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Investment Certificates

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Government control of the aggregate level of new private investment is an accepted, central prescription of post-Keynesian economic policy.¹ When the economy is sluggish, the Keynesian prescription calls for (among other things) increased investment to stimulate demand; when the problem, instead, is inflationary pressures caused by excess demand, the solution is to reduce private investment as well as consumption.² But despite wide agreement on the importance of controlling investment expenditures, the means for achieving control of investment remain highly imperfect; they are uncertain in their direct impact and, frequently, unwelcome in their side-effects. Monetary policy has produced wide swings in crucial sectors of the economy and arbitrary shifts in the distribution of income, without subjecting over-all investment to reliable control. The Investment Tax Credit, not initially intended as an instrument of stabilization policy, has proved imprecise when used

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1. Cf. J. TOBIN, NATIONAL ECONOMIC POLICY 140 (1965).

2. A simple Keynesian analysis of the economy divides national output into three components—consumption, investment, and government expenditure. Government stabilization policy may attempt to affect one of these sectors either to offset some undesired development in that sector, or to compensate for changes in other sectors. Thus, the government may wish to curtail private investment either because an increase in the level of investment has threatened to cause economic overexpansion, or because a rise in government spending or private consumption threatens the same result. Like changes in taxes or government expenditures, increases or decreases in private investment have "multiplier" effects on the rest of the economy. (A \$1 billion change in investment expenditures may cause a \$2 or \$3 billion change in Gross National Product.)

For an exposition of the role of policy tools in the regulation of different sectors of the economy see C. SCHULTZE, NATIONAL INCOME ANALYSIS (1964). See also A. ORUN, THE POLITICAL ECONOMY OF PROSPERITY (1970).

in that role; countercyclical adjustments in depreciation schedules suffer from the same difficulty. Finally, changes in the over-all corporate tax rate are not used for short-term macroeconomic management, nor could they be especially useful for that purpose.³

One common feature of these policy measures accounts for much of their unpredictability. In each case, the government attempts to achieve a target level of aggregate investment by manipulating the environment of individual firms—by altering the cost of borrowed funds, the availability of internal finance, or the after-tax profitability of investment.⁴ For this strategy to work, the government must guess in advance the relationship between the proposed change in costs or incentives and the consequent shift in corporate investment behavior. In economists' terms, the government must know the aggregate investment equation. But, corporate investment behavior to date has resisted precise explanation. Profit expectations, the general business climate, and other unobservable or imponderable data relevant to business decisions seem to preclude the development of a reliable formula relating changes in government policy to changes in investment.⁵ Thus neither the timing nor the magnitude of the effects of government policy can be accurately predicted in advance. Indeed, recent theoretical work has suggested that even the general direction of these effects may often be unknown.⁶

This article proposes a novel policy measure designed to reduce this uncertainty. Rather than manipulate incentives and try to predict their impact on total investment, the government would "peg" investment and rely on the market to determine the change in incentives necessary to induce firms to invest at the desired rate. After deciding on a target level for the total amount of private investment in a given time period, the government would auction the right or duty to make this invest-

3. See pp. 1265-66 *infra*.

4. For a description of the mechanism linking monetary policies to the various forms of capital expenditure see Smith, *The Effect of General Credit Controls on the Major Sectors of the Economy*, reprinted in READINGS IN MACROECONOMICS 227 (N. Keiser ed. 1965). A good theoretical exposition of the way in which tax incentives affect corporate investment decisions is presented in Hall & Jorgenson, *Application of the Theory of Optimal Capital Accumulation*, in TAX INCENTIVES AND CAPITAL SPENDING 9 (G. Fromm ed. 1971). A lengthier, more accessible exposition of the same area is contained in Musgrave, *Effects of Tax Policy on Private Capital Formation*, in COMMISSION ON MONEY AND CREDIT, FISCAL AND DEBT MANAGEMENT POLICIES 45 (1963).

5. For a discussion of the comparative performance of competing forms of the investment equation see Jorgenson, Hunter & Nadiri, *A Comparison of Alternative Econometric Models of Quarterly Investment Behavior*, 38 ECONOMETRICA 187 (1970) and Bischoff, *Business Investment in the 1970's: A Comparison of Models*, 1 BROOKINGS PAPERS ON ECONOMIC ACTIVITY 13 (1971). For a brief but incisive discussion of the problems of explaining investment expenditures see J. MEYER & R. GLAUBER, INVESTMENT DECISIONS, ECONOMIC FORECASTING, AND PUBLIC POLICY 1-5 (1964).

6. See D. FOLEY & M. SIDRAUSKI, MONETARY AND FISCAL POLICY IN A GROWING ECONOMY (1971).

ment among firms; the auction price would vary automatically with the private economy's willingness to make investments during the time period.

Specifically, this proposal would have the government issue "investment certificates" which would serve as either a permit or a promise to invest in new plant and equipment. Certificates representing the total amount of desired investment would be issued periodically by the government and sold to firms or brokers through competitive bidding. If the government desired to reduce private investment, it would require businesses purchasing new plant and equipment to possess certificates in the dollar amount of their purchase. The requirement could be enforced either by denying depreciation deductions to any investment not covered by certificates, or by subjecting uncertificated investment to specific statutory penalties. If the government wanted to expand investment, it would offer subsidies to purchasers of certificates. These certificates in this case would constitute obligations on the purchaser, or his transferee, to make new investment of the specified amount within a designated time. In either case, the certificates would take the form of a promise by the government to pay a fixed sum (say, \$200) per \$1000 of new investment in plant and equipment. Bidding at the auction would establish a price for these certificates of below \$200 if some government subsidy is necessary to induce the desired level of private investment, and above \$200 if firms are anxious to invest and thus willing to buy the right to do so. If the certificate holder or his transferee failed to make \$1000 worth of investment in the specified period, some or all of the \$200 obligation would be forfeited.

In what follows, these arguments will be outlined in greater detail and the administrative and political problems of the investment certificate proposal will be explored.

I. Shortcomings of Current Policy Instruments for the Control of Investment

The current policy measures used to control investment suffer from two kinds of difficulties. First, their effects are not specific to investment: they influence other economic aggregates as well. Thus, if the government attempts to control investment by manipulating interest rates, there will be immediate ramifications in the housing market and in the balance of international payments. High interest rates, for instance, will choke off construction of new housing and will cause foreign capital to flow into the United States—effects which the govern-

ment may or may not desire. Adoption of the certificate plan would free interest rate policy, and other policy instruments used currently to influence private investment, for other important functions.

In addition to the fact that they incidentally compromise objectives other than investment control, the policy instruments currently used to control investment are defective for a second, more important reason; they do not control investment with any precision. To achieve precise control, it would be necessary to estimate a stable "investment equation"—that is, a formula which connects the aggregate level of investment to observable economic magnitudes and policy variables. The more unpredictable the effects of any given policy instrument on investment, the greater the likely divergence between the target level of GNP and the level actually achieved.⁷ Using current policy instru-

7. To be more precise, the magnitude of the induced error in predicted GNP depends upon the effect of the policy instrument in question not simply on investment, but on other constituents of GNP as well. Policy tools are rarely specific in their effects on economic activity; e.g., monetary policy aimed at controlling the level of investment will also affect consumption expenditures through changes in the value of household portfolios. It is conceivable that errors in predicting the effect of monetary policy on investment may be negatively correlated with errors in predicting the effect of the same policies on consumption: thus, overestimating the expansionary impact of monetary policy on investment may be correlated with underestimating its expansionary impact on consumption. This would lead to an error in predicting the effect of monetary policies on GNP that averaged less than the error in predicting the investment effects of the same policies. If the errors in investment and consumption prediction were, instead, positively correlated, we would have the opposite result, i.e., a larger mean error in GNP prediction. For a technical exposition see Brainard, *Uncertainty and the Effectiveness of Policy*, 57 AM. ECON. REV. PA. & PROC. 411 (1967).

The statement in the text amounts to the assertion that there is no negative correlation between (1) the average prediction error of an instrument on the sector of major effect and (2) the correlation coefficient of that error with prediction errors for the instrument in other sectors.

Consider a simple economy, with only two sectors, consumption (C) and investment (I), and a simple policy instrument (P).

Assume:

$$\begin{aligned} C &= a + bP + e_1 \\ I &= c + dP + e_2 \\ Y &= C + I \end{aligned}$$

e_1 and e_2 are random error terms.

Then:

$$(1) Y = a + c + (b+d)P + e_1 + e_2$$

The prediction error will be measured by the error variance, denoted by σ_y^2 . The statement in the text is that $E((Y - Y_{\text{target}})^2)$ is an increasing function of σ_1^2 . In fact it can be shown that:

$$(2) \sigma_y^2 = E((Y - Y_{\text{target}})^2) = \sigma_1^2 + \sigma_2^2 + 2p\sigma_1\sigma_2 \text{ where } p \text{ is the correlation coefficient of } \sigma_1 \text{ \& } \sigma_2. \quad \frac{d\sigma_y^2}{d\sigma_1^2} = 2\sigma_1 + 2p\sigma_2.$$

Only if $p < -\frac{\sigma_1}{\sigma_2}$ will control error be reduced by an increase in investment prediction error. But it is reasonable to expect the prediction error to be larger for the sector of major impact, investment, than for the sector of lesser impact, consumption. Hence we expect $\frac{\sigma_1}{\sigma_2} > 1$. Since p is a correlation coefficient, $p < 1$, and we have $p \geq -\frac{\sigma_1}{\sigma_2}$ which is the result we want.

ments and the best available information, government planners risk missing their target level of GNP by perhaps \$10-\$15 billion.⁸ This uncertainty has obvious costs: if actual GNP falls short of its target level, unemployment will be increased; if the target level is exceeded, inflation will become a threat. The variance also involves what might be called redistributorial costs. For instance, when the government attempts to stimulate investment by lowering business taxes or reducing interest rates, income is redistributed toward, and within, the business sector.⁹ If GNP overshoots its target, the government in effect has given a larger "gift" to the business sector than macroeconomic objectives would warrant.

In addition to these costs of uncertainty, each current policy instrument raises its own particular difficulties:

1. *Tax Incentives.* In 1962, Congress passed legislation providing for a seven per cent tax credit for purchase of new capital equipment.¹⁰ The credit was originally intended as a semi-permanent alteration in the incentives for capital investment, serving growth objectives rather than stabilization policy. But its supposed utility for countercyclical policy proved alluring in 1966, when the inflationary pressures of the war in Vietnam had just begun and the President was not yet ready to ask for an across-the-board tax increase. The credit was suspended in 1966,¹¹ restored in 1967,¹² repealed in 1969,¹³ and restored again in 1971.¹⁴ In addition, the Nixon administration has used changes in the depreciation schedules for investment equipment as an alternative means for stimulating business investment.

In spite of the fairly short delay between presidential request and congressional action in suspending or restoring the investment tax credit, or in altering depreciation schedules, these devices have not proved well adapted to stabilization policy. To predict the effect of these tax changes on a businessman's decision to invest would require a well-specified and stable investment equation—which, as noted above,

8. See note 19 *infra*.

9. Cf. Coen, *The Effect of Cash Flow on the Speed of Adjustment*, in G. FROMM, *supra* note 4, at 131. "Policies that produced an estimated \$5.1 billion (constant 1954 dollars) in tax savings in manufacturing from 1954 through mid-1962 increased manufacturing capital expenditures by only \$2.0 billion during the same period;" *Id.* at 179.

Criticisms of President Nixon's economic measures of August 15, 1971, stressed the redistributive impact of his tax measures, particularly the proposed restoration of the investment tax credit.

10. 76 Stat. 963 (Oct. 16, 1962), 26 U.S.C. § 46.

11. 80 Stat. 1508 (Nov. 8, 1966).

12. 81 Stat. 57 (June 13, 1967).

13. 83 Stat. 660 (Dec. 30, 1969).

14. 85 Stat. 498 (Dec. 10, 1971).

is unavailable. Moreover, the frequent *changes* in tax policy required to meet changing economic conditions have their own unpredictable, and often perverse, effects on private decision-making. The firm's investment plans will depend partly on its perception of the likely duration of the tax credit, credit suspension, or depreciation provision. For example, the profitability of delaying investment is far greater if a suspended credit is thought likely to be restored within a few months than if the suspension is regarded as enduring. In times of cyclical stress, the government's own intentions are unclear, and its assessment of businessmen's predictions of those intentions is triply obscure. But such an assessment now forms the basis for the government's prediction as to the likely course of investment.¹⁵

A frequently suggested alternative tax scheme, the Swedish investment reserve system, suffers from similar infirmities. Under this plan, corporations may—at their option—place a portion of their before-tax profits in a blocked government account free of taxation. During recessions, the government may—at its option—allow tax-free withdrawals of funds for investment in capital equipment or inventories. The plan creates a kind of reservoir of investible funds, which can be released at the government's pleasure. In effect, the Swedish reserve system amounts to a massive, discretionary investment tax credit.¹⁶ Its chief advantage over the American devices lies in its independence of legislative action, but its precise effects on investment are just as uncertain as those of American tax schemes. And, like the American schemes, the Swedish plan may unnecessarily increase the cost to society in altering the level and timing of private investment.¹⁷

2. *Monetary Policy.* Monetary policy is supposed to affect investment through a two-stage process. Changes in the money supply are expected to influence interest rates and yields on corporate stocks; these rates

15. For an example of an equation taking explicit account of the difference between a permanent and a temporary change in investment expectations see Klein & Taubman, *Estimating Effects Within a Complete Econometric Model*, in FROMM, *supra* note 4, at 197. The Klein and Taubman model does not, however, take account of the role of expectations concerning policy changes.

16. See Lindbeck, *Theories and Problems in Swedish Policy in the Post-War Period*, 58 AMER. ECON. REV. 1, 40-47 (Supp. June, 1968) which provides a description of the Swedish system.

17. The Swedish plan allocates to private corporations much of the long-term risk inherent in the business cycle. A corporation deciding whether or not to use the plan must predict the likelihood and timing of future economic downturns which would trigger release of the funds. Since these predictions involve great uncertainty and draw on no special knowledge on the part of the corporation, the government may have to pay a high price in terms of tax incentives in order to induce businessmen to accept such risks. Providing such incentives may involve not merely a transfer but also a misallocation of resources if society at large is a more appropriate bearer of business cycle risks than is any individual business.

and yields, in turn, influence corporate investment.¹⁸ The latter relationship is subject to the inaccuracies of the investment equation. In addition, the influence of monetary policy on interest rates is subject to long and variable lags, further complicating the task of prediction.¹⁹

Aside from predictive difficulties, the use of monetary policy to affect investment involves substantial and frequently undesired side-effects. First, shifts in monetary policy can result in significant redistribution of income between borrowers and lenders, and between society at large and those living on fixed interest obligations.²⁰ Second, the housing industry, in particular, bears a disproportionate share of the burden of a restrictive monetary policy. The tight money policy of late 1965—early 1966, for example, reduced housing starts 40% from the fourth quarter of 1965 to the fourth quarter of 1966; outlays for residential structures fell nearly \$6 billion during the

18. See note 4 *supra*.

19. There does not seem to be any reference which focuses on the precise question of concern to this article: the prediction error of estimated investment equations, as this affects policy-making. But studies of related questions are suggestive. See Kareken & Solow, *Lags in Monetary Policy*, in COMMISSION ON MONEY AND CREDIT, STABILIZATION POLICIES 14 (1963) which stressed the existence of a complex series of lags which, taken together, introduced substantial uncertainty into the prediction of the effects of monetary policy.

The authors have been supplied with data for the one quarter investment prediction errors for three major econometric models: Wharton School (for years 1968-70), University of Michigan (1968-70), MIT-FRB (1967-69). In each case the forecasts fall within the estimation period of the model, i.e., the equation is fitted using data through 1970 and the fitted equation is then used to generate forecasts for quarters prior to 1970, using only information available in the immediately preceding quarter.

The mean, single-quarter, forecast errors are \$1.1 billion (MIT-FRB), \$1.3 billion (Wharton) and \$1.5 billion (Michigan). The standard deviations of these errors are estimated as \$5 billion, \$9 billion, \$12 billion, respectively. With single-quarter multipliers of only about 1.2 (see, e.g., Ando & Goldfeld, *An Econometric Model for Evaluating Stabilization Policies*, in STUDIES IN ECONOMIC STABILIZATION 215 (Ando, Brown & Friedlaender eds. 1968)) the implied control errors are quite small, \$1.5-\$2 billion compared with a GNP of about \$1,000 billion for the period and annual changes of about \$50 billion.

These errors, however, are clearly underestimates of the errors relevant to policy decisions. Genuine forecasts, i.e., forecasts outside of the equation's estimation period, as would be required for policy purposes, will have a larger mean error. Evidence for this essentially mathematical proposition can be taken from the Wharton model. Using an equation estimated on data through the fourth quarter of 1967, one-quarter forecast errors are obtained for 1969 and 1970 that fall between \$11.6 billion and \$16.1 billion.

The work of Kareken and Solow points to a lag of three quarters between the actions of monetary authorities and their initial stabilizing impact. Hence monetary authorities need to make at least three-quarter forecasts of investment. The longer the period of the forecast, the greater is the mean error. In addition, a longer forecast period is associated with a larger multiplier—i.e., investment prediction errors lead to larger GNP control errors. Ando and Goldfeld, *supra*, estimate the multiplier to rise from 1.2 to approximately 2.8; a \$1.5 billion prediction error becomes a \$4.2 billion control error.

On the basis of these figures and arguments we conjecture that a policy-maker using existing macroeconomic models and conventional monetary instruments to attain target levels of GNP, quarter by quarter, might well find actual GNP deviating from his target by an average of \$10 billion to \$15 billion annually.

20. See Brownlee & Conrad, *Effects upon the Distribution of Income of a Tight Money Policy*, in COMMISSION ON MONEY AND CREDIT, *supra* note 19, at 499.

same period.²¹ Business capital spending and inventory investment—the major targets of the substantially tight money policy—were far less substantially affected.²² As the former Chairman of the Council of Economic Advisors, Arthur Okun has observed, the government, through its tight money policy, was in effect using a stiff excise tax on new homes as its primary tool of macroeconomic control.²³

The sharp impact of monetary policy on the housing industry has, at times, inhibited its use for macroeconomic objectives. Reacting to these extreme results of the 1965-66 crunch, the Johnson administration decided not to use monetary policy to control inflation during 1967 and 1968 while Congress was stalling on the Administration's proposed tax surcharge. "A stabilization policy," Okun argues, "that continued to kick homebuilding while it was down and that once again put enormous pressure on financial markets would not have met social priorities, even if it made prices behave."²⁴

Third, the use of monetary policy also has significant side-effects on financial institutions, especially those designed to serve the housing market. Savings and loan associations are limited by law as to the kind of assets they may acquire. The bulk of their funds is channeled into the home mortgage market. They "lend long and borrow short."²⁵ As a result, they are vulnerable to a sharp cost squeeze in times of rising interest rates, when the payments they must make to depositors rise while much of their mortgage income remains fixed.²⁶ In order to safeguard their solvency, the federal government has had to prevent competition among savings and loan associations for deposits by imposing a ceiling on the rates payable to depositors.²⁷ In addition, to prevent a flight of deposits from savings and loans to banks, the ceiling on bank time deposit interest rates must be kept in line with that adopted for savings and loans. The result is a system of restriction which impedes the optimal flow of savings and sharply discriminates against small savers. While blame for this difficulty can more prop-

21. OKUN, *supra* note 6, at 80.

22. Crockett, Friend & Shavell, *The Impact of Monetary Stringency on Business Investment*, 47 SURVEY OF CURRENT BUSINESS 10-27 (1967).

23. OKUN, *supra* note 2, at 80-81.

24. *Id.* at 85; see also COUNCIL OF ECONOMIC ADVISERS, ANNUAL REPORT FOR 1968 at 84-85 (1969).

25. C. KREPS, JR. & D. LAPKIN, IMPROVING THE COMPETITION FOR FUNDS BETWEEN COMMERCIAL BANKS AND THRIFT INSTITUTIONS 42 (1963). This pamphlet is summarized in an article by the same authors, *Public Regulation and Operating Conventions Affecting Sources of Funds of Commercial Banks and Thrift Institutions*, 17 J. OF FINANCE 289 (1962).

26. C. HAYWOOD & C. LINKE, THE REGULATION OF DEPOSIT INTEREST RATES 69 (1968).

27. Regulations with respect to interest rates are issued by the Federal Deposit Insurance Corporation pursuant to 12 U.S.C. § 1828(g) (1970).

erly be apportioned to the rigidities of the law governing housing finance institutions, rather than to the use of monetary policy, the existence and vulnerability of savings and loans adds a major social cost to the use of monetary policy.

A final shortcoming of monetary policy is its impact on our international accounts. When low interest rates are commanded by domestic growth or stabilization policy, they may nonetheless have to be foregone in the interest of attracting and holding internationally mobile funds.²⁸ The Kennedy administration confronted this dilemma in the early sixties, when domestic unemployment coexisted with balance of payments deficits.²⁹ The administration attempted to separate the two objectives by decreasing long-term interest rates while increasing short-term rates, on the theory that the former were more relevant to domestic growth while the latter determined foreign investment.³⁰ The result was a massive flow of dollars into foreign long-term investments. Once more, the experience demonstrated the short international tether of domestic monetary policy.

Alternatives to Indirect Control of Investment

During inflationary periods, a number of nations have turned from these imperfectly predictable indirect instruments to direct control of investments. Great Britain, for example, required in the postwar period that all major investments in new buildings within leading sectors obtain government licenses issued according to the government's assessments of prospects and priorities.³¹ An alternative system could function in the same manner as the American controls on direct investments overseas which limit investment for each firm to some percentage of the amount invested during a base year, without administrative discretion to dictate ceilings for particular firms or

28. See R. COOPER, *THE ECONOMICS OF INTERDEPENDENCE* 157-58 and *cf.* R. TRIFFIN, *THE WORLD MONEY MAZE* 118-32 (1966), cited in COOPER, *supra*.

29. See historical discussion in *ECONOMIC REPORT OF THE PRESIDENT* 143 (1969); see also, SCHLESINGER, *A THOUSAND DAYS* 599 (1965).

30. See B. COHEN, *BALANCE OF PAYMENTS POLICY* 155 (1969). R. Cooper, *The Interest Equalization Tax: An Experiment in the Separation of Financial Markets*, *FINANZARCHIV* 447-71 (1965).

31. See J. DOW, *THE MANAGEMENT OF THE BRITISH ECONOMY 1945-1960*, at 197 (1964). Most building work was subject to control until 1955, although "for the first three or four years after the war the building controls were not an effective restraint simply because they were not rigorously applied." *Id.* at 150.

Investment in plant and machinery and vehicles . . . was subject to no similar direct control. Nevertheless the government possessed some informal influence: there were various "arrangements, statutory or voluntary, with various sections of the engineering industries about the division of output of plant and machinery between the home and export markets."

industries. But either system suffers from the characteristic shortcoming of any system of central planning: massive misallocation of resources is risked by making economic decisions independently of market constraints.

II. The Certificate Plan: Fundamentals and Objections

The investment certificate plan, used as an alternative or supplement to the currently available means for influencing investment, would combine the certainty of direct controls with the use of the market mechanism characteristic of indirect controls. It represents no more of an interference with the market economy than does the use of monetary policy for stabilization purposes, yet its effects on investment and aggregate economic activity would be more predictable in direction, scope and timing. The following are the plan's major features and the objections that might be lodged against it.

A. *Administration*

The certificate requirement would be applied at two levels of the production process.³² First, business firms which purchased new plant and equipment would be required to hold certificates covering the net amount of their purchase for the period in question (for the purposes of illustration, the calendar year 1972). The requirement would not be enforced on an item-by-item basis, but rather would be based on records contained in the corporation's books. Thus, for example, a furniture manufacturer who purchased hammers, saws and paint applicators during 1972 would not have to buy a separate certificate for each hammer. Rather, his purchases of 1972 certificates would have to equal the change (before depreciation) in the book value of his total investment in equipment. Depending on the enforcement scheme chosen, failure to meet this requirement could result either in denial of the right to take tax deductions for depreciation on 1972 purchases of equipment, or other specified penalties.

Second, manufacturers of producers' goods would be required to hold certificates equal to the net increase, during 1972, of their inventory of finished goods and "goods in process." (Like other firms, they would also be required to hold certificates for their own *pur-*

32. The following discusses the case in which certificates serve as a permit to invest. The "promise" case (involving a government subsidy for investment) would be handled analogously.

chases of plant and equipment as well.) Firms which experienced a net decrease in these categories would be allowed to sell an equivalent amount of their goods with a warrant exempting the purchaser from compliance with the certificate requirement with respect to such goods.

Some goods have both household and business use and are thus not unambiguously "producers' goods" (typewriters, for example). Producers of goods with substantial household use (say, over 20% of total sales) would be exempted from the requirement of holding certificates for any increase in inventories of these goods. Business firms which purchased such goods would, however, still be required to hold certificates in the amount of their total purchases.

Consumer durables (such as automobiles and television sets) might conceivably be included in the certificate scheme, but their inclusion would be less likely to improve the predictability of GNP than would the imposition of the certificate requirement on business investment. Consumers who, because of the certificate scheme, are priced out of the market for durables are likely to increase their demand for non-durables. Predicting the degree of such substitution involves substantial estimation difficulties.³³

1. *Duration of Certificates*

To achieve maximum predictability of investment, the government would probably wish to limit the certificates' validity to a period shorter than one year—three months seems a likely target. On the other hand, high costs might be imposed on businesses if they were allowed no leeway for error in matching their certificate purchases to their investment experience over such a short period. A sensible compromise might involve issuing certificates every month, valid for three months without penalty and for some time thereafter subject to a mild but increasing penalty. In this manner, the plan could avoid the danger of an end-of-the-period scramble for certificates, while still allowing considerable precision of investment forecasts by the government.

2. *Future Market*

Since investment expenditures are often planned well in advance of the day of order or manufacture, firms will wish to assure themselves of the price and availability of certificate "futures"—that is, of

³³. Extension of the certificate scheme to cover inventory investment and housing is discussed at pp. 1278-79 *infra*.

certificates whose period of validity begins at some point in the future. Once the certificate scheme took effect, a private futures market would undoubtedly develop to serve this need. But the government might wish to improve the liquidity and stability of the futures market by itself issuing certificates of future validity. It might issue a constant number of certificates in advance of each period, withholding the remainder until the period had begun, or it might publish in advance its best estimate of the total number of certificates it will wish to have outstanding once the period begins. In either case, the government would reserve the right to make open market purchases and sales of certificates before and during the period in response to changes in its own predictions or targets.

3. *Issuing Authority*

The agency administering the investment certificate plans would have power not merely to affect the over-all course of the economy, but also to affect relative distribution between the corporate and non-corporate sectors. For both these reasons, Congress would be reluctant to delegate power over the certificate plan to an executive agency. Yet recent experience with tax rate changes confirms the charge that Congress itself acts too slowly for optimal macroeconomic control.³⁴

One solution would be for Congress to entrust the certificate scheme to the Federal Reserve Board, or some other quasi-independent agency.³⁵ The power to control the supply of investment certificates would be comparable in scope and political sensitivity to the Federal Reserve Board's control over the money supply. Monetary policy affects the economy as significantly, if somewhat less predictably, than would aggregate investment control; and it has a similar magnitude of impact on the distribution of income. (Of course, to the extent that the investment certificate scheme achieves more precise control than does monetary policy, its administrator would have greater power over the economy.) If, for some reason, Congress chose not to delegate certificate authority to an independent agency, it might allow an executive agency to manage the scheme subject to statutory restrictions on the quantity, or maximum and minimum allowable price of the certificates. The more severe these restrictions are, however, the greater would be the chance that the certificate scheme would

34. See Ando & Brown, *Lags in Fiscal Policy*, in COMMISSION ON MONEY AND CREDIT, *supra* note 19, at 97.

35. Creation of a new independent agency to administer the certificate scheme would have the disadvantage of compounding the difficulties of coordination that already exist among Congress, The Federal Reserve Board, and the Executive Branch.

suffer from some of the same drawbacks as congressionally set fiscal policy.

B. *Possible Objections*

The certificate plan is not, of course, a flawless policy instrument. Much more would have to be known about its administrative costs and difficulties before it could conceivably be adopted. The purpose here is merely to suggest that serious consideration of the plan is warranted. This article argued above that current policy measures are inadequate, in type and number, to the tasks assigned them. Here it notes the major objections that might be raised to the certificate plan, and argues that they are not fatal to its prospects.

1. *The plan will not actually stabilize GNP. Unpredictable fluctuations in investment have merely been replaced by unpredictable fluctuations in the price of certificates. The latter—representing changes in the government's budget and in the income of the business sector—will lead to fluctuations in GNP.*

This objection is only partially correct: The certificate plan could not remove *all* GNP variation due to the unpredictability of investment decisions, but it could greatly reduce such variation. It is true that when certificates sell at a premium the corporate sector will lose income to the government, while the reverse will occur when the certificates carry a subsidy. But these changes in the government's receipts and expenditures need not lead to automatic changes in GNP. Additional budget receipts could be sterilized by the government. As for the flow of subsidy to the corporate sector,³⁶ this will affect GNP only if, and to the extent, that the corporate recipients of the subsidy spend the money in ways which increase aggregate demand. The subsidy money might be spent in any of four ways: fixed investment, inventory accumulation, dividend payments, and loans to other corporations. These must be separately considered.

For the economy as a whole, an unwanted increase in fixed investment will be impossible so long as the government refuses to issue new certificates to meet the raised demand for investment. Such raised demand would thus lead only to an increase in the price of outstanding certificates, or of certificates issued in succeeding periods. As for inventory accumulation, studies have shown that it is determined almost solely by expected sales and is insensitive to short-run

36. Analogous arguments would hold in the case where corporations were paying a premium to the government rather than receiving a subsidy.

variations in the availability of corporate capital.³⁷ Nor should a flow of subsidy appreciably increase corporate dividend payments: *i.e.*, these payments are typically tied to a corporation's long-term profit expectations, not to short-run fluctuations in cash flow.³⁸ Even if dividend payments are increased, their impact on the consumption behavior of shareholders is attenuated by the "double tax" on dividends and, to some degree, by the lower-than-average marginal propensity to consume of dividend recipients. A flow of subsidy might be expected to increase loans to other corporations, either directly or through financial intermediaries. The certificate scheme itself ensures that these loans will not be translated into increased fixed investment. But the enhanced availability of loanable funds will arguably depress the interest rate, thereby producing some increase in stock prices; a similar increase will also mark the shares of corporations which merely "hold on" to the subsidy money they receive from the certificate scheme. Although a rise in stock prices increases the wealth of the household sector, experience shows that changes in wealth have only negligible effects on household consumption decisions in the short-run.³⁹ To summarize, unpredictable fluctuations in the auction price of investment certificates may induce some undesirable variations in GNP, but nothing like the wide swings in GNP currently induced by unpredictable fluctuations in the level of investment.

2. *The certificate plan would distort the relative prices between consumption and investment goods, and between plant and equipment investment and other kinds of investment.*

This is true. But it is not always true that adding a new distortion to an economy already riddled with market imperfections will decrease over-all efficiency.⁴⁰ More important, the certificate plan is not

37. Lovell, *The Determinants of Inventory Investment*, in *MODELS OF INCOME DETERMINATION* 122 (E. Denison & L. Klein eds. 1964).

38. Lintner, *The Distribution of Incomes of Corporations Among Dividends, Retained Earnings and Taxes*, 46 *AM. ECON. REV.* 97 (Supp. May, 1956).

39. Cf. Friend, *Determinants of the Volume and Composition of Saving with Special Reference to the Influence of Monetary Policy*, in *COMMISSION ON MONEY AND CREDIT, IMPACTS OF MONETARY POLICY* (1963). One other effect of the certificate plan is worth consideration. Corporations, frustrated in their plans to make domestic purchases of new plant and equipment, might be induced to purchase the shares of domestic or foreign companies, in order to achieve the desired output expansion or diversification. Such purchases might run counter to government antitrust or foreign investment policy, and would put additional strain on the enforcement of these policies. But a government seriously committed to antitrust, or foreign investment control, should still be in a position to enforce the law and achieve its objectives.

40. According to "the theory of the second-best," taxing or subsidizing investment goods need not always increase the degree of non-Pareto optimal distortion in the economy, assuming that some distortions would exist even without the tax or subsidy. See Lipsey & Lancaster, *The General Theory of the Second Best*, 24 *REV. OF ECON. STUDIES* 11 (1956).

alone in having non-neutral price effects: All macroeconomic policy instruments have such effects. Use of monetary policy, for instance, distorts the market's choice between long- and short-term investments. To the extent that the certificate plan minimizes undesirable fluctuations in GNP, it should alleviate the need for emergency, ad hoc measures of government intervention, and thus—in the long run—reduce government distortions of resource allocation. However, should the government wish to have no systematic impact on society's choice between consumption and investment, or between types of investment, the certificate-issuing agency could commit itself to maintain the average certificate price at par (*i.e.*, at face value) over the business cycle.⁴¹

3. *The imposition of the certificate plan could add a new source of uncertainty to business investment and thus impose additional social costs.*

This argument is correct so far as it goes. Firms contemplating making an investment would have to take into account the risk of fluctuation in the price of certificates, and would thus require greater rewards to motivate the gamble.⁴² But the new uncertainty inherent in the certificate scheme would be offset by reduced instability in both interest rates and aggregate demand. Since monetary policy would no longer be used as significantly to regulate investment, variations in interest rates should be more moderate than those currently experienced. And, if the certificate scheme is successful in its objective

41. The certificate scheme might lead to one especially serious kind of market distortion. If no restrictions were imposed on the importation of new foreign equipment, an above-par price on certificates would induce increased imports. This result might run counter to the government's balance of payments program. In any case, it would increase the uncertainty of predictions about the balance of payments. It would in addition arouse strong political opposition from domestic manufacturers.

Yet it would be inappropriate simply to extend the certificate requirement to cover imports. Imports and domestic investment have opposite effects on GNP; if a single certificate plan covered both categories, the government would need to predict what proportion of the certificates would be used for domestic investment and what for imported equipment. Some of the forecasting advantages of the certificate scheme would be lost.

A preferable plan would be to impose a special tax on foreign equipment purchases equal to the market price of certificates. This would insure the neutrality of the certificate plan with respect to firms' choice between foreign and domestic equipment, without diminishing the precision of the government's control over GNP.

42. Earlier this article criticized the Swedish investment reserve plan for placing on businesses an extra burden of uncertainty in predicting the future course of GNP (a business must decide what percentage of profits to place in the investment reserve fund; a rational decision will depend on the expected likelihood and timing of a recession which would motivate the government to release the funds). But in the case of the Swedish system, the additional uncertainty placed on businesses would not yield any certainty on the government's part in predicting the total level of investment in the period in which the funds are released. Any such prediction would require knowledge of the aggregate investment equation.

of improving the predictability of investment and aggregate demand, business firms could operate with reduced uncertainty about a major source of risk—the general condition of the economy. Over-all, the certificate plan seems more likely to reduce business risk than to increase it. Moreover, even if the certificate scheme did moderately increase the riskiness of business investment, this cost would have to be weighed against the manifold social benefits accruing to everyone from enhanced economic stability.

4. *The plan will subsidize all investors—not solely those requiring a subsidy as an incentive to invest. Thus it will waste government funds.*

The premise is correct but the characterization does not follow. The certificate auction market would be free and competitive, and like all free and competitive markets, it would offer a uniform price to all purchasers, even though some purchasers would be willing to buy at a still higher price. Such markets implicitly offer a bonus (or “consumer’s surplus”) to buyers willing to buy at higher prices, but such a bonus cannot validly be considered a “waste” unless a market which discriminates among purchasers is feasible. In the case of investment, such discrimination would involve impossible information and enforcement costs. It should also be noted that current policy instruments also offer a bonus to investors who would invest even without special government incentives; lower interest rates and the tax credit are available to all who invest, not merely to those who require these inducements to make their investments.

5. *Recessions should be met by increases in private consumption or in government spending, not by subsidized increases in private investment.*

Objections of this sort misperceive the modest function of an investment certificate plan. The plan does not imply that aggregate demand be allocated in any particular way among consumption, private investment, and government spending, nor that any particular component of demand carry the “main” burden of macroeconomic adjustment. The composition of aggregate demand, and the distribution of the adjustment burden, are vital political questions, and must be resolved outside the certificate-issuing agency. But any macroeconomic strategy will include a private investment target, and will be compromised if the target is missed. The certificate plan is designed to improve the accuracy of the government’s aim, not to preselect its target.

6. *Within any certificate period shifts in the private sector’s demand*

for certificates may render a government subsidy needless, and its payment may thus be a complete waste of funds.

To understand this point, suppose that at the beginning of the period a five per cent subsidy was needed to induce purchase of the targeted number of certificates, but that changes taking place within the period (for example, in the interest rate, or in the foreign demand for American goods) raised the market price of certificates above par, so that they commanded a premium rather than offered a subsidy. The government, nonetheless, would remain bound by its initial offering of certificates to pay out the five per cent subsidy. But can this subsidy be considered wasted? The government was, under conditions of uncertainty, acting to insure results that it desired; the price it paid for this insurance is no more wasted than any insurance premium designed to guard against an eventuality that did not occur.

7. The program would involve prohibitive administrative costs.

This may be a fatal objection; only a comprehensive study of the plan could dismiss or confirm it. In a complicated economy, enforcement of the certificate scheme is bound to require a substantial and expensive enforcement machinery, and to impose additional book-keeping and transactions costs upon businesses. We have no way of estimating these costs, except to observe that they seem likely to be substantially smaller in magnitude than the costs of running the stock market and brokerage industry—a set of institutions whose significance for allocative efficiency has been questioned.

To summarize, the chief difficulties with the certificate scheme are its novelty, scope and administrative cost; while its advantages are its potential for precision, its ability to liberate monetary policy for the pursuit of non-stabilization objectives, and the simple fact that it would provide an additional, independent instrument of macro-economic policy to a world whose goals chronically exceed the capacity of its means for attaining them.

III. The Certificate Plan: Details and Alternatives

A. *Scope of Coverage*

The certificate plan proposed in this article would be limited to investment in new plant and equipment by businesses. Equipment could be given the same meaning for the purposes of the certificate plan that it has under the provisions of the investment tax credit.

Investment in plant is not covered by the tax credit, but a definition of this category would seem relatively straightforward.

Conceivably, the certificate plan could be extended to include business investment in inventories, or investment by the public in new housing, as well as business investment in plant and equipment. But severe administrative difficulties would discourage the first of these possible extensions. To measure the change of inventories on a less-than-annual basis, substantial new accounting requirements would have to be placed on business firms. Quarterly audits and inventory checks would add significantly to the cost of doing business for millions of small firms throughout the economy. To some extent, these difficulties could be eased by exempting small firms from the certificate requirement. But such an exemption would produce uneconomical substitution of purchases between large firms and small firms, and might encourage large firms to set up satellite small firms to hold their inventories.

Fortunately, there seems little need to include inventories in the certificate plan. The available evidence indicates a low level of correlation between inventory investment and plant and equipment expenditure. Thus, exemption of inventory investment from the plan would not be likely to tempt firms to divert plant and equipment spending into inventory accumulation. Most commentators conclude that the demand for inventories is largely determined by the technical relationships between inventory and production levels, and is strongly price-inelastic.

A better case can be made for including housing under the certificate plan. Housing starts, unlike inventory accumulations, are strongly price-sensitive; there is little doubt that new housing construction could be curtailed or expanded by including it under the certificate scheme. Of course, for reasons of social policy, the government may wish to treat housing differently from other types of investment, and render it less vulnerable to swings in macroeconomic policy. This might be accomplished by enacting a compensatory subsidy for investment certificates used for housing construction during periods of sharp contraction, or by issuing separate housing certificates whose supply could be precisely controlled. In either case, however, significant administrative difficulties would arise. A large percentage of housing construction is carried out by small enterprises; it might be difficult and costly to police their possession of certificates in the precise amount of the new construction (completed and uncompleted)

Investment Certificates

they have accomplished in a given quarter. For these reasons, the discussion here is limited to the categories of plant and equipment.

B. *Effective Date of Investment*

In recent investment tax credit legislation, the effective date of the investment has been the date on which a legally binding, non-contingent order was placed, while the credit itself has been available only upon payment or delivery. For purposes of macroeconomic management, neither date is totally satisfactory. Using the date of delivery is unsatisfactory since it may come long after the major part of expenditure for the capital good. But the time at which a capital goods manufacturer receives an order need have no necessary relation to the time at which the manufacturer increases its hiring of workers and accumulation of inventories to meet the order; and it is this latter date (or dates) which is relevant to the determination of GNP. Of course, an addition to a manufacturer's backlog orders may affect the manufacturer's own investment plans, but under a continuously effective investment certificate plan this effect would show up only as an increase in premium for future (or conceivably current) investment certificates, and not as an increase in total investment. Similarly while an increase in backlog might prompt higher dividends by the manufacturer, this result is unlikely to be immediate or comparable in magnitude to the size of the increase in backlog. In sum, using the date of order as the measuring point for investment seems inappropriate.

Instead, an ideal certificate plan would define investment as dating from the time, and to the extent, that it appears as work in progress in the accounts of the construction firm or capital goods manufacturer. The full value of the investment would be recognized when production was complete. Thus, firms specializing in investment goods would have to purchase certificates representing the value of any increase in their inventories of materials and finished goods. The prices they charged for such goods would, of course, reflect the burden (or benefit) of the certificate requirement.

C. *Enforcement*

If the plan defines investment as binding orders for or actual delivery of plant and equipment, the enforcement problems are rather minor. If, as suggested above, investment is defined as work in progress, matters are more complicated. The two cases are taken in turn.

1. *Where the certificate requirement applies only to the final purchaser of the investment good.* Enforcement of an effective ceiling on investment could be accomplished conveniently through the tax system. Firms could be denied tax write-offs for depreciation of any investment not covered by investment certificates. Ordinarily, the present discounted value of the right to depreciate new plant or equipment would substantially exceed the market price for the necessary investment certificates. Some additional penalty would be needed in order to cover the remaining cases. Enforcement of this penalty would require little more than the normal audit of the investing corporation's books necessary to prevent capital items from being charged as current expenses in order to reduce income taxes.

A more complicated method of enforcement would be necessary when the government offers a subsidy in return for an agreement to invest. If the certificate simply represented a pledge by the original purchaser to make a given amount of investment or to ensure that his transferee would do so, then the government would have to restrict initial purchase of certificates to parties thought to be trustworthy or at least not judgment-proof. In addition, a mechanism would have to be developed for assuring the initial purchaser that all subsequent transferees would be likely to comply with the investment requirement. While such mechanisms are conceivable, this article has suggested above the more convenient method of incorporating the agreement to invest in an instrument with substantial face value, redeemable only upon presentation of proof that the stipulated amount of investment has been made. So long as the face value of the bond (*e.g.*, \$200 on an agreement to make \$1000 of investment) exceeded any likely value of the subsidy required to clear the market in certificates, enforcement should prove automatic. The only drawback to this plan would be the drain on credit markets required to pay the initial premium. This difficulty could be eased by allowing credit-worthy institutions to buy the bonds on margin, shifting to them the burden of enforcing the investment requirement on their transferee or requiring full payment or alternative collateral.

2. *Where the Certificate Requirement applies to goods in process and equipment producers' inventories.* A different administrative scheme would be required in order to gear the certificate plan to the time at which goods are produced rather than time of order or delivery. Producers would be required to possess certificates covering any increase during the relevant period in their goods in process and

finished goods. They would be allowed to transfer investment certificates to purchasers of new equipment in the amount of any net decrease in the two inventory accounts. Purchasers, in turn, would be required to buy the certificates on the open market if they did not obtain them from producers. In this manner, the regulation would ensure that the amount of certificates required to be purchased in any period would equal the total production of investment goods (including goods in process), since total production is equal to sales plus or minus the change in inventories.

A similar scheme would be used if investment certificates were incorporated in a fixed-value instrument in order to provide a subsidy for investment. Producers would be entitled to validate the certificate (that is, to redeem certificates at their face value) to the extent of any new production during the period. The price charged to purchasers of investment goods would, in normal circumstances, adjust to reflect this subsidy to producers.

One difficulty with the certificate scheme is that businesses would have an incentive to alter their accounting methods, or even their records, to take advantage of changes in the certificate price. Several considerations, however, limit the likely extent of such alterations.

First, accounting definitions of "goods in process" are already in common use, and are to some extent policed by independent auditors in the normal course of their verification procedures. Corporations whose stock is listed on an exchange are at present required to distinguish between raw materials and goods in process in their annual statements. Moreover, since raw materials are considered better security than goods in process, conscientious independent auditors are already motivated to enforce the distinction. While it is conceivable that small companies might collaborate with accountants to violate the certificate plan's accounting regulations, such behavior in the case of large corporations would almost certainly run too high a risk of detection to prove attractive.

Second, explicit modifications of the definition of goods in process could be controlled by a requirement that the modification be made in advance of the first period for which it is to be applied, and be used consistently for several subsequent periods. Similar restrictions are used to prevent tax-motivated changes of other accounting conventions. Finally, market forces will place some limits on both the predicted and actual degree of fluctuations in the certificate price; thus there may often be no strong incentive for altering the time at

which a given investment is recognized for the purposes of the certificate requirement.⁴³

D. *Duration of Certificates*

There are three related questions to be decided with respect to the time for which certificates will be valid; first, the period of primary validity; second, the schedule of penalties for use of the certificate after this period; third, whether certificates should be issued on an overlapping basis (*e.g.*, certificates valid for a year but issued monthly), or sequentially.

The simplest alternative would be to issue certificates valid for a fairly ample fixed period (say, three months to a year), unusable after the date of expiration, and non-overlapping with prior issues. The government would then know the precise amount of investment promised (or permitted) during each period. Businessmen would have to make sure that their investments were undertaken during the period for which they purchased certificates; if, toward the end of the period, they found themselves with excess certificates, they would have to dispose of them on the secondary market or lose their entire value.

This scheme has three drawbacks. First, it might promote an uneconomic rush to invest toward the end of each period. Second, if

43. Two cases must be distinguished. If the anticipated alteration is one which must be made in advance, then the investment certificate plan will be imperiled only to the extent that firms agree upon the likely direction of certificate price change and make accounting modifications which reflect that agreement. (If firms have opposite anticipations, then the accounting modifications they make are likely to cancel out.) But the existence of a market in certificates places rather narrow limits on the extent to which any given price movement will be anticipated in advance by a large majority of participants in the market. If, for example, the certificate prices were \$100 in December and were universally expected to reach \$120 in January, then firms could buy equipment in December, hold it for a month and then resell it at a profit in January. Either the current price or the anticipated future price will adjust to prevent such riskless arbitrage. (This example assumes that there is no anticipated countervailing change in equipment prices; the gap between the current and anticipated price for goods is also limited by similar possibilities for arbitrage.) If the accounting modifications or evasions are ones which can be made after the fact, then the relevant price fluctuations are those which actually occur rather than simply those which can confidently be anticipated. The possibility of arbitrage restrains actual price fluctuations, as well as anticipated ones, but not in such an automatic manner or within such narrow bounds.

If, contrary to the argument here, there were occasions when price anticipations on the part of potential rule-evaders were focused in a single direction, then orientation of the investment certificate plan to the time of production might actually alleviate some problems of enforcement or of ensuring compliance. Assume, for example, that the date of order rather than the date of production were taken as dispositive. If investment certificates commanded a premium which was expected to be transitory firms would find it advantageous to make informal orders for later delivery rather than subject themselves to liability at current rates. Since these orders could induce suppliers to expand production, the macroeconomic consequences of the informal orders might be indistinguishable from those of more formal undertakings.

the government did not announce the number of certificates it would offer during a period until the beginning of that period, then the price of certificates might jump or fall considerably between the end of one period and the beginning of the next. Some businesses might invest in the latter part of the first period in the hope that the price on certificates would fall (or the subsidy rise) between periods, and that they could disguise or alter the date of the transaction to take advantage of the new situation. While some incentive to tinker with the timing of transactions is inevitable in any tax system, the non-overlapping certificate plan might needlessly aggravate the problem. Finally, the government might try to avoid this problem by announcing its plans in advance. The market price of certificates would then adjust to prevent large discontinuities between the price of the certificates in successive periods. Thus, for example, if the government announced in September, 1970 that it would greatly expand the number of one-year certificates issued in 1971, then the premium on 1970 certificates would probably fall close to the level expected in January, 1971 for 1971 certificates. Since firms always have the option of postponing their investments, few would pay a price in September, 1970 that greatly exceeded the price they would have to pay in 1971. But, to the government, this policy of advance notice has the cost of decreasing effective control over the economy. The government's decisions in September about the appropriate level of investment for 1971 are bound to be less informed than its decisions in January.

The end-of-the-period investment rush could be avoided if certificates did not become invalid at the end of the designated period, but could be used for some extended period upon payment of a gradually increasing penalty. Thus, for example, a one-year certificate might be valid for an additional three months, with a penalty of one-quarter to one-half per cent of the amount invested per one week delay in the use of the certificate. This provision would encourage certificate holders to use the certificates on time, but would not make the penalty for delay so great as to encourage fraudulent or wasteful exertions to obtain the benefit of the certificates. From the government's point of view, the difficulty of this proposal is that it would reduce the predictability of investment during any given time period.

A similar objection would apply to a plan in which investment certificates were staggered in expiration date rather than expiring all at once. Suppose, for example, that each month the government issued

a new batch of three-month certificates. Then, in order to predict how much investment would occur in any quarter, the government would have to estimate how many certificates remained outstanding from the previous quarter, and how many of those issued in the given quarter would not be exercised until the succeeding one. A staggered system would achieve greater continuity in certificate prices, at the expense of a loss in predictability of effects.

There is no a priori way to decide the appropriate length and timing of certificates; some experimentation would undoubtedly be necessary. The choice of terms is probably not too significant, since smoothing of prices by speculators will probably ease the rigidities of any scheme.

E. Mechanics of the Auction and the Secondary Market

The mechanism for auctioning off certificates could be designed on one of two assumptions. On the one hand, the government might prefer to encourage a fairly concentrated market of certificate brokers who would themselves undertake the task of distributing certificates to other brokers and investors. In that event, the government might accept sealed bids from underwriting syndicates for all or a substantial part of the certificates to be issued at any one time. Alternatively, the government might wish to deal directly with a far larger clientele. It would then accept sealed bids in the form of demand schedules, indicating the number of certificates the bidder would be willing to purchase at each of a number of market prices. Thus, for example, a medium-size firm wishing to bypass the certificate brokers might declare its willingness to purchase \$5,000,000 in certificates if they carried a 3% subsidy, and \$3,000,000 if they demanded a 1% premium. The government would then aggregate the demand schedules and set a price which would clear the market.⁴⁴

The government's role in managing investment need not cease once certificates have been issued. If shifts in government expenditure

44. If the government selected the second system, it would have the opportunity to act like a monopolist in tailoring the number of certificates it offers to its knowledge about buyers' demand schedules. Thus, for example, if the government were concerned with maximizing its revenue from the certificate plan, it could issue a number of certificates corresponding to the level at which the marginal revenue from the sale of additional certificates would be zero. Presumably, however, the authorities would be more concerned with stabilization than with revenue, and will use knowledge of the demand schedule merely as an aid toward precise definition of their investment objectives. Thus, for example, the authorities might wish to hold investment down to \$100 billion providing that the distortion such a ceiling would cause would not exceed that implied by a five per cent price on certificates; but at any higher price, they would be willing to make some sacrifice of stabilization objectives in the interests of allocative efficiency.

plans, or other change in the economic environment altered the premises underlying the original issuance of certificates, the government could enter the market to buy back certificates or could issue more. While such a move might frustrate the expectations of certificate holders, the government should retain the same flexibility to manage the certificate market that it now has to manage the debt market. Indeed, one objective of government intervention might well be to stabilize the price of investment certificates and reduce speculative risks.

IV. Conclusion

The proposal presented in this article would allow the government to control directly the amount of private investment in plant and equipment and thereby avoid the uncertainties and undesired side-effects of indirect controls now used. Direct government control of private decisions is often associated with misallocation of resources. To avoid this problem, the government would auction investment certificates among firms: each certificate would signify the right or duty to participate in a total target amount of investment. This target amount thus would be distributed (through a market mechanism) to those firms with the most profitable investment opportunities during a particular period.

The general analysis of the plan presented here suggests that it could have a variety of advantages, warranting a more thorough investigation. It would add an instrument to the government's scant arsenal of macroeconomic policy tools. It would admit of great flexibility in application. In accuracy of impact on investment, and in minimizing side-effects, the certificate proposal would be clearly superior to the tax and monetary policies currently employed by the government. There is the danger that it might entail prohibitive administrative costs, but only a complete cost benefit study of all its ramifications could settle that issue.

One thing is certain: the performance of present policies will not improve even marginally until a stable investment equation is estimated. That task is beyond the capacity of today's most sophisticated econometric techniques, and it may well prove unachievable. The time for serious consideration of new approaches is obviously at hand.