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Liquidity effects, the monetary transmission mechanism, and monetary policy

Lawrence J. Christiano and
Martin Eichenbaum



Conventional wisdom holds that an expansionary monetary policy shock generates a persistent decline in short term interest rates and a persistent increase in the level of employment and output. Using different styles of analysis, Bernanke and Blinder (1992), Christiano and Eichenbaum (1992a,c), Eichenbaum (1992), Gali (1992), King and Watson (1992), Sims (1992), and Strongin (1992) provide strong empirical support in favor of the conventional view. These findings pose an important challenge to macroeconomists. This is because existing quantitative, general equilibrium business cycle models which allow for capital accumulation are inconsistent with the conventional view. For example, King (1991) and King and Watson (1992) discuss the difficulty of generating a negative interest rate response to positive money supply shocks in Keynesian type models with sticky wages and/or sticky prices. This is also the case for real business cycle models in which money is introduced simply by imposing cash in advance constraints on agents (as in Lucas [1984], Greenwood and Huffman [1987], Cooley and Hansen [1989], or Christiano [1991]), or by incorporating a transactions demand for money into the analysis (as in Kydland [1989], den Haan [1991], or Marshall [1992]). A generic implication of these monetized real business cycle models is that, if money growth displays positive persistence, then unanticipated increases in the supply of money drive interest rates up, not down. This is because, in these models, money shocks affect

interest rates exclusively through an anticipated inflation effect. So, to drive interest rates down, a positive shock to the supply of money would have to signal less inflation in the future. But to obtain this result one must make grossly counterfactual assumptions regarding the law of motion for the money supply. Specifically, one would have to assume that the growth rate of money displayed substantial negative serial correlation.

In our opinion, any convincing explanation of the empirical facts will involve business cycle models in which money supply shocks generate significant, persistent liquidity effects. Recently, a number of researchers have made progress in constructing such models. For convenience we refer to these models as *liquidity effect models*. Specifically, Lucas (1990), Christiano (1991), Christiano and Eichenbaum (1992a), Fuerst (1992a), Grilli and Roubini (1992), and Schlagenhauf and Wrage (1992) have constructed general equilibrium models in which purely *transitory* liquidity effects arise. In these models, the liquidity effect can dominate the initial expected inflation effect associated with a change in the growth rate of money. Under these circumstances, the contemporaneous effect of an unanticipated increase in the money supply is a fall in the nomi-

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nal interest rate along with an increase in employment and output.

In this article, we seek to accomplish three objectives. First, we discuss the basic mechanisms at work in these liquidity effect models. Second, we investigate one way of generating persistent (as opposed to purely transitory) liquidity effects. We argue that once a simplified version of the model in Christiano and Eichenbaum (1992a) is modified to allow for small costs of adjusting sectoral flows of funds, positive money supply shocks generate long lasting, significant liquidity effects as well as persistent increases in aggregate economic activity. Finally, we discuss some of the policy implications of this class of models.

The model we analyze builds on a tradition of theoretical papers which begins with the premise that the key to understanding the effects of money supply shocks lies in the differential impacts that such shocks have on different agents in the economy (Grossman and Weiss [1983], Rotemberg [1984], Woodford [1987], and Baxter, Fisher, King, and Rouwenhorst [1990]). Following Lucas (1990) and Fuerst (1992a), we focus on firms and financial intermediaries as the key subset of agents who absorb disproportionately large shares of money supply shocks. To generate this result, we assume that households make their nominal consumption-savings decision before observing the current period realization of monetary policy. This allows us to capture in a simple way the notion that firms and financial intermediaries respond relatively more quickly than households do to movements in asset prices induced by open market operations.

Consistent with the fact that actual open market operations involve the financial sector of the economy, we suppose that cash injections go to financial intermediaries. These intermediaries are assumed to be in constant contact with goods producing firms who need working capital, that is, cash, to fund their ongoing operations. As long as the nominal interest rate is positive, financial intermediaries will lend out all of the cash at their disposal. When a positive money supply shock occurs, households are out of the picture, at least in the short run. This means that firms *must* absorb a disproportionately large share of unanticipated cash injections. To induce firms to do so voluntarily, the interest rate must fall. The down-

ward pressure on interest rates continues as long as an unusually large percentage of the economy's cash flows through the financial sector.

The same frictions in agents' environments that give rise to a liquidity effect also imply that constant growth rate rules for the money supply, of the type advocated by Friedman (1968), will not be optimal. This is because, in our model, it is less costly for the monetary authority to direct cash to financial intermediaries (and ultimately to firms) via open market operations than it is for private agents to do so via adjustments in their nominal consumption-savings decisions. So it can be welfare improving for the monetary authority to accommodate various shocks which impact on agents' environments. To make this point concrete, we analyze the response of our model economy to technology shocks which affect the marginal productivity of labor and capital. A key result is that, absent monetary accommodation, contemporaneous aggregate employment does not increase in response to a positive technology shock. The problem is that the extra working capital necessary to fund an increase in employment is simply not forthcoming sufficiently quickly from the household sector. Without a change in the money supply, interest rates rise dramatically and valuable social opportunities are wasted. As an alternative to inaction, the monetary authority could pursue a version of the Real Bills Doctrine in which the money supply is increased in response to unanticipated improvements in real production opportunities. In our model, when such a policy is pursued, contemporaneous employment and output do increase in response to favorable technology shocks. Transitory opportunities do not go unexploited.

The previous finding is suggestive along on a number of dimensions. First, the perspective on monetary policy provided by our version of the Real Bills Doctrine captures the spirit of the Federal Reserve Act which directs the central bank to "... furnish an elastic currency, to afford means of rediscounting commercial paper..." (Board of Governors [1988]). Second, in our example, accommodative monetary policy has the effect of smoothing nominal interest rates. Thus, it provides a possible rationale for interest rate smoothing rules of the sort allegedly pursued by the Federal Reserve in much of the post war era (Goodfriend, [1991]). Third, with costs to adjusting sectoral flows of funds,

even fully anticipated changes in the money supply (say, a period in advance) generate liquidity effects. Because of this, more fully developed versions of the model could perhaps rationalize seasonal smoothing of interest rates by the Federal Reserve of the sort documented in Mankiw and Miron (1991).

A simple model with liquidity effects

We begin by considering a simplified version of the model in Christiano and Eichenbaum (1992a). In this model, optimizing households, financial intermediaries, and firms interact in perfectly competitive markets. For now we suppose that the only source of uncertainty in agents' environments pertains to the realization of monetary policy. Later, when we discuss the policy implications of the model, we also allow for shocks to the aggregate production technology.

At the beginning of each period, the representative household possesses the economy's entire beginning of period money stock, M_t . The household allocates Q_t dollars to time t purchases of the consumption good, C_t , and lends the rest, $M_t - Q_t$, to financial intermediaries. In addition, the household must decide on how much time, L_t , to work for firms. The household ranks alternative streams of consumption and leisure according to the expected value of the criterion:

$$(1) \sum_{t=0}^{\infty} \beta^t U(C_t, L_t),$$

where $U(C_t, L_t)$ is given by,

$$(2) U(C_t, L_t) = (1 - \gamma) \ln(C_t) + \gamma \ln(T - L_t).$$

The parameters β and γ are scalars between zero and one and T is the household's endowment of time.

In period t , the household faces a cash in advance constraint on nominal consumption expenditures:

$$(3) P_t C_t \leq Q_t + W_t L_t.$$

Here P_t and W_t denote the period t dollar price of goods and labor, respectively. According to (3), consumption purchases must be fully financed with cash that comes from two sources:

Q_t and wage earnings, $W_t L_t$. In addition, the household must obey its budget constraint,

$$(4) M_{t+1} = R_t(M_t - Q_t) + D_t + F_t + (Q_t + W_t L_t - P_t C_t).$$

The variable R_t denotes the gross interest rate in period t while F_t and D_t denote period t dividends received from firms and financial intermediaries, respectively.

The household maximizes (1) subject to (2), (3), and (4) by choice of contingency plans for L_t , C_t , and Q_t . Throughout we assume that the contingency plans for L_t and C_t are functions of all model variables dated t and earlier. In the *basic liquidity model*, the household's contingency plan for Q_t is not allowed to be a function of the period t realization of monetary policy, that is, the household decides how much money to send to the financial sector before seeing the realization of time t monetary policy. This assumption is intended to capture, in an analytically convenient way, institutional and other factors which constrain households' choices of Q_t , at least in the short run. Institutional considerations include the fact that a nontrivial fraction of M_t is held by firms and financial intermediaries in the form of retained earnings or pension funds and cannot be readily allocated by households to change Q_t . In addition, a variety of fixed costs associated with portfolio decisions, such as those stressed by Akerlof (1979), render it suboptimal for households to continually readjust their nominal consumption-savings plans. To illustrate the impact of the assumed rigidity in Q_t , we also analyze a model which abstracts from that rigidity. Specifically, we investigate the *basic cash in advance model*, where Q_t is allowed to be a function of period t monetary policy.

To simplify the analysis, we suppose that the money supply changes via lump sum cash injections to perfectly competitive financial intermediaries. This means that the representative financial intermediary has two sources of funds: cash received from the household sector, $M_t - Q_t$, and lump sum injections of cash by the monetary authority, X_t . These funds are lent over the period in perfectly competitive markets to firms at the gross interest rate, R_t . The financial intermediary's net cash position at the end of the period is distributed, in the form of dividends, to the financial intermediary's own-

er, the household, after the consumption good market has closed.

New goods are produced by perfectly competitive firms via the production function,

$$(5) \quad f(K_t, L_t) = AK_t^\alpha (z_t L_t)^{1-\alpha} + (1-\delta)K_t,$$

where $0 < \alpha < 1$, $0 < \delta < 1$ and A is a positive scalar. Here K_t is the beginning of period t stock of capital, δ is the rate of depreciation on capital, and $f(K_t, L_t)$ denotes new period t output plus the undepreciated part of capital. The variable z_t denotes the time t state of technology. For now we suppose that z_t grows at the constant geometric rate $\mu > 0$. Firms must borrow working capital from financial intermediaries to cover their payments to labor. Loans must be repaid to the financial intermediaries at the end of period t . Consequently, the total period t cost associated with hiring labor equals $R_t W_t L_t$.

Firms own the stock of capital, which evolves according to

$$(6) \quad K_{t+1} = (1 - \delta)K_t + I_t,$$

where I_t denotes period t gross investment. Unlike labor, capital is assumed to be a credit good, so that firms need not borrow funds from the financial intermediary to finance investment activities.¹ At the end of the period, after the consumption good market closes, the firm's net cash holdings are distributed to its owner, the household. The perfectly competitive firm maximizes the expected value of its dividends by contingency plans which specify L_t as a function of model variables dated period t and earlier, and I_t as a function of model variables dated $t-1$ and earlier. This timing specification captures the idea that employment decisions can be revised quickly, while investment decisions cannot be revised as frequently as the rate at which open market operations are carried out. See Christiano (1991) for the role of the timing assumption regarding investment in these types of models.

Generating a liquidity effect

The key feature of the basic liquidity model which allows it to generate a substantial liquidity effect is the assumed rigidity in Q_t . It is this assumption which prevents an increase in the money supply from being distributed pro-

portionally among all agents. To see this, consider the basic cash in advance model. To keeps things simple, suppose that the growth rate of money, $x_t = X_t/M_t$, is an identically and independently distributed random variable. Under these circumstances, a positive money supply shock is neutral: it simply results in a proportional jump in current and future prices and wages, leaving all other variables unaffected. The key to this result is that the nominal expenditures of *all* agents respond to the money shock in equal proportion. Among other things, this requires that the percentage of the money stock available to financial intermediaries, $(M_t - Q_t + X_t)/(M_t + X_t)$, be invariant to X_t . But this requires that Q_t be a positive function of X_t . In the frictionless world of the basic cash in advance model this is just what happens. Knowing that the monetary authority has increased the amount of cash available to the financial sector, the representative household reacts by sending less cash to that sector and more to the consumption sector.

Now if Q_t does not respond to X_t , then a positive money shock increases the fraction of the money supply in the hands of financial intermediaries. As long as R_t exceeds one, financial intermediaries lend all of the cash at their disposal to firms. But this requires that firms absorb a disproportionately large share of new cash injections. For firms to do so voluntarily, interest rates must fall. Of course, if the growth rate of money displays positive persistence, then the expected inflation effects of a change in the growth rate of money exert countervailing pressure on interest rates. Under these circumstances, whether interest rates fall or rise depends on whether the liquidity effect or the expected inflation effect is stronger.

Suppose for the moment that the liquidity effect dominates, so that R_t falls in response to a positive money shock. To understand the resulting impact on aggregate employment and output, it is useful to think in terms of the demand and supply curves for labor. A necessary condition for the solution of the firm's optimization problem is that the marginal cost of an extra unit of labor equals the marginal product of that labor. Since the firm must borrow working capital at the gross interest rate R_t , this requires that $R_t W_t/P_t$ be equal to the marginal product of labor. By assumption, the marginal product of labor is a decreasing function of the

amount of labor employed. So, holding the interest rate fixed, the demand for labor is a decreasing function of the real wage, W_t/P_t . This is why the demand curve for labor in Figure 1, labeled $DD(R_t, K_t, z_t)$, has a negative slope. But for a given level of W_t/P_t , the demand for labor is a decreasing function of R_t . So, in Figure 1, the demand curve labelled $DD(R'_t, K_t, z_t)$, $R'_t < R_t$, lies farther from the origin than the demand curve labeled $DD(R_t, K_t, z_t)$. Finally, since the marginal product of labor is an increasing function of the stock of capital, K_t , and the level of technology, z_t , an increase in K_t or z_t also shifts the demand curve for labor away from the origin.

A necessary condition for the solution to the representative household's optimization problem is that the marginal utility of leisure equal the marginal benefit of working: W_t/P_t times the marginal utility of consumption. Conditional on a fixed value of consumption, this condition generates a static upward sloping labor supply curve that does not directly involve R_t . In Figure 1 this labor supply curve is labelled $SS(C_t)$. The equilibrium level of employment, L_t^* , and the real wage, $(W_t/P_t)^*$, corresponding to an interest rate of R_t , is depicted by the intersection of the curves $DD(R_t, K_t, z_t)$ and $SS(C_t)$. Notice that if the monetary authority is able to drive down the interest rate, it can shift the labor demand curve to the right without inducing a directly offsetting shift in the labor supply curve. If the general equilibrium effects on consumption are small, this logic suggests that unantic-

pated expansionary monetary policy disturbances which drive interest rates down generate increases in aggregate hours worked and output as well as the real wage rate.

Quantitative properties of the basic liquidity model

To investigate the quantitative properties of the basic liquidity model we calculated the dynamic response of the system to a shock in the growth rate of money. For now, we suppose, as in Christiano and Eichenbaum (1992a) that the growth rate of money, x_t , evolves according to:

$$(7) \quad x_t = (1 - \rho_x)x + \rho_x x_{t-1} + \varepsilon_{xt}$$

Here ε_{xt} is an independent and identically distributed random variable with standard deviation σ_{ex} , $0 < \rho_x < 1$, and x denotes the unconditional mean of x_t . According to this specification, the growth rate of money displays positive serial persistence. The larger ρ_x is, the more serial persistence there is in x_t .

Figure 2 displays the response of the basic cash in advance and liquidity models to a one standard deviation increase in x_t due to a positive shock in ε_{xt} which occurs in period 5. All calculations are based on values for the parameters of the model equal to those used in Christiano and Eichenbaum (1992a).² Consider first the response of the system in the basic cash in advance model. In the impact period of the shock, the interest rate, R_t , and investment, I_t , rise, while consumption, C_t , falls. Consumption and investment respond in different ways because the rise in R_t acts like a tax on the cash good, C_t , and a subsidy on the credit good, I_t . Notice also that time worked, L_t , falls. This effect can be viewed as reflecting a leftward shift in the labor demand curve and a rightward shift in the labor supply curve. The former is induced by the rise in R_t , the latter by the fall in C_t . Both shifts contribute to a fall in the real wage, W_t/P_t . That L_t falls reflects that the shift in the labor demand curve dominates the shift in the labor supply curve. With L_t down and diminishing marginal

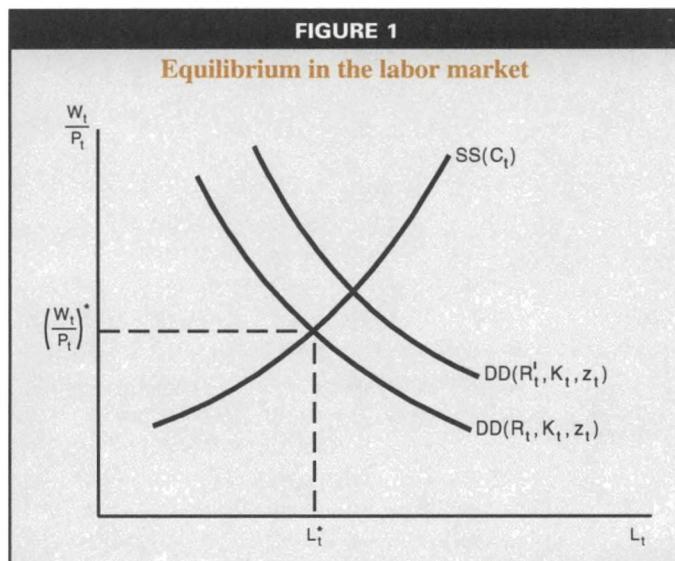
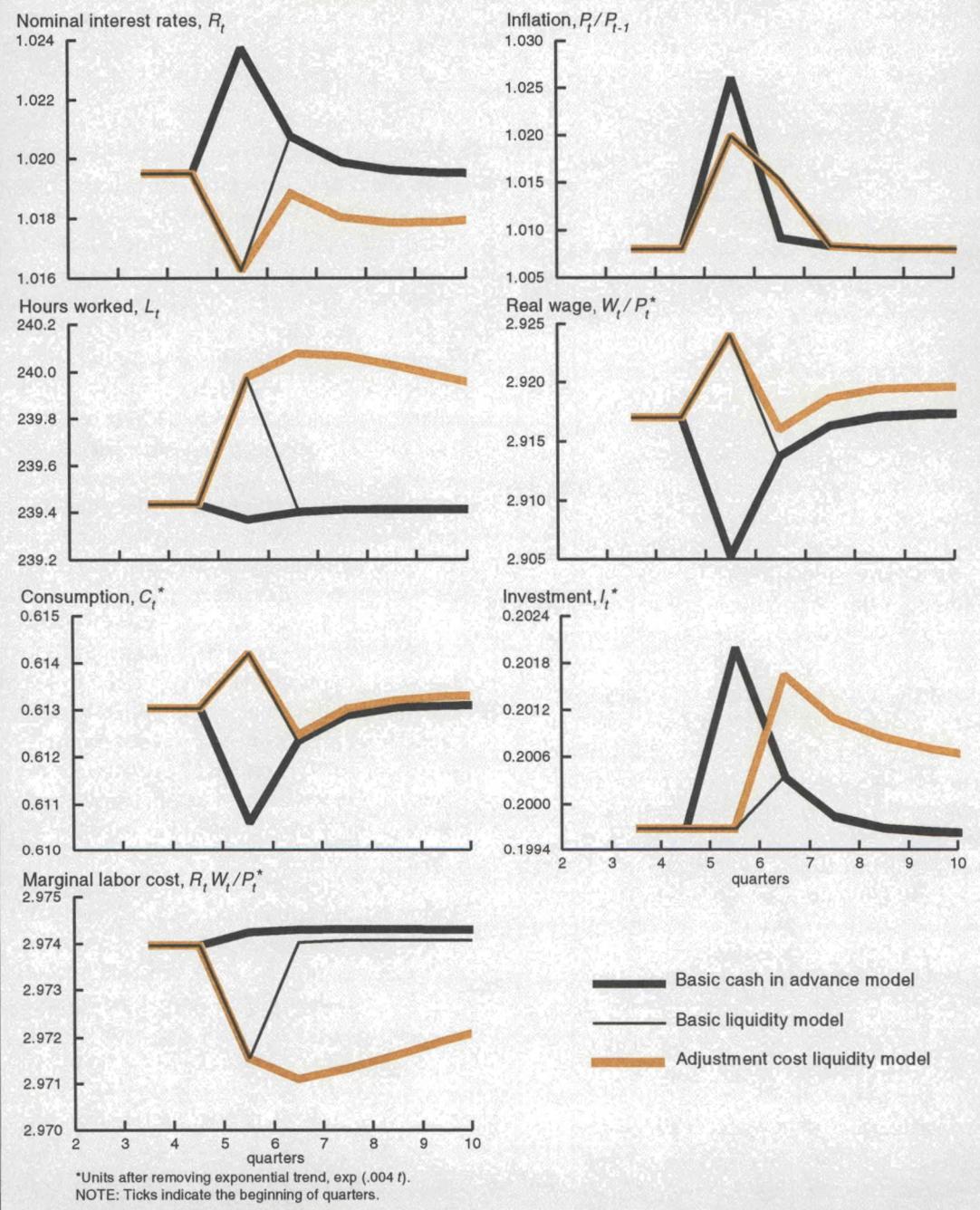


FIGURE 2
Dynamic response to money growth shock



al cost of hiring labor, $R_t W_t/P_t^*$, must rise. Finally, since L_t has fallen and the stock of capital is unchanged, current output must also fall.

With output down, and the stock of money up, prices rise by more than the percentage change in the money supply.

Since $0 < \rho_x < 1$, monetary growth continues to be high relative to its steady state level.

But with the growth rate of money declining, the inflation rate also declines toward its steady state value. Consequently, R_t declines to its steady state value from above. With R_t declining, consumption slowly rises to its steady state value while investment declines to its steady state level. Since a high value of R_t depresses labor demand, as long as R_t is high, hours

worked and the real wage stay low relative to their steady state values and the marginal cost of hiring labor stays high relative to its steady state value.

All in all, it seems hard to imagine a scenario more at variance with the conventional view regarding the effect of an unanticipated positive shock to the money supply.

In sharp contrast to the basic cash in advance model, the basic liquidity model implies that the contemporaneous value of R_t falls, while the corresponding values of C_t and L_t rise in response to a positive money supply shock. The rise in L_t can be thought of as occurring because the fall in R_t induces a rightward shift in the labor demand curve, while the rise in consumption induces a leftward shift in the labor supply curve. Both shifts contribute to a rise in the real wage rate, W_t/P_t . That L_t rises reflects the fact that the shift in the labor demand curve dominates the shift in the labor supply curve. With L_t up, and diminishing marginal labor productivity, the marginal cost of hiring labor, $R_t W_t/P_t$, falls. Since the stock of capital is unchanged, the rise in L_t implies that output increases, which mutes the contemporaneous rise in the price level. Consequently, the initial rise in the inflation rate is less than the initial percentage increase in the money supply. The intuition regarding the dynamic response of the system thereafter is similar to the basic cash in advance model.

We conclude that, at least at a qualitative level, the basic liquidity model seems quite promising in terms of its ability to account for the basic facts which motivate the conventional view of the effects of money supply shocks. Still, the model clearly fails on one key dimension: it cannot generate *persistent* liquidity effects. Because households face zero costs of adjusting sectoral flows of funds over different periods of time, all flows are instantly adjusted in the period after a monetary disturbance. This pattern of adjustment is reflected in Figure 4a (see below), which depicts the dynamic response of Q_t/Q_{t-1} to an unanticipated shock in the money supply. By assumption, the household cannot adjust the amount of funds it sends to the consumption sector in the impact period of the shock (period 5). Therefore, Q_t/Q_{t-1} equals its steady state value, $(1+x)$, when $t=5$. In the next period the household sharply increases the amount of funds sent to the con-

sumption sector so that Q_t/Q_{t-1} exceeds $(1+x)$. Thereafter, Q_t/Q_{t-1} quickly returns to its steady state value. To a first approximation, the only period in which firms must absorb a disproportionate amount of the money stock is period 5. And this is the only period in which there is a quantitatively significant liquidity effect.

Generating a persistent liquidity effect

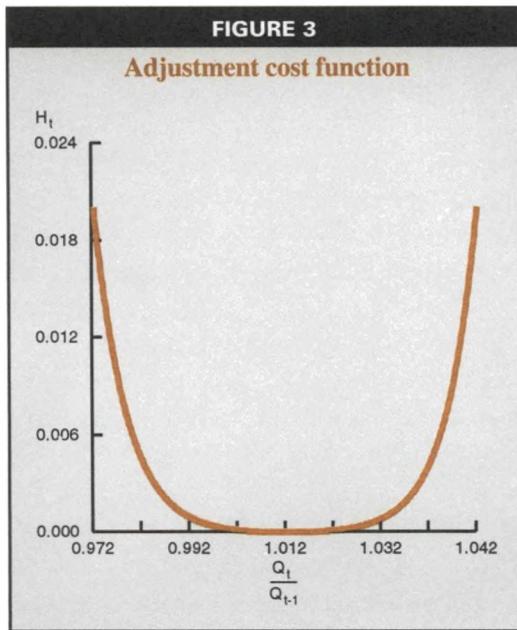
One way to induce persistent liquidity effects is to modify the environment so that the financial sector remains more liquid than the consumption sector for several periods after a money supply shock. This can be done by assuming that adjusting Q_t is costly. If, because of these adjustment costs, households increase Q_t by a relatively small amount in the period after the money shock, then in that period too, financial intermediaries and firms have to absorb a disproportionately large share of the economy's funds. As long as this is true, liquidity effects persist. We show that substantial persistence effects can be generated with only very small adjustment costs.

Explicitly modeling the reasons why adjusting the growth rate of Q_t is costly is beyond the scope of this article. Here we simply adopt a convenient functional form to investigate the potential of this mechanism for generating persistent liquidity effects. Let H_t denote the amount of time agents spend on reorganizing flows of funds. We assume that H_t is given by

$$(8) \quad H_t = d T \{ \exp[c(Q_t/Q_{t-1} - (1+x))] + \exp[-c(Q_t/Q_{t-1} - (1+x))] - 2 \}.$$

Figure 3 displays this function for $c = 150$ and $d = 0.00005$. Notice that H_t is a symmetric function about $Q_t/Q_{t-1} = (1+x)$. We refer to a modified version of the basic liquidity model in which leisure is defined by $(T - L_t - H_t)$ as the *adjustment cost liquidity model*. The steady states of the two models coincide because both the level and the derivative of H_t with respect to Q_t/Q_{t-1} are zero in steady state.

Figure 2 displays the dynamic response of this model to a one standard deviation shock in the growth rate of money. In the impact period of the shock, the system's response is identical to that of the basic liquidity model. But now, since financial intermediaries remain flush with cash, the liquidity effect persists. The financial sector remains relatively liquid be-



cause households persist in sending it a relatively large amount of funds.

The dynamic response of R_t to a money shock is determined by the relative strength of the expected inflation and liquidity effects. In the impact period of the shock, the expected inflation effect plays no role in determining the interest rate response.³ This is because, in the immediate aftermath of the money shock, the only participants in financial markets are firms and financial intermediaries. Neither of these agents cares about inflation when making their money market decisions. As long as the interest rate is positive, financial intermediaries lend all of their funds without regard to expected inflation. In deciding how much to borrow, firms simply equate the marginal cost of hiring labor, $R_t W_t$, with the value of the marginal product of labor, $P_t MPL_t$, where MPL_t denotes the time t marginal product of labor. This first order condition does not involve the inflation rate.

Anticipated inflation effects do play a role in the periods after a money shock. This is because, in these periods, households participate in financial markets and they do care about expected inflation when making their money market decisions. This is why the drop in R_t is smaller in the period after the shock than it is in the impact period. Given the assumed law of motion for x_t , the anticipated inflation effect rapidly dissipates after period 6. But, the li-

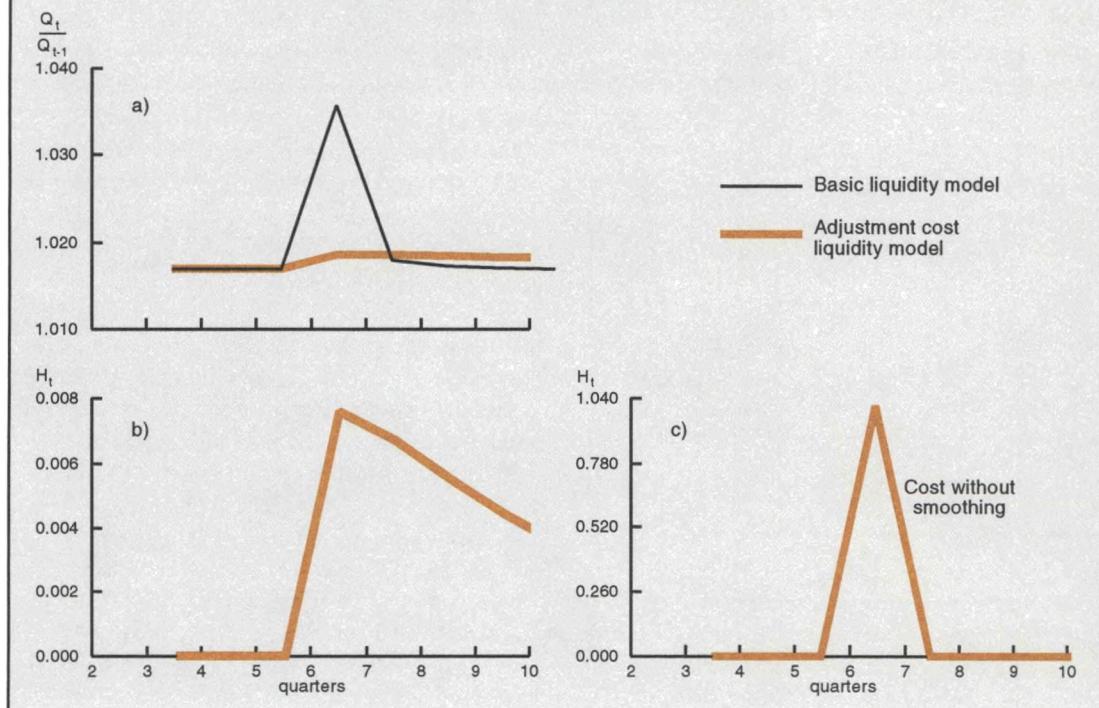
quidity effect persists until Q_t has reached its new, higher steady state growth path. This explains the kink in the impulse response function. As households slowly adjust the growth rate of Q_t , the percentage of the money stock going to the financial sector is reduced and the interest rate slowly climbs back to its steady state value. The movements in the other variables of the system mirror the movements in R_t in the way suggested by our discussion of the basic liquidity model.

The preceding results establish that, once costs of adjusting Q_t are introduced into the analysis, money supply shocks lead to persistent liquidity effects. A key remaining question is how to assess the magnitude of the adjustment costs used in the previous example. To do this, we consider two measures. The first measure is the actual amount of time spent by the household adjusting Q_t after a shock to the money supply. From Figure 4b we see that the maximal value of H_t occurs in period 6, at .0076 of one hour, that is, 27 seconds. So, according to this metric, the adjustment costs are very small.

Our second measure is based on the following experiment. Suppose that the representative household responded to a shock in the supply of money as if there were no adjustment costs, that is, as if the parameters c and d were equal to zero. The resulting sequence of values for Q_t / Q_{t-1} would then be the same as those emerging from the basic liquidity model. We can measure the time spent on implementing these changes using (8) for $c = 150$ and $d = 0.00005$. The excess of this measure of H_t over its value in the adjustment cost liquidity model represents the time the household avoids wasting by smoothing its adjustment to a monetary shock. According to Figure 4c, H_t achieves its maximal value of one hour in the period after the shock. Thereafter, H_t is approximately zero. So, all of the persistence in the adjustment cost liquidity model is induced by the household's effort to avoid wasting two minutes a day during the quarter after the shock. Evidently, regardless of which metric we use, the adjustment costs in our example seem quite small.

We conclude that, once small adjustment costs are introduced into the analysis, our model can generate persistent declines in the interest rate following a money supply shock.

FIGURE 4
Time spent adjusting flows of funds in response to money shock



Some policy implications

In this section we discuss some of the welfare implications of our model. Given the early stage of the research program, it is premature to take detailed policy prescriptions emerging from the model literally. Still, the policy implications of the model are interesting for at least two reasons. First, they make very clear the nature of the frictions built into the model. Second, they are suggestive of the general policy principles which might emerge from future research.

Unlike the model of the previous section, actual economies are buffeted by a variety of shocks which affect agents' production opportunities and their demand for money. Holding the growth rate of money fixed in the face of these types of shocks (say, by adopting the k percent money growth rule advocated by Friedman [1968]) will not be optimal. The simplest way to show this is to modify the adjustment cost liquidity model and allow for shocks to technology. Until now, we assumed that the level of technology, z_t , grows at the constant growth rate μ . Suppose instead that the law of motion for z_t is given by:

$$(9) \quad z_t = \exp(\mu t + \theta_t),$$

where θ_t is a stationary shock to technology which evolves according to

$$(10) \quad \theta_t = \rho_\theta \theta_{t-1} + \varepsilon_{\theta t},$$

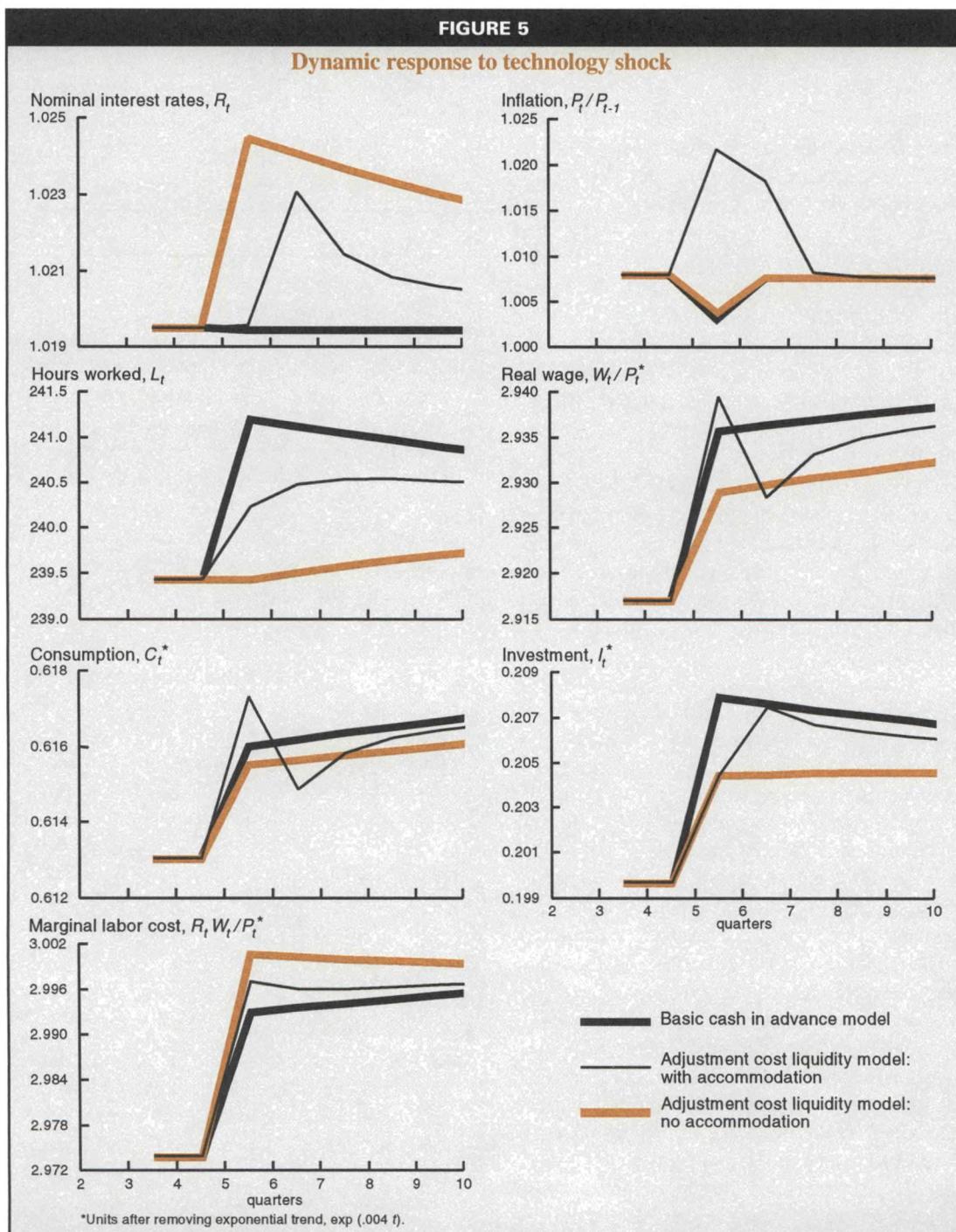
Here, $0 < \rho_\theta < 1$ and $\varepsilon_{\theta t}$ is an independently and identically distributed shock to θ_t with standard deviation $\sigma_{\varepsilon\theta}$. This specification for the shock to technology is standard in the real business cycle literature (see Hansen [1985]).

We assume that θ_t is revealed after agents choose Q_t . This assumption captures the notion that, due to a variety of unmodeled costs, households do not immediately direct cash to the financial sector when unexpected productive opportunities arise in the firm sector. As before, we assume that x_t is realized after agents choose Q_t , and that x_t evolves according to (7). Finally, we assume (as before) that firms choose I_t before observing X_t but after observing θ_t . The timing assumptions on I_t can be interpreted as reflecting the notion that, in reality, firms have advance information about changes in their own technology, but not about open market operations.

It is straightforward to prove that employment does not respond contemporaneously to a technology shock. A key factor underlying this result is that the wage bill, $W_t L_t$, is independent of the realization of θ_t . This latter result reflects the fact that the quantity of dollars supplied by financial intermediaries, $M_t - Q_t + X_t$, is by assumption independent of θ_t . This does

not establish the result, however, since it leaves open the possibility that the wage rate could fall, thus permitting an increase in employment. As it turns out, our specification of preferences, (2), and the cash in advance constraint, (3), do rule out this possibility.⁴

Figure 5 displays the dynamic response of the adjustment cost model to a shock in tech-

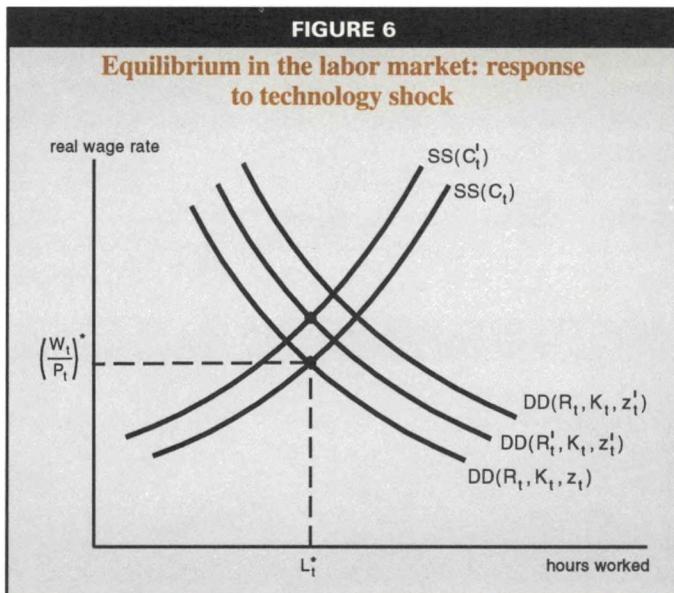


nology that occurs in time period 5.⁵ In the impact period of the shock, hours worked do not change, while consumption, investment, the real wage, the marginal cost of hiring labor, $R_t W_t / P_t$, and the nominal interest rate, R_t , all rise. To understand the interest rate response, it is useful to take as given the result that, in equilibrium, contemporaneous employment does not change. With this in mind, consider Figure 6 which depicts the demand for and the supply of labor. The initial equilibrium is given by the intersection of the demand and supply curves, $DD(R_t, K_t, z_t)$ and $SS(C_t)$, at L_t^* and $(W_t/P_t)^*$. A positive shock to θ_t increases z_t and raises the marginal product of labor.

So, holding R_t fixed, the demand curve for labor shifts rightwards to the curve labeled $DD(R_t, K_t, z'_t)$, where $z'_t > z_t$. Abstracting from shifts in labor supply and given that equilibrium employment cannot increase, the interest rate must increase by enough to shift the labor demand curve back to where it was before the technology shock. In practice, a positive technology shock leads to a rise in consumption which causes the labor supply schedule to shift left, thus mitigating the rise in the interest rate.⁶ In Figure 6 the new supply curve of labor is given by $SS(C'_t)$, where $C'_t > C_t$.

In the period after the shock, Q_t begins to fall. The increased flow of funds from households to financial intermediaries permits an increase in hours worked. With L_t rising and diminishing marginal labor productivity, the marginal cost of hiring labor, $R_t W_t / P_t$, slowly declines, while the real wage, W_t / P_t , slowly rises as the system reverts to its (unchanged) steady state. As a reference point, Figure 5 also displays the dynamic response of the economy to a technology shock in the basic cash in advance model. Notice that the employment response in the cash in advance model is uniformly larger than the corresponding response in the adjustment cost liquidity model. Evidently, in the adjustment cost liquidity model, the economy does not take full advantage of the improved production opportunities.

This suggests that the representative household's welfare (1) could be enhanced if the monetary authority were to increase the money



supply in response to a positive technology shock. To investigate this, we modified the law of motion for x_t to allow monetary policy to respond to shocks in technology. Specifically, we assume that x_t evolves according to

$$(11) \quad x_t = (1 - \rho_x)x + \rho_x x_{t-1} + \varepsilon_{xt} + v\varepsilon_{\theta_t}.$$

When $v > 0$, the monetary authority accommodates a positive technology shock by increasing the money supply.

Figure 5 displays the response of the model to a one standard deviation shock in technology when $v = 1.5$. Notice that with accommodative monetary policy, hours worked increase immediately in the wake of a positive technology shock. Notice also that the rise in the interest rate induced by the technology shock is muted compared to the situation in which $v = 0$. In this sense, accommodative monetary policy serves to smooth the interest rate. With the monetary authority increasing the supply of cash to financial intermediaries after a technology shock, there is simply less pressure on the interest rate.⁷

Conclusion

In this article, we have investigated a class of models which is capable of accounting for the conventional view that positive shocks to the money supply generate persistent decreases in short term interest rates as well as persistent increases in hours worked and output. The models are clearly at an early stage of develop-

ment. Still, they serve to highlight a key friction in the actual economy which we believe is central to understanding the ability of the monetary authority to affect aggregate economic variables via open market operations. We

believe that this class of models will serve as an important building block for future research into the interaction of monetary policy and aggregate economic activity.

FOOTNOTES

¹We make capital a credit good in order to minimize the impact of inflation on average employment in the model. For a further discussion of this point, see Christiano (1991) and Stockman (1981).

²Specifically, the parameters β , μ , α , γ , δ , x , σ_{ex} , and ρ_x were set equal to $(1.03)^{-25}$, 0.004, 0.36, 0.797, 0.012, 0.012, 0.014, and 0.30, respectively. Also, $A = T^{(\alpha-1)}$, and $T = 1,369$. See also Christiano and Eichenbaum (1992b).

³In particular, Christiano and Eichenbaum (1992a), footnote 14, show that the interest rate response to a money shock is independent of the value of ρ_x .

⁴Equation (3), together with the loan market clearing condition, (i) $W_t L_t = M_t - Q_t + X_t$, imply (ii), $P_t C_t = M_t + X_t$. The unitary elasticity of substitution assumption between consumption and leisure implicit in our specification of preferences, (2), implies that the value of consumption is proportional to the value of leisure, that is, (iii) $P_t C_t = W_t (T - L_t - H_t)(1 - \gamma)/\gamma$. Combining (i), (ii), and (iii), we obtain

$M_t + X_t = W_t (T - H_t)(1 - \gamma)/\gamma - (M_t - Q_t + X_t)(1 - \gamma)/\gamma$. This equation determines W_t as a function of Q_t , M_t , and X_t . Since the latter are independent of θ_t , it follows that W_t is also independent of θ_t . From (i), it is clear that if W_t is independent of θ_t , then L_t must also be independent of θ_t . This establishes our result.

⁵For ρ_0 and σ_{e0} we use the point estimates obtained by Burnside, Eichenbaum, and Rebelo (1993): $\rho_0 = .9857$ and $\sigma_{e0} = .014$.

⁶The extent to which the labor supply curve shifts to the left is minimized by our assumption that investment decisions are made after the realization of θ_t . Because I_t responds positively to θ_t , the resource constraint limits the extent to which consumption can increase after a positive technology shock.

⁷See Fuerst (1992a,b) for a related analysis of optimal monetary policy.

REFERENCES

- Akerlof, George A.**, "Irving Fischer on his head: the consequences of constant threshold-target monitoring of monetary holdings," *Quarterly Journal of Economics*, Vol. 93, May 1979, pp. 169-187.
- Baxter, Marianne, Stephen Fisher, Robert S. King, and K. Geert Rouwenhorst**, "Monetary transmission in an economy with capital," manuscript, University of Rochester, 1990.
- Bernanke, Ben S., and Alan S. Blinder**, "The federal funds rate and the channels of monetary transmission," *American Economic Review*, Vol. 82, September 1992, pp. 901-921.
- Board of Governors of the Federal Reserve System**, *Federal Reserve Act and Other Statutory Provisions Affecting the Federal Reserve System*, Washington, D.C., August 1988.
- Burnside, Craig, Martin Eichenbaum, and Sergio Rebelo**, "Labor hoarding and the business cycle," *Journal of Political Economy*, forthcoming, April 1993.
- Christiano, Lawrence J., and Martin Eichenbaum**, "Liquidity effects, monetary policy and the business cycle," NBER Working Paper No. 4129, 1992a.
- _____, "Current real business cycle models and aggregate labor market fluctuations," *American Economic Review*, Vol. 82, June 1992b, pp. 430-450.
- _____, "Identification and the liquidity effects of a monetary shock," in *Political Economy, Growth and Business Cycles*, A. Cukierman, L.Z. Hercowitz, and L. Leiderman, (eds.), MIT Press, forthcoming, 1992c.
- Cooley, T.F., and G. Hansen**, "The inflation tax in a real business cycle model," *American Economic Review*, Vol. 79, September 1989, pp. 733-748.

den Haan, Wouter J., "The term structure of interest rates in real and monetary economies," manuscript, University of California at San Diego, 1991.

Eichenbaum, Martin, "Comment on -Interpreting the macroeconomic time series facts: the effects of monetary policy- by Christopher Sims," *European Economic Review*, Vol. 36, June 1992, pp. 1001-1012.

Friedman, Milton, "The role of monetary policy," *American Economic Review*, Vol. 58, March 1968, pp. 1-17.

Fuerst, Timothy S., "Liquidity effects, loanable funds, and real activity," *Journal of Monetary Economics*, Vol. 29, February 1992a, pp. 3-24.

_____, "Optimal monetary policy in a cash in advance economy," manuscript, Northwestern University, 1992b.

Gali, Jordi, "How well does the IS-LM model fit postwar U.S. data?," *Quarterly Journal of Economics*, Vol. CVII, May 1992, pp. 709-738.

Goodfriend, Marvin, "Interest rates and the conduct of monetary policy," in *Carnegie Rochester Conference on Public Policy*, Allan H. Meltzer and Charles I. Plosser, (eds.), Vol. 34, North-Holland, Amsterdam, Spring 1991, pp. 7-30.

Greenwood, Jeremy, and Gregory W. Huffman, "A dynamic equilibrium model of inflation and unemployment," *Journal of Monetary Economics*, Vol. 19, March 1987, pp. 203-228.

Grilli, Vittorio, and Nouriel Roubini, "Liquidity and exchange rates," *Journal of International Economics*, Vol. 32, May 1992, pp. 339-352.

Grossman, Sanford, and Laurence Weiss, "A transaction based model of the monetary mechanism," *American Economic Review*, Vol. 73, December 1983, pp. 871-880.

Hansen, Gary D., "Indivisible labor and the business cycle," *Journal of Monetary Economics*, Vol. 16, November 1985, pp. 309-327.

King, Robert S., "Money and business cycles," manuscript, University of Rochester, 1991.

King, Robert S., and Mark Watson, "Comparing the fit of alternative dynamic models," manuscript, Northwestern University, 1992.

Kydland, Finn E., "The role of money in a business cycle model," Discussion Paper 23, Institute for Empirical Macroeconomics, Federal Reserve Bank of Minneapolis, 1989.

Lucas, Robert E., Jr., "Money in a theory of finance," in *Carnegie Rochester Conference on Public Policy*, Karl Brunner and Allan H. Meltzer, (eds.), Vol. 21, North-Holland, Amsterdam, Autumn 1984, pp. 9-46.

_____, "Liquidity and interest rates," *Journal of Economic Theory*, Vol. 50, April 1990, pp. 237-264.

Mankiw, N. Gregory, and Jeffrey A. Miron, "Interest rates and the conduct of monetary policy," in *Carnegie Rochester Conference on Public Policy*, Allan H. Meltzer and Charles I. Plosser, (eds.), Vol. 34, North-Holland, Amsterdam, Spring 1991, pp. 41-70.

Marshall, D., "Inflation and asset returns in a monetary economy with transaction costs," *Journal of Finance*, forthcoming, 1992.

Rotemberg, Julio, "A monetary equilibrium model with transaction costs," *Journal of Political Economy*, Vol. 92, February 1984, pp. 40-58.

Schlagenhauf, Don E., and Jeffrey M. Wrage, "A monetary, open economy model with capital mobility," Discussion Paper 67, Institute for Empirical Macroeconomics, 1992.

Sims, Christopher A., "Interpreting the macroeconomic time series facts: the effects of monetary policy," *European Economic Review*, Vol. 36, June 1992, pp. 975-1000.

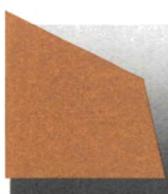
Stockman, Alan, "Anticipated inflation and the capital stock in a cash in advance economy," *Journal of Monetary Economics*, Vol. 8, November 1981, pp. 387-393.

Strongin, Steven, "The identification of monetary policy disturbances: explaining the liquidity puzzle," manuscript, Federal Reserve Bank of Chicago, 1992.

Woodford, Michael, "Credit policy and the price level in a cash in advance economy," in *New Approaches to Monetary Economics*, William Barnett and Kenneth J. Singleton, (eds.), Proceedings of the Second International Symposium in Economic Theory and Econometrics, Cambridge University Press, 1987, pp. 52-56.

Can the states solve the health care crisis?

Richard H. Mattoon



The United States spends a larger share of gross domestic product (GDP) on health care than any major industrialized nation.¹ While U.S. health expenditures as a share of GDP are estimated to have topped 13 percent in 1991, Germany and Japan spend 8.2 and 6.8 percent, respectively. Even socialist Sweden, known for high expenditure levels on public health, spent only 9 percent. To make matters worse, this gap has been widening. In 1980, total health care costs as a share of GDP was 9.3 percent for the U.S. compared to 7.1 percent, on average, for the 24 OECD nations. By 1990, U.S. expenditures had risen to 12.4 percent of GDP while the share for the OECD group had increased to only 7.6 percent.²

Increased health care costs affect all sectors of the U.S. economy. According to a Washington State study, health costs consume 25 percent of the average private firm's profits and translates into a 3 to 5 percent surcharge on the price of U.S. products when sold abroad.³ Health costs currently account for 15 percent of the federal budget (up from 10 percent in 1980) and, if unchecked, are expected to consume 28 percent by 2002, according to the Congressional Budget Office. Federal spending for the Medicaid program alone is on a pace to eclipse 50 percent of all federal benefits targeted for the poor by 1993.⁴ In the case of state and local governments, rising health care costs (particularly those associated with Medicaid payments) are frequently seen as the primary culprit in budget deficits. Given that state and local

governments cannot run explicit budget deficits like the federal government, these rising costs are forcing reductions in other budget areas. Most observers agree that the U.S. cannot continue funding such robust growth in health expenditures.

At the same time that costs are high and growing, there is a substantial support for broadening health care coverage to all citizens. In particular, those citizens and workers who are above but close to the poverty level often lack adequate health care benefits. Several options have emerged in an attempt to meet the twin goals of cost containment and universal access. These range from trying to inject more market incentives into health care provision and consumption to adopting government based national health care insurance. Impatient for federal action and weary of the failure of private markets, many states are trying to craft their own health plans.

This article discusses why health costs have been rising at such a rapid rate in the U.S., and examines state initiatives aimed at addressing this issue.

How fast are medical costs rising?

In 1970, personal consumption expenditures for medical care totaled \$55 billion. By 1988 the figure had grown to \$443 billion, a nominal increase of 705 percent.⁵ Table 1 shows the rate of increase by type of medical

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TABLE 1

**Personal consumption expenditures for medical care by type of services
(billions of dollars)**

	1970	1988	Percent change
Total	55.0	443.0	705.5
Hospital	19.7	182.3	825.4
Physician	14.0	105.0	650.0
Drugs, appliances	10.0	44.7	347.0
Dentists	4.9	27.0	451.0
Net cost of health insurance	2.1	29.3	1,295.2
All other medical	4.3	54.3	1,162.8

SOURCE: U.S. Department of Commerce, Bureau of Economic Analysis, *Survey of Current Business*, various issues.

service. As is shown, the rate of expenditure growth shows considerable variation depending on the service in question.

Furthermore, as the comparison with the Consumer Price Index (CPI) in Figure 1 shows, prices for medical care commodities and services have grown much faster than the CPI for all items in recent years. Growth rates in the two major components of medical prices exceeded the general inflation rate. Other statistics illustrate similar gains in expenditures. Figure 2 illustrates national health expenditures as a share of GNP and personal consumption for

medical care as a share of disposable income from 1970 to 1988. Regardless of how it is measured, the trend is clearly for health care expenditures to consume a growing share of the economy.

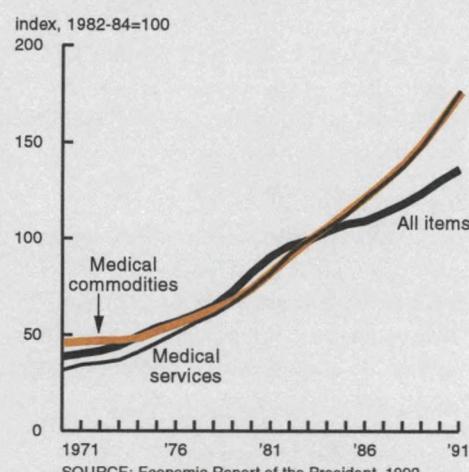
Even more troubling is the possibility that higher expenditure levels on health care are not translating into significantly better health care. Measures of U.S. public health remain poor when compared to other developed nations. For example, the U.S. ranks eighth in the world in life expectancy, 11th in maternal mortality, 18th in child mortality, and 22nd in infant mortality.⁶

Why are health care costs growing so quickly?

The market for health care is unique in that asymmetric information between buyer and provider and restricted competition among suppliers and third party payments are the rule, not the exception. Incentives embodied in America's system of health care are complex and rarely emphasize cost containment. The Health Care Financing Administration (HCFA) identifies three factors as affecting the growth of personal health care expenditures:⁷ increases in the prices charged for services; increases in the population receiving medical treatment; and increases in the intensity with which medical services are used. In 1988, the HCFA estimated that price increases accounted for 67 percent

FIGURE 1

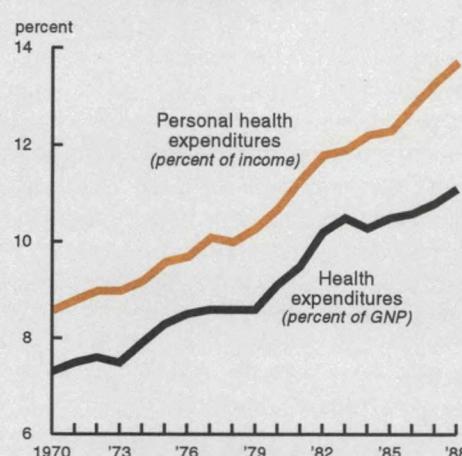
CPI: All items vs. medical commodities and services



SOURCE: Economic Report of the President, 1992.

FIGURE 2

Health expenditures compared to GNP and disposable income



SOURCE: U.S. Department of Health and Human Services, HCEA; U.S. Department of Commerce, BEA; *Survey of Current Business*, various years.

TABLE 2								
Factors affecting growth of personal health care expenditures								
	(percent contribution)							
	1981	1982	1983	1984	1985	1986	1987	1988
Prices	67	69	67	73	61	52	52	67
Population	7	9	10	12	11	11	9	10
Intensity	26	22	23	15	28	37	39	23

SOURCE: U.S. Department of Health and Human Services, Health Care Financing Administration.

of growth in personal health care expenditures, followed by increases in intensity of service utilization (23 percent) and population changes (10 percent). However, future demographic changes, namely the aging of baby boomers, will have a profound effect on medical spending, given that people 65 years or older spend four times as much on health care as younger people. The pattern for these three factors is shown in Table 2. In order to understand why prices for medical commodities and services have risen so quickly, we must look at the factors affecting supply of and demand for health care.⁸

Demand factors

One of the primary factors in the spiraling costs of health care is the low price elasticity of demand for medical services. According to some estimates, the price elasticity of demand for medical services may be as low as 0.2.⁹ This means that the consumption of medicine tends to be relatively unaffected by price increases so that total expenditures increase over time as prices rise.

Health insurance often distorts the costs of consuming medical care. An individual covered by an insurance plan often bears no additional cost for consuming additional units of medical care once they have exceeded the deductible on their policy. Consequently, at a given threshold, medical care consumption becomes costless (other than for the individual's time) and presumably the absence of immediate cost encourages greater consumption, even though the costs are ultimately passed along to consumers in the form of higher premiums and/or taxes. As a result, consumers are relatively insensitive to price increases in medical services since the penalty of higher cost medical consumption only shows up in higher insurance premiums, which

are shared by all policyholders, muting the magnitude of the cost increase to any individual.

Further evidence of the potentially distorting effect of insurance can be seen in the percentage increases in the cost of medical services. Services traditionally covered by insurance, such as hospital stays, have risen much faster than health services like eye exams which tend not to be included in coverage. From 1970

to 1988, hospital service expenditures increased by more than 800 percent while less frequently or not fully covered items such as drugs and eyeglasses showed a gain of less than 350 percent. This evidence suggests that some of the observed price increases in specific health care procedures are related to the distorting effects which insurance coverage has had on the demand for medical services.

Other factors influencing demand and therefore the price of medical services include demographic and lifestyle factors and the environment. Clearly, as life expectancy grows and the population ages, demand for medical services increases. The elderly consume a significant portion of health care as is illustrated by the fact that a large percentage of health care expenditures are spent on the very elderly, particularly during their last years of life. For example, the U.S. spends 1 percent of GNP on health care for elderly people in the last year of their lives (Fuchs [1984]). Lifestyle changes also play a role. Society's increasing incidence of alcohol and drug abuse and other abusive behaviors reduce the stock of health while increasing health care expenditures. The quality of the environment also plays a role. Problems with air and water quality provide environmental hazards which potentially lead to a greater demand for medical care.

Supply factors

Productivity gains in the provision of medical services have been slow for a variety of reasons. First, insurance and public health reimbursement programs have traditionally paid medical providers on a cost of service plus a small profit basis. Since providers are always assured of covering their costs there is little incentive to improve productivity and lower

costs. Similarly, the use of "best practice" techniques, in which expensive procedures with sometimes marginal benefits to the consumer of the service are used, also encourages potentially wasteful uses of resources.

There is a limited supply of physicians because, despite a large applicant pool, the number of medical school seats is limited. This limited supply of doctors helps to keep the costs of their services high. Furthermore, increased specialization among doctors has actually increased the variety of potential services and has helped create a demand for those services. The relative abundance of medical specialists has encouraged patients to seek specialists for routine medical procedures which could be treated by general practice physicians who presumably charge lower fees. Part of the Canadian system of health care cost control is to restrict the number and availability of medical specialists.

Asymmetric information is another important factor affecting the cost of health care. The health care market is one of the few areas where most consumers are generally uninformed about purchasing decisions. Because medical information is specialized, the consumer often has no knowledge as to whether the treatment prescribed for a given illness is necessary. Without a third party opinion, there is little reason for restraint in prescribing medical treatment. Furthermore, many consumers purchase medical care infrequently and consequently do not know whether the price for a particular procedure is in fact a good price. Since price advertising is not common in the medical profession it is very difficult for consumers to develop even a casual understanding of the costs of the system.

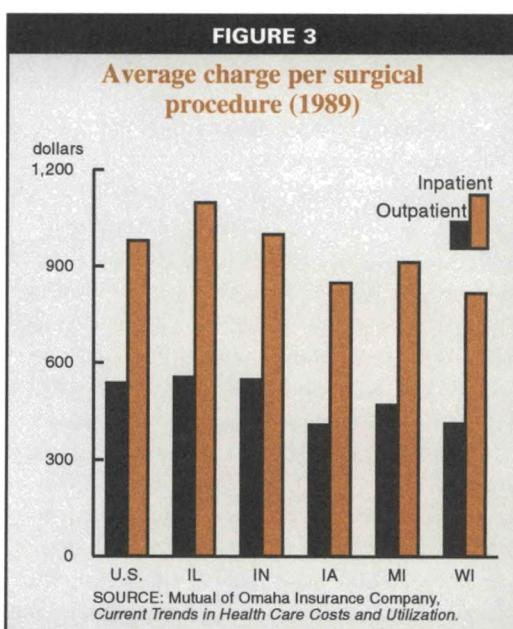
The emphasis on medical technology also contributes to high costs. The U.S. is a leader in the development and use of high technology medical treatments. Much of this may be due in part to the historical tendency for insurance coverage to pay for any treatment without regard to cost. Furthermore, in comparison to the Canadian system, technology is used much more broadly. In Canada, high technology devices such as CAT scanners tend to be available only at specific hospitals, while in the U.S., they are available almost everywhere.

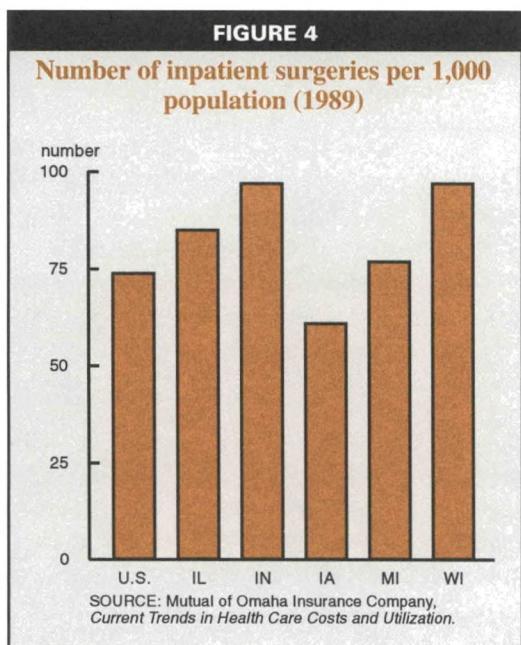
Health care costs in the Seventh District

Costs and demand for medical care are not uniform across the U.S. This lack of uniformity has led some analysts to favor state based solutions to health care cost and availability concerns, fearing that a federal solution will fail to recognize local variations in these problems. This section examines the supply and demand factors as well as the cost for health care in the states comprising the Seventh District (Illinois, Indiana, Iowa, Michigan, and Wisconsin) relative to the rest of the nation.

One indicator of the District's cost of health care can be found in average surgery and hospital charges. For inpatient surgery, the District's average 1989 cost per surgery was \$936 versus a U.S. average of \$980. However the average surgery charge within the District ranged from \$1,099 in Illinois to a low of \$817 in Wisconsin (see Figure 3). The Figure also shows a similar pattern for outpatient surgeries. Similarly, the average daily cost per admission for hospitals was below the national average of \$586 in Indiana (\$571), Iowa (\$431), and Wisconsin (\$483). The costs were above the U.S. average in Illinois (\$632) and Michigan (\$643).¹⁰

District states were found to lag the nation in utilization containment for health care services. For example, the national average for surgical procedures is 74 per 1,000 of population. All of the District states, except Iowa with 61 per



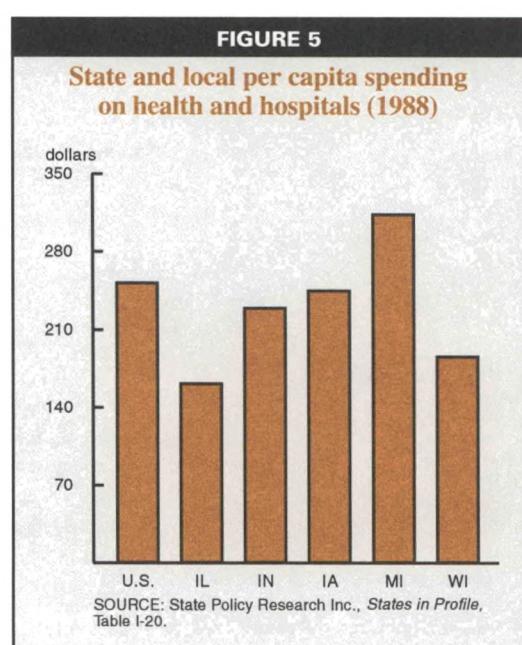


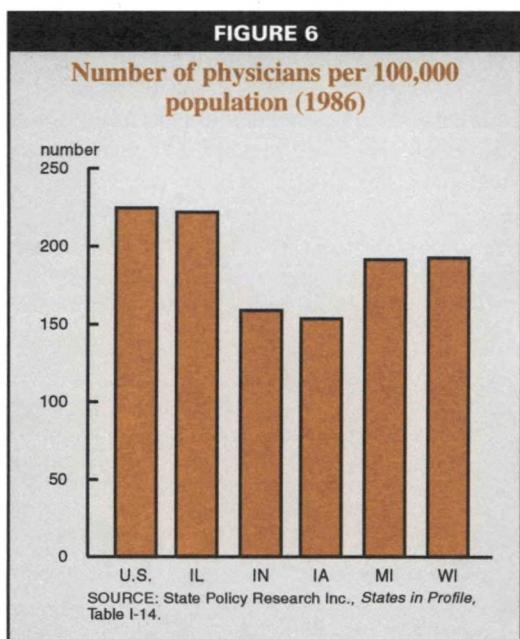
1,000, had surgical rates which were significantly higher (see Figure 4). Similarly, District statistics for the average length of stay for a hospital visit are slightly above the U.S. average. The national average hospital stay is 7.2 days. District states range from 6.6 days for Indiana and 7.4 for Michigan, Wisconsin, and Illinois, to 8.2 for Iowa.¹¹ This higher utilization may reflect the fact that health insurance coverage in District states is generally broader than the U.S. as a whole. For the U.S., 17.4 percent of the nonelderly population have no health insurance, while the percentage without coverage in the District is much lower. Wisconsin leads the way with only 9.8 percent of the population without health insurance, followed by Michigan (11.9), Iowa (12.7), Illinois (14.5), and Indiana (16.9).¹² Broader coverage may encourage more active use of medical services.

In the area of public expenditures for health and hospitals, District annual per capita public expenditures were below the U.S. average. As Figure 5 shows, only Michigan's public spending on health and hospitals is above the U.S. average. Even in the difficult area of Medicaid payments per capita, three of the five District states spent less than the national average. The U.S. average for Medicaid payments was \$185 as compared to \$151 in Illinois, \$167 in Indiana, and \$149 in Iowa. Only Michigan and Wisconsin were above at \$198 and \$209 respectively.¹³

Other factors which can influence the supply of and demand for medical services include the availability of health services (the health care infrastructure) and health characteristics of District citizens. With respect to health care availability, the District is better than average in access to hospital facilities. While the U.S. average is 4.1 hospital beds per 1,000 of population, District state averages are 4.5 for Illinois, 4.2 for Indiana, 5.2 for Iowa, 4.0 for Michigan, and 4.5 for Wisconsin.¹⁴ In the number of physicians relative to the population as a whole the District fares somewhat worse. The national average for physicians per 100,000 population is 225. All of the District states are below this figure with Iowa showing the largest relative deficit at 154 physicians per 100,000 population (see Figure 6). However, it should be noted that a relatively large supply of physicians does not appear to reduce medical costs. States such as New York and California have among the highest prices and expenditure levels for medical services despite having more doctors per 100,000 population. The concentration of higher priced medical specialists coupled with a demand for their services may explain why the presence of more physicians has not created price competition which would act to hold down medical costs in these two states.

In terms of health characteristics of District citizens two statistics are helpful. Demographically the District has approximately the same





percentage of citizens that are 65 or older as the rest of the nation (roughly 12.5 percent). This is important since the elderly consume a significantly larger share of health care expenditures than the rest of the population. Since the District's share of this segment of the population is roughly similar to the nation, health care costs attributed to the elderly should rise at the same rate as the national average. Table 3 shows the mortality rates from the four leading causes of

death. As expected, the District averages are roughly comparable to all regions except the West, where death rates from heart disease, cancer, and stroke are all significantly lower.

One area where District states may be able to make headway in controlling health care costs is managed care. District figures on participation in HMOs (health maintenance organizations) and PPOs (preferred provider organizations) indicate that District states, like much of the U.S., could increase participation in these organizations to control health care costs. Evidence suggests that these types of health organizations have a greater incentive for internal cost control which reduces total medical costs since fees for procedures are often fixed. Nationally, 13.2 percent of the population is enrolled in HMOs. In the District, Wisconsin leads the way with nearly 22 percent of its population in HMOs, followed by Michigan (15.3 percent), Illinois (13 percent), Indiana (7.8 percent), and Iowa (7.2 percent).¹⁵

Explaining the variation in regional medical costs

Some of the factors which explain the variation in regional health care costs are obvious. Areas with a higher cost of living and higher labor costs tend to have higher medical costs. Similarly, metropolitan areas with technologically advanced hospitals, concentrations of medical specialists, and the ability to perform advanced medical work also tend to have higher medical costs.

However other forces are at work. One recent study examining regional cost differences in Medicaid was conducted by Jane Sneddon Little of the Federal Reserve Bank of Boston.¹⁶ While Little's findings concern variations in state Medicaid costs, they provide some interesting insights into potential explanations for variations in general health costs. In her paper, the rate of reimbursement provided by Medicaid for nursing home care is found to be the most significant factor in explaining regional Medicaid price variations. States with high nursing home reimbursement rates tended to have high Medicaid costs and vice versa. However, while states with lower reimbursement rates had lower Medicaid

TABLE 3

Death rates—four leading causes (1987 per 100,000 residents)

State	Heart	Cancer	Stroke	Accident
IL	336.8	200.1	59.6	33.1
IN	322.9	199.9	69.0	38.7
IA	366.8	208.3	77.0	37.2
MI	331.2	191.8	59.5	34.2
WI	326.9	196.5	70.6	34.4
Regional averages				
Northeast	343.6	218.2	60.1	33.2
Seventh District	336.9	199.3	67.1	35.5
North Central*	328.6	195.9	68.5	38.8
South	319.3	201.3	66.4	45.5
West	218.5	153.5	46.5	48.2

*Minus Seventh District states.

SOURCE: National Center for Health Statistics, Monthly Vital Statistics Report, September 26, 1989.

costs, these savings did not appear to spill over into personal health care costs for nonMedicaid recipients. Practices such as cost shifting from Medicaid to other payors (such as private insurers willing to pay higher charges for medical services) appear to be common, making personal health care expenditures vary less from state to state. The tendency to cost shift makes it very difficult to know what medical services are being provided in state to state comparisons. Each state's medical dollar may be buying different levels of service and this may explain some of the regional variation in medical costs.

Cost shifting also occurs in the health care system as a whole when negotiated discounts are used to control private health care costs. What happens is that either an individual company or group of companies negotiate specific discounts with a particular provider. For example, a different fee structure for services at a particular hospital might be the focus of such a discount. While these discounts provide lower costs to the recipients of the discounts, they may lead the health care provider to charge even higher fees to companies and individuals not included in the negotiated discount plan. Furthermore, the discount can also lead to reduced access to health care for individuals covered by the discount because the provider has an incentive to serve full paying patients first, rather than those with the discount. Negotiated discounts can limit health care costs for a segment of the population but they may not reduce the cost of health care for society at large unless the discount is available to everyone.

Proposals for reforming the health care system

Factors such as regional variations in the utilization, cost, and availability of health care have spurred a wide range of state health care reform measures in the U.S. Virtually all of these proposals are designed to address two issues: cost containment and access to health care. The interest in cost containment is obvious given the escalation in health care prices. Government, business, and individual consumers all agree that health care costs cannot continue to rise at current rates. There are an estimated 37 million Americans without health insurance¹⁷ who have less access to medical care and often are forced to receive medical care in emergency situations, increasing the cost of treatment. This treatment is often uncompensated, which induces cost shifting to privately insured patients. Conse-

quently, cost containment and access to health care are the twin goals of most proposals.

Most reform proposals are a variation on three general frameworks: market based reforms, "play or pay" proposals, or national health insurance. All three types of proposals include the private provision of at least some medical services and do not favor the adoption of an all inclusive public health care system, such as the system in the United Kingdom, where medical services are provided through publicly supported facilities staffed with public employees.

Market based reforms

Most of the so called market based reform proposals assume that a lack of market discipline explains much of the recent rise in medical costs. Since insurance often makes the consumption of medical care relatively costless to consumers, they have no real incentive to seek lower prices or reduce their consumption of medical care. If consumers were forced to bear a greater cost for consuming medical care, according to this view, they would consume it more wisely and would have a greater incentive to limit their use of medical care by adopting healthier lifestyles. Similarly, if health care providers found that higher prices for medical services reduced patient demand, it is assumed that they would have a greater incentive to provide more cost efficient care. For example, the Heritage Foundation has proposed making health care a taxable benefit.¹⁸ The argument is that because health insurance is tax exempt, individuals purchase more health insurance (in terms of taking on broader coverage) than they would if they actually had to bear the full cost of the purchase, if only from a tax perspective. If the full cost of employer sponsored plans was taxable, people might be more willing to opt for lower cost managed care and HMO options or accept coverage which more closely reflects their lifestyle.

Generally speaking, these proposals are also geared toward maintaining a system of private insurance as the most efficient method for providing health coverage for everyone. In order to extend private health insurance to the poor, market based proposals usually contain voucher and tax credit options. For example, the Bush Administration's market based reform proposal provides for a \$3,750 voucher for a family of four to purchase health insurance.

Opponents point out that the cost of health insurance for a family of four will probably exceed the voucher payment. Supporters of these proposals believe that managed care programs now being pursued by insurers show great promise for controlling health care costs. Since insurers have a profit motive, they are best positioned to monitor the appropriateness of medical expenditures and procedures.¹⁹ Critics of market based proposals worry that medical rationing will result. While making consumers bear more of the cost of consuming medical care would probably reduce demand for medical services, it may also lead to under-consumption of appropriate medical care. To avoid copayments or higher insurance premiums, individuals may try to avoid consuming medical care even when beneficial. For example, they might avoid diagnostic screenings where early detection of disease might prevent more expensive treatment later.

"Play or pay" proposals

These proposals try to expand health care coverage by requiring that employers provide a minimal health insurance package for their employees (play) or pay a payroll tax for a new health care program designed to cover the uninsured with publicly provided health plans. These proposals usually have guidelines that would initially apply play or pay standards to businesses of a certain minimum size (10 employees) and then only to employees working more than 17.5 hours per week. Furthermore, to reduce potential opposition, most play or pay options include some provision for cost containment, usually through a form of public rate setting for medical services.

Play or pay is partially designed to address the plight of workers in industries where health insurance coverage tends to be slight. For example it is estimated that almost 50 percent of retail and nearly 75 percent of hotel and restaurant workers are not covered by health insurance. However, critics of play or pay point out that the additional costs of play or pay may encourage businesses to lay off marginal workers or at least limit their demand for new workers. The target group of employees might find themselves not only uninsured but unemployed. Also, it is unclear how employers who currently provide health care would react to the play or pay option. Given that the payroll tax

may be cheaper than paying for health insurance premiums, it may be that some employers would actually choose to repeal coverage and pay the tax, thereby straining the financial solvency of the system.²⁰

National health insurance

National health insurance proposals are usually based on the Canadian health insurance system in which the government becomes the primary payer for all medical services. The provision of medical services remains a private industry but the government pays for virtually all medical treatment for all Canadian citizens. To pay for the system, Canada levies taxes in lieu of private health insurance premiums. While secondary insurance plans are available to cover certain special costs (such as private hospital rooms, dental services, and eyeglasses), almost all other costs from check-ups to surgery are covered by national health insurance. The government also becomes responsible for setting rates for medical procedures and is therefore able to use its single-payer clout to try to control medical costs. The system also reduces costs by cutting the administrative expense associated with dealing with large numbers of private insurers. (The U.S. has an estimated 1,500 private insurance companies).

The Canadian system is also designed to reflect differing regional preferences for medical care. The central government pays a minimum of 40 percent of each provinces' health tab but the remainder is allocated by each province. In designing a health care program, each province must address five national objectives. These are: 1) the plan must cover all citizens; 2) all medical and basic hospital services must be included; 3) no user fees or other special billing fees can be used to limit access; 4) the plan must be transferable with no change in coverage if a plan recipient changes jobs; and 5) it must be publicly administered.²¹

The biggest objection to national health insurance plans concerns de facto access to health care. The government sets the reimbursement rates for specified procedures only and establishes the capital spending for hospitals. As a result, highly sophisticated equipment tends to be found in only a handful of university hospitals. For example, while the U.S. has nearly 2,000 hospitals with magnetic resonance imaging machines (MRIs), Canada

has only 15.²² Thus, Canadian hospitals often have to schedule procedures to reflect the availability of equipment. This in turn causes long waits for routine but necessary surgery. The U.S. General Accounting Office (GAO) estimates that in Canada, six month waits for CAT scans and one year waits for orthopedic work such as hip replacements are common. In contrast, privately insured Americans are largely accustomed to a system of medical care on demand. The benefit of the Canadian system is evident in lower fees and average per capita health costs. However, there is some dispute whether the lower per capita health costs are the product of the health insurance system or simply reflect the fact that proportionately fewer Canadians are either poor or old than is the case in the U.S. These are the most expensive patients to treat.²³

U.S. state based plans

States have grown impatient waiting for the federal government to devise a national health care plan. Pressured by constituents and the growing contribution of health care costs to state budget problems, more than two dozen states have passed some form of health care reform. Some of these programs are sweeping in scope while others intend to address more limited areas such as reducing the cost of publicly provided health programs or increasing health care coverage. The following examples illustrate the variety of the proposals being developed at the state level.

Iowa

Iowa has shown increasing interest in play or pay reforms to address health care cost and availability issues. Massachusetts passed a similar measure in 1988 but the implementation of the plan has been delayed until 1995 by a state budget crisis and a severe economic downturn.²⁴ The Iowa proposal has been designed by a consortium of hospitals, businesses, labor unions, and insurers. As such it has broader based support than most reform efforts. The plan would require all Iowa residents to have health insurance and would extend coverage in two ways. Employers would either have to provide health insurance for their employees or pay a 5 percent payroll tax. The payroll tax would be used to provide health insurance subsidies on a sliding scale for those uninsured that have incomes up to 250 percent of the federal poverty level.

Under the Iowa proposal, cost containment is achieved in a variety of ways. First, emphasis would be placed on using managed care methods designed to limit the choice of medical providers for consumers. In addition, while insurance would still be provided by private insurance companies, reimbursement rates from insurers to medical providers would be standardized. Furthermore, growth in the cost of health insurance would be limited by establishing a ceiling on the percentage of health insurance premiums that could be claimed as profit and overhead by the insurer, presumably encouraging insurers to reduce overhead in order to increase profits.

Opposition to Iowa's play or pay scheme has been voiced by several parties. The first source of friction is small business. For those small businesses which traditionally have not provided health insurance to their workers, the play or pay program immediately increases costs. These Iowa businesses usually claim they will be less competitive if they face an additional cost of doing business which small businesses in neighboring states will not face. For large companies with comprehensive medical plans, there is the fear that these businesses will drop medical coverage (estimated to cost 13 percent of payroll costs) in favor of the lower priced 5 percent payroll tax. Such an incentive would lower health care expense for firms with medical plans but it would also have the unintended effect of expanding the share of the population needing to receive insurance through the state's health insurance pool which would be created through the new payroll tax. In response to this, some have suggested placing up to a 10 percent payroll tax on larger companies in an effort to discourage such defections.²⁵ However, these fears may be unfounded or at least limited in any case. Employees would certainly object to any unilateral withdrawal of health benefits, and multistate companies would be hard pressed to offer medical benefits which differed so drastically from one location to another.

Oregon

Oregon has come up with an innovative but controversial proposal for insuring health care coverage for nearly all state residents while containing costs. The future of the plan is in limbo since the state did not receive the waiver from the U.S. Department of Health and

Human Services (HHS) which was needed to implement the plan, but it is expected that the state will resubmit the proposal once the HHS objections can be addressed. One aspect of the plan which is drawing particular attention involves guaranteeing health care for all state residents below the poverty level through a system of public rationing of medical care. The potential use of rationing to control expenses has been evolving in the state since 1989. Under previous law, Oregon has set out plans to insure coverage for all citizens through either private insurance or Medicaid. To make this affordable, the state proposed limiting the range of services provided. The idea was to establish a minimum health plan of specific covered services which would be extended through Medicaid to all citizens below the federal poverty level. (Previously, Medicaid in Oregon only covered citizens with incomes lower than 50 percent of the poverty level.) As a second step, by 1995, most employers will have to provide a health benefits package which provides the same level of coverage as the state's Medicaid package provides.

The Oregon proposal attempts to contain costs by limiting the types of treatments available to patients. Oregon has circumscribed the allowable range of health care services by creating a ranking of possible medical treatments. The Oregon Health Services Commission compressed 10,000 diagnoses and treatments into 709 "condition-treatment" pairs. For example, one such pair would be: condition—appendicitis; treatment—appendectomy. Next, the commission developed 17 social importance categories for the 709 condition-treatment pairs. These categories ranged from those deemed "essential" to those deemed "valuable to certain individuals." An example of an essential treatment would be a procedure which prevents death and leads to full recovery of the patient. An example of a treatment which would be valuable to certain individuals would be a treatment which provides minimal improvement in the patient's quality of life or is geared to helping recovery from a self-limiting condition, for example, plastic surgery for minor scarring. This procedure created a rank ordering for the condition-treatment pairs based on the impact of the treatment on the patient's quality of life and the clinical effectiveness of the treatment. Once the list was established it was submitted to the legislature and it was the legislature's

task to determine how much of the list would receive state funding. The legislature decided to appropriate enough funds to cover services numbered 1 through 587 on the list. Services below 587 would not be covered in the Medicaid package. Health care providers would be legally entitled to deny treatment to patients seeking treatments not covered by the plan. The tradeoff in the Oregon system is clear. Health care is extended to a broader audience but at the cost of limiting the available services.

Critics of the rationing system have questioned the ethics of such an approach. Is it ethically correct to ever withhold treatment even if the benefits of the treatment are marginal? One of the objections raised by the U.S Department of Health and Human Services in rejecting the state's request for a waiver to implement the program was the possibility that treatment for people with disabilities could be denied under the Oregon ranking system. Since the treatment might be necessary but may have little effect in improving the condition of a disabled individual, it was likely that the Oregon plan would not cover these medical procedures. This was seen as potentially discriminatory. By ranking potential treatments on both a societal and individual benefit basis, government is in fact determining the value of a treatment for an individual. Proponents of the plan counter that rationing of medical care already exists when individuals are denied health care coverage. This plan insures that everyone has at least a minimal level of medical care guaranteed. More broadly, the nature of public budgeting is always to ration dollars between competing goals. Health care competes with national defense for funding. Given this, why should rationing amongst health care benefits be any different?

A less philosophical argument questions whether the cost containment goals of this approach will, in fact, work. Given that a diagnosis is more of an art than a science, some question whether health care providers can circumvent limits on coverage and tailor some diagnoses to fall under covered treatment classes. Also because the effect of treatment and the severity of the same illness varies from patient to patient, ranking systems may be inherently arbitrary and doomed to fail. A treatment which might provide a complete return to health for one patient may be ineffective for another. As such the rankings may be arbitrary and ineffective.²⁶

Vermont

Vermont has recently passed a law requiring that universal health care coverage be made available to all residents by October 1994. This legislation has prompted the state to consider two primary options for providing universal care. The first would be to adopt a Canadian style, single-payer health insurance program in which the state would set medical prices and be responsible for paying all medical bills. Alternatively, the state is also considering a multiple-payer plan in which the state would set all health care prices, but private insurance companies would still be used to provide health insurance coverage.

As envisioned, the Canadian style program would provide comprehensive care to all residents without any deductibles or copayments by patients. The system would be financed from revenues from the state's income, sales, and payroll taxes. Proponents of the system believe that costs will be contained not only through price setting, but also through a reduction in administrative cost by eliminating multiple payers. As of yet it is not certain whether the single-payer will be a public or private agency.

The multiple-payer approach is based loosely on the experience of West Germany's health plan which was considered successful at containing health care costs in the 1980s. (A multiple-payer approach has since been adopted throughout unified Germany.) The system consists of a number of nonprofit organizations (called sickness funds in Germany) which collect insurance premiums from employers and employees. The premiums are then paid to regional doctor's associations which uses the money to provide health care. The state sets prices and provides insurance to the unemployed. It is assumed that in Vermont, existing insurance companies would serve the role of collecting premiums.

While it is unclear which approach will be adopted, Vermont has already passed several health care reforms. The state has established a three member Health Care Authority with oversight authority including the power to negotiate insurance rates for state residents. Other reforms include: establishing a standard set of benefits; insuring that benefits are portable from one job to another; subsidizing primary care coverage for all pregnant women and teenagers with family incomes up to 225 percent of the federal poverty level; and central-

ized budgeting with nonbinding expenditure targets for hospitals, clinics, and physicians.²⁷

Virginia

A more limited approach aimed just at cost containment is being tried by Virginia. The state has chosen to revive its certificate of need program. This program, which was started in 1974 by the federal government, was designed to create state oversight for hospital expansions. The belief was that through aggressive growth plans, hospitals were creating an oversupply of hospital beds and services and in doing so were driving costs up through duplication of services. Unrestricted capital construction and high technology acquisition encouraged utilization of expensive hospital facilities for procedures which could be performed in doctors' offices. The certificate of need program required hospitals to prove to a state board that they had a need for expansion or new equipment.

The program was largely discontinued by states when federal funding was eliminated in 1986. However, Virginia has returned to the certification of need concept in an effort to control costs. Part of the state's interest in returning to this form of regulation stems from the fact that from 1989 to 1991 hospitals spent \$130 million on expansion and new technology in Virginia. The state estimates that 50 percent of this would have been denied if the certification of need program had been in effect. Furthermore, the certification program uncovers one of the problems with incentives in the health care market. Unregulated competition in health care encourages hospitals to provide the best technology for patients rather than the best price per unit of care.

Critics of the certification program point out that its success has been mixed. One study by the University of Alabama at Birmingham found that the program may have encouraged hospital expansion as hospitals accelerated growth plans in anticipation of tougher regulation which would reduce future expansion. Others have criticized the program for reducing access to health care by limiting the facilities of hospitals.²⁸

Kentucky

Another more limited reform approach aimed at controlling Medicaid costs is being tried in a number of states, but most notably in Kentucky. These programs are generally designed to introduce managed care reforms into

the Medicaid system. In Kentucky's case, the thrust of the reform is to use family physicians as the primary care giver for Medicaid cases. In the past, Medicaid patients often had no family doctor. When treatment was needed the recipient would go to the hospital or seek out a specialist for their specific ailment. This method of treatment was expensive and resulted in uncoordinated care for patients. By using a family doctor, additional treatment can be coordinated and costs reduced by using specialists and hospitals only when they are necessary. Kentucky estimates that this program will save the state \$120 million this year while covering 288,500 participants.

Critics of the program believe that the set reimbursement schedules for family physicians treating Medicaid patients will encourage doctors to reduce the quality of their services. Also, critics point out that such an approach may not work well in states with little experience with managed care programs, particularly those with few HMOs. For example, Wisconsin estimates that it saves \$10 million per year with its managed care system for 122,000 AFDC recipients; however, it has been unable to expand the program because of the lack of HMOs to function as service providers.²⁹

Conclusion

Due to the lack of national consensus on a health care policy, states are again proving to be the laboratories of public policy. Through the state's varied approaches, a better understanding of the most promising programs for expanding coverage and moderating costs may emerge. Clearly, any solutions will have to address those aspects of the health care market that have gone awry. The practice of providing the best possible care without regard to cost will likely give way to a more cost effective approach to health care provision. It is also likely that individual consumers of health care services will have to bear a greater share of the cost of consuming health care. Greater incentives for maintaining personal health are likely to be adopted, as well as the use of disincentives for destructive and self-inflicted health problems related to behaviors such as smoking and drinking, which currently bear no insurance penalty.

Most of all, solutions will have to address both the cost and access to health care. Based on the diversity of the proposals under consideration, the state experiments in health care are on the right track and may well point to an effective health care policy for the nation as a whole.

FOOTNOTES

¹See Health Insurance Association of America, (1990), p. 55.

¹⁵HIAA, p. 31.

²See Koretz (1992), p. 22.

¹⁶Little (1992), pp. 43-66.

³See Gardner (1992), p. 28.

¹⁷Rowley (1992), p. 15.

⁴Wessel, *The Wall Street Journal*, May 11, 1992, p. 1.

¹⁸Graham (1992), p. 23.

⁵HIAA, p. 61.

¹⁹Ibid, pp. 22-26.

⁶See Harden (1992), p. 61.

²⁰Ibid, pp. 22-26.

⁷Ibid, p. 48.

²¹Ibid, pp. 14-16, 18, 22.

⁸For more on supply and demand factors affecting medical costs, see Fuchs (1972).

²²Lays (1992), p. 62.

⁹Ibid.

²³New York Times Company (1992), p. A-14.

¹⁰American Hospital Association (1989).

²⁴Biemesderfer (1992), p. 58.

¹¹HIAA, p. 64.

²⁵Worthington (1992b), pp. 1-2.

¹²State Policy Research, Inc. (1990), Table I-24.

²⁶Wiener (1992), pp. 26-30.

¹³Ibid, Table I-19.

²⁷Worthington (1992a), pp. 15-16.

¹⁴Ibid, Table I-15.

²⁸Wagar (1992), pp. 20-22.

²⁹Knapp (1982), pp. 16-19.

REFERENCES

- American Hospital Association**, *Hospital Statistics*, Chicago, IL, 1989.
- Biemesderfer, Susan C.**, "Running for coverage," *State Legislatures*, National Conference of State Legislatures, July 1992, p. 54-59.
- Committee for Economic Development**, *Reforming health care: a market prescription*, New York and Washington, D.C., 1987.
- Fuchs, Victor**, "The basic forces influencing costs of medical care," in *Essays in the Economics of Health and Medical Care*, Victor Fuchs, ed., National Bureau of Economic Research, Columbia University Press, New York, 1972, pp. 39-50.
- _____, "Though much is taken: reflections on aging, health, and medical care," *Milbank Memorial Fund Quarterly/Health and Society* Vol. 62, No. 2, 1984, pp. 143-166.
- Gardner, Booth**, "Health care reform: the state perspective," *Intergovernmental Perspective*, Advisory Commission on Intergovernmental Relations, Vol. 18, No. 2, Spring 1992, pp. 28-30.
- Graham, D. William**, "Long-term health care reform: three approaches," *Intergovernmental Perspective*, Advisory Commission on Intergovernmental Relations, Vol. 18, No. 2, Spring 1992, pp. 22-24.
- Harden, Shelda**, "Feds take a stab at health care reform," *State Legislatures*, National Conference of State Legislatures, July 1992, pp. 61-63.
- Health Insurance Association of America**, *Source Book of Health Insurance Data*, Washington, D.C., 1990.
- Knapp, Elaine**, "Medicaid diet plans," *State Government News*, The Council of State Governments, Vol. 35, No. 6, June 1982, pp. 16-19.
- Koretz, Gene**, "America's medical tab is growing faster than ever ... and that's bad news for an aging population," *Business Week*, June 8, 1992, p. 22.
- Lays, Julie**, "The Canadian system," *State Legislatures*, National Conference of State Legislatures, July 1992, p. 62.
- Little, Jane Sneddon**, "Lessons from variations in state Medicaid expenditures," *New England Economic Review*, Federal Reserve Bank of Boston, January/February 1992, pp. 43-66.
- New York Times Company, The**, "Canada's no medical model," *New York Times*, May 26, 1992, p. A-14.
- Rowley, Storer H.**, "Prescriptions from Canada—would universal health care work in this country?," *Chicago Tribune Magazine*, May 31, 1992.
- State Policy Research, Inc.**, *States in Profile*, Alexandria, Virginia, 1990.
- Wagar, Linda**, "Rebirth of a good idea," *State Government News*, Vol. 35, No. 6, The Council of State Governments, June 1992, pp. 20-22.
- Wessel, David**, "The coming federal battle: health costs vs. poor," *The Wall Street Journal*, May 11, 1992, Sec. 1, p. 1.
- Wiener, Joshua M.**, "Oregon's plan for health care rationing," *The Bookings Review*, Winter 1992, pp. 26-31.
- Worthington, Rogers**, "Vermont may take health care lead," *Chicago Tribune*, July 12, 1992a, Section 1, pp. 15-16.
- _____, "Iowa warms to 'play-or-pay' health plan," *Chicago Tribune*, May 26, 1992b, Section 1, pp. 1-2.

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