Europe EconoMonitor

Some unpleasant arithmetic of the Geithner Plan

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RGE Monitor has recently provided timely explanation of the essentials of the Geithner Plan aimed to clear "toxic assets" from banks' balance sheets by way of public-private partnerships (RGE Monitor Newsletter, March 25). The overall assessment was mixed: some weaknessess were pointed out, "but taking care of legacy loans and securities is a welcome step forward, especially for solvent institutions whose asset values are subject to a substantial liquidity discount".

Later, Joe Stiglitz, in a short and harsh article in NYT.com, presented a simple example showing that the Plan is a "win-win-win" game for the private investors and a bad deal for the government and the taxpayers. This is indeed the most severe criticism levied against the Plan by the large share of public opinion worried about "making profits private, and losses public". The argument is not well posed in that the candidates to make profits with the Plan are not the same who bear the responsibility for the disaster. Nonetheless, it remains questionable that the government should enter a joint venture where it is bound to bear the bulk of the chances of losses.

Examples about what the Plan will look like are now abundant. I have tried to extract and present some more general information about the implications of the Plan by means of some back-of-the-envelope algebra[1]. It goes without saying that this exercise overlooks many details of the Plan - though, hopefully, it captures some key features. It is also to be premised that the Plan consists of two Programs: the Private-Public Program for Legacy Loans, and the Legacy Securities Program. As is mostly the case in current disucssions, I only focus on the former Program (also known as the PIPP).

The key elements of the PIPP are:

. the auction value of a toxic asset (V) · the equity share provided by private investor (k_p) · the equity share provided by the government (k_g) · the remaining share provided by the government as a guaranteed loan ($1 - k_p - k_g$)

The participation scheme is the following:

· the equity shares of the private investor and the government

are equal ($k_p = k_g = k$) · the debt-to-equity ratio cannot exceed 6-1 (i.e. $(1 - 2k)/2k \leq 6$, $k \geq 7.1\%$) · the two partners split 50-50 the future payoffs generated by the asset that are left over after paying back the loan · the loan is repaid only if the payoffs exceed the loan.

Now let us consider the same basic case proposed by Stiglitz, that is a toxic asset that in one year's time will pay *X* with probability *p* and 0 with probability (1-*p*). Note that for most mortgage-backed assets the face value of *X* is almost known with certainty, whereas the true trouble is whether it will ever materialize. Hence auctions are supposed to aggregate and reveal private investors' guesses about *p*.

As a preliminary step let us recall that, if *p* is the chance associated to *X*, then the expected value of the asset is *Xp*. Yet this may not turn out to be the auction value *V* of the asset. First, investors who pay *V* wish to earn as much much as they would with an ordinary investment at the market rate *r*, plus an appropriate risk premium. It is therefore quite likely that toxic assets will only be sold at a substantial discount. Let us then say that $V = Xp/d$, where $d \geq (1 + r)$, which implies $V \leq Xp$ (an alternative interpretation of "second-order uncertainty" is that buyers are uncertain about *p* and tend to underestimate it; the algebra does not change). This raises the problem, discussed in the RGE-Monitor's Newsletter, whether banks will be willing to participate. The answer is that they will be as long as the discount claimed by the PPP buyers is nonetheless a better deal than having no buyers at all. Stiglitz, by contrast, presents the case that the asset is overvalued by the buyers, which does not seem plausible. Yet this case is not essential to his argument, as we shall see. Let us now turn to some hot issues in the Geithner Plan.

1) *First, what is the expected return (ER) for the two partners*? The answer is that it depends on *k*, *p* and *d.* To proceed, it is convenient to posit an "agnostic" 50%-50% chance of getting *X* (as in Stiglitz's example). Table 1 shows the private investor's (p) and the government's (g) ERs for different combinations of *k* and *d*.

Table 1.

			d					
			1	1.01	1.05	1.1	1.2	1.3
k	7%	ERp	307.1%	314.3%	342.9%	378.6%	450.0%	521.4%
		ERg	-23.1%	-22.6%	-20.4%	-17.7%	-12.4%	-7.0%
	10%	ERp	200.0%	205.0%	225.0%	250.0%	300.0%	350.0%
		ERg	-16.7%	-21.7%	-19.4%	-16.7%	-11.1%	-5.6%
	20%	ERp	75.0%	77.5%	87.5%	100.0%	125.0%	150.0%
		ERg	-6.3%	-18.1%	-15.6%	-12.5%	-6.3%	0.0%
	30%	ERp	33.3%	35.0%	41.7%	50.0%	66.7%	83.3%

	ERg	-14.3%	-13.6%	-10.7%	-7.1%	0.0%	7.1%
40%	ERp	12.5%	13.8%	18.8%	25.0%	37.5%	50.0%
	ERg	-8.3%	-7.5%	-4.2%	0.0%	8.3%	16.7%
50%	ERp	0.0%	1.0%	5.0%	10.0%	20.0%	30.0%
	ERg	0.0%	1.0%	5.0%	10.0%	20.0%	30.0%

The main messages are: · ERp increases with *d* and decreases with *k*: hence private investors will have an inecentive to call for a small stake in the joint venture or to impose a heavy discount onto the asset value · ERg also increases with d, but it is increasing in *k* too; thus the government and the private investors may have a common interest in high discounts on asset values, whereas the may be in conflict of interest as to the capital at stake · What is more remarkable, however, is that unless *d* and *k* are *both* high (say d > 1.2 and *k* > 30%) *ERg is always negative*.

Consider the example in the RGE Monitor Newsletter, where the fair value of the asset is 100, the auction value 84 (*d* = 1.2, 20% discount), and the leverage 6-1 (*k* = 7.1%). Then, it can be seen form table 1 that ERp = 450% and ERg = -12.4%. A higher probability of success than 50% would tilt the ER distribution in favour of the government, but in order to break even, *p* should be 76.7%, which seems a highly optimistic hypothesis (why, then, should the market call for a high discount?). Hence it seems possible to conclude that within a realistic range of situations, the taxpayers should expect (statistically) net losses from the PIPP.

This is intuitively the result of the partecipation scheme given above, where, in case of *X* = 0, the private investor looses *kV* and the government (1-*k*)*V*. In the previous example, with the highest leverage of 6-1, the private investor's stake is 7.1%, whereas the government's stake is 92.9% (7.1% equity and the remainder as a loan). Unlike ordinary loans, this is as risky as the equity share since it will not be recovered in case of zero cash flow. On the other hand, the ERp is amazingly high only because the capital at stake is very small.

2) *Second issue: can the government do better*? One may conceive two possible alternative participation schemes. One in which, all other provisions being unchanged, the ER is the same for the two partners. Another in which the government is happy with breaking even, i.e. ERg = 0.

a) The first type of plan is simply one of choosing *k* such that ERp=ERg. The result can be seen in table 1: *k* = 50%. Note that this result is general, and it is independent of both d and *p*. Hence the message is that if the government really wants to be a 50-50 partner with the private investors, it should extend *no loan* at all while sharing the whole equity capital up to the auction value of the asset. Then the two partners would face the same ER exactly equal to the discount rate charged

to the seller. Of course, the ERp would now be dramatically lower than under the PIPP in any circumstance.

b) The second type of plan consists of choosing k_g such that ERg = 0. In this plan it may happen that k_g differs from k_p, so that $k_g + k_p$ is total equity capital, and each partner claims on the ER in proportion to its share. In this case the result is a bit more complicated, since k_g turns out to be a non-linear function of k_p, given *p* and d. In practice, *if* the two partners agree on *p* and d, the government might let the private investor choose his/er preferred k_p and then put its own break-even share. As a result, it can be shown that in any circumstance, the private investor would face ERp = $(d - 1)/k_p$, so that his/er capital choice is not conditioned by that of the government. For concreteness, let us consider again the previous example with *p* = 50%, and *d* = 1.2. We already know that the investor would always like to choose the minimal stake (as is also clear from the previous formula for ERp). Let us assume that this is left unchanged with respect to the PIPP, i.e. k_p = 7.1% Then, the government would add 13.8% of equity capital and 79.1% as a loan (under the same PIPP conditions). Note that the leverage ratio would be less than 6-1. For the reason explained above, increasing equity capital and reducing the loan component would actually improve ERg. In this case the government would act as a sort of benevolent majority shareholder. Consequently, the ERp would be reduced though reaching a remarkable 285%.

To conclude. Under the Geithner Plan, it is likely that taxpayers bear net losses, the more so the smaller are the capital stakes of private investors, and the larger are the loans extended by the government. Is this a necessary evil in order to raise private capital and clean the banking system? Perhaps it is not, or at least, not in the dimension that seems implied by the PIPP. I have sketched an example of a scheme where private investors are granted substantial incentives in terms of expected returns, while the government breaks even. This prospect may appear more equitable and more palatable to the public opinion, and it would be interesting to know why the US government seems to have neglected it .

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[1]Available on request.