

Economics of the Geithner Plan

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The Private-Public Investment Program (PPIP), or “Geithner Plan,” would ironically use financial leverage to help resolve a financial crisis caused in considerable part by excessive leverage. As Robert Samuelson, citing Yale economist John Geanakoplos, has pointed out, a rationale for this paradox is that the process of deleveraging has gone too far in the opposite direction as loanable funds for leveraged investment have dried up.¹ The premise of the plan is that troubled assets on the books of the banks cannot be sold except at prices far below their long-term cash-flow value because of lack of liquidity in this distressed market. The PPIP seeks to jumpstart a return to liquidity for this asset market, thereby setting the stage for a normalization of the banking sector and financial conditions more generally. A key motive of this arrangement is to use private investors, rather than bureaucrats, for “price discovery,” addressing a central problem that derailed the original Troubled Asset Relief Program (TARP) plan of Geithner’s predecessor, Henry Paulson: the difficulty in determining a price that will be fair to both the taxpayer and the bank. For this purpose, the government would in effect provide lending to enable the leverage needed to attract private-sector investors.

Problems with the Critiques of PPIP

Some prominent economists have decried the plan as a giveaway of public funds to the banks and private investors such as hedge funds, private equity firms, pension and endowment funds, and others. Jeffrey Sachs has attacked it as a “massive transfer of wealth.”² Joseph Stiglitz has called it “robbery of the American people.”³ They as well as Paul Krugman⁴ have provided numerical examples of large overpayment by private investors at the public’s expense.

A fundamental problem with these attacks is that they omit on the benefit side of a cost-benefit analysis the potential gains to the public from an improvement in the economy that could flow from a normalization of the financial system. Even on the narrower analytics ignoring such social externalities, however, the analyses tend to make crucial

¹ Robert J. Samuelson, “Geithner’s Hedge Fund,” *Washington Post*, March 30, 2009.

² “Will Geithner and Summer Succeed in Raiding the FDIC and Fed?” *VoxEU*, March 25, 2009. For Sachs’ calculations considered in this paper, see Jeffrey Sachs, “Obama’s Plan Could Rob the Taxpayer,” *Financial Times*, March 25, 2009.

³ “Geithner Plan Will Rob US Taxpayers,” *Reuters*, March 24, 2009. For a calculation similar to that presented by Sachs, see Joseph E. Stiglitz, “Obama’s Ersatz Capitalism,” *New York Times*, April 1, 2009.

⁴ Paul Krugman, “Geithner Plan Arithmetic,” <http://krugman.blogs.nytimes.com>, March 23, 2009.

assumptions that seriously bias them toward the conclusion that investors will pay far too much for the troubled assets, and thus that the public will experience serious losses as a result while the banks and private investors enjoy any gains. This paper will illustrate this bias using the Sachs results.

The essence of the critiques is that government loans for leveraged private investors on a nonrecourse basis create a “heads I win, tails you lose” situation for the investors. Nonrecourse borrowing means that if the assets purchased go sour, the investing firm walks away from both the assets and the loans it borrowed from the government using the assets as collateral. The defaulted assets become the property of the government, which seeks to recover what it can but is unlikely to recover much, and the government has no recourse to recover from the private investing firm itself.

However, a key feature of the PPIP will limit this asymmetric risk. The amount the government will lend will apply a variable “haircut” against the face value of the loans in arriving at what will be acceptable as collateral value. For the Legacy Loan program, the FDIC will exercise oversight; for the Legacy Securities program, the Federal Reserve will do so. Both are almost certain to require larger haircut discounts in determining the collateral value for more risky loans or securities.⁵ With lower permissible collateral, the investor would not be able to make as large an offer. The critiques of Sachs, Krugman, and Stiglitz do not take this into account.⁶

In the case of the Sachs analysis, as set forth below, the conclusion of overpayment is exaggerated for four reasons. First, he assumes an unrealistically high probability of default. Second, he assumes an unrealistically low rate of recovery given default. Third, he applies a leverage ratio higher than that available in the PPIP. Fourth, he assumes perfect competition and therefore zero profits for the investing firm, instead of a more realistic target profit rate.

Moreover, two further considerations suggest that there is considerable reason to fear that the private-public initiatives will underpay rather than overpay for the troubled assets. The economist who has been credited in part for the conceptual framework of the PPIP, Lucian Bebchuk of Harvard University, has emphasized that insufficient competition among prospective private-sector participants could cause the prices offered to be too low, because of what is technically “oligopsony power” used to extract a “rent” from the potential sellers.⁷ For this reason he has emphasized the need for many participants to compete against each other. The Legacy Loan half of the PPIP is structured with many

⁵ The Treasury documentation of the PPIP indicates that for the Legacy Loan program, “The FDIC will conduct analyses to determine the amount of funding it is willing to guarantee. Leverage *will not exceed* a 6-to-1 debt-to-equity ratio” [emphasis added]. US Treasury, “Fact Sheet: Public-Private Investment Program,” available at www.treas.gov/press/releases/reports/ppip_fact_sheet.pdf (accessed on April 1, 2009).

⁶ The Sachs exercise is described below. It assumes the FDIC would approve \$643 collateral value on a \$1,000 loan with an 80 percent default probability and only 20 percent recovery rate. Instead, the FDIC would likely set the permissible collateral much lower on such a damaged loan.

⁷ Lucian Bebchuk, “Jump-Starting the Market for Troubled Assets,” *Forbes*, March 3, 2009.

investors in mind, but the Legacy Securities half only calls for five initial hedge funds, a number that may or may not be sufficient to overcome the oligopsony problem.

The other reason for concern about underpayment is the recent political climate, in which private-sector bonuses and profits at firms in some way involved in the credit crisis and, especially, the public-sector intervention to address it have become the target of retroactive taxation. The shaky rule of law substantially increases the risk to private-sector partners in the PPIP.

Overall, these considerations suggest that the outcry of some economists against the PPIP as a giveaway to banks and private investors is at best useful as an alert to the need for close monitoring of the mechanism (especially in FDIC and Federal Reserve determination of the collateral haircut) but at worst constitutes an unhelpful undermining of public confidence in an approach that could play an important role in stabilizing the financial crisis.

The rest of this note provides a specific analysis of the Sachs diagnosis of overpayment in the PPIP.

Recalculating the Sachs PPIP Overpayment Estimate

Jeffrey Sachs has produced an arithmetic example indicating that investors in the Private-Public Investment Program (the “Geithner Plan”) would be willing to pay as much as \$714,000 for a toxic asset with face value of \$1 million but a true value of only \$360,000, based on a probability of default of 80 percent and a recovery ratio of 20 percent.⁸ The amount offered would be almost twice the true value, calculated as the sum of 20 percent probability times face value for the good outcome (\$200,000) and the recovery rate times face value times 80 percent probability ($\$200,000 \times 0.8$) for the bad outcome.

The Sachs model, reverse-engineered from his example, is as follows.

Let E = equity of the investing firm, X = the price it will offer, L = the size of the loan from the government, λ = the leverage ratio (defined as the ratio of total purchase price to investor equity), π_G = profit in the good outcome, π_B = profit in the bad outcome, P_d = probability of default on the asset, and F = face value of the assets. Let V = the probability-weighted value of the asset, R = the recovery value if the asset defaults, and $r = R/F$ the recovery rate on the defaulted assets. The question is then how much will the investor be willing to pay (X) for the asset. The Sachs (and Krugman) proposition is that X is much greater than V .

Following Sachs, the problem is simplified by ignoring government equity and treating the investment solely as one by a private investor obtaining nonrecourse borrowing.

The amount of equity the investor will need is:

⁸ “Obama’s Plan Could Rob the Taxpayer,” *Financial Times*, March 25, 2009.

$$1) E = X / \lambda$$

The size of the loan from the government is:

$$2) L = X \frac{\lambda - 1}{\lambda}$$

Profit in the good outcome will be the full face value of the asset minus the amount of the loan the investor needs to repay and minus the investor's original equity, or:

$$3) \pi_G = F - L - E$$

In the bad outcome the investor walks away from the asset, which becomes the property of the government, but loses his initial equity, so profit is minus the original equity:

$$4) \pi_B = -E$$

This equation changes if the recovery ratio is high enough to keep the investor loss to a lesser amount than the entire equity investment. In this case,

$$4') \pi_B = \text{Max}[rF - L - E; -E]$$

At this point Sachs (and Krugman and Stiglitz) assume perfect competition and zero expected profit. As a result, the probability-weighted good- and bad-outcome profits sum to zero.

$$5) (1 - P_d) \pi_G + P_d \pi_B = 0$$

However, zero profit is unlikely to be acceptable to private investors. If instead they demand a hurdle profit rate of θ (defined as the equivalent of a capital gain after a moderate holding period such as 3–5 years), then the profit equation becomes:

$$5') (1 - P_d) \pi_G + P_d \pi_B = \theta E$$

In the Sachs formulations of low recovery (equation 4 rather than 4') and zero profit (equation 5 rather than 5'), substituting and solving for X leads to:

$$6) X = \frac{\lambda(1 - P_d)F}{(1 - P_d)\lambda + P_d}$$

In the more general case, taking account of higher recovery (equation 4') and profit motive (equation 5'), the offer price becomes:

$$6') X = \text{Max}\left\{\frac{\lambda(1-P_d)F}{(1-P_d)\lambda + P_d + \theta}; \left(\frac{\lambda}{\lambda + \theta}\right)[(1-P_d)F + P_d rF]\right\}$$

In contrast, the underlying value of the asset is its probability-weighted value under the two alternative outcomes, good and bad. Thus:

$$7)V = P_d R + (1 - P_d)F = F\{1 - P_d(1 - r)\}$$

In the Sachs case with zero profit and low recovery, the ratio of the price offered to the underlying value of the asset is then the ratio of equation 6 to equation 7, or:

$$8) X / V = \frac{\lambda(1 - P_d)}{\{(1 - P_d)\lambda + P_d\} \times \{1 - P_d(1 - r)\}}$$

In the more general case the corresponding ratio of offer price to underlying value is the ratio of equation 6' to equation 7.

In Sachs' example (in thousands), with $F = 1,000$, $P_d = 0.8$, and $\lambda = 10$, it turns out that the price the investor is willing to offer is 714, or 98 percent above the true value based on default probably and recovery ratio.⁹ Ironically, under these circumstances the recovery ratio does not enter at all into what the investing firm is willing to pay, because it is not the firm's concern: The government gets the recovery of collateral because the investor walks away from the loan.

This estimate of overpayment appears to be seriously overstated, however. For the probability of default, Sachs uses 80 percent, and for recovery, 20 percent. In contrast, recent estimates by Goldman Sachs suggest that nonprime bank mortgage claims have a weighted average default probability of 32 percent and recovery rate of 50 percent.¹⁰ Overstatement of default probability and understatement of recovery leads to understatement of loan value and overstatement of the ratio of the offer price to loan value.

Similarly, Sachs overstates the leverage ratio. In the description of the Legacy Loan program of the PPIP, US Treasury documentation illustrates the plan with the example of a loan portfolio purchased at \$84 for a \$100 face-value loan, with \$6 in equity from the private investor, \$6 from the Treasury, and \$72 in loans guaranteed by the FDIC.¹¹ The loan is of sufficient quality that the collateral haircut is only 16 cents on the dollar, and the leverage ratio is 7 to 1 (purchase price to equity; or equivalently, 6 to 1 for loan to

⁹ In equation 8), $X/V = [10 \times 0.2] / \{(0.2) \times 10 + 0.8\} \times \{1 - 0.8(1 - 0.2)\} = 2 / (2.8 \times 0.36) = 1.984$.

¹⁰ These include Alt-A, subprime, option ARM, closed-end second mortgages, and home-equity lines of credit. Calculated from Jan Hatzius and Michael A. Marschoun, "Home Prices and Credit Losses: Projections and Policy Options," *Global Economics Paper* No. 177, January 13, 2009.

¹¹ US Treasury, "Fact Sheet: Public-Private Investment Program," available at www.treas.gov/press/releases/reports/ppip_fact_sheet.pdf (accessed on April 1, 2009), note 5.

equity). As for the Legacy Securities program, the leverage ratio is even lower, ranging from 3 to 4. Sachs instead uses a leverage ratio of 10.

Table 1 compares the parameters and results of the Sachs calculation, discussed above, with those that would be more appropriate on the basis of the discussion above. For “This paper,” the estimates calculated from the Goldman Sachs study are applied (32 percent default probability and 50 percent recovery rate). A leverage ratio of 7 is used, consistent with the maximum allowable under the Legacy Loan program description and well above that in the Legacy Securities program. The calculation here assumes a profit hurdle (capital gains target) of 0.25, which is probably on the modest side.

The result is that the offer price exceeds the underlying value by only 7 percent, a radically different conclusion from Sachs’ 98 percent.

Table 1 PPIP Price offer relative to underlying value (X/V), Sachs versus this paper

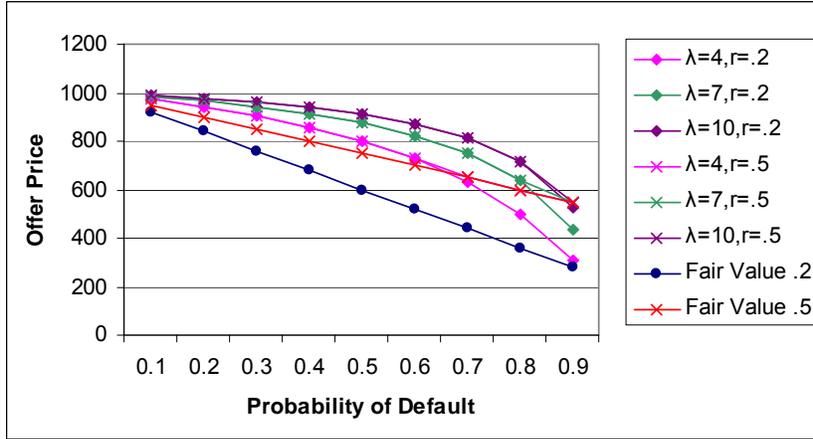
Concept	Symbol	Sachs	This paper
Probability of default	P_d	0.8	0.32
Recovery ratio	r	0.2	0.5
Leverage ratio	λ	10	7
Profit hurdle rate	θ	0	0.25
Offer price / underlying value	X/V	1.98	1.07

Figure 1 shows alternative fields of PPIP investor offer prices for an asset with a face value of \$1,000 under differing assumptions about the leverage ratio, default probability, and recovery rate. The first panel is for the Sachs zero-profit case; the second sets the capital gains target at 25 percent ($\theta = 0.25$); the third, at 50 percent ($\theta = 0.5$). Because the recovery rate enters into the calculation only at high probabilities of default, over most of the range the lines for a given leverage ratio overlap each other, but they diverge for the highest default probabilities.

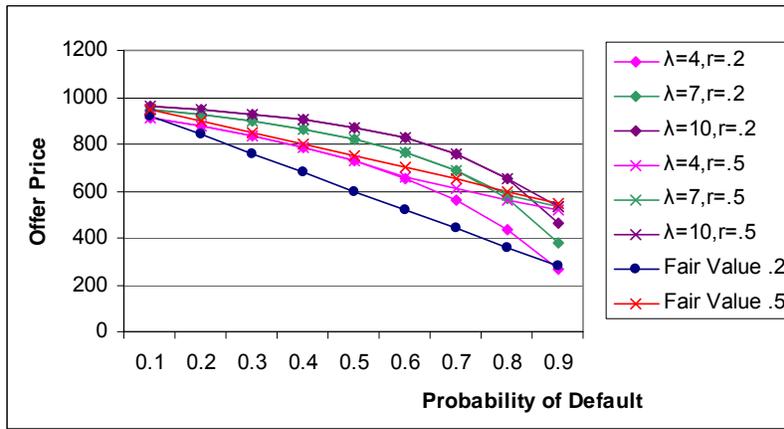
Table 2 simplifies the field of results by focusing on three alternative default probabilities (0.3, 0.5, and 0.7) and two alternative recovery rates (0.5 and 0.2), using only the intermediate profit target ($\theta = 0.25$) and only one leverage ratio ($\lambda = 0.7$). The table reports the ratio of offer price to underlying value for each of these six cases. It is clear that if the recovery rate is as high as the relatively standard 50 percent, the range of overpayment is quite limited, remaining in a range of 6 to 10 percent. In contrast, if the recovery rate is the low 20 percent assumed by Sachs, the overpayment is moderate (18 percent) only when the default rate is at the lower end of this central range (30 percent); at the higher end (70 percent) overpayment is large, at 56 percent. However, it is precisely for assets with such high default probabilities and low recovery rates that the FDIC (or the Federal Reserve) would be likely to insist on larger haircuts for permissible collateral, meaning that the leverage ratio allowed would be considerably smaller than the 7 to 1 ratio for higher quality assets.

Figure 1 PPIP investor offer price for an asset with a \$1,000 face value, under alternative default probability, recovery rate, leverage, and profit target assumptions

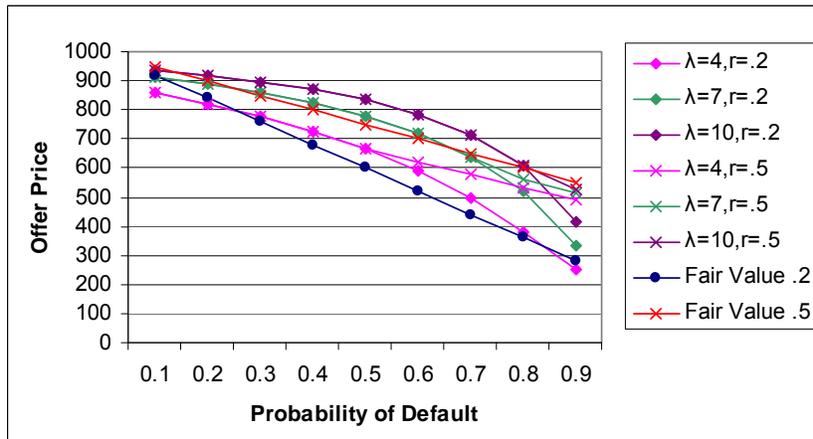
A. Zero profit



B. 25 percent capital gains ($\theta = 0.25$)



C. 50 percent capital gains ($\theta = 0.5$)



λ : leverage ratio

r: recovery rate

Fair value: underlying value at recovery rate of 0.2 or 0.5

Table 2 Ratio of offer price to underlying value for illustrative default probabilities and recovery rates^a

Recovery rate	Default probability		
	0.3	0.5	0.7
0.5	1.06	1.10	1.06
0.2	1.18	1.37	1.56

a. For leverage $\lambda = 7$ and profit target $\theta = 0.25$

Overview

In short, the Sachs conclusion that PPIP will cause investors to pay twice as much for distressed assets as they are worth is likely to be a considerable exaggeration. His leverage ratio of 10 is much higher than those in the PPIP (7 for legacy loans, and as low as 3 for legacy securities). His probability of default of 80 percent is much higher than usually attributed to these assets. More appropriate leverage ratios, default probabilities, recovery rates, and assumptions about profit-hurdle rates lead to lower excess-price results. If one considers the top row of table 2 and only the first entry of the bottom row as illustrative (because at higher default rates and low recovery the allowable leverage would be lower than used in the table), an appropriate range for the estimation of overpayment in the PPIP would be on the order of 10 to 20 percent, not 100 percent.

If the PPIP does lead to prices of, say, even 25 percent above long-term value being paid for distressed assets, it is not obvious that the taxpayer will have lost. This arithmetical model does not take account of the macroeconomic benefits to be expected from normalization in the banking system. Introducing greater liquidity to distressed assets held by banks could make an important contribution to that normalization, making it possible to avoid much more disruptive outcomes such as the nationalization of some of the largest banks. Similarly, if the “illiquidity discount” is about 25 percent, then the “overpayment” becomes “discovery of the appropriate price” from the standpoint of longer-term value under more liquid conditions. On balance, the taxpayer could gain from a moderate price boost to these assets from the PPIP, by being pound wise rather than penny wise.