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# Financial Stability, Deflation, and Monetary Policy

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**Abstract:** The paper explores the relationship between financial stability, deflation, and monetary policy. A discussion of narrow liquidity, broad liquidity, market liquidity, and financial distress provides the foundation for the analysis. There are two preliminary conclusions. Equity prices are a misleading guide for interest rate policy. Monetary policy tactics protect market liquidity while maximizing the central bank's leverage over longer-term interest rates and aggregate demand.

Monetary policy is a fundamental source of deflation and stagnation risk when price stability is fully credible. A central bank can be fooled by its own credibility for low inflation into being insufficiently preemptive in a business expansion. Then monetary policy can be constrained by the zero bound from reducing real interest rates enough in the subsequent contraction. The chain of events that leads to deflation and stagnation can be weakened or broken in a number of places. Monetary policy has the power to preempt deflation and the power to overcome the zero bound to restore prosperity after a deflationary shock. Fiscal policy is likely to be relatively ineffective at best and counterproductive at worst.

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## INTRODUCTION

Experience shows that credible price level stability is the foundation of effective monetary policy. In the last two decades, central banks acquired credibility by consistently taking policy actions to hold the line on inflation. Low and steady inflation is generally credited with improving macroeconomic performance around the world.

However, the era of low inflation has not brought an end to boom and bust cycles related to financial instability.<sup>1</sup> For instance, there was the run-up and sharp correction in US equity markets in 1987, and in Japanese equity and real estate prices a few years later. More recently, US equity prices made enormous gains well in excess of historical experience. There were two worldwide financial crises, one originating in East Asia in 1997 and the other following the Russian debt default in 1998. These latter events were marked by a sudden collapse of confidence in credit markets resulting in a rapid destruction of market liquidity and a flight to safety. As a result of these and other experiences, central bankers and economists have begun to consider what monetary policy can and should do in addition to maintaining low inflation to stabilize asset markets and the macroeconomy.

The conquest of inflation increases the chances that a cyclical downturn could push an economy into deflation and stagnation, as has happened already in Japan.<sup>2</sup> Policymakers and macroeconomists are currently divided in thinking about the nature of deflation and the monetary policy response to it. The division of opinion about deflation is reminiscent of the views about inflation in the mid-1950s. Today, most seem to regard the risk as small that the US economy will experience deflation in the next couple of decades. Moreover, the profession is divided about how to deal with deflation if the nominal short-term interest rate hits the zero bound, as it has in Japan. Many policymakers would rely on fiscal not monetary policy to combat deflation at the zero bound, much as many favored fiscal over monetary policy to fight inflation in the 1950s. This paper concludes the opposite: monetary policy has the power to preempt deflationary forces, and the power to overcome the zero bound on interest rates to restore price stability and prosperity after a deflationary shock. Fiscal policy, on the other hand, is likely to be relatively ineffective at best and counterproductive at worst.

The exploration of financial stability, deflation, and monetary policy begins in Part 1 by distinguishing between various aspects of financial stability. The

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<sup>1</sup> See International Monetary Fund (2000) for a useful empirical survey of the relationship between asset prices and the business cycle.

<sup>2</sup> Hetzel (1999), International Monetary Fund (1999b), Organization of Economic Cooperation and Development (1998), Posen (1998), and Ueda (1997) discuss macroeconomic developments in Japan.

discussion lays the foundation for the analysis in Parts 2 and 3. Part 1 opens with a brief review of monetary and secular influences on asset prices. There is a discussion of three aspects of liquidity: narrow liquidity, broad liquidity, and market liquidity. All three have the potential to influence asset prices significantly. The nature and consequences of financial distress are reviewed next. Financial distress amplifies asset price fluctuations and contributes to macroeconomic instability. Part 1 concludes with a discussion of the role of financial distress in the collapse of the US savings and loan industry in the 1980s.

Part 2 assesses the actual and potential influence of asset markets on monetary policy in light of the discussion in Part 1. There are two main points. First, equity prices can be a misleading guide for interest rate policy. Second, monetary policy tactics have evolved to protect market liquidity and to maximize the central bank's leverage over longer-term interest rates and aggregate demand.

Part 3 identifies forces that put an economy at risk of deflation and stagnation when inflation is low. Asset prices are seen as a conduit rather than a source of deflationary shocks; asset prices amplify and propagate more fundamental forces. Monetary policy is regarded as a fundamental source of deflation and stagnation risk. The analysis identifies two problems for monetary policy. The first is that a central bank can be fooled by its own credibility for low inflation into being insufficiently preemptive in a business expansion. An unsustainable boom can produce a capital stock overhang, impair balance sheets, and subsequently require low or negative interest rates to avert deflation and restore prosperity. The second problem is that monetary policy can be immobilized at the zero bound on nominal interest rates.

The discussion makes clear that the chain of events leading to deflation and stagnation can be weakened or broken in a number of places. The central bank should take care to be sufficiently preemptive in a boom. The central bank should prepare to undertake aggressive open market purchases if the zero bound on nominal interest rates is ever reached. The central bank should put in place systems to impose a carry tax on bank reserves and currency so that nominal interest can be made negative if need be. Policymakers should be aware of the limitations and counterproductive potential of seemingly stimulative fiscal policy initiatives. Regulators should position themselves to resolve financial distress in the banking system at an early date.

## **1) ASPECTS OF FINANCIAL STABILITY**

The first third of the paper reviews influences on asset prices relevant for the discussion in Parts 2 and 3. Monetary policy is one of the factors that potentially influences asset prices. Real factors such as productivity growth, and financial

factors such as liquidity and financial distress, are the major determinants of asset prices over time. The discussion presents an overview of the consequences for asset prices of these sorts of factors.

### 1.1) MONETARY INFLUENCES ON ASSET PRICES

Monetary policy was a particularly important source of macroeconomic instability and cyclical volatility in asset prices in the period of go-stop policy prior to the stabilization of inflation in the early 1980s.<sup>3</sup> In those days, excessively easy monetary policy in the go phase of a policy cycle proceeded until a consensus developed to fight inflation. Asset prices would tend to fall in tandem with tighter monetary policy for three reasons. First, long-term interest rates would rise with an increase in inflation expectations. Second, the increase in real short-term interest rates brought about by tighter monetary policy would raise long rates even further. Third, monetary policy worked to bring inflation down by precipitating a recession, which caused a decline in expected future real earnings. Equity prices would fall because future earnings were discounted at higher interest and because earnings themselves were expected to be lower.

However, the relationship between asset prices and the business cycle has been relatively loose over the years. Asset prices are forward looking. Hence, asset prices have the potential to lead the business cycle, or to move and then reverse field in anticipation of cyclical fluctuations that fail to be realized. Moreover, the stabilization of inflation has the potential to weaken the cyclical sensitivity of asset prices entirely. In the absence of go-stop monetary policy inflation expectations are firmly anchored, employment and earnings are more stable, and real short-term interest rate variability is attenuated. With long-term interest rates and expected earnings less cyclically variable, asset prices exhibit less cyclical sensitivity, too.

However, fully credible price stability creates another problem for monetary policy. Non-inflationary potential GDP may appear in an expansion to be greater than it is. Monetary policymakers can be fooled by their own credibility into letting a boom continue too long with adverse consequences for asset prices and economic activity in the subsequent bust. The nature of this kind of policy mistake and its effect on asset prices and the economy are discussed in connection with the potential for deflation and stagnation in Part 3.

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<sup>3</sup> Go-stop monetary policy is discussed in Goodfriend (1997).

## 1.2) SECULAR INFLUENCES ON ASSET PRICES

Secular factors have the potential to exercise larger and more persistent effects on asset prices.<sup>4</sup> For instance, lower productivity growth probably helped to hold equity prices down in the 1970s. The increase in productivity growth appears to have contributed to the run-up in US equity prices in the 1990s. In a developing economy, a take off to faster productivity growth can produce a big increase in equity values. The slowing of productivity growth in a maturing miracle economy can cause its equity prices to fall. The introduction of new productivity enhancing technology may cause a "creative destruction" of the value of old technology firms. Thus, a change in productivity growth can have conflicting effects on the valuations of old and new firms.

Major regime changes in monetary and fiscal policy can also exert a longer-term influence on asset prices. For instance, lower corporate income taxes can raise equity values, and encourage investment and innovation. Deregulation can harm the equity values of previously protected firms even as it creates new opportunities for value-creation elsewhere in the economy. Lower inflation reduces effective taxes on capital income if tax rates are not fully indexed. Establishing full credibility for low inflation may enable an economy to operate at a lower unemployment rate, and thereby raise the marginal product of existing forms of capital. An end to go-stop monetary policy and the cyclical volatility that goes with it may even reduce the demand for liquid assets in the economy. The subsequent rebalancing of portfolios will cause the prices of less liquid assets to rise relative to the prices of liquid assets.

Ultimately, asset price movements may be transitory even if the underlying secular changes are permanent. Producible assets such as human, physical, or organizational capital will be built up over time in response to increases in the prices or returns on existing capital. All or part of an initial asset price rise may be reversed over time as capital is built up, adding to the potential for volatility. Asset prices can be particularly volatile when secular factors such as trend productivity growth are in play. Volatility may be an inevitable consequence of the fact that it is difficult to predict the future. Even volatile asset prices that reflect relative value help the economy to allocate scarce resources to their most valued uses.

## 1.3) THE INFLUENCE OF LIQUIDITY ON ASSET PRICES

This section describes and distinguishes between narrow liquidity, broad liquidity, and market liquidity. Liquidity is central to the issues at hand for two

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<sup>4</sup> Barsky and Delong (1993) discuss the effect on equity prices of changes in the trend growth of earnings.

reasons. First, liquidity has the potential to influence asset prices enormously. Second, to a large extent monetary policy exerts its leverage by influencing liquidity in the three senses above. The discussion of liquidity is the foundation for the analysis of the relationship between monetary policy, deflation, and financial instability presented in Parts 2 and 3 of the paper.

### 1.3.1) Narrow Liquidity

Narrow liquidity is a service yield provided by the medium of exchange that allows the public to economize on "shopping time" in transactions. A central bank manages the aggregate supply of the medium of exchange through its control of the monetary base (bank reserves and currency). At any point in time, the public's demand for narrow liquidity services, and the derived stock demand for the real medium of exchange, depends on the interest opportunity cost of money and the scale of monetary transactions that the public wishes to undertake. In practice, a central bank such as the Federal Reserve provides the monetary base so as to manage a short-term nominal interest rate over time. The Fed supports its short-term nominal interest rate target by accommodating the public's demand for narrow liquidity services at the short rate that reflects the current desired stance of monetary policy.

If inflation and inflation expectations are reasonably well-anchored, then a central bank can manage aggregate demand by manipulating nominal and real short-term interest rates. In practice, then, management of the medium of exchange influences asset prices in two ways. First, there is the direct influence through the leverage that current and expected future nominal short rates exert on longer-term nominal rates according to the expectations theory of the term structure. Longer-term interest rates, in turn, influence the present discounted value of future asset returns. Second, there is the indirect effect that interest rate policy exerts on asset prices through its effect on inflation, employment, and earnings over the business cycle.<sup>5</sup>

### 1.3.2) Broad Liquidity

Liquidity defined broadly is a service yield provided by assets according to how easily they can be turned into cash, either by sale or by serving as collateral for external finance. Broad liquidity services are valued because they can be used to minimize the exposure of households and firms to the external finance

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<sup>5</sup> See Goodfriend and King (1997) for a discussion of the role of monetary policy in a modern new synthesis macromodel.

premium.<sup>6</sup> The premium is a consequence of imperfect information and the costly enforcement of contracts that create a wedge between the cost of funds raised externally and internally generated funds. In other words, the premium reflects the deadweight costs associated with the principal-agent problem that typically exists between lenders and borrowers. All assets provide broad liquidity to one degree or another. Generally speaking, implicit broad liquidity services contribute to any asset's value together with direct utility, monetary, or productive returns.

The existence of an external finance premium gives rise to an inventory demand for assets that yield broad liquidity services. An inventory of assets held for their implicit broad liquidity yield is variously referred to as precautionary savings, a buffer stock, or self-insurance.<sup>7</sup> Precautionary savings or retained earnings help households to smooth consumption and firms to take advantage of profitable investment opportunities. Liquid buffer stocks help entities to protect themselves from internally generated financial distress, and to ride out or profit from a temporary destruction of market liquidity that shuts off external finance or precludes selling other assets.<sup>8</sup> Broad liquidity is held in the form of monetary assets such as currency and bank deposits. It is also held in the form of securities and relatively illiquid real assets. Even assets not easily sold can serve as collateral for borrowing and so should be considered to be a potential source of broad liquidity services, at least from the perspective of an individual household or firm.<sup>9</sup>

The external finance premium varies over the business cycle in a way that reinforces asset price movements. Consider a depressed economy. A collapse of asset prices reduces collateral values and, thereby, raises the external finance premium. That, in turn, raises the implicit liquidity services yield on assets. To maintain capital market equilibrium, explicit returns on liquid assets, e.g., short-term securities, must fall relative to explicit returns on less liquid assets. If explicit nominal rates are already near zero, then the required increase in the expected explicit yield spread between illiquid and liquid assets must show up as an increase in the expected yield on relatively illiquid assets. Prices of illiquid assets must fall to produce the increase in expected returns required to equilibrate asset markets. The secondary asset price fall causes net worth to fall and the external finance premium to rise further. Firms must rely on retained earnings to rebuild net worth and to provide funds for investment. Rebuilding net worth takes time, especially

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<sup>6</sup> Bernanke and Gertler (1995) discuss the nature of the external finance premium in detail.

<sup>7</sup> Aiyagari (1994), Holmstrom and Tirole (1998), and Krusell and Smith (1998) analyze self-insurance in models without money. Goodfriend (2000) discusses the role of broad liquidity in the transmission of monetary policy at the zero bound on nominal interest rates.

<sup>8</sup> Shleifer and Vishny (1997) emphasize the role of financial capital to help firms profit from arbitrage in extreme circumstances.

<sup>9</sup> Shleifer and Vishny (1992) analyze liquidation value and relate it to debt capacity, i.e., the degree to which an asset provides broad liquidity services.

when earnings are low.<sup>10</sup> Thus, financial factors amplify and propagate macroeconomic contractions over time.

### 1.3.3) Market Liquidity

Market liquidity refers to the ease with which an asset can be sold on short notice. Consider the potential for market liquidity to influence security prices in terms of firms that stand ready to make a market in securities. Free entry and competition in market making implies an inverse relation between trading volume and transactions cost. The reason is that volume enables market makers to cover overhead costs with lower fees per transaction. Market liquidity is potentially fragile.<sup>11</sup> A sharp fall in security prices due to pessimism about future returns has the potential to trigger a collapse of market liquidity that amplifies the initial price fall. The amplification mechanism works like this. A decline in security prices shrinks the net worth of market makers, who finance the bulk of their securities inventories with debt. That elevates the external finance premium on the loans used by market makers to finance their portfolios. Market makers may raise transactions fees to cover their higher financing costs and to recapitalize themselves with retained earnings. The problem is that higher fees have the potential to cause trading volume to fall off, necessitating still higher fees, with the potential for a collapse of market liquidity.<sup>12</sup>

Given the total expected return required to hold a security, the drying up of its market liquidity requires a security price to fall to the point where the higher expected explicit return offsets the former implicit liquidity services yield. Anticipating this possibility, market participants might attempt to sell the security on the initial news, making a collapse of its market liquidity more likely. If a liquidity crisis spreads into financial markets more generally, it will create more serious problems for firms and households. A generalized collapse of liquidity in financial markets creates doubt about the ability of firms to roll over their liquid debt and, thereby, calls the creditworthiness of firms into question.<sup>13</sup> Credit spreads rise, compounding the liquidity crisis by cutting households and firms off from credit markets. In addition, even if market liquidity does not collapse completely, the ability of firms to realize cash by selling securities is limited by the

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<sup>10</sup> Kiyotaki and Moore (1997) model the dynamic interaction between credit limits and the prices of assets that serve as collateral for borrowing.

<sup>11</sup> Descriptions of liquidity crises are found in Committee on the Global Financial System (1999), Group of Ten (1996), and International Monetary Fund (1998, 1999a).

<sup>12</sup> Securities whose market liquidity had deteriorated could still serve as collateral for external finance; and they could still provide broad liquidity services to some extent.

<sup>13</sup> Morris and Shin (1999) analyze theoretically and quantitatively the effect of liquidity risk on the price of corporate debt.

collapse in their market value. In this way, a collapse of market liquidity has the potential to trigger a rise in the external finance premium and a rise in the demand for liquid assets with additional contractionary consequences for the economy.

#### 1.4) FINANCIAL DISTRESS

Financial distress is an important aspect of financial instability. Falling asset prices and financial distress can be mutually reinforcing, as the liquidity crisis discussed above makes clear. In order to understand the nature and consequences of financial distress more fully, this section reviews the relationship between financial structure and firm value. The ideas are employed to explain the collapse of the US savings and loan industry. The logic of financial distress is utilized again in connection with deflation and stagnation in Part 3.

##### 1.4.1) Financial Structure and Firm Value<sup>14</sup>

Funding a firm with outside equity is costly because it reduces the manager's incentive to maximize the value of a firm's assets. The manager is tempted to spend too much on perks because he bears only part of the cost. The manager will be more interested than shareholders in the growth and longevity of the company. Rarely is a manager wealthy enough to finance his firm himself. But even when this is possible, the firm may then be too cautious in making investments that would be desirable if the risk could be diversified.

Issuing debt is the main alternative to self-financing or issuing outside equity. The advantage of debt relative to equity is that it allows owner-managers to retain earnings above and beyond interest on the debt. Thus, debt overcomes the agency costs associated with equity. However, debt is costly because it gives rise to conflicts between equity interests and creditors. The use of debt creates an "asset substitution" problem. Equity interests have an incentive to take on excessively risky projects or to screen projects too lightly. This is because equity interests enjoy the returns if the projects do well, but the creditors suffer the losses if the projects do poorly. Recognizing the problem, lenders can refuse to lend or require a higher interest rate, so that the expected cost of inefficient business decisions falls on equity interests. Thus, borrowers have an incentive to commit not to take on excessively risky projects. Borrowers agree to abide by covenants in debt contracts to limit risk taking. Covenants are costly, however, because they limit the discretion of management to make value-maximizing investments, and creditors must monitor covenants.

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<sup>14</sup> See Milgrom and Roberts (1992), Chapter 15, for a general overview of related issues.

Debt also has costs associated with the "debt overhang" problem.<sup>15</sup> This problem exists to some extent whenever a firm's outstanding debt is at some risk of default and covenants give current debt priority for repayment. In this case a portion of value created by new investments will go not to the equity interests of a firm, but to creditors through a reduced risk of default on currently outstanding debt. The problem becomes particularly severe when the probability of debt default is very high. Equity interests are most likely to forgo value-maximizing investments in such circumstances because the returns will go mainly or exclusively to rehabilitate outstanding debt.

Bankruptcy is another cost of debt. There are legal and administrative costs; and influence costs are incurred as the claimants to the firm's assets try to protect their claims.<sup>16</sup> Equity interests have little incentive to run a bankrupt firm efficiently, and creditors may have insufficient knowledge of how to run the firm. Consequently, firm assets and overall value are easily dissipated in bankruptcy. Even the likelihood of bankruptcy may cause equity interests to take on excessively risky projects for reasons analogous to those mentioned above. Where a long-term customer relationship is efficient, the prospect of bankruptcy will cost the firm its customers and help force the firm into bankruptcy. If the claimants can't agree on how to resolve their claims, additional costs are incurred if a firm is liquidated at a loss relative to its going concern value.

In order to avoid bankruptcy costs, informal debt workouts occur in which the firm and its creditors bargain over rescheduling debt payments. Workouts are more difficult for widely held debt. On the other hand, when debt is concentrated in a few creditors the opportunity for renegotiation exacerbates the asset substitution problem. A debt overhang problem can be eliminated if lenders can be persuaded to make concessions, perhaps in exchange for equity. If the going concern value is high enough, a workout might involve recapitalizing the firm. Recapitalization would be efficient if the restoration of an efficient mix of equity and debt creates enough value to generate the return required by new investors.

#### 1.4.2) The Collapse of the US Savings and Loan Industry<sup>17</sup>

The story of the collapse of the US savings and loan industry in the 1980s illustrates nicely some of the consequences of financial distress sketched above. Ultimately, the collapse cost the US taxpayer about 130 billion dollars in transfers to make good on the federal deposit insurance guarantee.<sup>18</sup> In addition, there were

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<sup>15</sup> See Myers (1977).

<sup>16</sup> Bankruptcy is discussed in Cornelli and Felli (1995) and in International Monetary Fund (1999c).

<sup>17</sup> See Kane (1989) for a discussion and analysis.

<sup>18</sup> See General Accounting Office (1996), page 13.

untold social costs due to misallocated and wasted investment financed by S&Ls. The overbuilding that occurred took years to work off, contributing to macroeconomic instability. The S&L story illustrates how the incentive effects of financial distress interacted with the deposit insurance guarantee, inflation, and disinflationary monetary policy to create a serious banking problem.

S&Ls financed themselves with deposits and other short-term instruments and held long-term mortgages. As inflation rose in the 1970s the inflation premium in nominal interest rates rose. S&Ls paid higher short-term interest for their loanable funds. Previously booked long-term mortgages paid the lower interest prevailing in earlier years. Newly booked mortgages paid higher interest. But in the early 1980s monetary policy was tightened to bring inflation down, and short rates moved far above long rates. New mortgage bookings slowed during the accompanying recession and there was an increase in defaults. For all these reasons the S&L industry suffered a prolonged period of negative cash flows. Inflation stabilized at around 4 percent in 1983, the recession ended, the yield curve became upward sloping and S&Ls became profitable again. By then, however, the period of negative cash flows had depleted the book value capital of a large number of S&Ls.

It is estimated that in 1985 all the S&Ls that were book insolvent could have been closed and depositors paid off with an infusion of only around 20 billion dollars.<sup>19</sup> In other words, ultimately over 100 billion dollars of taxpayer transfers to resolve the S&L industry appear to have resulted from regulatory forbearance. Forbearance was initially decided upon because the S&L insurance fund was overwhelmed and Congress would not appropriate the 20 billion dollars. So S&Ls with low or negative book value net worth were allowed to continue operating. The hope was that deregulation of the assets that they could buy, and growth, would generate enough internal cash flow to recapitalize the S&Ls over time. Instead, as predicted by the analysis of financial structure above, S&Ls engaged in asset substitution. S&Ls could get insured deposits freely; they did not have to pay much of a risk premium. Since many S&Ls had little or none of their own funds at stake, they increased the riskiness of their portfolios, screened loans less carefully, and engaged in outright fraud.<sup>20</sup> Moreover, once S&L owners judged that forbearance would last a while, competition to exploit the situation caused otherwise conservative S&Ls to follow suit or lose market share.

The debt overhang problem played a part in the forbearance. Owners of S&Ls had little incentive to recapitalize their institutions if additional capital mainly helped to back deposits and reduce the deposit insurance liability. In this

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<sup>19</sup> See Dotsey and Kuprianov (1990), page 15.

<sup>20</sup> See Marshall and Prescott (2000).

case, deposit insurance played the role of debt in creating an overhang problem. Hence, new capital was not forthcoming. In retrospect a workout should have been arranged in 1985 or sooner in which taxpayers could have contributed 20 billion or so to make good on the deposit guarantee in exchange for closing or merging nonviable S&Ls.

One reason for the lengthy forbearance was that the public was reluctant to appropriate the funds. In addition, the beneficiaries of forbearance could lobby Congress to block the appropriation of public funds. In effect, funds to lobby Congress came from inappropriate lending or outright looting, and ultimately from taxpayers who would back the deposit insurance guarantee.<sup>21</sup> It helped that the general public and the media did not understand how all of this worked.<sup>22</sup>

Of course, banking crises can result from shocks other than inflation and disinflation. And the consequences can be different depending on the strength of regulation. For instance, banking systems can have their net worth depleted in other ways. Real estate and other collateral values can collapse after a boom-bust cycle. Deregulation of the financial industry can destroy franchise value in banking.<sup>23</sup> If bank regulation is weak, then financial distress can lead to forbearance as in the S&L crisis. However, if regulation is effective, so that taxpayers stand ready to appropriate funds to close insolvent institutions promptly and to help recapitalize viable ones, then financial distress can manifest itself in a credit crunch, rather than with go-for-broke lending and looting. Responsible behavior among financial institutions can be made to predominate. In an effort to rebuild capital, financial intermediaries will raise loan rates, cut deposit rates, and screen loans more carefully. There will be less use of public funds and less inappropriate lending when regulations are strict and credible. Financial distress will be costly because intermediation costs increase temporarily as the industry recapitalizes itself. But the magnitude and overall cost of any banking system distress should be reduced. These points will be revisited in Part 3.

## **2) MONETARY POLICY AND ASSET PRICE FLUCTUATIONS**

The second part of the paper develops two points about the influence of asset markets on monetary policy. First, equity prices can be a highly misleading guide for interest rate policy actions over the business cycle.<sup>24</sup> Second, many features of

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<sup>21</sup> Garcia (1999) surveys actual and best practices in the provision of deposit insurance around the world.

<sup>22</sup> Akerlof and Romer (1993) present a theoretical and empirical analysis of looting in the S&L industry.

<sup>23</sup> On this point see Keeley (1990).

<sup>24</sup> See Bernanke and Gertler (2000), Bank for International Settlements (1998), Cecchetti et al (2000), Fuhrer and Moore (1992), and Smets (1997) for quantitative model-based analyses of this issue, and Gertler et al (1998) and Goodhart (1995) for other points of view.

the tactical implementation of monetary policy should be understood to reflect a central bank's desire to protect market liquidity while maximizing its leverage over longer-term interest rates and aggregate demand.<sup>25</sup>

## 2.1) INTEREST RATE POLICY AND EQUITY PRICES

Consider two scenarios that might describe the end of a business expansion in which the central bank was not sufficiently preemptive. First, an inflation scare could send long-bond rates up and raise the prospect that a monetary tightening will precipitate a recession. Equity prices will fall on such news. Nevertheless, the central bank should follow through with higher short-term real interest rates to hold the line on inflation. As discussed in Part 1 above, this is what happened in the stop phase of the go-stop policy cycle in the years before inflation was brought under control.

Alternatively, the central bank's credibility for low inflation might remain intact. The business expansion could eventually tighten labor markets so much that a rise in unit labor costs squeezes firm profits. The profit squeeze could precipitate a fall in equity prices. Again, tighter interest rate policy might be necessary anyway to head off inflation. In this case, however, the decline in firm cash flow, the fall in collateral values, and the less favorable equity cost of capital could slow aggregate demand and obviate the need for higher short rates. The proper direction for interest rate policy would depend on the details of underlying macroeconomic conditions. In neither of these two cases can the appropriate response of interest rate policy be read from the direction of equity prices.

As a third example consider rising structural productivity growth. Increased productivity growth leads households and firms to borrow against their improved future income prospects. At initial interest rates, aggregate demand accelerates in excess of current potential output causing employment to grow in excess of the sustainable long-run trend. Labor markets tighten and wages grow faster. Yet, as long as productivity growth continues to rise, unit labor costs may remain stable or even fall. In other words, firms may be able to finance rising wages out of rising productivity with room to spare. Consequently, inflation pressures may take time to build up. Hence, the central bank may put off raising real short-term interest rates, in spite of the fact that equity values may be rising to reflect accelerating firm profits.

Once productivity growth stops rising, ongoing competition for workers in tight labor markets will cause compensation to catch up to the higher productivity growth path. Real wages must grow faster than productivity growth and firm

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<sup>25</sup> Goodfriend (1998) discusses related issues.

profits must grow more slowly during this transition period. The slowdown in profit growth will slow the rise in equity prices, or cause them to fall.<sup>26</sup> By that time, however, inflation may be more of a threat than before. Labor markets will be tighter and firms will find it more difficult to finance further growth in nominal wages out of rising productivity. To control inflation, the central bank may have to go ahead and raise short-term interest rates regardless of the behavior of equity prices.

The three scenarios sketched above illustrate why equity prices can be a highly misleading guide for interest rate policy.

## 2.2) THE TACTICS OF INTEREST RATE POLICY AND MARKET LIQUIDITY

The maintenance of liquidity in financial markets is a primary concern of central banks for two reasons. A collapse of market liquidity can have adverse consequences for asset markets and the economy. Moreover, central banks rely on liquid markets to transmit interest rate policy actions to the economy. This section outlines how monetary policy operating procedures enable central banks to support liquidity in financial markets while maximizing leverage over longer-term interest rates and aggregate demand.

Central banks can use either a quantitative policy instrument (bank reserves or the monetary base), or an interest-rate instrument (the overnight inter-bank rate) to implement monetary policy. Central bankers generally prefer to use an interest rate instrument because it automatically smooths short-term interest rates against short-run shifts in the demand for currency and bank reserves. Thus, the supply of currency and bank reserves always equals the demand at the intended level of short-term interest rates. In particular, a sudden surge in the demand for currency and bank reserves during a financial crisis is automatically accommodated at the interbank interest rate target.

However, aggregate demand does not respond directly to overnight rates but only to longer-term rates. Hence, central banks target overnight rates with the aim of managing longer-term interest rates. Leverage over longer-term rates is exercised as follows. The market determines longer-term rates as an average of the expected overnight rate over the relevant horizon (with allowance for default risk, and a term or liquidity spread). Consider the pricing of a six-month bank loan. A bank could fund the loan with a six-month CD, or it could plan to borrow overnight for the next six months. Cost minimization and competition among

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<sup>26</sup> Kiley (2000) points out that in a production economy with an endogenous interest rate faster productivity growth ultimately lowers the ratio of the market value of firms to output along the new balanced growth path.

banks keep CD rates in line with the average expected future overnight rate for a comparable horizon; and competition in loan markets links loan rates to CD rates. Finally, arbitrage links other money market rates to CD rates of similar maturity.

Central bankers prefer to influence longer-term market rates with a minimum of volatility of the overnight interbank rate in order to protect market liquidity further. This is partly because sudden interest rate spikes can threaten liquidity in asset markets; and because nominal interest rates cannot go below the zero bound. Changes in the overnight rate are highly persistent and seldom quickly reversed, so that a change in the overnight target rate carries expected future overnight rates with it and thus longer-term money market rates too. This way, a central bank anchors the short end of the term structure of interest rates to the intended overnight rate and influences longer-term rates with a minimum of volatility in short rates.

Such reasoning explains two tactical principles of interest rate policy. First, the interbank rate target is changed only when a near-term reversal is relatively unlikely to be desirable *ex post*. Second, a central bank is usually inclined to stick with a target change for a period of time, even if subsequent events suggest that the target change should be reversed quickly. In other words, one observes a degree of inertia in a central bank's interest rate policy instrument.<sup>27</sup>

To strengthen its leverage over longer-term rates (with a minimum of volatility in short rates) a central bank accompanies interest rate target changes with discount (lombard) rate changes, and verbal statements. For instance, longer-term rates in the US rise more for a given increase in the federal funds rate, when the discount rate is raised together with the funds rate.<sup>28</sup> When the Fed wishes to signal that it has reached the top of a sequence of increases in the funds rate, it can make a move without increasing the discount rate. On the other hand, when the Fed reinforces a funds rate target change with a discount rate action, it signals that the target change is likely to persist and that rates are likely to go higher still.

Announcements or discount rate changes also allow a central bank to signal the intensity of its concerns about the economy. Raising the discount rate together with the interbank rate can help anchor inflation expectations and reduce the likelihood that workers and firms will demand inflationary wage and price increases. On the other hand, lowering the discount rate together with the interbank rate can help to boost consumer and business confidence and preempt an inclination to cut back on spending and production. Quieter policy actions are called for when a central bank is more relaxed about current economic conditions. A "one-two punch" that changes both the interbank rate and the discount rate can

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<sup>27</sup> Woodford (1999) develops this point in a theoretical model of monetary policy.

<sup>28</sup> Cook and Hahn (1998) demonstrate this effect empirically.

be counterproductive if it causes the public to believe that the central bank is more worried about inflation or recession than is the case.

Communication is particularly important to help stabilize securities markets after a financial shock. As described in Part 1, a break in equity prices or a significant default in credit markets can destroy market liquidity. A central bank needs to take action to counteract that process. Signals that convey a commitment to help stabilize markets help to do that.

Because the provision of bank reserves and currency occurs automatically at the central bank's interest rate target, it contains no signal of a central bank's commitment to support markets. A small drop in the interbank rate target taken relatively quickly sends a signal of the central bank's concern, especially if accompanied by a cut in the discount rate and a statement. The cut in short rates helps to stabilize asset prices directly by pulling down longer-term rates, and indirectly by stimulating aggregate demand. The rate cut also demonstrates the central bank's commitment to do more if necessary. A rate cut is not without risks, however, because the central bank must be prepared to let it stand for a while for the reasons mentioned above, even if markets bounce back relatively quickly. This increases the chances of an outbreak of inflation if the economy is already at risk of higher inflation.<sup>29</sup>

If a collapse of lending threatens to widen and deepen a liquidity crisis, the central bank can utilize its discount window. It could announce its intention to lend relatively freely on reasonable collateral to depository institutions that do not call in their loans, especially to market makers. Again, an announcement would establish a commitment that could encourage market confidence. Central bank lending would not undermine its interest rate target if financed by selling Treasury securities.

The central bank's lending commitment can be effective against an incipient collapse of market liquidity by relieving financial distress all around, especially on market makers. Most importantly, lending can buy time to help the market redistribute liquidity, and shift risky positions to entities positioned to carry them in return for considerable short-term financial gain. However, extending the central bank's lending commitment is not without risk. Excessive central bank support of market liquidity would cause banks, market makers, and other beneficiaries of central bank lending to take less care to self-insure themselves against financial distress. Enforcing prudential standards on banks and market makers would help to deter moral hazard. A central bank should limit its lending so that moral hazard does not increase risk in asset markets over time.<sup>30</sup>

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<sup>29</sup> Easy monetary policy in the aftermath of the October 1987 stock market break probably contributed to rising US inflation in the late 1980s.

<sup>30</sup> Goodfriend and Lacker (1999) discuss at length how to deal with this problem.

### 3) DEFLATION AND STAGNATION

The remainder of the paper addresses the roots of deflation and the forces that put a potentially deflationary economy at risk of stagnation. In so doing it suggests how monetary policy might contribute to asset price volatility even in an era of price level stability.<sup>31</sup> Asset prices play an important role in amplifying and propagating shocks, but they are a conduit rather than a source of deflationary forces. The analysis identifies monetary policy as a fundamental source of deflation and stagnation risk. There are two problems for monetary policy that put an economy at risk of deflation and stagnation when inflation is low. First, a central bank can be fooled by its own credibility for low inflation into being insufficiently preemptive in a business expansion. Allowing a boom to go on too long creates the conditions for a bust and a recession after that. Second, although the economy may need low or negative short-term interest rates to stimulate aggregate demand subsequently, interest rate policy can be immobilized at the zero bound on nominal interest rates.

The discussion begins by pointing out the potential for deflation and stagnation that exists when the central bank has full credibility for low inflation. Then it addresses the power of monetary policy, fiscal policy, and banking policy to act against deflation and stagnation at the zero bound on interest rates. The policy discussion indicates how the chain of events that potentially leads to stagnation can be weakened or broken at a number of places.

#### 3.1) THE POTENTIAL FOR DEFLATION AND STAGNATION

The public's confidence that the price level will remain stable creates the potential for boom-bust cycles that manifest themselves primarily in fluctuations of asset prices and real quantities (employment, production, consumption, and investment) and less in price level instability. If expectations of inflation are firmly anchored, labor markets might get surprisingly tight without triggering inflationary wage pressures. Firms might be inclined to hold the line on price increases even if labor costs begin to rise.<sup>32</sup> Early warning indicators of inflation

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<sup>31</sup> See Shiller (1993, 2000).

<sup>32</sup> Taylor (2000) notes that recently there has been a significant decline in the degree to which firms pass through changes in costs to prices, a decline frequently regarded as a reduction of the pricing power of firms. Taylor's sticky-price model suggests that low inflation itself (in particular low expectations of inflation) causes the low pass-through. The main point of Taylor's paper is that low pass-through should not be taken as exogenous to the inflationary environment. He points out that the tendency for pass-through to stay low in the face of strong growth in demand would disappear if the public lost confidence in the central bank's resolve to tighten monetary policy sufficiently to validate low inflation. See Goodfriend and King (1997), Section 8.2.2, pp. 274-5.

might not work very well. For instance, inflation expectations in long-bond rates might be firmly anchored in spite of potentially inflationary resource utilization.

Hence, a central bank might be inclined to delay monetary tightening when the economy moves above a presumed level of non-inflationary potential output. The timing and magnitude of interest rate policy actions are difficult to determine in any case. Preemptive interest rate policy actions are difficult to justify to the public when there is little evidence of inflationary pressure. A kind of wishful thinking can develop. The public might come to believe that the economy has become less prone to inflation, regardless of what the central bank does. Such optimism could support a boom in spending by households and firms, especially if the central bank exhibits a reluctance to raise short-term interest rates. The plausibly persistent increase in the economy's non-inflationary productive potential would be reflected in a run up in equity, real estate, and other asset prices.

If, however, the economy continued to operate significantly above potential, then at some point the credibility for stable prices would self-destruct. Tightness in labor and product markets would trigger a jump in inflation, and the central bank would react with tighter monetary policy. In effect, the outbreak of inflation would destroy an implicit reputational equilibrium in which wage and price setters kept their part of an implicit bargain by not inflating as long as the central bank was expected to support its commitment to price stability.

An unsustainable boom is apt to collapse relatively quickly. Once significant inflation occurs, the mutual confidence among wage earners, price setters, and the central bank will deteriorate rapidly.<sup>33</sup> There is the potential for a sharp downgrading of future income prospects involving a sharp break in asset prices and a substantial fall in aggregate demand.

The combination of open inflation, a collapse in asset prices, and declining real economic activity puts the central bank in a difficult situation. On one hand, the central bank may be inclined to raise real short-term interest rates to restore its credibility for low inflation. However, the need for tighter policy might be short-lived. The heavy investment during the boom will look excessive in light of subsequent developments. A capital-good overhang may cause investment in producer and consumer durables to be weak for some time to come.<sup>34</sup> Moreover, the collapse in asset prices will impair balance sheets and widen the external finance premium, with additional contractionary implications. The central bank's predicament is made worse by the zero bound on nominal interest rates.

The immobilization of interest rate policy at the zero bound will create doubt about whether monetary policy can act against the deficiency of aggregate demand.

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<sup>33</sup> The collapse of the Japanese boom in the early 1990s is consistent with this view. See Goodfriend's comment on Ueda (1997).

<sup>34</sup> This point is made, for instance, in International Monetary Fund (1999b).

Households and firms will be inclined to save more as interest rates near zero, worsening the contractionary pressure. A lack of confidence in stabilization policy will be reflected in excessively depressed asset prices.

Note the role of asset prices in the boom-bust cycle. Prices of assets such as equity and real estate would exhibit considerable volatility, reflecting the wide range of variation in expected future income prospects. Asset price movements, in turn, would reinforce cyclical volatility by reducing the external finance premium in the boom and raising it in the bust part of the cycle. Asset price volatility, however, should be regarded as a symptom and not a cause of the boom-bust cycle. Rather than focusing on asset prices, central bankers should address the problems for monetary policy that give rise to the potential for economic instability.

A full analysis of interest rate policy is beyond the scope of this paper. One thing is certain, there are no good options when an unsustainable boom turns to bust. A central bank should make every effort not to be fooled in the first place into being insufficiently preemptive during an economic expansion. To guard against this possibility a central bank should benchmark its policy actions against a rule that has performed reasonably well in the past.<sup>35</sup> A central bank should also position itself to overcome the zero bound on interest rate policy.

### 3.2) MONETARY POLICY AT THE ZERO BOUND ON INTEREST RATES<sup>36</sup>

With fully credible price level stability, nominal short-term interest rates could average as low as 1 or 2 percent per annum. This leaves relatively little leeway for interest rates to fall in a recession to stimulate aggregate demand. Thus, the zero bound on nominal interest rates is a potential problem for monetary policy when inflation is low and stable. The zero bound is a consequence of the fact that no one will lend money at negative nominal interest if cash is costless to carry over time. In particular, the nominal interbank interest rate will not fall below zero because central banks store electronic bank reserves for free. Once a central bank has lowered its interbank interest rate policy instrument to zero, conventional interest rate policy is immobilized. Moreover, an expansionary open market purchase cannot relax the transaction constraint any further to free "shopping time" for more productive uses. At that point the economy may be said to be satiated in narrow liquidity services provided by the medium of exchange.

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<sup>35</sup> See Taylor (1999). Orphanides (1998) emphasizes that measuring the output gap in real time is very difficult. His work suggests that central banks should downgrade the response of the interest rate to the output gap in the policy rule and respond mainly to inflation. The argument in this paper suggests that with credible price stability, responding only to inflation has problems of its own. Central banks need to respond to real measures of inflationary potential so as not to be insufficiently preemptive in a business expansion.

<sup>36</sup> This subsection borrows from Goodfriend (2000); see also McCallum (2000). See Fujiki et al (2000) for a closely related discussion and analysis of the Bank of Japan's zero interest policy.

Nevertheless, there are two mechanisms by which monetary policy can continue to stimulate spending when the interbank rate is at the cost-of-carry floor. First, open market purchases can stimulate spending because money also provides broad liquidity services, and these will generally not be satiated when the nominal interest rate is at the zero bound. A central bank can increase broad liquidity by buying relatively illiquid assets, such as long-term bonds. Second, a central bank can put in place systems to impose a carry tax on electronic bank reserves. Open market purchases could then push the interbank rate below zero by the cost of carry. A carry tax could be imposed on currency and vault cash to provide more leeway to push nominal interest rates below zero.

### 3.2.1) Quantitative Monetary Policy at the Zero Bound

The transmission mechanism by which broad liquidity stimulates spending at the zero bound involves the portfolio rebalancing channel identified by monetarists and the credit channel by which a monetary expansion reduces the external finance premium.<sup>37</sup> These two channels are thoroughly intertwined since broad liquidity services are closely related to the external finance premium. It is plausible to think that the implicit marginal broad liquidity services yield (given, income, consumption, and wealth) declines as the aggregate stock of monetary assets increases. This would be so because the greater abundance of liquidity reduces the exposure of households and firms to the external finance premium.

A monetary expansion that reduces the implicit marginal services yield on monetary assets causes the public to rebalance its portfolio by acquiring assets yielding direct utility, money, or productive services. Portfolio balance is restored when the prices of the latter rise enough so that their expected returns have fallen as much as the implicit liquidity yield on monetary assets. Higher asset prices stimulate spending by raising wealth and by increasing the return to the production of producer and consumer durable goods.

From the credit channel point of view, a reduction in the external finance premium is achieved both by the increase in monetary liquidity and by the rise in asset prices. Balance sheets improve. Collateral values improve, net worth increases in non-financial firms and in the banking system. Consequently, bank lending is stimulated and credit spreads narrow. Spending increases all around because the cost of borrowing against future income prospects falls. Thus, aggressive open market operations have the power to stimulate spending even when nominal interest rates are at the zero bound.

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<sup>37</sup> See Meltzer (1995) and Bernanke and Gertler (1995).

There are complications. Ordinarily, a relatively small change in bank reserves is sufficient to support a change in the central bank's interest rate policy instrument. However, monetary policy actions that must stimulate spending through their effect on broad liquidity may require much larger injections of monetary base. For quantitative monetary policy to be effective at the zero bound, the central bank must be prepared to engage in open market purchases that increase the size of its balance sheet considerably. Moreover, in order to increase monetary assets providing broad liquidity significantly, a central bank would have to acquire relatively illiquid assets such as long-term bonds, which are subject to interest rate risk.

Quantitative monetary policy at the zero bound is likely to be effective only if the public believes that the central bank will do whatever it takes, and that the monetary stimulus will not be withdrawn before the economy recovers. Such a commitment would expose a central bank to the risk of capital loss on its long bonds due to uncertainty about the timing and magnitude of the rise in interest rates that would accompany a recovery. If the public thinks that the central bank is unwilling to pursue quantitative policy aggressively for fear of capital losses, or for any other reason, then quantitative policy will lack credibility. To help assure the credibility of quantitative monetary policy, the Treasury should indemnify the central bank against capital losses. In order to guard against inflation, the Treasury should agree to provide the central bank with enough securities to sell in order to drain excess money balances from the economy once prosperity has been restored.

### 3.2.2) Imposing a Carry Tax on Bank Reserves and Currency

If a central bank imposed a per period, per dollar carry tax on electronic bank reserves when the interbank rate was pressed to zero by an abundance of reserves, competition among banks to avoid the carry tax would push the interbank rate below zero by the cost of carry. If negative rates were expected to persist for a while, however, banks and the public would hoard currency rather than lend at negative interest. To deal with this problem, a central bank could also impose a carry tax on vault cash and currency in the hands of the public. Modern payments technology makes it possible to impose a carry tax on currency by recording the date it leaves an automatic teller machine and the date it is returned to a bank. For the most part, currency is spent and returned to the banking system by merchants a week or so after it is withdrawn. Thus the imposition of a carry tax on currency would be collected like a sales tax. For instance, a carry tax on currency of 5 percent per year would be sufficient to prevent hoarding as long as the interbank rate was not pushed farther than 5 percent below zero.

By varying the carry tax on electronic bank reserves when needed, a negative nominal interbank rate could be targeted as easily as a positive rate. The carry tax would be a powerful supplement to quantitative policy. Systems to impose a carry tax to fight deflation could be introduced to pay interest on bank reserves and currency when nominal interest rates exceed zero. Carry interest could be introduced in exchange for the opportunity to use the carry tax to overcome the zero bound on interest rate policy if need be. By introducing the means to impose a carry tax, and by getting the Treasury to support quantitative policy, a central bank could completely overcome the zero bound on interest rate policy.

### 3.3) FISCAL POLICY PITFALLS

The immobilization of monetary policy at the zero bound would create pressure to use fiscal policy to stimulate aggregate demand. Unfortunately, fiscal policies are likely to be costly, relatively ineffective at best, and counterproductive at worst. For the purpose of this discussion it is useful to distinguish between three types of fiscal policy: a debt-financed cut in taxes, debt-financed government investment in public capital, and microeconomic interventions and regulations to support incomes in specific sectors.

A temporary debt-financed cut in taxes could have a positive effect on spending if public bonds are regarded as net wealth. However, if the public has been sensitized to the problems of financing social security or banking system bailouts, then the public may recognize that debt-financed tax cuts amount to deferred and not reduced taxes. In that case, a cut in taxes financed by debt could have a relatively small effect on aggregate demand.

A debt-financed tax cut could increase spending by putting cash in the hands of credit-constrained households and firms. Such entities would be better off even if they had to pay their share of taxes to support interest on the increase in public debt. The reason is that such a policy effectively would allow credit-constrained entities to borrow at the government interest rate. Any benefits, however, would have to be judged in light of administrative and distortion costs of the change in tax rates, and any perceived increase in the burden of the public debt.<sup>38</sup>

Debt-financed government investment in public capital would have a direct effect on aggregate demand. If public capital were already overbuilt, however, then building more could be a costly waste of real resources. Accelerating the construction of public capital scheduled to be built in the future might be less

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<sup>38</sup> Aiyagari and McGrattan (1998) study the optimum quantity of government debt in a real business cycle model with no aggregate uncertainty, but where there is individual uncertainty due to the absence of insurance markets. Thus there is precautionary saving in their model, and government debt provides broad liquidity services.

wasteful. If a capital overhang is part of the stabilization problem, however, then accelerating the construction of public capital might simply extend the period over which the capital stock needs to be worked off.<sup>39</sup> Finally, debt issued to finance public capital creates future tax liabilities that could deter private investment at a time when investment is already weak. Even the possibility of such tax liabilities could deter investment by increasing uncertainty about the appropriability of returns.

Perhaps the most dangerous fiscal policy response to economic stagnation is the inclination to support the income of particular groups or sectors in the economy with anti-competitive interventions and regulations. Such interventions transfer income by distorting relative prices and markups. They amount to off-budget subsidies financed by higher prices for households and firms. They would be attractive, however, to a government whose debt to GDP ratio was already high due to on budget debt-financed fiscal initiatives. Protracted stagnation would increase the demand for special favors and the willingness of politicians to supply them.

The danger from this class of fiscal policy is many-fold.<sup>40</sup> First, regulatory favors distributed to one group create a demand to help others. Second, off-budget taxes are only imperfectly perceived. Third, the aggregate efficiency costs can be considerable. Collectively, anti-competitive fiscal policies can have a significant negative effect on potential output. The bottom line is that dispensing fiscal favors to particular groups tends to breed stagnation. Even the possibility of the dispensation of such distortions will depress aggregate income prospects, asset prices, and spending, and drive the economy toward deflation and stagnation.

### 3.4) BANKING POLICY AND THE CONSEQUENCES OF FINANCIAL DISTRESS

The problem facing bank regulators in the aftermath of a boom-bust cycle is the large increase in non-performing loans on bank balance sheets.<sup>41</sup> In contrast to the S&L crisis, even before a period of forbearance begins, a significant bad loan problem ties up a large share of loanable funds. Ordinarily, bank owners have an incentive to write off and resolve loans early in order to take control of collateral before it depreciates. Financial distress blunts that incentive. A bank owner has

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<sup>39</sup> This would be so to the extent that public capital is a substitute for private capital.

<sup>40</sup> Kennedy (1999) describes Roosevelt's New Deal policies in the 1930s as a collection of market interventions taken to support favored sectors of the economy. Cole and Ohanian (1999) model these New Deal interventions and show quantitatively that they can explain the persistence of the Great Depression in the US.

<sup>41</sup> See, for example, the discussion of the bad loan problem in Ueda (1998). Hoshi and Kashyap (1999) cite deregulation as an important cause of the banking problems in Japan. Kanaya and Woo (2000) present a particularly good overview of Japanese banking problems and policy responses.

no incentive to foreclose if write-offs make the bank (book) insolvent, forcing regulators to seize the bank.<sup>42</sup>

Regulators acting on behalf of taxpayers do have an incentive to take control of insolvent banks. To do so, however, examiners must force banks to write down loans, and the deposit insurer must have sufficient resources to fund the deposit guarantee. Both hurdles are particularly difficult to overcome when there is widespread financial distress. Moreover, loan valuations are highly subjective. Bank owners threatened with a loss of control will challenge write-downs forced on them.

Speedy appropriations might save taxpayers money in the long run, but appropriations are difficult to get, especially in a recession. As in the S&L crisis, there are those who profit from a delayed resolution of banking problems, e.g., borrowers whose loans are not foreclosed and bankers who retain control of bank assets. Such beneficiaries have an incentive to use the gains from delayed resolution to lobby the legislature not to appropriate funds for closing banks. Furthermore, taxpayers are naturally slow to recognize the need to transfer funds to close distressed banks. They don't understand the incentives for bank owners with little of their own funds at stake to take on excessive risk and let collateral dissipate. There is a reluctance to authorize funds until the waste and fraud that result from forbearance become visible for all to see.

If financial distress in banking were seen clearly to restrict the supply of credit, then the public might agree to finance (with taxes) a more prompt resolution of insolvent banks. But a stagnant economy might show little evidence of inadequate bank credit. Moreover, at very low interest rates, significant non-performing loans create less of a negative cash flow problem for banks. Consequently, forbearance is easier to sustain.

Society should take steps to protect itself from the costly forbearance that can accompany financial distress in banking.<sup>43</sup> Bank supervision and regulation should be strengthened. Regulators should have the power to write down loans more aggressively.<sup>44</sup> And regulators should enforce minimum capital requirements.<sup>45</sup> The deposit insurance fund should be enlarged to reduce the risk of having to ask the legislature for funds to close banks. In any case, funds should

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<sup>42</sup> Bank owners also have little incentive to set aside loan loss reserves. See Walter (1991).

<sup>43</sup> There now exists a large literature on bank restructuring. Federal Deposit Insurance Corporation (1997, 1998) tells the story for the US. Alexander et al (1997), Bank for International Settlements (1999), Enoch et al (1997, 1999), Lindgren et al (1996), Nyberg (1997), and Sheng (1996) summarize international experience on bank restructuring and the consequences of unsound banking.

<sup>44</sup> Goodhart et al (1998) discuss how this should be done. Their advice accords well with the recommendations in this paper.

<sup>45</sup> Marshall and Prescott (2000) and Diamond and Rajan (1999) present useful ways to think about bank capital. Merton and Perold (1993) present a framework for thinking about the cost of capital in financial firms.

be appropriated promptly, and used to resolve banks in a way that does not protect parties that have benefited from misallocating bank loans.<sup>46</sup> The public should be made to understand the nature and costliness of forbearance. Taking corrective action may restrict the supply of bank credit somewhat for a period of time.<sup>47</sup> But to do otherwise just delays the necessary corrective action and incurs wasteful forbearance costs. Most importantly, a lingering widespread financial distress in the banking system places a greater burden on monetary policy at a time when the zero bound complicates the central bank's power to lower interest rates.

## SUMMARY

The paper explored the relationship between financial stability, deflation, and monetary policy. A discussion of narrow liquidity, broad liquidity, and market liquidity provided the foundation for the analysis. There was also a review of the consequences of financial distress for asset price fluctuations and banking crises. Two initial conclusions were reached in light of these preliminaries. Equity prices are a misleading guide for interest rate policy. Monetary policy tactics protect market liquidity while maximizing the central bank's leverage over longer-term interest rates and aggregate demand.

The main point of the paper is that monetary policy is a fundamental source of deflation and stagnation risk when price level stability is fully credible. There are two problems for monetary policy. A central bank can be fooled by its own credibility for low inflation into being insufficiently preemptive in a business expansion. Monetary policy might then be constrained by the zero bound on nominal rates from reducing real interest rates enough to avert deflation and stagnation in the subsequent contraction.

The following steps should be taken to guard against this chain of events. First, a central bank should be sufficiently preemptive in a boom. Second, a central bank should prepare to undertake aggressive open market purchases at the zero bound. Third, a central bank should put in place systems to pay carry interest on the monetary base, and then use the systems to impose a carry tax to make nominal rates negative if need be. Fourth, policymakers should forswear counterproductive fiscal policy initiatives. Fifth, regulators should position themselves to resolve financial distress in the banking system at an early date.

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<sup>46</sup> Whether insolvent banks should be closed, or recapitalized and allowed to remain open is often a difficult question. Diamond (2000) presents a theoretical discussion of the issue. The references in note 43 discuss practical restructuring options at length.

<sup>47</sup> Hogarth and Thomas (1999) find evidence that actions taken in 1998 to recapitalize and resolve insolvent Japanese banks restricted the supply of bank credit relative to the demand.

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