A Comparison of the Bush-Paulson Plan and a Plan Based on Mortgage Guarantees

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September 29, 2008

Abstract

I compare the Bush-Paulson plan of intervention in secondary markets for mortgage-backed securities (MBS) with an alternative based on insuring mortgages directly. Fully insuring mortgages achieves the same bottom-line effect as buying all outstanding MBS but instantaneously with no upfront costs. A plan based on partial insurance can match most effects of a partial Paulson-style intervention. Mortgage insurance also has advantages of transparency and simplicity and would probably be more politically popular.

Model   A bank has a portfolio consisiting of zero cash and a distribution of illiquid mortgage claims each with a face value that is normalized to 1 and an idiosyncratic default probability p. The cumulative distribution of p across the bank's portfolio is denoted F. The value of p for each individual mortgage in the portfolio is the bank's private information.

The Bush-Paulson intervention.   In the Bush-Paulson plan, the government offers a price $1 - z$ which induces the bank to sell all mortgages having a default probability $p \geq z$.[1] The fraction of such mortgages in the portfolio

[1]This is the adverse-selection problem due to asymmetric information about p that limits the effectiveness of the Bush-Paulson intervention.

is $1 - F(z)$. The goverment pays $(1 - z)[1 - F(z)]$ up front. Eventually the government recovers

$$\int_z^1 (1 - p)dF(p) = [1 - F(z)](1 - \mathbf{E}(p|p \geq z))$$

from those mortgages that do not default. The total long run cost of the Bush-Paulson bailout with target price z is thus

$$[1 - F(z)](\mathbf{E}(p|p \geq z) - z).$$

The effect of the intervention is to increase the value of the bank's portfolio and to provide liquidity. The diagram in Figure 1 shows the bank's portfolio before and after the intervention. The value of the portfolio is equal to the integral of the corresponding function with respect to the distribution F. The program provides liquidity to the bank in the amount of $(1 - z)[1 - F(z)]$. The bank now has a portfolio consisting of a mix of $F(z)$ of illiquid mortgage contracts and $(1 - z)[1 - F(z)]$ in cash.

Mortgage Guarantees An alternative is for the government to provide a full or partial guarantee of all outstanding mortgages. When a bank declares a mortgage to be in default, the government takes possession of the property and assumes the mortgage payments, paying a fraction $z' \in [0,1]$ to the bank. Full insurance corresponds to the case of $z' = 1$. For any z envisioned by the Paulson plan the government can set z' to achieve the same increase in the value of the bank's portfolio. When the government guarantees a fraction z' of mortgage payments, a mortgage with default rate p is now worth $(1 - p) + z'p$. The diagram in figure Figure 2 compares the two interventions. To equate them, the government sets

$$\bar{p}z' = [1 - F(z)](\mathbf{E}(p|p \geq z) - z).$$

where $\bar{p} = \mathbf{E}p$ is the aggregate defualt rate.

By contrast to the Bush-Paulson intervention, there is no initial payment by the government and so the long-run balance of the program never exceeds the ultimate total cost $[1 - F(z)](\mathbf{E}(p|p \geq z) - z)$. Moreover, precise estimates of $\bar{p}$ and therefore this maximum balance can be easily obtained. Thus, in terms of cost the mortgage insurance approach is more transparent and presumably more politically attractive.
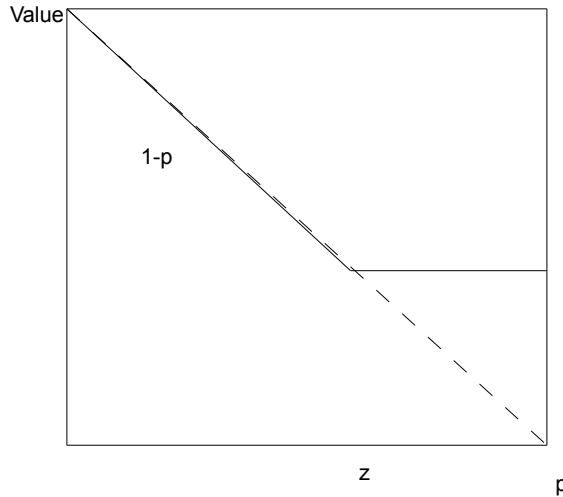
Figure 1: The effect of the Bush-Paulson intervention with target price z.

A benchmark point of comparison would be to set $z = z' = 1$, i.e. full mortgage insurance. Supposing an aggregate default rate of $\bar{p} = 20\%$, and estimating the total value of outstanding mortgages to be 2 trillion dollars[2], full insurance instantaneously restores mortgages to their face value but costs the government less than 400 billion dollars in expectation, whereas the 700 billion dollars budgeted by congress would prevent the Bush-Paulson intervention from achieving the same result.

A related difference is that while the Bush-Paulson intervention puts cash in the hands of the bank, mortgage insurance achieves liquidity by guaranteeing the bank's cash flows. Because in any state of the world the bank will have a cash flow of z', the market will immediately be willing to lend to the bank at least z'. However, these measures of liquidity differ across the two programs and this is a key difference. Recall that the Bush-Paulson bailout
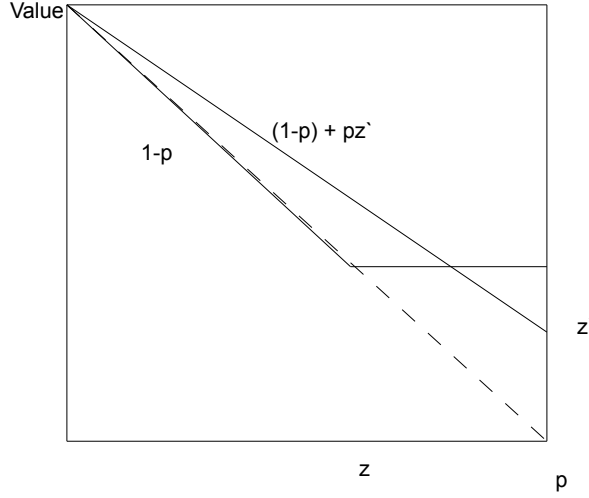
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[2]A pure guess.

Figure 2: Comparison with mortgage insurance at rate z'.

provides cash amounting to

$$(1 - z)\left[1 - F(z)\right].$$

We can calculate that the mortgage guarantee at the equivalent rate z' achieves more liquidity than the Bush-Paulson intervention if

$$\mathbf{E}(p|p \geq z) - z \geq (1 - z)\bar{p}. \tag{1}$$

To interpret this, note that the mortgage guarantee dominates whenever the overall default rate is relatively low and/or the distribution of default rates has a thick upper tail above the target rate z. These facts can reasonably be assumed to accurately describe the current climate. Also note that z' is a crude lower bound to the credit-worthiness of the bank under mortgage insurance.

It bears repeating that this superiority in the liquidity effect comes instantaneously the moment the insurance is mandated, with no upfront cost to the government.

4

Indeed an additional benefit comes from considering the moral hazard problem associated with the cash infusions that are key to the Bush-Paulson strategy. These infusions will have the desired effect only under some assumptions that the market will believe that the crisis will be averted. In the worst-case scenario, the shareholders of the bank use the cash to pay themselves a dividend and allow the bank to fail anyway. There is no such risk from the mortgage insurance plan.

Based on these considerations, even if the ineuqality in Equation 1 is reversed, it may be more desirable to use a program of mortgage insurance, setting the insurance rate z' to achieve the desired level of liquidity even at the greater expense to the government. The additional cost may be seen to be offset by the other advantages mentioned here.

Summary For any target price z in the Bush-Paulson intervention, there is a fraction z' of mortgage insurance which can achieve the same increase in the value of the bank's portfolio at the same cost. Moreover, under plausible assumptions about market conditions, the boost to the bank's liquidity is matched or surpassed. In addition, mortgage insurance has the following advantages

1. Favorable timing of payments. In the Bush-Paulson intervention the government makes a large initial outlay and recovers some of these costs over time. Mortgage payment incurs the same long-run cost but requires payments only at the time of mortgage defaults.

2. Transparency.

   (a) Agency Issues. The Bush-Paulson intervention demands a great deal of trust that the agents in charge of the implementation are acting in good faith. It will be hard to obtain good measures of the value of the securities purchased and so it will be nearly impossible to monitor whether the government is achieving the theoretical ideal considered here. And it is hard to put a good estimate on how far short the second-best will be. Mortgage insurance mandates a simple and verifiable decision procedure: intervene when banks declare default and continue to make mortgage payments.

   (b) Bottom Line. It is straightforward to estimate and bound the costs associated with mortgage insurance. Because of asymmetric

information, it is harder to project in advance the cost of buying the troubled securities that are the targets of the Bush-Paulson plan.

3. Immediacy. At the stroke of a pen, mortgage insurance restores the troubled assets to a specified value. The Bush-Paulson cash infusion takes time and how quickly the program will be reflected in market values depends on assumptions about market expectations. Given the urgency claimed by proponents of the Bush-Paulson intervention, this should be an important consideration.

4. Political Popularity. The transparency of the program would surely make it an easier sell politically.