past institutional relationships.

In contrast to other components of the stabilization effort, the Committee on Interest and Dividends has played a minor role, limiting its action to minimal jawboning. Even so, its actions have been controversial. Some objected to even this amount of interference in the decision process while others have complained because it has failed to hold down the price of credit. Because widespread dissatisfaction points up the desire for more effective policies, this appears to be a good time for us to meet and discuss possible methods of improving our existing system of credit allocation.

Let me list some major points which I shall develop in more detail:

- Our system of credit allocation has developed in a very hodge-podge manner. It lacks internal logic and is far from the model of pure, perfect competition of an ideal market system.
- We do not know how far the existing system differs from one which would efficiently distribute savings among the variety of borrowing demands.

*Professor of Applied Economics and Finance, University of California (Berkeley). This paper draws heavily on my previous publications, particularly: "Credit Allocation and the Federal Reserve" in *Managerial and Regulatory Problems in Banking*, Banking Research Center, Northwestern University, 1971; and *Managing the Dollar* (New York: W.W. Norton & Co., 1973).

- We know that our financial system has been very unstable in the past. Many of our regulations and current practices developed in an attempt to increase stability. We do not know what would happen if they were removed.
- Numerous possibilities exist, in addition to those we are now using, for more selective allocation of credit. They can be found in other countries and in our own past. Just as our present system has obvious problems, so do these other approaches.
- We would be better off if we could use fiscal policy rather than monetary policy in attempts to bring about stabilization and a more desirable income distribution.
- To the degree that monetary policy is to be used instead of fiscal policy to fight inflation, our present system requires change. We may rapidly be approaching the point beyond which tightening of over-all monetary policy may be harmful rather than useful.

Policies to improve our financial markets and move them closer to the pure, perfect model of theory can take the form either of removing regulations or of replacing or supplementing existing instruments with more logical ones. It is frequently assumed, without analysis, that removal of regulations will do the job. This may be far from true. Other features of the financial system, such as its dynamic responses, concentration of resources, and our lack of knowledge, may cause it to function less well if regulations are removed than it does at present.

In contrast, regulations, taxes, licenses and other forms of selective credit allocations can be designed to insure that our market will work more like the perfect model of theory than either our existing system or any system derived merely through doing away with current regulations.

- While we cannot know what would happen, I believe that we are more likely to achieve a better operating structure through improvements in selective techniques than through attempts which seek primarily to dismantle parts of our existing structure. We should not assume that the forces which caused our system to interfere with uncontrolled market forces have disappeared.
- Our structure of credit allocation can be improved by the use of more market-oriented selective charges and taxes. As an example, controls based on market auctions rather than existing arbitrary quotas could be introduced. There is no guarantee that results would be better. They would depend on governmental policies rather than on accidental events, but the framework of policy would be more logical. Policy results would be more predictable than they are under the existing structure. A greater degree of equity could be obtained. Efficiency would be increased.

Our Current System

General agreement exists in the United States that if the share of economic decisions made by properly operating, impersonal, competitive market forces could be increased, the efficiency of the economy would rise. Many of our most vehement economic debates would disappear if we had a system with pure atomistic competition, perfect knowledge, minimal impediments to instantaneous adjustments; one that corrected for problems of externalities and macro-instabilities, and that properly reflected our social priorities. Because our system is so far from such an ideal one, controversies abound, and we hold conferences such as this. We hope to find those policies, tools and instruments which might reshape our current economic system and structure to utilize market forces more fully. If successful, they would bring us closer to our ideals of efficiency and, more controversially, to desired social goals.

The financial field has been characterized since the founding of our republic by especially vehement conflicts over how well our system works and how it should be improved. As a result of a long history of instability, concern over social values, entrenched oligopolists, and periods of disastrous crises and failures, we have erected an extremely complex financial structure.

On one hand, it appears close to the competitive ideal. We have more than 35,000 financial institutions, hundreds of different credit instruments and financial markets, and an unquenchable innovative spirit among entrepreneurs. They interact with millions of borrowing units in innumerable decisions as to how and when to borrow and lend.

On the other hand, as in many economic processes, activity is concentrated in a fairly small number of institutions. In most sectors fewer than 50 firms account for a majority of assets and lending. In many localities a single institution has a monopoly in its own market. Overall, a relatively small number of institutions or borrowers — say 500 to 1,000 — accounts for the bulk of lending and borrowing. Numerous market problems arise because of costs of information, returns to scale, uncertainty, delays in the adjustment process, externalities, and frequent periods of disequilibrium.

Our money and credit system contains numerous laws granting rights and privileges in particular markets. Many sectors are highly regulated as to entry, interest rates, portfolio policy, and operations. Borrowers receive subsidies or indirect aids through tax deductions and exemptions. The Federal government helps others through direct lending, insurance and guarantees, and sponsored agencies. Some borrowing or lending is controlled directly.

We are all familiar with some of the ways in which these regulations work out in practice. The Federal government has delegated to commercial banks the government's right to create money, subject only through reserve requirements to a small franchise tax. The banks are forbidden to pay interest on these funds. They are, in addition, granted whatever protection from geographic competition they can extract from their state legislatures. The Federal government, by guaranteeing both liquidity and solvency, has aided banks and thrift institutions to develop a highly desirable type of deposit primarily for households. In turn it has restricted the uses to which these funds can be put, as well as the interest that can be paid on them.

The list of lenders and borrowers who benefit from tax exemptions, excess tax deductions and direct subsidies is long. Savings institutions, life insurance companies, banks, credit unions and pension funds have all been granted special tax treatment. Corporations are helped by excess depreciation allowances and the ability to retain undistributed profits. State and local governments, home owners, owners of apartment houses, and others are also on the list of beneficiaries. In addition, borrowers and lenders are helped or hindered by ceilings on interest paid and received, usury laws, and other efforts of both the Federal and state governments to influence financial markets.

Most observers agree that, as a result, credit distribution in the current financial system or structure deviates considerably from that which might obtain in a better constructed and operating system. The existing market is segmented by geography, types of savers, lenders, and borrowers. While some overlaps exist, and while large borrowers may encounter quite effective competition, non-competitive pockets remain for many. The procedures by which credit is allocated contain many non-price elements. They lead to rationing on a haphazard basis that is not well understood. They may raise the average level of interest rates. They express in only the dimmest way national priorities for credit.

Nor is it clear whether the existing system increases or reduces instability compared to other possible market structures. Under the present system interest-rate movements appear to be increasing in volatility. As this trend continues, the probability of a major financial crisis rises. A system which works under conditions of minor instability may not be viable if financial institutions and corporations find they must adjust to ever-larger fluctuations in interest rates and liquidity.

As an interesting aside, in the recent past when some commercial banks announced they would use so-called "market determined rates," they made clear that they were talking in terms of their customers' but not their own prices, i.e., the amount of margins or mark-ups they charge between their borrowing and lending rates. They based their pricing on techniques which could not occur in a competitive market, but could exist only in an imperfect-oligopolistic market with administered prices. They announced they would alter their prime lending rate weekly or bi-weekly to insure themselves a constant mark-up on margin for their services. Such movements could not occur (except under most unusual circumstances) in any type of a well-operating competitive system.

In addition to the questions our current system raises with respect to domestic financial markets, still larger ones are found when we examine the international sphere. The growth of multinational corporations and banks, as well as increased international lending, has been dramatic. These firms have the ability to borrow and lend in a wide variety of separated domestic markets. As the number of available markets grows so does the variety of financial structures faced by a firm. All of the problems of different regulations, tax systems, subsidies, information, etc., rise exponentially. Unique features are offset or multiplied by an overlay of regulations dealing specifically with foreign borrowing and lending.

While purists may believe that all of these international variations can be encompassed and such market differences can be corrected for through adoption of flexible exchange rates and international speculation, the problem in practice is far more complex. Shifts in exchange rates which primarily reflect market structures rather than underlying economic values may cause extreme variations among local markets in credit and resource allocation and costs. Just as the current internal systems do not guarantee that we will reap the benefits of pure, perfect competition, so differences among them mean that flexible exchange systems may exacerbate, not reduce, the amount of instability and divergences from an efficient or desirable solution.

Possible Improvements in Credit Allocation

Just as general agreement exists that a well-operating market can improve economic decisions, so also most observers believe, even though they may not agree on specifics, that improvements are possible in our financial structure.

Secular Aspects. In an improved market, borrowers would be more likely to obtain the funds which they were willing and able to pay for. Savers would receive competitive rates of interest from financial institutions. Lenders would not discriminate among potential borrowers. Rates would depend on risk, duration, size, and type of loans and would not be affected as much by institutional relations as they are at the present. The profits of institutions would be at the competitive level.

Each observer probably has a different list of the types of changes he believes necessary to bring about a more perfect market. Some place great stress on reform of our system of regulations, taxes, and subsidies. Many emphasize changes in organizations, chartering and better information. Still others stress new tools and instruments for credit allocations. Some feel improvement in how the market reflects social needs and desires is most necessary.

Even if the financial markets were completely rational and allocated resources efficiently on the basis of existing private earnings or wealth, logical reasons could exist for governmental policies to alter such allocations. Just as tax and spending programs have been used to express social priorities, so have special claims on financial markets or below-market rates been used in many countries for these same purposes. Financial income is a significant part of the whole. It can be redistributed through financial policies. Governments provide increased access to the credit market for demands such as schools, lower income housing, ecological improvements, redevelopment of urban centers or rural areas, or other needs which appear to promote national welfare more than other less vital expenditures.

Stabilization Aspects. Perhaps more significant at the moment are changes in the financial system which would aid our stabilization goals. If monetary policy is to fight inflation successfully, we may need to find new techniques to make such policy effective.

For purposes of stabilization, even as demand is restricted in inflationary sectors, we might want to maintain other demand in sectors critical in an economic or social sense or which use available non-transferable resources. At the present, even if inflationary demand arises primarily in a limited number of sectors, aggregative techniques curtail demand and output across the board. The total impact may, consequently, be more than desired, or adequate curtailment may be possible only through major shifts in resources away from spheres with high national priorities.

When monetary policy is tightened, the burden on different sectors is both uneven and haphazard. It depends not on any necessary

or valid economic principles but upon the particular shape of the financial structure as it has developed to this time. If our credit allocation system is improved, the burden may be made more even and less random.

A good deal of concern is expressed about the major redistributions in wealth which accompany rising interest rates. Just as with inflation, changes in wealth and income which arise from rapidly shifting interest rates have only slight economic logic. A family may experience a large capital loss or gain, depending on when its head is transferred to a new city. Two adjacent school districts may have most uneven tax burdens, depending on when they happened to finance their new high schools.

Under a system which relies primarily on the control of total credit, the burden of restraint falls very unevenly. Who pays for the battle against inflation depends not on equity or economic efficiency, but upon the particular distribution of debts, assets and cash flows that exist at the start of the period. The greater the variations in interest rates required to bring about the desired level of restraint, the greater are the inequities that result from major shifts in interest rates and credit flows.

Interest rates are prices. The more they can be stabilized, the easier will be the fight against inflation. Narrower movements in interest rates would serve another useful purpose. Many people place a high priority on the consequent stabilization of asset prices, which would remove the inequity that arises from their wide swings. It would appear not only logical but necessary that such factors be considered in developing and using our tools of economic policy.

From the policymaker's point of view, an important reason for desiring new techniques of credit allocation or changes in the existing system may be to improve the predictability of policy while decreasing existing lags. A major school of monetary thought believes that monetary policy is not a useful tool because of its lags and lack of certainty. They prefer to accept the changes in income distribution and potential crises which can arise from a fixed monetary rule. Those who disagree with them that poor knowledge renders monetary policy inoperative would, however, welcome the improved efficiency which would ensue if new tools could insure a more exact response within a narrower time period.

Finally, changed methods of credit allocation may be necessary so demand can be cut back sufficiently without the need to raise interest rates so high as to cause a financial crisis or crunch. It is entirely possible that, given our existing financial structure, the level of interest rates required to halt inflation may not be a feasible one from

either an economic or a political point of view. The necessary degree of restraint may only be obtainable through a combination of instruments. If demand can be curtailed by selective controls in specific sectors, the lower will be the interest rate needed for a given degree of restraint.

Foreign Lending and Borrowing. Because the knotty problems of lags, speculation, income and interest rate elasticities in the international sphere are well recognized, our international monetary system has contained a large number of specific tools aimed at influencing credit flows across foreign borders. Virtually the identical arguments for and against the need to adopt specific new tools and instruments can be found in the international as in the domestic sphere.

Methods of Altering Credit Flows

A vast number of instruments and techniques can be used to help achieve a better operating financial structure for both stabilization and long-term allocation purposes. The literature, our past experience and the experience of foreign countries all contain a variety of suggestions. The Conference has been called to discuss in greater detail some of these possibilities.

In examining such methods I have found it useful to classify them into three types, even though several may fall into more than one category: (1) changes in the financial structure; (2) limits on quantities of credit; and (3) changes in price relationships.

Changing Institutions. Recognizing that our financial structure is a hodgepodge of institutions, habits, rules, market relationships, subsidies and tax preferences, observers find many actions which hopefully would improve the structure and its reactions in order to do a better job of dividing the scarce resource — credit.

Of course, the structure is constantly changing anyway. Present institutions have a long history of development. Obvious regulatory discriminations exist, praised by those they benefit and denounced by those feeling deprived. During the past five years many institutions found themselves with very unsatisfactory portfolio policies and limited flexibility. The financial market has been in a constant state of learning as it has tried to solve some of its basic problems.

The problem is whether, or to what extent, the developing structure will meet the market's basic needs. Some believe that we can now make sufficient changes so that any need for selective action

may not be necessary. We can do away with many of the selective controls of our existing system. But many are less optimistic, arguing that as knowledge increases and communications speed up, critical problems also increase. Both views reinforce the constant need to search for methods of institutional improvement.

Another approach stresses the need to create new institutions which would be more efficient in the raising and channeling of funds into deficit areas. The revised FNMA, new functions for the Home Loan Bank Board, and an environmental financial authority all are examples of this type. The improved operations and market results of FNMA and the FHLBB show that major gains can be made through institutional change.

We are currently experimenting with deregulation of deposit interest-rate ceilings. A wide variety of other suggested institutional changes are being debated. Some of these proposals are aimed directly at the problem of credit allocation. Others seem to flow from a narrowly theoretic approach to a particular part of the overall problem and may be expected to worsen rather than to correct some of the poorly working features of the existing system.

Altering Quantities. Several selective controls attempt to limit the quantities of credit which may be made available. Ceilings or quotas may be placed on total credit, on credit to specific spheres or to individual borrowers on credit through individual lenders or types of lenders, or preferences may be granted to credit in particular sectors.

In recent years the United States has used ceilings to control foreign, but not domestic, lending. For stock market credit, limits are placed on the amount which can be borrowed on particular types of collateral. In the past, consumer and mortgage credit were also limited in terms of the amount of a transaction which could be financed and by the length of time during which loans could be repaid. Another technique used has been through controls over capital issues — limiting the type of size of issues in the market or which could be purchased by lending institutions.

In many countries there are and have been special quotas for loans in preferred fields as well as supplementary primary or secondary reserve requirements. Reserve ratios can work in many ways. If the reserve must be kept at the central bank, it allows the central bank to control total but not specific assets. If particular liquidity ratios are required, these insure larger markets for certain types of assets — most frequently borrowing by the government. Asset reserve requirements can be still more general. They can require that specific or

cumulative fractions of each financial institution's assets be held in certain types of assets. For example, savings and loan associations are constrained to hold residential mortgages, both by regulation and by tax advantages.

Changing Prices. Even more common than restrictions on quantities are attempts to change credit flows by altering prices (frequently through subsidies) particularly of interest payments or the terms of loans. Subsidies usually come from the government, but they are also paid by central banks and frequently by one group of savers, lenders or borrowers to others.

Most countries have subsidies or tax preferences similar to those which housing receives in this country. The ability to borrow at subsidized interest rates is also common. Who is subsidizing whom often becomes almost impossible to determine. We have such an example in our system, where it is not at all clear whether financial institutions, large business borrowers, or mortgage borrowers are aided by the regulations against paying any interest on demand deposits or full market interest rates on time and savings deposits. We also do not know who foots these bills. Similarly, how much of the Federal forgiveness of income taxes on state and municipal bonds goes to the localities and how much to the individual or firm buying the bonds is almost impossible to calculate, since it varies greatly over time and among issues.

The opposite may also occur, of course. The price of credit to particular borrowers or classes of borrowers can be raised through taxes or other change. In the case of the interest equalization tax on foreign lending, the tax is paid by the lender. It is also possible to tax borrowers either directly or by not allowing full deductibility for tax purposes of marginal or total borrowing. Reserve ratios imposed on lenders against particular types of loans would have a similar impact in raising specific rates. By increasing credit availability elsewhere, they would also serve to lower rates on other types of loans.

What Changes Should Be Made?

We have examined some of the problems inherent in our existing credit allocation system. To achieve a more efficient structure, we must both remove certain existing inefficient features and add other elements which would improve the speed and certainty with which the financial structure reacts to change.

A haphazard system is an inefficient system. As a goal we would like the allocation of funds to be as effective as possible. This would

give a minimum cost for operating the mechanism by which claims on resources are allocated. Tax and subsidy programs would also be of a minimum necessary size; administrative and regulatory costs would be reduced. An efficient system is probably one in which borrowers (after taxes and subsidies) can obtain all the funds for which they are willing and able to pay the going rate.

This leads to a second goal for our financial system. The ability-to-pay criteria can be made consistent with a proper expression of the public's social priorities by ensuring that those sectors which are accorded priority have the ability to pay. This can be approached by optimizing our policies and programs for taxation, subsidy, lending, and direct government appropriations.

Progress toward a more stable system is also desirable. In a stable system uncertainty is reduced, as are the lags between policy changes and final spending. The policy instruments would be adequate to the job set before them. With such characteristics in our financial system, we would expect less variation in financial flows through institutions and the open market and less volatile interest-rate fluctuations.

In examining the possible ways to improve the present situation, we find major conflicts in views. The situation is like the proverbial half-empty, half-full glass, depending on the outlook of the beholder. Observers who are basically pessimistic with respect to government action and optimistic with respect to what an uncontrolled market can do stress the advantages of deregulation. Others, more skeptical, stress improvements in the existing structure.

One solution to the difficulties raised by our present methods of credit allocation might be to use only fiscal, not financial, policies to help achieve economic goals. In a perfectly functioning flexible system with complete information and without any policy lags, we might find that fiscal tools were always more efficient than monetary and financial instruments for stabilization purposes. Furthermore, it is possible that under more perfect conditions, using only fiscal tools would be a better way to express social priorities. However, in the world as we know it, this seems not to be the case. Monetary policies for both stabilization and social priorities developed and are used primarily because they have been more adaptable and politically easier to instigate.

If we could abolish all existing regulations, the average family might be better off. But, unfortunately, there would be many families not as well off. The present system has evolved through innumerable financial and political battles and actions. A sudden shift in the structure would raise strong opposition from those who would be hurt. Problems of compensating them are difficult, both because equities are not clear and because losses are hard to measure.

It is also true that we do not know whether a more competitive market would solve the problems of stabilization and equity as well as the existing system, or how it would compare if we improved rather than abolished current techniques. Almost all of the analysis one sees of this question tends to be static. Very little work has been done on dynamic solutions, particularly ones which take into account poor information and significant time lags. Yet it was the existence of these forces which led to the development of the present structure.

Because no one knows or has analyzed what would happen, recommendations for changes depend primarily on personal value judgments and individual points of view. Those who believe that, contrary to history, the financial market left to itself would operate with stability, equity and efficiency, and who place little value on existing rights stress deregulation as the solution to our problems of credit allocation. Those who recognize the difficulties and costs of massive changes in the structure, who believe that past policies have increased, not diminished, stability, who are somewhat optimistic that logical governmental policies can be operated — or at least that monetary policies can be changed more easily than fiscal ones — tend to argue for improvements in monetary tools and better selective techniques rather than for their elimination.

The Role of the Federal Reserve

I think it only fair to say that the attitude toward the problem of credit allocation over the past 20 years at the Federal Reserve has been ambivalent. The initial theory under which the System was founded was based on differential uses of credit, and qualitative measures were used through the Korean War. From 1953 to 1965, however, most emphasis was placed on aggregative monetary and credit policy. Indeed, during much of that period the Fed seems to me to have welcomed selective sectoral impacts, since it was believed they speeded up and increased the total effectiveness of a given degree of monetary restraint.

Since 1965, however, the Federal Reserve has frequently stated that monetary policy might be more effective if all sectors were restrained more evenly. The Fed has used its limited powers — regulations over maximum interest rates and reserve requirements as well as voluntary controls on foreign lending — to obtain some selective results. But at the same time there has been strong support for deregulation, particularly in the sphere of interest-rate ceilings on time deposits — Regulation Q.

On the whole, I believe it would be fair to say that the majority of those in the System have opposed the use of a more selective monetary policy. They did not argue against the use of monetary policy *per se*, but did oppose more Federal Reserve involvement in the system of credit allocation. In many cases the view seemed to be that if the Federal Reserve had greater responsibility for credit allocation, pressures to meet specific needs would be so great that monetary policy could no longer be used effectively for stabilization purposes. More and more needs would be assigned high priorities. Sectors disadvantaged in the credit allocation procedures would press, even more than now, for political solutions to their problems. As a result, total credit could no longer be constrained to a sufficient degree for overall stabilization policy.

This general view was reenforced by two specific points. Most suggestions involved the use of Federal Reserve regulations only with respect to member banks. This fulcrum for Federal Reserve action is too small to promise useful results. Any instrument for altering credit allocations must be concerned with the interrelationships which exist among markets and institutions. Any attempt to affect the distribution of total credit flows to a significant extent through banking controls alone would impose an intolerable burden on the 5,700 member banks of the Federal Reserve System. Foreign experience shows that attempts to control only one part of the financial system do not work. New institutions and methods of lending proliferate.

Furthermore, it seemed unlikely that there would be any clear mandate from Congress or directive from the executive as to what sectors (or what elements within those sectors) a credit allocation program should favor (or discourage), and to what degree. The Fed feels uncomfortable enough with the changes in income distribution it causes with its existing powers and policies without seeking added duties.

These arguments have no certain refutation. Answers must be pragmatic, based on one's views of the American economy and political structure. The added pressures exerted by selective powers must be compared to those which are now felt. Partly, of course, this depends on whether central bank policy can be more effective if the necessary powers exist to improve the distribution of credit and resources. Pressures, as well as results, depend on whether there are sufficient tools to do the job. My own belief has been — and recent experience does not contradict it — that the Federal Reserve and the Administration need better techniques to deal with the problems raised by sharp movements in monetary aggregates and interest rates. Some risks of added political pressures should be taken.

On the other hand, I believe it is proper for the Federal Reserve to object to being asked to use additional powers such as supplementary reserve requirements without a clearer indication of what objectives such policies are to seek and without clearer directions as to how extensive such assistance should become.

Conclusion

Because my paper is primarily introductory to a conference in which most papers are concerned with specific tools and techniques, I have not attempted to discuss the pros and cons of particular suggestions. However, I believe it only fair to state my own views.

I believe that for both stabilization and fulfilling social priorities, taxes and subsidies are preferable to monetary or credit policies. Fiscal policy can constrict all spenders and investors rather than only those whose expenditures in a particular period happen to depend on credit. Even more vital is the fact that reactions should be more certain as well as more equitable.

On the other hand, fiscal policy in fact has not been flexible. The lag in recent years between the time a policy need is recognized and is finally enacted has been long. In 1972 and 1973, as in 1966 and 1967, both the Administration and the Fed appeared to believe that fiscal action was required. To fight inflation successfully, specific taxes should have been increased. But in both periods the Nixon and Johnson administrations failed to include the policies they thought proper and best among their suggestions because of political considerations and because they were pessimistic and believed that Congress would not enact them.

Because fiscal policy is not used, the need for action in the monetary and credit fields arises. I believe, too, that there are strict limits on what monetary policy can, and therefore should, attempt to do in a fight for stabilization. Having made monetary policy, I am more concerned than most over the uncertainty of when and what will happen if monetary tools are used. Because of all we do not know, I believe the magnitude of policy changes should be limited. Neither extreme of policy action — the fixed rule or drastic monetary moves — is feasible with our existing instruments and structure.

Some of the problems of short-run stringency can be avoided if we improve our existing institutions. I have advocated in the past more logical portfolio policies, more flexible arrangements for interest and principal payments on debt instruments, unified Treasury borrowing for agencies, and additional special purpose agencies. It is important that steps such as these plus others be taken in order to equalize the future impact of monetary policy.

Beyond changing institutions, however, I believe that new techniques, similar to those used in most of the rest of the world, may be necessary if monetary policy is used to curtail demand sharply. Such policies should be as automatic as possible and require the minimum of administration. They should primarily influence market decisions and not attempt to supplant them. They should apply to all, not banks alone, so as not to be dissipated by shifts in the channels of borrowing or lending. They should vary as the problem areas alter. Controls should be used only for stabilization purposes and only for minimum periods. Their effectiveness decreases and their cost increases with time. Policies for stabilization should differ from those aimed at long-term aid to priority borrowers.

It has seemed to me that a technique which meets many of these criteria is that of raising the marginal cost of non-preferred borrowing in periods of monetary tightness. Many instruments for raising such costs are available, for instance through taxes, decreased tax exemptions, or charges for borrowing or lending permits. Steps of this type can both increase the effectiveness of policy and lower its cost. Under the Credit Control Act the President has the authority to introduce such instruments immediately.

More selective controls are necessary primarily if more impact from financial policy is desired in the fight against inflation. Added instruments will increase both the certainty and the equity of policies. Under the existing authority, action can be taken to raise the costs of money to specific borrowers or from particular lenders. In addition, policies can take into account whether funds are flowing overseas or internally; they can consider type of use, size of borrower and similar factors. They can thus fill the gap which aggregate moves in money and credit cannot.

Clearly, the introduction of variable charges would be controversial and hard to apply. I believe, however, that it would be less dangerous and harmful than possible alternatives such as deregulation or pushing much farther with an unchanged structure and current instruments in attempts to solve problems that are really beyond the scope of existing tools. Attempting to do too much through tight money could start us on the road to financial crisis and panic.

Our financial system has evolved over the past 200 years to this point. We should not assume that further improvement is impossible. At the same time, minor tinkering may not suffice. We should strive for a system which truly allows the market to make the maximum number of decisions within a structure that assures more stability, certainty and equity. This may well require a structure which is more

logical in the way it allocates credit to specific uses. It may mean that we place more emphasis on raising costs specifically to classes of nonpreferred borrowers or uses rather than across the board when we want to use monetary and financial policy to restrict demand.

Controlling Lender Behavior: Asset and Liability Restraints

MAURICE MANN
and
HARRIS C. FRIEDMAN*

In recent years, there has been considerable discussion on the matter of channeling credit into socially desirable investments. Among the many problems to be faced in this area are (1) identifying those social objectives or sectors that warrant special attention, and (2) reducing the resulting large number — which would certainly include housing, small business, agriculture, and environmental controls — to manageable proportions. As is well known, the more pieces of the economy that are designated as socially desirable for public policy purposes, the less useful such a designation becomes. Available funds and other resources can be channeled into designated areas of the economy only at the expense of nondesignated areas. Therefore, a balanced view of the whole question of socially desirable forms of credit must take into account the implicit reordering of social priorities that, in effect, reduces the amount of funds and resources flowing into affected sectors. Trade-offs are mandated, but may not be made very easily.

The American political process does not provide an explicit or suitable framework for arranging or reordering social priorities or objectives. Rather, the process tends to be one of compromise and of politics. As a result, policy incentives for most economic sectors are developed in a highly diffused and disorderly fashion. The result is often little net benefit to those sectors.

It can be argued that it is desirable to direct resources and funds into selected areas of high social priority when and where the private market economy either cannot or will not do the job on its own. For one thing, considerable evidence exists that the private credit market

*The authors are, respectively, President, Federal Home Loan Bank of San Francisco, and Director of Research and Chief Economist, Federal Home Loan Bank Board, Washington, D.C. They acknowledge the comments and suggestions of Mark J. Riedy, Vice President and Chief Economist, Federal Home Loan Bank of San Francisco, and Marshall A. Kaplan, Economist, Federal Home Loan Bank Board, Washington, D.C.

discriminates against certain types of borrowers. As a result, the Federal Government has developed a set of complex Federal and federally sponsored agencies, as well as federally chartered and protected lending institutions, that are designed to help fill gaps in the flow of credit to such borrowers. Second, through the Federal budget, the Government attempts to compensate for the divergence between private benefits and social benefits, as well as between private costs and social costs.

Techniques of Credit Allocation

What is the best technique for channeling funds into socially desirable sectors of the economy? The attention in this paper, not surprisingly, is on housing, or more accurately, the financing of home construction and the sale of new and existing housing. The Federal Home Loan Bank System regulates the portfolios of savings and loan associations (S&Ls) to assure that an adequate volume of funds flows into housing. A plausible, or at least possible, alternative would be to create incentives for those institutions to make selected socially desirable investments.

Before discussing the merits of these two alternatives — portfolio control versus incentives — it may be instructive to provide some additional perspective. The application of either controls or incentives can occur at any one of several levels in the delivery system of the financing of housing — to the house itself, to the mortgage instrument, or to the lending institution. Taking each in turn:

Tied to the house: Housing allowances and the income tax deductibility of property tax payments are incentives to home ownership.

Tied to the mortgage instrument: Income tax deductibility of mortgage interest payments may favor the use of a mortgage rather than cash payment for a home, or may encourage high loan-to-value loans rather than large downpayments. Government programs, such as the Tandem Plans, subsidize mortgage interest returns for investors. Tax credit proposals are designed to make mortgages more profitable and, thus, more appealing to investors.

Tied to the lending institution: Deductions from income for bad debt reserves, which are related to the ratio of mortgage investments to total assets of thrift institutions, represent a prime example of a policy designed to bind a financial institution into specialized lending for housing.

Some economists argue that the fungibility of capital introduces an undesirable "slippage" into the delivery system for home finance. As a result, the more directly Government policy is tied to housing, the more effective that policy would be. If that is true, policies tied to the house are likely to be more efficient and more effective than those tied to the mortgage instrument, as well as those tied to the lending institution.

The fungibility concept can be used to develop the argument as follows: A major source of financing for small business is the funds obtained from refinancing an entrepreneur's home. Such refinancing presumably results in an additional sum of money being loaned by an institution — most frequently a savings and loan association — through a mortgage instrument. The "extra" funds are not channeled into housing, but instead go directly into the small business. The question could then be raised, why should the savings and loan association be allowed to utilize a tax program designed to assist home ownership to provide funds for non-housing purposes?

A part of the answer, of course, is that the great bulk of mortgage lending by S&Ls translates directly into housing. The slippage that does occur, through refinancings to generate capital for a small business or for a college education, may also be socially desirable — or not undesirable. Moreover, it can be argued that, without the ability to refinance his home in order to obtain funds for a small business or for a college education, a homeowner might be forced to relinquish ownership — to sell the house — to raise such funds. This alternative, while a free market choice for the individual, may not be considered socially desirable.

Another part of the answer is that, if capital is indeed fungible and if S&Ls reduce their investments in mortgages, it is questionable whether other lenders would fill the breach. If they did fill the breach, what would be the cost? What would be the extent of consistency and reliability, and what would be the nonprice terms and efficiency? Residential mortgage lending is a highly specialized function where localized knowledge and talent are important. The benefits of doing away with tax incentives for lending institutions that specialize in home mortgages, in order to shift the impact of Government policy more directly to the mortgage instrument or to the house, are obviously not clear.

To summarize, the existing array of Government policies with an impact on each of the three levels in the delivery system for home finance works efficiently and effectively in practice. The social costs of the bad debt reserves of S&Ls are no less open and measurable

than income tax deductibility of mortgage interest and property tax payments; likewise, the social benefits are no less open and measurable. Although mortgage funds are somewhat fungible, their ability to substitute for other sources of credit is essentially independent of the delivery system of home finance.

Against this background, the merits of portfolio regulation versus incentives for channeling an adequate flow of funds into housing can be discussed. Those who stress a free market approach prefer to do nothing, but when forced to choose would prefer incentives to direct portfolio regulation. They believe that incentives permit social costs to be made explicit and measurable, and therefore controllable. However, previous experience with expenditure and tax subsidies indicates that there is vast potential in the incentive approach for loss of control and for manipulation for politically — rather than socially — motivated purposes.

In the case of mortgage finance, it is an open question whether incentives would be applied to stimulate new home construction, to the refurbishing of older homes, or simply to the turnover of existing housing. The stimulation of home construction to lead the economy out of a recession has been a favorite countercyclical policy over the years, a policy that is usually motivated by factors other than the housing needs of consumers. It is also a major question whether subsidies should be attached to single or multi-family housing, to new or existing housing, to attached or detached homes, to low- or high-priced housing, or for housing the young or the elderly. Resolution of these alternatives would take the wisdom of a Solomon (we are pleased that Ezra Solomon is on the program).

The question may also be raised as to whether portfolio regulation is more desirable as an alternative to incentives for housing finance. Portfolio regulation of S&Ls is at the heart of the Federal Home Loan Bank System, and, as such, has some “socially redeeming value.”

Admittedly, portfolio regulation can be overly rigid. The extent to which certain types of socially desirable credit are needed is not fixed, but actually varies over both time and place. Moreover, there is often no consensus on the size, intensity, or duration of the need for socially desirable credit. Housing construction is clearly one area where individuals inside and out of the Government may legitimately disagree on the dimensions of need.

Even if a consensus were to develop that construction is currently adequate, portfolio regulation may channel additional credit into housing and further stimulate construction. In theory, portfolio requirements can be varied over the cycle to meet changing needs,

just as expenditure and tax subsidies theoretically can be adjusted flexibly. In practice, flexibility is highly unlikely. Indeed, this is why additional policies have been developed to supplement and to add flexibility to basic programs. For instance, the Federal Home Loan Banks have developed flexible lending programs (advances to S&Ls) to help meet the cyclical needs of mortgage lenders. In a sense, portfolio regulation satisfies the growth *trend* needs of mortgage markets served by S&Ls, while Federal Home Loan Bank advances help cushion *cyclical* needs.

A possible serious disadvantage of portfolio regulation is that, by reducing the portfolio flexibility of S&Ls, it leads to a lower level of profitability. This is in contrast to the situation under expenditure and tax subsidy inducements, where S&Ls are free to respond to such inducements in a way that still allows them to maximize profits. Thus, financial inducements may not damage the competitive position of lending institutions as much as rigorous portfolio regulation. On the other hand, a shift from portfolio regulation to expenditure or tax inducements for lending institutions in socially desirable sectors carries a serious risk of reducing the overall availability of funds to these sectors, if the added benefits from the latter do not fully compensate for the loss of benefits flowing from the former. This is a critical consideration.

Portfolio regulation may not necessarily hamper profit maximization significantly if there is, in fact, an economic rationale to such regulation that permits substantial economies of scale. Thus, during much of the "early" post-World War II period, S&Ls were more profitable than banks; the reversal of this situation dating from the early 1960s stems in large part from an unfavorable yield curve of maturities that converted the asset-liability imbalance of S&Ls from an advantage to a disadvantage.

Current Financial Institution Restraints

Although a considerable amount of detailed portfolio regulation is built into the existing financial system, most financial institutions still have a significant amount of operating flexibility. Pension funds, insurance companies, and commercial banks have broad investment powers and are certainly in a position to shift large sums of money in response to changes in private credit demands. S&Ls can make loans for single family housing, multi-family housing, residential and commercial construction, mobile homes, and for education.

The evolution of the portfolio regulation of S&Ls has not represented an active, conscious, or overt attempt to attain certain social

objectives. Put simply, the lending practices of S&Ls have developed to fill the void created by the unwillingness of other financial institutions to make housing loans. The establishment of the Federal Home Loan Bank System and the system of federally chartered savings and loan associations can be viewed originally as a response to the chaotic conditions in the housing credit market that existed during the 1930s. As such, these systems were among a number of measures adopted by Government to restore the viability of many sectors of the American economy.

The history of S&Ls since the 1930s shows a continuous broadening of portfolio powers. While most of the broadening has occurred within housing and real estate, it still constitutes a substantial liberalization. This liberalization at both the Federal and state levels has generally been a reaction to both the demands imposed on the S&Ls and the changing lending philosophies of S&Ls. As such, it does not necessarily reflect a *conscious* attempt by Government to dictate the direction in which S&Ls should evolve.

Whatever the case, recent experience indicates that S&Ls are better equipped to respond to sharp changes in the economy and financial markets than earlier. For example, S&L mortgage lending held up better in 1969-70 than it did in 1966, even though savings outflows were considerably worse in 1969-70. On the other hand, it should be acknowledged that the Federal Home Loan Bank System, through an aggressive advances program, more actively supported S&L lending in 1969-70 than in 1966.

Regulatory changes beginning in 1969 have further broadened the lending powers and improved the ability of S&Ls to attract and retain savings capital. Secondary mortgage market changes are continually underway, making the mortgage instrument a more liquid and marketable security and enhancing the ability of the savings and loan industry to improve profitability through mortgage banking activities. Implementation of these changes takes time. Indeed, the regulatory changes that have occurred since 1969 were promulgated with the implicit assumption that Regulation Q would remain substantially unchanged until such time as the average portfolio earnings of S&Ls had risen sufficiently to permit removal of the ceilings.

What is needed now is a time span during which S&Ls can adjust to recent regulatory changes, and after which the operational success of these changes can be assessed. Forces are already in motion within the savings and loan industry and the secondary mortgage market to enhance the profitability of S&Ls and the investment qualities of

home mortgages. These developments promise to deliver long-run improvements to the capability of the Nation's delivery system for home finance.

Of particular importance is the need to make the mortgage instrument more competitive with other investment alternatives. This is, of course, easier said than done. At least until very recently, the socially desirable character of the mortgage has kept it as a low interest-rate vehicle. These two conflicting requirements are not easily reconciled. To compensate for lower yields, the mortgage instrument must be made as liquid, as riskless, and as acceptable to investors as is possible. An improved secondary market, such as the automated trading facility proposed by the Federal Home Loan Mortgage Corporation, would be a step in the right direction.

Housing capital requirements are far greater than any other credit needs of households. As a result, a specialized institution aimed at satisfying the entire range of financial requirements of households inevitably would still have to allocate the largest percentage of its resources to housing. Thus, there need be no serious conflict between permitting reasonable portfolio flexibility designed to enhance profitability and to help the consumer, and the objective of channeling credit into housing.

Additional broadening of the regulatory authority of S&Ls would necessarily generate some risk of an adverse impact on home finance. But there is also a risk to housing in not making improvements in portfolio regulation that would be necessary to strengthen the competitive viability of S&Ls. In the final analysis, the risks must be weighed against each other.

Liability Restraints

There is always the basic question of whether specialized institutions such as S&Ls can thrive — indeed, survive — in a world of completely unfettered rate competition. If asset portfolio regulation is likely to bring with it some constraints on profitability, S&Ls cannot compete on the liability side in a completely free market. Interest-rate controls of the Regulation Q variety, which are imposed on depositary institutions, are currently necessary for the survival of S&Ls. It should be noted, however, that despite restraints on the asset composition of S&Ls prior to 1966, interest-rate controls were not essential. Indeed, S&Ls and mutual savings banks (MSBs) had no ceilings on rates payable, and commercial banks in general offered returns on savings that were lower than permitted under Regulation

Q ceilings. It may be asked, what has changed since 1965 that now dictates the need for interest-rate controls for depository institutions?

Briefly, the primary difference would be the heightened competition for consumer savings deposits, which has been caused mainly by the increasing inadequacy of demand deposits as a source of funds for commercial banks. It also reflects the fact that savers are increasingly sophisticated in money management. This situation has evolved slowly over time. The raising of Regulation Q ceilings by the Federal Reserve in December 1965, in response to the changing priorities of banks, officially marked the beginning of a new era in rate competition. An era(?) of even greater competition may have been inaugurated on July 5, 1973.

Do rate controls work? Two features of rate controls — ceilings *per se* and rate differentials among different lenders — must be evaluated separately. In 1966, many S&Ls and MSBs for a time lost savings to commercial banks until differentials were established to favor the S&Ls and MSBs. In addition, savings funds at all depository institutions were lost to open market investments. In 1969-70, rate differentials prevented sizable transfers of funds out of the S&Ls and MSBs into commercial banks, but did not prevent serious disintermediation from all deposit-type institutions into the open market. In the current situation, with interest ceiling differentials either narrowed or nonexistent for some categories of savings certificates, S&Ls and MSBs are again losing deposits to the open market but, unlike 1969 and like 1966, are also losing deposits to commercial banks. Interest-rate ceilings *per se* obviously affect the total flow only when they are below yields on alternative investments in the open market. On the other hand, differentials among deposit-type institutions tend to be effective throughout the interest-rate cycle.

Thus, it can be concluded that rate controls “work” with respect to a two-pronged impact on the volume and allocation of savings. With respect to housing, to the extent that ceilings *per se* do not cause more disintermediation from the S&Ls into the open market than differentials retain for the S&Ls, then rate controls in general would tend to cushion declines in mortgage lending during tight money periods.

Concluding Comments

Government policy tools provide a large number of trade-offs designed to stimulate housing or other social objectives. Limited knowledge with respect to the impact of each of these tools suggests

that greater reliance is needed on a mix of different approaches to attain socially desirable goals, rather than depending on any one approach. Nothing is ideal or sacrosanct in the present system of portfolio regulation to achieve socially desirable ends. Yet, considering the problems with other policy approaches, portfolio regulation is not yet ready to be relegated to oblivion.

A possible approach that would move the financial system a step closer to the ideal solution may be to improve the rules to make institutions more effective in carrying out their objectives, rather than to abandon portfolio regulation. Even the most fervent supporter of specialization for S&Ls in the field of housing would have to concede that such specialization can be self-defeating if it does not allow for sufficient profitability for S&Ls. Without adequate profitability, S&Ls cannot pay a return to savers that is competitive in private markets, but there is a limit to the extent to which S&Ls should or can be sheltered from the competition of more profitable lending institutions. Any system of portfolio regulation must, therefore, not only be designed to channel funds into appropriate areas, but also allow a reasonable level of profitability that makes it possible to compete for funds.

In this connection, it would be helpful to broaden and deepen the portfolio choices of the S&Ls in order to provide a broad complementary package of services to households and families, which would increase the inducement for them to do business at S&Ls. This would permit S&Ls to shift funds among different types of investments, and to better balance asset maturities with liability maturities, so as to meet liquidity needs and to exploit profit opportunities more effectively and more efficiently.

Many portfolio restrictions are nothing more than a by-product of concern for the soundness and solvency of financial institutions and, in large part, reflect the unfortunate experience of financial institutions during the Great Depression. To the extent that stabilization policies of Government have been successful, a number of portfolio restrictions have been relaxed. Nevertheless, there are so many different types of financial institutions, with such broad lending and investment powers, it is reasonable to conclude that in the context of the overall composition of credit, portfolio regulation has probably had only limited impact in redirecting the *total* supply of credit into socially desirable channels. Probably the major impact of portfolio controls on S&Ls has been to reduce somewhat the degree of fluctuation in housing credit in the short run, but not to change significantly the flow of housing credit over the long run.

When portfolio restrictions on S&Ls are viewed in the more limited context of other policy measures taken to stimulate housing credit in the economy, the impact has been a much more substantial one. Thus, taking into account the Federal Home Loan Bank System, the Federal Home Loan Mortgage Corporation, the Federal National Mortgage Association, the Government National Mortgage Association, and the Farmers Home Administration, as well as Government-sponsored devices to stimulate housing credit (such as GNMA passthroughs), the overall impact is even greater. These other policy tools do not involve portfolio regulation. They provide incentives (or institutional mechanisms) of one type or another to stimulate or stabilize housing credit. All of which forcefully illustrates the fact that we have a very mixed system for attaining the Nation's housing — as well as other social — objectives.

It would be remiss not to mention the Hunt Commission report and the more recent document, "Recommendations for Change in the U.S. Financial System," which, of course, stems from the Hunt Commission report. As is widely known, both of these purport to be able to solve many of the problems involved in controlling lender behavior. At least two basic questions need answering before there can be agreement that this is the case. By providing S&Ls more flexibility on the asset side, will there be greater ability, in fact, to compete for funds and thus maintain an adequate flow of funds into housing; and second, will a mortgage tax credit of reasonable size entice other lenders into the mortgage market?

The first question can be debated indefinitely. The only real data available were presented by Jaffee and Fair at the Nantucket Conference last year. They argue that, by giving S&Ls expanded lending authority, the flow of funds into the mortgage market will actually be increased. The one serious flaw in their argument is that the non-rate control data used were of a pre-1966 vintage. As indicated earlier, commercial banks are now much more interested in consumer savings than they were in the early 1960s. (The activity of commercial banks in the new four-year consumer CDs since July 5, 1973, has been a sight to behold.) Subsequent simulations performed by Jaffee, with commercial banks competing head-to-head with S&Ls, have shown much different and disheartening results for both the mortgage market and S&Ls. Also, Jaffee and Fair assumed almost instantaneous portfolio adjustment by S&Ls. This is obviously impossible, in view of the asset composition of these institutions. Parenthetically, even the Treasury has recognized that the adjustment could take as long as five years.

With respect to the second question, the answer would seem to be a definite and resounding “no.” Ignore for a second the effects of eliminating the bad debt reserve, and take, for example, an 8 percent mortgage. Tax credits of 1 percent, 3 percent, and 5 percent would raise before-tax yields to 8.16 percent, 8.48 percent, and 8.80 percent, respectively, assuming the 50 percent tax bracket. It is conceivable that an increase in yield of 80 basis points would entice *some* investors, but marginal investors in mortgages may only be offered a tax credit of 1 percent or less — if that much. An increase of 16 basis points in yield, or less, is unlikely to shift or attract many funds. In addition, pension funds, which are a primary source of untapped mortgage funds, are not taxed, so there is no marginal benefit to them.

These comments should not be construed to imply opposition to the kinds of reform of the financial structure that are being proposed. Reform of financial markets, financial institutions, and financial flows is all to the good and is sorely needed. But reform should not contradict those established policies and practices that have worked well in the past. Nor should reform be at the uncompensated expense of the housing market. In short, the crucial thing is to guarantee that the first question raised above is answered in the affirmative. Unfortunately, much more evidence than is available now will have to be developed before the jury can be brought in for a verdict.

Discussion

PETER FORTUNE*

The role of a discussant is largely one of comparing what the discussant would have said with what the paper did say. Since I received the Mann-Friedman paper too late to digest it properly, I am left with the role of reporting what I think it should have said. However, the late receipt of the paper is a good sign, for it suggests that the authors, very informed and able students of capital markets, were occupied by the pressing problems of the Federal Home Loan Bank System.

Before briefly discussing their paper I want to establish a context for my remarks. In doing so I will present my view of why we are discussing credit-allocation techniques and the criteria by which these techniques can be evaluated.

I believe that our reasons for considering controls are primarily related to the conflict among social goals arising from the cyclical behavior of the financial structure of our economy. Thus, I see controls as a means of improving the tradeoffs which are implicit in the use of macroeconomic stabilization policies. I do not see credit controls as a device for altering the secular behavior of the composition of aggregate expenditures. Our concern with the secular behavior of the shares of "high priority" claims on aggregate output has already been expressed through such "tax expenditures" as the deduction of mortgage interest and the tax-exemption of state-local interest, as well as through other methods such as Federal mortgage guarantees.

In order to support this view of credit-allocation techniques as a short-run supplement to macroeconomic policies, I offer answers to three questions. First, what are the problems with our financial structure which lead some of us to reject the observed cyclical behavior of

*Economist, Federal Reserve Bank of Boston

the allocation of credit? Second, what are the conflicts among policy goals which lead to our willingness to consider credit-allocation techniques, and how well have our existing credit-allocation policies performed? Third, what are some desirable characteristics of an effective credit-allocation control program?

Problems with the Cyclical Behavior of Credit Allocation

It is well known that in periods of tight monetary policy the share of total credit taken by small businesses, home buyers and state and local governments declines while in easy money periods these shares recover. What is not well known is why this happens. Those who view credit allocation as determined primarily by interest rates argue that this is the natural, and necessary, consequence of the relatively high interest sensitivity of spending by small businesses, home purchasers, and state and local governments. Since these sectors are especially sensitive to interest rates and since capital expenditures are easily postponable, we should not worry about such a cyclical behavior of credit allocation. Rather, we should welcome it as enhancing the effectiveness of monetary policy.

Such an optimistic view of credit allocation has its opponents, who note that interest rates do not tell the whole story. Nonprice means of rationing credit are widespread in the commercial loan and residential mortgage markets, due largely to the loan-rate setting behavior of commercial banks and thrift institutions as well as to the existence of usury ceilings established by states and by the FHA and VA. State and local governments have also been faced with usury ceilings. In addition, the tax-exemption of state-local interest payments imparts an especially great volatility to the cost of credit for state-local governments as commercial banks increase or decrease their participation in the municipal bond market.

It requires no major search to find evidence that the structure of financial markets does not allow interest rates to provide the sole explanation of the cyclical behavior of the allocation of credit. What is not known, however, is the extent to which market imperfections shape the allocation of credit. While extensive research is needed to establish the suboptimality of credit allocation, there is clearly a potential role for credit-allocation techniques in moving more toward an appropriate composition of credit. Even if all usury ceilings were eliminated, the behavior of major financial intermediaries is not likely to allow us to ignore the thesis that credit markets discriminate against small businesses, home purchasers, and state-local governments.

Conflicts Among Stabilization Policy Goals

For my purposes I will concentrate on the conflicts among four stabilization goals: stability of real income growth, stability of the rate of inflation, stability of interest rates, and stability of the composition of aggregate spending. By stability I do not mean constancy. Instead I mean that we are concerned with the amount of short-run swings in macroeconomic variables. Clearly the weights attached to achievement of each of these goals vary considerably among informed individuals. For example, my interpretation of "monetarism" leads me to believe that the primary weight is attached to the real income and inflation goals while "Keynesians" place relatively more weight on interest rate and expenditure-composition goals. This accounts for at least part of the disdain which "monetarists" often express for credit controls.

Whatever the relative importance of each goal, the 1960s provided abundant evidence on the conflicts among them as well as on potential methods to reduce these conflicts. In the early 1960s, when we experienced rapid real income growth along with interest rate and inflation stability as well as a reasonably high share of "high priority" spending, there were few conflicts among goals. If anything, we wanted to promote spending, which now seems classified as "low priority," — plant and equipment investment and consumer durables.

In the mid-1960s this harmony of interests was shattered by a return to full employment in conjunction with a highly expansionary fiscal policy brought about by the Vietnam War and the 1964-65 income tax cuts. It seemed clear in prospect that a need for tax increases existed in 1965-66, and it is now clear in retrospect what were the costs of the failure to raise taxes. Most of the stresses on our financial structure as well as the disruptions resulting from a stubbornly accelerating inflation could have been avoided by an appropriate mixture of traditional stabilization policies.

Since the burdens of achieving our inflation goals rested on monetary policy, we experienced a volatility in interest rates and in the composition of spending, which has been the subject of several of the Boston Fed's monetary conferences. We also found that the policies adopted to promote secular changes in the composition of spending promoted undesired cyclical instability in the share of resources going to high priority sectors. For example, tax-exemption of state-local interest aggravated the cyclical instability of municipal finance, and restrictions on the asset and liability choices of nonbank financial intermediaries aggravated the housing cycle. The tradeoffs

became more apparent than they had been — to achieve real income and inflation goals required interest-rate and expenditure-composition volatility.

The major policy responses were, as Paul Smith puts it, to add new wheels to the car rather than to fix the flat tire. While experiments with fiscal policy were undertaken, largely through the brief repeal of the investment tax credit in 1966 and the income tax surcharge of 1968, the basic problem was seen to be one of financial structure, calling for credit-allocation policies, rather than of an excessive reliance on monetary policy.

One of the first credit allocation strategies was the reduction of Regulation Q ceilings in 1966 (after they had been raised in late 1965) and the extension of deposit rate ceiling powers to the FDIC and the FHLB System. These changes, it was hoped, would mitigate the problems of cross-disintermediation between commercial banks and thrift institutions, thereby supporting housing while weakening the rise in interest rates. I believe that this step was of little, if any, benefit. The bulk of thrift deposit losses in 1966 were not primarily due to commercial bank competition but were due to disintermediation with the open market. Furthermore, the administration of deposit rate ceilings exacerbated the open market disintermediation since thrift institutions could not raise their deposit rates. Finally, empirical evidence indicates that the reduction in Regulation Q ceilings raised, rather than lowered, the level of yields available in the open market. This means that the deposit rate ceilings may have promoted thrift deposit losses as well as increased interest-rate volatility.

A second strategy employed in 1966 was the large increase in the acquisition of Federally insured and guaranteed mortgages by FNMA. While this did support the market for FHA-VA mortgages, it did so at the expense of reinforcing interest-rate volatility.

Essentially the same strategies were used in 1969, when the existence of accelerating inflation and the *apparent*, though not necessarily real, failure of the 1968 surtax led to a highly restrictive monetary policy. This time deposit rate ceilings were kept at their 1967-68 levels and both FNMA and FHLB advances were actively used to support the mortgage markets. As interest rates rose to the highest levels observed in this century, while the rate of inflation failed to decelerate, thrift institutions suffered a sharp decrease in deposit inflows and a new credit-allocation instrument was used — in early 1970 the Treasury raised the minimum denomination of Treasury bills to \$10,000.

On balance there is no evidence that the credit-allocation policies of 1966-70 provided a net benefit. While housing was probably supported, especially in 1969, some of this support was at the expense of other high priority forms of spending such as state-local government capital outlays and capital spending by small businesses. Furthermore, the support of housing undoubtedly contributed to interest rate volatility and to an inequitable shift in income distribution away from small savers. Finally, the restrictions on interest rate competition among financial intermediaries led to the growth of new methods of bypassing financial restrictions — among these being Real Estate Investment Trusts, the commercial paper market and the Euro-dollar market. These changes in financial structure have, if anything, worsened the conflict inherent in stabilization policy.

The array of policy instruments which either exist or are under consideration has expanded in recent years in recognition of the need to increase our ability to achieve the multiple goals we have set. To the traditional monetary and fiscal policies have been added the housing-oriented credit-allocation policies discussed above. We have added wage-price controls to help deal with the slow response of inflation to monetary and fiscal policies. We have begun to consider alternative methods of municipal finance, such as a direct Federal subsidy through taxable municipal bonds, in order to stabilize state-local capital outlays. We have experimented with a dual prime rate in order to reduce the costs (though not necessarily increase the availability) of credit for small businesses.

Finally, and the subject of our attention here, we are considering the strengthening of fiscal policy and the development of new techniques for the allocation of credit.

Desirable Characteristics of a Credit-Allocation Controls Program

Several approaches to cyclical credit-allocation controls have been suggested. Sherman Maisel presents a case for flexible tax-subsidy policies affecting the marginal borrowing costs of non-preferred borrowers. It is not clear from his paper whether he prefers that these fiscal instruments be applied to the debt issue choices of borrowers, to the asset choices of lenders or to both sides of the market.

My view is that if credit controls are adopted it would be better that they be applied to the borrower rather than to the lender. The basic reason is administrative; there seem to be two basic non-preferred borrowers — consumers and large firms, with the latter being the least preferred. On the other side, there are a large number

of financial markets with many lenders in each. Effective lender-oriented controls require policies to affect the asset-choices of individuals, commercial banks, thrift institutions, life insurance companies, pension funds and other less important sources of funds for large corporations. Borrower-oriented controls, on the other hand, can be placed more directly and certainly on the non-preferred sectors.

An effective controls program must also have a clear list of priorities and be sufficiently flexible. Priorities are needed to ensure that the controls serve the purpose of achieving a shift of credit from non-preferred to preferred borrowers rather than merely to shift credit among preferred sectors. The largely random method of creating priorities in response to crises has left us with policies which might be offsetting. For example, FNMA support of the mortgage market might aid housing largely at the expense of capital expenditures by state-local governments or by small businesses.

The need for flexibility in our policy instruments is clear from the cyclical nature of the allocation problem. We should ensure that policies to affect short-run allocation decisions do not retard the efficiency of the allocation of resources over longer periods of time. There is abundant evidence that tax-subsidy programs intended to achieve short-run goals remain in effect after the need for them has passed. An example is the administration of deposit rate ceilings since 1966 — there was little foundation for the failure to increase thrift deposit rate ceilings between 1967 and 1969. Another example is the continued high rate of mortgage acquisitions by federally sponsored credit agencies in 1971 and 1972.

Finally, if the primary reason for short-run credit-allocation policies is to overcome market imperfections, we need to know not only when and where these market imperfections are important, but how important they are. Without this information we cannot develop effective policies which are sufficiently flexible in both the ranking of priorities and the administration of the policy instruments.

Summary

I have tried to identify the primary case for credit controls and to present some characteristics of an appropriate controls program. As I see it, judgments about the secular allocation of resources can, and have been, reflected in Federal tax policy. We have, unfortunately, done something for everyone. While I believe that rationalization of our tax system is necessary in order to achieve an optimum secular

allocation of resources, the main argument for credit-allocation policies lies in the cyclical movements of credit.

The objective of credit-allocation policies is to achieve a better credit (and expenditure) mix without the sacrifice in other goals such as interest rate stability. These conflicts arise largely from the heavy weight placed on monetary policies to achieve stabilization goals. Since I believe that flexible fiscal policy based on variable tax rates can achieve the goals which are set for credit-allocation policies, our major efforts should be devoted to more timely use of fiscal instruments. This would allow us to achieve stabilization goals without the creation of market imperfections implicit in monetary policy.

Even in the absence of improvements in fiscal policy the case for credit controls is weak. While such a case does exist, the requirements for an effective controls program — a clear list of priorities, flexible administration, and information on the distribution and importance of market imperfections — do not exist at this time. As Maisel notes, “. . . minor tinkering may not suffice.” And given the state of our knowledge, major tinkering may be detrimental.

The Mann-Friedman Paper

In my opening remarks I said that I had not had time to digest the Mann-Friedman paper properly. This was before I had seen the paper. Having read it, I am not sure that it is digestible.

The paper might have been titled “An Ode to Existing Housing Policies.” I suspect that it will help members of the FHLB system feel they have a friend in Washington, or in San Francisco, as the case may be. The paper opens with the observation that credit-allocation policies must be based on a list of sectors which warrant special attention. It then proceeds to discuss housing and the profits of savings and loan associations solely. Other sectors apparently are not social objectives.

But this provincial outlook is understandable. The authors' primary concern is with housing. Therefore, let us look at the meat of the paper and accept the “housing only” orientation.

The authors' efforts are devoted to justifying existing housing policies. Their main argument can be summarized in the following points:

- 1) The existing array of government policies with an impact on housing finance works efficiently and effectively in practice.
- 2) Portfolio regulation is at the heart of the FHLB system and, as such, has some socially redeeming value.

- 3) Reform should not contradict those established policies and practices that have worked well in the past nor should reform be at the uncompensated expense of the housing market.

While the authors pay some attention to the idea of reform embodied in the Hunt Commission report they do so only half-heartedly. The main message is clear: the existing policies, with the FHLB system at the center, work well and should not be tampered with.

The authors make a weak case for portfolio restrictions rather than tax incentives as a method of mitigating cyclical fluctuations in mortgage finance. Portfolio controls for SLAs have, they report, reduced cyclical fluctuations in housing without affecting the housing stock in the long run. The evidence suggests, I believe, the reverse — portfolio rigidity has exacerbated the housing cycle while adding to the long-run housing stock. The study by Ray Fair and Dwight Jaffee presented at a previous Boston Fed Conference reaches this conclusion. Furthermore, the conventional wisdom of the mortgage market that SLAs lose deposits during tight money because they “cannot” pay higher deposit rates due to their portfolio composition also suggests that the authors are too optimistic about the role of portfolio restrictions in the housing cycle.

On the topic of liability restrictions the authors come out for deposit rate ceilings. Their main argument is that a fixed structure of deposit rate ceilings prevents commercial banks from taking deposits from SLAs and this offsets any increased disintermediation against the open market. While I believe the conclusion is correct, it hardly makes a case for deposit rate ceilings in a broader context. The net gain to SLAs is, I suspect, small, and rate ceilings are inequitable in their impact on small savers. Finally, if rate ceilings do tighten overall credit conditions, they discriminate against other borrowers who may have as strong a social claim on resources as housing.

In summary, Mann and Friedman appear to me to be addressing the members of the Federal Home Loan Bank system rather than a conference devoted to broad questions of social policy. While I note their arguments for policies favoring housing, I do not share their view that housing is our only credit-using sector with socially redeeming value, nor can I accept their arguments for a status quo. Perhaps we are in the “best of all worlds” in terms of current policies. But Mann and Friedman provide little support for this view.

Controlling the Terms on Consumer Credit

PAUL F. SMITH*

The reexamination of an old economic problem is like a trip to a childhood hometown. Nothing is quite like you remembered it. Time has changed our perceptions of the problems of controlling the terms on consumer credit. Part of the change can be traced to research that was stimulated by the last attempts to use these controls. Part can be traced to advances in theory that have placed some of the old problems in a new perspective.

Nearly all of the research on consumer credit controls dates back to the 1950s and, in reviewing that literature, it is surprising to realize how much our views and insights have changed. Many of the old debates now seem to be resolved and many of the old problems have been clarified. An encouraging amount of progress has been made but some of the most important issues are still unresolved.

The remaining problems center around the effectiveness of selective controls as a substitute for general monetary controls in controlling the economic aggregates. There seems to be little doubt that selective controls have selective effects. The difficult question is whether the selective effects merely change the shape and composition of the aggregates or whether they work directly to alter the totals. Unfortunately this question is seldom explicitly discussed. The implicit answer is usually buried in the assumptions.

Characterizations of the extreme positions on this question will be familiar to those who have followed the discussions of selective controls. At one extreme, we find the "someone else will use the money" school that focuses on the supply side of the problem and assumes that, if we keep someone from borrowing, the funds will be used by someone else. This school uses the analogy that you do not change the size of a balloon by pushing it into a different shape. At the other extreme, we have the "additive" school which accepts as obvious the fact that all of the parts add to the total and that, if we change any part, we change the total. They focus on the expenditure

*Professor of Finance, University of Pennsylvania

side of the problem and assume that, if we reduce expenditures on automobiles, we will automatically reduce the aggregate level of expenditures. Clearly the holders of these positions will not agree about the effectiveness of selective controls as an alternative to general monetary controls.

Areas of Agreement

It may be helpful to identify some of the old problems that seem to have been resolved as background for the discussion of the unresolved issues. Since this subject has received very little academic attention in recent years, some of what appears to be agreement may be in part the silence of indifference. But it will be asserted that the following propositions are accepted by most students of the problem of controlling the terms on consumer credit.

1. *Terms on instalment contracts are an important determinant of the demand for expensive durable goods and the associated credit.*

This proposition has long been accepted by practical marketing experts. It is now firmly established both by empirical evidence and theoretical arguments as part of the theory of consumer behavior as it applies to the use of consumer credit. Empirical evidence on this point has come from a variety of sources. Supporting evidence has been obtained from studies of the demand for consumer credit (14), from studies of the demand for durable goods (2, 24) and from earlier experience with the regulation of credit terms (18, 4).

Modern utility theory and its application to investment decisions have paved the way for the application of utility theory to the purchase of consumer durable goods on instalment credit. Recognition of the similarity between the stream of services from consumer durables and the earnings stream from capital goods has made it possible to demonstrate that consumer purchases of durables on credit, even at extremely high rates, can be perfectly rational behavior. It can be shown that the utility of the discounted present value of the stream of services from consumer durables can be larger than the disutility of the discounted value of a stream of repayments that includes substantial amounts of interest charges. It can also be shown that the sum of the disutility that arises from a stream of payments is reduced by spreading the payments over a longer period of time. The reduction in disutility that accompanies the reductions in monthly payments will more than cover the added interest costs, so that the

spread between the discounted present value of the stream of services and that of the repayment stream is widened, making the purchase more attractive.

Experience, statistical evidence and the theory of consumer behavior all support the claim that changes in the terms on consumer instalment contracts have an important impact on the demand for credit and the demand for goods purchased on amortized repayment contracts including many types of business expenditures. The effects are most important on the demand for houses, automobiles, and other expensive items where the service and repayment streams extend over a long period of time.

Controls on credit terms are in many ways an attractive approach to the problem of controlling spending. They go directly to the sources of the problem — the demand for goods and services. They do not really deny the consumer the right to make the purchase. They just make it unattractive. They work like price changes. The relaxation of credit terms can be used to stimulate the demand and the tightening of terms can be used to contract it.

2. *The consumer sector is potentially an important source of instability*

The consumer sector is no longer viewed as a slow-moving aggregate that responds only to the changes in income that are generated by business or governmental decisions. It is recognized as a potential source of exogenous change. George Katona has been one of the most articulate spokesmen for this position (13) but the view has developed in so many ways that it hardly needs elaboration.

Consumer credit plays a role in the new independence of the consumer by giving him greater flexibility in the timing of his purchases and by extending the range of financial decisions available to the average consumer. The growth of liquid assets, the increase in discretionary income, the growing importance of durable goods and the increased sophistication of consumers are other factors cited as contributing to the new role of the consumer.

The new status of the consumer sector in economics has mixed implications for the control of consumer credit terms. First, it emphasizes the potential need for controls over this sector. Second, it destroys the oversimplified distinction between “nonproductive” consumer expenditures and “productive” business expenditures that has often been used as an argument for the selective control of consumer credit. It can no longer be considered obvious that controls that restrain the consumer sector and encourage business outlays are automatically desirable.

3. *The impact of changes in credit on aggregate income should be measured by the differential effects of changes in the volume of new credit and changes in the level of credit repayments (or the rate of change in outstanding credit)*

This seemingly minor technical point is crucial for the interpretation of historical events and for any decisions about the timing and usefulness of controls on consumer credit. This measure gives a very different picture of the timing of the impact of consumer credit than the older measure which involved the use of the change in outstanding credit (4, 11, 15, 20, 27). The older version portrays consumer credit as an expansionary force that continues at least up to the turning point and perhaps beyond. The newer measure indicates that consumer credit may often be exerting a depressing effect for some time before the peaks are reached. A similar but inverted difference in impact can be observed on the downside.

4. *The volume of consumer credit is affected by money market conditions in much the same way as other types of credit*

A number of studies, that were either done by the Federal Reserve System or stimulated by the use of selective controls in the 1950s, make a convincing case for the responsiveness of consumer credit to money market conditions and hence to general monetary controls (3, 4, 26). These results refute the arguments that selective controls are necessary because consumer credit does not respond to general monetary controls. The older arguments depend upon the assumptions that the demand for consumer credit is inelastic to changes in interest rates and therefore has first claim on scarce funds when general monetary controls are used. The new evidence suggests that consumer credit is subject to a variety of forms of credit rationing that are effective in curtailing the supply of funds to this sector despite the presumed inelasticity of demand.

Unresolved Economic Issues

If the state of the arts has in fact resolved the problems covered by the preceding propositions, we can turn to the unresolved questions with less interference from side issues. We start with the knowledge that consumer credit terms can be used effectively to influence the demand for automobiles and other expensive consumer durables. The impact of these controls on retail sales of these items and upon the

manufacturer and the productive and distributive chains in these industries can be taken for granted. We also know that these particular sectors of the economy are not uniquely the villains of our aggregate economic problems nor are they in some favored position that makes them insensitive to more general fiscal and monetary policies that would affect other sectors as well. The basic economic question then becomes whether or not we can achieve the aggregate results we seek by using controls that we know will affect one particular segment of the market. If selective controls cannot be depended upon to produce the desired effects on economic aggregates, the debate is over. If they can produce the desired effects, the debate must continue but it shifts to the broader social questions of the choice among control techniques.

The following statement by Paul McCracken and his co-authors is one of the few explicit statements on the aggregate impact of selective controls that we could find in a search of the literature. They take the position that in periods of high levels of economic activity "... the effect of an increase in consumer credit outstanding is largely a diversion of credit from other uses, with little effect on total demand" (18, p. 27). If this is the case, the imposition of controls on consumer credit terms will have little effect on total demand and there will be little economic justification for the use of these controls.

However, their position requires some rather special assumptions about the nature of market adjustments which they unfortunately do not specify or attempt to defend. Their position implies that the market is not in equilibrium and that there is an overhanging excess demand for funds that is excluded from the market by some unspecified force — presumably credit rationing. If this is the case, the imposition of controls that reduce the demand for consumer credit would merely open the door for the unsatisfied credit demand.

An attempt to trace the effects of the imposition of selective controls on consumer credit within the context of an aggregate theoretical model illustrates the demanding assumptions that the McCracken position requires. Any shift in the demand for funds, such as the one we know we can induce by the use of selective controls, should result in a shift in the aggregate demand function with traceable results on the aggregate level of spending and the interest rate that depend upon the relative elasticities of the functions. There will be an interest-rate effect but no spending effect only if the supply function is absolutely inelastic. Spending and interest-rate effects of some type should occur unless it is assumed

that the shift in demand is offset by an equal and opposite shift in other forms of demand. The normal *ceteris paribus* assumptions do not provide for this possibility. The mechanism might be provided by the "credit availability doctrine". But it requires a great deal of faith in the effectiveness and timing of the availability adjustments to assume that an induced reduction in the demand in one sector will be offset completely by an increase in the availability in other sectors.

My own reading of the theoretical and empirical evidence leads me to the view that credit availability adjustments are an important part of credit market behavior during periods of tight money and that the supply function may be highly inelastic. Yet I find it hard to believe that the reduction of the demand in any major sector would have no effect on the total amount of credit extended. I would expect the imposition of consumer credit control to produce some easing in the credit markets.

Despite the possibility that consumer credit controls may have a significant impact on aggregate spending, it is possible to oppose their use on the broader grounds that they are inferior to general monetary controls for achieving the same objectives or that they have undesirable social side effects.

Broader Social Issues

The case against the use of selective credit controls has to be based not on the fact that they are discriminatory but on the fact that the method of discrimination is inappropriate. Since all types of controls have an unfavorable impact on someone, the technique used to select the victim becomes important. A number of studies have found evidence that general monetary controls have a discriminatory impact (22, p. 474). The selective impact of general monetary policies reflects differences in wealth, economic position and perhaps social position. But it results from the give and take between thousands of banks and their customers. The credit decisions reflect factors that have some bearing on the credit process. It is unlikely that anyone who reviewed all of these cases would find them to be equally fair and equitable. But if they were making the loans themselves, the results would probably be much the same.

The discrimination that results from selective controls does not represent the impersonal operation of the demand for and the availability of funds. It represents the decisions of administrative officials about the appropriateness of a particular class of expenditures. Selective controls place a great deal of power and authority in the hands

of administrative officials to affect the spending decisions of a great many people and prosperity of many businesses. The centralization of this type of power should be avoided.

Automobiles, and particularly those that have to be purchased on credit, have never been very high on anyone's list of social priorities. Their contributions to our energy and pollution problems have not increased their popularity. Some reductions in expenditures for automobiles would seem to be a small price to pay for a reduction in inflationary pressures and some easing in credit market conditions. A popular case can be made for the imposition of consumer credit controls at the present time. But our monetary system should not be based on such tenuous and largely irrelevant considerations.

The recent revival of interest in selective controls reflects disappointment and disillusionment with the performance of general monetary policies. But good arguments can be made that these problems can be traced to the inadequacy in the present conceptions and structure of control systems rather than to the basic inadequacy of the general monetary approach. The first step would seem to improve the techniques of general monetary controls rather than to turn to less desirable alternatives. When a car gets a flat tire, the usual approach is to fix the tire. You do not start adding new wheels to the car.

BIBLIOGRAPHY

1. Ali, M. A., "Hire Purchase Controls and the Demand for Cars in Postwar Years," *Journal of Economic Studies*, Vol. 1, No. 1: 1965, pp. 88-97.
2. Atkinson, L. J., "Consumer Markets for Durable Goods," *Survey of Current Business*, XXXII (April 1952).
3. Bach, G. L. and Huizenga, C., "The Differential Effects of Tight Money," *American Economic Review*, Vol. LI (March 1961) pp. 52-80.
4. Board of Governors of the Federal Reserve System, *Consumer Instalment Credit*, Washington, D.C.: U.S. Government Printing Office, 1957.
5. Board of Governors of the Federal Reserve System, "A Study of Instalment Credit Terms," *Federal Reserve Bulletin*, XXXV (December 1949).

6. Coppock, J. D., *Governmental Agencies of Consumer Instalment Credit*, New York: National Bureau of Economic Research, 1940.
7. Eastburn, D. M., "The Philosophy of Selective Credit Regulation," in Charles R. Whittlesey (editor), *Readings in Money and Banking*, New York: W. W. Norton Co., 1952, pp. 107-14.
8. Einsig, P., "Dynamics of Hire-Purchase Credit," *The Economic Journal*, Vol. LXVI, No. 261 (March 1956) pp. 17-24.
9. Enthoven, A., "The Growth of Instalment Credit and the Future of Prosperity," *American Economic Review*, XLVII (December 1957) pp. 913-29.
10. Gupta, M. C., "Differential Effects of Tight Money: An Economic Rationale," *The Journal of Finance*, Vol. XXVII, No. 4 (September 1972) pp. 825-39.
11. Haberler, G., *Consumer Instalment Credit and Economic Fluctuations*, New York: National Bureau of Economic Research, 1942.
12. Hodgman, D. A., "Selective Credit Controls," *Journal of Money, Credit and Banking*, Vol. IV, No. 2 (May 1972), pp. 342-60.
13. Katona, G., *The Powerful Consumer*, New York: McGraw-Hill, 1960.
14. Kisselgoff, A., *Factors Affecting the Demand for Consumer Instalment Sales Credit*, Technical Paper No. 7, New York: National Bureau of Economic Research, 1952.
15. Klein, P. A., *The Cyclical Timing of Consumer Credit, 1920-1967*, Occasional Paper 113, National Bureau of Economic Research, 1971.
16. Mao, J. C. T., "Is Consumer Credit Immune to General Monetary Controls?" *Michigan Business Review*, January 1961, pp. 24-28.
17. Mayer, T., "Financial Guidelines and Credit Controls," *Journal of Money, Credit and Banking*, Vol. IV, No. 2 (May 1972), pp. 360-75.

18. McCracken, P. W., Mao, J. C. T., and Fricke, C. V., *Consumer Instalment Credit and Public Policy*, Ann Arbor, Mich.: Univ. of Mich. 1965.
19. Melnicoff, D. C., "Regulation of Consumer Credit," in Charles R. Whittlesey (editor), *Readings in Money and Banking*, New York: W. W. Norton and Co., 1952, pp. 115-7.
20. Oliver, F. R., *The Control of Hire-Purchase*, London: George Allen and Unwin Ltd., 1961.
21. Parry, C. E., "Selective Instruments of National Credit Policy," *Federal Reserve Policy*, Postwar Economic Studies, No. 8, Washington, D.C.: Board of Governors of the Federal Reserve System, 1947.
22. Rao, D. C., "Selective Credit Policy: Is it Justified and Can it Work?" *Journal of Finance*, Vol. XXVII, No. 2 (May 1972) pp. 473-480.
23. Selden, R. T., "Monetary Restraint and Instalment Credit", *Consumer Spending and Monetary Policy*, Federal Reserve Bank of Boston.
24. Suits, D. B., "The Demand for New Automobiles in the United States, 1929-56," *Review of Economics and Statistics* (August 1958) pp. 273-80.
25. Simmons, E. C., "The Role of Selective Credit Control in Monetary Management," *American Economic Review*, Vol. XXXVII, No. 4 (September 1947), pp. 633-41.
26. Smith, P. F., "Response of Consumer Loans to General Credit Conditions," *American Economic Review*, Vol. XLVIII (September 1958), pp. 649-55.
27. Smith, P. F., "Multiplier Effects of Hire-Purchase," *Economica*, Vol. XXXI, (May 1964), p. 190.
28. Webster, P. M., "Instalment Credit Terms Before and During Regulation," *Federal Reserve Bulletin*, (July 1951), pp. 800-806.

Discussion

IRA P. KAMINOW*

My overall reaction to the paper is that I wish I were as certain as Paul about the issues surrounding selective credit controls in general and consumer credit controls in particular. As I see the thrust of the paper, there are three important conclusions, about which we are told there is or ought to be little doubt.

1. The empirical evidence is clear, consumer credit controls of the sort we had in the 1940s and 1950s can have substantial predictable impacts on the demand for consumer goods relative to other demands.
2. While there might be some logical possibility that the effect of consumer credit controls on real consumer demand will be offset elsewhere in the real economy, this seems implausible. Thus, consumer credit controls can be used to affect total real demand and hence, be used as a countercyclical tool.
3. But they should not be so used because the market is preferable to governmental authorities as resource allocators.

In many ways, my "gut" feelings are not very different from Paul's conclusions, but I continue to have substantial doubts and find it difficult to close the books on any of these three issues. Let me look at each of the three points in turn.

Can Consumer Credit Controls Be Used to Affect the Demand for Consumer Durables?

My guess is that in the short run, but perhaps not in the long run, restrictive consumer credit controls will restrict the demand for consumer durables. However, I see little systematic evidence to support this view.

*Economic Adviser, Federal Reserve Bank of Philadelphia

The evidence offered in the paper is in part indirect and in part direct. The indirect evidence is the observed relation between the demand for consumer durables and credit terms. Such a relation, however, is merely necessary but hardly sufficient to demonstrate that consumer credit controls would or did affect real demands. The studies that show a link between real demands and credit terms look at absolute credit terms rather than the more relevant (in the present context) relative terms among liability classes. Selective credit controls are supposed to affect real demand *selectively*. In the context of selective controls, it is not enough to show that demand for consumer durables is inversely related to the interest rate. It is necessary also to determine whether by administratively raising the rate on consumer credit relative to *other* rates we can selectively cut down the demand for consumer durables.

Whether the answer is yes or no, of course, depends on the ease with which consumers can switch sources of finance, the substitutability between consumer durables and other commodities, and so on. I find these questions to be the crux of the matter. And the answers depend on how much time you give consumers and lenders to learn how to beat the system. Once you allow time for this kind of learning process, it becomes much less certain that the controls would selectively allocate resources.

The direct evidence cited on the allocational efficacy of consumer credit controls relates to tests of the U.S. experience with these controls a few decades back. The evidence indicates that by regulating allowable credit terms, the demand for consumer durables was in fact altered. Since, however, the period of investigation includes many war years when there were "shortages" of consumer durables as well as other special situations, I find it difficult to interpret the evidence. Moreover, because the laws were in effect for relatively short periods it is difficult to analyze the impacts of learning and longer-term adjustments of the sort I talked about a minute ago.

Finally, it is not clear how relevant the earlier experience is to the current situation. It is hard to see how consumer credit controls based on minimum down payment and maximum maturity would have a very big impact in a world with rapid growth in unsecured, revolving type consumer credit. My guess is that reimposition of consumer credit controls based on down payment and maturity would simply accelerate the expansion of this kind of debt as borrowers and lenders seek to avoid the regulation.

Can Selective Credit Controls Be Used as a Countercyclical Tool?

A second issue of selective credit control efficacy that Paul touches on is countercyclical efficacy. He sees this as being the significant outstanding economic issue surrounding consumer credit controls. He divides the economics profession between (a) those who see that consumer credit controls will have little impact on aggregate demand because restriction of consumer demand will set in motion forces to encourage demand elsewhere that will completely offset the decline in consumer demand and (b) those who see less than a complete offset in demand elsewhere. Economists who believe that consumer credit controls have no impact on real variables whatever would, of course, represent a third category.

For Paul, the relevance of selective controls to countercyclical policy hinges on whether view "a" or "b" is adopted: "If selective controls cannot be counted on to produce the desired effects on economic aggregates the debate is over". Moreover, he comes down firmly on the "b" side — that is, that selective credit controls can have aggregative effects. I'm not so sure either that the debate ends if choice "a" is selected or that "b" is the appropriate selection. Even if consumer credit controls have no net aggregative impact, it would still be possible to use them in conjunction with more general controls. That is, if the authorities decided that the "burden" of a restrictive policy ought to be borne more heavily by the consumer sector than would be the case if the market were left alone, they could impose a generally restrictive policy and a restrictive consumer credit policy simultaneously.

With regard to the view that selective credit controls can have aggregative effects, Paul argues that the alternative view hinges on a credit availability doctrine which he believes (correctly, I think) cannot be counted on except under certain overly-restrictive assumptions. It seems to me, however, that he has not looked at the whole story and the case for view "a" might be made on other grounds.

In the Smith paper, we read that "Any shift in the demand for funds, such as the one we know can be induced by the use of selective controls, should result in a shift in the aggregate demand function with traceable results on the aggregate level of spending and the interest rate. . ." The point of view expressed by this sentence, I think, is that aggregate commodity demand is a function of the demand for funds. A more symmetric view, however, would be that the demand for goods and the demand for funds are jointly determined and that neither is ultimately a function of the other.

Under this more symmetric view the aggregate demand for goods and the demand for credit might be thought to depend on interest rates and regulated selected credit control terms.

In such a world, when credit controls are tightened credit markets will respond by equilibrating at lower interest rates. The aggregate demand for goods and services may go up or down. On the one hand, commodity demand will be depressed because of the restrictive credit control; on the other, it will be encouraged by the decline in interest rates. What in fact will happen to the demand will depend on the amount by which interest rates change in response to the imposition of the credit control and the relative elasticities of aggregate demand to interest rate changes and the credit control. Without specific information regarding the relative magnitudes of these effects, I know of no way of anticipating the impact of a particular selective control on aggregate demand.

The Broad Social Issues

Let me now finish up with the last of the three points I raised at the outset: if we assume that selective credit controls can affect aggregate demand, should they be used for that purpose? The answer we get in the paper is no. I believe the reasoning behind the answer roughly parallels what might be called the traditional conclusions of the old welfare economics: it is preferable to allocate resources through the market as compared with government administrators. As a general rule, I would concur with this proposition but I think in the current context a case can be made in favor of market interference.

In part because of the legislated restrictions on mortgage and deposit rates, restrictive monetary policy has sharp differential impacts against the housing industry. These differential impacts probably are economically inefficient, although in a world of "second best" there is no way of knowing. Perhaps more importantly, however, anticipations of these impacts by monetary policymakers can move them in the direction of monetary ease more often than appropriate on other grounds. Selective controls — if they have aggregate impacts — could be one way out of the dilemma. That is, policymakers might elect to restrict consumer demands so as to ease the pressure on the housing sector and so obtain more flexibility in aggregative policy making. I know that the response to this suggestion is frequently that we should get rid of interest rate regulation, and I would agree. But I don't know how quickly interest rates are likely to be deregulated. Whether or not one agrees with this justification for consumer credit controls, I think the argument has some merit and requires some response.

*The Cost of Capital, The Desired Capital
Stock, and a Variable Investment
Tax Credit as a Stabilization Tool*

GLENN C. PICOU*
and
ROGER N. WAUD**

This study considers the potential of a variable investment tax credit to relieve the pressure of a contracyclical monetary policy on the housing and State and local government sectors. In particular, it examines the potential of such a policy instrument to affect business capital expenditures in the U. S. manufacturing sector at the two-digit SIC (Standard Industrial Classification) level of aggregation. If a variable investment tax credit can affect investment expenditures with sufficient force and speed, the active use of such a policy instrument could reduce the stabilization burden now borne by the housing and State and local government sectors.

Perhaps the best known recent works in this area are those by Hall and Jorgenson (11,12,13) and Bischoff (2). The model used by Hall and Jorgenson assumes that the elasticity of the desired capital stock with respect to the implicit rental rate on capital is unity, that is, it is an assumed rather than an estimated value. In addition, their model has a theoretical difficulty which recent research [6] has found to be of empirical consequence. Essentially this difficulty stems from attempting to explain the demand for an input, capital, by use of output in a single equation model. Bischoff's model is more general than that used by Hall and Jorgenson in that it assumes a CES production function, instead of Cobb-Douglas, and it is a putty-clay model as opposed to a putty-putty model. Bischoff's model still has the same theoretical difficulty alluded to above, however. Furthermore, his model must be estimated by nonlinear estimation tech-

*Economist, Federal Reserve Bank of Richmond

**Professor of Economics, University of North Carolina — Chapel Hill and Senior Economist; Board of Governors of the Federal Reserve System. The authors wish to acknowledge the programming assistance provided by Cathy Gaffney of the Federal Reserve Bank of Richmond.

niques the statistical properties of which have not as yet been established except to a limited extent in certain asymptotic cases. Bischoff's as well as Hall and Jorgenson's empirical investigations of tax effects on investment behavior were conducted at a much more aggregative level than that undertaken in this study. Our model differs from both of these models in that: output specific to the industry is not used as an explanatory variable; the effects of labor costs on the demand for capital are explicitly taken into account. Our model differs from the Hall-Jorgenson model in that the elasticity of the desired capital stock with respect to the implicit rental rate on capital is a parameter to be estimated, rather than assumed to equal one. Our model differs from the Bischoff model in that ours is a putty-putty model assuming a Cobb-Douglas production function. Because of this we are able to use a linear estimation procedure whereas Bischoff's model must be estimated by nonlinear techniques. Undeniably, this gain is obtained by giving up some generality of specification. However, as regards the Cobb-Douglas assumption, Jorgenson's survey [14, pp. 1131-1133] of findings on this issue concludes that it is a tenable assumption.

In Section I we summarize the case that is commonly put forward for a variable investment tax credit scheme. Section II details the framework of analysis used in this study. Section III discusses estimation and related data problems, and presents our estimation results. In Section IV the policy implications of our findings are considered.

I. Monetary Policy and the Case for a Variable Investment Tax Credit

A major, often heard, complaint against heavy reliance on monetary policy to stabilize the economy is that its effectiveness places the major burden of adjustment on those sectors most sensitive to changes in general credit conditions. In particular, the housing and State and local government sectors appear among the most severely, some argue inequitably, penalized. Given the existing political and economic institutions, these sectors will continue to bear the cutting edge of monetary policy unless measures are instituted that will increase the responsiveness of other sectors to monetary stabilization policies.¹

¹A compendium of papers which examines possible measures to alleviate the problem in housing in particular, plus extensive bibliographies on the problem in general, may be found in [3].

There are a number of potential ways to reduce the burden of cyclical stabilization currently borne by the housing and/or State and local government sectors. Most have some severe drawbacks associated with them, however. For example, the notion of pursuing a more active contracyclical fiscal policy has not turned out to be very feasible in the United States. Allocation considerations have typically taken precedent over stabilization objectives in making Federal expenditure decisions, and the instigation and implementation of changes in general tax rate schedules has usually been a protracted process. Schemes designed to insulate the housing sector from the effects of changes in credit conditions would only serve to further exacerbate the effects of such changes on the State and local government sector, and schemes designed to insulate the latter would similarly worsen the burden on the housing sector. Schemes designed to buffer both sectors from the effects of changing credit conditions would reduce the impact of monetary policy on aggregate demand and therefore would require larger, probably unpalatable, fluctuations in interest rates and monetary aggregates to obtain the same effect on aggregate spending. Hence, extensive insulation of the housing and State and local government sectors would considerably compromise the efficacy of monetary policy as a stabilization tool.

Largely because of the above considerations, attention has been given to the design of policy instruments intended to affect business fixed investment in a contracyclical manner. Whatever the sources of fluctuations in aggregate economic activity, changes in the rate of business fixed investment have been a large and volatile component. If this component could be stabilized, reliance on conventional monetary policy could be reduced and this would help alleviate the burden of cyclical adjustment that is now borne by housing and State and local government construction activity. It appears that conventional monetary policy as conducted since the Treasury-Federal Reserve accord has found it difficult to exercise either a rapid or sizable influence over business fixed capital spending. This suggests that attempts to induce contracyclical movements in business fixed investment may require larger movements in interest rates and monetary aggregates than monetary policy has heretofore envisioned. But this would place an even more severe burden of adjustment on the housing and State and local government sectors. These considerations have motivated the search for a policy instrument specifically designed to directly affect business fixed investment expenditure while minimizing their impact on other sectors.

Such an instrument could be designed by using a system of business investment taxes and subsidies to pursue desired stabilization goals. Various traditional types of taxes could be imposed on investment during periods deemed excessively expansionary while investment tax credits might be offered during recessionary periods. Because it is typically difficult to get rapid congressional approval of such discretionary measures, it would be necessary that such a scheme be endowed with formula flexibility, with circumscribed discretionary authority vested either in the executive branch of government or the Federal Reserve System in order that the primary function and purpose of the scheme may be to pursue stabilization goals. For lack of a better name, such a policy instrument may be called a variable investment tax credit.²

In the context of a neoclassical theory of factor demand, such as developed by Haavelmo [10] and Jorgenson[15], it can be shown that a variable investment tax credit (VITC) can change the effective factor demand for capital equipment by altering the implicit rental rate or own price of capital. If a VITC scheme is to be a useful stabilization tool, two conditions must be satisfied to some reasonable degree: first, the demand for capital should be sensitive to changes in the implicit rental rate of capital; second, the full impact of such changes must occur within a reasonable time after a change in the implicit rental rate occasioned by a change in the VITC. It is the purpose of this study to provide an empirical examination of both of these issues for 12 out of 20 of the two-digit SIC industries comprising total U. S. manufacturing (see Table I): with regard to the sensitivity of the desired capital stock to changes in the implicit rental rate of capital, elasticity estimates are obtained; with regard to lag lengths, distributed lags are estimated to attempt to ascertain how long it takes for the impact of a change in the implicit rental rate of capital to be fully realized.

²An alternative approach has been suggested by Pierce and Tinsley [3, pp. 345-355]. They propose the establishment of a business investment fund (BIF) having a unit deposit or withdrawal rate geared to the level of aggregate fixed investment expected relative to the expenditure level deemed necessary for economic stabilization; the BIF rate would amount to a mark-up or rebate on the purchase price of new capital goods. A positive BIF rate would be applied to gross fixed investment expenditures during periods of excess aggregate demand, thereby effectively raising the price of new capital goods and discouraging investment demand. During periods of deficient aggregate demand the BIF rate would be negative, the outpayments serving to effectively lower the price of new capital goods to investing firms. A similar scheme has been used in Sweden: see Lindbeck's paper in this volume.

TABLE 1
STANDARD INDUSTRIAL CLASSIFICATION

SIC No.	Industry
20	Food and Beverages
22	Textile Mill Products
26	Paper and Allied Products
28	Chemical and Allied Products
29	Petroleum and Coal Products
30	Rubber Products
32	Stone, Clay, and Glass
33	Primary Metals
34	Fabricated Metals
35	Nonelectrical Machinery
36	Electrical Machinery and Equipment
38	Instruments

If the lags appear to be "too long," a case can be made for administering the VITC scheme in such a way as to encourage business investment decision makers to speed up their attempts to put new capital in place. For example, if the policy maker publicly announces that an investment tax credit will be granted on all projects started between say time t and $t+4$ (a period of four months for example), decision makers would presumably try to take advantage of such a credit while it lasted. The closer the termination date is to t , the more "bunching" of investment expenditures would presumably occur in the time interval from t to $t+j$, where j is the termination date. By varying j the policy maker could in this way have an effect on the length of the lag between the change in the implicit rental rate of capital, caused by a change in the variable investment tax credit, and the point in time by which the impact of such a change on the desired stock of capital would be fully realized.

The purpose of a VITC scheme is to stabilize business fixed investment which, by virtue of its multiplier effects on aggregate demand, would serve to help stabilize the economy. Increased stability of the economy would in turn make the task of stabilizing investment that much easier by reducing the fluctuations in the feedback effects from the economy on investment — the well-known accelerator effect which aggregate economic fluctuations have on investment. This study obtains estimates of the strength of these feedbacks and the distributed lag lengths over which their impact on investment is fully realized. Hopefully this will shed some light on just how much the feedback effects of increased stability in the economy might aid a VITC scheme's task of stabilizing fluctuations in fixed business investment.

II. The Framework of Analysis – A Neoclassical Reduced Form Model

The model used in this study is derived from a microtheoretical analysis of a monopolistic producer. The model can then be extended to imperfectly competitive and perfectly competitive industries. The interpretation of the parameters is the same on an industry or firm level; and the market structure of the industry will not affect the interpretation of the results. The model has been used to analyze investment behavior by Gould and Waud [6], and a variant has been used by Waud [24] to study the demand for labor.

The Reduced Form

The following symbols are used in the derivation of the model to follow:

- P = unit price of output Q;
- Q = quantity of output;
- s_1 = total cost per production worker hour;
- s_2 = total cost per overhead worker hour;
- L_1 = production worker hours;
- L_2 = overhead worker hours;
- q = price of capital goods;
- K = capital stock employed;
- K^* = capital stock desired;
- I = gross capital formation;
- T = corporate profit taxes;
- R = time rate of discount;
- u = corporate tax rate;
- v = proportion of depreciation cost chargeable against net taxable income;
- w = proportion of cost of capital chargeable against net taxable income;
- x = proportion of capital gains on assets subject to taxation;
- r = cost of capital;
- δ = rate of depreciation.

In this version of the neoclassical model, it is assumed that the firm chooses its capital and labor inputs in such a manner as to maximize its net worth, or the present value of all future net

receipts. It is also assumed that replacement investment is directly proportional to the capital stock of the firm.³ Net investment is thus constrained by the relation.

$$(1) \quad \dot{K} = I - \delta K \quad (\dot{f} = df/dt)$$

The firm's output is also constrained by the production possibilities embodied in the firm's production function

$$(2) \quad F(K, L_1, L_2, Q) = 0 .$$

Net receipts at time t are equal to the algebraic sum of gross receipts, labor costs, capital costs, and taxes, where taxes are equal to the tax rate times the firm's net taxable income:

$$(3) \quad T = u[PQ - s_1L_1 - s_2L_2 - vq\delta K - wqrK + x(\dot{q}/q)qK] .$$

In (3), $vq\delta K$ is the amount of depreciation chargeable against net income, $wqrK$ is the amount of capital cost chargeable against net income, and xqK is the amount of capital gains chargeable to net income. The unit cost of capital is assumed to be invariant with respect to the rate of investment. The cost of investment at the rate I is simply equal to the amount of capital investment per unit of time multiplied by the unit cost of capital goods. The labor inputs L_1 and L_2 are assumed to be sufficiently elastic so that the desired labor inputs can be realized in each period without any costs of adjustment.⁴ Thus the cost functions for labor are simply equal to the labor inputs multiplied by their unit costs.

The firm will thus act so as to maximize

$$(4) \quad V = \int_0^{\infty} e^{-Rt} [PQ - s_1L_1 - s_2L_2 - qI - T] dt$$

³For a discussion of this assumption, see Jorgenson [17, p. 139].

⁴It will be presumed that the demand for labor inputs for a two-digit industry constitutes a relatively small proportion of the total labor demand. Consequently, labor inputs can be adjusted to the desired level in each period with little cost of adjustment. Such an assumption is made by Waud [24].

subject to the constraints (1) and (2). We assume a Cobb-Douglas production function. Neutral technological change is introduced into the production function by assuming that the effective input from each factor is the product of that input and a proportionality factor which is a function of time. The proportionality factor in the production function is also a function of time. In this case, the proportionality factors are assumed to be exponential functions of time: $A_i(t) = A_i e^{g_i t}$ ($i = 0, \dots, 3$). Thus the production function can be expressed as

$$(5) \quad Q = A_0(t) [A_1(t)K]^a [A_2(t)L_1]^b [A_3(t)L_2]^d \\ = A e^{gt} K^a L_1^b L_2^d \quad a, b, d > 0$$

where $A = A_0 A_1^a A_2^b A_3^d$ and $g = ag_1 + bg_2 + dg_3$; it is assumed $g > 0$.

Substituting (3) and (5) into (4) and then obtaining the Euler first order conditions for a maximum, we get the following comparative static equilibrium values for capital and labor:⁵

$$(6) \quad K = K^* = \frac{aQP}{c};$$

$$(7) \quad L_1 = L_1^* = \frac{bQP}{s_1};$$

$$(8) \quad L_2 = L_2^* = \frac{dQP}{s_2};$$

where c in (6) is the implicit rental on a unit of capital services, or the own price of capital, which from the Euler conditions can be shown to be

$$(9) \quad c = q \left[\left(\frac{1 - uv}{1 - u} \right) \delta + \left(\frac{1 - uw}{1 - u} \right) r - \left(\frac{1 - ux}{1 - u} \right) \dot{q}/q \right].$$

Following Jorgenson [16, p. 59], it is assumed that the firm views all capital gains and losses on its capital stock as transitory. This assumption may be justified on the grounds that the manufacturing firm does not generally buy capital goods with the intention of realizing any capital gain which might arise due to changes in the prices of capital goods. The firm views all such capital gains as transitory and of no consequence in determining its cost of capital so that (\dot{q}/q) can be equated to zero. From (6) and (9) it is now apparent how tax and credit schemes imposed on the firm enter into the determination of the desired capital stock through the own price of capital c , that is, by virtue of the presence of such policy determined tax parameters

⁵The details of this derivation may be obtained from the authors on request.

as u , v , and w in (9). It is through changes in just such parameters as these that a VITC scheme would work by changing c .

It is important to emphasize that (6) defines the long-run equilibrium value of capital, since the cost of adjustment of capital has been constrained to zero. In a dynamic situation, however, the desired capital stock will not equal (and will generally exceed) the actual stock. The actual output level, Q , which is constrained by the actual capital stock, will generally fall short of the long-run optimal output level. Gould [9] has shown that the use of actual output in determining optimal capital when output is constrained by the non-equilibrium stock of capital K will lead to a bias in the estimation of the long-run value of K^* . This occurs if the level of output which can be produced under the constraint imposed by the production function is less than that which the firm would wish to produce given the demand for its product. It is therefore necessary to formulate long-run desired capital in terms of variables which are not influenced by the capital investment decision and the adjustment processes of the firm.⁶ To obtain the necessary reduced form model, it will be assumed that a monopolist firm faces the following demand function.⁷

$$(10) \quad P = \lambda_0 Q^{\gamma_1} Y^{\gamma_2} \quad \gamma_2 \geq 0, \quad \gamma_1 < 0.$$

The shift variable Y is real GNP, and $\gamma_1 = (1/\eta)$, where η is the firm's price elasticity of demand.⁸ For the nonmonopolist industry, η is the elasticity of demand for the industry as a whole.

Using the equilibrium values of capital and labor, as given by (6), (7), (8), the demand function (10), the production function (5), and the first order conditions, it can be shown that the desired capital

⁶Gould and Waud [6] have found that this consideration, to some a seemingly theoretical nuance, appears to be an important consideration when estimating investment functions from real-world data, and then using the estimated investment functions to forecast future levels of investment expenditures.

⁷This procedure also eliminates another source of endogeneity present in the desired capital stock specification of (6), i.e., the price-quantity relationship implicit in the demand function. It is assumed that the firms in the industry make a decision with respect to either quantity or price. In this study the firm is presumed to be a price taker and a quantity adjuster. In either case, quantity and price cannot both be considered exogenous to the firm, or the industry.

⁸This follows Gould and Waud [6].

stock can be expressed as a function of technological change, the own price of capital, the costs of labor, and the shift variable, real GNP:⁹

$$(11) \quad K^* = \lambda_0 e^{\lambda_1 t} c^{\lambda_2} s_1^{\lambda_3} s_2^{\lambda_4} Y^{\lambda_5}$$

or in log-linear form

$$(12) \quad \ln K^* = \ln \lambda_0 + \lambda_1 t + \lambda_2 \ln c + \lambda_3 \ln s_1 + \lambda_4 \ln s_2 + \lambda_5 \ln Y .$$

Equation (12) expresses the capital demand function for a monopolist firm. Gould [7] has shown that the model can be extended to the analysis of any industry organization without any change in the interpretation of the demand elasticities λ_j . The only change in the model occurs in the constant term.¹⁰

Analysis of the raw data showed very high correlations between s_1 and s_2 . It is therefore assumed for all industries that $s_2 = \theta s_1$ ¹¹. In order to avoid serious multicollinearity problems this relationship is used to substitute s_2 out of the derivation which leads to the reduced form (11) and (12). The reduced form model can then be rewritten as

$$(13) \quad \ln K_t^* = \ln \lambda_0 + \lambda_1 t + \lambda_2 \ln c_t^* + \lambda_3 \ln s_{1t}^* + \lambda_4 \ln Y_t^*$$

where the coefficient on $\ln Y_t^*$ is now called λ_4 instead of λ_5 . The asterisks on c , s , and Y indicate that these are the values expected to hold in the "long run," the permanent values of c , s , and Y ; we shall discuss this at greater length below.

⁹The rather lengthy and involved details of this derivation will be provided on request of the authors.

¹⁰Gould [7, pp. 35, 36] demonstrates that "... these coefficients [λ_j] are the elasticities of K^* with respect to each of these variables and hence this result can be interpreted as meaning that a change in the price of productive factors, a shift in demand, or a neutral technological change will have the same proportionate effect on the demand for capital irrespective of whether the industry is monopolistic or competitive in structure. This identity of coefficients has empirical advantages, since the interpretation of the estimated parameters (except the intercept) stays the same even if the organization of the industry is ambiguous."

¹¹Simple regression of $\ln s_2 = \ln \theta + \ln s_1$ produced R_2 's of more than .90 for all industries except SIC 34, in which the R_2 was quite small. To maintain uniformity in the results, the assumption $s_1 = \theta s_2$ was also made in SIC 34, although the possibility of specification bias is thereby introduced.

Cost of Adjustment

The desired capital stock K^* appearing on the left side of (13) refers to the amount of capital which is desired at the present time t given the values on the right side of (13). This model, however, like almost all others which have been used in the empirical analysis of investment behavior,¹² has been derived on the assumption that the unit cost of capital goods is invariant with respect to the rate of capital formation. This assumption is no doubt an inaccurate characterization of the capital stock adjustment process since clearly the more rapidly a firm, or industry, tries to purchase and put capital stock in place, the more expensive each unit of capital will become.

The firm's cost of capital adjustment reflects both internal and external cost factors. An internal cost is associated with the introduction of new equipment to a firm's production process. One example of such a cost might be the overtime payments required for the installation of capital equipment in a relatively short period of time. The more rapid the rate of installation for a given unit of capital, the greater these internal costs. The external cost is the purchase price of a unit of capital. For a single firm in a competitive market for capital equipment, external costs of adjustment may well be zero. However, if the firm's desire to accumulate capital more rapidly is held in common with other firms in the market, their common attempt will tend to raise the supply price of capital. For an industry as a whole, regardless of the market structure of the capital goods producing industry, an attempt to increase the rate of capital investment would tend to push up the purchase price of capital.¹³ Taking both factors into consideration, a realistic cost of investment function for a manufacturing industry should reflect these nonzero costs of adjustment. Hence it is inconsistent to speak of profit maximizing behavior without recognizing that the rate of investment will be a determinant of the unit cost of capital, and this cost will have an effect upon the profits of the firm. But if costs of investment affect profits, they also affect the desired capital stock variable. That is, the desired capital stock and the rate of investment are determined simultaneously, with the cost of adjustment a factor in their mutual determination.¹⁴

¹²See Jorgenson [14] for an extensive survey.

¹³For a detailed discussion of adjustment cost function characteristics, see Eisner and Strotz [5].

¹⁴See Gould [8] for an extensive discussion of these issues.

When it is assumed that the unit cost of capital goods is invariant with respect to the rate of capital formation, the first order conditions for maximization of the present value of all future net cash flows, i.e., maximization of equation (4), do not yield an investment equation but rather the equilibrium value of the capital stock since investment is either zero or infinite, as Haavelmo [10] has demonstrated. This is precisely what is given by the reduced form, equation (13). The typical investment study, having arrived at some expression for K^* by a maximization procedure under the assumption that the unit cost of capital goods is invariant with respect to the rate of capital formation, then attempts to relax this assumption and give explicit recognition to the real world fact that firms cannot adjust their actual capital stock to the desired level instantaneously without incurring exorbitantly prohibitive costs of adjustment. They do this by substituting for K^* the equation defining K^* , such as (13), into some kind of ad hoc adjustment scheme which defines how the actual capital stock is adjusted through time to the desired level K^* . Such a scheme is then shown to give rise to an expression defining investment expenditure as a distributed lag function of all the variables defining the desired capital stock.¹⁵

The only theoretically correct way of dealing with the cost of adjustment problem is to directly incorporate cost of adjustment functions, for both labor and capital, into the objective function, such as (4), and then carry out the maximization procedure.¹⁶ This explicitly recognizes that fact that the rational firm must take explicit account of adjustment costs in the profit-maximizing process. When such costs are included in the objective function, the resulting first order conditions yield the optimum capital stock and the corresponding investment path for the firm. However, the investment functions are nonlinear forms not amenable to linear estimation techniques, and this limits their usefulness in empirical analysis. This is the main reason such a procedure was not followed in this study.

Given that (13) was derived on the assumption that the unit cost of capital is invariant with respect to the rate of capital formation, and given that we know that the unit cost of capital typically rises

¹⁵For a more complete description of this procedure and a survey of the studies which adopt it, see Jorgenson [14].

¹⁶See Gould [8] for an extensive discussion of this procedure and the issue in general.

with the rate of capital formation — contrary to assumption, it must be recognized that at any point in time t the desired capital stock K^* defined by (13) is not likely to be equal to the actual capital stock K in place at t in a world continually adjusting to change. Only in some long run, static, steady state might we expect K^* to equal K .¹⁷ Recognizing therefore the need for characterizing the process by which the actual capital stock K is adjusted to the desired capital stock K^* through time, we could adopt the rather general, though ad hoc, adjustment process specified by Jorgenson [15]. Substituting K^* as defined by (13) into that scheme gives rise to a distributed lag investment function.¹⁸ Unfortunately, the function is nonlinear and must be estimated by nonlinear estimation techniques. One of the main requirements of this study is to be able to make statements regarding the statistical significance of the estimated relationships between K^* and the explanatory variables on the right-hand side of (13). Unfortunately, the theory of statistical inference for nonlinear estimators is not as yet sufficiently developed to allow us to do this. Another serious drawback of the Jorgenson scheme is that it would constrain us to the assumption that the distributed lags on the independent variables in (13) are all of the same length. We have no *a priori* reason for believing this to be the case.

Given all of these considerations the approach taken in this study is to construct ex post measures of the desired capital stock K^* for each industry and substitute these measures for K^* into (13). Then we may use linear estimation techniques and, in addition, we are not constrained to assume that the independent variables in (13) all have the same distributed lag lengths.

Measuring the Desired Capital Stock

Given that the costs of capital stock adjustment rise with the rate at which the firm adjusts its actual capital stock to its desired or target level, it follows that at any point in time t the firm envisions

¹⁷Even this would only be approximately true because, in a real world characterized by nonzero adjustment costs, the desired long-run steady state level of the capital stock would be lower than that desired in a world where adjustment costs are zero. This is because nonzero adjustment costs would make any amount of capital more expensive than would be the case if adjustment costs were zero, and these costs would effectively drive up the implicit rental rate on capital thereby reducing the size of the desired capital stock below what it would be if adjustment costs were zero and the implicit rental rate of capital were therefore lower. Hence, even in a long run steady state, K^* as defined by (13) would tend to overstate the amount of capital desired in a world characterized by nonzero costs of adjusting to that steady state.

¹⁸This has in fact been done elsewhere: see Gould and Waud [6].

making this adjustment to its notion of the desired level, held at time t , over several periods n . Presumably, the more (less) rapidly costs of adjustment rise with the speed of adjustment the lower (larger) will be the rate of adjustment of the actual capital stock to the desired level. It is maintained that the firm's plans for capital accumulation are embodied in its capital appropriation decisions. Given the firm's actual stock of capital in period t and the stock of capital which it desires to have in place in period $t+n$ assuming its anticipations are realized, it is assumed that the firm adjusts its capital appropriations backlog so that the backlog represents the amount of capital expenditures necessary to bring the actual capital stock up to the desired level in period $t+n$.¹⁹ These expenditures will include replacement investment necessary to maintain the current capital stock plus expenditures for replacement of any net capital formation which occurs over the n periods. Let ϕ_t be that proportion of the appropriation backlog B_t which the firm anticipates will be directed toward net capital formation. Assuming that the firm forecasts its expenditure pattern accurately over the n period horizon, ϕ_t can be estimated ex post, as described below. Subsequently, it can be shown that the desired capital stock for period $t+n$, as of period t , can be expressed as the sum of current capital stock depreciated at the rate δ over the subsequent n periods, and the depreciated gross investment stream over the same period. We will now develop this notion of the desired capital stock more explicitly.

The concept of desired capital stock employed in this study assumes that in period t , the capital stock desired for period $t+n$, K_t^* , is equal to the current stock of net depreciable capital assets plus some proportion of the current backlog:

$$(14) \quad K_t^* = K_t + \phi_t B_t .$$

K_t is the stock of net depreciable assets at the end of period t , B_t is the backlog, in real terms, at the end of period t , and ϕ_t is the proportion of the current backlog planned for net capital formation over the investment "horizon" (which is discussed below). The

¹⁹This notion of the desired capital stock is based on an assumption made by Jorgenson [17, p. 177]. "... We assume that the desired level of capital is equal to the actual level of capital plus the backlog of incompleting investment projects."

remaining proportion of the backlog, $(1 - \phi_t)$, is planned either for maintaining the existing stock of capital over the n period horizon, or for maintaining the new capital stock which is put in place in periods $t+1$ through $t+n-1$.

The proportion ϕ_t of the backlog intended for net capital expansion over the horizon is estimated ex post. Net capital expansion over n periods is the sum of depreciated (determination of δ , the depreciation rate, is described below) gross investment over the n periods less the depreciation over n periods of the capital stock in place at the beginning of the n periods (end of period t). Thus:

$$(15) \quad \phi_t = \frac{\sum_{i=1}^n (1 - \delta)^{n-i} I_{t+i} - [K_t - K_t (1 - \delta)^n]}{B_t}$$

Examination of (15) reveals that it defines the proportion of the backlog intended for net capital expansion over the horizon. Since $K_t(1 - \delta)^n$ represents the amount of capital K_t presently in place which will still be in existence in period $t+n$, $K_t - K_t(1 - \delta)^n$ represents the amount of capital presently in place which will no longer be in existence in period $t + n$. $\sum_{i=1}^n (1 - \delta)^{n-i} I_{t+i}$ represents that part of gross investment taking place between t and $t+n$ which will still be in existence as capital stock in period $t+n$. Hence the numerator of (15) represents the net addition or growth of the capital stock between t and $t+n$. The numerator of (15) divided by B_t , the total backlog in existence in period t , gives ϕ_t , the proportion of the backlog intended for net capital expansion over the horizon n . The resulting desired capital stock can be expressed as:

$$(16) \quad K_t^* = K_t + \phi_t B_t \\ = K_t + \sum_{i=1}^n (1 - \delta)^{n-i} I_{t+i} - [K_t - K_t(1 - \delta)^n] \\ = \sum_{i=1}^n (1 - \delta)^{n-i} I_{t+i} + K_t (1 - \delta)^n .$$

The assumption of perfect forecasting is made for the simple reason that the true desired capital stock variable is an ex ante variable which is a function of the expected investment stream over time. Such a simplifying assumption is necessary to allow any estimation whatsoever of desired capital stock. Perhaps the strongest justification for this assumption is provided by the rational expectations hypothesis due to Muth [19]. Basically, that hypothesis asserts that rational economic actors will use forecasting schemes which have the property that they are correct on average, i.e., that they are unbiased predictors. Unfortunately, even if this is true on

average, it is still possible of course for the forecaster to be systematically wrong over some finite number of periods. For example, suppose the actual investment stream through period $t+n$ in fact exceeds the planned investment stream based upon conditions in period t . Given the conditions in period t , the firm may accurately forecast what the investment path would be over n periods, were nothing to change after period t . Only if the firm were also accurate in its anticipation of the future values of the explanatory variables in (13) would actual investment over n periods tend to coincide with the expected n period stream from period t to $t+n$. If however, the economic series under consideration were subject to some exogenous shift introducing a positive time trend for example, it is possible that over time the firm would be revising its desired capital stock upward. This would mean that in period $t+i$, $0 < i \leq n$, the actual rate of investment would include a component resulting from changes in desired capital after period t . If I_{t+i}^* is the expected investment expenditure due to conditions in period t , and if the desired capital stock is revised upward after period t and before $t+i$, then it is possible that $I_{t+i} > I_{t+i}^*$. Such a situation would introduce a systematic error into measurement of the dependent variable K_t^* , which might give rise to serial correlation.

The planning horizon of the firm is the number of periods n over which the current appropriations backlog is expected to be translated into actual capital formation. The procedure to be used in the estimation of the length of the horizon is that suggested in the NICB Survey of Capital Appropriations.²⁰ The backlog rate is the ratio of the backlog of capital appropriations outstanding at the end of each quarter, divided by the amount of actual capital expenditures during that quarter. The backlog rate indicates the number of quarters over which the current backlog would be worked off, were it to be spent at the current rate of investment. The high, low and average length of the planning horizon over the period 1954 to 1967 is given for each industry in Table 2. The horizon was computed by taking the rounded value of the backlog rate for each quarter from 1953 to 1967.

The procedure used to estimate the rate of depreciation δ for each industry is that developed by Jorgenson [16, pp. 38-40]. The estimates of the depreciation rates for each industry are shown in Table 3. A description of all the data used in calculating the desired capital stock series for each industry is given in the appendix.

²⁰See Cohen [4, p.318].

TABLE 2
LENGTH OF PLANNING HORIZON*

SIC No.	High	Low	Mean
20	4	1	2
22	9	2	5
26	7	3	4
28	7	3	4
29	5	1	3
30	6	1	4
32	8	2	4
33	9	3	6
34	10	3	6
35	6	1	3
36	9	3	5
38	5	1	3

*Rounded.

Source: Computed from NICB Survey on Capital Appropriations.

TABLE 3
ESTIMATED RATE OF DEPRECIATION

SIC #	δ
20	.01235
22	.02015
26	.01302
28	.01942
29	.01316
30	.01839
32	.02051
33	.01919
34	.02079
35	.03123
36	.01165
38	.01067

Expectations and Distributed Lags

In a world of perfect knowledge and positive costs of adjustment, K_t^* would be the capital stock which, given the future paths of the explanatory variables c , s , and Y as of period t , the firm desires for period $t+n$. This capital stock would in fact be realized in period $t+n$. But knowledge of the future is not certain, and future values of the explanatory variables will not be known with certainty. As it stands, the formulation of desired capital depends upon variables unknown at time t . To characterize the way the firm handles this problem we assume that the decision maker in the firm has an "anticipation" function. This function transforms ex post data into ex ante data which in this case are the expected, long-run equilibrium values of c , s , and Y prevailing over some specified period of time.²¹ These expected long-run, or "permanent," values c^* , s^* , and Y^* , at time t are each assumed to be functions of their past values.²² The permanent value is incorporated in the form of a distributed lag function of each of the independent variables in (13). (The asterisks indicate these long-run or permanent values of the variables.) The permanent values of the three independent variables are assumed to be exponential functions of past values of each of the respective variables. These anticipation functions can be expressed in log linear form as:

$$(17) \quad \ln c_t^* = \sum_{i=0}^{\theta_2} a_{2i} \ln c_{t-i}$$

$$(18) \quad \ln s_{1t}^* = \sum_{i=0}^{\theta_3} a_{3i} \ln s_{1t-i}$$

$$(19) \quad \ln Y_t^* = \sum_{i=0}^{\theta_4} a_{4i} \ln Y_{t-i}$$

where θ_2 , θ_3 , and θ_4 are the respective lag lengths on c , s , and Y . Substituting (17), (18), and (19) into (13), the final form of the reduced form model to be estimated is:

²¹The entire future path of the independent variables will not in general be needed for purposes of optimum decision making. Beyond some future date, values of the independent variables will become irrelevant to the current optimum decision. See Modigliani and Cohen [18, pp. 34-36].

²²Alternatively, the anticipation functions could be interpreted as expressing a relationship between past values of the variables and the relevant future paths of P , s , and c .

$$(20) \quad \ln K_t^* = \ln \lambda_0 + \lambda_1 t + \lambda_2 \sum_{i=0}^{\theta_2} a_{2i} \ln c_{t-i} \\ + \lambda_3 \sum_{i=0}^{\theta_3} a_{3i} \ln s_{1t-i} + \lambda_4 \sum_{i=0}^{\theta_4} a_{4i} \ln Y_{t-i} + u_t$$

where u_t is a disturbance term.

Long-run equilibrium is defined to occur when the permanent values of the variables do not change over their respective anticipation formation periods.²³ This equilibrium condition implies that:

$$(21) \quad \sum_{i=0}^{\theta_j} a_{ji} = 1 \quad (j = 2, 3, 4)$$

The sum of the coefficients for each of the three variables estimated will thus be equal to the long-run elasticities λ_2 , λ_3 , and λ_4 . The signs which can be associated with λ_1 , λ_3 , and λ_4 cannot be established unambiguously on *a priori* grounds.²⁴ The sign of λ_2 , the elasticity of the desired capital stock with respect to the own price or implicit rental rate of capital, can be said *a priori* to be unambiguously negative.

III. Estimation of the Model

Sample Period and Level of Aggregation

The analysis is based upon quarterly data covering the period 1954I to 1967IV. The level of aggregation was dictated by the source of the data on capital backlogs: the National Industrial Conference Board's (NICB) *Quarterly Survey of Capital Appropriations: Historical Statistics, 1953-1967* [1970]. The NICB's survey universe consists of the 1,000 largest manufacturing corporations in terms of total assets. These 1,000 firms are broken down into 15 sub-universes corresponding to 15 industrial categories established by the Standard Industrial Classification (SIC). Capital backlog estimates for the sub-universes are obtained through a sample drawn from each of these 15

²³This approach to the anticipation function is discussed in detail by Tinsley [23].

²⁴For an extensive theoretical discussion of the *a priori* statements which can be made about the signs of λ_1 , λ_2 , λ_3 , and λ_4 in models of this type see Gould [7].

sub-universes. This study examines the demand for capital in 12 of these 15 sub-universes.²⁵ The 12 industries included in the study are listed in Table 1.

It is presumed that the demand for capital in the sub-universe under consideration is representative of the demand for capital in each of the corresponding industries as a whole. This assertion is made on the basis of the ratios of sub-universe total assets to industry total assets. Except for the textile industry, SIC 22, and the fabricated metal industry, SIC 34, the sub-universe firms hold more than half of the assets in each of the corresponding industries as a whole. These ratios for the years 1954, 1957, and 1967 are given in Table 4.²⁶

TABLE 4
PERCENTAGE OF TOTAL INDUSTRY ASSETS HELD
BY FIRMS IN NICB SUB-UNIVERSE
1954, 1957, 1967*

SIC No.	1954	1957	1967
20	62.3	57.2	66.4
22	34.6	41.7	58.8
26	55.9	67.5	76.1
28	81.7	80.3	86.2
29	100.0	100.0	95.5
30	84.4	82.2	72.4
32	63.9	66.1	73.4
33	83.7	87.0	85.0
34	43.2	45.9	46.3
35	59.4	56.4	79.2
36	87.7	80.9	79.5
38	62.8	83.5	77.4

*Figures are for the 4th quarter in each year.

Source: *Quarterly Financial Reports for U.S. Manufacturing Corporations*; *Quarterly Survey of Capital Appropriations*.

²⁵Four of the industries are actually three-digit industries. Primary Iron and Steel and Primary Non-Ferrous Metals are combined to obtain SIC 33, Primary Metals. The other two, Transportation Equipment and Motor Vehicles and Equipment form SIC 37, Transportation and Equipment. Because of the 1957 changes in the Standard Industrial Classification cited by Waud [24, p. 424], SIC 37 is omitted from the analysis.

²⁶A more complete description of capital backlogs and the NICB Survey can be found in Cohen [4].

While the sample period for the dependent variable, the desired capital stock, covered the 56 quarters from 1954I through 1967IV, the time series for the independent variables were extended further back to reduce the degrees of freedom lost in estimating the distributed lags. Labor costs and real GNP were constructed for the period 1951I through 1967IV. The own price of capital variable could only be extended back through 1952I. Wherever the own price of capital variable was lagged more than 8 quarters, the sample period for the dependent variable was accordingly reduced. The data and sources are described in the appendix.

Multicollinearity and Estimation of the Distributed Lags

When two or more explanatory variables are highly correlated, it is often very difficult to distinguish the separate effects of these variables on the dependent variable. In the presence of such multicollinearity, estimation of the regression coefficients by ordinary least squares will still yield unbiased estimates, but relatively large sampling variances of these coefficients may be obtained, thus potentially understating the actual significance of the explanatory variables implied by the theory. Because of the distributed lag formulation of the model to be estimated here, the reduced form (20), there are a large number of highly intercorrelated explanatory variables which give rise to rather severe multicollinearity. In an attempt to increase the efficiency of our estimation of (20) in the face of this problem, we resorted to the Almon lag procedure [1].

The Almon technique allows indirect estimation of distributed lag weights by a procedure which yields more efficient estimators than direct ordinary least squares (OLS) estimation. Discussing lagged variables, Almon points out that for long lags, "... or when successive observations are too collinear for this straightforward (OLS) treatment, as will frequently be the case with quarterly data, it becomes necessary to make some reasonable, restrictive assumption about the pattern of the weights" [1, p. 179]. The assumption made is that these weights lie on a polynomial function. Use of the Almon procedure is not a solution to the problem of multicollinearity among lagged variables. However, through indirect OLS estimation, it yields unbiased estimates of the distributed lag coefficients which are more efficient than those obtainable through direct OLS estimation which imposes no *a priori* restrictions upon the shape of the lag

distribution. This procedure thus reduces the chance of understating the significance of the estimated coefficients due to multicollinearity.²⁷

Autocorrelation

Incorrect specification of functional forms and/or of the variables to be included in the functions to be estimated can give rise to autocorrelation. Systematic measurement errors in the dependent variable can also contribute to autocorrelation. If these errors in specification or measurement give rise to a systematic relationship among the disturbances over time, autocorrelation occurs. The disturbance term becomes a proxy for the effects of these specification errors on the dependent variable. Consequently, a necessary assumption for ordinary least squares estimation is violated. OLS estimation of a model with autocorrelated disturbances will still yield unbiased regression coefficients. In general, however, the OLS estimate of the disturbance variance and the sampling variances of the coefficients will be biased; the direction of these biases is difficult to establish.²⁸

In preliminary estimations of the model, the Durbin-Watson coefficient consistently indicated the presence of positively autocorrelated disturbances. Subsequent estimation of the model was therefore based on the assumption that the disturbances were related by a first order regressive scheme of the type:

$$(22) \quad u_t = \rho u_{t-1} + \epsilon_t \quad |\rho| < 1$$

The disturbance term ϵ_t is assumed to be identically and independently distributed with zero mean and constant variance. The autoregressive coefficient ρ is estimated and then used to transform all of the variables according to the scheme $x_t = (X_t - \rho X_{t-1})$. Estimation of ρ is carried out using the Cochrane-Orcutt iterative procedure. The initial step is the estimation of the model's parameters by OLS, as if no serial correlation were present. The residuals u_t are computed, and then used to estimate the autoregressive coefficient, ρ_1 . The raw data are then transformed by ρ_1 , and the

²⁷For an extensive discussion of the Almon lag technique and its uses and misuses see Schmidt and Waud [20].

²⁸See Theil [21], pp. 254-257.

parameters are estimated again, using the transformed data. The residuals are recomputed, and a second estimate ρ_2 , and the procedure continues. In the computer program used for this study, the procedure continues until either:

- i) two successive estimates of ρ differ less than .001;
- ii) the number of iterations exceeds 20;
- iii) ρ exceeds .975, in which case first differences are indicated as necessary.

Generalized least squares (GLS) estimation of the model, using the transformed data, will yield unbiased estimates of the disturbance variance if ρ is correctly estimated; unbiased estimates of the sampling variances of the regression coefficients will also be obtained. However, the Cochrane-Orcutt procedure yields a local minimum for the sum of the square of transformed residuals, which is not necessarily the global minimum. However, even if ρ is incorrectly estimated, GLS estimation will generally reduce the bias in OLS estimation of the disturbance variance as well as the biases in the sampling variances of the regression coefficients.²⁹

Minimum Standard Error Criterion and Selection of Lag Lengths

The choice of an appropriate specification of the lengths of the distributed lags on each of the independent variables in (20) is a complex decision problem for which no formal statistical procedure is available. However, in regression problems with fixed independent variables, such as ours, Theil [22, p. 211-215] has suggested a justification for the criterion of minimizing the estimated standard error of regression. This is the criterion used in this study. There is no reason to suppose that this criterion will be satisfied when $\ln c$, $\ln s$, and $\ln Y$ all have the same lag length. Certainly a much more general search is necessary to allow for the sizable probability that the lag lengths on $\ln c$, $\ln s$, and $\ln Y$ which satisfy the minimum standard error criterion are all different. For each industry studied here, searching over *all possible* lag combinations on $\ln c$, $\ln s$, and $\ln Y$ for as many as up to 12 periods in some instances, this was found to be the case.

²⁹See Theil [21] p. 256.

When searching the lag space beyond four quarters the Almon technique is used; a fourth degree polynomial is assumed and no endpoint constraints are imposed. Of course in the case of a fourth degree polynomial, any lag length less than or equal to four periods is simply estimated by ordinary least squares. Imposing endpoint constraints by constraining the weights at these points to be zero is not warranted unless it can be established that such constraints are valid. In the absence of validation, no such constraints should be imposed — otherwise there will be misspecification errors. Using the Almon technique without imposing endpoint constraints allows the data to tell whether such constraints are valid.³⁰

Estimation Results

Searching all possible lag lengths on $\ln s$, $\ln c$, and $\ln Y$ in each industry up through three years, the estimates of the reduced form (20) which give the minimum standard error of regression are reported in Tables 5 through 16. In each industry the lag space was always searched through 12 quarters including the current quarter. This required examination of approximately 500 equations in each industry. In several industries the minimum standard error of regression occurred when one of the independent variables had a lag length of 11 quarters. This means it is possible that the lag lengths in those cases on those variables may be longer. Nonetheless this was quite an exhaustive search procedure and indicates that further search might reveal an even longer lag length in these instances. As discussed above, since the disturbance terms always seemed to be autocorrelated, we used generalized least squares (GLS) and estimated the autoregression coefficient ρ by the Cochrane-Orcutt procedure. Since the reduced form (20) is expressed in logarithms, the regression coefficients may be interpreted as elasticities.³¹

³⁰For a more extensive discussion of the use of the Almon technique see Schmidt and Waud [20].

³¹In the presence of autocorrelated disturbances the minimum standard error criterion is only justified asymptotically.

TABLE 5
SIC 20
GLS REGRESSION ESTIMATES OF EQUATION (20)*
(t-statistics)

Period	s	c	Y
t	0.1331 (0.2251)	0.0057 (0.0938)	-0.1966 (1.4144)
t-1	-0.2415 (0.4031)	-0.0165 (0.2675)	0.0235 (0.1633)
t-2	-0.4023 (0.6491)	-0.0491 (0.7481)	0.0644 (0.4900)
t-3	-0.2854 (0.5035)	-0.0712 (1.1636)	0.0997 (0.7220)
t-4	-0.8149 (1.2585)	0.0582 (0.9997)	0.1855 (1.4143)
t-5			0.2607 (1.9512)
t-6			0.1465 (1.3118)
Σ	-1.6109 (2.1361)	-0.0729 (0.5531)	0.5838 (1.1845)
λ_1	0.0219 (1.9731)		
Cons.	6.1010 (2.4826)		
\bar{R}^2	0.9911		
SE	0.0142		
DW	1.7755		
ρ	0.8643		

*Data transformed into logarithms. Coefficients estimated using Almon lags. \bar{R}^2 is R^2 adjusted for degrees of freedom. SE is the standard error of regression. DW is the Durbin-Watson statistic. ρ is the autoregression coefficient on the disturbance terms estimated by the iterative Cochrane-Orcutt procedure.

TABLE 6
SIC 22
GLS REGRESSION ESTIMATES OF EQUATION (20)[†]
(t-statistics)

Period	s	c	Y
t	0.4635 (0.9704)	-0.2469 (2.4216)	0.5424 (2.1774)
t-1	-0.1287 (0.2697)	-0.0893 (1.4128)	0.0274 (0.1017)
t-2	0.7766 (1.7230)	-0.0495 (0.6998)	-0.1408 (0.5544)
t-3	0.0141 (0.0301)	-0.0729 (1.1334)	0.0166 (0.0645)
t-4	0.5399 (1.0689)	-0.1176 (2.1593)	-0.4566 (1.7153)
t-5		-0.1541 (3.0412)	
t-6		-0.1654 (3.4302)	
t-7		-0.1470 (3.5159)	
t-8		-0.1070 (2.9467)	
t-9		-0.0657 (1.7678)	
t-10		-0.0562 (1.6240)	
t-11		-0.1239 (2.1790)	
Σ	1.6054 (1.5812)	-1.3954 (3.1385)	-0.0111 (0.0107)
λ_1	0.0112 (0.6386)		
Cons.	2.9224 (0.7119)		
\bar{R}^2	0.9837		
SE	0.0193		
DW	2.0051		
ρ	0.9415		

[†]See * Table 5.

TABLE 7
SIC 26
GLS REGRESSION ESTIMATES OF EQUATION (20)⁺
(t-statistics)

Period	s	c	Y
t	0.6169 (1.8269)	0.0521 (0.7413)	-0.0657 (0.7171)
t-1	0.4754 (0.5879)	-0.0509 (1.9216)	-0.1214 (0.7936)
t-2	-0.0750 (0.0888)	-0.0672 (1.7887)	0.0105 (0.0912)
t-3	-0.6126 (1.2229)	-0.0421 (1.6081)	0.1659 (2.6378)
t-4	-0.8628 (2.2814)	-0.0084 (0.3727)	0.2447 (2.2663)
t-5	-0.6951 (1.2153)	0.0132 (0.4315)	0.2100 (1.8067)
t-6	-0.1238 (0.2087)	0.0142 (0.4738)	0.0888 (1.1467)
t-7	0.6928 (1.5683)	-0.0014 (0.0576)	-0.0287 (0.2878)
t-8	1.4517 (2.7290)	-0.0175 (0.6954)	0.1115 (0.0368)
t-9	1.7058 (2.0463)	-0.0058 (0.2384)	0.4270 (4.3313)
t-10	0.8634 (1.0982)	0.0074 (1.5250)	
t-11	-1.8115 (4.3904)		
Σ	1.6280 (0.8468)	-0.0393 (0.2947)	0.9426 (3.4824)
λ ₁	0.0094 (2.0040)		
Cons.	3.8518 (2.5858)		
R ²	0.9926		
SE	0.0149		
DW	1.8393		
ρ	0.0451		

⁺See * Table 5.

TABLE 8
SIC 28
GLS REGRESSION ESTIMATES OF EQUATION (20)⁺
(t-statistics)

Period	s	c	Y
t	-0.6222 (0.7310)	-0.1923 (2.8054)	-0.0955 (0.7172)
t-1	-0.7942 (1.0469)	-0.0186 (0.3343)	-0.0135 (0.0674)
t-2	0.7091 (0.9365)	-0.0839 (1.7822)	0.1032 (0.5804)
t-3	0.0488 (0.0641)	-0.1671 (2.8179)	0.2246 (1.6052)
t-4	-0.4905 (0.5158)	-0.1680 (3.2353)	0.3282 (2.2755)
t-5		-0.1079 (1.8215)	0.3984 (2.8063)
t-6		-0.1289 (2.0959)	0.4270 (3.5626)
t-7			0.4128 (3.1282)
t-8			0.3620 (2.4457)
t-9			0.2877 (2.8036)
Σ	-1.1490 (0.8622)	-0.8666 (4.2454)	2.4349 (3.2134)
λ ₁	0.0012 (0.0631)		
Cons.	-2.9072 (0.7269)		
R ²	0.9936		
SE	0.0158		
DW	2.2359		
ρ	0.8596		

⁺See * Table 5.

TABLE 9
SIC 29
GLS REGRESSION ESTIMATES OF EQUATION (20)[†]
(t-statistics)

Period	s	c	Y
t	0.2147 (0.8458)	-0.0801 (1.7007)	0.2996 (3.1536)
t-1	-0.2289 (0.7201)	-0.0253 (0.5952)	0.5038 (4.9658)
t-2	-0.2029 (0.6020)	0.0552 (1.4051)	0.2726 (2.7521)
t-3	0.0343 (0.1485)	0.0312 (0.8134)	-0.0208 (0.1832)
t-4	0.2895 (1.5099)	-0.0755 (1.7198)	-0.1569 (1.2475)
t-5	0.4351 (1.8044)	-0.0919 (2.3034)	-0.0703 (0.5488)
t-6	0.4089 (1.6989)		0.1504 (1.1820)
t-7	0.2145 (1.1384)		0.2625 (2.5268)
t-8	-0.0795 (0.3537)		
t-9	-0.3386 (1.0151)		
t-10	-0.3630 (1.1319)		
t-11	0.1126 (0.4560)		
Σ	0.4967 (0.4120)	-0.1863 (1.5612)	1.2409 (2.9135)
λ_1	-0.0089 (1.3196)		
Cons.	3.3491 (1.4136)		
\bar{R}^2	0.9912		
SE	0.0115		
DW	2.1189		
ρ	0.5835		

[†]See * Table 5.

TABLE 10
SIC 30
GLS REGRESSION ESTIMATES OF EQUATION (20)[†]
(t-statistics)

Period	s	c	Y
t	-0.0635 (0.1446)	-0.5584 (6.0047)	-0.4750 (2.9728)
t-1	1.4487 (2.6254)	-0.0733 (2.6164)	0.6572 (4.5781)
t-2	-0.1138 (0.1918)	0.0877 (2.9520)	1.0075 (6.5983)
t-3	0.2160 (0.3745)	0.0709 (2.9772)	0.8677 (7.4683)
t-4	0.5677 (1.0265)	-0.0121 (0.6143)	0.4947 (5.1478)
t-5		-0.0838 (3.0207)	0.1101 (1.2078)
t-6		-0.1006 (3.1780)	-0.0998 (1.0954)
t-7		-0.0537 (2.0054)	0.0161 (0.1459)
t-8		0.0320 (1.5144)	0.5736 (3.2152)
t-9		0.0970 (3.9290)	
t-10		0.0477 (2.0036)	
t-11		-0.2435 (5.5705)	
Σ	2.0552 (4.1924)	-0.7902 (3.7237)	3.1520 (8.2358)
λ_1	-0.0331 (4.2092)		
Cons.	-9.7346 (4.2700)		
\bar{R}^2	0.9915		
SE	0.0192		
DW	2.1346		
ρ	-0.4694		

[†]See * Table 5.

TABLE 11
SIC 32
GLS REGRESSION ESTIMATES OF EQUATION (20)⁺
(t-statistics)

Period	s	c	Y
t	0.6221 (0.8174)	-0.0380 (0.4615)	0.2235 (1.3778)
t-1	-0.3209 (0.5160)	0.0355 (0.8532)	0.4641 (2.7579)
t-2	-0.2075 (0.2942)	0.0459 (1.0062)	0.3419 (2.2475)
t-3	-0.8430 (1.2360)	0.0026 (0.6636)	0.0965 (0.6514)
t-4	-0.9194 (1.3047)	-0.0120 (0.4039)	-0.1040 (0.7363)
t-5		-0.0426 (1.2753)	-0.1634 (1.3295)
t-6		-0.0613 (2.0709)	-0.0569 (0.4306)
t-7		-0.0672 (2.7718)	0.1686 (1.0787)
t-8		-0.0669 (2.0868)	
t-9		-0.0739 (2.2733)	
t-10		-0.1092 (2.0770)	
Σ	-1.6687 (3.0849)	-0.3671 (2.0987)	0.9704 (2.8429)
λ ₁	0.0134 (1.7794)		
Cons.	3.6093 (1.9246)		
R ²	0.9820		
SE	0.0193		
DW	1.9177		
ρ	0.1959		

⁺See * Table 5.

TABLE 12
SIC 33
GLS REGRESSION ESTIMATES OF EQUATION (20)⁺
(t-statistics)

Period	s	c	Y
t	0.3245 (1.0616)	0.0088 (0.1351)	0.3191 (2.0805)
t-1	0.1520 (0.4763)	0.0348 (0.7775)	0.2585 (1.8708)
t-2	0.2397 (0.7102)	0.0169 (0.3901)	0.2365 (1.6131)
t-3	0.4454 (1.4965)	-0.0014 (0.0340)	0.2881 (1.7673)
t-4	0.6603 (2.1570)	0.0046 (0.1124)	0.4043 (2.0822)
t-5	0.8093 (2.3634)	0.0401 (1.0855)	0.5316 (2.5939)
t-6	0.8504 (2.5213)	0.0916 (2.4901)	0.5727 (2.8635)
t-7	0.7756 (2.7153)	0.1261 (2.5875)	0.3860 (2.1953)
t-8	0.6101 (2.3785)	0.0918 (1.8993)	-0.2144 (1.2341)
t-9	0.4128 (1.4199)	-0.0826 (1.1313)	
t-10	0.2759 (0.9987)		
t-11	0.3254 (1.2466)		
Σ	5.8813 (2.4383)	0.3308 (1.7549)	2.7825 (4.1272)
λ ₁	-0.0410 (2.7577)		
Cons.	-4.0628 (1.0743)		
R ²	0.9690		
SE	0.0156		
DW	2.0088		
ρ	0.6779		

⁺See * Table 5.

TABLE 13
SIC 34
GLS REGRESSION ESTIMATES OF EQUATION (20)⁺
(t-statistics)

Period	s	c	Y
t	0.1688 (0.6415)	-0.0321 (0.4649)	0.0821 (0.5913)
t-1	0.4399 (1.1201)	0.0558 (1.5466)	0.3179 (3.0043)
t-2	-0.2180 (0.5298)	0.1055 (2.4767)	0.2496 (2.4061)
t-3	-0.0055 (0.0143)	0.1097 (3.0917)	0.0519 (0.4968)
t-4	-0.1289 (0.5265)	0.0704 (1.9031)	-0.1443 (1.2958)
t-5		-0.0006 (0.0166)	-0.2512 (2.1704)
t-6		-0.0822 (2.1491)	-0.2249 (2.0773)
t-7		-0.1437 (2.9874)	-0.0650 (0.7066)
t-8		-0.1449 (3.0189)	0.1853 (2.1842)
t-9		-0.0360 (0.5319)	0.4395 (4.5987)
t-10			0.5671 (5.4849)
t-11			0.3943 (3.1470)
Σ	0.2563 (1.2214)	-0.0982 (0.6718)	1.6022 (6.4750)
λ_1	-0.0081 (5.6612)		
Cons.	-0.0558 (0.0546)		
\bar{R}^2	0.9760		
SE	0.0201		
DW	1.9343		
ρ	-0.1429		

⁺See * Table 5.

TABLE 14
SIC 35
GLS REGRESSION ESTIMATES OF EQUATION (20)⁺
(t-statistics)

Period	s	c	Y
t	7.5425 (5.3193)	-0.3871 (3.9435)	-0.3973 (2.4081)
t-1	-1.6001 (0.6122)	0.0878 (1.7673)	-0.3161 (1.6131)
t-2	-2.8669 (1.0334)	0.0919 (1.8100)	-0.0944 (0.6171)
t-3	-0.4595 (0.3011)	-0.0886 (2.9081)	0.2012 (2.3570)
t-4	2.4895 (2.2731)	-0.2535 (6.0529)	0.5117 (4.5142)
t-5	3.9173 (2.1182)	-0.2886 (5.7095)	0.7864 (6.1668)
t-6	2.8303 (1.5440)	-0.1654 (3.3081)	0.9824 (9.6515)
t-7	-0.6952 (0.7187)	0.0583 (0.9667)	1.0648 (8.9190)
t-8	-5.5138 (4.0412)	0.2390 (4.3674)	1.0067 (6.9836)
t-9	-9.4104 (3.4276)	0.1474 (1.6832)	0.7892 (4.9294)
t-10	-9.1104 (3.3112)		
t-11	-0.2299 (0.2118)		
Σ	-13.0966 (1.9365)	-0.5590 (3.0449)	4.5346 (17.9194)
λ_1	- 0.0470 (5.5730)		
Cons.	-15.4342 (9.7946)		
\bar{R}^2	0.9932		
SE	0.0238		
DW	1.9163		
ρ	- 0.2756		

⁺See * Table 5.

TABLE 15
SIC 36
GLS REGRESSION ESTIMATES OF EQUATION (20)[†]
(t-statistics)

Period	s	c	Y
t	-3.3508 (4.4839)	-0.1102 (1.3411)	-0.7150 (4.9473)
t-1	1.6587 (1.3915)	-0.1748 (3.8035)	-0.4205 (2.3644)
t-2	-1.8384 (1.4352)	-0.1947 (3.9607)	-0.6742 (3.9865)
t-3	-1.3266 (0.9819)	-0.2213 (5.4038)	-1.0630 (6.9237)
t-4	-2.0911 (2.2068)	-0.2801 (6.1361)	-1.3002 (7.5403)
t-5		-0.3701 (7.5684)	-1.2252 (6.5704)
t-6		-0.4644 (9.4806)	-0.8038 (4.8483)
t-7		-0.5097 (8.8559)	-0.1281 (1.0237)
t-8		-0.4267 (7.6627)	0.5837 (5.0857)
t-9		-0.1098 (1.5227)	0.9870 (8.1672)
t-10			0.6180 (4.8934)
Σ	-6.9482 (9.7444)	-2.8616 (10.4534)	-4.1486 (5.9487)
λ ₁	0.0997 (9.0103)		
Cons.	24.3705 (7.5357)		
R ²	0.9872		
SE	0.0270		
DW	1.9605		
ρ	0.1118		

[†]See * Table 5.

TABLE 16
SIC 38
GLS REGRESSION ESTIMATES OF EQUATION (20)[†]
(t-statistics)

Period	s	c	Y
t	2.5955 (1.5099)	0.0878 (0.5834)	0.0084 (0.0303)
t-1	2.2404 (1.1913)	-0.0575 (0.3803)	0.3569 (1.3507)
t-2	-3.6129 (1.8400)	-0.2853 (1.8800)	0.4705 (1.8914)
t-3	-1.1552 (0.6104)	0.2339 (1.4455)	0.4423 (2.0677)
t-4	0.1890 (0.1003)	-0.1342 (0.8315)	0.3477 (1.6380)
t-5			0.2441 (1.0376)
t-6			0.1711 (0.7109)
t-7			0.1507 (0.7008)
t-8			0.1868 (1.0462)
t-9			0.2657 (1.5991)
t-10			0.3557 (2.0452)
t-11			0.4074 (1.7139)
Σ	0.2567 (0.1762)	-0.1552 (0.5059)	3.4070 (2.4702)
λ ₁	-0.0100 (0.4206)		
Cons.	-9.4545 (1.3484)		
R ²	0.9878		
SE	0.0368		
DW	2.0340		
ρ	0.6568		

[†]See * Table 5.

A comparison of the sums (Σ) of the estimated distributed lag regression coefficients associated with $\ln s$, $\ln c$, and $\ln Y$ and the t -statistics associated with these sums (Tables 5 through 16) indicates that all three of these variables appear to have a significant influence in SIC 30, 32, 33, 35, and 36 (Tables 10, 11, 12, 14, and 15). It is noteworthy that four of these industries, SIC 32, 33, 35, and 36 are durable goods industries and that all five of these industries are among the most cyclical variable of the 2-digit SIC industries in U. S. manufacturing. As noted above, multicollinearity is a major difficulty in a study of this nature and the problem is more acute in those industries where there is less cyclical variability in the data, such as is the case in the nondurable goods sector of U. S. manufacturing. Since multicollinearity causes the estimated standard errors associated with estimated regression coefficients to "blow-up," i.e. pushes the estimated t -statistics toward zero, the apparent insignificance of many of the sums (Σ) of the estimated distributed lag coefficients of the nondurable goods industries SIC 20, 22, 26, 28, and 29 (Tables 5, 6, 7, 8, and 9) may well be a reflection of this problem and not necessarily an indication of the true influence of these variables in these industries. It is suspected that a major factor contributing to the multicollinearity problem is the presence of the time variable t in these regressions; unfortunately there did not appear to be any other tractable way of controlling for technological change. Experimentation with some of the industries indicated a notable increase in the t -statistics when time was dropped from the regressions.

In 6 of the 12 industries the sum of the estimated regression coefficients associated with s , the hourly cost of a production worker manhour, appears to be significant: SIC 20, 30, 32, 33, 35, and 36 (Tables 5, 10, 11, 12, 14, and 15 respectively). The signs of these sums are negative in four of these industries, SIC 20, 32, 35, and 36 (Tables 5, 11, 14, and 15 respectively) and positive in two, SIC 30 and 33 (Tables 10 and 12 respectively). As was noted above, it is not possible to specify on *a priori* grounds what the sign of the coefficient of hourly labor costs should be. This is because it is not possible to say *a priori* whether substitution effects or scale effects will dominate when there is a change in relative factor prices. When hourly labor cost increases (falls), labor becomes more (less) expensive relative to capital. The substitution effect alone dictates that

more (less) capital be used relative to labor. However, the increase (decrease) in the hourly labor cost causes the industry supply schedule to shift up (down) and this causes a reduction (an increase) in industry output which by itself has the scale effect of reducing (increasing) the use of both inputs. If the demand schedule facing the industry is elastic enough the scale effect causing a reduction (an increase) in the demand for manhours and the demand for capital services, may more than offset the increase (decrease) in the demand for capital services stemming from the substitution effect. The net result is that an increase (a decrease) in hourly labor costs leads to a reduction (an increase) in the demand for capital services as well as in the demand for labor services. Hence, depending on the elasticity of the demand schedule facing the industry, the sign of the regression coefficient associated with the hourly cost of a production worker manhour may be either positive or negative.³²

The sum of the estimated regression coefficients associated with c , the implicit rental rate or own price of capital, appears significant in 8 out of the 12 industries: SIC 22, 28, 29, 30, 32, 33, 35, and 36 (Tables 6, 8, 9, 10, 11, 12, 14, and 15 respectively). In seven out of these eight the signs of the sums are negative as we would expect on *a priori* grounds. The positive sign in SIC 33 (Table 12), the one exception, is contrary to theoretic considerations. If the own price of capital rises (falls), then the substitution effect dictates that less (more) capital and more (less) labor be used. The scale effect, resulting from the upward (downward) shift in the supply schedule due to the increased (decreased) cost of capital, dictates that less (more) of both inputs be used. Hence, both the substitution and the scale effect operate to reduce (increase) the use of capital in response to a rise (fall) in the own price of capital.

The sizes of the negative sums of the significant estimated regression coefficients associated with c (Tables 6, 8, 9, 10, 11, 14, and 15) are the magnitudes of the elasticities of the desired capital stock in each industry with respect to the own price of capital. Examination of these estimates suggests that a 1 percent fall in c will cause a rise in the desired stock of capital ranging anywhere from about 0.19 percent after five quarters in the case of SIC 29 (Table 9), to as much as 2.86 percent after nine quarters in the case of SIC 36 (Table 14). The lengths of the distributed lags on c in these industries range from a low of 5 quarters in SIC 29 (Table 9) to a high of 11 quarters in

³²For a more technical discussion see Gould [7].

SIC 22 (Table 6) and SIC 30 (Table 10). Given our lag length search procedure described above, the true maximum lag length in some instances may be even longer. In order to get an estimate of the total distributed lag length from the point in time of the change in c and the point at which the actual investment expenditures have brought the actual capital stock to the desired level in any industry, the mean length of the planning horizon given in Table 2 must be added to the corresponding industry lag length given in one of the Tables 6, 8, 9, 10, 11, 14, and 15. The variability of the lengths of the planning horizons shown in Table 2 should be kept in mind when assessing these lags. These results are summarized in Table 17 for the seven industries having significant negative estimated sums of regression coefficients, or elasticities, associated with c , the own price of capital.

In all industries except SIC 20 and 22 (Tables 5 and 6) the estimated sum of the regression coefficients or elasticities associated with Y , gross national product, appear significant. Among the ten industries for which this sum elasticity appears significant, only one of them has a negative sign — SIC 36 (Table 15), Electrical Machinery and Equipment. While the sign of the sum elasticity associated with Y cannot be specified on *a priori* grounds, since an industry may move cyclically or contracyclically, we are suspicious of the negative sign in SIC 36 simply because it is hard to believe that this industry responds negatively to movements in general economic activity as measured by GNP. For the nine industries with significant positive estimated sum elasticities, a 1 percent change in Y would appear to cause an increase in the desired capital stock ranging anywhere from about 0.94 percent in the case of SIC 26 (Table 7), with a distributed lag of nine quarters, to as high as 4.53 percent in SIC 35 (Table 14), also with a nine quarter distributed lag. The lengths of these distributed lags range from 7 quarters for SIC 29 (Table 9) and SIC 32 (Table 11) up to 11 quarters for SIC 34 (Table 13) and SIC 38 (Table 16). Again, given our description of the lag length search procedure, it is possible in some instances that the true maximum lag length may be longer. The estimated sums of the regression coefficients or elasticities on Y and their distributed lag lengths are summarized in Table 18 for the ten industries where they appear significant. The accelerator-type of effects of changes in GNP on the desired capital stock in each of these industries appears to be quite strong. Again, an estimate of the total length of the distributed lag between a change in GNP and the point at which the actual investment expenditures have brought the actual capital stock to the desired level in any industry requires that the mean length of the planning horizon in Table 2 be added to that shown in Table 18.

Regarding the individual regression coefficients which add up to the sums in Table 5 through 16, there are instances where the signs switch, or "flip-flop," at some point in the distributed lag. It appears that this happens with statistical significance in: SIC 26 (Table 7) in the case of s ; SIC 30 (Table 10) in the case of c and Y ; SIC 34 (Table 13) in the case of c and Y ; SIC 35 (Table 14) in the case of s , c , and Y ; and SIC 36 (Table 15) in the case of Y . The significant switching of signs among these distributed lag weights cannot be ruled out as theoretically implausible on *a priori* grounds. Gould [8] has shown in a dynamic theory of investment of the firm that in some instances there is reason to expect the true distributed lag weights to switch sign.³³

TABLE 17
ESTIMATED DISTRIBUTED LAG LENGTHS
BETWEEN CHANGE IN OWN PRICE OF CAPITAL
AND TOTAL CHANGE IN DESIRED STOCK OF CAPITAL ΔK^*
AND TOTAL CHANGE IN ACTUAL CAPITAL STOCK ΔK
FOR SIC 22, 28, 29, 30, 32, 35, 36

Industry	ΔK^* lag length ⁺ (1)	\bar{n} Mean Planning Horizon (variation) (2)	ΔK lag length equal (1)+(2) (3)	Σ Elasticity ⁺ (t-statistic) (4)
SIC 22	11	5 (2-9)	16	-1.3954 (3.1385)
SIC 28	6	4 (3-7)	10	-0.8666 (4.2454)
SIC 29	5	3 (1-5)	8	-0.1863 (1.5612)
SIC 30	11	4 (1-6)	15	-0.7902 (3.7237)
SIC 32	10	4 (2-8)	14	-0.3671 (2.0987)
SIC 35	9	3 (1-6)	12	-0.5590 (3.0449)
SIC 36	9	5 (3-9)	14	-2.8616 (10.4534)

⁺From Tables 6, 8, 9, 10, 11, 14 and 15.

⁼From Table 2.

³³ However it is also possible that this phenomenon is an artifact of attempting to estimate distributed lags by use of higher order polynomials. See Schmidt and Waud [20].

In 8 of the 12 industries, SIC 20, 26, 30, 32, 33, 34, 35, and 36 (Tables 5, 7, 10, 11, 12, 13, 14, and 15 respectively), the estimated regression coefficient associated with t , time, appears to be significant. It will be recalled that time was introduced in order to control for technological change. *A priori*, it is not possible to specify what the sign of the coefficient λ_1 on time should be. It is conventional to presume that it should be negative on the assumption that technological progress will diminish the size of the desired stock of capital. This presumption is not necessarily correct however. In an industry facing an elastic demand schedule for its product, it is possible for λ_1 to have a positive sign. A positive λ_1 indicates that firms will increase

TABLE 18
ESTIMATED SUMS OF REGRESSIONS COEFFICIENTS OR ELASTICITIES
ON GNP AND THEIR DISTRIBUTED LAG LENGTHS
FOR SIC 26, 28, 29, 30, 32, 33, 34, 35, and 36

Industry	GNP Elasticity ⁺ (t-statistic)	Lag length
SIC 26	0.9426 (3.4824)	9
SIC 28	2.4349 (3.2134)	9
SIC 29	1.2409 (2.9135)	7
SIC 30	3.1520 (8.2358)	8
SIC 32	0.9704 (2.8429)	7
SIC 33	2.7825 (4.1272)	8
SIC 34	1.6022 (6.4750)	11
SIC 35	4.5346 (17.9194)	9
SIC 36	-4.1486 (5.9487)	10
SIC 38	3.4070 (2.4702)	11

⁺From Tables 7-16.

their desired stock of capital in response to technological improvement. If the industry demand schedule is sufficiently elastic, an increase in productivity will cause the industry supply schedule to shift rightward causing a relatively large increase in equilibrium industry output. The increase in productivity by itself, as reflected in normal replacements, would not be sufficient to permit the increased production without an increase in the total stock of capital.³⁴ In this case λ_1 would have a positive sign. Of the eight industries having significant estimates of λ_1 , the sign on λ_1 is positive in four of them: SIC 20, 26, 32, and 36 (Tables 5, 7, 11, and 15).

IV. Implications for a Variable Investment Tax Credit Scheme as a Stabilization Tool

Before drawing any policy implications from the estimates presented here, it should be reemphasized that there are many caveats which dictate reservation and caution in interpreting our results. The model we have used, like others which have characterized empirical research in this area, does not adequately incorporate the dynamic considerations of adjustment cost in its explicit derivation from the profit maximization process. Rather, adjustment costs and expectations formation are tacked on ad hoc by imposing a distributed lag scheme ex post the explicit profit maximization derivation; again, this has been the common practice of other well-known econometric research efforts in this area. Ours is a putty-putty model and assumes a Cobb-Douglas production function. Jorgenson's [14, pp. 1131-1133] survey of the research on the tenability of the Cobb-Douglas assumption concludes that overall this assumption is not inconsistent with the findings of empirical investigations of this issue. However, some might justifiably feel more comfortable if the more general CES specification had been used in this study. Also, there is little doubt but that a putty-clay model is a more accurate characterization of the world than a putty-putty model.

Statistically, multicollinearity was a major problem in the data used here and this may account for the lack of evidence of statistical significance among several of the nondurable goods industries. Perhaps even more worrisome are the many approximations and heroic assumptions which were needed in the process of constructing

³⁴This argument is similar to those regarding scale and substitution effects. Again, for a more technical and rigorous treatment of the signs of parameters like λ_1 , λ_2 , λ_3 , and λ_4 in reduced form neoclassical models see Gould [7].

the data — both by us and the various agencies which collect the raw data by sampling procedures. No doubt this gives rise to not insignificant errors in variables problems. These problems are common to any econometric investigation, but when drawing policy implications for the consideration of policy makers and others not often so aware of econometric and statistical nuances it is especially important that they be emphasized. All of these problems aside, there is still the usual imprecision inherent in any interpretation of statistical estimates. With these reservations in mind, the following tentative conclusions are offered.

As indicated at the outset, a VITC scheme would operate by changing the implicit rental rate or own price of capital. Our estimates of the elasticity of the desired capital stock with respect to the own price of capital suggest that the own price of capital is a significant determinant of the desired capital stock level, particularly in the durable goods industries. Hence a VITC scheme would appear to be a potential stabilization policy tool insofar as changes in the own price of capital could be expected to have a significant, and predictable, effect on the desired capital stock and thus on investment expenditures. However our results (summarized in Table 17) suggest that these effects occur with rather lengthy distributed lags, requiring anywhere from 5 to 11 quarters for the full effects of a change in the own price of capital on the desired stock of capital to be realized, and on average another three to five quarters for actual investment expenditures to finally bring the actual level of the capital stock into line with the desired level. In view of our description of the lag length search procedure above, it is possible that in some instances the lag lengths may be even longer. These findings lend support to the suggestion that a VITC scheme be administered in such a way as to encourage the bunching of investment expenditures, as described in Section I above, with the intention of shortening the lag lengths which would otherwise appear to be inordinantly long from a policymaker's standpoint.

Finally, as was pointed out in Section I, to the extent there are multiplier-accelerator-type feedbacks from investment expenditures to general economic activity (as measured by GNP) and back to investment expenditures, any increase in the stability of investment expenditures brought about by a VITC scheme would, by virtue of this multiplier-accelerator feedback linkage, reduce fluctuations in investment expenditures even more. This itself would make the stabilization task of a VITC scheme easier, once it is properly initiated. Our estimates (summarized in Table 18) suggest that this feedback is significant and quite strong — as proponents of an accelerator theory of investment would predict. Again, however, the distributed lag lengths of these effects appear quite long, ranging

between 7 and 11 quarters, possibly longer, for the full realization of their impact on the desired capital stock, plus on average another three to five quarters for actual investment expenditures to fully bring the actual level of the capital stock into line with the desired level. Nonetheless, any initial stabilization of investment expenditures and thus GNP, brought about by a VITC scheme, could be expected to receive substantial subsequent reinforcement from the accelerator effects of GNP on investment expenditures — at least according to the estimates we have presented.

The stabilization potential of a VITC scheme depends crucially on yet another factor which has not been a subject of investigation in this study. Namely, the ability of the policymaker, vested with the authority to administer the VITC scheme, to forecast sufficiently well so that his stabilization efforts are appropriately timed. Otherwise, the administration of a VITC scheme will only aggravate the instability it is designed to alleviate. To the extent our estimates suggest that it can be a powerful tool for increasing economic stability, it can also be a destabilizing force in the hands of a policymaker lacking sufficient prescience.

BIBLIOGRAPHY

- [1] Almon, S., "The Distributed Lag Between Capital Appropriations and Expenditures," *Econometrica*, January 1965, 33 pp. 178-196.
- [2] Bischoff, C. W., "The Effect of Alternative Lag Distributions" in Fromm, G., ed. *Tax Incentives and Capital Spending*. Washington, D. C.: Brookings Institute, 1971.
- [3] Board of Governors of the Federal Reserve System. *Federal Reserve Staff Study: Ways to Moderate Fluctuations in Housing Construction*, Washington, D. C., 1972.
- [4] Cohen, M., "The National Industrial Conference Board Survey of Capital Appropriations" in *The Quality and Economic Significance of Anticipations Data: A Conference*. Princeton: Princeton University Press, 1960.
- [5] Eisner, R. and Strotz, R.M., "Determinants of Business Investment" in *Impacts of Monetary Policy*, Commission on Money and Credit. Englewood Cliffs, N.J.: Prentice-Hall, Inc., 1963.

- [6] Gould, J.P., and Waud, R.N., "The Neoclassical Model of Investment Behavior: Another View," *International Economic Review*, February 1973, 14 (1), pp. 33-48.
- [7] Gould, J.P., *A Microeconomic Approach to the Demand for Physical Capital*. Unpublished PH.d. dissertation, University of Chicago, 1966.
- [8] _____, "Adjustment Costs in the Theory of Investment of the firm," *Review of Economic Studies*, January 1968, 35 pp. 47-55.
- [9] _____, "The Use of Endogenous Variables in Dynamic Models of Investment," *Quarterly Journal of Economics*, November 1969, 83 pp. 580-600.
- [10] Haavelmo, T., *A Study of the Theory of Investment*. Chicago: University of Chicago Press, 1960.
- [11] Hall, R.E., and Jorgenson, D.W., "Tax Policy and Investment Behavior," *American Economic Review*, June 1967, 57 (3), pp. 391-414.
- [12] _____, "Tax Policy and Investment Behavior: Reply and Further Results," *American Economic Review*, June 1969, 59 (3), pp. 388-401.
- [13] _____, "Application of the Theory of Optimum Capital Accumulation" in Fromm, G., ed. *Tax Incentives and Capital Spending*. Washington, D.C.: Brookings Institution, 1971.
- [14] Jorgenson, D.W., "Econometric Studies of Investment Behavior: A Survey," *Journal of Economic Literature*, December 1971, 9 (4), pp. 1111-1148.
- [15] _____, "Capital Theory and Investment Behavior," *American Economic Review* May 1963, 53 (2), pp. 247-260.
- [16] _____, "Anticipations and Investment Behavior," J.S. Duesenberry, E. Kuh, G. Fromm, and L.R. Klein, eds., *The Brookings Quarterly Econometric Model of the United States*. Chicago: Rand McNally, 1965, pp. 35-94.

- [17] _____, "The Theory of Investment Behavior," R. Ferber, ed., *Determinants of Investment Behavior*. New York: Columbia University Press, 1967.
- [18] Modigliani, F. and Cohen, K.J., *The Role of Anticipations and Plans in Economic Behavior and Their Use in Economic Analysis and Forecasting*. Urbana, Illinois: University of Illinois, 1961.
- [19] Muth, J.F., "Rational Expectations and the Theory of Price Movements," *Econometrica*, July 1961, 29, pp. 315-335.
- [20] Schmidt, P., and Waud, R.N., "The Almon Lag Technique and the Monetary versus Fiscal Policy Debate," *Journal of the American Statistical Association*, March 1973, 68, pp. 11-19.
- [21] Theil, H., *Principles of Econometrics*. New York: John Wiley and Sons, Inc., 1971.
- [22] _____, *Economic Forecasts and Policy*. (2nd ed.) Amsterdam:North-Holland Publishing Company, 1961.
- [23] Tinsley, P.A., "An Application of Variable Weight Distributed Lags," *Journal of the American Statistical Association*, December 1967, 62, pp. 1277-1289.
- [24] Waud, R.N., "Manhour Behavior in U. S. Manufacturing: A Neoclassical Interpretation," *Journal of Political Economy*, May/June 1968, 76 (3), pp. 407-427.

APPENDIX SOURCES, DESCRIPTION, AND DERIVATION OF DATA

Capital Stock, Backlogs, and Investment

Net Depreciable Capital Assets. For the period 1952 through 1968, quarterly estimates of net fixed capital assets for two digit manufacturing industries are obtained from the *Quarterly Financial Reports for U.S. Manufacturing Corporations*. The estimates reported are obtained from a sample selected from all U. S. corporations filing a corporate tax return.

The net fixed capital asset data reported are estimates of land plus net depreciable assets plus net depletable assets. In order to get an estimate of the stock of net depreciable assets, it is necessary to first obtain quarterly estimates of the ratio of net depreciables to net fixed capital assets. Annual ratios of net depreciables to net fixed capital assets can be computed directly from the *Statistics of Income: Corporate Income Tax Returns* for the period 1954 to 1967.¹ Net fixed capital stock for each industry is obtained by taking the sum of depreciable assets less accumulated depreciation, depletable assets less accumulated depletion, and land. For the years 1952 and 1953, the fixed capital estimate is not broken down into depletable and depreciable assets; the data is not available for 1968. Thus the ratio of depreciables to total fixed capital cannot be directly computed for these years. Based upon the stable pattern of these ratios over time, it was assumed that the average ratio for the period 1954 to 1967 could be used for the years 1952, 1953, and 1968. The mean, high, and low values of the ratios for each industry are presented in Table A-1. The annual ratios are interpolated linearly to obtain quarterly ratios for each industry. Net depreciable capital assets are obtained by multiplying, for each quarter, net fixed capital assets by the ratio of net depreciables to net fixed capital assets.

For the years 1955 through 1967, the ratios of net depreciable assets to net fixed assets were computed from data for all active corporations filing income tax returns, as published by the Internal Revenue Service in the *Statistics of Income*. In 1954, the ratios were

¹In 1962, the categories of balance sheet data published in the *Statistics of Income* did not correspond to the categories published prior to and after 1962. Neither were they available from the Source Book, the comprehensive source from which the *Statistics of Income* data are taken. All of the series obtained from the *Statistics of Income* were linearly interpolated in order to obtain figures for 1962.

TABLE A-1

RATIO OF NET DEPRECIABLE ASSETS TO NET FIXED CAPITAL ASSETS

SIC No.	HIGH	LOW	MEAN
20	.946	.921	.933
22	.981	.959	.973
26	.913	.887	.898
28	.994	.945	.953
29	.881	.787	.844
30	.991	.951	.964
32	.943	.914	.928
33	.943	.913	.927
34	.944	.937	.939
35	.957	.947	.952
36	.971	.950	.961
38	.969	.949	.956

Source: *Statistics of Income*, various annual issues.

computed from all returns of all active corporations who also filed a balance sheet; of the 722,805 corporations filing returns in 1954, 667, 856 (92.4%) filed returns with balance sheets.

At the time the data were being compiled, the 1967 income tax data had not yet been published. The 1967 data were directly obtained from the Internal Revenue Service.

In 1958, changes were made in the *Standard Industrial Classification Manual* [1967]. For most industries, the changes were minor and appear to have had no significant effect on the data. In the category of nonelectrical machinery (SIC 35), however, a number of three-digit industries previously included in nonelectrical machinery were reallocated to other two-digit industries. The result was a reduction in the net capital stock series of approximately 5 percent. For the year 1958, overlapping data were presented in the *Quarterly Financial Reports*; the percentage reduction for each of the four quarters was: I - 5 percent; II - 5 percent; III - 6 percent; IV - 5 percent. In order to standardize the series, therefore, the data for the 24 quarters previous to 1958 were multiplied by a factor of .95 to make the pre-1958 series compatible with the post-1958 series.

Deflation of Net Depreciable Capital Assets. Annual deflators for net depreciable assets at the two-digit industry level were obtained from the National Industrial Conference Board. These deflators represent the ratio of the book value of net depreciables to their 1958 prices. The data are available for the years 1953 to 1965 (except for SIC 34, fabricated metals, where the deflator is available

only through 1963). In order to obtain estimates of the deflators for 1952 and through 1968, it was assumed that the capital stock deflators for two-digit industries were closely related to that for all manufacturing. The net depreciable capital stock deflator for all manufacturing was obtained from the Office of Business Economics, Department of Commerce. The annual values of the two-digit industry deflators for the period 1953 to 1965 (1963 for SIC 34) were regressed onto the corresponding values of the deflator for all manufacturing. The resulting relationships, shown in Table A-2, were used to extrapolate the two-digit industry deflators to 1952, and through 1968. These annual estimates were then interpolated linearly to obtain quarterly deflators of net depreciable capital stock at the two-digit industry level.

Reduction of Net Depreciable Capital to NICB Universe Level. The capital appropriations data compiled by the NICB are estimates for a universe consisting of the 1000 largest manufacturing corporations, ranked according to total assets. In the years 1954, 1957, and 1967, the NICB computed estimates of total year end assets, by two-digit industries, of all firms in the 1,000 corporations universe. These total asset figures are divided by total year end assets for all corporations in each two-digit industry, which data are obtained from the *Quarterly Financial Reports*. These ratios are interpolated linearly to provide quarterly estimates of the ratios, for each industry, of the assets of the corporations in the NICB universe to

TABLE A-2
REGRESSION OF INDUSTRY CAPITAL STOCK DEFLATOR
ON ALL MANUFACTURING DEFLATOR

SIC No.	R ²	CONS. (t)	COEF. (t)
20	.987	-10.0583 (- 3.497)	1.0253 (29.677)
22	.973	- 4.5046 (- 1.163)	0.9761 (20.983)
26	.998	- 1.5888 (- 1.533)	0.9700 (77.908)
28	.988	-14.8295 (- 4.963)	1.1177 (31.142)
29	.998	- 0.1554 (- 0.155)	0.8808 (72.906)
30	.992	- 6.6356 (- 2.911)	1.0655 (38.917)
32	.998	-20.2170 (-14.988)	1.1698 (72.198)
33	.993	0.6041 (0.307)	0.9393 (39.793)
34	.994	- 2.6875 (- 1.312)	1.0070 (39.696)
35	.997	0.4982 (0.412)	0.9853 (67.785)
36	.939	28.1811 (8.227)	0.5581 (13.564)
38	.996	2.6986 (1.884)	0.9620 (55.920)

the assets of all corporations in the total universe for the period 1955 to 1967. For 1952 to 1954, the 1954 value of the ratio was used for each quarter; for 1968, the 1967 value was used. Finally, these ratios were multiplied by the quarterly net depreciable assets corresponding to the NICB universe data on capital backlogs and appropriations.

Capital Backlog and Investment Data. For the period 1953 to 1967, quarterly estimates of the capital backlog and investment expenditures are obtained from the NICB *Quarterly Survey of Capital Appropriations*. These series are estimates of expenditures and backlogs for the NICB universe of the 1,000 largest manufacturing corporations, by industry.

The investment data and the backlog data are converted to real terms by means of the deflator for gross private domestic fixed non-residential investment (GPDI). This quarterly series, which is seasonally adjusted, is obtained from Table 8.1 of the *National Income and Product Accounts of the United States (NIPA)* [1967].

Estimation of Rate of Depreciation (δ). The net depreciable capital stock series used in the estimation of δ is that obtained from the *Quarterly Financial Reports*, which has been deflated and reduced to the NICB population level (see the description above). Capital expenditures are obtained from the NICB *Quarterly Survey of Capital Appropriations: Historical Statistics, 1953-1967*. These data are deflated by the investment deflator q . The data cover the period from the 4th quarter of 1954 to the 4th quarter of 1967.²

Total Hourly Compensation Per Production Worker

See the appendix in [24] for a description of how these data were constructed.^{3,4}

²Subsequent to the analysis of the model, an error was found in the algorithm used in estimating δ . The error in δ exceeded .001 in only 2 industries (.00108 in SIC 20, and .00219 in SIC 35); in five of the industries, the error was .00001 or less. These errors should have only negligible effects on the estimated own price variable, and also on the final regression results. The cost of reestimating all equations does not seem justified on the basis of the very minor potential gains in accuracy. Table 3 contains the original estimates of δ .

³BLS Data for 1954-1967 are obtained from the *Employment and Earnings Statistics for the United States, 1909-1969* [Bureau of Labor Statistics, 1969]; data for 1968-1969 are obtained from various monthly issues of *Employment and Earnings and Monthly Report on the Labor Force*.

⁴OBE data for 1954-1965 are obtained from the *National Income and Product Accounts of the United States, 1929-1965* [Office of Business Economics, 1969]; data for 1966-1969 are obtained from various monthly issues of the *Survey of Current Business*.

Implicit Rent Per Unit of Capital Services (Own Price of Capital)

The concepts and methods used in the determination of the user cost of capital will be the same as those used by Jorgenson [1965]. Assuming, as Jorgenson does, that capital gains from price changes of capital equipment are considered transitory by the firm, and thus do not affect the user cost of capital, the user cost can be written as:

$$c = q \left[\left(\frac{1 - uv}{1 - u} \right) \delta + \left(\frac{1 - uw}{1 - u} \right) r \right]$$

Investment Deflator (q). The investment deflator used in this formulation of user cost is the deflator for gross private domestic fixed nonresidential investment. This deflator is obtained on a quarterly, seasonally adjusted basis from the NIPA.

Corporate Tax Rate (u). The tax rate is the ratio of corporate profit taxes to corporate profits before tax. The data are available on an annual basis, for two-digit industries, from the NIPA. Federal and state corporate profits tax liability data by industry are taken from the NIPA, as are corporate profits before tax data by industry. Since there is no reason to believe that tax rates are viewed as variable over the year by the firm, the tax rate computed for each year is used for the four quarters in each year.

Proportion of Depreciation Chargeable Against Net Taxable Income (v). The variable v is the ratio of the capital consumption allowance to the current replacement cost of capital. Corporate capital consumption allowance by industry is obtained annually from the NIPA. Current replacement cost is computed as the product of the rate of depreciation (δ) (see below) times the value of the net stock of depreciable assets. For the period 1954 to 1967, the value of the net stock of depreciables is directly obtainable from the *Statistics of Income*, as described under "Net Depreciable Capital Assets." For the period 1951 to 1953, these data are not available. However, the value of net fixed capital assets can be computed. Because the ratios of net depreciable assets to net fixed capital assets are relatively constant over the period 1954 to 1967, it is assumed that they can be extrapolated backwards for the period 1951 to 1953. Multiplying these estimated ratios by the value of net fixed capital stock, estimates of the value of net depreciable assets for the years 1951 to 1953 were obtained. The mean and range of these ratios, for each two-digit industry, for the period 1954 to 1967 have been given in Table A-1 above. Again, the variable v computed on an annual basis is used for all four quarters of the corresponding year.

Proportion of Cost of Capital Chargeable Against Net Taxable Income (w). The variable w is the ratio of net monetary interest to the cost of total capital. Net monetary interest is the difference between interest paid and interest received, and is obtained annually from the *Statistics of Income* for each two-digit industry. The cost of total capital is computed as the product of the cost of capital (r) (see below) times the value of total capital (net fixed capital plus working capital) in current prices. The value of net fixed capital is obtained annually from the *Statistics of Income*, as described under "Net Depreciable Capital Assets." Working capital is in general the sum of cash, net notes and accounts receivable, government investments, inventories, and other current assets, less accounts payable, bonds, notes, and mortgages payable in less than one year, and other current liabilities. The yearly breakdown by specific item included in working capital is given in the following table. The data are obtained

TABLE A-3
ITEMS INCLUDED IN WORKING CAPITAL

YEAR	ITEM NUMBER										
	1	2	3	4	5	6	7	8	9	10	11
1951	X	X	X		X		X	X			
1952	X	X	X		X		X	X			
1953	X	X	X		X		X	X			
1954	X	X	X	X	X		X	X	X		
1955	X	X	X	X	X		X	X	X		
1956	X	X	X	X	X		X	X	X		
1957	X	X	X	X	X		X	X	X	X	
1958	X	X	X	X	X		X	X	X	X	
1959	X	X	X		X	X	X	X		X	X
1960	X	X	X		X	X	X	X		X	X
1961	X	X	X		X	X	X	X		X	X
1963	X	X	X		X	X	X	X			X
1964	X	X	X		X	X	X	X			X
1965	X	X	X		X	X	X	X			X
1966	X	X	X		X	X	X	X			X
1967	X	X	X		X	X	X	X			X

ITEMS:

1. Cash
2. Net Notes and Accounts Receivable
3. Inventories
4. Prepaid Expenses and Supplies
5. Government Investments
6. Other Current Assets, including short term marketable instruments
7. Accounts Payable
8. Bonds, Notes, Mortgages, Payable in Less Than 1 Year
9. Accrued Expenses
10. Deposits and Withdrawable Shares
11. Other Current Liabilities

on an annual basis from the *Statistics of Income*. The variable v is also computed on an annual basis.

Cost of Capital (r). The cost of capital is defined by

$$r = \frac{\text{corporate profits after tax} + \text{net monetary interest}}{\text{value of securities}}$$

The value of securities is equal to the value of equity plus the value of debt. The value of equity is given by the ratio of corporate profit after tax to the earnings price ratio. The value of debt is equal to the ratio of net monetary interest to the bond yield. Corporate profits after tax are obtained annually for each industry from the NIPA. The bond yield is a quarterly average of the monthly composite average of yields on industrial bonds; the price earnings ratio (the reciprocal of the earnings price ratio) is a quarterly average of the monthly end of the month average price earnings ratio for industrial common stocks. Both are obtained from *Moody's Industrial Manual* [1970]. Quarterly estimates for net monetary interest and corporate profits after tax are obtained by a linear interpolation of the annual data.

Do We Know Enough to Adopt a Variable Investment Tax Credit?

JOHN LINTNER*

The United States adopted a flat-rate 7 percent investment tax credit in the Revenue Act of 1962 to induce higher rates of new capital investment. The underlying purposes were to stimulate the economy and increase its rate of growth in real terms, to reduce unemployment and to make American industry more competitive with foreign firms. Although enacted as a "permanent" credit, certain changes were made in 1964 and the credit was suspended in 1966 only to be reinstated early in 1967. More recently, the credit was again suspended in 1969, but was reenacted as a "Job Development Credit" in 1971 and continues in effect as a flat-rate credit. This on-again, off-again history of the "permanent" flat-rate credit has increasingly led to suggestions that the existing instrument, originally designed for economic stimulation, be redesigned as an explicitly *variable* investment tax credit for purposes of economic *stabilization*. Instead of either being allowed at fixed rate or completely suspended, as with the present credit, the level of the new variable investment tax credit allowed could be varied from time to time within a wider band of rates in response to varying conditions and prospects of the economy. In several major addresses over the past year, for instance, Arthur Burns has proposed that Congress enact new legislation delegating authority to initiate changes in the investment tax credit, between a lower limit of zero and a maximum rate of perhaps 15 percent, subject to modification or disapproval within 60 days by either house of Congress. Such legislation is now pending in Congress.

There are several important reasons why a variable investment tax credit (VITC) scheme merits serious consideration for inclusion as one of the instruments in a well designed policy for economic stabilization. Experience over a quarter of a century has well documented

*George Gund Professor of Economics and Business Administration, Harvard Graduate School of Business Administration.

the practical difficulties involved in implementing a flexible fiscal policy which will effectively stabilize the economy through variations in *general* tax rates and aggregate government expenditures. It has been painfully established that a flexible monetary policy is very uneven in its impacts, with the major burdens of monetary restrictions falling on the housing sector and state and local governments. Moreover, effective efforts to insulate these sectors would substantially compromise the effectiveness of monetary policy as a stabilization device. Business fixed investment is another large and highly volatile component of expenditures. Econometric and other research has established that more generous depreciation allowances and "permanent" investment credits lead to significant increases in these outlays over a period of time. The limitations and undesirable side-effects of other more general stabilization instruments, and the apparent effectiveness of maintained investment credits, lend a certain *a priori* attractiveness to a variable investment tax scheme as an additional component of our overall stabilization policies.¹

Indeed, one would have thought that these well known considerations would have led long before now to a substantial amount of research specifically examining just how effective a VITC might reasonably be expected to be as an added stabilization instrument. Nevertheless, we find that there has been remarkably little serious research work done on the effects of an explicitly *variable*, as distinct from a "permanent", investment tax credit. The very paucity of probative research on the design, implementation and probable effects (or effectiveness) of the VITC adds significantly to the potential importance of this session on variable investment tax credits, and to the commendation otherwise due to those planning the program of this conference.

I suspect that there are essentially four reasons why there has not been more earlier work on variable investment tax credits. Although as already noted, both theoretical arguments and various econometric studies agree that a permanent investment tax credit has a sizable and significantly positive impact on investment outlays over a considerable period of time, it is also apparent from a review of the literature that there is a wide range of difference in the estimates of the *extent* of this effect even in the long run. There are even greater differences in the estimates of the *time path* of the effects which

¹The material in this paragraph has been ably developed and summarized in the papers by Gramley and others in the Federal Reserve Staff Study, *Ways to Moderate Fluctuations in Housing Construction*. See also the first section of the Picou-Waud paper at this conference.

become critically important in assessing the desirability of a variable tax credit and designing good strategies for its use. In addition, the introduction of a tax credit scheme which was billed in advance as being variable would require allowance for the *expectations* of company managers with respect to the *future* timing and size of the credit itself which raise a host of delicate and difficult problems that are not easily amenable to standard econometric techniques. And finally, one of the important reasons more work has not been done by economists on *variable* investment tax credit schemes is doubtless the fact that the effects and effectiveness of such variable credits will depend very heavily on administrative considerations and legal "details" of regulations which are not normally of concern to professional economists.

The first body of information required to appraise the probable effectiveness (and optimal implementation) of a VITC is a good structural econometric model of the determinants of investment outlays, including reliable statistical estimates of the slope of elasticity coefficients on the relevant variables and with special emphasis on the reliability of the *time-path* of the response to variations in the term (or terms) involving the investment credit. Unless we have relatively sure knowledge of these basic matters, variations in the level of investment tax credits will produce uncertain and potentially destabilizing effects. A recent Conference at the Brookings Institution under the title *Tax Incentives and Capital Spending* included papers by Hall and Jorgenson (HJ), Bischoff, Coen, and Klein and Taubman which, together with the Picou and Waud (PW) paper at this session, provide a good set of references for judging the adequacy of our present knowledge regarding the impact of investment credits on investment outlays. The first section of this paper will review the structure of the models used by these authors and their different findings and implications with respect to the effects of investment tax credits. Reasons for the different findings are explored, and suggestions are made for needed further research on the structural determinants of investment outlays. The internal evidence of the available papers is used to form a composite assessment of the steady-state effects of investment tax credits and the time path of these effects which can serve as a provisional basis for exploring some of the important additional issues that must be resolved before we will have a firm basis for policy decisions regarding the introduction and implementation of a VITC program. These further issues are examined in the second section of the paper. A brief summary of our entire analysis will be found in the concluding section.

Structural Determinants of Investment Outlays and Effects of Permanent Tax Credits

Broadly speaking, Picou-Waud's work and the four Brookings papers fall in the mainstream of recent econometric work on investment functions. In each case, a theoretical model of the optimal capital stock *desired* (on the basis of currently available readings of other variables) is specified, and the amount of current investment outlay is made a function of the discrepancy between the capital stock on hand and that desired, with the speed and time pattern of closure depending upon both theoretical and institutional considerations. But in spite of this common general structure, differences in assumptions regarding (a) optimal capital stocks and (b) the relevant determinants of the response to disequilibria have led to very substantial differences in the estimated response of investment outlays to changes in the cost of capital services in general, and more particularly to changes in tax rates, depreciation allowances and tax credits.

As would be expected in the published work of eminent professional authors, each model provides excellent "fits" to the past data used, with high multiple correlation coefficients, uniformly high *t*-ratios on the included variables and very satisfactory Durbin-Watson coefficients. The disturbingly wide range of estimates regarding the effectiveness of even a "permanent" investment tax credit, which PW and the Brookings authors nevertheless present, dramatically highlights the fact that we do not yet have professional agreement regarding some of the basic elements required for serious analysis of a variable tax credit.

Among the Brookings authors, Hall and Jorgenson develop estimates which are most favorable to the introduction of a variable tax credit. They found that the investment tax credit had stimulated approximately four times as much additional gross investment as the 1962 depreciation guidelines, and that the 1964 reduction in corporation tax rates had considerably less effect than the change in depreciation provisions. Specifically, they estimated that the 7 percent investment tax credit introduced in 1962 increased *gross* investment in manufacturing and nonmanufacturing equipment in 1965 by \$3.95 billion (about 10 percent of its actual level of \$40.6 billion), and the \$2.82 billion increase induced in *net* investment in equipment was over 22 percent of the actual level in that year.² Through 1966, the *total* increase in gross outlays on equipment was estimated

²Computed from Tables 2-5 and 2-7, Hall and Jorgenson, *op. cit.*, pp. 43-60.

to have been slightly over \$14 billion. They also found substantial effects from the repeal of the Long Amendment in 1964 and the suspension of the credit in 1966. The Hall-Jorgenson estimates are particularly favorable to a VITC, not only because they estimate larger long-run "total" effects than most other authors but even more because of the *time shape* of the response. They find that the induced investment increases rapidly over a roughly two year period to a level very substantially *above* the "steady state" magnitude, with geometric declines in the induced effects thereafter.

Bischoff also finds very substantial, though smaller, effects from the 1962 investment tax credit in the four years through 1966. Specifically, he estimates that the 1962 credit induced a total increase in equipment outlays through 1966 of \$9.1 billion, which is only about two-thirds of the HJ estimates.³ Although Bischoff's equations imply that the *long-run* steady state effect of a *maintained* tax credit would be as large as suggested by HJ,⁴ his estimates of these effects over any short run period are nevertheless considerably smaller. Most significantly for present purposes, Bischoff estimates that the effects of the credit build up rather slowly over at least a four year period as they *asymptotically* approach their steady-state impact. Robert Coen was still more pessimistic on the effectiveness of the credit, estimating that the *combined* effects of depreciation guidelines, the tax cut in 1964 *and* the investment tax credit which "produced and estimated \$8.6 billion in tax savings through the third quarter of 1966 increased (investment) expenditures by only \$2.8 billion."⁵ While "significant," Coen finds the benefit/cost ratio very low. Finally, Klein-Taubman provided estimates regarding the effects of tax credits a little higher than Coen's but considerably short of Bischoff's and very much below the Hall-Jorgenson estimates.

Unfortunately, Picou-Waud have not provided estimates of the effect of an investment tax credit which can be directly compared to these others. In part, this is because they focus on micro-effects on individual industries rather than in economy-wide aggregates. Also,

³Bischoff, *op. cit.*, esp. p. 117 and *passim*.

⁴Both authors infer this long run effect from the elasticity of desired capital stocks with respect to the rental price of capital (which HJ assumes to be unity and Bischoff's unrestricted equations estimate to have essentially this value). For both authors, the elasticity of the rental price of capital with respect to an investment credit is also unity (see footnote page 119 below).

⁵Coen, *op. cit.*, p. 179.

we observe that (the distributed lag sum of) the regression coefficients on the implicit rental rate on capital stock was significant and of the right sign in only 7 of the 12 two-digit industries studied — and they did not carry through the additional calculations required to evaluate the effect of (even a permanent) investment tax credit on this rental price of capital. Nevertheless, some general qualitative observations may be made. First, the Picou-Waud work provides a salutary caution that the percentage changes induced in capital stocks by a permanent investment tax credit, even in a long-run steady state, will probably vary widely among different industries in the economy. We can also observe that in five of the seven industries for which “significant” estimates are provided, the elasticity of the desired capital stock with respect to the rental value of capital is *substantially below* the unitary value in the Hall-Jorgenson estimates — implying that the *long-run steady-state* effects of a change in investment tax credits in these industries would range from 19 percent to 86 percent of the HJ values. Moreover, in all seven industries emphasized in the PW analysis, the impact on desired capital stocks *builds gradually* over a very *substantial period* of time (ranging from 8 to 16 quarters). We also note that the two industries with significant elasticities greater than one also show the longest reaction periods (14 and 16 quarters). The time-paths of the response of desired *capital stocks* to changes in investment tax credits estimated by PW are thus on balance roughly the same as the sluggish buildup to asymptotic levels Bischoff estimates for the response of *investment outlays*. But since all modern investigators explain investment outlays by some distributed lag on changes in desired capital stocks, we may conclude that the PW work implies *slower adjustments* and longer mean lags in the response of *investment outlays* than Bischoff’s estimates suggest. PW’s work consequently implies that permanent investment outlay tax credits will have a *cumulative* effect on investment outlays over any period of two, three or four years which probably falls in the range between the Bischoff and Coen estimates.

As noted above, the substantial differences in the estimates of the magnitude and time pattern of the response of equipment outlays to investment tax credits provided in these five studies largely reflect differences in the assumptions made regarding the determinants of optimal capital stocks and the patterns of reaction to disequilibria. A brief review of these assumptions will help to explain the differences in their findings, and will also set the stage for some further comments bearing directly on the variable investment tax credit.

Since all these studies have been heavily influenced by the neo-classical theory originally developed by Jorgenson, the structure and assumptions of this model provide a common base reference for all the others as well.

Specifically Jorgenson assumes that (1) the firm seeks to maximize its market value at all points in time (which equivalently requires the maximization of profits at all points in time)⁶ with (2) no allowance for uncertainty, and (3) that this maximization is subject to a Cobb-Douglas production function; that technological change is (4) neutral and (5) "embodied" (in effect) in all equipment, old as well as new; that the required before-tax rate of return is (6) independent of the scale of investment and (7) constant over time; that (8) tax rates and (9) the prices of capital goods and all other inputs are expected at each point in time to be constant in the future, but that (10) the price of capital goods at all times must be equal to the present after-tax value of their future net rental values; finally, that (11) *economic* depreciation occurs at a constant (exponential) rate. Maximizing the firm value or profits under assumptions (1)-(9) yields marginal conditions which make the optimal capital stock desired at any point of time strictly *proportional to output* in the ratio $a(p/c)$ where a is the elasticity of output with respect to capital input, and (p/c) is the ratio of the price of the firm's output to the net rental value of capital services. Jorgenson makes direct estimates of the desired capital stock K_t^* at every date from data on the level of output, the price of output and the rental price of capital services at that time.⁷ HJ then uses rational distributed lag functions to esti-

⁶See Hall and Jorgenson, *op. cit.*, esp. p. 12 and references there cited.

⁷The latter, on the basis of assumptions (9), (10) and (11), turns out to be
 (1) $c = q[(1-u)r + \delta] (1-k-uz)/(1-u)$
 where

- c = net rental value of a unit of capital services
- q = price of a unit of capital goods
- u = corporation tax rate
- δ = (exponential) rate of depreciation
- r = cost of capital (before tax)
- k = the (decimal) investment credit
- z = the after tax present value of depreciation deductions totaling one dollar over the life of the investment.

Equation (1) applies to years beginning in 1964 and allows for an investment credit to 100k% which is not deducted from the depreciation base of the asset. During the years 1962 and 1963 the Long Amendment requiring that the credit be deducted from allowable depreciation was in effect, and the corresponding formula for these years is:

$$(1') \quad c = q[(1-u)r + \delta] (1-k)(1-uz)/(1-u).$$

Bischoff and Coen also use these same formulas for computing the rental value of capital services, although they insert different values for the cost of capital.

mate the time path of the investment outlays induced by discrepancies between actual and desired capital stocks. The form of the lag functions draws primarily on statistical rather than economic theory, and the resulting speeds of adjustment to disequilibria are essentially empirical, in contrast to their estimates of desired capital stocks which implement an explicit, rigorous theory.

This Jorgenson model of desired capital stocks is also the starting point for Coen's work, as well as the Picou-Waud paper at this conference.⁸ But both Coen and PW (following Gould) object that output and desired capital stocks are simultaneous decision variables. To avoid the resulting biases in estimates of K_t^* both introduce exogenous estimates based respectively on distributed lags on orders and sales (Coen), or on labor costs, costs of capital services and real GNP (Picou-Waud) [see their equations (13) and (20)]. While the PW procedure for estimating K_t^* seems to be preferable to the others used in these papers, we should also note that their use of planning horizons computed from NICB Surveys of Capital Appropriations is much more questionable. Apart from his exogenous estimates of the capital stocks desired, the major innovation in Coen's work is the idea that the time path of the distributed lags relating investment outlays to the difference between actual and desired capital stocks will be a function of the internal cash flows of funds available to finance the new investment [see his equation (4.38)]. With sufficient imperfections in the capital markets, cash flows (as a fraction of the gap between actual and desired capital stocks) can clearly affect the pace of investment outlays, but Coen's implementation leaves open serious matters of identification and collinearity. In particular, his model essentially reduces to estimating K_t^* by a distributed lag on past sales, while simultaneously varying the time path of response of investment outlays to the differences between desired K_t^* and actual capital stocks by a cash flow term which is known to be very highly correlated with sales.⁹ Even if perhaps satisfactory for strictly forecasting purposes in the absence of policy changes, the structural parameters required for estimating the marginal impact of investment credits are not identified in Coen's work.

⁸Picou-Waud, however, revert to Jorgenson's original work in which [instead of using assumptions (10) and (11) above] he simply specified net profits each year as profits before tax less tax payments, which led to the formula for the net rental value of capital services reproduced as equation (9) in the PW paper here. This may be compared to the formulas given in the preceding footnote used by HJ, Coen and Bischoff.

⁹In this connection, see Franklin Fisher's criticisms at the Brookings Conference, *op. cit.*, p. 250.

Bischoff also uses most of the same assumptions underlying the Jorgenson model as listed above, but he develops a more complex formula for the desired capital stock (K_t^*) because his maximization is subject to (3') a more flexible CES production function; also he specifies that (5') technological change is embodied in new investment but not existing capital stocks (the "putty-clay" hypothesis with irreversible investment), and (7') the cost of capital varies each year with a weighted average of bond yields and dividend yields and the tax rate. He also relaxes the assumptions of static expectations (9) found in Jorgenson and other work. His hypothesis of the more plausible "putty-clay" formulation of technological change is well supported by the data as against the "putty-putty" assumption; and relative prices (including tax credits) are convincingly shown to affect equipment outlays with a much longer lag than do changes in output. Also, while the Almon lag distributions fitted could easily have revealed a "humped" effect as had been reported by Jorgenson, Bischoff finds clear evidence that the effects of investment credits (and other elements affecting the rental value of capital) build gradually over time and approach their long-run steady-state effects asymptotically.

Klein and Taubman also accept the Jorgenson specification of optimal capital stocks with respect to an idealized world of perfect competition and certainty, but they make rather extensive adjustments for various market imperfections and uncertainty which are ignored in Jorgenson's work (and largely ignored in the other papers). Like Bischoff, they also adjust their data to allow for the fact that accelerated depreciation was adopted quite gradually by business firms; failure to allow for the fraction of assets actually depreciated by the new methods clearly introduces biases in the HJ, Coen and PW results for the effects of investment credits as well as for the change in depreciation itself. The Klein-Taubman analysis also evaluated the effects of investment tax credits and accelerated depreciation within the full Wharton model of the economy, thereby allowing for feedback effects ignored in all the other papers. (I come back later to their distinctive and valuable analysis of the *temporary* suspension of the credit in 1966).

In summary, the four important papers at the Brookings Conference and the Picou-Waud paper here clearly reflect the great advances which the profession had made over the last 15 or 20 years in understanding the determinants of investment expenditures and in developing probative statistical models of the investment process. But with full recognition of the highly constructive developments

which have occurred over the years, it is distressingly clear that the profession has not yet found "the" structural explanation of investment outlays. Each of the five papers reviewed has used sophisticated theoretical and econometric techniques; each study was addressed to the same question of the effectiveness of investment credits; but even with respect to the magnitude and time pattern of the effects of a *permanent* investment tax credit, the estimates provided differ very widely. It seems fair to conclude that no one of these papers provides an adequate basis for making firm estimates of the effects of investment tax credits for policy purposes, quite apart from the additional issues involved in the implementation of a *variable* tax credit.

Further work on the basic determinants of investment outlays is clearly needed. Jorgenson's development of the neoclassical model a decade ago lifted work on investment functions to new levels of rigor and sophistication, but reliance on this model involves acceptance of all the 11 basic assumptions listed above — at least (in the spirit of Milton Friedman's positivist metaphysic) as an adequate basis for the prediction of investment behavior. We also know, however, that inappropriate specifications, omission of relevant variables and measurement errors all bias parameter estimates and falsify predictions. Other work reviewed has relaxed the original restrictive assumptions of static expectations, constant required returns, and Cobb-Douglas production functions. But even as modified, the basic framework remains a Fisherian model of optimization of desired capital stocks *under certainty*, and no intertemporal tradeoffs affect the stocks desired at any given time. Relevant variables are allowed to vary from time to time, but no allowance is made in the models for the knowledge that they *will* vary and in an unknown (uncertain) way.¹⁰ I suggest that the next great watershed in the econometrics of investment functions will be the explicit and rigorous incorporation of uncertainty and adjustment costs *within* dynamic optimizing models used to specify and capital stocks desired under a given set of conditions. In virtually all models to date, uncertainty is ignored and adjustment costs only enter into the distributed lags through which investment outlays gradually bring existing capital stocks up to desired levels.

In the same vein and as part of the same effort, more attention must be given to market imperfections, disequilibria and the proper measure of the cost of capital under uncertainty. Jorgenson's assumption (10) that the price of capital goods at all times equals the

¹⁰The Klein-Taubman paper is a partial exception in this respect, but their allowances for uncertainty are *ad hoc* and judgmental rather than vigorously derived in an explicit model.

present value of their future after-tax net rentals, for instance, implicitly but unrealistically assumes *continuous perfect equilibrium* in purely competitive markets for real capital goods. Moreover, none of the papers measures required returns in a way consistent with modern neo-Fisherian portfolio and capital market theory. Nor do any of the papers properly allow for the increasing costs and restrictions on desired capital stocks involved in an uncertain world with increased leverage and/or declines in equity values.¹¹ Misspecification in each of these respects will introduce errors in measurement in the rental value of capital goods – and thereby into the estimates of the effects of investment credits on investment outlays obtained in each of the papers reviewed.¹²

In addition to such improved formulations and measurements of desired capital stocks K_t^* and relevant rental value of capital c , much more work is needed on the dynamic adjustments of actual capital stocks through investment outlays to their desired levels. Current models introduce distributed lags, essentially on an *ad hoc* basis, to reflect the influence of past data on expectations and delays in the conversion of appropriation into installed capital goods.¹³ Much more careful work on the formulation of expectations is required. Costs of varying speeds of adjustment need to be measured and more rigorously incorporated into the optimal time patterns of response to perceived discrepancies in capital stocks from their desired levels; and this analysis must explicitly incorporate the effects of the unavoidable uncertainties regarding the underlying determinants of optimal capital stocks upon the desired time pattern of response. Finally, we observe that investment functions to date have very generally regarded the order-to-installation lag as being constant over time. In fact, we know that in 1956-7, in 1966, and again quite recently, supply bottlenecks have significantly delayed deliveries. Failure to allow for such exogenous effects will clearly bias the parameters of the distributed lags of investment outlays on desired capital stocks.

¹¹See Lintner, esp. pp. 224-30 and 242-52 for the theory and empirical evidence for the stable and highly significant *negative* effect of leverage on investment outlays, where leverage is measured by long debt (less current retained funds) as a fraction of equity at current market values.

¹²The same conclusion follows directly from any mismeasurement of the effect of the credit on the required return in the Klein-Taubman paper.

¹³Distributed lags on past actual values of capital stocks are of course used to incorporate replacement demands into total investment demand; but these are not on the essentially *ad hoc* basis being criticized.

Pending the outcome of all this further work needed on investment functions themselves, we must simply review the assumptions used and the evidence provided in the available papers to arrive at a "best judgment" assessment of the probable magnitude and time path of the effects of an investment tax credit presumed to be permanent. However uncertain and subject to error, such judgments form an essential base for considering the design and probable effects of a variable credit. Using the Hall-Jorgenson estimates as a provisional benchmark, we observe that Bischoff's strong confirmation of the superiority of the "putty-clay" hypothesis and of the different lag distributions on changes in output and relative prices argue strongly in favor of his more conservative estimates of the time-path of the effects of investment credits.¹⁴ The appropriate allowance in Picou-Waud and Coen for non-static expectations, and for output and desired capital stocks being simultaneously determined decision variables, seem to point in the same direction — as do the more judgmental adjustments for uncertainty and market imperfections introduced in Klein and Taubman's work. It consequently appears from the composite evidence of the five papers taken together that (a) the total long-run steady-state effects of permanent investment tax credit is no greater than the Jorgenson-Bischoff estimates and may be a little lower, and (b) the time path of these incremental effects on the rate of investment outlays builds up rather slowly over a period of at least three and perhaps as much as five years, with relatively little effect within the first year and a somewhat more rapid increase in the effect during the second year, so that (c) the *cumulative* response of induced incremental investment outlays within the first one or two years will be a rather small fraction (probably a third or less) of the *total* incremental response over a four or five year period. We now turn to the implications of these apparent properties of a permanent investment tax credit for the probable effectiveness of a variable investment tax credit as part of an overall stabilization policy.

¹⁴Further support for the conclusion comes from the fact that the Hall-Jorgenson assumption of a *constant* 20 percent required return before tax almost certainly involves an "error in variable" bias in their estimates. Bischoff's use of a separate weighted-average estimate each year is clearly preferable; even though his formula for the cost of capital leaves much to be desired, its year-to-year movements will moderate the bias induced by the HJ fixed number.

FURTHER PROBLEMS AND ISSUES RAISED
BY VARIABLE TAX CREDITS AS AN INSTRUMENT
FOR STABILIZATION POLICY

This synthesis of the evidence of previous investment studies, if it is at least a reasonably good representation of the true underlying reality, raises several serious questions with respect to the design, implementation and probable effectiveness of a *variable* investment tax credit. The fact that the steady-state effects of a maintained investment tax credit are large of course provides strong justification for the use of such credits as an important component of long-run policies designed to affect the composition and growth of real GNP. But the fact that these long-run effects are large has *two different and offsetting* implications for the potential use of investment tax credits as a variable instrument for *stabilization* purposes.

Any instrument under consideration which was found to have no substantial impact on events even in the long run *if* it were continued would not be regarded as a promising candidate for purposes of stabilization. But while the large long run effects of an investment tax credit make it a *potentially* attractive stabilization instrument, they also compound the requirements for accurate forecasting on the part of policy-makers when viewed in the context of substantial lags and a slow build-up in the effects of any given change in the level of the credit. If, as our composite assessment of the available evidence suggests, more than half of the increase in the rate of investment outlays induced by the credit in any quarter occurs *after* six or eight quarters have elapsed, there is a clear danger that the delayed effects of earlier changes in the credit will continuously swamp the shorter run effects of more recent changes in the credit. *Unless* (a) some effective way can be found to "bunch up" the response of investment outlays to changes in a VITC *or* (b) policy makers responsible for changes in the levels of variable investment credits can forecast the needs for such changes with some precision as much as six or eight quarters in advance, the VITC will prove to be destabilizing rather than stabilizing in its effects whenever the forecast on which it is based is sufficiently erroneous. Moreover, unless one or the other of these conditions is satisfied, the destabilizing effects will be more serious the larger the long-run or steady-state effects of investment tax credits *per se*. This further important conclusion reflects the fact

that in all modern models the pace of investment outlays depends with a lag on changes in *desired* capital stocks which depend multiplicatively (rather than linearly) on output and a term involving investment credits (inversely) through the rental value of capital services.¹⁵

Zarnowitz' analysis of the "track record" of the forecasts of business conditions which have been made by official agencies (Council of Economic Advisors) and by serious private forecasters, including those using the larger econometric models, show substantial forecast errors as little as three or four quarters ahead, especially when the forecast interval turned out to have included an upper or lower turning point. This record surely raises serious doubts that the profession can yet provide forecasts of conditions *six and more quarters ahead* which have the degree of accuracy and reliability required to eliminate the danger that a VITC might turn out in practice to be a destabilizing rather than a stabilizing policy instrument. Indeed, unless substantial "bunching" of *outlays* can be induced, it appears that errors in forecasts of general economic conditions over such necessarily long forecasting horizons are still so large in the relevant respects that the risks of counterproductive outcomes remain at an unacceptably high level.

Experience with the first American effort to modify our investment tax credit for countercyclical purposes clearly supports this negative conclusion. In 1966-67, the economy was seriously overheated and experiencing its first credit crunch. In an effort to restrain booming investment outlays, the investment tax credit for equipment was suspended as of October 10, 1966 with an announcement that the suspension would remain in effect for the 15 months through December 1967. In fact, with weakening business activity, the suspension was lifted on March 9, 1967 after an effective period of less than five months.

Investment expenditures in 1966:4 and 1967:1, just after the suspension of the credit, were clearly dominated by the decisions and orders placed in earlier quarters under the stimulus of the investment credits then in effect. The lack of the credit in these two quarters reduced outlays later in 1967 and in 1968 and 1969. To have significantly relieved the overheating of the economy in 1966, the investment tax credit would have had to be suspended in 1964 or early in 1965, but there were no public or private forecasts which anticipated

¹⁵Thanks are due my colleague Benjamin M. Friedman for fruitful discussions of these issues, as well as others in this paper.

the pressures of mid-1966 so far in advance. The suspension of the credit in October 1966 clearly presumed continued overheating through 1967, even though within five months new data had so changed the prospect that the credit was restored. But once again, the restoration of the credit early in 1967 did little to shore up economic activity during the mini-recession of 1967. The lags between the decisions to place more orders for equipment under the stimulus of the restored credit primarily raised spending in 1968 and 1969 when the economy was again needing restraint rather than stimulus.

Similarly, the credits was repealed in the first quarter of 1969, just two quarters before the cyclical peak, and the effects of this action primarily accentuated the subsequent recession in economic activity. To complete the historical record, the reinstatement of the credit while business was weak in 1971 added little to investment outlays until late 1972 and 1973 when the economy was again overheated. While other fiscal and monetary policy actions were probably more important factors in creating the excesses of 1973, our concern here is that once again the timing of changes in the investment credit was perverse.

On the basis of the investment functions fitted to date, the burden of accurate forecasting upon policy makers undertaking to implement a VITC seems onerous indeed. But as repeatedly emphasized, all of the empirical studies of the effects of investment credits upon investment outlays have simply introduced the level of the credit available in *each* quarter into the estimate of *desired* capital stocks and then run these numbers through a distributed lag to get estimates of the impact on investment outlays in *future* quarters. No allowance has been made for anticipations or forecasting by business firms of what the level of the investment credit will be in the future. In one of the few studies concerned with the design of a variable investment tax credit, Craine, Stephenson and Tinsley (CST) have provided some *indirect* evidence that business firms also act on anticipation of changes in the level of investment credits. Specifically, they noted that there were widespread rumors in 1966 which correctly forecast the suspension of the investment tax credit. When they computed the residuals in the level of new equipment orders in the MIT-FRB-Penn model, they found that new *orders* for equipment were between 1.0 and 1.5 standard deviations above their expected values in the first three quarters of 1966, and were correspondingly lower in 1966:4 and 1967:1 right after the suspension.

After we allow for the lags between orders and investment outlays, these findings are of course quite consistent with the negative appraisal of the effects of the 1966 suspension of the credit given above. They nevertheless suggest that businessmen do respond to some extent to their *anticipations* of the level of the investment credit which will be available in the future. Indeed, since the 1966 suspension involved a change in legislation and went against the prevailing mores regarding the proper use of an investment tax credit, the anticipation response in 1966 was no doubt substantially weaker than could have been expected had an explicitly variable investment tax credit scheme already been in effect.

Picou-Waud, like Craine-Stephenson-Tinsley, argue that in *principle* such anticipatory "bunching" of investment plans during periods of deficient aggregate demands and high tax credits in anticipation of reduction (or removal) of investment tax credits *should* be stabilizing — as would the corresponding hold-back of investment plans in periods of excess aggregate demands in anticipation of future restoration (or increases) in the VITC. The CST proposal to restrict high investment tax credits to periods of deficient aggregate demands (with small credits or none when demand is excessive) clearly eliminates the perverse timing of our 1966-7 experience when in fact the 7 percent investment tax credit was continued through the period of excess aggregate demand, taken off during the (short) interval of declining business activity, and restored in time to exaggerate the overheating of 1968 and early 1969. But the proposal does not go far enough, as our experience in 1969 to date well illustrates. The bunching of investment plans during periods of high investment tax credits in anticipation of their elimination (or reduction) when aggregate demands become excessive involves *orders*, not investment outlays. The bunched orders while demands are still deficient but just before the credit is eliminated will add to the investment outlays three to six quarters later when aggregate demands may be excessive. To be truly stabilizing, the granting (or suspension) of investment tax credits must not be geared to the *current* excess or deficiency of aggregate demands, but rather to the *future* need for stimulus or restraint.

In short, as compared to the situation before 1966, legislation giving some government agency discretionary authority to impose, suspend or vary an investment tax credit will clearly lead to more anticipatory "bunching" or withholding of *orders*, but it will still leave this agency with a substantial *forecasting problem* because it will not eliminate or even reduce the long lead times involved in the distributed lag between orders and investment outlays.

Moreover, this forecasting problem involves more than just having reliable estimates of the state of excess (or deficient) aggregate demands several quarters in advance. The agency must *also* have reliable forecasts of the incremental effects of its own current actions (or inaction) — and these further forecasts must explicitly allow for the responses of the business community to their assessments (and uncertainties) regarding the pattern of the agency's subsequent actions as well as other aspects of the upcoming economic environment.

To illustrate with a concrete simple case, suppose that new legislation had given some government agency the right to impose or suspend an investment tax credit of 7 percent — its discretion is limited to *timing* and to a choice of 0 percent or 7 percent. At least once each quarter, the agency will then have to decide whether to maintain an existing credit a little longer or suspend it, and this will involve judgments or *forecasts of how much incremental order-bunching will occur during the upcoming quarter* if the credit is not suspended immediately. In the contrary case, where the credit has been suspended, the decision when it should be reallocated will of course involve corresponding judgments regarding incremental rates of order deferral. In the context of its estimates of the distributed lag between investment orders and outlays, and its forecasts of business conditions several quarters in advance, *ceteris paribus*, the responsible government agency's decision will depend substantially on its assessment of the anticipatory bunching (or deferral) or orders which would be induced by a *one quarter change in the timing* of its action. At any given time, however, this assessment will depend (along with all standard variables usually included in investment functions) on the probability distributions businessmen were *then* assessing regarding the *timing and magnitude* of the *agency's own future actions*. Whether "raw judgment" or judgment informed by spot surveys or other sources of intelligence were used, the decisions would be difficult and fraught with doubt — and the consequences of error could easily turn good stabilizing intentions into destabilized histories after the fact. As George Terborgh has perceptively noted,¹⁶ although the authority to suspend or restore 7 percent investment tax credits may reduce the policy response lag, it probably increases uncertainty in the business community and involves considerable risks of perverse responses.

¹⁶ *Capital Goods Review*, No. 92, May 1973.

These added forecasting burdens under proposed legislation giving some agency the right to *vary* investment tax credits between limits of 0 percent and 15 percent would obviously be even greater, even though the risks of perverse responses might be somewhat reduced. Supposing that the current credit were 7 percent, the agency would then have to decide at least once each quarter not only whether to sit tight for a while longer or move to say 9 percent, 11 percent, 13 percent, or 15 percent, *or* to 5 percent, 3 percent or 0 percent — and such decisions would involve assessments of the *incremental* effects of *changes in timing and magnitude simultaneously*.

At the present time, we simply have no adequate theory of how much anticipatory ordering (or deferral) would be optimal for the business firms themselves, let alone any good econometric estimates of how much would in fact occur under any given set of circumstances. Klein and Taubman at least introduced a simple model of the present value of a one-period deferral of investment in their consideration of the temporary suspension in 1966, and Craine-Stephenson and Tinsley build on some earlier work to develop optimal adjustment paths to *assumed sequences* of “anticipated” (as well as anterior) events, but the optimal *stochastic* control solutions based on explicit probability distributions over future levels of the investment credit (as well as other variables) have not yet been developed. Moreover, even *if* such more relevant theory were available and good structural econometric estimates of its parameters had been developed, there would still be a very substantial range of uncertainty regarding the magnitudes and time path of the effects of any given change in the credit at any particular time, and probably substantial risks of destabilizing consequences from any given change in the credit.

In addition to these theoretical, empirical and assessment problems involved in the successful implementation of a variable investment tax credit plan, there are also administrative problems which to date have seriously compromised the short-run cost-effectiveness of the introduction (or suspension) of investment credits. Although the law has included a complex binding contract rule and (nominally at least) applied the credit to only the uncompleted fraction of work on earlier contracts, the practice has been to allow credit on most of the equipment installed after the effective date of the credit. As Brannon has written,

At the end of the effective period of the VIC (the go-out), the binding contract rule seems to limit the tax law change to prospective decisions, but it does so only in a loose way. In normal business affairs, contracts which appear to be binding are modified when it is in the interests of both parties to do so. Also, entering into a binding contract is a fairly trivial event taken by itself. Given any anticipation of the termination of VIC, it is relatively costless to enter now some contracts that would have ordinarily been entered over the next year.

As a result, credits are given (and tax revenues lost) on substantially all investment outlays based on equipment order-backlogs at the time of the "go-in" (even though these have not been induced by the credit) — and also on a substantial volume of *later* investment outlays based on orders placed prior to the suspension. The resulting inefficiencies may not be of major moment if investment tax credits are introduced (or suspended) only at very infrequent intervals and regarded as "permanent" in either case, but raise fundamental questions regarding the cost-effectiveness of a *variable* investment tax scheme.

In an unpublished memorandum, Brannon has suggested that this problem might be met by legally restricting the credit of the *value-added* by the producer of each investment good during the credit period.¹⁷ This proposal is attractive in principle and surely merits much more study and development. If feasible, reliable and not too costly, it could also significantly ease the forecasting burdens emphasized earlier. There are clearly serious problems of reporting and

¹⁷Brannon sketches the operation of his proposal as follows:

Consider first a large non-fungible item like a dynamo. The producer of dynamo would certify his goods-in-process inventory as of the starting date, and he would be permitted to normalize this goods-in-process inventory for the normal relationship between inventory values and sales prices. The producer would be limited to certifying for investment credit purposes only and value added after the starting date. The basic control on this system is that a producer must indicate an amount of partial certification in which the disallowed amounts equaled his normalized goods-in-process inventory as of the starting date. He would normally be permitted to report a schedule of these partial certifications which would involve their being spread over a year or two after the starting date. There would seem to be no particular reason for government to be greatly concerned about the possibility that a particular seller could juggle certifications between buyers. This could be left to bargaining. With respect to fungible goods, the producer of the good should simply be allowed to submit a program of partial certifications which would in aggregate equal the initial normalized goods-in-process inventory. It could be left to him to decide how to allocate this to particular sales. With regard to the go-out, the same technique of partial certification would apply. The producer of a fungible good would simply certify the normalized goods-in-process inventory value as of the termination date, and this would be available as a partial certification whether or not there was a binding contract.

compliance involved, even if a variable investment tax credit scheme has the simple form of administrative discretion merely to allow or suspend an investment credit at a *fixed* rate of, say, 7 percent. These problems of costly reporting and compliance would obviously be greatly compounded if a more flexible VITC were adopted, such as proposed plans which involve administrative discretion to vary at quarterly or semi-annual intervals the level of the credit anywhere in the range from 0 or 3 percent up to as much as 15 percent. The more variable the credit, the more serious are the questions of the costs, the reliability, and the basic feasibility of the scheme.

CONCLUSIONS

Neither the theoretical nor econometric work on investment functions to date justifies much optimism that a VITC would prove to be stabilizing rather than destabilizing in practice. While substantial developments have been made in the theoretical models over the last decade or so, much more work on the formation of expectations, incorporating uncertainty and explicit probability distributions, is required before we have an adequate theoretical basis for designing a VITC plan. The available econometric work has treated the level of the credit prevailing at each point in time as if it were permanent, and even so, widely differing assessments of the magnitude and time paths of the effects of tax credits have been presented by respected scholars. Variables essential to the operation of a VITC have not been introduced into the fitted equations, so the values of the parameters are unknown.

Relying on the best composite assessments, based on the internal evidence of the available investment studies, it seems clear that successful implementation of a VITC based on investment outlays will depend upon substantial accuracy in forecasts of excess (or deficient) aggregate demands *at least* three to six quarters ahead (because of the basic lag between orders and outlays), and very probably over a much longer forecast interval. Under a flexible VITC, businessmen's anticipations of the timing and magnitude of prospective changes in the credit will seriously compound the administering agency's decision as to what if any changes should be made at any given time. Brannon's proposal that the credit be allowed only on values-added in each time interval would in principle reduce the time interval over which the agency would need accurate forecasts of future business conditions. It would also substantially improve the cost-effectiveness of an "on-again, off-again" tax credit. However,

the monitoring and compliance costs and the complexity of the scheme would be very considerable even if a given level of credit (say 7 percent) were reintroduced or suspended only after several quarters had elapsed, and these legal and administrative problems and costs would be greatly increased if credit levels were changed more frequently or in more flexible steps.

This review of the state of our knowledge regarding the probable effectiveness and desirability of a variable investment tax has raised more doubts and unanswered questions than reassuring conclusions. Within the context of past American practice in which tax credits have been granted *de facto* essentially on the basis of investment *expenditures*, frequent changes in the level of an investment tax credit get low marks on the basis of their cost-effectiveness. Moreover, the long lead times between the business decisions affected by the credit and the resulting *outlays* raise substantial risks that variations in the level of the credit will prove to be destabilizing rather than stabilizing. We can anticipate that further research on investment functions themselves, and further improvements in the reliability of the forecasts of aggregate demands and supplies from large scale econometric models several quarters ahead, will ease these problems in the future, but for the nearterm they appear to be very substantial indeed.

Several alternatives to simply varying the level of our existing tax credit which in practice is based essentially on investment outlays should also be examined further. If difficult legal and administrative problems can be worked out, the proposal to tie the investment tax credit to values-added may provide a means of simultaneously improving the cost effectiveness of a VITC and reducing the risks of destabilizing effects of changes in the level of the credit. Even if practically feasible with relatively infrequent changes in the level of the credit, this plan would probably break down into a morass if the level of the credit were varied every two or three quarters. Lindbeck's optimistic reports of Sweden's experience with variable investment *reserve funds* at this conference should also encourage further study of this alternative to U.S.-type investment credits.¹⁸ Finally, Pierce and Tinsley have proposed a modified Business Investment Fund scheme which in principle promises more flexibility as well as stronger and more assured stabilizing effects, but to date we only

¹⁸See, however, Brannon's critical discussion of the Swedish plan at this conference, and other analyses of this experience as cited by Pierce and Tinsley.

have the results of a preliminary theoretical exploration of the plan. Further work on the *design*, and the practical problems of *implementing*, a variable investment stimulus plan as an added stabilization instrument is clearly justified, even though our experience to date has not been favorable. The gaps in our present knowledge must be closed before we proceed.

BIBLIOGRAPHY

- [1] Bischoff, Charles W., "The Effect of Alternative Lag Distributions," published in [6].
- [2] Brannon, Gerard M., "A Note About a Variable Investment Credit," unpublished memo.
- [3] Coen, Robert M., "The Effect of Cash Flow on the Speed of Adjustment," published in [6].
- [4] Craine, Roger; Stephenson, James A.; and Tinsley, Peter A., "Some Evidence on a Fiscal Instrument to Alter Business Investment," published in [5].
- [5] Federal Reserve Staff Study: *Ways to Moderate Fluctuations in Housing Construction*, Board of Governors of the Federal Reserve System, 1972.
- [6] Fromm, Gary (Ed), *Tax Incentives and Capital Spending*, The Brookings Institution, 1971.
- [7] Gould, John P., "The Use of Endogenous Variables in Dynamic Models of Investment," *Quarterly Journal of Economics*, November 1969.
- [8] Gramley, Lyle E., "Short-Term Cycles in Housing Production: An Overview of the Problem and Possible Solutions," published in [5].
- [9] Hall, Robert E., and Jorgenson, Dale W., "Application of the Theory of Optimum Capital Accumulation," published in [6].
- [10] Klein, Lawrence R., and Taubman, Paul, "Estimating Effects Within a Complete Econometric Model," published in [6].

- [11] Lintner, John, "Corporation Finance: Risk and Investment," *Determinants of Investment Behavior*, (N.B.E.R. and Columbia Univ. Press, 1967)
- [12] Picou, Glenn C., and Waud, Roger N., "The Cost of Capital, The Desired Capital Stock, and a Variable Investment Tax Credit as a Stabilization Tool," these proceedings.
- [13] Pierce, James L., and Tinsley, Peter A., "A Proposal for a Policy Instrument to Affect Business Investment," published in [5].
- [14] Terborgh, George, "The Investment Tax Credit as an Economic Control Device — Revisited," *Capital Goods Review*, Machinery and Allied Products Institute, May, 1973.
- [15] Zarnowitz, Victor, "Forecasting Economic Conditions: The Record and the Prospect," in Victor Zarnowitz (Ed), "The Business Cycle Today," Economic Research: Retrospect and Prospect, *National Bureau of Economic Research*, 1972. (Fiftieth Anniversary Colloquium I).

Credit Controls in Western Europe:

An Evaluative Review

DONALD R. HODGMAN*

I

This paper examines experience with credit controls in selected countries of western Europe to see what lessons that experience may provide for actual or potential efforts to control credit in the United States. The countries included in the review are Belgium, France, Italy, the Federal Republic of Germany, the Netherlands and the United Kingdom.

“Credit controls” are defined in this paper as measures by which the authorities seek to modify the pattern of incidence of cost and availability of credit that market processes would produce in their absence. Moreover, credit controls are distinguished for present purposes both from measures of budgetary policy and measures of general monetary policy. Thus, credit controls are conceived to exclude both taxes and subsidies involving the budget of the central government and the more traditional instruments of central bank policy. These traditional instruments are taken to be open market operations in short-term government securities, variations in a uniform discount rate charged by the central bank, and a uniform percentage change in the central bank’s minimum required cash reserve ratio or in its maximum credit lines to eligible borrowing institutions.

Typically the target of *monetary* policy is an aggregate such as the monetary base, money supply, or the economy’s stock of liquid assets. The pattern of interest rates and credit flows is left to be determined by market processes. By contrast, *credit* controls seek to influence credit allocation and interest-rate structure.

In European experience credit controls have been motivated by a variety of purposes. These have been (1) to finance government debt at lower interest rates than market preferences would permit; (2) to

*Professor of Economics, University of Illinois

check the flow of credit to the private sector without raising domestic interest rates and thus attracting foreign funds through the balance of payments; (3) to influence the allocation of real resources to priority uses; (4) to block channels of financial intermediation and thus to assist a restrictive general monetary policy by impeding a rise in velocity; and (5) to strengthen popular acceptance of price-wage controls by holding down interest income to credit granting institutions and private investors. The measures of credit control that the authorities have used to achieve these objectives and the degree of success they have enjoyed are treated in part II of this paper. Part III draws conclusions and applies them to the situation in the United States.

II

There is considerable diversity of attitudes toward and experience with credit controls in the six west European countries reviewed here. At one end of the spectrum is the Federal Republic of Germany (hereafter, Germany) where market-oriented techniques of monetary management are strongly upheld. The principal German experiment with credit controls in recent years was judged a failure and abandoned. As a failure it is instructive.

The Netherlands and, to a lesser extent, the United Kingdom, occupy an intermediate position on the control spectrum, having made fairly extensive use of credit controls in the past 10-15 years but always regarding them as a more or less temporary expedient. Moreover, the Dutch use of credit controls never was strongly allocative in purpose. The British system evolved gradually and pragmatically without legislative enactment beginning in the late 1950s. The rationale advanced for credit controls in the United Kingdom and the methods employed have been much discussed and are of particular interest because of the sophisticated development of British financial institutions and markets. The British system of credit controls was largely (though not completely) dismantled by the official Credit Reform of 1971 when the authorities became convinced that its disadvantages had come to outweigh its advantages.

The principle of controlling credit flows and interest rates to serve national economic interests is fully accepted and has been extensively applied in practice in France, Italy, and Belgium in recent years. Techniques and objectives of credit control have differed among these countries as have other factors that have influenced the

effectiveness of the authorities' measures. These differences cast a cross-light upon the respective national systems and thus aid in drawing some lessons from them.

Germany: After their experience with pervasive economic controls during the Second World War most German government officials and businessmen have been enthusiastic supporters of free markets. Credit markets in Germany are among the least regulated in any country. But there is one episode from the years 1965-66 involving ceiling controls for deposit and lending rates paid and charged by credit institutions that fits the pattern of credit controls and deserves mention. During these years governmental authority (dating from the banking crisis of the early 1930s) to set maximum interest rates on deposits and loans of credit institutions was refurbished and applied with renewed vigor. Historically maximum rates for deposits were intended to prevent cutthroat competition for funds by credit institutions and those for loans to protect borrowers from exorbitant interest charges.

During the 1965-66 episode the German central bank was engaged in restricting credit to bring a domestic economic boom under control. Since interest-rate maxima for loans were linked by specified differentials to the central bank's discount rate, officials apparently felt that such a link gave the Deutsche Bundesbank more control over effective lending rates in credit markets than reliance on market forces would have done. However, the ceiling rates become the effective rates only in the presence of excess demand for credit at the ceiling rates.

Ceilings on deposit rates of interest were applied to customer deposits but not to interbank deposits and were varied for size and maturity of deposit. Deposits with maturities of two and one-half years or more were not subject to interest-rate maxima. Ceilings were varied by administrative order of the Federal Banking Supervisory Office in consultation with the Deutsche Bundesbank. In a period of tight credit these ceilings became the effective interest rates paid on deposits except for various forms of evasion. Deposit ceilings were justified as necessary so as to avoid abrupt changes in the relative competitive positions of different types of credit institutions (commercial banks, savings banks, credit cooperatives, mortgage banks) subsequent to decontrol. There was also the hope that ceilings on deposit rates would impede the intermediation function of credit institutions and reduce the incentive for inflows of foreign short-term capital. Both of these results would increase the effectiveness of restrictive monetary policy implemented by more conventional means.

Controls over deposit and lending rates were revoked on April 1, 1967 and have not been restored. To this statement there is an exception for deposits of nonresidents which remain subject to such controls at official discretion. The official explanation for revoking interest-rate controls was given in the 1966 *Annual Report* of the Deutsche Bundesbank:

One important reason for the complete liberalizing of bank interest rates, after more than 35 years of official regulation, was that even after the various partial liberalizations, the observance of the Interest Rate Order could be verified only with difficulty and could not be enforced at all. At all events numerous "legal" subterfuges enabled the larger and more adroit employers of money to obtain higher rates of interest, although often only at the cost of accepting complicated technical forms like transactions under repurchase agreements and other devices. The official fixing of interest rates also became increasingly questionable the more the course of the "free" rates made it obvious that the hard and fast interest rate structure needed major alterations (for instance through wider spreading of interest rates according to maturities), although without the authorities having any firm guidance as to how great these alterations were to be. Finally, however, it was to be expected that "genuine" interest rates, fully conforming to the market, would guide the markets for credit with more efficiency than governmentally regulated rates, the justification for which lay, at least partly, in the fact that they often diverged from the "equilibrium rate" for the various kinds of deposits.¹

Thus, the German authorities abandoned interest-rate controls on the familiar grounds of economic inefficiency, evasion, and lack of objective criteria to guide official decisions. It is noteworthy that these controls were not being used to allocate credit among types of borrowers or economic uses, and that they applied to a substantially broader list of credit institutions than commercial banks. Both these factors might have been thought to make their task simpler.

The Netherlands: Quantitative ceilings on bank credit were in active use in the Netherlands from the end of the Second World War until 1952 when they were suspended. Ceilings on bank credit were reintroduced in 1961 and evolved during the decade of the 1960s until they became the primary instrument of central bank policy. During this period the scope of quantitative credit ceilings gradually expanded. At first only short-term lending by commercial banks and

¹ *Report of the Deutsche Bundesbank for the Year 1966*, p. 15.

the central institutions of agricultural banks was subject to quantitative controls. In 1965 controls were extended to cover longer-term loans when banks began to shift to longer loan maturities to evade controls. The growth of commercial banking activities by general savings banks brought about their inclusion under loan ceilings in 1969. They were asked to limit their short-term lending to its traditional modest level and to restrict the expansion of their longer-term lending to the increase in their long-term liabilities. The dividing line between "short term" and "long term" was ruled to be a maturity of either one or two years depending on type of loan or type of deposit. In 1970 an agreement between the *Nederlandsche Bank* and the Post Office's director general brought lending by the postal check and giro services to the private sector and local authorities within the scope of the central bank's quantitative controls. For the commercial, agricultural, and savings banks, ceilings initially (in 1961) applied only to loans to businesses and individuals. In 1966 loans to local authorities were brought under the ceilings. In a decade or more of use in the Netherlands quantitative loan ceilings have steadily expanded their coverage by type of loan and type of credit-granting institution. In addition they have been accompanied by regulations and requests intended to preserve a degree of specialization in the deposit services and credit activities of different types of credit institutions.

Throughout the period just reviewed, the *Nederlandsche Bank* had at its disposal three principal instruments of general monetary policy: discount rate, reserve requirements, and open market operations. But these were scarcely used as instruments of active policy during the decade of the 1960s because the banks held ample foreign short-term assets that were easily repatriated to offset a domestic liquidity squeeze by the central bank. In this situation credit ceilings, bolstered by prohibitions on borrowing abroad by Dutch business firms, were regarded as more effective than the traditional instruments. Only with the tightening of foreign exchange controls in 1971 and the floating of the Dutch guilder in that year did the central bank resume more active use of its open market operations and minimum reserve requirements.

Certain features of the Netherlands situation must be kept in mind when evaluating Dutch experience with quantitative credit controls. First, the rationale for these quantitative controls has been to strengthen general stabilization policy rather than to influence the microeconomic allocation of credit. Moreover, the effectiveness of quantitative credit controls has been enhanced by the concentrated

nature of commercial banking (dominated by two large branch-banking systems), a tradition (though a declining one) of considerable specialization by different types of credit institutions and a system of foreign-exchange controls that required business firms and individuals to have official permission for short-term borrowing abroad. Further, the Dutch money market, though formally open to many types of participants, remains, in practice, primarily an inter-bank market. The central bank exercises substantial influence over the volume, terms and timing of new issues of bonds in the capital market, and the government regulates municipal borrowing in the capital market by centralizing it through the Bank for Netherlands Municipalities. Thus, both the structure of financial institutions and markets and partial control by the central bank or the government over nonbanking channels of financial intermediation, have favored the effectiveness of quantitative credit controls in the Netherlands. Despite these relatively favorable circumstances, the system of credit controls in the Netherlands has exhibited the familiar pattern of evasion and escalation, and there are the usual complaints about its stultifying influence on competition and efficiency. It is also recognized that large business firms have generally been able to escape the effects of domestic credit restrictions by being preferred customers of banks, by drawing funds from abroad through less obvious channels, and by engaging in interfirm credit transactions that bypass the controlled channels of intermediation.

The United Kingdom: The United Kingdom's experience with credit controls during the decade of the 1960s differs in some important respects from that of the other countries reviewed in this paper. First, the system of financial institutions and markets in the United Kingdom is more refined, less restricted by formal governmental regulation, and provides both borrowers and lenders a wider choice of alternatives than do the financial systems of other west European countries. Second, in using credit controls the authorities have sought both to serve the goal of macroeconomic stabilization and to influence the allocation of credit and real economic resources. Thus, British experience with credit controls is richer than that of Germany or the Netherlands. Finally, British credit controls have been more thoroughly analyzed and debated on both the theoretical and policy-oriented levels so that more is known about their rationale, mode of operation, and effects than is generally the case for other countries in western Europe.

During most of the period from the end of World War II until the Credit Reform of 1971, the British authorities viewed the structure of interest rates, credit flows, and the maturity composition of the

national debt as the key financial variables in aggregate demand management. They paid little or no attention to the money supply or to the wealth effects of an overall deficit in the budget of the central government as important influences on aggregate demand. Moreover, their view of the market for long-term government bonds (so-called gilt-edged stocks) stressed the cumulative destabilizing nature of private investors' response to bond price movements and the consequent need for the central bank to maintain price stability in that market to forestall the possibility of a liquidation crisis.²

On the policy level these theoretical views were expressed in informal but binding arrangements among the Bank of England, the clearing banks and the discount houses to control a network of short-term interest rates, in official requests and quantitative ceilings to control the volume and, in some measure, the allocation of bank credit, and in open market purchases and sales by the Bank of England to maintain stable yields and prices on government bonds. Understandings among the Bank of England, the clearing banks, and the discount houses tied key short-term interest rates to the Bank of England's Bank rate. The rates so tied included the clearing banks' deposit and lending rates, the rate on call money lent by clearing banks to the discount houses, the rate on commercial bills, the rate at which discount houses bid for Treasury bills at the weekly tender and the so-called "market rate" on Treasury bills offered for resale by the discount houses. Therefore, this network covered the deposit and lending rates of the principal commercial banks and the key interest rates in the traditional money market.³ When the Bank of England moved Bank rate and thus the rates tied to it, market arbitrage tended to convey similar upward or downward pressures to rates in the interbank and local authorities' markets and to lending and borrowing rates employed by other credit institutions such as savings banks, merchant banks and accepting houses, and finance houses. These latter rates were free to move at any time in response to market pressures, however, while the tied rates moved *only* when Bank rate moved.

The Bank of England supplemented its control over short-term interest rates by a system of quantitative ceilings and requests to control the volume of bank lending to the private sector. These

²For a more detailed account and critique of British monetary theory of this period, see my article, "British Techniques of Monetary Policy: A Critical Review," *Journal of Money, Credit and Banking*, Vol. III, No. 4, Nov., 1971, esp. pp. 767-775.

³This system of controls over short-term interest rates is analyzed in much greater detail in my *National Monetary Policies and International Monetary Cooperation*, scheduled for publication by Little, Brown and Company, fall 1973, Ch. VII, esp. pp. 175-183.

requests became more formal and more frequent as the decade of the 1960s advanced. They were in effect almost continuously from 1965 until the Credit Reform of 1971. Initially they applied only to the clearing banks. From 1965 they were applied as well to other banks, discount houses and finance houses in an effort to regulate the flow of credit to the private sector through these alternate institutional channels.

A principal aim of this system of interest-rate and quantitative credit controls was to permit the financing of government borrowing (including that of the central and local governments and nationalized industry) at lower interest rates than would have been determined by competitive market forces. This aim was motivated in part by fear that rising yields and falling bond prices might generate a liquidation crisis for the national debt. In part it was motivated by concern for the implications of high interest-rate levels for domestic income distribution and for the burden that interest payments on foreign-held government debt could impose on the balance of payments. A more limited aim of the quantitative ceilings was to guarantee a continued flow of short-term credit at favorable interest rates to high priority activities such as shipbuilding, the finance of exports, and productive investment in manufacturing or agriculture. In addition to requests addressed to the banks specifying categories of loans the authorities wished to see favored, such loans were sometimes encouraged by exempting them from overall credit ceilings. To encourage loans for domestic shipbuilding and medium- and long-term loans to finance exports the Bank of England also offered refinancing on favorable terms. The Bank's credit control requests also indicated categories of credit that were to be discriminated against such as loans for personal consumption, the financing of imports, and inventory accumulation.

There is both quantitative and qualitative evidence on the effects and effectiveness of British credit controls. In an unpublished doctoral dissertation, Alan Pankratz employed econometric techniques to study the effectiveness of quantitative loan ceilings in the United Kingdom and concluded:

Empirical results indicate that from 49 to 57 per cent of the excess supply of loans [i.e. demand for credit] arising during any given quarter because of a loan ceiling is offset within the same quarter by sales of Treasury bills, national savings, and finance house deposits, and through the issuance of new equities and debentures. This overall strong response appears without considering trade credit, which may be an important channel of offset. . . .

. . . If ceilings are able to force any cutback in expenditures over the short run, the persons or firms affected are probably those who are quite unsophisticated in financial affairs and those who are relatively small and weak such that they have limited cushions of liquid assets and have no access to the capital issues market.⁴

Pankratz also noted “. . . a strong response by firms to loan ceilings in the form of increased issues of equities and debentures. . .” and that “The empirical results of this study suggest. . . that loan ceilings in the United Kingdom have had the effect of making the rate of growth of the money stock somewhat smaller than it would otherwise have been [i.e. *given* the authorities’ interest rate policy].”⁵

In an unpublished paper presented at the Konstanz Monetary Seminar in June 1972, Marcus Miller presented econometric results which led him to a related but not identical conclusion. Miller found that credit controls had a pronounced effect in increasing the cost of capital in the United Kingdom as measured by an earnings/price-ratio variable for equities. The cost of capital, of course, may be regarded as a key variable in determining the volume of private investment and thus the level of aggregate demand. Miller’s results also indicate that credit controls can be used to increase the cost of capital *relative* to the yield on long-term government bonds *given* the rate of increase in the money supply.⁶ This is similar to Pankratz’s observation that credit controls may have reduced the rate of growth in the money supply given the authorities’ interest-rate policy. Thus both authors find some support for the authorities’ view that quantitative controls on bank lending exerted a contractionary pressure on the economy accompanied by a smaller increase in yields on government long-term debt than would have been possible with full reliance on interest rates to ration credit. To this extent credit controls in Britain performed the task the authorities intended.

In drawing lessons from the British experience, however, other aspects must be considered. Throughout most of the 1960s the British monetary authorities paid little or no attention to growth in the money supply, relying instead on the controls over interest rates

⁴Alan E. Pankratz, “Quantitative Loan Ceilings in the United Kingdom: A Theoretical and Empirical Analysis,” Unpublished doctoral thesis, University of Illinois, 1971.

⁵*Ibid*, p. 95.

⁶Marcus H. Miller, “Aspects of Monetary Policy in the U.K., 1954-65,” An unpublished paper presented at the Konstanz Seminar on Monetary Theory and Monetary Policy, June 28-30, 1972.

and credit flows that have been described above. The rapid expansion in the money supply that occurred (an average annual compound growth rate of 5.46 percent compared to a 2.72 percent rate of growth in real gross national product) must bear a substantial share of the responsibility for the record of persistent domestic inflation and frequent balance-of-payments crises culminating in the devaluation of the pound in 1967. British experience clearly demonstrates the folly of trying to stem the inflationary effects of too rapid an expansion in the money supply by relying on credit controls selectively applied to financial institutions and markets composing only part of a sophisticated financial system.

The longer credit controls remained in use in the United Kingdom, the more did uncontrolled channels of financial intermediation expand at the expense of controlled channels. Accepting houses, foreign and overseas banks grew in importance relative to clearing banks. Clearing banks organized finance-house subsidiaries to compete at higher interest rates for longer maturity deposits than were sanctioned under their cartel understandings. The markets for inter-bank deposits, sterling certificates of deposit, and local authorities' deposits expanded to challenge the controlled, traditional money market whose focus was on call money, commercial bills, and Treasury bills dealt in by clearing banks, discount houses, and the Bank of England. The scope of credit controls had to be steadily broadened in the authorities' race to keep up with flows of credit seeking ways around the controls. It is important to recall that a comprehensive and rigorous system of foreign exchange controls was available to protect the authorities' foreign flank in their efforts at credit control throughout this entire period.

In September 1971 following some months of study and discussion the authorities abandoned their efforts at nonprice rationing of credit. The Credit Reform of 1971 abrogated the understandings among clearing banks, discount houses, and the Bank of England by means of which the network of controlled, short-term interest rates had been administered. The reform revoked the quantitative ceilings on bank loans. The Bank of England had already ceased (in the spring of 1971) its relatively inflexible support of gilt-edged prices. No liquidation crisis occurred in the gilt-edge market.⁷ In general the

⁷A study by Michael Hamburger entitled "Expectations, long-term interest rates and monetary policy in the United Kingdom" published in the Bank of England's *Quarterly Bulletin* for September 1971 has this closing statement: "Finally, the evidence suggests that in moving to greater flexibility in their policy on interest rates, the authorities have accomplished their objective of allowing market forces to be more fully reflected in the prices of gilt-edged securities. There is no indication, however, that this has impaired the functioning of the market in any way." (p. 365).

reform marked a return by the authorities to more market-oriented techniques and somewhat greater regard for the money supply as an important variable. A succinct statement of the considerations that led the authorities to turn from quantitative rationing to more reliance on market processes in the sphere of monetary policy is contained in these words from a speech by the Governor of the Bank of England:

... We must beware of believing that if we do succeed in restraining bank lending we have necessarily and to the same extent been operating a restrictive credit policy. We may by our very actions stimulate the provision of credit through non-bank channels; we may introduce distortions into the financial system; and we may indeed be distorting in harmful ways the deployment of the real resources of our country.⁸

France: Thus far in our consideration of European experience we have been moving along a spectrum from very little reliance on credit controls toward more ambitious use of credit controls. With France we now come to the first of three countries, namely France, Italy, and Belgium, where methods to control and to allocate credit in the service of national economic objectives are fully accepted as desirable and where the authorities have been granted substantial explicit powers to this end.

The French system of credit control received its initial impetus and legislative authorization at the end of the Second World War. In December 1945 major new legislation nationalized the Banque de France and the four principal branch systems of deposit banks and established the National Credit Council to serve as the focal point for formulation of national credit policy. The Minister of Economics and Finance is the president of the Council but normally delegates his powers to the Governor of the Banque de France, the ex-officio vice president. In short-term credit affairs the line of policy implementation runs from the Council through the Banque de France and Banking Control Commission and then via respective professional associations to the banks and other credit institutions. The Council also advises the Ministry of Economics and Finance on subsidies, tax privileges, and other important budgetary measures to influence the distribution of medium- and long-term credit in the economy. Thus, there is formal legislative and institutional provision for official efforts to influence the volume, distribution, and terms of availability of credit in the French economy.

⁸“Key issues in monetary and credit policy: text of an address by the Governor to the International Banking Conference in Munich on 28th May 1971,” published in Bank of England, *Quarterly Bulletin*, June 1971.

The broad aims of credit policy in France have been to contribute to the modernization of the French economy and its ability to compete in international markets. Credit policy has sought to stimulate investment in industry, agriculture, and energy industries, transportation, and housing by means of favorable credit terms, subsidies, tax privileges, and greater availability during episodes of quantitative rationing of credit. For many years interest rates throughout the entire maturity structure were kept below market equilibrium levels to encourage investment and to aid the cost competitiveness of French exports. Interest rates were prevented from rising by administrative regulation of lending and deposit rates for banks and other credit institutions, by controlling issue and redemption terms on government securities, by control over new issues of fixed interest securities in the capital market, by stipulating minimum asset reserve requirements for banks in the form of Treasury bills and notes, and, ultimately, by an expansion of central bank credit via privileged rediscounting facilities or to cover Treasury deficits.

To influence the volume and allocation of credit, the Banque de France has used various methods. Banks have been required to observe minimum reserve requirements in the form of specified earning assets. These have included the "Treasury floor" (*plancher*) in effect from 1948 to 1967, the bank "liquidity coefficient" (*coefficient de trésorerie*) in use from 1961 to 1967, and the "coefficient of retention" introduced in 1967 and still in effect in 1973. The Treasury floor required banks to maintain minimum holdings of Treasury securities; the liquidity coefficient — of cash and rediscountable medium-term loans; and the coefficient of retention — also of rediscountable medium-term loans. These asset reserve requirements had the dual purpose of adding to bank portfolio demand for the specified assets and of preventing the banks from using these eligible assets for rediscounting at the central bank.

A second technique of credit control, that of quantitative ceilings on bank-credit expansion, has been employed by the Banque de France on three occasions: in 1958-59, in 1963-65 and in 1968-70. During these episodes certain priority categories of loans have sometimes been exempt from inclusion within the general ceilings or permitted more rapid rates of expansion. These have included short-term export credits, medium-term loans for construction and for investment in industrial and agricultural equipment, loans for stockpiling cereals, and loans eligible for the mortgage market. The ceilings were applicable to commercial banks, business banks, banks for long-term investment, people's banks, agricultural credit banks, and mutual credit banks. Penalties in the forms of reductions in redis-

count lines at the central bank and of non-interest bearing deposits at the central bank were assessed on banks whose loan expansion was excessive.

One other form of credit control used by the Banque de France has been the scrutiny of individual credits made by banks. The Banque de France reviews directly, before they are granted, individual credits whose eligibility for subsequent rediscount the lending bank wishes to establish. This review provides an opportunity for the central bank to disapprove credits that are not consistent with its current policies. Commercial banks normally do not conclude credits that have been disapproved by the Banque de France. Moreover, until June, 1969, the prior approval of the Banque de France was required on *any* bank credit extended to a firm that brought the total amount of bank credit to that firm above the level of F10 million. This amount has now been increased to F25 million and the requirement altered to *ex post* reporting. But the lending bank may still be called upon to justify the credit. Banks are also required to report monthly to the central bank's Service Central des Risques credits outstanding to a firm or individual in excess of F100,000. This census is helpful to the National Credit Council in observing the responsiveness of credit flows to national policy objectives. Some 85 percent of bank credit currently is covered by reporting.

In 1971 the Banque de France introduced a new minimum obligatory reserve requirement that is calculated as a percentage of prescribed categories of bank credit. To date there has been no departure from the uniform application of this requirement to the categories covered. Thus its use has been as a general instrument of monetary policy rather than as a selective credit control.

The various measures just described have exerted their primary influence in the sphere of bank credit, predominantly short- and medium-term. Other arrangements, supervised by the Ministry of Economics and Finance and other economic ministries, are intended to direct the flow of savings in the economy and to stimulate priority areas of medium- and long-term investment. These measures have included government control over the flow of savings through non-bank financial intermediaries and investment funds, preferential tax treatment of interest earned on Treasury bills and notes, and priority access to the capital market for new issues of government bonds and those of public and semipublic investment funds and nationalized industries. All savings deposits in public and mutual savings banks must be redeposited in the Caisse des Dépôts et Consignations. The investment policies of this fund are determined by the government.

They emphasize loans to municipal authorities, loans for construction of housing, mortgages, and loans to or purchase of bonds issued by other specialized state funds that grant long-term loans for industry, commerce, construction, and the professions. Deposits with the postal checking system are redeposited with the Treasury. The Treasury also makes loans and grants from a Fund for Economic and Social Development whose resources are derived from tax receipts and from bond issues. These various channels, which enjoy administrative sheltering from competitive forces in credit and financial markets, are sometimes referred to collectively as the "Treasury circuit". In addition, the Board of the Fund for Economic and Social Development must approve annually the investment program for nationalized industry, especially important in the fields of energy and transportation.

The Ministry of Economics and Finance has the authority to regulate new issues on the capital market. At present such supervision is relatively relaxed. Until the late 1960s, however, capital market controls were actively used to influence timing and rates on new issues with priority ranking being given to public and semipublic issues.

Official intervention in French domestic credit and financial markets has been accompanied throughout the years since 1945 (with the exception of an interval in 1966-68) by substantial exchange controls on capital movements and since late 1971 by the operation of a dual foreign exchange market. Such controls represent a logical complement to the domestic ones.

Quantitative studies of the effectiveness of French credit controls are not available. This is especially true for efforts to allocate credit into priority uses. Statistics on credit expansion and even on credit granted in specific categories do not answer the question of the extent to which patterns observed *ex post* can be assigned to the effects of controls.

More impressionistic evidence is available in the form of official discussions and reports and the record of recent policy decisions. The current trend in France is toward greater reliance on price rationing and market mechanisms in implementing domestic monetary and credit policies. Quantitative ceilings for bank credit expansion were suspended in 1970.⁹ Prior to their suspension in 1970 official

⁹The French authorities restored quantitative ceilings on bank credits in December 1972 as part of a comprehensive set of measures to restrain inflation. These ceilings remain in force in late 1973.

commentary noted the usual deleterious effects of ceilings on competition, innovation, and efficiency in banking and related credit industries as well as successful evasion by larger borrowers. The credit ceilings were thought to have contributed to slowing the rate of growth in the money supply. But the quantitative significance of ceilings in influencing the rate of growth of the money supply compared to loss of foreign exchange reserves, a reduced deficit in the central government's budget, and some shift in household asset preferences toward savings accounts has not been established.

Traditionally in France the principal channel for the extension of central bank credit to the banking system has been rediscounting. For years the Banque de France sought to influence the cost and allocation of bank credit by offering to rediscount certain types of bills and loans at low interest rates and in excess of established ceilings on rediscount credit. Examples of instruments eligible for this special privilege included Treasury bills, export credit, and medium-term equipment loans to industry. There is no quantitative evidence concerning the effect of these measures on the allocation of bank credit. But the privileged rediscount categories undeniably weakened the central bank's control over growth in the money supply and contributed to inflationary pressures in the French economy. This rediscounting practice, as well as the existence of the sheltered "Treasury circuit", was vigorously criticized in a special official study published in 1969, one of whose authors is the present Governor of the Banque de France.¹⁰ Recently the Banque de France has suspended the privileged rediscounting categories and is supplying credit primarily through its purchase of eligible bills in the money market at a uniform but flexible effective rate of interest. The previously sheltered Treasury circuit also has been partially opened to forces of market competition by such measures as permitting deposit banks to compete more vigorously for savings accounts, eliminating the difference between tax treatment of interest income from Treasury bills and notes and savings deposits, and allowing the Caisse des Dépôts et Consignations greater discretion to invest in a wider range of assets in response to market opportunities.

French official efforts to control the volume of credit and to allocate it to priority uses have been based on explicit legal power implemented by an extensive administrative apparatus. Yet measures to allocate bank credit have had ambiguous results accompanied by

¹⁰R. Marjolin, J. Sadrin, and O. Wormser, *Rapport Demande, par Decision en Date du 6 Decembre 1968*.

undesirable side-effects on competition, efficiency, and control of the money supply. Efforts to direct the flow of longer-term investment funds through government controlled financial intermediaries, control over new issues in the capital market, and various public and semipublic investment funds may have been more successful. Recent developments in both areas reveal a trend toward greater reliance on market forces and price rationing to regulate the volume of credit and its allocation.

Italy: In Italy national legislation confers extensive powers of control in monetary and credit matters on the Interministerial Committee for Credit and Savings. This Committee is under the chairmanship of the Minister of the Treasury. Other ministers are members of the Committee. The Banca d'Italia is the Committee's executive agent; the governor of the Banca d'Italia participates in the Committee's meetings. Under authority derived from the Committee the Banca d'Italia can prescribe deposit and lending rates for banks, specify a wide variety of balance-sheet ratios, regulate commissions and service charges set by banks, impose rules regarding the allocation of bank credit to various economic sectors, and fix quantitative limits on bank loans of various types or on total bank loans. The Banca d'Italia also regulates all new issues in the capital market that are listed on any of the Italian stock exchanges or issued through any of the banking and credit institutions subject to the central bank's supervision. These provisions guarantee the central bank virtually complete control of access to the capital market. Under supervision of the Ministry of Foreign Trade the Italian Exchange Office exercises comprehensive powers of foreign-exchange control. The primary limits to these powers of foreign-exchange control have been set by Italian participation in international agreements (such as Bretton Woods, the European Economic Community, and OECD) rather than by domestic legislation. The Banca d'Italia acts for the Italian Exchange Office on the operating level. Thus, on the operational level the Banca d'Italia has comprehensive powers and responsibilities in the realm of credit control and allocation.

Despite these extensive formal powers the Italian authorities have not imposed direct quantitative controls on overall volume or on specific categories of bank credit. But they have been much concerned with the flow of business and household savings through the banking system and the money and capital markets into investment categories assigned a high national priority. Priority categories have included government borrowing, the energy and transportation

industries, municipal construction, and productive investment in agriculture and industry, especially in economically underdeveloped regions of southern Italy.

Throughout most of the 1960s the authorities pursued a low interest-rate policy in short-term credit markets by keeping the central bank's rediscount rate at 3.50-3.75 percent, supporting the Treasury bill rate at approximately that same level, sanctioning the banking cartel's Interbank Agreement that set guidelines for interest rates on bank deposits and loans, and imposing a ceiling on the interest rate banks could pay for interbank deposits. In addition to keeping down the general level of interest rates this policy in short-term credit markets was intended to encourage savers to invest in longer-term securities at higher yields than those available on bank deposits and Treasury bills.

Other measures to channel savings into the controlled capital market also were employed. The desire of commercial, savings and cooperative banks to invest in government, mortgage, agricultural, and highway bonds was stimulated by making these eligible to fulfill minimum obligatory reserve requirements for time and savings deposits, requirements that would otherwise have been met by holding deposits at lower interest return at the central bank. During the years 1966-69 the central bank pegged long-term bond prices so as to stabilize yields and thus make these bonds more attractive to the investing public. The pegging policy was suspended when inflationary pressures at home and high interest rates abroad combined to produce a growing deficit in the Italian balance of payments.

In the Italian financial system a major role in directing the flow of credit is played by nonbank financial intermediaries whose investment policies are subject to official control. Over 15,000 branches of the post office offer savings account services to individuals. Savings deposited in these accounts are turned over to an agency of the Treasury known as the Fund for Deposits and Loans and used to make medium- and long-term loans in accordance with public priorities. More important are the "special credit institutions" that specialize in medium- and long-term lending. They are active in industrial, real estate, and agricultural credit, in financing of exports, and as channels through which state funds are funneled to priority borrowers via loans and interest-rate subsidies. The principal source of funds lent out by the special credit institutions is bonds issued in the capital market. A recent article by two Italian economists on direct credit controls as a monetary policy tool emphasizes the degree of official control over the special credit institutions:

In Italy, three major sources of finance exist as alternatives to bank credit: loans by the so-called "special credit institutions", direct recourse to capital markets, and borrowing abroad. Special credit institutions raise funds essentially through bond issues. Since these issues must be authorized by the authorities, the expansion of the special credit institutions' intermediation can be controlled by limiting the issues. The monetary authorities can also control the two other sources of non-bank financing.

... We may add that a large proportion of loans granted by the Special Credit Institutions takes the form of subsidized credit. The determination of the supply conditions of this kind of credit is an additional instrument of official economic policy. The Government can, in fact, decide not only the level of subsidized rates, but also the categories of firms, the sectors of economic activity, and the geographical areas eligible for subsidized credit. This discretionary power can be used to implement a selective control of credit.¹¹

Favorable treatment of preferred borrowers in the capital market by the methods just described is complemented by tax measures. Since the Treasury, nationalized industries, and special credit institutions borrow in the bond market rather than in the stock market, investors' enthusiasm for the stock market is deliberately dampened by the imposition of a 15 percent withholding tax on stock dividends. In the bond market private borrowers must pay a 38 percent tax on interest paid to bondholders. Public borrowers are exempt from this tax.

Thus, the philosophy of the Italian authorities is to apply direct credit controls primarily to the allocation of medium- and longer-term investment funds rather than to bank credit. Mr. Carli, Governor of the Banca d'Italia has expressed his reservations concerning selective control of *bank credit* as follows:

Even if it were possible to introduce more selectivity into bank credit, it is hard to see how to avoid arbitrariness, given the complexity and variety of the sector of medium-sized and small enterprise which relies upon bank credit and given, above all, the great number of medium-sized and small banks operating in geographically restricted areas. If these latter were asked to implement directives implying choices of high-priority sectors, they would be all but paralyzed in

¹¹F. Cotula and T. Padoa-Schioppa, "Direct Credit Controls as a Monetary Policy Tool," Banca Nazionale del Lavoro, *Quarterly Review*, No. 98, September 1971, pp. 207-208, text and footnote 8.

practice, or else they would be forced into a concentration of risks incompatible with efficient safeguards for the class of depositors to whom they cater.

For all these reasons I believe that, in the conduct of modern government, qualitative control of bank credit is a tool to be kept in reserve and to be applied with moderation in special conditions rather than as a regular component of credit policy. In certain cyclical phases one kind of credit may indeed have to be curbed in favor of others and, in exercising its overall powers of control and direction, the central bank has from time to time done so and may do so again. But we have only to look at the most recent developments to see that cyclical situations can change very quickly, and for this reason we must be watchful and flexible in anything we do to direct the flows of credit. Moreover, intervention of this kind is apt to have so many general and specific effects of opposite sign and unmeasurable magnitude, that it would seem safer for the monetary authorities not to assume direct responsibility for the innumerable adjustments required by cyclical developments, but to leave these adjustments to the market processes, within the general conditions created by control of the volume of liquidity.¹²

Thus, the Italian authorities have been granted comprehensive legal powers to control the volume and allocation of credit. But they have chosen to concentrate their efforts on the capital market rather than on bank credit. Their attempts to influence flows of medium- and long-term credit take place in the context of extensive powers to regulate both the capital market and capital flows between Italy and foreign countries. The money market is narrowly restricted and heavily controlled. Public and publicly controlled financial intermediaries dominate the institutional channels for medium- and long-term credit. Italian experience and philosophy offer little encouragement for those who seek support for applying credit controls solely to the banking sector.¹³

¹²Banca d'Italia, *Abridged Version of the Report for 1963*, p. 134.

¹³In a departure from former practice on July 26, 1973 the Italian Treasury announced the establishment of ceilings to limit the expansion of ordinary bank credit. A limit of 12 percent has been set for the annual rate of expansion in overall bank credit in the period up to March 31, 1974.

This 12 percent limit applies also to bank credit for certain borrowers: individual firms whose borrowings on March 31, 1973 exceeded 500 million lire as well as to all finance companies, private borrowers and commercial enterprises. Other firms may borrow freely up to the 500 million lire limit.

Belgium: In Belgium the role of governmental policy in directing flows of medium- and longer-term credit into priority investment categories is firmly established. The principal instrumentalities used by the government to channel investment funds are control over the resources of the state savings bank network and the Postal Check Office, capital market controls to govern access of borrowers to the long-term bond market, and the lending activities of official investment funds that are given priority access to the capital market and in turn make loans on attractive terms for investments assigned a high national priority. Market rates of interest are strongly influenced by the policies of two official agencies: the Securities Stabilization Fund, active in stabilizing the yield on government securities throughout the maturity spectrum, and the Rediscount and Guarantee Institute, whose operations are confined to the call money and acceptance portions of the short term money market.

Ceilings have been applied to bank credit in Belgium on three occasions: January 1964 to July 1965, April 1966 to June 1967, and May 1969 to October 1971. Ceilings are assigned to individual banks. The main purpose of these ceilings has been to check the general expansion of bank credit as a counter-inflationary measure. The Banque Nationale de Belgique customarily has accompanied the imposition of credit ceilings with recommendations concerning lending categories to be favored (for example, productive investment in industry and agriculture, export industries, and the financing of foreign trade) and those to be squeezed (typically loans related to consumption). Ceilings on bank credit have been paralleled by lending limits applied to savings banks, official nonbank financial intermediaries (for example, the specialized official investment funds) and insurance companies. These limits have been imposed by appropriate ministries or regulatory authorities in consultation with the Banque Nationale de Belgique.

Deposit and lending rates of banks and other credit institutions are no longer tied to the central bank discount rate as they once were. But they continue to be strongly dependent upon price leadership and official suggestion by the authorities. In 1971 a Consultation Committee for Creditor Interest Rates was established.

This committee was to devise a consultation procedure for fixing the rates allowed to suppliers of funds by each of the bodies belonging to the three categories of financial intermediaries concerned [i.e. banks, private savings banks, and public credit institutions]. The conclusions of this committee were to be binding. The Bank agreed in principle to use its power as a monetary authority to impose these quasi-statutory measures, which were preferred to the rules of the market economy.¹⁴

¹⁴National Bank of Belgium, *Report*, 1972 p. XXII.

The Bank's influence over interest rates charged and paid by credit institutions can be used to prevent lending rates from rising when credit ceilings ration loan volume. Thus, the central bank can set maxima to both price and quantity of bank loans. This control helps to separate domestic Belgian credit markets from their foreign counterparts.

The effectiveness of restrictive policies applied to banks and other short-term lenders is increased by the domination of the authorities in the money and capital markets and by exchange controls and the dual foreign exchange market. Nonbank firms and individuals are barred from participation in the money market. The Rediscount and Guarantee Institute and the Securities Stabilization Fund are the sole intermediaries in the money market. The Securities Stabilization Fund's operations dominate the market in outstanding government and government-guaranteed securities, including those of the local authorities. The Ministry of Finance and the Banking Control Commission control access of public and private borrowers to the market for medium- and long-term bonds. Public borrowers have priority access at low and stable interest rates in both the money and capital markets. Therefore, borrowers disadvantaged by rationing in bank credit markets cannot successfully by-pass the system of controls by turning to the money or capital markets. Finally, operation of a dual market for foreign exchange with a floating rate for all but a specified list of current account transactions helps to shelter domestic money and capital markets from capital flows through the balance of payments and thus increases the effectiveness of domestic monetary and credit measures.

Belgian authorities have designed a system that appears capable of exerting an important influence on the allocation of investment funds in the economy. The principal ingredients of this system are the high degree of official control over open market channels of financial intermediation, policy control over new issues in the capital market, the role of specialized public financial intermediaries in channeling capital market funds to high priority investment projects, and the shelter provided to domestic credit policy by the dual exchange market. Although quantitative ceilings have been applied to short-term credit supplied by banks and other institutions, the primary intent of these ceilings has been to support general monetary policy rather than to allocate credit.

III

This survey of experience with credit controls in six European countries provides some insights that can aid in evaluating the desirability of greater reliance on credit controls in the United States.

An aspect of primary importance in determining the effects of credit controls is the complexity and flexibility of financial institutions and markets in relation to the breadth of coverage of control measures adopted by the authorities. In general, the structure of commercial banking is far more concentrated in all the European countries studied than in the United States. Moreover, in Europe commercial banks are relatively more important as channels of financial intermediation compared to other institutions and markets. With the exception of the United Kingdom (and to a much lesser extent the Netherlands) money markets are narrow, often limited to interbank transactions, and frequently dominated by the central bank (as in France, Germany, and Italy) or by other official agencies (as in Belgium). In France, Italy and Belgium, public or semipublic financial intermediaries whose investment policies are under public control are the key channels through which medium- and long-term credit flows from savers to investors. Also, in these three countries official control over access to the capital market has been used to channel investment capital to priority uses, either directly or via specialized credit institutions or investment funds. With the exception of Germany the countries studied all operate exchange controls or dual exchange markets to regulate capital flows between domestic markets and their foreign counterparts. To look at credit controls over banks without consideration of the broader context of controls involving these other areas can be very misleading.

Credit controls applied to commercial banks alone have generally not been effective and have had to be extended. In general when the scope of credit controls is limited to one or a few types of institutions in a relatively complex financial system, the controlled institutions have suffered an erosion of competitive position which has increased with the duration of the controls.

The use of quantitative ceilings on bank loans in France, Belgium and the Netherlands appears to have been motivated more by a desire to check domestic economic expansion without raising domestic interest rates and thus attracting short-term capital from abroad than by a desire to alter the incidence of credit restraints. Concern to reduce incentives for an inflow of short-term capital may have contributed also to the German experiment with controls on interest

rates in 1965-66. In France, Belgium and the Netherlands the authorities held down interest rates on bank deposits and credits through formal or informal understandings with the banks while simultaneously setting quantitative limits to the expansion of bank credit. Short-term borrowing abroad by banks and business firms also was controlled. Even so, leakages in the system permitted significant amounts of funds to enter from abroad.

The British authorities employed credit ceilings in an effort to reduce aggregate demand in the face of domestic inflation and deficits of crisis proportions in the balance of payments. Their resort to credit ceilings was motivated by two principal considerations. First, they wished to reduce private sector demand by means other than a rise in interest rates which they feared might threaten the stability of the market for long-term government debt. Second, their theoretical views emphasized the importance of bank credit rather than the money supply as a key variable for aggregate demand management. In retrospect both of these views appear to have been mistaken.

Credit controls cannot replace and may undermine controls over the money supply or comparable monetary aggregate. In the United Kingdom concentration on credit controls led to neglect of the money supply for many years, a neglect that contributed to continuing inflation, balance-of-payments deficits, and recurrent crises of confidence in sterling. In France use of privileged rediscounting facilities for certain types of commercial bank bills and loans and for Treasury bills provided an escape from the central bank's other efforts to reduce the rate of growth in the money supply and contributed to continuing inflation. In Italy the pegging of the yield on long-term government bonds in the years 1966-69 to make them more attractive to investors resulted in loss of control over the money supply with growing inflationary results and accompanying capital outflow. These are examples of credit controls taking precedence over measures to control monetary aggregates with unfortunate results.

In those countries where serious and sustained efforts have been made to allocate credit by means of the financial system (as distinct from the budgetary system) the authorities have concentrated on the allocation of medium- and long-term investment capital rather than on bank credit. Moreover, in pursuit of their allocative objectives their principal reliance has been on heavily controlled money markets, a dominant role for public or semipublic financial intermediaries and investment funds, and control over new issues in the capital market. Also, in all the countries surveyed except Germany,

central government authorities have a determining voice in the amount of borrowing that local governments are permitted to undertake. Budget grants and interest subsidies often are combined with these other measures to encourage preferred categories of real investment. These structural features of the financial system and these controls applied to money and capital markets have been intended primarily to direct the secular growth of the national capital stock rather than to alter the pattern of credit allocation determined by the market during a cyclical episode of monetary and credit restraint.

A preoccupation among advocates of credit controls in the United States has been the ability of the business sector to obtain credit during a squeeze while the household and government sectors were rationed or priced out of the market. For example, a recent article by one member of the Board of Governors of the Federal Reserve System states: "One of the main objectives of monetary policy in 1969 and early 1970 was the restriction of bank lending to business."¹⁵ European experience offers but faint encouragement to those who seek this goal by means of credit controls on banks and other lending institutions. Consumer credit rather than business credit has been the favorite target of the European authorities during periods of credit restraint. All the countries surveyed regulate consumer instalment loans by specifying minimum down payments and maximum maturities. In addition the authorities often request credit institutions to exercise special restraint in the sphere of personal and other consumption-oriented loans. Official requests also may exempt certain categories of credit from ceilings or express the wish that they be favored within the ceilings. Credits for "productive investment", for exports, and for construction of housing are those favored most frequently. The allocative effects of these hortatory guidelines are uncertain when they conflict with criteria of profitability and customer relationships. Big business is as much a favored customer of banks and credit markets in Europe as it is in the United States.

The recent trend in western Europe is away from credit controls and toward greater emphasis on control of monetary aggregates combined with reliance on market processes to allocate credit. Evidence of this trend is the Credit Reform of 1971 in the United Kingdom, suspension of privileged rediscount categories at the central bank and partial opening to market forces of the closed

¹⁵ Andrew F. Brimmer, "Multi-National Banks and the Management of Monetary Policy in the United States," *The Journal of Finance*, May, 1973, p. 443.

Treasury circuit in France, and the earlier abandonment of controls on interest rates in Germany. In Belgium, Italy, and the Netherlands the authorities traditionally have not sought to influence the allocation of short-term credit in any systematic manner. In Italy and Belgium the authorities continue to exert an important influence on the allocation of medium- and long-term credit. For this purpose they employ the investment policies of public and semipublic financial intermediaries, control over new issues in the capital market, and various tax and subsidy measures of the central government's budget.

European experience suggests that selective controls to influence credit allocation in the United States are unlikely to succeed in view of the low degree of concentration in commercial banking, the variety of alternative institutional lenders, the openness of the money market, the absence of key public and semipublic financial intermediaries, the lack of control over new issues in the capital market, and the limited nature of controls over international capital movements. Moreover, European experience also provides ample evidence of the negative aspects of credit controls in the form of distortion of financial organization produced by efforts at evasion, reduced competition and efficiency in financial institutions and markets, and diversion of the authorities' attention from the macroeconomic task of regulating growth in the money supply. Superficial impressions to the contrary, European experience offers more cautions than encouragement to the application of credit controls in the United States.

Discussion

JACQUES H. DAVID*

Donald Hodgman gives us a very clear description of the different techniques of credit allocation used in six European countries during the last decade. I do not find it useful to add any detail to the Hodgman analysis of the French system, because all the main features of it were very clearly mentioned. But his survey of experience with credit controls in six European countries leads me to some remarks upon three general problems with credit controls: the results expected from the implementation of a selective credit policy, the nature of the instruments for such an implementation, and the role of credit selectivity in the attainment of the objectives corresponding to the so-called public interest.

I would like to develop these three points, using French experience to illustrate them.

I. WHAT IS EXPECTED FROM A SELECTIVE CREDIT POLICY?

A. *Differences of Conceptions Between Post-War and Recent Selective Policies (Last 15 years)*

As it is already well known, French financial structures were deeply marked by the situation of scarcity which characterized the post-war years and justified at that time the setting up of precise priority and discriminatory plans for granting credit. The problem then was to avoid using the bulk of available credit for financing "superfluous economic activities (those which do not satisfy essential consumption or indispensable equipment)" or "business activity which has self-financing possibilities (profit margins large enough to enable self-financing, companies able to collect savings to avoid the grasp of the market of the banking system)".¹

*Chief, Econometric Research Department, Banque de France

The opinions put forward in this note are the author's responsibility only and may not reflect the French authorities' views.

¹Banque de France Note — Direction Generale du Credit Nov. 30th 1948.

Thus the various sectors of activity were classified into several categories referred to as A, B, C, D, E according to the credit priorities given to each of them.

For example, the A category related to those branches in which industrial and commercial activity had by any means to be expanded or held above a minimum, and which could be granted credit without limitations. In the A category one could find mainly semi-finished products and essential foodstuffs. At the other end of the list, the E category included the trade sectors for the sale to consumers of non-food products such as perfume and furs and any credit to this sector was to be progressively suppressed.

Such ultra-selective policy, adopted in a situation of economic reconstruction when the aims of overall economic policy were clearly and simply defined and in the context of a public opinion prepared to accept the controls necessary to its implementation, undoubtedly contributed to the drastic recovery of the French economy in the early post-war years.

In the experiences of constrictory monetary policy which followed (notably in 1958-1959, 1963-1964 and 1969-1970), the overall economic situation was no longer the same: there no longer existed in France the state of scarcity which, just after the war, has justified priorities and discrimination in granting credit, when the broad objective of monetary policy had been to limit the overall expansion of liquidity in order to prevent demand from becoming excessive and thus to slow inflation. Besides, the selective policy applied in France before 1958 had led the authorities to conclude that a credit policy necessarily had to be global. This is reflected in a note issued by the Banque de France, dated June 4th 1958, which stated that: "The selective derogations granted over the rediscount ceilings in favour of medium-term industrial credits and loans for housing purposes have undoubtedly made it possible to launch programs which would normally have had to be postponed until sufficient savings had been gathered; however they have as well offset the impact on the money supply of rediscount restrictions and, by stimulating demand, hindered the development of new savings which would have provided a sound basis for financing equipment and housing. If this be so, then it must follow that any priority to a branch of activity or a firm must be *ipso facto* accompanied by a refusal given to another branch or firm".

B. The Aims of Selective Policy Since 1958

Such remarks did not infer that selectivity in the allocation of bank credit was useless; they simply meant that the results expected from such a policy could only be different in 1958 and in 1969 from those pertaining to an epoch when there was no problem of overall restriction.

In 1958, in a letter sent on February 7th to the banks, the Governor of the Banque de France defined those expected results in broad terms. Indeed, after setting an upper limit to the expansion of all kinds of bank credit which could be broken "provided that such infringement resulted in granting additional or further loans for the financing of foreign trade claims or the prefinancing of exports", the Governor went on: "The banks shall discriminate between the demands of credit so as to be able to go on providing those customers who achieve better results in the export and productivity fields. Such choice shall duly take into account the role played in the economy by commercial and industrial borrowers, whatever scope they have. This choice shall particularly bear upon medium-term credit demand. I request you to urge the banks to inform their customers of the credit facilities available to them for export purposes".

On July 9th 1958, the Economic and Social Council², in a little more precise terms, recommended a restrictive policy which "should adopt diversified criteria resting upon a really selective concept, particularly so far as medium-term credit is concerned, according to the following principles:

- Fostering the activities which tend to reduce import bill or increase foreign sales;
- Within the framework of the Commissariat au Plan's directives, favouring the companies whose size or specialization forbid any recourse on their part to borrowing on the capital market or which invest in plant and equipment in order to compete favorably with their Common Market partners;
- Restricting loans when they may have a speculative influence and encourage the process of stock-building (beyond the level required by normal supplies);

²Economic and Social Council: Draft note put forward by Mr. Compeyrot in behalf of the Finance, Credit and Tax Committee, July 9, 1958.

—According to the degree of social usefulness, selecting and, if necessary, limiting the volume of funds available for hire-purchase credit.”

It also recommended that “in applying those criteria, the banks should bear in mind the economic and social role locally played by a commercial or industrial potential borrower”.

II. IMPLEMENTATION OF THE SELECTIVE CREDIT POLICY IN A CONTEXT OF GLOBAL LIMITATION OF BANK LENDING

Thus, in the three most recent experiences, the total amount of credit extended by the banking system was rationed, and the essential task of the selective policy was to organize this rationing by granting a preferential treatment to specific sectors. It is possible, a priori, to consider several directions which could act as guidelines for a selective policy. Some of these refer to the different kinds of credit transactions such as — short-medium- and long-term loans, credit for working capital, equipment, storage, exports, etc. Others refer to the main characteristics of the business firms themselves (productivity, etc.). Others, finally, are related to the drawing up of a general economic plan.

a) Differentiating the general terms applied to the various categories of credit — or at least the introduction of some specific regulation — is the most conventional practice in the matter of selective policy.

There have been many differentiations of this kind in France during the period under review. They are essentially:

- a drastic regulation of hire-purchase business (limitation of outstanding loans according to the amount of ownership, time limit for repayment, minimum cash payment);
- a preferential regulation in favor of medium-term equipment or export credits, which were eligible, in spite of the strictness of the rules, for the Central Bank’s rediscount;
- preferential conditions for special housing loans, which are also eligible, under certain conditions, for the Banque de France’s rediscount in spite of the rather strict regulation applied to these loans;
- preferential terms, finally, in favor of export credits:
 - preferential rate and no rediscount ceiling for paper representative of claims on the foreign sector;

- special ceiling for the rediscount of credits extended for refinancing large export contracts.

b) With regard to business management, one must, of course, refrain from extending excessive support to those firms which are a dead weight for the country's economy. But even though there may be a relationship of one to two or three between the respective productivity of various firms in the same sector (as was the case in the French industry in the mid-fifties), it is difficult to suggest or to indicate to banks precise criteria which would enable them to judge a firm's economic productivity. As criteria must be wide enough to ensure a certain uniformity of action, they would necessarily be inadequate because they would not sufficiently take into account particular circumstances in such and such a sector of activity or even in such and such a firm. Moreover, we must note that it is not bankers' business to interfere in managing their customers' firms and that, as a matter of fact, bankers generally do not have competent staff at their disposal to this purpose. Understandably, the recommendations of the monetary authorities in this field have always been put in quite general terms, just advising banks not to back "lame ducks".

c) In spite of the foregoing reservations, we still have good reasons for thinking that, in some cases, a certain selection of the firms may complement the results which would be effected by a global limitation of credit. On the contrary, using bank credit in order to carry out a nation-wide economic plan is a much trickier matter. This plan does not take into account a particular firm, but embraces each industry as a whole. On the one hand, some firms operate in several sectors or at least influence related markets; on the other hand, even in those cases where firms are distinctly related to specific sectors, it may be that the distinction between industries to be fostered and industries to be discriminated against does not fit in with some public interest aims, for example, because of social or local reasons.

So within the framework of a global limitation of the credits extended by banks, the only scheme which would permit fostering a selective credit policy seems to be the one above described in the first place. It is based on a set of incentives related to differences in the treatment by the Central Bank of the various kinds of credits extended by banks. By these incentives, the Central Bank tries to curb the behaviour of the banks in order to promote a selective policy. It may be asked on that score if a global restrictive credit policy really needs any selective incentive, because normally banks

tend to rely on two main criteria for making loans: the profitability of the loan and the customer's solvency. I would like to discuss this point now from the point of view of solvency of firms and public interest.

III. SOLVENCY OF FIRMS RECEIVING BANK CREDITS AND THE PUBLIC INTEREST

In our modern economies credit policy is in fact a global policy. Being individualised, lines of credit are by nature selective. It is therefore a false problem to contrast a "global" credit policy with a "selective" credit policy. This being so, there remains the problem of whether, within a global credit restraint policy, given a certain number of incentives such as those mentioned in the second part of this paper, the structure of bank loans corresponds to the a priori structure consistent with the general interest of economy.

As far as the granting of credits is concerned, decisions are arrived at essentially after taking into consideration the solvency of the firm, and, through it, the presumed credit worthiness of its customers. To take account of a possible lack of customers, the granting of a line of credit can be made dependent on the existence of other guarantees. Credit mergers cannot have any higher criterion on technical grounds than that of solvency. They cannot abandon this criterion and only additionally can they examine whether the operation warranting the opening of credit meets the requirements of the so-called "public interest". Public interest will then be consistent with the interest of banks if, by means of the above-mentioned incentives, some operations considered as particularly advantageous from the point of view of public interest (exports, investments, house-building) are made financially solvent. Other means of improving the solvency of public interest operations can be imagined, for instance, through the granting of budgetary subsidies. Through means of this type, it would be quite possible to enforce a credit policy of global restraint which would simultaneously have selective effects even without adopting any specific selection measures. To this purpose it would be sufficient that the profit and solvency criteria used by banks to allocate credit should simply lead these institutions to make their loans available to some sectors or firms in preference to other sectors or firms, and this result can be achieved indirectly through appropriate fiscal, social and regional policies.

Moreover, it is worth noting that the system of subsidised loans such as practised in France for farm loans extended by the National

Agricultural Bank is a sort of compromise between a selective credit policy in the strict sense and a policy of selective income distribution (since these subsidies are paid out by the Treasury and financed through fiscal and budgetary transfers).

When there are no such fiscal, social or equivalent policies, selective credit policy, such as defined in the first and second parts, may alter the solvency of a credit operation and, somehow, correct the inadequacies in the structure of demand with regard to the so-called public interest. Whether these correctives are efficient is a question we shall try to answer in the light of the precise case of French housing policy from 1958 to 1972.

IV. HOUSING POLICY IN FRANCE: AN EXAMPLE OF SELECTIVE CREDIT POLICY

A. *Structure of Financing for Housing in France in 1958*

A considerable part of house-building financing in France takes the form of loans granted to HLM (low rent housing) and special loans granted by the Mortgage Loan Bank (also used to finance buildings of social character), all these loans being financed on long-term resources.

The part of the banking sector in house-building financing can be defined very roughly as the total housing credits financed or likely to be financed by the Bank of France and banks on which monetary authorities can exert a direct influence. These credits mainly comprise freely rediscountable medium-term loans which were created in 1950, credits qualifying to be refinanced on the mortgage market since 1967, and the non-freely-rediscountable medium and long-term credits which have been growing rapidly, particularly since 1960.

The proportion of these credits to the total of outstanding housing credits³ from 1958 to 1972 is shown below:

CREDITS FOR HOUSING FINANCED BY THE BANKING SECTOR
(percent of total of outstanding credits for housing)

Year	Percent	Year	Percent	Year	Percent	Year	Percent
1958	5.3	1962	8.2	1966	15.5	1970	25.8
1959	5.2	1963	10.2	1967	18.6	1971	28.0
1960	5.9	1964	11.6	1968	22.7	1972	31.8
1961	7.0	1965	13.6	1969	25.5		

³The special credits granted by the Mortgage Loan Bank, of which the medium-term element has a duration of 2½ to 4½ years, are not included. Should special medium-term credits be included, the above mentioned percentages would amount respectively to 9 percent in 1958 and 36 percent in 1972.

These figures indicate that these loans represent a small part in the total housing credit. The bulk of housing finance still consists in lending for low rent housing, special credits by the Mortgage Loan Bank and advances by the Deposit and Consignment Office to its property subsidiary company (outstanding). This part is however rising strongly, having increased from 5.3 percent in 1958 to 31.8 percent in 1972.

B. Regime Applied to Housing Credit Eligible for Bank Portfolios During the Last Three Experiences of Quantitative Credit Restrictions and Now

During the first experience (from July 1957 to February 1959), discountable medium-term housing credits represented the majority of loans of this kind eligible for bank portfolios (90 percent). These credits were subject to quantitative restrictions, as were other rediscountable medium-term and short-term loans; but as they could be discounted over and above ceilings at the Banque de France and, given the fact that the so-called financial institutions ("établissements financiers")⁴ which financed one-third of rediscountable medium-term credits at the end of 1958 were not directly affected by the quantitative restrictions, the amount of such lending has risen strongly.

**CREDITS FOR HOUSING EQUIPMENT AND EXPORTS
ANNUAL INCREASES**

	1957	1958	1959	1960
	Percent			
Rediscountable medium-term credits				
— Construction	+10	+14	+17	+24
— Equipment, export	+28	+20	+ 2	+ 9

During the second experience (from February 1963 to February 1967), quantitative restrictions, though not so tough as the first ones, affected all kinds of credit, including rediscountable medium-term construction loans. But the latter amounted only to two-thirds of housing credits eligible for bank portfolios, because non-rediscountable medium-term and non-eligible long-term loans had grown rather rapidly. Also in this case, "financial institutions" were

⁴They can refinance themselves either by increasing their ownership or by turning to non-banking financial intermediaries, or finally by rediscounting bills at the Banque de France. If they resort to banks, the cost of refinancing is higher as the latter are penalized.

not directly affected by the restrictions, and by the end of 1963 they had extended almost half of the amount of rediscountable medium-term construction credits. For the same reasons, the medium-term construction lending increased strongly.

CREDITS FOR HOUSING EQUIPMENT AND EXPORTS ANNUAL INCREASES					
	1962	1963	1964	1965	1966
	Percent				
Rediscountable medium-term credits					
– Construction	+30	+36	+39	+38	+37
– Equipment, exports	+16	+14	+13	+ 9	+ 6

The third experience extended from mid-November 1968 to October 1970. For the first time, rediscountable construction and equipment credit (medium-term export loans and short-term credits by the National Cereals Office were exempted) and the claims eligible for the mortgage market (which was created at the end of 1966) were initially not subject to the ceilings imposed by the monetary authorities. In June 1969 a special regulation was implemented; it was comparatively loose – the maximum permitted increase amounted to 10 percent in 1969 and 12 percent in 1970 for medium-term equipment and construction credit, and, for the mortgage market⁵ 100 percent in 1969 and 27 percent in 1970. Therefore, only non-rediscountable medium-term loans and non-eligible long-term loans were subject to the general regime.

CREDITS FOR HOUSING, EQUIPMENT, EXPORTS AND OTHER PURPOSES ANNUAL INCREASES					
	1967	1968	1969	1970	
	Percent				
Rediscountable medium-term housing-credits	+18	+ 21	+17	+11	
Mortgage market		+246	+91	+29	
Rediscountable medium-term equipment, export credits	+17	+16	+24	+10	
Total outstanding		18.4	12.8	10.4	

⁵The mortgage market was created in December 1966, which explains the erratic figures concerning this item.

C. Recorded Results

- The amount of bank home loans has increased much more than total bank credit. From 1960 to 1972 such loans rose by 3600 percent, as against 570 percent for the total outstanding. Similarly, total bank home loans increased considerably more than global lending to individuals and firms (630 percent, as against 380 percent).
- Despite restrictive measures the amount of bank home loans has always increased at a good pace except in 1970 and the same holds true for new loans.
- Similarly, credit restrictions led to a slackening property market in 1970 only, with the 1964-1967 crisis accounted for by other factors. In fact the crisis on the property market from 1963 up to 1967 resulted both from a substantial increase in demand due to the inflow of money from French people repatriated from Algeria and some disinvestment in securities. As a result, there was a very strong rise in prices and a fall in solvent demand for the following years. The 1970 crisis lasted just one year; it appears to have been the consequence of credit restrictions though some relaxing measures were taken. Inventories were easily financed through short-term loans to property development industry which usually was subject to common regulations imposing quantitative credit restrictions.

CONCLUSION

After considering a particular example such as that of the housing sector we are entitled to suggest that the selective policy adopted by the French monetary authorities has enabled this sector which is regarded as deserving a priority to develop well. Nevertheless it must be underlined that these positive results were probably achieved only at the price of a too rapid increase in [or, at least, of some lag in curbing the growth of] overall bank lending, as shown by the period from November 1968 to May 1969, during which a flexible and selective scheme of credit ceilings was applied. (Only short-term credit and nondiscountable medium- or long-term loans were restricted, while nondiscountable medium-term credit — about a third of overall bank lending — remained unrestricted). In fact during the first half of 1969 the course of the economy was characterized by a rapid growth of overall bank lending, an increased pressure of demand, an always larger use of productive capacity and a sharp rise

in prices and wages. Moreover, as a result of the subsidized interest-rate policy followed in extending credit for housing, export, equipment and so on, the average credit cost was quite low in France during the whole period reviewed, and this low cost did undoubtedly help the fairly rapid credit expansion, especially at times of restriction, and therefore added to the increase in inflationary pressures. Selective credit policy is, therefore, probably harmful to the expected effectiveness of the global restrictive policy it has been designed to complement. Finally — a point of importance that contemporary economists should remember — monetary policy (in France but also in other European countries) is one of the preferred instruments for the short-term management of an economy. Now, an effective selective policy takes a long time (because of the implied research and controls to be introduced) and, therefore, is very hard to manage in the short term. So there seems to be some contradiction between attempting to make credit policy selective and using it for short-term management of the economy. As this specific use is one of the main characteristics of monetary policy in European countries, the question arises of whether it is not enough to merely run a global credit policy and simultaneously to intervene by such measures as budget appropriations or social benefits and so on in favor of certain industries or classes of people, thereby ameliorating some of the ill effects of the global policy.

Discussion

MARCUS MILLER*

I would like to start with the definition of credit controls. It seems clear from Professor Hodgman's paper that his definition excludes some of the borrower and lender controls discussed earlier at this conference. At the beginning of his paper, credit controls are distinguished both from measures of *budgetary* policy ("taxes and subsidies involving the budget of the central government") and from measures of general *monetary* policy ("open market operations . . . variations in a uniform discount rate charged by the central bank, and a uniform percentage change in the central bank's minimum required cash ratio or in its maximum credit lines"). This would certainly leave under credit controls both "guidelines" on lending for certain institutions and also ceilings on interest rates ("credit controls seek to influence credit allocation and interest rate structure").

Now it can be argued that a rise in the required cash reserve ratios of all those institutions subject to such ratios (with no change for those not so controlled) is analogous to an increased tax on those penalised in this fashion and is therefore a form of lender control. But under Professor Hodgman's definition, as I understand it, a general increase in *existing* ratios would be treated as a part of general monetary policy and not as a form of credit control, despite the tendency for such a measure to drive business away from the intermediaries adversely affected to those left unaffected. Similarly the taxes on particular borrowers discussed by Professor Maisel at this conference would presumably come under budgetary controls as defined above.

Hence I think that Professor Hodgman's paper discusses a *subset* of those credit controls in which the conference is interested, and also that his arguments do not weigh so heavily against credit controls, more widely defined, as they do against those considered in his paper.

*London School of Economics and Bank of England

I will consider the U.K. case in some detail because a number of different forms of credit control were given up in 1971, but subsequent developments have hardly shown that the controls were not working or not worthwhile, and it is now an open question as to whether the U.K. authorities may not revert to some of their earlier practices.

If we look first at the monetary system prior to the reforms of 1971, we find that it was characterised by the stabilisation of long term interest rates, by official control of level of short term interest rates (as required for "external" purposes) and by credit rationing to the extent that the authorities channelled banks' funds into the government sector and away from the private sector by lending controls. Using the earnings-price ratio as a measure of the "cost of capital" to firms, there is some evidence that a reduction in the availability of bank credit — measured crudely by the quantity of bank lending as a per cent of private net worth — raised the cost of capital, *ceteris paribus*. Since the loan market was not cleared by price, the quantity of credit available as well as its price could be expected to influence firms' decisions, and both were to some degree controlled by official policy. Although the "cost of capital" variable appeared sensitive to the availability of credit in the period I studied (in the paper cited by Professor Hodgman), it should be noted that lender controls on banks were often complemented by borrower controls on hire purchase customers, for example. Controls on bank lendings were usually activated in a crisis, so the effects on the earnings-price ratio of the lender control alone are difficult to disentangle.

There were also, throughout the period, variations in the amount of "borrower control" in the form of tax credits to companies. A study of the effects of these fiscal changes, which may nevertheless be considered as part of credit control, has recently been published¹ and provides evidence for the U.K. analogous to that presented to the conference for the U.S. by Professor Waud.

Such in outline were some of the salient features of the system before the reforms of 1971. Despite the lack of competition in the banking sector, the system had its attractions for the authorities as it left them in control of short rates, and limited the ability of the

¹The Estimation of Investment Functions for Manufacturing Industry in the United Kingdom," B.D. Boatwright and J.R. Eaton, *Economia*, Nov. 1972, 39, 403-18.

banks to compete with the Government in selling debt; and the rationing of credit allowed the authorities to switch the resources of the banks to servicing the government's needs, rather than those of the private sector. It would be possible to think of a set of taxes on the banks and subsidies to chosen borrowers which would lead to the same sort of behaviour as was observed for the major U.K. banks, and surely some such market-oriented controls would have been preferable to the *ad hoc* credit guidelines and interest rate agreements which prevailed. Instead of levying taxes on the major banks and disbursing subsidies to selected borrowers, however, the authorities gave over these duties to the banks, allowing them to collect the tax on the intermediation process in the form of extra profits, and disburse the subsidy in the form of cheap loans to preferred customers (e.g. ship builders). So long as the net profits for the banking system were not too large, the authorities were content to delegate such authority to the clearing banks in exchange for those features described above which attracted them. Such was the *modus vivendi* before the introduction of the new system of "Competition and Credit Control" in 1971.

One reason for the change to the new system was that the authorities found from 1965 to 1971 that they were having to rely *continuously* on intervention in the market for bank credit. They recognised, however, that the biggest contractionary effects of such intervention come quickly, diminishing as circumvention increases with the passage of time. But such circumvention could lead to the growth of new channels of finance, which a policy of sustained intervention would also have to check, and so the financial system would become progressively distorted over time. A change of the system seemed a welcome alternative to the prospect of ever-widening circles of control, particularly to the new Conservative government which took office in 1970 with a commitment to freeing markets and using the price mechanism.

Since the new government had also been committed to cutting back the accelerating pace of price inflation it was no coincidence that unemployment rose to almost 4 percent in 1971. With fairly high unemployment and no balance of payments problems on the horizon, the time seemed propitious to stimulate competition in the financial system and end the sort of direct credit controls discussed above. The name of the new system was perhaps designed to reassure its critics that there did remain control over the extension of credit by the financial system, though clearly of a different kind from that previously exercised.

Just after this change was inaugurated, however, the government decided to "go for growth", hoping that the expansion of money incomes would raise prices less as real income growth was accelerated. Monetary policy was subordinated to stimulating the growth of real income, and was aided mightily by an expansionary budget in early 1972 (which included *inter alia* a measure giving tax relief for all interest charges above a minimum of £35 p.a.) When questions were raised as to what tool would handle an excessive rise of prices, the Bank of England, though not the government, would customarily mention the need for incomes policy. In these circumstances the money supply grew by 25 percent on the broad definition in 1972, and this growth rate has not tailed off since. Despite their market orientated philosophy, moreover, the Conservative government enacted an incomes policy in late 1972 — self-consciously following the path trodden by the Nixon administration a year before.

The new system has certainly encouraged competition, but has hardly controlled credit. Initially there were problems of interpreting the significance of the growth of money supply figures. This was because one would expect there to be some re-intermediation as the banks competed for deposits and moved — dare one say it — towards "the optimum quantity of money". These problems were exacerbated by the fact that the broad money definition adopted included CDs, which tended to *increase* whenever market rates rose sharply above administered "base" lending rates, as they did whenever bank reserve assets were in short supply.

The behaviour of M_3 , the broad money aggregate, initially adopted as the quantitative indicator of monetary policy, differed from that of the narrowly defined money supply, M_1 , including only cash and demand deposits, giving rise to further problems of interpretation. It may be that part of this difference is to be explained by the fact that the "speculative" demand for capital-certain assets has switched from Treasury bills to CDs as the rates on the latter have risen above Treasury bill rate. The ability of the authorities to control the money supply, however interpreted, was not enhanced by two other features of the new system — the continued existence of the discount houses which could create reserve assets, and the need to sell gilt-edged stocks to squeeze the reserve asset base.

Why did the authorities adopt a system whose behaviour seems so difficult to interpret and control? In the first place, the authorities had surely not anticipated such considerable stochastic elements in the monetary sector. If one was to follow Bill Poole's analysis, the good "fits" found for demand for money equations prior to 1971

would have provided good reason for preferring money supply control to interest rate control for avoiding variations in GNP. Moreover, after the unwelcome task of controlling the quantity of credit in an undeniably *ad hoc* fashion for some time, any change may have seemed for the better to the monetary authorities; and they could surely not have forecast the size of government sector deficit that they would be called upon to finance so soon after the "Competition and Credit Control" was inaugurated.

The operation of the new system which replaced the old credit controls has clearly been unsatisfactory, so what will the authorities do next? All the options discussed above under the broad definition of credit controls remain open. While the likelihood of going back to guidelines on lending is not very great, as it would seem too much of a return to the *status quo ante*, other forms of credit controls seem quite probable. It would be easy to remove the tax concession enjoyed by consumers in respect of loan interest, for example; changes in investment tax allowances for businesses are fiscal options available at any time; and consumer credit controls (in the form of minimum down payments, maximum terms) could well be reintroduced if the present monetary experience continues. These are all forms of borrower control and look more likely than forms of lender control which are more easily circumvented.

I would conclude therefore by returning to the question of the definition of credit controls, and arguing that if these are defined more widely (to include "taxes" and "subsidies" on borrowers and lenders as well as lending limits and interest rate ceilings) then they are quite likely to be effective; and given the mixed experience with the new regime, may well reappear in the U.K. It may well be objected that this is a second-best strategy, that there is a policy of money supply control which has not been tried, perhaps because of the interest rate implications, or for other reasons; but the U.K. authorities may be content to settle for second-best after their recent monetary experience.

Some Fiscal and Monetary Policy Experiments in Sweden

ASSAR LINDBECK*

Both monetary and fiscal instruments have been continuously and rather systematically used in Swedish stabilization policy during the entire postwar period. The policy has relied mainly on rather conventional "Keynesian" tools of fiscal and monetary policy: variations in public spending and taxation, interest rate variations, and attempts to influence the supply of credit and money. It may be of some interest to report on the experiences of these tools, in the context of general macro theory. However, there are also a number of experiments with "new" tools worth studying — special tax-subsidy program (such as investment taxes and so-called investment funds policy) to influence private investment; attempts to make variations in public investment programs more useful in countercyclical policy by way of an actual "shelf of public projects"; active labor mobility policy; "protected works" for people with special difficulties to compete in the open labor market; experiments with various kinds of credit market regulations, etc. There are also a number of interesting problems to report on possible destabilizing effects on income formation of the highly progressive tax system, as well as on the effects of fiscal policy actions on the behavior of organizations.

Let us start with a schematic picture of the general performance of fiscal stabilization policy in Sweden after the Second World War.

General Fiscal Policy

An attempt is made in Chart 1 to estimate the immediate (direct) impact effects of fiscal policy on aggregate demand, i.e. the "multiplicand" in the context of a simple Keynesian multiplier model. The analysis includes the effects of both discretionary actions (changes in tax rates and in public real expenditures) and of automatic budget changes (mainly on the revenue side). All effects are

*Professor, Institute for International Economic Studies, University of Stockholm

The paper is partly based on two forthcoming publications by the author, [15] and [16]. I am grateful to Marianne Biljer for research assistance.

expressed as a percentage of GNP (in the previous year).¹ The statistical computations in Chart 1 have been made by Lars Matthiessen.

As the consumption function used includes time lags, and the figures for public expenditures are taken from the national accounts, the analysis will *in principle* take account of *all* basic time lags in influencing aggregate demand — the recognition lag, the decision lag and the effect lag. The quantitative estimates do not include the effects of fiscal policy on private investment; actions designed to influence private investment have instead been indicated “qualitatively” by arrows in the diagram — arrows pointing “up” denoting expansionary actions and arrows pointing “down” denoting restrictive actions.

The reason for using this rather primitive analytical technique is that no sufficiently reliable econometric models exist so far for Sweden (or, I think, for any country, for that matter). Thus the analysis may be regarded as a substitute for an econometric approach — with a combination of, on the one hand, a quantitative estimate of *direct* impact effects on private consumption and public spending on goods and services, and, on the other hand, a *qualitative* analysis of the direct effect of actions undertaken to influence private investment.²

The analysis includes both central and local government activities (excluding the small groups of publicly owned corporations). As the central government in fact, during most of the period, has tightly controlled the volume of housebuilding — by credit supply over the budget and some administrative controls of building starts — variation in housebuilding has been treated in the analysis as a fiscal policy instrument. By contrast, public credit transactions in general, and monetary policy are not included in the diagrammatic analysis.

According to the diagram, fiscal policy in Sweden has shown a countercyclical pattern most of the time (mainly during the period 1949-1963) — with positive impact effects on aggregate demand of

¹For a discussion of the methodology of the study see [7], [11], [14] and [19]. In estimating the effects on private consumer goods demand, a consumption function of the following type (for yearly data) has been used (with t-value below the coefficients):

$$C_t = 0.43 Y_t + 0.58 C_{t-1} - 878.90$$

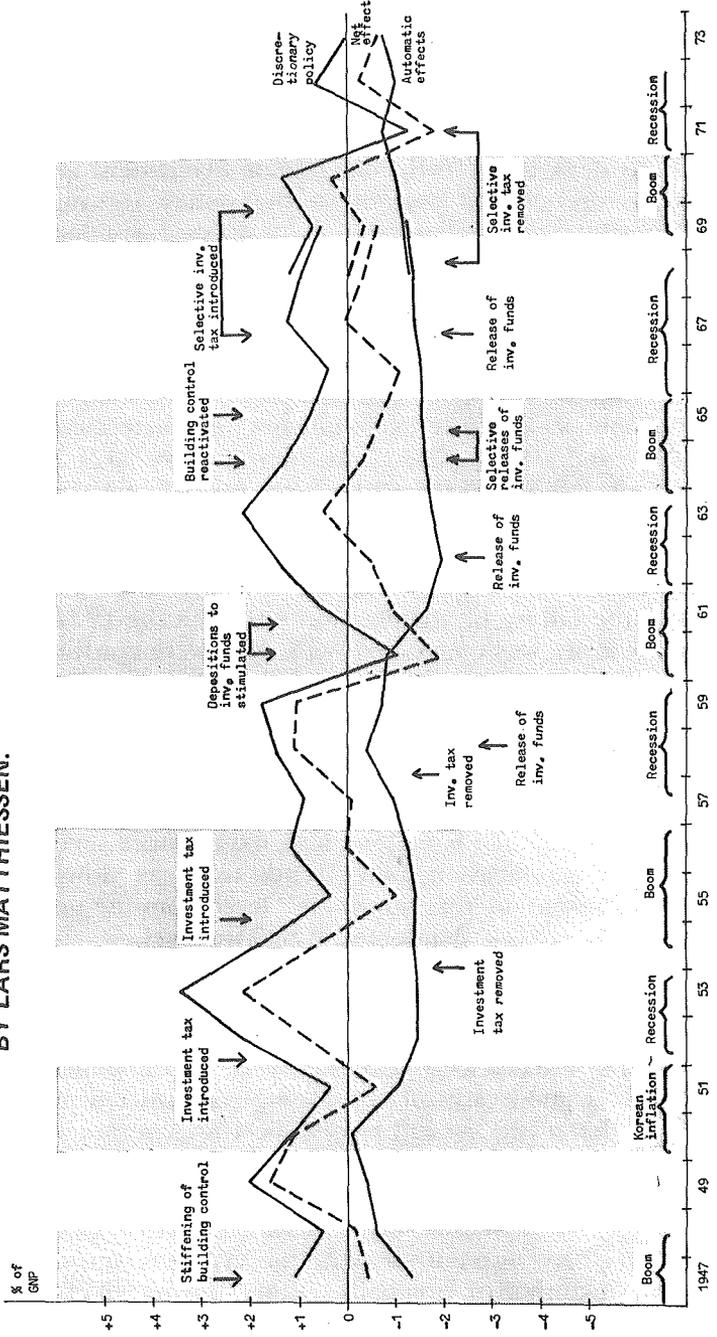
(5.21) (6.27)

$$R^2 = 0.998 \quad D/W = 1.98$$

²Pension fees on firms are treated as indirect taxes, assumed to be shifted on to households (by way of commodity prices or wages) — perhaps a questionable assumption in short-run analysis.

CHART 1

IMPACT EFFECT ON AGGREGATE DEMAND OF FISCAL POLICY,
 PERCENT OF GNP. REAL VALUE ESTIMATES (1947-1969 IN 1959
 PRICES, 1968-1973 IN 1968 PRICES). YEARLY DATA. ESTIMATES
 BY LARS MATTHIESSEN.



discretionary actions usually of about 2 percent of GNP during recessions, and effects rather close to zero (occasionally negative) during booms. The "automatic stabilizer" on the demand side — for instance by way of automatic tax increases when income in the private sector rises — has had very little variability over time. If actions designed to influence private investment are also considered, the countercyclical pattern of the policy is somewhat more pronounced.

However, restrictive actions have been considerably delayed in the booms. And from 1964 the countercyclical pattern has hardly been discernible. Not only have the restrictive actions been weak and delayed in booms (1964, 1969) and the expansionary action rather weak also in recessions (such as 1966 and 1972/73), but the policy on some occasions is probably best characterized as "procyclical" (1966 and 1971). Moreover, during the 1971-73 recession, the attempts to *replace* general expansionary measures with strongly selective measures were highly unsuccessful. The obvious lesson is that selective policies cannot *replace* a skillful management of aggregate demand.

As the failure of stabilization policy in the 1971-73 recession to a large extent was connected with the severe conflicts of goal at that time — unemployment was amplified by restrictive policies designed to fight inflation and an *assumed* balance-of-payments problem — the experience also underlines the need for a multiplicity of policy instruments when there is a multiplicity of policy targets.

The experience in 1971-73 also illustrates what several countries, such as the United Kingdom, have experienced several times, i.e. that domestic stabilization policy tends to break down if the exchange rate is fixed at an "inappropriate" level from the point of view of the targets concerning the domestic activity level.

Specific Fiscal Tools

So far I have looked at "general" fiscal policy only. However, there is a good case for developing stabilization policy tools *specifically* designed to influence specific components of aggregate demand, such as inventory investment, fixed private investment, public investment, housebuilding etc. One obvious reason is that macroeconomic disturbances often come from specific sectors of the economy. By using tools with the main impact on the sector from which disturbance originally comes, rather than using tools with effects on *all* sectors, we avoid creating "disturbances" on a great

number of other sectors of the economy [11A]. Secondly, and this is a rather similar aspect, in an economy working close to full employment, there is often simultaneously excess demand in some sectors and excess supply in others. In such a "split" economy, there is a case for using tools with impact on specific parts of total demand and/or supply [14].

It is therefore of interest to discuss the stabilization policy problems for various breakdowns of GNP. Let us start with private consumption.

Private Consumption

Variations in taxes for households have *not* been extensively used for short-run stabilization policy in Sweden — or in any other country for that matter (except possibly the United Kingdom) — during the postwar period. There are several reasons for this. One basic "non-economic" reason is presumably the slowness of the parliamentary machinery. Another, related reason is connected with complications in party politics. After all, it is households, not firms, that have voting rights!

There are, however, also a number of more "purely economic" reasons. One is related to (1) the scope and time lags; and the uncertainty about these, of the effects, i.e. with the properties of the aggregate consumption function; another reason is connected with (2) the effect of the policy on the behavior of organizations, such as labor unions; a third, closely related aspect has to do with (3) the "automatic stabilizers" of the tax system. Let us look at each one in turn.

1. Scope and Time Lags of Effects

Simple *one-period* Keynesian consumption functions have during the last decade more or less universally been replaced by *multi-period* consumption functions, with consumption in a given period a function of disposable real income during several consecutive periods. This has at least two important consequences for fiscal policy. To highlight them, let us assume that consumption in period t , (C_t) is a function of past, present and expected future real disposable income (Y_p , Y_t , and Y_f , respectively):

$$C_t = f(Y_p, Y_t, Y_f)$$

Let us first look at the influence of *the past* (neglecting the future); this influence may be interpreted as some kind of "inertia" in behavior: it takes time for households to adjust to changes in income, in particular if the change deviates considerably from the previous trend. The well-known consequence is that unexpected, or as compared to past experience "abnormally" large increases (reductions) in current income (Y_t) would result in a rise (fall) in the average saving ratio of households.

The marginal propensity to consume with respect to *current* income only ($\delta C_t / \delta Y_t$) then becomes rather small, as compared to figures usually assumed in textbook examples in fiscal policy analysis, based on older, one-period consumption functions. In fact, a short-run one-year marginal propensity to consume of the magnitude of 0.4-0.5 is quite usual in contemporary econometric studies from various countries, where such "inertia" effects, reflecting the past, are considered. Thus, in order to reduce consumer goods demand by \$1 billion in one year, it would be necessary, *ceteris paribus*, to cut down real disposable income by \$2.0-2.5 billion, whereas the same demand-reducing effect could in principle be achieved by a reduction in public spending on goods and services by just \$1 billion (considering, in both cases, the *direct* impact only). Assuming that political complications are positively correlated with the *size* of tax and expenditure changes (realistic in particular in the case of tax increases), the "new" types of consumption functions no doubt make fiscal policies designed to influence private consumption look more difficult than suggested by the older, one-period consumption functions.³

Second, let us look at the influence of *the future*. A complication for fiscal policy, as regards finding the appropriate scope of action, is that the coefficients in empirically estimated consumption functions presumably usually reflect the influence of changes in income that have been expected by households to be "permanent"; for instance, in the sense that Y_t and Y_f change in the same direction (possibly even in the same proportion). As a corollary, we would expect that a change in disposable income that is expected to be *temporary*, i.e. a change of Y_t for which $\delta Y_f / \delta Y_t = 0$, will influence household consumption much less than a change that is expected to be permanent (i.e. where Y_f / Y_t is constant — or at least where $\delta Y_f / \delta Y_t > 0$); the

³A more technical-analytical inference from empirical multi-period consumption functions is that the changes in the budget surplus between two years, whether actual or some kind of "full employment surplus", may be a rather poor approximation of the size of the demand effects of fiscal policy — if we did not know that before.

reason is of course that the expected income stream over time (measured for instance by its capital value) would in the first case change only insignificantly [4, 12, 14].⁴

The situation is somewhat different in the case of changes in *indirect* taxation. Here too, of course, a permanent tax change influences real disposable permanent income more than a temporary change. However, in the case of a *temporary* tax change, there is also a substitution effect between periods, strengthening the effects on consumer goods demand in the first period — a “postponement effect” (of a similar kind, in principle, as for *temporary* investment taxes) [12]. If this substitution effect between periods is stronger than the difference between the income (wealth) effect of a permanent and a temporary tax change, there is in principle a case for announcing changes in indirect taxes to be temporary, and income taxes to be permanent — from the point of view of stabilization policy only. However, it is an open question, if governments can persuade the taxpayers to believe that a tax announced as temporary will be just that: “Nothing is so permanent in this world as a temporary tax”. It is also difficult to convince people that a change in the income tax that is announced to be permanent will also be just that, if households have experienced that earlier announced “permanent” changes in income tax rates have been “temporary”, as they have to be in stabilization policy!

2. *The Behavior of Organizations*

An even more complicated issue is that various *organizations* of income receivers might adjust their income claims to tax changes designed to influence their real income. As has been recognized in many countries, labor unions and/or farmers' organizations have occasionally asked for compensation for tax changes — in the form of increases in wages and agricultural prices, respectively. Even though the mechanism may apply both in the case of direct and indirect taxes, the possibility has been particularly recognized in the latter case.

When this type of mechanism is working, attempts to fight demand inflation by higher taxation are likely to result in cost-push inflation instead (in excess of the price increase directly “attributable” to higher indirect taxes). The conclusion is presumably that it is difficult to pursue stabilization policy if the dominant organizations of income receivers do not “cooperate” with, or even

⁴However, it should be observed that the effects on *spending* on consumer goods, including the purchases of durable consumer goods, most likely are not quite as small as the effects on *consumption*, defined as the flow of services provided by consumers' goods.

subordinate their activities to the wishes of the authorities responsible for stabilization policy, which of course is one of the basic ideas behind (a modest version of) "incomes policy".

3. Automatic Destabilizers

Consideration to the effects of tax policy on income formation is important both for the theory and empirical applications of "built-in stabilizers".

Even if high marginal tax rates and a progressive tax system make the government budget function as an automatic stabilizer on the *demand side* (in the markets for commodities and services), it may at the same time be a destabilizer on the *cost side* by inducing various organizations of income receivers to demand compensation for "automatic" tax increases. Such reactions could push up production costs. Thus, even if "automatic" tax changes might stabilize real aggregate demand, and possibly also the path of real GNP, they may at the same time "destabilize" the trend of wages and prices. Thus, there is a delicate balance between the stabilizing effects on the demand side, and the destabilizing effects on the cost side — of "automatic" tax increases.

In fact, if the tax system is highly progressive, very large increases in wages will be necessary to achieve a given increase in real disposable income, in particular if the price-raising effects of wage increases (in excess of productivity increases) are considered. This might be illustrated by Erik Lundberg's so-called "wage multiplier" (formulated in 1953), which shows how much the wage rate must increase (in percentage term) to compensate for a 1 percent (autonomous) price increase — when both the progressiveness in the tax system and induced price increases due to higher wage costs are considered [17]. Hence, the multiplier does *not* show how much wages will *in fact* change as a result of an "autonomous" price change (there is no behavior function for wages in the model), but instead how much wages *would have to change* to keep real after-tax wages constant.

Let the Lundbergian "wage multiplier" be written

$$m = \frac{1}{\frac{1 - t_m}{1 - t_a} - k} = \frac{1}{e - k}, \quad ^5$$

⁵The ratio $\frac{1-t_m}{1-t_a} = \frac{\Delta(W-T)}{W-T} / \frac{\Delta W}{W} = e$ is the elasticity of after-tax wages ($W - T$) with

respect to before-tax wages (W). k is the elasticity of prices with respect to wages. The size of k depends of course *inter alia* on the length of the period. In the interval where $e - k, m - \infty$, and hence in that case no change in wages can compensate for an autonomous price increase, considering the effects on real disposable wages of both price increases and induced changes in taxes.

where t_m and t_a are the marginal and average tax rates, respectively, and k is the ratio of the "induced" price change (in percentage terms) to a 1 percent change in wage rates. In the case of Sweden, fairly realistic figures for the tax rates are $t_m = 0.6$ and $t_a = 0.3$, respectively. If $k = 0.5$, the "wage multiplier" becomes 6, implying that wages have to increase by 6 percent to compensate for an initial "autonomous" 1 percent increase in prices. (If we would neglect induced price changes — i.e. if we assumed that $k = 0$ — the wage multiplier would be 1.5.) This kind of tax system, though having rather strong "conventional" automatic stabilizing effects on the *demand side*, might be rather explosive in its effects of the *cost side*, if labor unions have learned how much wages must be pushed up to compensate for the effects of progressive taxation and price increases.⁶

An obvious way of counteracting these biases toward cost-inflation of the tax system is that the government offers households increased real disposable incomes by way of a tax cut, thereby helping them to moderate their wage demands. (Something like this was done by the government in August 1973.)

Inventory Investment

Year-by-year fluctuations in inventory investment are in many countries of the magnitude 2 to 3 percent of GNP. (See Chart 1 for Swedish figures.) Thus, a successful stabilization of inventory investment could make a considerable contribution to macroeconomic stability. In fact, if the authorities fail to stabilize not only export production (which is extremely difficult to stabilize) but also inventory investment, a stabilization of the growth path of GNP will put a very heavy burden on counter-cyclical policies toward the other GNP components.

⁶If the tax system is *extremely* progressive (or k is large, i.e. close to unity), we might even wind up in a situation where $e < k$ (such as when $t_m = 0.7$, $t_a = 0.3$ and $k = 0.5$). The multiplier then becomes *negative* and the only chance for wage earners to compensate themselves for a 1 percent ("autonomous") increase in prices would be to force through a *reduction* in nominal wages — assuming that this reduction will pull down prices according to the coefficient k . In open economies this presumably requires a revaluation of the currency. Thus, (1) if all employee organizations would understand the functioning of the system; (2) if they all could act by *concerted* action; and (3) if they could bring about an appropriate revaluation, incentives would in fact in this case have been created for wage *reductions!* Thereby employee organizations could "cheat" the government on real disposable income.

Thus, Whereas a highly progressive tax system (making m high and positive) may considerably stimulate cost inflation, an even more progressive system (making m negative) could *theoretically* create anti-inflationary (or even deflationary) incentives for employee organizations.

It is probably correct to say that very few attempts have been made so far in various countries to influence the short-run behavior of inventory investments by specifically designed tools. Moreover, most econometric studies in this area do not seem to reveal many effects on inventory investment of "general" monetary and fiscal tools, as implemented so far in various countries. This interpretation of econometric studies also seems to be quite consistent with the observation of a rather symmetric, and *apparently* rather "undisturbed" (by economic policy) time path of inventory investments in many countries; this seems to hold for Sweden as well (Chart 2).

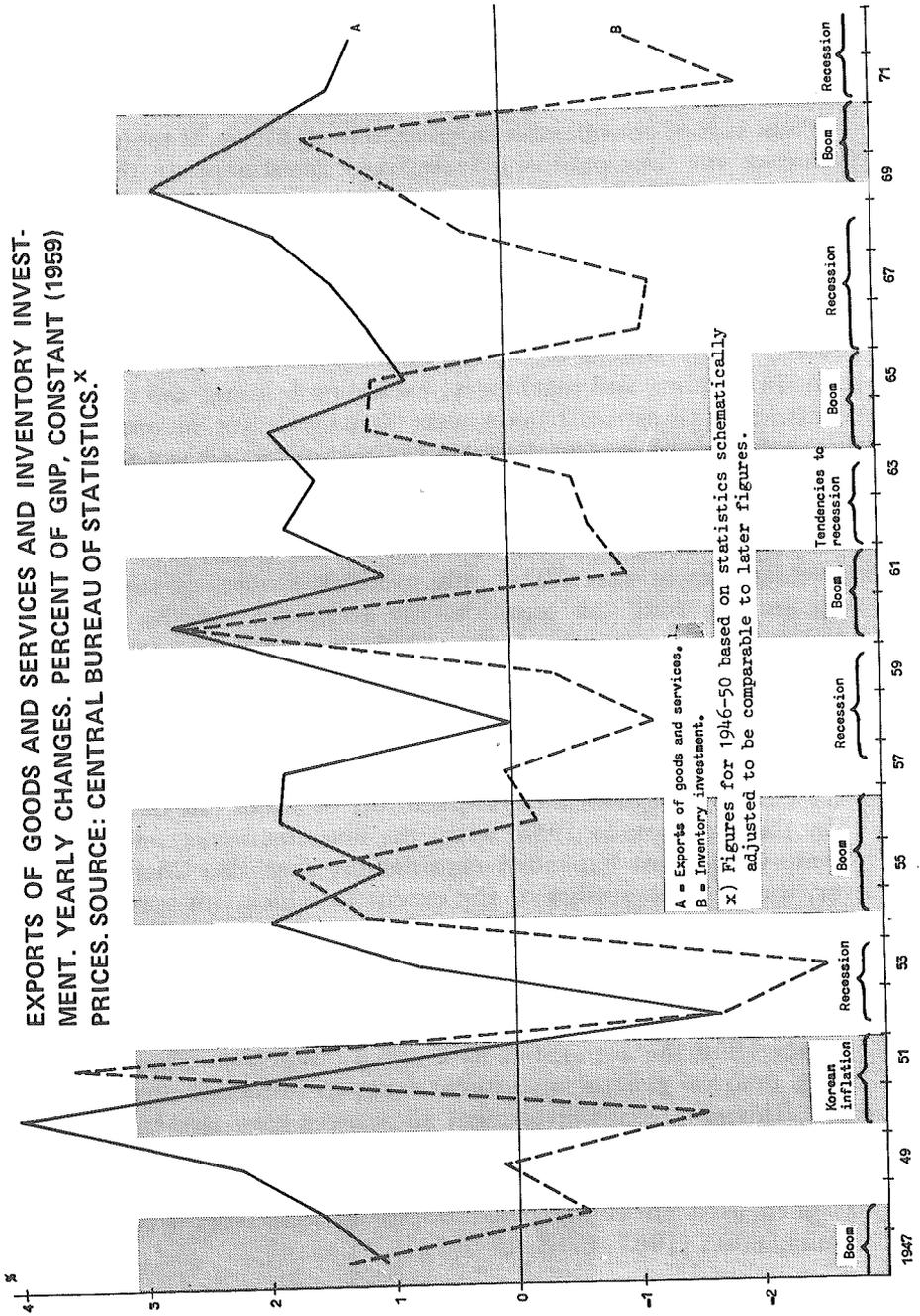
A preliminary conclusion of all this is, in my judgment, that *much* stronger doses of monetary or fiscal incentives than those tried so far — possibly by way of policy tools designed *specifically* to influence inventory investment (such as taxes and subsidies on inventory investment) — would be necessary to achieve appreciably stabilizing effects on inventory investment.

Private Fixed Investment

In contrast to the (relative absence of) policies towards private consumption and inventory investment in most (all?) countries, energetic attempts have been made in several countries to influence the short-term behavior of private fixed investment. We might, in principle, conceive of a monetary policy skillful and aggressive enough to stabilize the time path (around the trend) of private fixed investment. However, the authorities in many countries do not seem to be able or prepared to implement such a policy. There are several well-known reasons for this: (1) the uncertainty about the scope of the effect, and the length of the effect lag; (2) the rather "uneven" impact on different sectors, with risk of unemployment problems in certain subsectors of the labor market (such as in construction), possibly also conflicts with political allocation goals; (3) "disturbances" of the values of the stocks of earlier issued assets (though such "disturbances" might help to create the desired effects on spending); (4) undesired and/or uncertain effects on the distribution of income and wealth (between debtors and creditors); (5) complications with respect to the balance of payments by way of the international mobility of capital in response to interest rate differentials; (6) price-raising cost-push effects of interest-rate increases, in particular perhaps in price-regulated sectors such as public utilities, housing and agriculture; (7) problems of party politics; (8) prejudices and taboos about interest-rate flexibility among politicians; (9) the need for rather "differentiated" tools of policy in an economy where we

CHART 2

EXPORTS OF GOODS AND SERVICES AND INVENTORY INVESTMENT. YEARLY CHANGES. PERCENT OF GNP, CONSTANT (1959) PRICES. SOURCE: CENTRAL BUREAU OF STATISTICS. X



are rather close to full employment; hence there may be simultaneously excess demand in some sectors and excess supply in others (a "narrow-band economy"); and (10) the need to use *many* tools simultaneously in a world with many policy targets.

Thus, it is of considerable interest to look for *fiscal* tools as well to influence the time path of private fixed investment. In the Swedish attempts to stabilize private investment, two fiscal policy "innovations" are of particular interest — *taxes on investment expenditure* and *investment funds* policy.

General investment taxes have been used during two periods in Sweden, 1952-53 and 1955-57, on both occasions amounting to 12 percent of investment costs. The tax rate was applied to gross investment in building and machinery, excluding housing and most public investment. Investment taxes were deductible for income taxation purposes. As the income tax rate for corporations has varied around 50 percent in Sweden, the *net* (after tax) investment tax rate was about 6 percent in the two periods.

It is extremely difficult to estimate the quantitative effects of these investment taxes. The only available studies of any value are two studies using the questionnaire technique, of the effects on investment in industry of the 1955/56 investment tax [2, 22]. According to these studies, (planned) investment by industry was reduced by 5-6 percent in 1955, and a little less in 1956, due to the introduction of the investment tax in 1955. The effect of the investment tax, which was declared to be temporary, indicates a short-run *price* elasticity of investment expenditure of about one half.⁷

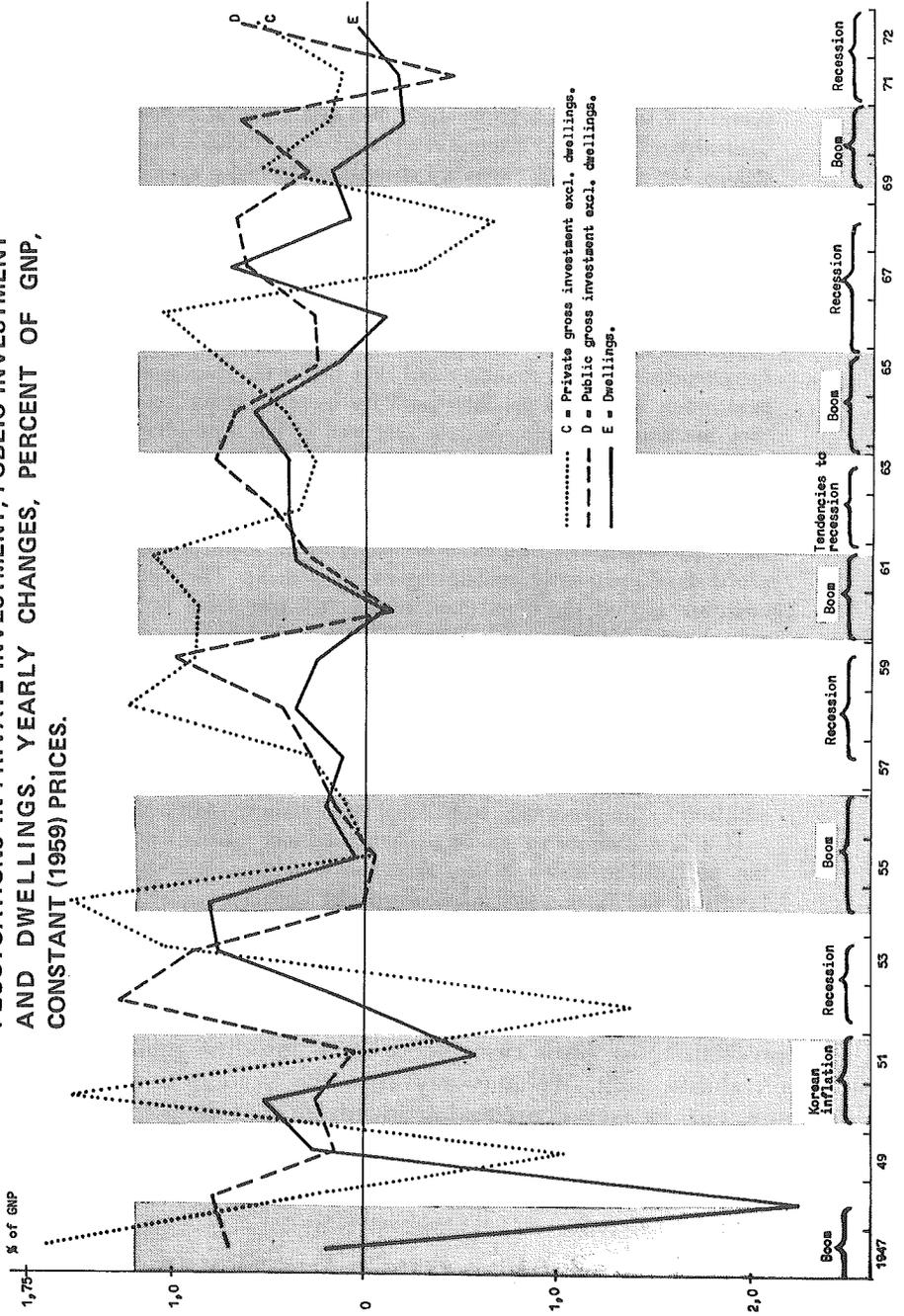
In the recession of 1958, when the investment tax was removed, private investment expanded considerably (see also Chart 3). However, there are no studies of the extent to which this was the effect of the removal of the investment tax or of other policy measures, such as an easing of the building regulation, a more expansionary monetary policy or possibly the minor release then of "investment funds".

Since 1958 the authorities have relied on *investment funds policy* rather than on *general investment taxes* to influence private investment. However, extra investment allowances have also been used at several occasions since the mid-sixties (1964, 1968, 1971-72) to influence private investment. Moreover, a *selective* investment tax has been used on building investment in the service sector and for municipalities (1967, 1968, 1970-71).

⁷As the 12 percent tax reduced demand by about 5-6 percent.

CHART 3

FLUCTUATIONS IN PRIVATE INVESTMENT, PUBLIC INVESTMENT AND DWELLINGS. YEARLY CHANGES, PERCENT OF GNP, CONSTANT (1959) PRICES.



The investment funds system (used mainly from 1955) implies that corporations, and certain other types of firms, are allowed to set aside as an investment-reserve fund a certain fraction, 40 percent, of profits before tax. This investment reserve is exempt from taxation, but 46 percent of the sum has to be deposited in a blocked account with the Central Bank (with no interest rate); the rest is available to the firm. By certain tax advantages, firms are stimulated to make appropriations to investment funds and to utilize them for investment in recession periods. The idea is, consequently, as in the case of temporary investment taxes, to induce firms to change the timing of their investment expenditure from booms to recessions.⁸

The basic incentive in the investment fund system is that firms are allowed to deduct new additions to the fund from their current profit for purpose of profit taxation and that profit tax does not have to be paid when the funds are later used for investment purposes, provided they are used at a time which is accepted by the authorities. Thus, the investment fund may be characterized as an appropriation, free of tax, for investment in the future. The immediate advantage to the firm is a certain gain of liquidity; the alternative to depositions of 46 percent of the appropriations to blocked accounts in the Central Bank is to pay profit taxes, presently amounting to 54 percent. The main incentive, however, is that the investment funds, still free from taxes, later on may be used for investment expenditures during periods when the government wants to stimulate private investment. Then the firms are also allowed to make an additional deduction from profits of 10 percent of the amount taken from the investment funds. Thus, the system implies tax deductions by depreciation charges in excess of 100 percent (in fact by approximately 110 percent) of the investment cost — in addition to the previously mentioned immediate liquidity gain.

If a firm chooses to use its investment funds without permission of the authorities, which it can, the fund is subject to the usual profit taxation, and there is also a special penalty tax imposed by the addition to taxable income of 10 percent of the amount taken from the investment fund.⁹

The idea of investment funds is similar to that of accelerated depreciation. In both cases there is a liquidity gain as well as a profitability gain. We may say that the system is approximately equivalent to free depreciation in advance of an investment made during a stipulated “release period”. The firm obtains a “tax

⁸For a presentation and analysis of investment funds policy, see Eliasson [5], Edenhämmar and Johansson [3, 10], and Matthiessen [20].

⁹The firm can use 30 percent of the deposition freely after 5 years, however (the so-called “free sector”).

subsidy" which amounts to the value of the tax reduction (due to the deposition and the 10 percent investment deduction) *minus* the capital value of future tax increases due to lost opportunities of "normal" depreciation deductions.

As an indicator of the potential importance of investment funds policy, it may be mentioned that in 1971 the funds amounted to 3.8 billion kronor (about 0.8 billion dollars), compared to a total of gross investment by private manufacturing industry of about 6.9 billion kronor in 1971 and about 15.5 billion kronor (3.1 billion dollars) for total private gross investment (excluding investment in housing).

The government has permitted firms to use their investment funds under favorable conditions during four main periods — 1958/59, 1962/63, 1967/68 and 1971/72. The releases of investment funds have each time been of about the magnitude of 5 percent of total private investment, with releases "spilling over" occasionally into the first boom year as well (1960, 1964, 1969). (See Table 1.) Thus, a very small fraction of yearly private investment in Sweden is in fact directly influenced by the investment funds scheme.

The first release occurred in 1958 and 1959, when private investment increased by 7 percent each year, in spite of obvious tendencies to a recession. There are no empirical studies of the effects, but there

TABLE 1
YEARLY RELEASES FROM INVESTMENT FUNDS

Year	Million Sw.Kr.*	Main Period of Release	Percent of Total Private Investment
1956	0.6		0.2
1957	0.2		0.01
1958	29.9	May 1958—	0.54
1959	308.8	—Sept 1959	5.09
1960	381.0		5.41
1961	172.4		2.12
1962	170.6	May 1962—	1.96
1963	644.6		7.01
1964	313.6	—March 1964	3.15
1965	227.5		2.03
1966	302.9		2.34
1967	536.3	May 1967	4.11
1968	1,421.2		11.47
1969	730.4	—March 1969	5.63
1970	368.7		2.58
1971	988.5	July 1971-Dec 1971	6.35

*Approximate dollar figures are obtained by dividing by 5 or 4, depending on whether the "old" or the "new" dollar rate is regarded as more relevant for a comparison.

seems to be general agreement that the release of funds lasted for so long that a substantial part of the investment expenditure generated by the action came at the beginning of the next boom (end of 1959 and beginning of 1960).

The effects of the release of the investment funds in 1962/63 and 1967/68 have been studied empirically by the use of a questionnaire technique [5, 21]. According to one study, there was a well-timed *net* effect (compared to the hypothetical case without a funds release) on private gross industrial construction during the ten-month period July 1962 – April 1963, amounting to about 15 percent of total annual industrial construction. (Chart 4, upper part.) There was also, during a five-month period, a net increase in orders placed for machinery and equipment of about 5 percent of total annual industrial machinery investment. That the timing of the policy was good from the point of view of the business cycle is indicated by a finding of the study, that the net effect reached its maximum in the middle of the recession at the beginning of 1963, nine to ten months after the announcement of the release of the funds. The effects had approximately disappeared by the middle of 1963, well in time before the next boom.

The effects of the investment funds release for machines in 1967 also seem to have been successful, including good timing, according to another study by questionnaire technique (Chart 4, lower part); for instance, during the four quarters when the funds release was in operation, the effects on machine investment amounted to about 7 percent of total machine investment in the manufacturing sector during a half-year period in the middle of the release period. (Chart 4, lower part.)

It should be emphasized, again, that the reliability of the results of these questionnaire studies presumably are somewhat questionable.

The release in 1971/72 was of a more selective basis than earlier releases, and it also involved less favorable terms for firms. There are presently no empirical studies available of the effects.

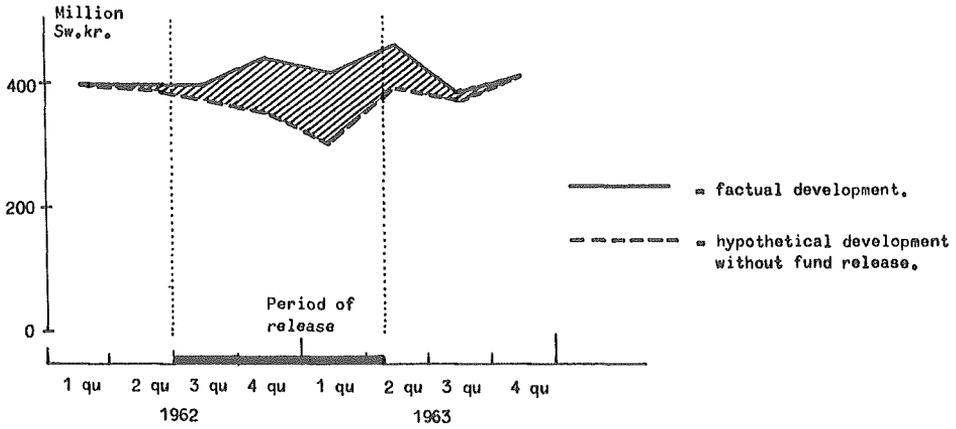
Public Investment and Housebuilding

The most important part of stabilization policy in Sweden has probably been short-run variations in public spending on goods and services. It has often been argued, in the international discussion, that short-run variations in public spending do not, in practice, constitute a very useful tool for economic stabilization. In the case of *current* spending, e.g. *public consumption*, there is probably some

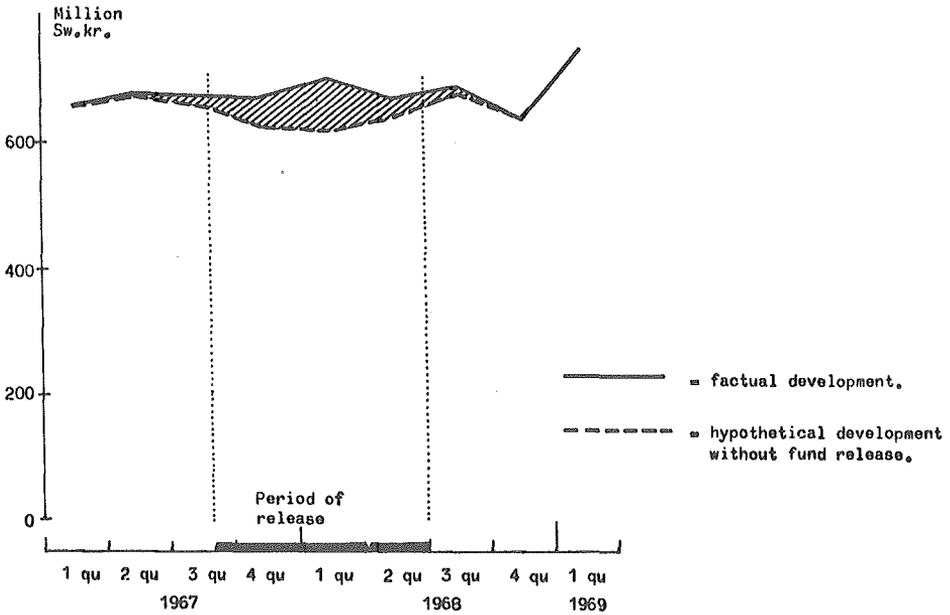
CHART 4

EFFECTS OF INVESTMENT FUND RELEASES IN MANUFACTURING INDUSTRY (SEASONALLY ADJUSTED, FIGURES IN CONSTANT PRICES).

A. EFFECTS ON CONSTRUCTION, 1962/63 RELEASE.



B. EFFECTS ON MACHINE INVESTMENTS, 1967/68 RELEASE.



truth in this observation, though it should be possible, and in Sweden it has to some extent been possible, to speed up, or maybe even slow down, *the rate of expansion* of programs which have already been planned.

More importantly, countercyclical variations in public investment spending should be much easier. The technique used in Sweden to make public investment a useful tool of short-run stabilization policy is rather similar to the techniques used to influence private investment.

The *decision lag* has been reduced by giving the right to the (executive) government to vary investment spending, up and down (in practice by at least 10 percent), during the course of the budget year, without previous consent of Parliament. This means, in fact, that the decision lag does not have to be longer than the time it takes for the government to judge the conjuncture situation and take action.

The *effect lag* has been reduced by giving various public authorities incentives to prepare continuously an "actual" shelf of ready projects; most government agencies (except possibly the university system!) nowadays know that if they do not have ready projects when "the next" recession comes, other agencies will be allowed to fill the vacuum for increased public investment instead, which means that the agency in question might have to wait for another recession to implement its projects. The *scope* of the actions can also be made reasonably large by holding a sufficiently large shelf of projects. In boom periods, contractive effects can, in principle, be achieved mainly by postponement of new orders and the launching of new projects; thus in this situation the effect lag would be expected to be more of a problem.

The government has also tried to use countercyclical variations in housebuilding as part of aggregate demand management. (Chart 3.) The techniques have been to regulate the supply of credit to housebuilding, which is largely financed by government credit, and also to influence the timing of housebuilding by the system of building starts, administered by the Labor Market Board according to the local availability of building workers, mainly as a method to even out seasonal fluctuations in housebuilding. A prerequisite for this policy has been that there is a permanent excess demand for housing (due to rent control), which means that increased building during recessions has not created problems of empty apartments in new houses. However, such problems would occur as soon as there is a tendency to equilibrium in the market for new apartments. This seems, in fact, to have occurred in the early seventies. In a market

with equilibrium for new apartments, new techniques would be required to use housing as a tool of counter-cyclical economic policy: for instance subsidies for house construction in recessions, and taxes (or *reduced* subsidies) during booms.¹⁰

As suggested by Charts 2-3, it would seem that the authorities have, to some extent, succeeded in moving public investment countercyclically to private investment (as well as to exports and inventory investment); it may be of interest to note that this countercyclical pattern has been most pronounced for local governments, which are influenced by monetary policy, building start restrictions and the earlier-mentioned selective tax on building investment. (There has been a countercyclical pattern also for public consumption by municipalities; see L. Matthiessen [19].) The countercyclical pattern is less pronounced for housebuilding.

In 1971 the countercyclical pattern broke down completely for the entire public sector, including housebuilding. The main reason was probably, as already suggested, delayed restrictive policies to fight the rapid inflation and the balance-of-payments deficit during the previous boom (in 1969-70).

Labor Mobility Policy and Public Works

Labor market policy is another area of budget policy, where new tools have been tried in Sweden during the postwar period, in particular from the 1958 recession. The development in this field has very much followed the ideas of Gosta Rehn, with the emphasis, particularly during the first ten years, on methods to increase *labor mobility*, such as increased activity of the public labor exchange boards, financial help to people who move from one job (place) to another, public organization and financial help for retraining, etc. However, in recent years there has also been increased emphasis on various types of *job-creating activities* — such as protected works, subsidies to the employment of the handicapped, and location subsidies.

Another way of expressing the importance of various programs is to look at the number of persons engaged in them. At the present

¹⁰There are other problems, too, connected with heavy cyclical fluctuations in housebuilding. For instance, there is a risk that costs are increased when housebuilding is rapidly expanded, and that these cost increases are not reversed in periods of reduction in housebuilding. It is therefore possible that the rate of inflation in the housebuilding sector is increased by aggressive countercyclical policies in this sector. Maybe there is also a risk that such cost increase can spread to other sectors of the economy (for instance by way of competition for labor).

time (1972), more than 1 percent of the labor force is more or less continuously engaged in public works or "protected employment" or "vocational rehabilitation" (work at high subsidies of labor costs), and another 1 percent is engaged in retraining organized by the Labor Market Board. The amounts are more dominated by long-term trends and seasonal fluctuations than by the business cycle. These activities together account for about 1.5-2.0 percent of the labor force in the early seventies, as compared to about 0.5 percent in the early sixties (Chart 5 and Table 2).

From 1956 to 1972, the budget of the Labor Market Board rose from 125 to about 3,900 million kronor in current prices. In 1972 this is nearly 2 percent of GNP, as compared to 0.2 percent of GNP in 1956. Direct "job-creating" activities nowadays account for about half of this expenditure (48 percent) — divided into 28 percentage points on "traditional" public works and 20 percentage points on new types of public works, so-called "protected employment" and "vocational rehabilitation", mainly designed for people who have difficulties in obtaining jobs in the open labor market. The other half of the expenditure may be classified broadly as "adjustment activities" (mobility-increasing policies, retraining, etc.) and administration costs.

Figures on government spending, or the number of people engaged, are a very incomplete indicator of the "importance" or "costs" of these various activities. The "economic costs" for the society of public works and "protected employment" and "vocational rehabilitation" is of course much smaller than the government spending, as a production result is obtained. Their total "economic costs" may rather be estimated as the difference between the return (value added) of the factors of production in public and protected works, and in alternative uses, which in some cases might be zero. Occasionally, the value added might of course be zero (or negative) also in public works; there may be some "social benefits" of the employment effects in such cases too, however.

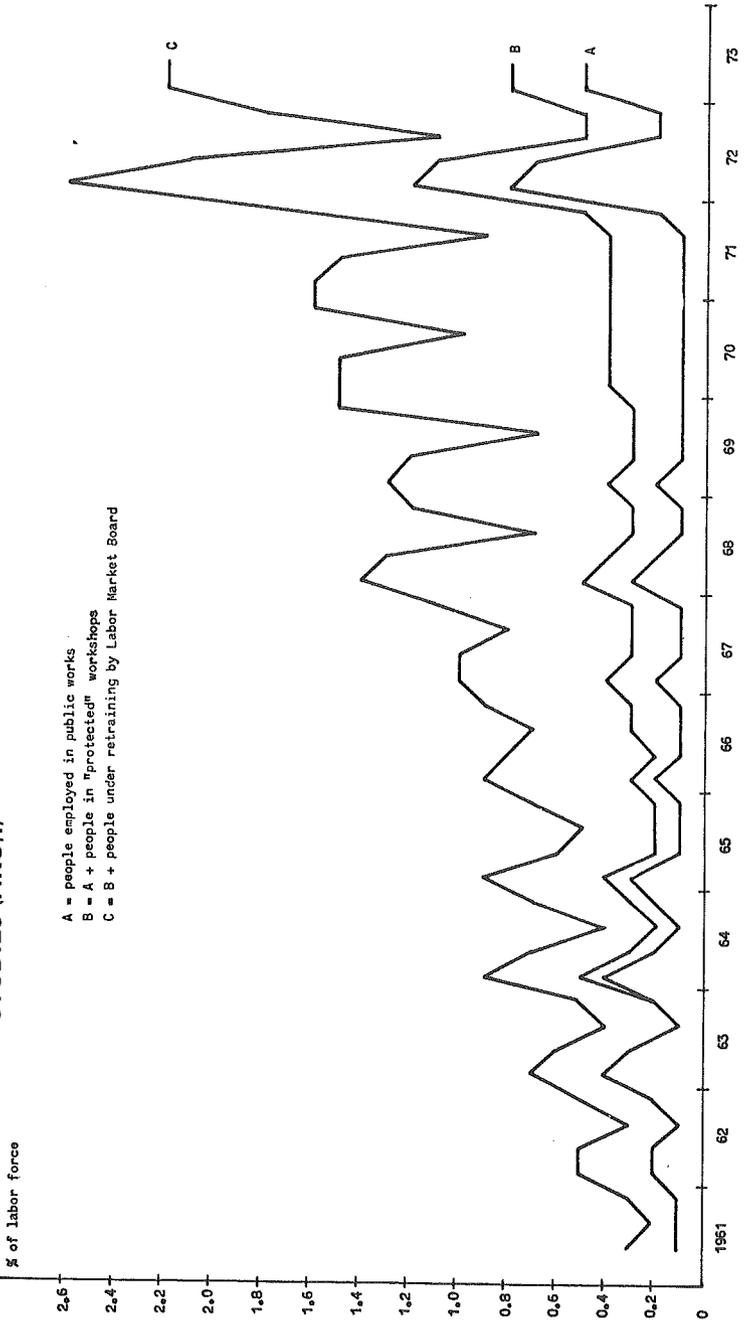
Several different goals lie behind the activities called "labor market policy": (1) to give the unemployed work rapidly; (2) to help them obtain new skills; (3) to compensate them financially for adjustments "forced" upon them by the development of the economy; (4) to make it possible to keep a high level of employment without increasing *aggregate* demand so much that excess demand emerges in high-employment sectors (i.e. labor mobility is designed as a method to make it easier to reconcile full employment and price stability); (5) to facilitate the rate of structural change of the economy. There is hardly any doubt that the policy has made impor-

TABLE 2
NUMBER OF PERSONS IN PUBLIC WORKS, IN PROTECTED WORKS AND RETRAINING
 (Yearly Averages)

	1966	1967	1968	1969	1970	1971	1972
Public works	4,664	5,433	6,826	4,332	3,197	4,743	18,733
Protected employment and vocational rehabilitation	14,480	19,987	27,916	29,419	33,415	38,969	40,388
Protected workshops	5,792	6,892	7,652	9,388	10,906	11,952	12,906
Retraining	18,846	23,549	29,593	31,564	33,882	39,425	43,089
Total	37,990	48,969	64,335	65,315	70,494	83,137	102,210

CHART 5

LABOR FORCE TAKEN CARE OF BY LABOR MARKET BOARD
(PERCENT OF LABOR FORCE ACCORDING TO LABOR FORCE
STUDIES (AKU).)



tant contributions to solve the first three “social” and “distributional” problems. However, empirical studies of “Phillips-curve”-type do not give much support for the hypothesis that labor mobility in Sweden has contributed to reducing the conflict between full employment and price stability [9].

Monetary Policy Experiments

The history of Swedish short-term monetary policy after the Second World War might be divided schematically into three periods:

- 1945–50: pegged interest rates and an easy (“passive”) monetary policy;
- 1950–55: attempts to pursue a tight monetary policy at low interest rates and with direct controls in the credit market;
- 1955– : more and more reliance on “high” and flexible interest rates, still with a number of credit market regulations.

Monetary policy in Sweden during the first years after the war followed the same general pattern as in most other countries. However, since the middle of the fifties, monetary policy has been extensively used as a tool in stabilization policy. A typical feature of the policy is that a vast variety of methods have been used — discount rates, open market operations, cash reserve requirements, liquid asset ratios, other portfolio regulations, bond issue control and occasionally also ceilings on bank advances (1955-57 and 1970). The increased reliance on monetary policy during the last decade, particularly to fight inflation, is indicated by the increased fluctuations in interest rates, on a rising trend (Chart 6). Another indication is that the “real quantity of money” held by the private (non-banking) sector usually tends to fall considerably during periods of tight monetary policy.¹¹ (See Chart 7 for a money/GNP ratio.) It is also of interest to note that interest rate policy in later years has been more and more motivated by balance-of-payments considerations.

In spite of much higher interest rates in the booms of the sixties than in the boom of the fifties, the degree of credit rationing seems to have been severe also in the sixties. An explanation is probably that the expected real interest rate after tax — i.e. the nominal rate, after tax, deflated by the expected increase in consumer goods prices

¹¹The quantity of money is here defined as the value of currency, demand deposits, and time deposits held outside the banking sector.

— may not have increased as much as the nominal interest rate before tax, if at all. In fact, as income taxation is about 50 percent and interest costs are deductible, and as people have reason to expect a yearly price rise of perhaps 4-6 percent, the real interest rate after tax in Sweden is scarcely above zero.¹² Thus, the real interest rate after tax is instead lower than during the depression of the thirties. Hence, *in real terms*, the “low interest rate policy” has in fact never been abolished. It is therefore not surprising that excess demand for credit has been considerable in boom periods.

A schematic picture of monetary policy in the postwar period in Sweden is given in Charts 6-9, showing interest-rate changes, the money/GNP ratio, percentage change in the quantity of money, and percentage change in the stock of credit obtained by the business sector from the organized credit market.

If evaluated by interest-rate changes, monetary policy shows a countercyclical pattern from the mid-fifties, when the policy of pegging interest rates was abandoned (if the effect lags are not *very* long, in fact at most one-and-a-half or two years). The diagrams for the quantity of money and the amount of credit to business (Charts 7-9) show about the same pattern. The diagram of changes in the credit stock gives a rather similar pattern, though according to such a diagram, monetary policy, or rather “credit” policy, would seem to have been much more restrictive in 1952, 1955/56 and 1969/70 than in the booms of 1960 and 1965.

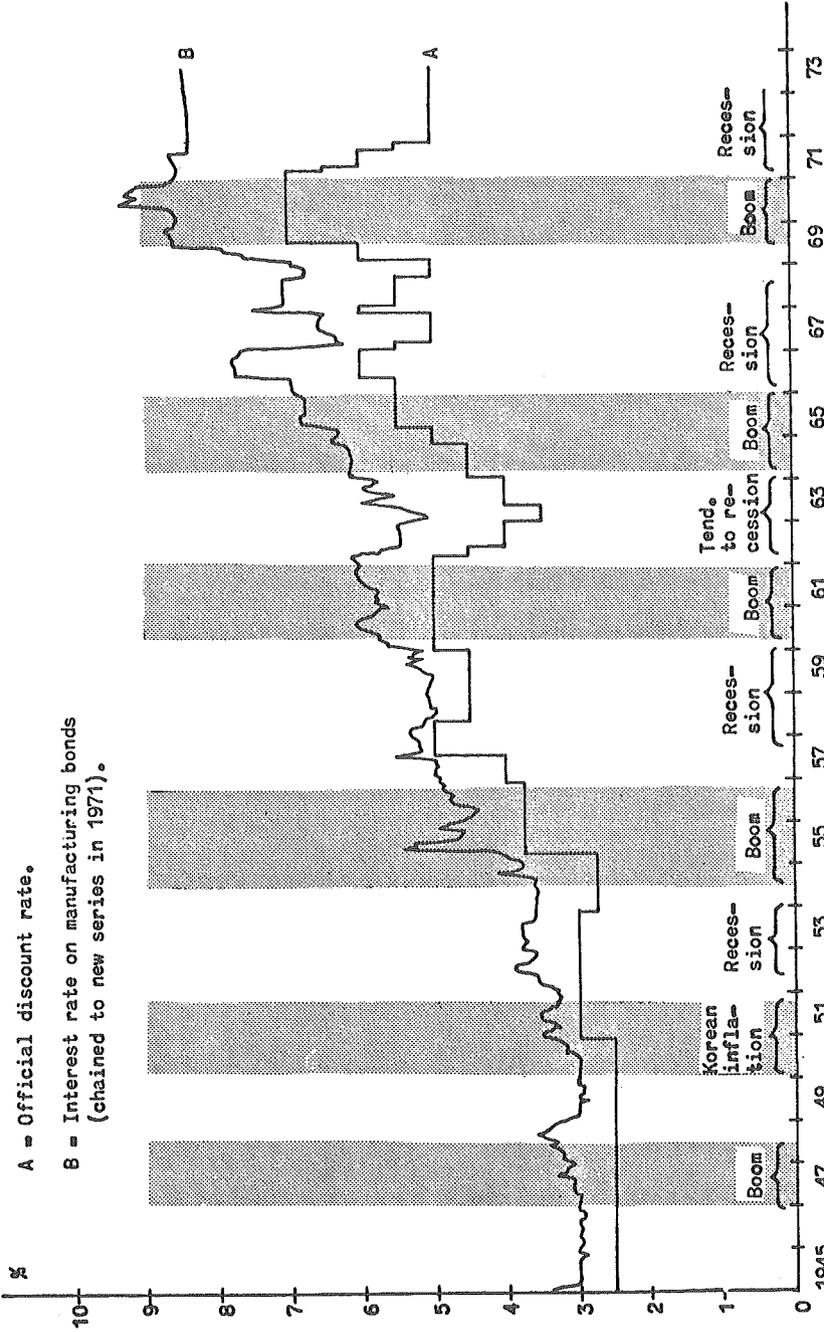
The most important factor behind the fluctuations in the “reserve base”, and hence facilitating the variability in the quantity of money, has been fluctuations over the cycle in the cash surplus (deficit) in the government budget — not financed by borrowing in the open market — as well as surpluses in the balance of payments during recessions and deficits during booms.

With budget deficits and expansionary monetary policy during every recession — and a boom after every recession in a four-to-five year cycle — there is, of course, for reasons of simple arithmetic, a peak in the rate of change in the monetary variables about 1-2 years before every period of economic expansion and a trough about 1-2 years before every

¹²An interest rate of 8 percent, a tax rate of 50 percent, and a rate of expected price rise of 4 percent make the real interest rate after tax about 0 percent. This calculation is relevant mainly for households who acquire assets, the incomes of which are not susceptible to effective taxation, such as owner-occupied houses. How relevant this type of calculation is for firms depends on how the tax system treats “nominal capital gains” due to inflation, i.e. how assets are evaluated.

CHART 6

DISCOUNT RATES AND INTEREST RATES ON MANUFACTURING BONDS. SOURCE: CENTRAL BUREAU OF STATISTICS.



A = Official discount rate.

B = Interest rate on manufacturing bonds (chained to new series in 1971).

CHART 7

MONEY — GNP RATIO

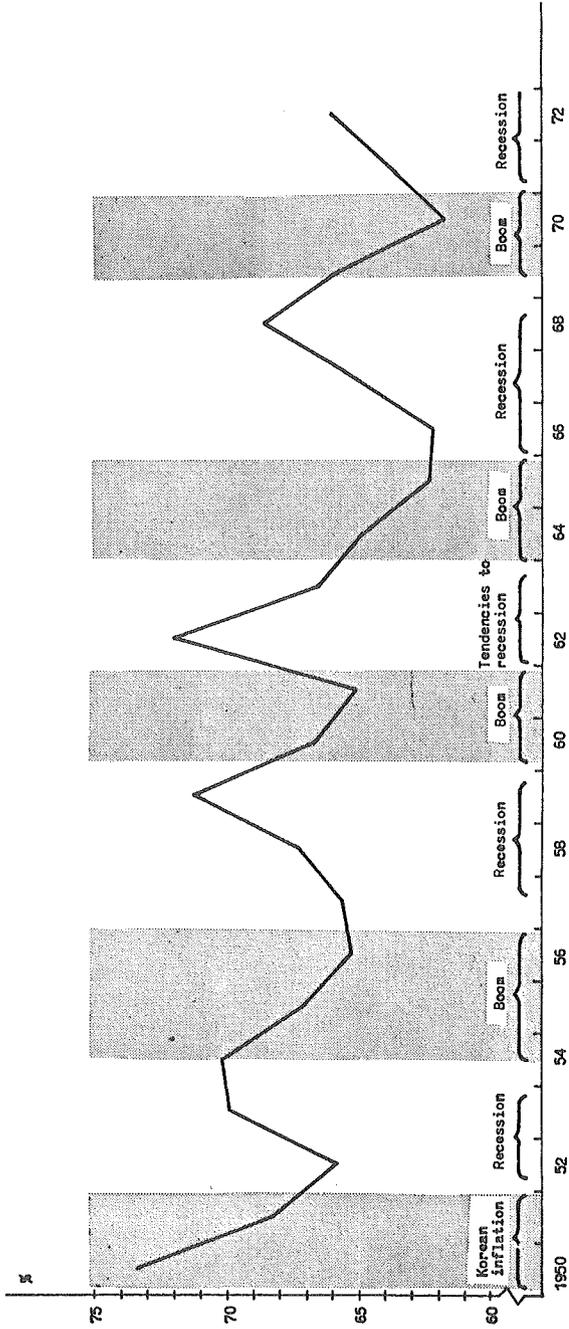
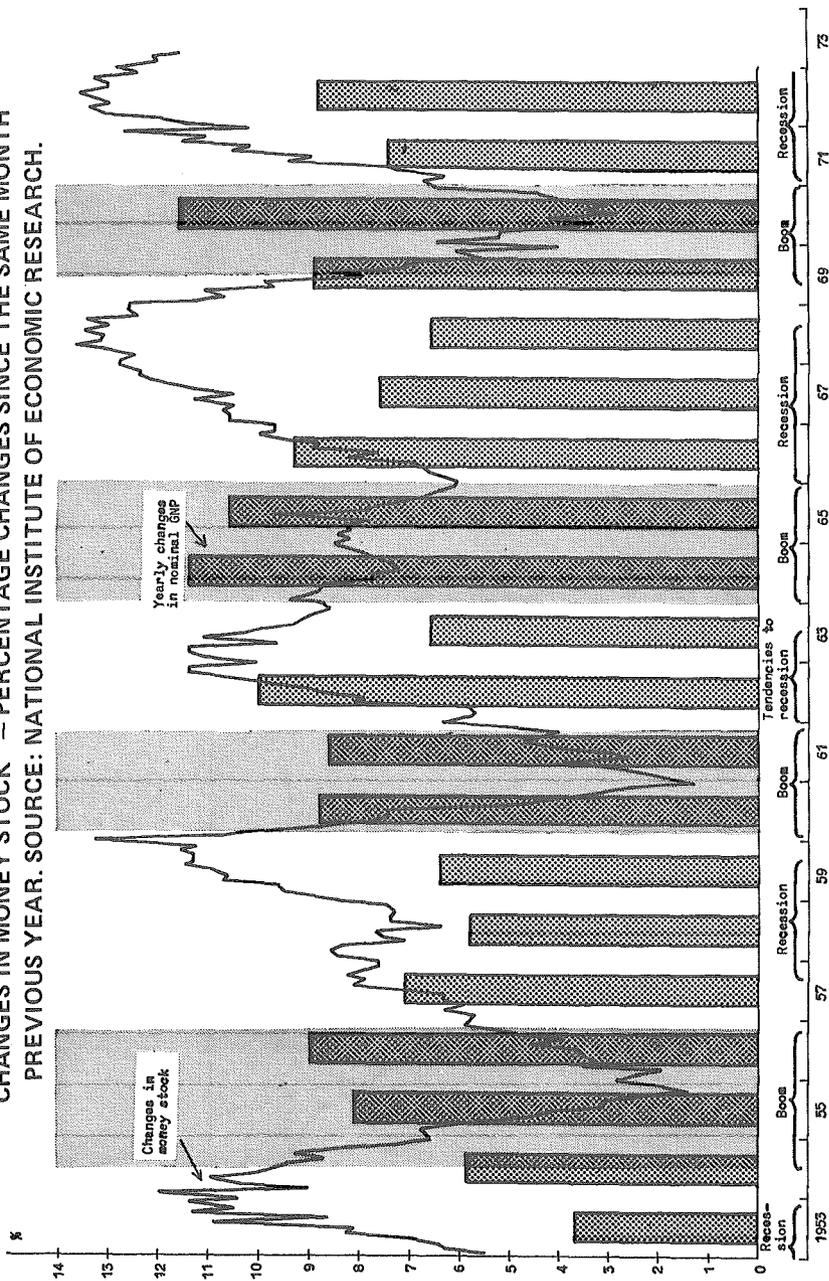


CHART 8

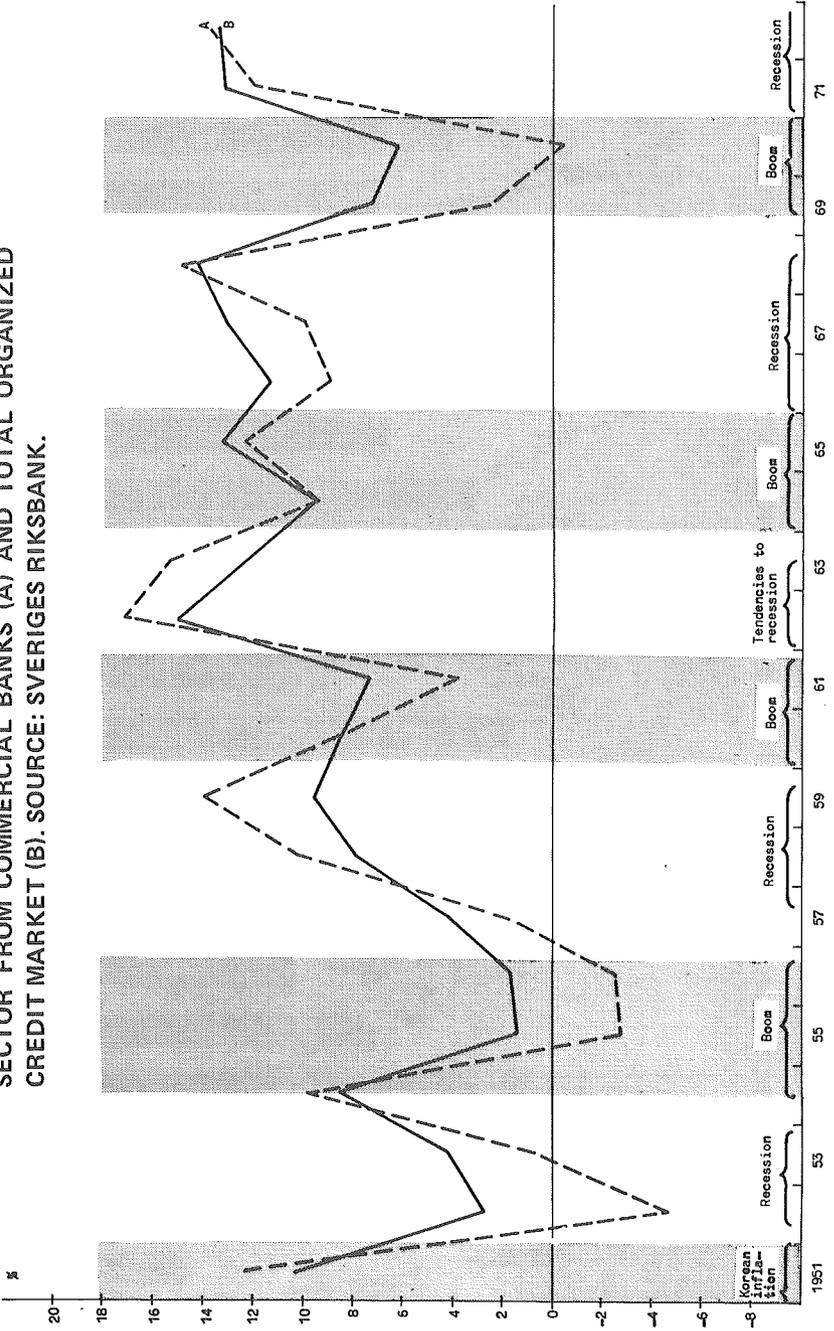
CHANGES IN MONEY STOCK¹ — PERCENTAGE CHANGES SINCE THE SAME MONTH PREVIOUS YEAR. SOURCE: NATIONAL INSTITUTE OF ECONOMIC RESEARCH.



1) Currency, demand deposits and time deposits in commercial banks, savings banks, postal banks, and banks ("centralbanker") for agriculture credit.

CHART 9

YEARLY RATES OF CHANGE OF CREDIT STOCK OF THE BUSINESS SECTOR FROM COMMERCIAL BANKS (A) AND TOTAL ORGANIZED CREDIT MARKET (B). SOURCE: SVERIGES RIKSBANK.



period of economic contraction. This pattern will, of course, emerge regardless of what the "ultimate" causes are of the fluctuations — changes in export demand, autonomous shift in private investment, public spending on goods and services (or "sun spots" for that matter). If we accept that the fluctuations are mainly "caused" by shifts in international demand for Swedish exports, we would have a good illustration of the risk of interpreting a systematic statistical correlation with time lags between two variables — in this case between financial variables and economic activity — as a causal relation, with the first type of variable (the financial variable) asserted to cause the change in the latter (the activity variable).

However, even if changes in the quantity of money are not regarded as "causes" of fluctuations in aggregate demand and nominal GNP, the expansion of liquid assets, including money, during recessions may of course be regarded as an "enabling" factor for the expansion in aggregate demands and GNP during the ensuing booms.

We know very little about the effects on aggregate demand of these policies. There are some empirical studies available, however, based on questionnaire techniques. One is the earlier-mentioned study (by Guy Arvidsson and Krister Wickman) of the effects on investment expenditures in manufacturing of the investment tax in the 1955/56 period, which also included an analysis of monetary policy. The results of these studies are summarized in Table 3.

The results reported by the studies are quite consistent with other types of information. More specifically, we know that *actual* investment by industry (*ex post*) was about 15 percent lower than planned investment expenditures (*ex ante*), reported regularly in the survey undertaken by the Board of Commerce (Kommerskollegium), immediately before the policy measures were undertaken.

According to these studies, monetary policy reduced investment expenditures in manufacturing by about 5-7 percent during the first year (1955) and by about 10 percent during the two-year period (1955/56) with the main effects emerging from stiffer credit rationing rather than from the rather modest increase in interest rates (by about one percentage point for industrial bonds).

There is also a study by questionnaire techniques (by Lars Jacobsson) of the effects of monetary policy in the 1969/70 boom and the 1971 recession [8]. According to this study, the restrictive credit policy would have reduced the investment expenditures in manufacturing by 3 percent in 1969 and by 8 percent in 1970.

Again, the credit rationing is reported (by the firms) to have had much stronger effects than the interest-rate increase which did occur (by a little more than 2 percentage points for industrial bonds, from spring 1969 to autumn 1970).

The effects were (according to all studies just mentioned) concentrated in small and medium-sized firms (except for firms with less than 10 employees, which were not much affected). For instance, quite strong effects were reported in 1970 for firms with 10-49 employees (a reduction in investment spending by 12 percent) and, above all, for firms with 50-199 employees (22 percent reduction).

It may also be possible to obtain some information of the strength of the "pure" interest-rate effects on investment expenditures — on the basis of the studies of the effects of investment taxes and investment funds. Suppose that an interest-rate change that affects the capital value of an investment in the same way as does an investment tax, also has the same effect on investment spending. We can then — on the basis of the studies of the effects of investment taxes and investment funds policy — calculate that a *1 percentage point* change in the long-term interest rate should have influenced investment spending in manufacturing by 1.5 percent in the 1955/56 boom, by about 2 percent in the 1962 recession, and by 1 percent in the 1967/68 recession [13, 16].

TABLE 3
EFFECTS ON INVESTMENT IN MANUFACTURING
OF INVESTMENT TAX AND INTEREST-
RATE POLICY — AS ESTIMATED BY
QUESTIONNAIRE STUDIES

	Percent Reduction in Investment in 1955		Percent Reduction in Investment in the Two-Year Period 1955/56
	According to 1955 study	According to 1956 study	According to 1956 study
Due to:			
Investment tax	5.8	5.0	3.2
Interest-rate increase	0.8	0.7	0.7
Stiffer credit rationing	3.9	6.9	9.1
Undistributed effect	3.5	1.7	1.0
Total effect	14.0	14.3	14.0

As fluctuations in investment spending plans (*ex ante*) by a magnitude of 10-15 percent do not seem to be unusual in many countries, this would indicate that interest-rate policy, as practiced so far, is usually "under-dimensioned" for achieving an efficient stabilization of private investment expenditures. If our analysis and the Swedish experiences, as reported here, are useful for *generalizations* about interest policy — in Sweden as well as in other countries — we would often need fluctuations in long-term interest rates of the order of 5-10 percentage points to stabilize private investment spending along its trend. The figure has, of course, to be adjusted downward if strong "credit rationing" effects are connected with monetary policy. However, as is often pointed out, that would mean that the case for monetary policy, as opposed to direct controls, to influence private investment is probably somewhat weakened. This would be an additional argument in favor of investment taxes or investment funds policy, as compared to monetary policy; these types of fiscal policy actions are in fact more "pure" forms of "interest-rate policy" than can be brought about by monetary and credit policies proper.

Thus, it would seem that the Swedish studies on the effects of monetary and credit policy — as implemented in Sweden — give support neither to those denying the effects of general monetary and credit policy, nor to those who argue that such policies have great effects even in *very* "small doses".

Some Critique of Monetary Policy in Sweden

By the shift to restrictive monetary policy in the middle of the fifties, still at rather low interest rates, the previous excess demand for commodities and labor was succeeded by excess demand in the credit market. Such a monetary policy — relying heavily on "credit rationing" — may be severely criticized on several grounds.

(1) Control of the volume of credit issued by credit institutions may be a poor instrument for monetary policy due to the fact that *the relation between the credit volume and aggregate demand* (for commodities and services) *is rather weak* [18], a point emphasized by Erik Lundberg and Bengt Senneby. In particular, a given aggregate demand in the economy can be combined with a varying volume of credit, depending, for instance, on how saving and investment are distributed between households, firms and government. For instance, the greater the fraction of saving performed by households and government, the larger is the volume of credit necessary in order to transfer financial surpluses to the business sector from the other sectors. Moreover, the more the distribution of saving deviates from

the distribution of investment *within* the business sector, the larger is the credit volume necessary to finance a given investment program. In fact, in a process of "profit inflation" a rise in investment might be compatible with a *reduced* credit volume. On the other hand, in a deflationary situation, with a rise in unplanned inventories, the demand for credit might have to *rise* to carry the increased inventories and at the same time to finish already started investment projects.

Thus, the credit volume may be both a poor *instrument* of economic policy and a poor *indicator* of the effects of monetary policy. This recalls well-known arguments against regarding the budget surplus as a tool, or an indicator, of fiscal policy: the volume of credit as well as the budget balance is an endogenous variable in the economic system, which is strongly influenced by a number of different parameters, including various policy instruments, as well as by other endogenous variables.

(2) Moreover, a system of credit restrictions on banks and other institutional lenders rather rapidly results in *an expansion of the credit market outside such credit institutes*; for instance, production firms lend to each other rather than depositing money in the banks. Part of these transactions take the form of trade credit and a considerable amount of these occur over the borders of the country. Thus, production firms simply take over "bank functions" and "credit intermediation functions" to some extent.

(3) Even if a credit freeze might work as a short-run brake on an acute investment boom, flexible interest rates might give the credit market better properties as a *built-in-stabilizer* than will a regulated credit market with a loan ceiling. Bent Hansen [6] has tried to show this by a number of examples of disturbances in the economic system, with a credit market with flexible interest rates in one case and with pegged interest rates and a controlled credit volume in the other case. One of Hansen's examples was a situation in which household saving increased and, as a consequence, business income tended to fall. In such a situation, a flexible credit market would automatically transfer increased saving into credit supply, partly long-term. The lower interest rates that follow would induce an increase in fixed investment and also help firms to carry additional inventories, which would be favorable from the point of view of economic stability. If the volume of credit was fixed in such a situation, no such built-in stability effects in the credit market would help to restore the stability of output.

(4) A fourth criticism is, of course, that reliance on credit rationing rather than high interest rates will in the long run be disruptive to the allocation of resources. The idea is, of course, that in the allocation of credit, considerations of profitability are often replaced by other types of considerations, such as traditional relations between lenders and borrowers (for instance one firm lending directly to another) and, in the case of the control of bond issues, by the turn in the bond queue (at the Central Bank, or at the private banks when the Central Bank, as in Sweden, left them to administer the queue). There is also a severe risk of compartmentalization of the credit market into a number of submarkets with quite different interest rates and other credit conditions in each market, and also a risk that firms with large internal funds, due to a good *historic* profit record, would be induced to invest internally in low profit projects rather than supply the funds to the credit market [18].

(5) Credit rationing will also create a new type of uncertainty in the economy – uncertainty whether credit can at all be obtained in the future – in addition to uncertainty about interest rates, collateral, etc. [18]. This would mean that a new “irrelevant” influence on the allocation of investment would emerge – an influence distorting the pattern corresponding to economic efficiency.

Many Swedish economists have concluded that a flexible interest-rate policy is desirable both from the point of view of stabilization policy and from the point of view of allocation of resources. They often admit, however, that a sudden reduction in the volume of credit, or a credit freeze, may be efficient as a short-run brake on an acute investment boom, before other measures could be implemented, even if the connection between the level of credit and total expenditure is rather loose. The disadvantages of this method would, however, in most economists’ opinion, increase with time.

Whereas these critical points are arguments for a freer interest-rate policy *in general*, Guy Arvidsson developed in the fifties a proposal for reconciling controlled interest rates on “priority credit” (mainly government securities and housing loans) and free and flexible interest rates on other types of credit (“private loans”) [2, pp. 123-27]. The technique – well known from discussions in other countries – would be to isolate the markets for government securities and mortgage bonds by portfolio rules for credit institutions. The original idea in Arvidsson’s proposal was to create incentives for banks to charge “equilibrium” interest rates on other types of credit, either by high cash reserve requirements or by high interest rates on bank deposits, and possibly also by taxes on deposits. Such actions would also, if properly adjusted, keep down the profits of the banks, in spite of high interest rates on private loans.

General Lessons of Swedish Monetary Policy Experience

Besides the general problems connected with credit rationing, what are the main lessons to be learned from monetary policy experiments in Sweden?

(1) First of all, it has proved difficult to pursue an efficient monetary policy without *flexible interest rates*. This is presumably the reason why a flexible interest-rate policy has become more and more accepted. Of course, such difficulties are predicted already by theoretical considerations. The occurrence of queues, tendencies to "grey" markets and difficulties in finding efficient criteria for the distribution of credit are effects of price control and rationing that can be inferred from the simplest type of price theory.

(2) *Cash reserve requirements* and *liquid asset ratios* also give rise to obvious problems. As is well known, the effectiveness of cash reserve requirements is impaired if banks can go on expanding private loans by unloading their holdings of government securities. It was mainly this reason that induced the Swedish monetary authorities to rely on liquid asset ratios (secondary reserve requirements) rather than on cash requirements as a tool of monetary policy. However, secondary reserve requirements are also afflicted with severe problems. One such problem is that it is difficult to fix the ratios so that the bulk of banks' holdings of government securities is efficiently locked in. Because of the unevenness of holdings among different banks, some of them may have excess liquidity, and these will in fact be more willing to sell out when liquid asset ratios have been raised than if instead interest rates had been increased (as an increase in interest rates will increase the willingness of banks to hold such assets). Moreover, in a system with very few banks (branch-banking), such as that in Sweden, an individual bank can usually expect that at least part of the deposits created by purchases of government securities will wind up as deposits in the bank itself. This means that if the bank buys government securities, the capacity of the bank to increase its supply of *private* loans will in fact *increase* (as the amount of actual liquid assets will then increase by a larger amount than "required" liquid assets, the latter rising only by a fraction of the expanded asset holdings).

Thus, whereas a main problem with cash reserve requirements is that banks can avoid the intended consequences (on the supply of private loans) by *selling* government securities, they can avoid the consequences of liquid asset ratios by *buying* government securities instead. Theoretically these difficulties could be mitigated by successive increases in both cash reserve requirements and liquid asset ratios for banks. However, such policies require considerable skill to be successful.

If a successful monetary policy requires a *broadly* based control of the supply of finance, and if the development of the quantity of money is associated with such a control, measures such as loan ceilings, liquid asset ratios and portfolio regulations of banks are *not* appropriate, as they will be expected to have at most minor effects on the quantity of money. Open market operations, cash reserve requirements and discount policy then are relevant measures.

A special motive for secondary reserve requirements has been to induce banks to supply housing loans to an amount consistent with the housebuilding plans of the authorities. The government has not as a rule, particularly not in the fifties, accepted interest rates on housing loans high enough to induce capital market institutions to satisfy the demand for housing loans. Instead the monetary authorities have tried to guarantee credit to housing, by including mortgage bonds among legal secondary reserves, and also by "voluntary" agreements with credit institutions.

(3) Another experience of monetary policy in Sweden is that it indicates the limitations not only of credit rationing and quantitative controls of the credit supply, but of the reliance in general on *control of liquidity* rather than on interest rates. For if a very expansionary fiscal and monetary policy is pursued in a recession, firms, households and credit institutes will be "flooded" with liquid assets during such periods. This means that it may take a very long time before a restrictive monetary policy "bites" in the next boom, if the policy relies on the control of *liquidity* and *credit volume* rather than on heavy interest-rate fluctuations.

For if firms and households have experienced such quantitative credit regulations in previous booms, they will, during recessions when monetary policy is lax, increase their liquidity for the very purpose of being "immune" against quantitative credit restriction in the next boom. Thus, when firms have learned the "regular" policy pattern, a policy of quantitative liquidity control and credit rationing will induce firms to make *financial* investments rather than investments in real capital during recessions. These problems could at least partly be avoided if monetary policy instead relied more on heavy fluctuations in interest rates between booms and recessions, or on tax-subsidy programs in their attempts to influence investment.

(4) As credit supply rather than the quantity of money has been regarded as the strategic variable for monetary policy, the emphasis in monetary policy has been on *the asset side of the credit institutions' balance-sheets*, rather than on their liability side. Thus a "credit theory" — with interest rate and, above all, credit availability

effects on spending — seems to lie behind monetary and credit policy in Sweden [20A]. This is presumably a reason for the relative de-emphasis on open-market operations, and the emphasis on methods to control the level of credit more “directly”, such as by loan ceiling, liquid asset ratios, and portfolio regulations. Even though there may be a correlation between, on the one hand, the credit volume extended by credit institutes, and, on the other, the quantity of money and other liquid assets, maybe we can say that the authorities have mainly pursued “credit policy” rather than “monetary policy”. Because of the high substitutability between different kinds of financial assets and liabilities in a developed financial system, a policy that concentrates on *specific channels* in the credit market is probably bound to be of rather limited efficiency as a tool of stabilization policy [22A].

Comparison between Interest-Rate Policy, Investment Taxes, and Investment Funds Policy

Both investment taxes and investment-funds policy work somewhat similarly to monetary policy — via profitability as well as via liquidity. There are, however, some differences between the techniques worth noting. It is convenient to compare the two fiscal methods by contrasting each one with interest-rate policy.

(1) It is rather difficult to translate the *profitability* effects of investment taxation and investment-funds policy into “interest-rate equivalents” in a general way; the outcome of a translation of that kind depends *inter alia* on the durability of the investment project and the timing of the income generated. But it is obvious, as already pointed out (page 192), that investment taxes and investment-funds policy, such as have been implemented in Sweden, have profitability effects which are considerable compared to the effects of interest-rate variations of the magnitude usually practiced in Sweden (and other countries for that matter) during the postwar period; this is so in particular for short- and medium-term investment.

A removal of an investment tax of 12 percent is, in the context of a conventional investment calculation, equivalent to a 6 percent subsidy of the costs of investment (if the tax is deductible for tax purposes and the tax rate is 50 percent). A release of investment funds implies an even stronger subsidy. The present value of a fund release can, in rather “normal” cases, be estimated at the magnitude 10 percent for machine investments and 35-40 percent for building investment. Thus, investment fund releases may be regarded as subsidies of investment in machines by about 10 percent and in buildings by about 35-40 percent — for firms that invest by way of accumulated investment funds.

(2) As in the case of interest-rate policy, we would expect investment funds to have stronger effects on long- than on short-term investment, contrary to investment taxes. We would also expect the effects of investment taxes to be even stronger if the tax is expected to be *temporary*, as in this case there will be a "substitution effect" between periods, making it profitable to postpone a planned investment to a period free of investment taxes.

(3) When comparing with interest-rate policy it may also be worth noting that the cost-effects of an investment tax are obvious and easily detectable by the firm, irrespective of whether the investment is financed by internal or borrowed funds. By contrast, it is often asserted in monetary policy discussion that interest rate increases mainly influence investment with borrowed funds.

(4) It has often been argued in Sweden that the effects of investment funds policy are mainly confined to the recession periods, whereas the contractive effects in the boom, according to this view, are small. It is true, of course, that it may be difficult to induce firms to reduce their investment expenditures in booms via appropriations to investment funds. However, by inducing firms to draw on investment funds and invest them in recessions, there will be a change in the timing of investment, which will more or less automatically reduce it in the booms. Such effects may occur either because firms speed up investment expenditures in a recession because of an investment-funds release, or because firms postpone projects in a boom to take advantage of an expected release in the next recession.¹³ An investment in a boom, rather than in a recession, will have an opportunity cost, due to the accelerated depreciation achieved by making appropriations to the investment funds in a boom and postponing the investment project to the next recession. These opportunity costs can be strengthened by certain special arrangements. An example is the specific tax concessions given in 1960/61 to firms which paid 100 percent of their deposition to investment funds to the blocked account in the Central Bank — a policy which resulted in a strong increase in deposition to investment funds. Through these special arrangements firms can, in principle, be offered such favorable concessions when postponing investment expenditures to recessions that they in fact cut down their investment expenditures during booms.

(5) It is also of interest to note that the investment funds system will increase the profitability of investment over the cycle as a whole, and hence increase the general level of investment over the cycle.

¹³The existence of a "speeding-up" effect is empirically fairly well established [3].

(6) Like interest-rate policy, both investment taxation and investment funds policy may be classified as rather *general* types of economic policy. Private firms are allowed to decide for themselves what type of investment they want to make; the government mainly influences the cost of choosing one timing rather than another. However, both methods can, if desired, easily be used in a selective way, by gearing the actions to particular types of investment, sectors and geographical areas. In Sweden, this possibility has been used by exempting investment in housebuilding and public investment from investment taxes (except for the selective investment tax, which covered investments, by municipalities) for the reason that these sectors are regulated by other measures, mainly direct control and government credit. However, with regard to the private sector, the main releases of investment funds, in 1958/59, 1962/63 and 1967/68 were general, hence without *much* intended discrimination between firms and regions. The fund release in the recession of 1971 was *formally* selective in the sense that individual permission was required, and that the terms were not quite as favorable as in the case of general releases (there was no 10 percent extra deduction from profits as with general releases). However, everyone applying for a release seems to have received the required permission.

However, there has been a tendency to use "selective" investment funds releases during the late sixties and early seventies as a part of location policy. If this tendency continues, it may to some extent reduce the usefulness of investment funds policy as a stabilization policy tool. There has also been a differentiation with respect to construction and machinery. In 1961 the policy was used selectively between branches, by a specific release for the pulp industry, which had a recession in that period. There have also been some other minor selective releases of this type. And the 25 percent investment tax on investment in the service sector in 1967/68 and 1970/71 was designed to discriminate in favor of investment in the industrial sector — evidently to help restore balance in the current account. As the tax was not deductible for taxation purposes, it became in fact prohibitive, except for investors who could obtain dispensation after special application. This made the tax actually equivalent to a physical building regulation in the form of a licensing system. Thus, this measure was in reality a partial building regulation "masked" as a selective tax.

A rather natural reflection of the Swedish experiences of investment funds policy, and to a smaller extent also of investment taxes, is that these new tools have probably more and more "tempted" the authorities to engage themselves in selective, "mercantilist" and "protectionist" interventions in the allocation of new investments.

(7) A difference between investment taxes and investment funds, on the one hand, and interest-rate policy on the other, is that the former methods do not generate the same type of "undesirable" side effects as interest-rate policy. For instance, the market value of the outstanding stock of bonds will not be disturbed in the same way as in the case of substantial interest-rate changes. Moreover, no immediate problems will arise of changes in the cost of government debt, and of changes in the distribution of income and wealth between debtors and creditors. The fact that such side effects can largely be avoided is important as these effects in many countries have constituted basic arguments against a powerful monetary policy.¹⁴ However, an income redistribution in favor of firms, is, of course, an unavoidable consequence of the investment-funds system, as well as for other methods to strengthen investment incentives in a profit-oriented economy.

(8) One of the reasons for relying more on investment-funds policy than on general investment taxes in recent years seems to be that the authorities have believed that investment-funds policy provides a closer administrative control of the timing of investment. It is rather easy for the labor market authorities, which administer the releases, to make sure that investments are in fact made during the period of release; this is especially so for investment in buildings. The investment-funds policy has also been closely synchronized with the Swedish system of building-start permits, practiced for seasonal adjustment reasons and administered by the labor market authorities. The timing of individual investment projects can in that way be easily adjusted according to local labor market conditions. In this connection a close cooperation between firms and local market authorities has been established.

(9) Moreover, as stressed by Wickman [23, pp. 8-13] and Eliasson [5, pp. 131-35], the ease of administration of the investment funds system makes it very flexible, so that the implementation can be changed rapidly, as new information about the economic situation is

¹⁴Investment taxes and investment-funds policy also have some credit-market effects. A payment of investment taxes reduces deposits and liquid assets of the banking system, as in Sweden the Treasury keeps its balances in the Central Bank rather than in the commercial banks. Similarly there was a tightening of the credit market when industrial firms in 1960/61 were induced by certain types of incentives to make 100 percent of their appropriations to investment funds as deposits on blocked accounts in the Central Bank. The reduction in deposits and liquid assets of the commercial banking system which then occurred was equivalent to the effects of considerable open-market sales. However, such credit-market effects are not an intrinsic part of investment taxes and investment-funds policy; the effects on the commercial banking system may be removed, if desired, by open-market operations.

obtained. Time lags in the policy can for this reason be kept relatively short. Investment taxes, on the other hand, have to be decided in advance for a certain period; in practice they have applied to the whole country and for a whole calendar year. These administrative advantages of investment funds perhaps explain why it was possible in the 1962/63 recession to get good timing of the effects. However, it is quite possible that the administrative system for investment taxes could also be constructed in such a way that these administrative advantages could be incorporated in that system as well.

(10) Obviously, the system of "payments to" and "release from" blocked accounts in the Central Bank is not a necessary part of the purpose of the investment-funds policy. About the same effect could *in principle* be achieved by a system of accelerated depreciation, confined to recessions, or simply by investment subsidies in recessions and investment taxes in booms provided the decision- and effect-lags can be cut as efficiently as in the Swedish investment-funds system.

(11) An obvious problem with investment-funds policy is that the system favors firms with high *past* profits. In comparison, variations in investment taxes, and general investment subsidies, have a more "neutral" effect on firms with different past profit records. In this sense, investment-funds policy imparts a "conservative" bias on the allocation of resources among firms, compared to general investment taxes and interest-rate policy. Investment tax/subsidy systems differ also from systems of "variable investment tax credit" à la the United States in the sense that the former measures will influence *all* investors whereas the latter will influence only firms with positive profits.

Moreover, the investment-funds system is "discontinuous": the funds are either released or not. The system would be a more flexible tool if the level of subsidies could be varied *continuously* so that there were, for instance, larger subsidies in deep recessions than in slight recessions. For instance, the extra deduction, at 10 percent, might be varied depending on the depth of a recession. Now the only way to make a *small* fund release is to make it *selective*. This is presumably one of the reasons why the releases in recent years have been more selective than earlier. Moreover, it may be easier to achieve a reduction of private investment in booms by an investment tax than by investment-funds policy.

All these problems of investment-funds policy can, in principle, easily be avoided if instead of investment-funds policy general investment taxes and investment subsidies are used. It is not completely obvious, however, that the previously mentioned administrative advantages of the investment-funds system can be "transplanted" to a system of general investment taxes and investment subsidies.

Lessons for Other Countries?

One of the main reasons for the present problems of stabilization policy is that politicians obviously do not fully understand that we cannot stabilize both the target variables and the policy instruments. If we want to stabilize the target variables, we have to accept a considerable instability of the policy instruments, such as interest rates, tax rates and subsidy rates.

However, let us also ask what are the more *specific* lessons for other countries of the Swedish experiences with short-run fiscal and monetary policy? Perhaps the following, rather brave, generalizations could be tried.

(1) It seems to be possible, at least in a parliamentary system where the government has a majority in parliament, to achieve countercyclical movements in *public investment*, provided the government has some discretionary powers to postpone and speed up spending, and incentives are created for various public administrative bodies to keep "a ready shelf of projects". Similar discretionary powers to the President are probably a prerequisite for a successful policy in these respects in the United States.

(2) To influence *private consumption*, very strong doses of income tax changes are necessary, particularly if the changes are expected to be temporary. Weaker doses might suffice in the case of indirect taxes, if they are expected to be temporary. Again, some discretionary powers to the Administration might be necessary for an efficient policy in this field.

(3) *Reactions by organizations* must perhaps be considered when tax policy is used to influence private consumption. Perhaps a co-ordination of such tax policy with bargaining in the labor market ("incomes policy") is necessary for a successful policy program.

(4) Very high *progressive taxation*, though providing an "automatic stabilizer" on the demand side, may create automatic *de*-stabilizing effects on the cost side.

(5) To influence *inventory investment* very strong doses of policy will probably be necessary, as compared to the monetary policy pursued so far in most (all?) countries.

(6) Fluctuations of interest rates by about 5-10 percentage points are probably necessary to stabilize *private fixed investment* around the trend. It is perhaps the *real* interest rate that matters.

(7) *Investment taxes and investment subsidies*, well timed during the business cycle, are probably feasible alternatives also for other countries to influence *private investment*. Several "undesirable" side effects of monetary policy (e.g. on financial markets, on the balance of payments, on the interest costs of the government, and on the income distribution) can then be avoided. Moreover, investment

spending is affected regardless of whether or not they are financed by borrowed funds. A third advantage of tax-subsidy programs is that they affect the capital cost of investment in physical assets exactly *when* we want to influence them, in contrast to monetary policy which does *not* necessarily raise the capital costs for physical investments *actually made* during boom periods, as firms may borrow during recessions and spend during booms. To generalize, investment taxes/subsidies and investment-funds policies, like various types of investment tax-credit systems, have the main influence on the *flow* of new physical investment, which is exactly what we want to affect rather than on the values of the *stocks* of already existing assets. Investment taxes/subsidies are also a more “market-conformed” type of economic policy than monetary policy, if the latter relies heavily on credit rationing. However, the incentive has to be very strong — perhaps subsidies of the investment costs during recessions of the magnitude 20-30 percent.

(8) *Investment funds policy* is an alternative, but in this case there are probably greater risks of unfavorable effects on the allocation of resources.

(9) *Labor market policy*, including retraining and mobility creating activities, is probably very important from the point of view of *social policy*, and hence “welfare”; it is less clear that such policies will also help to solve the stabilization policy problem, however. Perhaps the more heterogeneous labor market in the U.S. makes active labor market policy *potentially* more efficient in that country.

(10) Attempts to replace interest-rate flexibility with credit market regulations, i.e. attempts to pursue stabilization policy by way of *increasing the imperfections in the credit market*, have probably had some favorable stabilizing effects on investment spending in the very short run. However, the effects are counteracted after a while, due to the expansion of credit transactions *outside* the regulated institutes and over the national borders. Also the costs in terms of distortions of the allocation of resources would be expected to increase over time as long as the restrictions are kept.

(11) Some success in stabilizing fluctuations in *volume components* in the economy is no guarantee that the price trend will also be “stabilized”, i.e. damped. The opposite might in fact be the case if the stabilization of the volume components is achieved at a very high level of “full employment”.

(12) It makes good sense to use policy instruments that have *the main impact* on the sector where a “disturbance” actually originates — such as in exports, inventory investment, fixed private investment, etc. In this sense, differentiated (or selective) tools may be useful.

Perhaps also selective methods of demand management for separate branches and regions, as well as selective measures to increase labor mobility, are useful from the point of view of *stabilization policy alone*. However, the Swedish experience during the 1971-73 recession illustrates quite well the obvious fact that such selective policy measures are quite insufficient, even on a large scale, if *aggregate* demand is not allowed to expand at about the same rate as the growth rate for productive capacity. Hence, selective actions of this type can at most be a complement to, but certainly not a substitute for, *general* management of aggregate demand. Moreover, the more selective the tools are — whether quantitative credit controls or taxes/subsidies on lending, borrowing and spending — the greater the tendencies to “mercantilist” and protectionist effects will be on the allocation of resources, and thereby connected possible losses in economic efficiency.

(13) Another “normative” conclusion, based on a combination of the previous analysis and subjective judgments by the author is that taxes/subsidies on lending and borrowing is a more promising strategy than quantitative credit controls, but that taxes/subsidies directly on *spending* is a superior strategy, as it is extremely difficult to say to what particular kinds of expenditures a given type of borrowing is *in fact* going in an economy with a complex financial system. Moreover, taxes on lending/borrowing mean that investment on the basis of internal funds is favored as compared to investment on borrowed funds — without good reason.

BIBLIOGRAPHY

1. G. Arvidsson, “En enkat rörande verkningarna av investeringsavgiften, kreditatstramningen och rantehojningen pa den svenska industrins investeringar 1955”, *Ekonomisk tidskrift*, 1956, 58, 40-60.
2. _____, *Bostadsfinansiering och kreditpolitik*, (Stockholm 1958).
3. H. Edenhammar and S.-E. Johansson, *Investeringsfondens lönsamhet*, (Stockholm 1968).
4. R. Eisner, “Fiscal and Monetary Policy Reconsidered”, *The American Economic Review*, 1969, 59, 897-905.
5. G. Eliasson, *Investment Funds in Operation*, (Stockholm 1965).

6. B. Hansen, "Kreditrestriktionerna och konjunkturpolitiken", *Ekonomisk Revy*, 1956, 13, 526-38.
7. _____, (assisted by W.W. Snyder), *Fiscal Policy in Seven Countries 1955-1965*, OECD, (Paris 1969).
8. L. Jacobsson, *Industriinvesteringarnas beroende av kreditpolitiken*, Konjunkturinstitutet, mimeo, (Stockholm 1971).
9. L. Jacobsson and A. Lindbeck, "Labor Market Conditions, Wages and Inflation — Swedish Experiences 1955-67", *The Swedish Journal of Economics*, 1969, 71, 64-103.
10. S.-E. Johansson, "An Appraisal of the Swedish System of Investment Reserves", *The International Journal of Accounting*, 1965, 1, 85-92.
11. A. Lindbeck, *Statsbudgetens verkningar på konjunkturutvecklingen*, SOU 1956:48, (Stockholm 1956).
- 11A. _____, *A Study in Monetary Analysis*, Stockholm 1963.
12. _____, *Monetary-Fiscal Analysis and General Equilibrium*, Yrjö Jahnsson Lectures, (Helsinki 1967).
13. _____, "Theories and Problems in Swedish Economic Policy in the Post-War Period", *The American Economic Review*, June 1968, Suppl.
14. _____, "Fiscal Policy as a Tool of Economic Stabilization — Comments to an OECD Report", *Kyklos*, 1970, 23, 7-30.
15. _____, "Is Stabilization Policy Possible? — Time Lags and Conflicts of Goals", *Essays in Honor of Richard Musgrave*, (forthcoming).
16. _____, *Swedish Economic Policy*, (London 1973).
17. E. Lundberg, *Business Cycles and Economic Policy*, (London 1957), (Swedish ed. 1953).
18. E. Lundberg and B. Senneby, "The Dilemma of the New Monetary Policy in Sweden", *Skandinaviska Banken Quarterly Review*, 1956, 37, 79-88.

19. L. Matthiessen, "Finanspolitiken som stabiliseringspolitiskt instrument" in E. Lundberg et al., *Svensk finanspolitik i teori och praktik*, (Stockholm 1971).
20. _____, *Investment Funds, Growth and the Effective Tax Rate*, Stockholm Economic Studies, Pamphlet Series, (Stockholm 1973).
- 20A. J. Myhrman, "An Analytical Treatment of Swedish Monetary Policy", *Swedish Journal of Economics*, No. 3, 1973.
21. K. Rudberg and C. Ohman, *Investment Funds – The Release of 1967*, National Institute of Economic Research, (Stockholm 1971).
22. K. Wickman, *Preliminar redogorelse for vissa resultat av en undersokning rörande verkningarna av olika ekonomisk-politiska atgarder pa industrins fasta investeringar 1955–1956*, mimeo, (Stockholm 1957).
23. _____, *The Swedish Investment Reserve System. An Instrument of Contra-Cyclical Policy*, The Swedish Institute, (Stockholm 1964).

Discussion

PAUL A. SAMUELSON*

When a dog is given a good meat bone to chew on, it will take even a dog some considerable time to gnaw at it and get the full benefit of its substance. A professor, alas, is even more in need of time to digest a nutritious morsel like the one that Professor Lindbeck offered us. And, therefore, you must take the following reflections as preliminary impressions rather than as the well-digested conclusions that American economists will ultimately be able to derive from the Lindbeck bill of fare.

Preview

Clearly the Swedish experience will be of interest to Americans. For one thing, we've long realized the Swedes are much more clever at running a mixed economy than we Americans are. For another, they are also more lucky than we are in that theirs is a more homogeneous population of more manageable size than ours, and in addition they have a population with a tradition of compromise and consensus. Also, in terms of level of affluence, Sweden is the only country that can compare with the United States: despite the fact that the official statistics on per capita real GNP's show us still to be somewhat ahead of Sweden, it may well be that Myrdal and others are right in their contention that, when you take into account health and other public services, the average standard of life in Sweden may not be less than that in the United States.

Economics is not an experimental science. Therefore, the experiences of any other economy may add something to our knowledge about our own economy. So, even if Sweden used exactly the same budgetary fiscal methods as we do, and the same open-market monetary operations as our Federal Reserve, we could still benefit from seeing what their behavior equations can tell us about our own behavior equations and the degree of confidence that we can put in these patterns of experience worked out by economists.

*Professor of Economics, Massachusetts Institute of Technology

As an economist interested in improving our methodology, I was struck by the great reliance that Professor Lindbeck seems to place in the questionnaire as a method for arriving at economic truth. Is it that Swedish businessmen are so much better in taking written and oral examinations than American? Or that Swedish economists are so much lazier in performing econometric analyses? I shall not refuse help from any source, but I must register some skepticism concerning the survey and questionnaire as a model of learning the behavior equations of an economy. Thus, I recall talking many years ago in Stockholm to Professor Ragnar Benzel about the testimony that had been collected from Swedish industries about the rates of return that they required and earned. There were tremendous differentials between industries, as one might expect. Some rates of return reported were so low as to cause the commissioners taking testimony to ask the reporting businessmen: "If your profit rates are as low as you report, why in the world do you go on investing in your industry?" The usual answer must chill the blood of any enthusiast who thinks that interrogation is a great way of identifying an economy's investment equation: "Oh, if we did not reinvest, we would be losing tremendous amounts on our existing assets." So, although I share Professor Lindbeck's reservations about the conventional half-dozen different econometric investment equations, I feel that questionnaires simply give us a seventh inconclusive investment relation, and I would want eclectically to look at all seven in forming my own Bayesian probabilities about future investment.

Swedish Novelties

But, of course, Sweden does not confine her macroeconomic policies to those we are familiar with. For years we have heard about the Swedish *investment taxes*, which were used in the 1950s to try to put a damper on investment spending during boom times. And we have heard with envy about the Swedish experiment with *investment funds*, by which firms receive a tax-reduction bribe in good times for impounding funds that can be released in bad times when investment spending is more desperately needed. Professor Lindbeck's careful and unillusioned account of how these seem to have worked out must be of interest to anyone concerned with macroeconomic stabilization policies.

A third area of Swedish experimentation has been in the area of *labor market policy*. Almost 2 percent of Sweden's labor force (that would be almost 2 million people by American size standards) are

being employed on public works, or are in protected employment that involves a subsidy for handicapped workers or those in need of vocational rehabilitation, or are being retrained at public expense. And almost 2 percent of her GNP (that would be almost \$25 billion by our standards) is being spent to improve their labor exchanges, promote labor mobility, retrain workers, and provide last-resort public employment designed for those who lack the skills and attributes that are needed to get private jobs. Since we actively debate how much of our own unemployment is *structural* and hard core, Lindbeck's testimony should be of value in our debates about the costs and benefits from greatly expanding our own manpower programs.

From the standpoint of this Conference, probably the most interesting part of Lindbeck's discussion has to do with his review of Swedish experience with investment taxes and investment funds. However, from the standpoint of long-run solution to the dilemma of creeping inflation, many Americans will find Sweden's experiments with labor market policy the most interesting. About it let me merely record my disappointment to learn of Professor Lindbeck's unflinching conclusion, in which he says:

However, empirical studies of 'Phillips-curve'-type do not give much support for the hypothesis that labor mobility in Sweden has contributed to reducing the conflict between full employment and price stability.

If Sweden with its ethnically homogeneous population with fairly uniform education cannot improve its problem of stagflation by manpower policies, I despair that the much larger and more diverse United States can find a solution in this direction. But I join with Margaret Fuller, the nineteenth century Concord transcendentalist who said, "I accept the Universe." (Thomas Carlyle said, "By gad, she'd better!") But before I accept the sad fact of life, I would like to guard against possible overpessimism. When students of incomes policy abroad — I have Professor Lloyd Ullman of the University of California in mind as one of the best — arrive at the conclusion that such policies have not licked inflation in these countries, I have to agree. But I am left wondering whether those countries have not done better with such policies than they would have done without them. And I am struck by the fact that although Western Europe shows as much inflation as we do, they do manage to keep unemployment at lower levels for each rate of inflation than we do. So

I ask a question: "Is the evidence conclusive that, in the other things being equal sense, labor mobility problems have no perceptible effect upon the Phillips Curve tradeoff between unemployment and inflation?"

Conventional Macroeconomic Policies

Since time is scarce, let me be equally brief on the very interesting Lindbeck analysis on how conventional fiscal and monetary macro-policies have worked out in the Swedish case. On the whole, it looks to a foreigner as a much more commendable performance than perhaps it does to a Swedish economist cognizant of all the shortcomings and difficulties of public policy.

Example: As I study Lindbeck's diagrams on monetary policy, Charts 8, 9, 10, I find that in Sweden there has been a successful "lean against the wind" program pursued by the Central Bank. Growth in the money supply is lowered in the periods of boom; and in the periods of recessionary slowdown, M_1 's growth rate is speeded up. This makes sense to me and I congratulate Sweden for being able to do what our Federal Reserve has not yet succeeded in doing. Moreover, according to some rough calculations that I made from the graph, it would be a tragedy if a persuasive Professor Friedman converted the Bank of Sweden to the doctrine of a steady rate of growth of the money supply through thick and thin, through expansion and recession. Rerunning Swedish history in terms of such a simulated monetarist's model gave me a more-destabilized rather than less-destabilized pattern. Without Central Bank offsets to the pro-cyclical fluctuations in the velocity of M , the total of MV would have increased in standard deviation around trend.

I also want to congratulate Sweden on its anti-cyclical public works profile. This is a subject that I led Presidential task forces on for both Kennedy and Johnson. Despite our urgings that Congress delegate some discretion to the executive in this matter in order to reduce the *decision lag* and that up-to-date shelves of plans for public works be maintained in readiness in order to reduce the *effect lag*, we could never in our wildest dreams hope to do as well in the American system as Sweden did up until recent times. I take it that the poorer performance of public works in Sweden's '71 and '72 recession must be laid at the door of balance of payments and inflation concerns.

Professor Lindbeck reveals that economists are much the same everywhere in the world. Training is more important than longitude. On the whole Lindbeck prefers rationing by price to rationing by

quantitative restrictions. And therefore he properly stresses for future policy programs taxes and subsidies of a stabilizing sort. I see much merit in this.

But once we begin to depend on price effects alone, we may find ourselves disappointed by the weakness of the elasticity of response to price changes. The untidy world of regulation and rationing that we have been living in has brought us gifts that we have not always been aware of while we had them. Thus, here in America, during the first post-World War decades, our interest rate ceilings on veterans and FHA mortgages, our usury laws, and our regulation ceilings on interest rates that banks and S&Ls could pay resulted in drying up of funds to the housing industry in periods of tight money. Therefore, interest rates did not have to harden as much as would have been necessary if we were to have depended on interest elasticity of demand alone. Suppose we run the system in the future along the lines favored by most economists, who dislike the inefficiencies, inequities, and general untidinesses of rationing. Suppose, for example, we ultimately introduce variability of interest rates on long-term mortgages by one or another of the devices ususally proposed? I know that only for a brief time will I have to pay the 12 percent high interest rate on my mortgage, that is certain to make my demand for housing more interest elastic — with the result that short term interest rates will have to oscillate with greater amplitude to get the same relative stabilizing effect.

In closing, let me say that the primary problem that the United States or Sweden faces does not seem to be that of greater cyclical stabilization. So I do not find our progress on this front particularly disappointing. This is not said in order to show how optimistic I am. For, the true reason why a present day economist's greatest concern need not go with the adequacy of conventional and novel stabilization policies must reside in the fact that the truly fundamental problem that confronts every mixed economy is the long-run inflation-unemployment dilemma and tradeoff. This will still remain even after we have learned to do a better job in warding off the ancient scourage of trade-cycle instability.

Discussion

GERARD M. BRANNON*

To make up one's mind on a specific stabilization technique, one must evaluate the method in relation to all the others and to combinations of the others. Professor Lindbeck's analysis of Swedish experience with regard to the whole range of stabilization weapons is, therefore, particularly valuable. I can only refer to a few of his cases, and of those I will concentrate on applicability to the United States.

Contracyclical Management of Government Expenditures

Lindbeck refers to formal enactment in Sweden of authority for executive discretion with regard to expenditure. Until now such authority was old hat in the United States, but we are now going through a crisis of executive-legislative relations on expenditure control. I think that there is a good chance that congressional and judicial action, related to expenditure ceilings and impoundment, will reduce the ability of government to manage a stabilizing fiscal policy. The April Report of the Joint Study Committee on Budget Control shows scant comprehension of stabilization problems.

Another aspect of this is that we still have (and are likely to go on having) a particularly insane form of expenditure control — the public debt limit. If this debt limit is continued, along with the new penchant of the Congress for an expenditure ceiling, the only function the debt limit will serve is to provide a *lower* expenditure ceiling when government revenues are lower than Treasury forecasts, i.e., in recession.

I think that both economists and bankers should take some interest in the current political operations on expenditure control.

*Research Professor, Georgetown University

Contracyclical Management of Consumption

Lindbeck's catalog of problems with income tax flexibility, as a poor consumption regulator, is impressive and not inconsistent with our 1968 experience. I agree with Lindbeck's point that a variable consumption tax is more promising. The problem is that the United States does not have a Federal general consumption tax.

This raises an important issue of the interrelationship of policy objectives. Historically it is clear that the reason why we do not have a general Federal consumption tax is that these taxes are thought to be regressive, but the regressivity of a particular tax is not a crucial barrier to using it and still attaining whatever income distribution objectives the society desires. We could, for example, enact a value added tax (VAT) with a refund of the VAT paid on some basic level of expenditures; simultaneously income tax could be reduced in each bracket by an amount equal to the average VAT paid in that bracket. At a more sophisticated level we could shift some income tax into an expenditure tax.

There is a respectable case for some lower tax on savings and higher tax on consumption on allocation grounds as well as the stabilization case for consumption taxation. Since the regressivity-progressivity issue is not crucial to these matters, we should have some intelligent public dialogue on the allocation and stabilization aspects of consumption taxation. In fact we do not. VAT, for example, was debated mostly on the progressivity-regressivity issue.

I do not claim to know how to change things. At a minimum, advocates of structural tax changes for stabilization or allocation objectives should give more attention to separating these from income-distribution objectives. The point is broader than consumption taxes. A policy instrument to change the cost of investment differently in booms and recessions could be an investment tax or an investment tax credit. A distributionally neutral proposal would be to use both. The stabilization aspect of shifting from a 3½ percent tax to a 3½ percent credit should be the same as shifting from a zero to 7 percent credit. Unless we handle the income distribution consequences of our stabilization proposals, stabilization could get lost in the noise about these things being pro- or anti-business.

Contracyclical Management of Labor Mobility

I have little to add to Professor Samuelson's remarks about the long-run aspects of labor mobility measures. I would note that

Lindbeck's chart on Swedish experience in this field shows through 1970 a steady upward trend with only seasonal fluctuations (high in winter). There was growth above the trend and seasonals for the recession year 1971. There is really little evidence from the Swedish experience so far about the anti-cyclical use of this tool.

Contracyclical Management of Investment

I am quite unimpressed with the Swedish investment reserve system. The reasons will be clear if we look at these elements somewhat abstractly.

Assume that we have a 50 percent corporate tax rate and that a firm can take deductions for additions to a reserve *provided* 50 percent of the reserve is put in a blocked, non-interest bearing account. I argue that looking only at this part of the system the reserve is nothing. The firm whether it takes a reserve deduction or not has the use of only half of its income, and a blocked, non-interest bearing account is worthless.

Looking at this reserve deposit phase of the Swedish system, the basic tax rate is 52 percent while only 46 percent of the reserve need be put into the blocked account. This is plain tax reduction in the *boom* phase of the cycle.¹ There could be some technical complications. My brief reading of references to the Swedish system does not indicate whether there are any restrictions on a company's use of the 54 percent of the "reserve" that it is permitted to keep. Could it, for example, be distributed to stockholders on liquidation? I presume from my readings that the retained part of "reserves" are indistinguishable in practice from after-tax profits.

Let us turn now to unblocking. In my sequence of examining the investment reserve in steps, unblocking is equivalent to a refund of "tax". (I claimed the deposit in a blocked, non-interest account is really a tax.) If unblocking takes the form of current expensing of an investment, 100 percent first-year depreciation, then, in my initial model of a 50 percent tax and a 50 percent blocked deposit requirement, a company with adequate current income would be indifferent whether the 100 percent depreciation was taken against current income or the "reserve". Here the Swedish feature of only a 46 percent "tax" rate in the reserve is a slight nuisance because deduction against a 46 percent rate is less attractive than deduction against a 52 percent rate. This explains why the Swedish system allows 110 percent depreciation against the reserve.

¹The effective tax rate falls from .52 to $.52(.60) + .46(.40)$ or .494.

All this reserve business is useless paraphernalia. The meat of the system is the allowance of different depreciation systems between booms and recessions. If one wants to make depreciation so generous in recession that it would exceed the current income, then carry-backs or carryovers can be provided. The reserve primarily serves to limit the benefits of the generous depreciation to firms with income in the past. Lindbeck also dislikes this feature of the reserve, which he calls its conservative bias. I see no value in the reserve to offset this disadvantage.

The real purpose of all this activity could be better served by an investment credit which is turned off in a boom, or an investment tax which is turned off in a recession, or both. Credits and taxes do not have the strong bias that additional first-year depreciation has to favor very long-term investment. Favoring very long-term investment is allocatively unneutral, and it is contrary on stabilization grounds because long-term investments, mostly building, will take the longest time to plan and get under way.

This brings me to the remarkable claims of success for the Swedish system. I have little faith in results from surveys that ask businesses "What would you have done if. . . ?" The answer, strictly speaking, would call for a complete re-run of the firm's decision-making machinery under a new assumption. Off-hand guesses about what such an outcome would be are just that — guesses. Since they are guesses, they are likely to be influenced by what the respondent thinks the government should hear.

If we take seriously the survey results of high response to the release of investment reserves, what can be said? So far as Lindbeck reports these results, they simply report that more investment was being made during the release period. It is not clear to me that they are saying that the investments which were formally "charged to the reserve" involved in fact assets whose purchase was decided upon and executed in the release period. In all the references to use of reserve funds in the Swedish literature, I have found relatively little as to precisely when an investment must be made to qualify. I presume favorable treatment was extended to goods delivered after and ordered before the release period. (Each time the United States introduced the investment credit it covered such goods simply because old orders could be written.)

Lindbeck's reports of very prompt short-term response to an incentive which was loaded to favor building could be interpreted as consistent with a cash flow theory of investment.

The survey results that Lindbeck cites are particularly difficult to understand in the light of his concession that the immediate write-off

opportunity is loaded to favor buildings. It is not plausible that previously unplanned building investments suddenly were decided upon and came into being to a substantial extent in one year. If building investments were charged to the reserve within a year of the unblocking, these had to be building programs that were already underway before the release of reserves.

One could, nevertheless, reconcile charging building investments to the reserve along with the reserve leading to more total investment. If a firm has a building project underway and is suddenly told that it can expense the project for tax purposes, then it has cash flow to make or speed up other investments that have shorter delivery periods. If this is what runs the Swedish machine, you could get the same effect by a temporary cut in the tax rate with less distortion of allocations.

I am not able to add to the assessment of cash flow investment theories. I had assumed that Dale Jorgenson shot them down several years ago, but a recent article by Elliott claims that Jorgenson was firing blanks.

If the appropriate investment theory is a cost of capital one, there is no getting around the indication of very long lags of the type described by Professor Waud in this volume, which suggests that much of the effect will come in the next boom. In the United States, this delayed effect is aggravated by the rule followed both times the investment credit was terminated, that credit applies to deliveries contracted for prior to termination, plus contracts entered later to complete projects over 50 percent completed at the time of termination.

Finally, since this is a banking conference, I want to say more about the relation of investment incentives for interest rates. I take exception to Lindbeck's procedure for reducing the real interest rate for the effect of tax deductibility. A business firm borrows to earn money. If an 8 percent business return is taxed at 50 percent, then deduction of 8 percent interest is necessary to get the zero marginal profit condition. An 8 percent interest rate discourages ventures that do not yield 8 percent. I will also distinguish the case where interest is paid on borrowing to finance acquisition of tax-exempt income. This last point ties in with Marcus Miller's comment, earlier in this volume, on the United Kingdom's use of the instrument of disallowing consumer interest deductions. (Price inflation is a proper adjustment in describing real interest rates.)

Investment taxes or credits are alternatives to interest-rate changes and their enactment is likely to make interest rates different from

what they would have been. A strong application of investment incentives in a recession, for example, could be expected to foreclose a significant decline in, at least, long-term interest rates. This has distributional effects and shuts off some of the liquidity effect that might have been expected from a decline in interest rates as well as shutting off some of the housing starts that might have developed with lower interest rates.

A strong application of investment taxes (or cutback of investment incentives) in a boom should foreclose some rise in interest rates. Over time an active tax policy to stabilize investment, provided it is well timed, may tend to stabilize interest rates. My point is that this should not be described as having left interest rates alone. It is operating on interest rates indirectly rather than directly. One still has to ask about the consequences of these second level changes in interest rates.

REFERENCES

1. Elliott, J. W., "Theories of Corporate Investment Behavior Revisited," 63 *American Economics Review*, 195 March, 1973.
2. Jorgenson, Dale and Siebert, C., "Theories of Corporate Investment Behavior," 58 *American Economics Review* 681 September, 1968.
3. Lindbeck, Assar, "Theories and Problems in Swedish Economic Policy in the Post-War Period," *American Economic Review*, June, 1968, Supplement.
4. Lundberg, Erik, *Instability and Economic Growth*, Yale University Press, New Haven, 1968, pp. 192-260.
5. Norr, Martin, Sandels, Claes and Hornhammar, Nils, *The Tax System in Sweden*, Stockholms Enskilda Bank, 1969.
6. Vikbladh, Inge, "Monetary Policy in Sweden." In *Monetary Policy in Twelve Industrial Countries*, edited by Karel Holbik, pp. 375-420. Boston: Federal Reserve Bank, 1973.

CONFERENCE PARTICIPANTS

- PAUL S. ANDERSON, *Assistant Vice President and Financial Economist, Federal Reserve Bank of Boston*
- PAUL G. BLACK, *Executive Vice President, The National Shawmut Bank of Boston*
- GERARD M. BRANNON, *Research Professor, Georgetown University*
- GEORGE H. CLAY, *President, Federal Reserve Bank of Kansas City*
- PETER H. CRAWFORD, *Vice President, First National City Bank of New York*
- JACQUES H. DAVID, *Chief, Econometric Research Department, Banque de France*
- BRUCE DAVIDSON, *Economics Editor, The Boston Globe*
- RICHARD D. DRISCOLL, *Senior Vice President, New England Merchants National Bank*
- JAMES S. DUESENBERY, *Professor of Economics, Harvard University; Director, Federal Reserve Bank of Boston*
- ROBERT W. EISENMENGER, *Senior Vice President and Director of Research, Federal Reserve Bank of Boston*
- JAMES F. ENGLISH, JR., *Chairman, The Connecticut Bank and Trust Company*
- PETER FORTUNE, *Economist, Federal Reserve Bank of Boston*
- WILLIAM FRANKLIN, *Business Outlook Editor, Business Week*
- BENJAMIN M. FRIEDMAN, *Assistant Professor of Economics, Harvard University*
- HARRIS C. FRIEDMAN, *Director, Office of Economic Research, Federal Home Loan Bank Board*
- GEORGE GARVY, *Economic Adviser, Federal Reserve Bank of New York*
- DONALD R. HODGMAN, *Professor of Economics, University of Illinois*
- ALAN R. HOLMES, *Senior Vice President, Federal Reserve Bank of New York*
- IRA P. KAMINOW, *Economic Adviser, Federal Reserve Bank of Philadelphia*
- JAMES L. KICHLINE, *Chief, Capital Markets Section, Board of Governors of the Federal Reserve System*
- FRED LEVIN, *Economist, Federal Reserve Bank of New York*
- MICHAEL E. LEVY, *Director, Economic Policy Research, The Conference Board*
- ASSAR LINDBECK, *Professor, Institute for International Economic Studies, University of Stockholm*
- JOHN LINTNER, *Gund Professor of Economics and Business Administration, Harvard University*
- T. MICHAEL LONG, *Brown Brothers Harriman & Company*
- SHERMAN J. MAISEL, *Professor, University of California (Berkeley)*
- MAURICE MANN, *President, Federal Home Loan Bank of San Francisco*
- VINGENT G. MASSARO, *Senior Economist, The Conference Board*
- PETER H. McCORMICK, *Senior Vice President, New England Merchants National Bank*
- RALPH A. McININCH, *President, Merchants National Bank, Manchester, N.H.; Director, Federal Reserve Bank of Boston*
- JAMES A. McINTOSH, *First Vice President, Federal Reserve Bank of Boston*
- STEPHEN K. McNEES, *Economist, Federal Reserve Bank of Boston*
- DONALD L. MILLER, *Executive Vice President, The First National Bank of Boston*

MARCUS H. MILLER, *London School of Economics and Bank of England*
FRANK E. MORRIS, *President, Federal Reserve Bank of Boston*
RICHARD A. NENNEMAN, *Business and Financial Editor, The Christian
Science Monitor*
GUY E. NOYES, *Senior Vice President and Economist, Morgan Guaranty Trust
Company*
JAMES R. OSTAS, *Economist, Federal Reserve Bank of Boston*
ROBERT H. PARKS, *Chief Economist, Blyth Eastman Dillion & Company*
RICHARD S. PETERSON, *Vice President and Economist, Continental Illinois
National Bank and Trust Company of Chicago*
GLENN C. PICOU, *Economist, Federal Reserve Bank of Richmond*
WILLIAM POOLE, *Adviser, Federal Reserve Bank of Boston*
GEORGE B. ROCKWELL, *President and Chief Executive Officer, State Street
Bank and Trust Company*
PHILIP J. RUSHING, *Economist, Federal Reserve Bank of Boston*
PAUL A. SAMUELSON, *Professor of Economics, Massachusetts Institute of
Technology*
HENRY B. SCHECHTER, *Senior Specialist in Housing, Congressional Research
Service, Library of Congress*
KARL A. SCHELD, *Senior Vice President and Director of Research, Federal
Reserve Bank of Chicago*
ANNA J. SCHWARTZ, *Senior Research Staff Member, National Bureau of
Economic Research, Inc.*
COURTENAY M. SLATER, *Economist, Joint Economic Committee*
PAUL F. SMITH, *Professor of Finance, University of Pennsylvania*
EZRA SOLOMON, *Professor, Graduate School of Business, Stanford University*
SUNG WON SON, *Senior Economist, Council of Economic Advisers*
PETER N. TOULMIN, *Vice President, Rhode Island Hospital Trust National
Bank*
HERBERT F. WASS, *Assistant Vice President and Secretary, Federal Reserve
Bank of Boston*
ROGER N. WAUD, *Professor of Economics, University of North Carolina;
Senior Economist, Board of Governors of the Federal Reserve System*
H. DAVID WILLEY, *Vice President, Federal Reserve Bank of New York*
ALBERT M. WOJNILOWER, *Vice President and Economist, The First Boston
Corporation*

Copies of this Publication
are available, upon request, from the
PUBLIC INFORMATION CENTER
FEDERAL RESERVE BANK OF BOSTON
BOSTON, MASSACHUSETTS 02106

