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THE CASE FOR POSITIVE LOW INFLATION: SOME FINANCIAL MARKET CONSIDERATIONS WITH SPECIAL ATTENTION TO THE PROBLEMS OF JAPAN

Abstract

The 1970s witnessed a backlash against inflation. However, Japan’s prolonged stagnation and the global economy’s recent flirtation with deflation, have revived the case for low inflation. Low inflation acts as grease in labor markets, helping the process of adjustment and lowering equilibrium unemployment. It also has beneficial effects on financial markets. There is a “disequilibrium” role for inflation in reducing debt burdens resulting from asset price bubbles. There is also an “equilibrium” role. Low inflation helps avoid the trap of nominal interest rate floors and creates room to reduce real interest rates in recessions. It also reduces the real cost of capital by inducing portfolio substitution away from money, and by lowering the bankruptcy risk associated with deflation.

Key words: *Inflation, grease, debt burden, liquidity trap, bankruptcy risk.*

JEL ref.: E0, E3, E4, E5.

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OUT OF THE ASHES: THE REVIVAL OF THE CASE FOR LOW INFLATION

During the 1970s inflation accelerated throughout the industrialized world, and this acceleration in turn generated a policy backlash against inflation. Whereas low inflation had previously been seen by many economists as having some benefits, it became fashionable to argue that inflation was at best economically neutral.

The theoretical foundation for this changed view of inflation derived from classical macroeconomics which maintains that economic activity is neutral with regard to the level of the money supply and the general price level (the neutrality of money hypothesis). In the 1970s, this classical view was extended by monetarists who argued that economic activity is also neutral with regard to the rate of growth of the money supply and the rate of inflation (the super-neutrality of money hypothesis). As the decade progressed, this monetarist claim of super-neutrality of money was then further extended into a claim that inflation is actually harmful for economic activity. On the empirical side, the new claim was buttressed by the fact that the high inflation of the 1970s coincided with a period of sub-par economic performance. On the theoretical side, it was argued that inflation imposes "shoe leather" transaction costs by giving agents an incentive to reduce their money holdings and change their patterns of transacting [Feldstein, 1979]. It was also argued that inflation interacts adversely with the tax system because of the nominal based structure of taxation [Feldstein, 1983]. Finally, to these arguments were added arguments about inflation volatility. Such volatility is bad for economic activity because it creates uncertainty for economic agents, and inflation hawks argued that volatility increases with the level of inflation.

The shift amongst economists away from support of mild inflation contributed to a dramatic shift in economic policy that has had policy makers conducting a steady campaign against inflation,

and has elevated price stability as the major goal of monetary policy. However, there are now signs that this episode may be drawing to a close, and economists are again talking of the benefits of mild inflation. As with the earlier turn against inflation, this shift has also been driven by both empirical fact and theoretical argument. On the empirical side, Japan's long and enduring recession has been marked by deflation, while the global economy has also flirted with deflation in the wake of east Asia's financial crisis. On the theoretical side, there has been a revival of arguments that inflation greases the wheels of adjustment in labor markets. The current paper further extends these arguments, and explores how inflation may also grease the wheels of adjustment in financial markets.

The central policy conclusion is that steady low equilibrium inflation (defined as a situation in which both current and past inflation expectations are satisfied) may be beneficial for the macro economy because of its effects on both labor and financial markets. Policy makers should therefore aim for low inflation rather than price stability (zero inflation) which is the standard recommendation prescribed by new classical macroeconomic models built upon Walrasian microeconomic foundations. Lastly, the argument for low inflation that is developed in the paper is unrelated to the issue of inflation mis-measurement. Recently, the belief that inflation is mis-measured has prompted central bankers to begin moving away from zero inflation goals on the grounds that measured inflation is over-stated. Though the mis-measurement argument has worked to move inflation policy in the direction of accepting positive low inflation, it rests on an entirely different argument.[1]

INFLATION AS GREASE: THE CASE OF LABOR MARKETS

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The impetus behind the revival of support for mild inflation comes from a rediscovery of arguments that inflation may reduce unemployment by helping the process of adjustment in labor markets when there is downward nominal wage rigidity. It is in this sense that inflation is "grease." Rather than having real wages adjust through the difficult and contentious process of downward movement of nominal wages, adjustment is accomplished by the easier process of upward movement of prices.

The original Phillips curve postulated a negatively sloped long run equilibrium relation between inflation and unemployment. Tobin [1972] observed that "The Phillips curve has been an empirical finding in search of a theory, like Pirandello characters in search of an author." He therefore proposed a stochastic macro-equilibrium theory of the Phillips curve based on a multi-sector economy with downward nominal wage rigidity and perpetual sectoral demand shocks. In such an economy, unemployment emerges in sectors receiving negative demand shocks, while inflation emerges in sectors receiving positive shocks.

Tobin's [1972] model is descriptive in character and its equilibrium properties are unclear. Palley [1990, 1994] and Akerlof et al. [1996] develop formal models based on Tobin's reasoning. The former presents a model of a multi-sector economy with sectoral labor markets: the latter develop a model of a single labor market with multiple monopolistic firms.

Within a multi-sector economy inflation is generated by the underlying rate of aggregate nominal demand growth. Nominal demand growth raises demand in sectors receiving negative sector specific demand shocks, thereby offsetting the effect of downward nominal wage rigidity and reducing unemployment. Side-by-side, it raises demand in sectors receiving positive demand shocks, thereby raising inflation in these sectors. Hence, the negative empirical relation between

inflation and unemployment. An important insight is that it is nominal demand growth that is the true grease of adjustment, but application of this grease produces inflation in sectors at full employment.

A multi-sector approach also clarifies the role of inflation expectations. In sectors receiving positive demand shocks and having full employment, inflation expectations fully feed into nominal wages. In sectors receiving negative demand shocks and having unemployment, inflation expectations only partially feed through wages.[2] Thus, inflation expectations cause nominal wages to rise also in sectors with unemployment, and this partially neutralizes the effect of nominal demand growth on unemployment. Indeed, if inflation expectations fully feed through into nominal wage adjustment in sectors with unemployment, then nominal demand growth is fully neutralized so that it has no impact on unemployment. This corresponds to the case of the vertical Phillips curve, the necessary assumption for which is that nominal wages in sectors with unemployment fully incorporate inflation expectations. This illustrates how economy wide inflation indexing of nominal wages acts as "sand". In the presence of full indexing, nominal demand growth will still produce inflation but it will have no impact on unemployment (i.e. inflation without any grease).

There is much evidence supportive of the above view of labor markets. Blinder and Choi [1990] and Bewley [1997] provide survey evidence on the existence of downward nominal wage rigidity. Lebow, Stockton, and Wascher [1995] find evidence of a spike in the nominal wage change distribution at zero which they interpret as evidence of downward nominal rigidity. Altonji and Devereux [1999] find evidence of upward flexibility and a region of downward inflexibility

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beyond which nominal wage cuts are implemented. Palley [1997a] reports that inflation reduces the duration of spells of unemployment, a finding consistent with the grease hypothesis since nominal demand growth both helps displaced workers find jobs quicker and causes inflation in sectors with full employment.

THE SPECTER OF DEFLATION AND THE REHABILITATION OF LOW INFLATION

The acceleration of inflation and the deterioration in economic performance that occurred in the 1970s was an important factor prompting the reaction against inflation. In the 1990s, Japan's protracted recession and flirtation with price deflation has been an important factor prompting the rehabilitation of an acceptance of mild inflation. Table 1 shows real GDP growth and inflation in Japan for selected years. In the 1980s, Japan experienced stable low inflation accompanied by rapid growth. In the 1990s, the rate of inflation fell and became negative in 1995 and 1996, and GDP growth declined in tandem. This pattern has helped revive the belief that mild inflation may be economically beneficial.

Japan and the debt overhang trap. Japan's protracted slump has generated two principle competing explanatory hypotheses. One is the debt overhang hypothesis, the other is the deflationary expectations hypothesis. Though not mutually exclusive, these hypotheses are worth distinguishing because they rest on different interpretations of the ultimate causes of Japan's slump, as well as having some potentially different policy implications.

The debt overhang hypothesis derives from the analytic tradition established by Irving Fisher [1933] and Hyman Minsky [1982] according to which prolonged recessions (or even depressions) may result from excess debt burdens accumulated in periods of boom. Minsky [1982] describes the qualitative process by which excess debt burdens are incurred, while Fisher [1933] explores the

implications of price deflation in an environment of excessive indebtedness.

For Minsky, the business cycle upswing is initially characterized as a period of financial tranquility during which investment expectations are fulfilled. Bankers, industrialists, and households become more optimistic. In goods markets the result is more consumption and investment spending: in financial markets it is an increased willingness to borrow, an easing of lending standards, increasing indebtedness, and asset price inflation.

This process gradually transforms the situation from one of financial tranquility to one of financial fragility in which agents' balance sheets are such that they are vulnerable to small economic shocks. In the late stages of the expansion, financial dealings may take on a Ponzi complexion, with agents incurring debts to buy assets on the basis of expectations about future asset price appreciation rather than anticipations of future income streams. These fragile circumstances give rise to the end of the boom either by making the system vulnerable to exogenous shocks, or by creating conditions in which forces endogenous to the economy propel the economy into a downturn.[3] Once the downturn is initiated, prices may then begin to fall, initiating a process of deflation. This exacerbates existing debt burdens and worsens the downturn [Fisher, 1933; Tobin, 1980], and downward price and nominal wage adjustment can be unstable and lead to cumulative collapse [Palley, 1999].

Japan's economic recession has a strong resemblance to the above Minsky - Fisher process. In the 1980s there was extensive asset price inflation in financial and real estate markets. Banks lent heavily to real estate developers, and there appears to have been a large Ponzi component with equity and real estate prices being bid up solely on the belief that they could be sold to the next

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buyer at a higher price without regard to underlying income streams. Given these conditions, when the asset price bubble burst, the Japanese economy found itself saddled with an enormous debt overhang. On the demand side, many households, businesses and real estate developers have been left saddled with high levels of debt which have reduced their ability to undertake projects that remain profitable. On the supply side, banks have been left saddled with extensive bad loans and their equity holdings have fallen in value, and this has reduced the banking systems abilities to finance new investment.

Japan's asset price bubble was driven by expectations of continued asset price inflation, and it was this expectation that supported bank borrowing. The bursting of the bubble corresponds to a collapse in expectations about future asset price inflation. In of itself, such a collapse can be of modest consequence, but it takes on major significance when debt positions have been built up over an extended period of time on the basis of bubble prices. In the presence of a debt overhang, the economy is unlikely to be able to restore full employment. Falling prices and nominal wages stand to exacerbate debt burdens, while the floor to the nominal interest rate means that financial markets may be unable to spark increased economic activity through lower interest rates.

Japan and the deflationary expectations trap. The debt overhang hypothesis identifies the burden of existing debts as the principal cause of Japan's problem. An alternative hypothesis is that Japan is afflicted by deflationary expectations [Krugman, 1998] that have depressed demand. Regrettably, Krugman describes his model as a Keynesian model of the liquidity trap when it is not. Though the model does make use of the existence of an interest rate floor, it is not a model of the Keynesian liquidity trap (Keynes [1936]; Hicks [1937]) as conventionally understood. Instead, it is a classical loanable funds model in which there is unemployment because the interest rate floor

prevents the interest rate from clearing the loanable funds market at a level consistent with full employment output.

Within Krugman's model, Japan's problems are explained as the result of excessive saving. This excessive saving is due to deflationary expectations which generate anticipations of lower future consumption prices, thereby giving an incentive to delay consumption.[4] Figure 1 illustrates the model using the familiar ISLM diagram. The IS is negatively sloped as in the standard Keynesian model, but the LM is vertical owing to the model's classical macroeconomic character. Deflationary expectations result in excessive saving which shifts the IS left. Though interest rates are pushed to zero in the loanable funds market, there remains insufficient aggregate demand to absorb full employment output of y^*.

Though involving the presence of an interest rate floor, Krugman's model is not a model of the liquidity trap. This is clear from figure 1 in which the LM schedule is vertical, whereas the Keynesian liquidity trap involves a situation in which the LM schedule is horizontal as shown in figure 2. Instead, the Krugman model is a loanable funds model in which obtaining a level of saving and investment consistent employment output requires negative real interest rates owing to agents' deflationary expectations. However, the zero floor to the nominal interest rate prevents the interest rate from adjusting to this level, resulting in excess saving.[5]

The above classical loanable funds model with an interest rate floor can be contrasted with the traditional Keynesian approach to the liquidity trap. The latter approaches the liquidity trap in terms of the demand for money. A liquidity trap emerges when interest rates (which can be thought

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of as the opportunity cost of money) have fallen to such a low level that agents prefer at the margin to hold money over bonds because money's liquidity yield dominates the low interest yield on bonds. In this situation, the demand for money is infinitely elastic at the going interest rate, and the LM schedule is horizontal. Such a model of the Keynesian liquidity trap has been developed by Buiter and Panigirtzoglou [1999].[6] In the presence of liquidity trap conditions the monetary authority is unable to use expansionary open market operations to push short term interest rates lower because agents are willing to swap bonds for money in unlimited quantities.

***Differences between the debt overhang and deflation expectations traps*.** There are many resemblances between the debt overhang trap and the deflationary expectations trap account of Japan's slump, and this has encouraged mistaken claims of equivalence. However, a critical difference concerns the ability of price and nominal wage adjustment to solve the slump, and this difference makes distinguishing the two worthwhile.

Both the debt overhang and deflationary expectations hypotheses emphasize the importance of demand shortage, and both identify the existence of an interest rate floor as the reason why monetary policy (as conventionally conducted) may be unable to remedy the slump. However, they differ as to the cause of Japan's continued slump, and this difference has important analytical implications. The debt overhang hypothesis explains the continued slump in terms of a continuing debt burden which has reduced consumption and investment spending. This has made for depressed conditions that have caused interest rates to fall to their floor, but even at this low level AD is insufficient to match full employment output. The deflationary expectations hypothesis explains the continued slump by reference to expectations of lower future prices which have

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lowered current spending, and once again AD is insufficient to absorb full employment output at the nominal interest rate floor.

The deflation expectations trap can be nested within a debt overhang trap. Thus, a debt overhang may so depress AD and economic activity that the price level begins to fall. At this stage, agents may form deflation expectations, thereby contributing to a rise in the effective real interest rate and further reducing AD. As the nominal interest rate falls toward zero, liquidity trap conditions can assert themselves. Lastly, not only does deflation have a negative impact by increasing the real return to money and giving agents to hold money and delay consumption, it also increases the burden of existing debts.

The deflation expectations trap is a useful addition to the argument. It emphasizes the significance of AD concerns at a time when the economics profession has taken to ignoring the insights of Keynesian economics. Indeed, Krugman's [1998] observations about the depressing economic impact of deflationary expectations is really a rediscovery of an argument made many years ago by Tobin [1975] in the context of a dynamic Keynesian macroeconomic model.

However, there is one paramount difference between the two accounts of Japan's slump, and this concerns the presence of the stock of existing debt. According to the deflation expectations hypothesis, Japan's slump could be ended by a one time reduction in prices and nominal wages relative to the future. This would result in expectations of rising future prices, and it would also produce a positive Pigou effect operating through agents holdings of money.[7] In sharp contrast, the debt overhang hypothesis maintains that lowering of prices and nominal wages would profoundly aggravate the situation by increasing debt burdens and further depressing aggregate demand. In a

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world in which debt finance is an important part of overall finance, downward price and nominal rigidity is a stabilizing feature that guards against the emergence of Fisherian debt - deflations.

The analytical differences between the two hypotheses can be seen in terms of the aggregate demand (AD) function. Suppose output is determined by the level of AD so that

$$\underset{-}{} \quad \underset{-}{} \quad \underset{+}{} \qquad\qquad \underset{-}{} \qquad\qquad \underset{-}{} \quad \underset{+}{}$$
$$(1)\ y = AD(r, B/P, M/P,...) = AD(i - E[dP/P], B/P, M/P,...)$$

where y = output, r = real interest rate, B = nominal inside debt, P = price level, M = outside money balances, i = nominal interest rate, and E[dP/P] = expected inflation. Signs above functional arguments are assumed signs of partial derivatives. In Krugman's deflation expectations trap model the assumption is $AD_{B/P} + AD_{M/P} > 0$ so that a fall in the price level raises aggregate demand and output. This is shown in figure 3 in which the AD schedule is downward sloping, and y^* represents full employment output. Lowering Japan's price level below the existing level of P_0 would improve conditions. If this is not possible, ending the slump calls for shifting the AD right either by inculcating inflationary expectations (E[dP/P] > 0) or by other expansionary measures. In the debt overhang hypothesis the assumption is that $AD_{B/P} + AD_{M/P} < 0$ so that a fall in the price level lowers aggregate demand and output. The AD schedule is therefore upward sloping as shown in figure 4. Lowering Japan's price level would therefore lower AD and aggravate the slump. Instead, the appropriate response is to shift the AD schedule right either by reducing the debt burden (dB < 0) or by adopting other expansionary policies.[8]

Solutions for Japan's debt overhang trap: what works, and what does not. The debt overhang has left the Japanese economy short of demand, and the policy challenge is to overcome this shortage. One approach is to tackle the debt problem directly. A second approach is to create

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additional demand that offsets the negative demand effects of the overhang. However, for this second approach to succeed, the additional demand flows must be sustainable. Absent this, demand shortage will reassert itself once the additional flows slow owing to the continued presence of an excess "stock" of indebtedness. This is what happened in 1997 when the Japanese government suspended its fiscal stimulus by raising the sales tax rate.

(1) ***Expansionary monetary policy.*** The standard response to conditions of demand shortage has long been expansionary monetary policy that lowers interest rates, drives up asset prices, and stimulates aggregate demand. However, this response is not possible in Japan because short term nominal interest rates have fallen so low that they are now close to zero. As a result, interest rates can fall no further because they are now bounded by the institutionally set zero nominal floor. Monetary policy cannot therefore lower interest rates further in order to increase aggregate demand.

(2) ***Expansionary bond financed fiscal policy.*** The Keynesian ISLM apparatus [Hicks, 1937] identifies expansionary fiscal policy as a solution to demand shortages in the presence of an interest floor trap. One possible policy is a bond financed tax cut. However, the neo-Ricardian critique [Barro, 1974] argues that bond financed fiscal policy will be ineffective because it implies a tax obligation of equal net present value so that households permanent income is left unchanged, and consequently their consumption decisions will be unchanged. Buiter [1977] and Tobin and Buiter [1980] identify the necessary conditions for the future tax obligation to be fully internalized, and it is unlikely that these conditions hold in practice. This means that bond financed tax cuts are likely to have some positive impact.

An alternative to bond financed tax cuts is a bond financed increase in government spending.

Once again there is the problem that the future tax obligation associated with the issue of the bonds will be internalized by households and viewed as an increase in current taxes. However, even if this is the case, as long as the marginal propensity to consume out of income is less than unity, the net effect of tax financed spending will still be positive. This is the conclusion of the balanced budget multiplier theorem.[9]

One last reason why the impact of a bond financed increase in government spending may be reduced concerns the relative substitutability of government and private consumption spending. If government and private spending are relatively close substitutes, then private agents may reduce private spending in response to an increase in government spending. This reduction in private spending would come on top of any reduction caused by the internalizing of future tax obligations. However, in practice public and private spending are likely poor substitutes.

These considerations identify some of the limitations to using bond financed fiscal policy to increase AD (i.e. shift the IS schedule left). Most importantly, to the extent that asset prices are left unchanged, the problem of the debt overhang is left unsolved. This means that the negative "stock" influence of the debt overhang will reassert itself once the expansionary "flow" fiscal stimulus ends. Indeed, this is exactly what happened in 1997 when the Japanese government ended its fiscal expansion.[10] Finally, persistent bond financing leads to a build up of public sector indebtedness that may threaten the government's ability to continue with the palliative of bond financed spending, and at this stage the economy will be burdened by both a public sector and a private sector debt overhang.

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(3) Expansionary money financed fiscal policy. An alternative to bond financed fiscal policy is money financed fiscal policy. This implies no future income tax obligation, and therefore generates no crowding-out of private spending for income tax reasons. To the extent that an increased money supply implies higher inflation, it also implies a higher future inflation tax on money holdings. However, this is good for aggregate demand since it induces a substitution away from holding money toward increased current spending and increased holdings of other assets. Increased current spending would increase aggregate demand. Increased demand for other assets would raise asset prices, thereby alleviating the underlying cause of the debt overhang (i.e. the collapse in asset prices) and also reliquifying the banking system since banks are large holders of equities. Side-by-side, the increase in government spending would also add to aggregate demand. Money financed fiscal policy therefore both adds to the flow of aggregate demand and tackles the underlying cause of the debt overhang.

(4) ***Central bank real asset purchases.*** Tobin [1998] has proposed that the central bank buy equities, thereby engineering an increase in equity prices. The proposal can also be extended to real estate. Tobin's proposal is motivated by the fact that conventional expansionary monetary policy is not feasible because short term interest rates are at a floor. This means that expanding the money supply cannot change bond prices and initiate the chain of portfolio substitutions that causes other asset prices to change. Instead, the Tobin proposal has the Bank of Japan circumventing the asset market monetary transmission mechanism by directly purchasing real assets. The proposal would stimulate investment by lowering the cost of equity capital. Equally important, and less well appreciated, it would tackle the causes of the debt overhang problem by raising asset prices and the value of assets held by debtors and banks, as well as reducing the extent

of bank bad debts.

(5) ***A Friedman-style helicopter drop of money.*** Whereas injecting money into the economy through open market operations has no impact on aggregate demand when interest rates are at their floor, it can have an effect if it is simply given to agents. With agents indifferent at the margin between additional spending and additional money holdings, a "helicopter drop" of money would increase agents' total money holdings and wealth, and therefore positively impact spending. It would also increase the demand for other assets, raising asset prices and alleviating the debt overhang. As with money financed fiscal policy, the increase in the money supply might presage higher future inflation, but as before this would be expansionary. Ironically, a helicopter drop of money is analytically equivalent to a money finance tax cut - the government simply writes a check to every person which is paid by the monetary authority. Fiscal policy therefore lies behind the monetarist solution to conditions of economic depression.

(6) ***A Gesell tax on money.*** Buiter and Panigirtzoglou [1999] suggest taxing currency (as advocated by Gesell [1958]) as a means of escaping the liquidity trap and the problem of a zero nominal interest floor. The zero nominal interest rate floor is attributable to the existence of money which pays zero interest, thereby setting a floor to the nominal bond interest rate which cannot fall below zero because agents will then prefer to hold money (i.e.there would be no buyers of bonds at the lower interest rate). The Gesell tax on money makes the return to holding money negative rather than zero, thereby giving agents an incentive to switch from money to bonds and other assets even if their return is also negative. It also gives agents an incentive to consume rather than hold money. However, it also reduces agents wealth which lowers spending and aggregate demand. In terms of the ISLM model, the Gesell tax shifts the LM down, but the direction of shift of the IS

is ambiguous. If the IS shifts left, output could contract.

A tax on money can lower the nominal interest rate floor below zero. However, there are a number of problems. First, its effect on AD is potentially ambiguous. Second, Buiter and Panigirtzoglou [1999] point out that there are significant administrative difficulties. Third, currency represents only a small fraction of money holdings, and such holdings are unlikely to provide a sufficient base for shifting the economy's equilibrium. Making the tax sufficiently high to significantly discourage currency holdings would increase the negative wealth effect, and also introduce significant transactions efficiency costs.

An alternative to taxing just currency is to also tax bank deposits which increases the asset base on which to induce asset substitutions. However, this increases the negative wealth effect on AD which suggests that the tax could end up being deflationary. Moreover, to the extent that it raises the banking sector's cost of funds by reducing the demand for deposits, it would translate into higher loan interest rates which would also be contractionary.

(7) ***A negative discount rate policy*****.** An alternative to the Gesell tax is to set a negative central bank discount rate and then make reserves readily available to the banking system with the proviso that they not be held as free reserves. This proviso guards against banks just sitting on reserves borrowed from the central bank and collecting interest thereon. Making reserves available to banks in this fashion would give them an incentive to charge depositors administrative costs, thereby giving depositors an incentive to switch out of demand deposits. Since costs of holding currency are quite large, most of the substitution by depositors would likely be into bonds and other financial assets rather than currency, and this would drive the bond interest rate below zero. At the same time, because reserves would be readily available to the banking system, there would

be no reason for loan rates to rise because of the fall in demand for deposits. In effect, the central bank would step in and take the place of private depositors. The net result would be to shift the LM schedule down by lowering interest rates, and shift the IS left by driving up asset prices and mitigating the debt overhang.

(8) ***Restructuring the banking system.*** A last policy that has been widely advocated is restructuring and recapitalizing of Japan's banking system. This proposal implicitly views Japan's problems as being the result of a credit supply crunch that has prevented Japanese banks from making the loans needed to grow the economy. There are two problems with this proposal. First, evidence of credit rationing is hard to come by, and Hoshi and Kashyap [1999] maintain that the Japanese banking system has excessive access to savers' financial capital. Second, restructuring of the banking system does nothing to remedy the balance sheet problems of borrowers who are burdened by excessive debts matched by devalued assets. Thus, the demand side of the credit market would remain weak, as would economy-wide aggregate demand. Though borrowers may have many worthwhile projects at the margin, lenders are reluctant to lend to them because they lack collateral. In the event of bankruptcy, new lenders face being thrown into the pool of claimants alongside existing lenders. In effect, the marginal product from new lending exceeds the average product from old lending, and in a bankruptcy in which all lenders are treated alike, new lenders subsidize existing lenders. This discourages new lending.

Short of inflating nominal income streams or reflating nominal asset prices, the only way to remedy this borrower problem is to restructure borrowers' balance sheets. This is an enormous task. It is made even more difficult by the fact that it stands to be resisted by management self-interest since such a restructuring would force managers to admit past mistakes by taking the

losses associated with writing-down assets to current market values.

In sum. Japan is suffering from a debt overhang that has depressed AD and which market mechanisms are unable to resolve. The interest rate floor prevents further downward adjustment of interest rates, while downward price and nominal wage adjustment would aggravate the problem. In this circumstance, potentially effective policy responses include money financed fiscal policy, Tobin style central bank purchases of real assets, a Friedman style helicopter drop of money, and setting a negative discount rate with a perfectly elastic supply of reserves.

INFLATION AS GREASE: THE CASE OF FINANCIAL MARKETS

Japan's debt overhang has focused attention on the problems of deflation. It also shows why downward price and nominal wage rigidity can be a good thing in that they serve as a stabilizing mechanism guarding against the emergence of debt deflations. In the aftermath of an asset bubble burst, increased inflation can be a useful way ("grease") of restoring economic health by bidding up asset prices and eroding the real burden of existing debts which are nominally denominated. Such use of inflation can be thought of as "disequilibrium" inflation in that it is used opportunistically to erode existing debts that were incurred in a time of speculative excess.

Not only is there a case for using inflation to remedy problems arising from prior financial market excess, there is also a case for steady permanent "equilibrium" inflation. One argument advanced by Treasury Secretary Summers [1991] is that low inflation creates the space for the monetary authority to engineer negative real interest rates in the event of an economic downturn. Thus, if inflation expectations are zero, a negative real interest rate of minus 3% requires a negative nominal interest rate of minus 3%. This is problematic because of the zero interest rate floor. However, if expected inflation is 3%, then a 3% negative real rate can be obtained by setting

the nominal rate equal to 0%, and negative real rates can be obtained despite the bound imposed by a zero floor.

Maintaining the space for negative interest rates is important. As Japan has shown, economies can get caught up in speculative processes that generate the need for negative real rates. Modern financial economics emphasizes notions of equilibrium predicated upon the efficient markets hypothesis in which agents act rationally on the basis of economic fundamentals. The real world may correspond more closely to Minsky's [1982] financial instability hypothesis which has the animal spirits of entrepreneurs and financiers driving borrowing and asset purchase decisions based on overly optimistic calculations. In such a world, the economy may spend much of the time away from notional equilibrium, and there may be regular occasions when a negative real rate is needed to clear up prior speculative excesses.

The problematic of a nominal interest rate floor is usually approached from the perspective of the liquidity trap. An alternative explanation is in terms of financial intermediation in the presence of kinked demand curves. The significance of the kinked demand curves in banking is that they may raise the floor to the nominal interest rate above zero, which exacerbates the problem identified by Summers [1991]. The kinked demand curve explanation for nominal interest rate floors draws on new Keynesian information theoretic arguments explaining downward price rigidity [Stiglitz, 1979; Palley, 1991; 1997c]. It is illustrated in figure 5. The loanable funds market is intermediated by banks, and the loan demand schedule is kinked because borrowers have incomplete information about terms of lending amongst banks. The logic of the kink is as follows. When a bank raises rates it loses some of its existing borrowers, but when it lowers rates it gains only a few new borrowers because the pool of borrowers is not informed about the rate reduction.

Consequently, there is an asymmetric reaction to increases and decreases in the cost of borrowing, with loan demand being more elastic with respect to rate increases than rate decreases.

If the break in the marginal revenue schedule passes through zero, as can happen when nominal interest rates are low as a result of zero inflation, then loan interest rates will be downwardly rigid at the level determined by the kink in the demand curve — and this level can be well above zero. In recessions the demand curve may simply shift left even as inflation falls, so that the economy can get trapped with relatively high real rates. However, if the economy has positive inflation, nominal rates will tend to be higher so that the break in the marginal revenue schedule need not pass through zero. This voids the problem of the interest rate floor, and the monetary authority can lower the marginal cost of funds in recessions so as to lower loan rates and increase lending.

A third reason why mild equilibrium inflation may be desirable derives from an earlier literature on money and growth initiated by Tobin [1965]. The economic logic is the reverse of that underlying the dangers of deflation and the liquidity trap. Deflation is bad because it makes money relatively more attractive compared to holding other assets and current consumption: a little inflation may be good because it makes money relatively less attractive compared to holding other assets and current consumption. As a result, inflation induces wealth holders to switch into financial assets (e.g. equities) other than money, which bids up the price and lowers the interest rate on these assets. This then encourages investment and capital accumulation through the Tobin *q* channel, resulting in a higher steady state capital - labor ratio. When this is linked with a Kaldorian [Kaldor, 1957] technical change function in which technical advance is positively impacted by the level of investment spending, a higher steady state capital - labor ratio can in turn

lead to a faster steady state rate of growth [Palley, 1996]. Mild inflation may therefore be good for growth.

Fourth and finally, low equilibrium inflation may lower the cost of capital by lowering the risk of bankruptcy. The argument is as follows. Consider an economy in which nominal wages are tied to the rate of inflation, but they are downwardly rigid. As long as inflation is positive, nominal wages are flexible. However, if inflation is negative, nominal wages remain fixed. In this latter event, real wages rise, profit margins shrink, and firms reduce output and employment, and some may even face bankruptcy. Given this, as the expected rate of inflation falls closer to zero, the likelihood of a negative inflation shock and bankruptcy increase, and lenders therefore raise the cost of credit to compensate for this increased bankruptcy risk.

This argument can be formalized as follows. The rate of inflation is driven by the rate of nominal demand growth which is stochastic and governed by a symmetric uniform distribution with mean g and range [g + a, g - a]. As long as g > a, inflation is always positive. If 0 < g < a there can be deflation. The probability distributions governing realizations of inflation and deflation are shown in figure 6. In the event of deflation, a fraction q of firms go bankrupt and lenders incur a bankruptcy cost of c.The risk free rate of interest is $i_{F.}$

The probability of a deflationary realization, X, is given by

(2) $F(g - X < 0) = [a - g]/2a$

As long as g > a, there is no bankruptcy risk and the actual interest rate is

(3) $i = i_F$ $\qquad\qquad$ g > a

If g < a there is a positive risk of bankruptcy and lenders need to be compensated for the expected cost of bankruptcy. The risk free nominal rate is therefore adjusted by a bankruptcy premium, and the actual interest rate is given by

(4) $i = i_F + F(g - X < 0)qc \qquad g < a,\ F_g < 0$

$= i_F + [[a - g]/2a]qc$

The bankruptcy premium depends on the probability of a deflationary episode, the proportion of persons bankrupted, and the bankruptcy cost. Differentiating (4) with respect to g, a, q, and c it can be shown that

$di/dg < 0,\ di/da > 0,\ di/dq > 0,\ di/dc > 0$

It is also possible that the proportion of firms experiencing bankruptcy increases with the size of the deflationary shock, as does the cost of bankruptcy. In this case, the cost of capital becomes

(4') $i = i_F + F(g - X < 0)q(F(g - X < 0))c(F(g - X < 0)) \qquad g < a$

In an economy with downward rigidity of nominal wages, higher expected inflation, g, reduces the real cost of capital to business by reducing the bankruptcy risk premium. Higher volatility of inflation, a, raises the real cost of capital by raising the bankruptcy risk premium. Policy makers should therefore aim for low steady inflation and avoid deflationary episodes that result in increased bankruptcy.

Finally, these concerns regarding the interaction of deflation, bankruptcy risk, and the cost of capital are compounded by the problem of interest rate floors. The real interest rate on loans can adjust in response to deflation as long as the rate of deflation is less than the required real rate. Thus, if the real rate were 3% and the rate of deflation were 3%, then abstracting from any of the above concerns with bankruptcy risk arising from downward nominal wage rigidity, bond holders would be content with a 0% yield. However, once the rate of deflation falls to 4%, the zero floor to nominal interest rates prevents any further fall in the nominal interest rate so that the real rate charged to borrowers rises. As a result, not only is the demand for new loans reduced, but existing borrowers are burdened with additional real interest service. This additional burden can become an

additional cause of bankruptcy.

Such an effect can be captured by writing the risk free nominal rate as

(4) $i_F = Max[r_F + E[dP/P], 0]$

where r_F = exogenous real risk free real rate and E[dP/P] = expected rate of inflation of g. In this case there are four interest rate regimes. In regime 1 expected inflation is sufficiently high that deflation never occurs (g > a). In regime 2, expected inflation is positive but deflation can occur by chance (a > g > 0). In regime 3, there is expected deflation but the expected rate of deflation is below the required risk free rate (a > 0 >g and |g| > r_F). In regime 4, the expected rate of deflation exceeds the risk free rate. Given this, the interest rate is given by

$$
(5)\ i = \begin{cases} r_F + E[dP/P] & g > a \quad \text{Regime 1} \\ r_F + E[dP/P] + [[a - g]/2a]qc & a > g > 0 \quad \text{Regime 2} \\ r_F + E[dP/P] + [[a - g]/2a]qc & a > 0 > g,\ |g| < r_F \quad \text{Regime 3} \\ Max[r_F + E[dP/P] + [[a - g]/2a]qc, 0] & a > 0 > g,\ |g| > r_F \quad \text{Regime 4} \end{cases}
$$

Regimes 1 and 2 both have positive expected inflation, but there is some random chance of deflation in regime 2 and real rates are therefore higher in regime 2 because of bankruptcy risk. Regimes 3 and 4 both have expected deflation, but in regime 4 the rate of deflation is sufficiently rapid that the nominal interest rate floor can be binding. Finally, in the presence of kinked demand curves the nominal interest rate floor could be positive, thereby raising the real rate even more in regime 4.

CONCLUSION: STEADY LOW INFLATION IS GOOD POLICY

Japan's protracted slump and encounter with deflation has served to alert policy makers to the dangers of deflation. Japan's predicament has also revealed how inflation may perform a useful function in the presence of a debt overhang resulting from earlier financial market excesses.

However, not only is there a “disequilibrium” case for using inflation to remedy financial distress, there is also an “equilibrium” case for permanent steady inflation. One argument for steady equilibrium low inflation derives from its labor market effects on unemployment. A second set of arguments is based on its effect on financial markets. These include (a) retaining a margin of manoeuver to reduce real interest rates in event of a deep recession, (b) avoiding the problem of a floor to the nominal interest rate, and (c) lowering the real cost of capital by inducing a substitution out of money and by lowering the bankruptcy risk associated with the possibility of deflation.

NOTES

1. The inflation mis-measurement argument is important for the debate over the evolution of the standard of living. If inflation is over-stated this implies that the standard of living is understated. Within the U.S. economy, the corrections being made to the CPI to capture new goods and product quality improvements may also inadvertently have had positive real economic effects. First, they may have provided an unwitting "grease" effect by lowering the measured rate of inflation relative to "price tag" inflation, and it is price tag inflation that provides the grease. Second, the lowering of reported inflation may also have stopped the Federal Reserve from raising interest rates, thereby allowing and the unemployment rate to fall to thirty year lows.

2. Empirical evidence suggests that in conditions of high inflation(such as the 1970s) nominal wages rise in all sectors, including those with unemployment. However, they rise by less in sectors with unemployment, and this pattern illustrates that there is less than full feedback of inflation expectations. A possible logic is that workers in sectors with unemployment allow their relative real wage to be gradually eroded by inflation, but they restrict the pace at which this can be done.

3. Exogenous shocks may include downward revisions of expectations about asset price appreciation. Endogenous mechanisms may include (1) an Austrian business cycle mechanism whereby accumulation of excess capacity leads to a decline in prices and profitability, (2) a Kaleckian mechanism whereby labor market tightening leads to a shift in income distribution away from profits to wages [Goodwin, 1967], or (3) a financial mechanism whereby increased debt service burdens come to weigh down the spending plans of firms [Foley, 1987] and households [Palley, 1994].

4. Palley [1997b] presents a similar argument in analyzing production decisions of firms in a world where production takes time. Thus, firms incur production costs today but only sell their product tomorrow. Falling prices mean that firms may be unable to recover their cash outlays, and as a result they cut back on employment and output. The same logic holds for investment decisions which involve outlays for capital goods today, and these outlays are recovered by using these capital goods in the future production of goods for sale.

5. Krugman's model has no investment, and equilibrium in the loanable funds market therefore requires zero saving (i.e. the demand for loanable funds is zero, and consequently the equilibrium supply of loanable funds must also be zero).

6. In Krugman's [1998] classical loanable funds model money is present in the form of a cash-in-advance constraint. Money demand is independent of the interest rate, and hence there is no Keynesian portfolio based liquidity trap. In B & P [1999] money is included in the utility function, and this generates a demand for money function. When the nominal interest rate is sufficiently low and deflation expectations are sufficiently large, the return on money can match that on bonds and the economy then finds itself in a liquidity trap.

7. This holds for both the Krugman (1998) and Buiter & Panigirtzoglou (1999) models.

8. The fact that the AD schedule has a positive slope does not mean that the economy is unstable.

The AD schedule is not a demand function. Rather, it is a locus along which the level of demand is equal to the level of output. Examining the issue of stability would require additional details about how producers arrive at production outcomes. If producers adjust output according to $dy/y = f(y - AD)$ where $f' > 0$, then output will converge to a point on the AD locus.

9. The balanced budget multiplier theorem can be thought of as the worst case scenario in which households fully internalize the future tax obligation and treat the bond issue as equivalent to a current tax.

10. In terms of the ISLM diagram, expansionary fiscal policy shifts the IS right. Maintaining the expansion requires maintaining the flow of fiscal stimulus. Once this flow is ended, the IS shifts back left and the initial depressed conditions reassert themselves if nothing has been done to alleviate them.

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	1982-86	1987-91	1992	1993	1994	1995	1996	1997
Real GDP growth	3.3	4.8	1.0	0.3	0.6	1.5	3.9	0.8
% change GDP deflator	2.0	1.6	1.7	0.6	0.2	-0.6	-0.5	0.6
GDP gap	-1.2	0.7	1.5	-0.5	-1.5	-1.9	-0.1	-0.7

Table 1 Real GDP growth and GDP inflation for the Japanese economy for selected years. Source: OECD Economic Outlook, 1998.