Government Equity-Bonds and Stabilization: A Proposal

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A substantial group of monetary economists believes that the goal of monetary policy and debt management is to achieve stabilization targets by controlling the ratio of the market value of the stock of capital to its replacement value or, in James *Tobin's* notation, q. Because production decisions take time, market and replacement values can differ although in a very long run equilibrium q must equal one. From this perspective, monetary policy works in a most circuitous fashion. By changing the relative proportions of bonds and money held by the public, monetary policy exploits the substitutability in portfolios between money and capital and between bonds and capital to change q. *Tobin* [1971] has conjectured that bonds and money (both being nominal debt) are more substitutable in portfolios than either asset is for capital; thus, open market operations which change one type of debt for another are not the ideal tool to alter the value of q. In fact, one of *Tobins's* arguments for government issued purchasing power bonds is that they would be effective levers on q.

Now it has long been recognized that open market operations need not be restricted to government bonds. *Ritter* and *Silber* [1973] argue that "the reason for limiting its open market operations to the purchase and sale of government securities is quite obvious; who would determine whether the Federal Reserve should buy General Motors stock or IBM?"[1] With the current spectrum of assets, the only way in which the Fed can directly intervene in the equity market would be to buy particular shares of securities or mutual funds. As *Ritter* and *Silber* point out this would even tempt angels not to mention our political officials. If the government issued an equity linked security, it could intervene in the purchase and sale of its own security and avoid this particular set of difficulties. Subject to a few qualifications, our proposal is that in financing its deficit the government should issue, along with traditio-

[1] *Ritter* and *Silber* [1973] p. 16.

nal bonds, a security which is linked directly to a stock market index. For the remainder of this paper, we will discuss the nature of such an equity-bond and argue that not only is it feasible for the government to issue such a security but that it will potentially provide a more accurate stabilization tool than is currently available. Before turning to the specifications of the equity-bond, it will be helpful to review the evidence for the value of the stock market as a major determinant in GNP.

In the course of this paper, we will often speak of controlling the stock market, but the reader should bear in mind that the goal of monetary policy is to control q. Stock prices can change without q changing for a number of reasons; primarily, changes in dividend policy and changes arising from inflation. Under the conditions of the *Modigliani-Miller* theorem, the value of the firm is independent of financing decisions so that decreased dividends must mean increased capital gains for the investor or a change in stock prices. In addition, in a pure anticipated inflation nominal earnings of the firm will rise, divident holding policy constant, this means the nominal value of stock prices should also rise[2]. In constructing a series for q, these factors must be considered and they sever any direct link between q and stock prices. Nonetheless, for terminological ease we will often refer to authorities controlling "stock prices".

I. Stock Market and Aggregate Demand

Almost all interesting macroeconomic ideas are mentioned somewhere in the "General Theory" and J. M. *Keynes* did single out equity markets as an important determinant of investment:

"Daily revaluations of the Stock Exchange, though they are primarily made to facilitate transfers of old investments between one individual and another, inevitabily exert a decisive influence on the rate of current investment. For there is no sense in building up a new enterprise at a cost greater than that at which a similar existing enterprise can be purchased; whilst there is an inducement to spend on a new project what may seem an extravagant sum, if it can be floated off on the Stock Exchange at an immediate profit."[3] In his "A General Equilibrium

[2] There is evidence that stock prices are negatively related to inflation. For a review of the evidence and a hypothesis to explain this phenomenon see *Lintner* [1975].

[3] In *Keynes* "General Theory," p. 151, Harbinger edition.

Approach to Monetary Theory" *Tobin* [1971] argues that the chief link between the real and financial sectors of the economy is q, the ratio of market to replacement value of the current capital stock. Moreover, the interest rate on bonds is not monotonically linked to q so that interest rates (even abstracting from the real-nominal distinction) are not good guides to the expansionary or contractionary impact of debt policy. For example, in *Tobin's* framework it is an elementary exercise to show that increasing the outstanding stock of debt, holding everything else constant, will increase the interest rate on bonds but will not have a determinate effect on q.

There has been other theoretical work in a similar vein. *Foley* and *Sidrauski* [1971] incorporate the price of capital in a two-sector model — in their work the price of capital links the real and financial sectors and determines the rate of investment goods production. *Benavie* [1976] also constructed a two sector model with imperfect capital mobility so that the replacement value can differ from the current value of the stock. Finally, *Brunner* and *Meltzer* [1972] stress the importance of disaggregating the asset market into money, bonds, and capital and allow the price of capital in place to diverge from its reproduction cost.

There have been several studies of investment which incorporate the stock market and the concept of q as chief explanatory devices. *Tobin* [1974] cites the work of John *Ciccolo* [1975] in which a refined measure of q was utilized to explain investment. His quarterly measure was the ratio of the valuation of corporate physical capital in both stock and bond markets to the estimated cost of reproduction at current prices of goods. Employing some spectral analysis techniques, *Foley* and *Engle* [1976] estimated an investment relation based on the stock market and in their comparisons with traditional investment models, their model performed equally well[4]. This empirical tradition is quite young but the available evidence does suggest that the stock market is a primary factor in investment spending.

Evidence that consumption spending is influenced by the stock market is quite strong. In the life-cycle of *Ando* and *Modigliani*, wealth is an important determinant of consumption and the stock market is the only truly volatile component of wealth. According to *Modigliani*, in the MPS model the dynamic multiplier critically depends on wealth: "When we allow for the wealth effect ... the peak effect (from changes

[4] Their spectral technique makes etact comparison somewhat difficult. See *Foley* and *Engle* [1976] p. 644.

in the money supply) is reached in the fifth quarter and that peak is just over three. By the quarter, the *wealth* effect *via consumption accounts for nearly half of the total.*"[5] (italics in original). In the MPS model an increase in the money supply lowers short term interest rate which, in turn, lower the long term rate via the term structure equation. Stock prices increase with lower long term interest rates and that affects consumption spending. As *Modigliani* stresses, the short run impact of monetary policy comes primarily through this consumption channel, not investment.

Evidence for the role of the stock market in consumer durable spending is not quite so strong. *Bosworth* [1975] reports no affect from wealth on durable expenditures. However, Frederick *Mishkin* [1976] found that when the default risk of durables is accounted for and when the balance sheet on wealth is disaggregated into gross wealth and debt, there is a strong effect of wealth on durables. In some unpublished simulations, *Mishkin* illustrates how this changes both the timing and effects from monetary policy.

Given that there is a strong link between equity markets and aggregate demand, is it necessary to try to control stock prices directly? As was mentioned above, both *Tobin* and *Foley* and *Sidrauski* have shown that there is no monotonic relation between bond yields and q (or the price of capital in the *Foley-Sidrauski* model) so that bond yields might be a poor guide to policy. *Tobin* also cites the problems with inferring the real rate of interest from nominal yields. During the "commodity inflation" of 1973 both the inflation rate and nominal yields were high and some argued that the real rate of interest was in fact negative. *Tobin* [1974] questioned whether the one time increase in commodity prices was incorporated into expectations of continuing inflation[6]. Since there are no precise indicators of inflationary expectations, it is difficult to estimate the ex ante expected real rate of interest on long term bonds even if it did have a direct relation to q. While it certainly may be difficult to estimate q, there really is no proper substitute (as the theoretical studies indicate) for calculating the ratio of market to replacement value of the capital stock[7]. While the discussion has focused

[5] *F. Modigliani*, "Monetary Policy and Consumption," pp. 48 - 49 in Consumer Spending and Monetary Policy: The Linkages.

[6] Of course, very short term real rates were negative, but investment is usually thought to be governed by long term real rates.

[7] A monetarist would argue that in the long run the economy must adjust to any level of nominal money balances. As a long run proposition this is correct, but in the long run $q = 1$ and stabilization is no longer a question.

on the lack of correspondence between real yields and q, there also is no direct correspondence between q and the money supply. Thus, money supply guides are also plagued with problems.

Ciccolo's estimates of q (in *Tobin* [1974]) show that the value does not always hover close to one but has varied from a low of 0,6 to a high of 1,62[8]. An important fact for stabilization purposes is that the series is very sluggish — it took over seven years for q to go from 0,6 back to 1! One implication is clear, left to itself there is no guarantee that the stock market will move in a direction favorable to stabilization policy. Coupled with the observation that interest rates may be poor guides in certain situation, this suggests that we should be paying a good deal of attention to equity markets and find some way to control them if necessary.

II. Specification of the Equity-Bond

In order to control the stock market, the government need not directly buy and sell equities; all they have to do is intervene in the market for an asset which is close to being a perfect substitute for equities. Assets which are perfect substitutes must sell for the same price and, thus, the government can influence the equity market without direct intervention. Although the specification of the equity-bond will become more complex, this is the essential logic and its raison d'être. We will address ourselves to three basic questions: what price will equity-bonds sell for, what index of the equities market should be used, and will the bond be marketable?

For the moment, let us assume that we have chosen some index of the stock market and that investors know this index. Under alternative specifications of the bond we will now determine their prices. Consider the following bond (BOND I): the bearer of one share of the equity bond will receive the average dividends from the stock market index and can redeem the bond at the Treasury for the value of the index at any time. A moment's reflection will be enough to see that the price of BOND I at any time must be the current value of the index. Suppose that the bond sold for less than the index. Then you could sell short the stocks that compose the index, take the proceeds from selling short and buy the equity bond so that you would be perfectly hedged and have a profit equal to the value of the index minus the value of the

[8] Data from 1951 - 72.

bond. Arbitrage forces BOND I to be priced at the current level of the index.

Now consider a more complex security (BOND-OPT II): ownership of one share of BOND-OPT II entitles the holder to purchase one share of BOND I at price P on or before date T. BOND-OPT II should be recognized as a typical "American" option on BOND I (which, as we have seen, has a price equal to the stock index). The theory of option pricing is well-developed and many much more complicated options can be readily priced. If we are willing to assume that: (1) trading takes place continuously; (2) the market index follows a Weiner process and investors know and agree on the instantaneous variance; and (3) there is a riskless rate of interest; then it can be demonstrated that arbitrage will price the option as an explicit function of the current value of the market index, the variance of the index, the time until expiration, and the exercise price[9]. Since this explicit functional relation holds, the government could intervene in the option market to affect the equity market. Central banks and economists are familiar with intervening in forward foreign exchange markets in order to alter the spot rate — the same principle works here.

We can easily imagine more complicated equity-bonds. To the specifications of BOND I could be added the provision that after a certain period the bond could be converted at a certain rate into a more traditional long term government security. The price of the bond, of course, will reflect this new provisions — rational market participants (aided by work in mathematical finance) will insure this arbitrage takes place.

It might be convenient to issue equity bonds that are only redeemable after a specified period, essentially creating equity bonds of differing maturities. This would reduce the number of bonds that could be redeemed in any one period and also allow greater flexibility in debt management and in achieving stabilization goals. Indeed, the bond need not ever be redeemable — equity-bond consols could even be issued.

While the exact specifications of equity-bonds may be varied to suit potential investors preferences, there are three salient features to any of these bonds. First, all of the bonds promise to pay a certein amount (or allow one to buy another bond) at some date based on some index of stock market prices. Second, the government does not have to buy

[9] *Merton* [1973].

private securities to hold in order to pay bond holders. In normal times, the government will just be "rolling-over" its securities, a procedure which should suit investors (as current bond-holders are satisfied) for the government has a powerful source of revenue — its taxable authority. Finally, all of these securities will be highly correlated with the stock market and in some cases an exact arbitrage relationship will hold. Thus, by intervening in its own securities the government will have a powerful lever on the market.

Once it is recognized that all the government needs is a security which is highly correlated with the stock market then there is no serious problem in choosing an index. The index should be relatively stable with its weights being publically known. The Dow Jones or Standard & Poor's Index would be perfectly acceptable. If the government wanted to be a bit more ambitious, it could provide an index of the "market portfolio" which if combined with a riskless asset would give an optimal solution to the portfolio problem according to the Capital Asset Pricing model. But this could raise problems of exactly what stocks to include in the "market portfolio" and perhaps put a little too much temptation into the index constructing business. Since the primary purpose of introducing equity-bonds is to provide some direct control over the stock market, this refinement probably is not necessary.

Would the bonds be marketable? Equity-bonds can be thought of as combining aspects of both mutual funds and government securities. Unlike traditional government bonds, the stochastic properties of the returns are related not to the price level but to the price of capital. But equity bonds differ from mutual funds in the type of security offered investors — mutuals funds can go bankrupt from incompetent management or excess turnover. Since equity-bonds combine these two aspects they would allow rational investors to hedge against uncertainties which can only imperfectly be hedged against now — hence, there should be a ready market for these securities. If one examines the proliferation of financial futures markets in recent years, it is hard to believe that investors would not love the opportunity offered by another security.

Some economists might worry that the new equity-bonds would "drain" funds from equity markets. However in a growing economy, the total amount of wealth (assets) to be allocated also grows. The government can slowly issue the new bonds and watch the effects on the stock

market. Only a small fraction of new issues need be of this form — over time, this will amount to enough so that open market operations can be performed in this security.

III. Debt Management

Debt management would take on a more important role with the presence of equity-bonds. New debt could be issued in either this form or in traditional securities. Once a reasonable amount of equity-bonds have been issued, then the Federal Reserve would have the option of conducting open market operations in either equity-bond or bond markets. Rather than just controlling either the Federal Funds rate or the money supply the Fed would have to set independent targets for two of the following: money growth, Federal Funds rate, and the level of stock prices. Policy discussions would have to focus directly on these issues now that stock prices have become a control variable. One should not expect stabilization policy to become foolproof if equity bonds are introduced. Lag problems, parameter uncertainty, and interpretation of current data will still remain. However, policy makers, economists and the public will be forced to watch and discuss the level of stock prices and make some sort of conscious policy decision about them, even if by omission.

The discussion to this point has been conducted under the assumptions of a well-intentioned government trying to stabilize the economy. Of course, monetary policy is currently formulated in a politically charged atmosphere with many different interest groups trying to gain their say. Introducing an equity-bond would probably add to this politically charged atmosphere as both Wall Street and investors would be particularly interested in the governments stated goals for equity prices. While pressures on monetary policy from various interest groups might intensify, this might actually be a fortuitous turn of events. If special interests are drawn from a wider range of the populace, this might lead to a more pluralistic pressure system than we currently have. Furthermore, if enough of the public gets aroused about the effects of monetary policy this might force policy to be conducted in a more open fashion in which monetary policy would be discussed explicitly in terms of its projected effects on unemployment and inflation. Of course, these particular hypotheses about the nature of political behavior are quite tentative and other plausible conjectures could be offered; nonetheless, it is important to stress that as the number of

political actors increase the political process is also subject to change in a number of possible directions.

This proposal may strike some economists as "interfering" with the equities market. And to an extent, they are correct. But we already affect the market now. In a general equilibrium model of asset holdings, changes in the availability of one asset will generally affect yields on all other assets. In particular, when the yield on demand deposits is partially fixed by law, yields on other assets must change. Moreover, according to many economists, we should be influencing the level of stock prices for they are crucial in obtaining a decent stabilization policy. Monetary policy should be trying to do this now but is limited in its ability to really control the market[10]. As Franco *Modigliani* wrote, "Yet, what we have learned about the linkage mechanism, if valid, may ... help improve policy making. For, in assessing whether a given policy is or is not having the intended restraining or stimulating effect, one can directly look at the behavior of the equity markets to see whether they are responding as intended and, if not, can take corrective action."[11] With equity-bonds we can react almost instantaneously in a direct but simple fashion. Only experience with those bonds can actually tell us whether we will exploit this tool properly.

References

1. *Benavie,* A., "Monetary and Fiscal Policy In A Two Sector Keynesian Model," Journal of Money, Credit and Banking, Vol. VIII, No. 1, February 1976, pp. 63 - 84. — 2. *Bosworth,* B., "The Stock Market and the Economy," Brookings Papers on Economic Activity, 75:2, pp. 257 - 300. — 3. *Brunner,* K. and A. *Meltzer,* "Money, Debt and Economic Activity," Journal of Political Economy, Vol. 80, Sept./Oct. 1972, pp. 951 - 977. — 4. *Ciccolo,* John H., Jr., "Four Essays on Monetary Policy," Ph. D. Dissertation, Yale University, 1975. — 5. *Foley,* Duncan and Robert *Engle,* "An Asset Price Model of Aggregate Investment," International Economic Review, XVI, 3. October 1975, pp. 625 - 647. — 6. *Foley,* Duncan and Miguel *Sidrauski,* Monetary and Fiscal Policy in a Growing Economy, Macmillan, New York, 1971. — 7. *Keynes,* J. M., The General Theory of Employment, Interest, and Money, Harbinger, 1965. — 8. *Lintner,* John, "Inflation and Security Returns," Journal of Finance, Vol. XXX, May 1975, pp. 259 - 280. — 9. *Merton,* Robert C., "Theory of Rational Option Pricing," The Bell Journal of Economics and

[10] Needless to say, if one were entirely convinced that monetary policy was always destabilizing the introduction of equity-bonds would not be a welcome thought.

[11] *Modigliani,* op. cit., p. 96.

Management Science, Vol. 4, No. 1, Spring 1973. — 10. *Mishkin,* Frederick, "Illiquidity, Consumer Durable Expenditure, and Monetary Policy," American Economic Review, LXVI, No. 4, September 1976, pp. 642 - 654. — 11. *Modigliani,* Franco, "Monetary Policy and Consumption," Consumer Spending and Monetary Policy: The Linkages, Boston Federal Reserve Bank, 1971. — 12. *Ritter,* Lawrence and William *Silber,* Money, Basic Books: New York, 2nd edition, 1973. — 13. *Tobin,* James, "A General Equilibrium Approach to Monetary Theory," Essays in Economics, Vol. 1, Markham, Chicago, 1971. — 14. *Tobin,* James, "Principles of Debt Management," Essays in Economics, Vol. 1, Markham, Chicago, 1971. — 15. *Tobin,* James, "Reflections on Macroeconomic Policy," Brookings Papers on Economic Activity, 1974:1, pp. 214 - 232.

Zusammenfassung

Öffentliche Beteiligungs-Anleihen und Stabilisierung: Ein Vorschlag

Die geläufige Geldpolitik wird durch Offenmarktoperationen geprägt, mit deren Hilfe Geld in Anleihen umgewandelt wird. Dieses Verfahren ist nicht geeignet, das Verhältnis des Marktwertes des Nominalkapitals zu seinem Wiederverkaufswert (oder „q" in James *Tobin*'s System) zu beurteilen.

Es wird ein Vorschlag gemacht, zur Deckung eines Teiles der Staatsverschuldung eine Anleihe zu begeben, die mit dem Wert von Beteiligungskapital oder mit dem Aktienmarkt indiziert ist. Wenn Offenmarktoperationen mit diesem Wertpapier getätigt werden, wäre die Regierung in der Lage, die „Beteiligungspreise" der Anleihen und damit auch q ziemlich genau zu bestimmen.

Es wird dargelegt, welche Rolle die Beteiligungspreise für die Bestimmung des Volkseinkommens spielen, und angenommen, daß ein Verfahren zur genaueren Bestimmung der Beteiligungspreise nötig ist. Die Praktikabilität der öffentlichen Beteiligungs-Anleihe wird im Detail erläutert. Das Ergebnis ist, daß ein solcher Anleihetyp durchaus marktfähig wäre, sein Preis ziemlich leicht von den Anlegern festgestellt werden könnte, und daß er eine wichtige Diversifikation für viele Anleger eröffnen würde. Stabilisierungspolitik mit solchen Anleihen würde grundsätzlich Offenmarktoperationen sowohl mit regulären als auch mit Beteiligungstiteln einschließen. Die politischen Antriebskräfte für die Geldpolitik, die sich aus der Einführung derartiger Anleihen ergeben, dürften sich von den derzeitigen beträchtlich unterscheiden.

Summary

Government Equity-Bonds and Stabilization: A Proposal

Current monetary policy is conducted by open market operations which swap money for bonds. This may be an ineffective means of controlling the ratio of market value of the capital stock to its replacement value or "q" in James *Tobin*'s notation.

A proposal is made to issue some of the government debt in a bond which is indexed to equity or the stock market. By conducting open market operations in this security, the government would be able to control equity prices rather precisely and, hence, control q.

Evidence is summarized which illustrates the role of equity prices in the determination of national income and suggests that some mechanism is needed to control equity prices more precisely. The feasibility of the government equity-bond is discussed in some detail. It is concluded that the bond should be readily marketable, can be priced rather easily by investors and would provide efficient diversification for many investors. Stabilization policy with these bonds would generally involve open market operations in regular debt and equity-debt. The political dynamics of monetary policy following the introduction of this bond may differ considerably from the present.

Résumé

Emprunts publics de participation et stabilisation: Une proposition

La politique monétaire courante se caractérise par des opérations de marché libre (open market) à l'aide desquelles des capitaux se transforment en emprunts. Cette procédure est inapte à apprécier la relation de la valeur sur le marché du capital nominal avec sa valeur de revente (ou avec « *q* » dans le système de James *Tobin*).

En vue de couvrir une fraction de la dette publique, il est proposé d'émettre un emprunt indexé sur le capital placé en participations ou sur le marché des actions. Si l'on réalisait avec de pareils titres des opérations de marché libre, le gouvernement serait en mesure de déterminer avec une certaine précision les « prix de participation » des emprunts et donc également « *q* ».

L'auteur explique le rôle des prix de participation dans le chiffrage du revenu national et suppose qu'un procédé de définition plus précise des prix de participation est indispensable. L'on étudie par la suite en détail la praticabilité des emprunts publics de participation, pour aboutir à la conclusion que ce genre d'emprunt répondrait aux conditions prévalant sur le marché, que son prix pourrait être assex aisément fixé les intéressés et qu'il constituerait une importante diversification pour de nombreux investisseurs. Une politique de stabilisation faisant appel à de tels emprunts inclurait fondamentalement des opérations de marché libre tant sur titres ordinaires que sur titres de participation. Les forces motrices politiques qui se dégageraient en faveur de la politique monétaire de l'introduction de pareils emprunts se distingueraient nettement de celles qui prévalent aujourd'hui.