

Hand Out: Introduction +Tables

Paulson's Gift

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Abstract

We calculate the costs and benefits of the largest ever U.S. Government intervention in the financial system. We estimate that the first phase of TARP increased the value of banks' financial claims by \$133 billion at a taxpayers' cost of \$108 -130 billions, creating little or no value in the banking sector. We compare the cost of TARP with the costs of alternative solutions that would have achieved the same objective in term of solvency of the banking system. We find that the revised TARP is the most expensive for the taxpayers, second only to the original TARP. The biggest beneficiaries of this massive redistribution were the debtholders of financial institutions, especially those of the three former investment banks and of Citigroup. The equity holders just broke even.

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There is broad consensus that the 2008 financial crisis is the biggest banking crisis since the Great Depression. This crisis is also redefining the role governments play in financial markets, in particular in the banking sector. This paper assesses the costs and benefits of such government interventions. In particular, are these interventions simply a transfer from taxpayers to financial institutions or do they create/destroy value? If they do create value, what is the mechanism?

We answer these questions by estimating the costs and benefits of the largest U.S. government intervention into the financial sector in history, announced on Monday, October 13, 2008. The plan included a \$125bn equity infusion in the nine (ten if we consider Wachovia still independent) largest U.S. commercial banks joined by a three year Government guarantee on all new bank debt issues, which we estimate to be worth approximately \$99`bn. For brevity, throughout the paper we refer to the U.S. Treasury – FDIC joint plan as the “Paulson’s Plan,” after the name of the then U.S. Treasury Secretary, Hank Paulson.

Given the worldwide changes in financial markets occurring between Friday the 10th and Tuesday the 14th, it is impossible to estimate the systemic effects of the intervention. However, it is possible to estimate its effects on the banks involved. If the intervention stopped a bank run, for instance, it should have created some value in the banking sector. To compute the intervention’s effect on the value of banks we do not limit ourselves to the changes in the value of common and preferred equity, but we look at the changes in the entire enterprise value by looking also at changes in the value of existing debt. In fact, by using liquid credit default swap (CDS) prices, we introduce a new way to perform event studies on debt.

To separate the effect of the Paulson Plan from that of other events occurring at the same time, we control for the change in the CDS prices of GE Capital, the largest non-bank financial company. This difference-in-difference approach estimates the total increase in debt value due to the plan at \$130bn. If we add to these changes, the abnormal variation in the market value of common equity (-\$2.8bn) and of preferred equity (+\$6.7bn), we obtain that the enterprise value of the 10 banks involved in the first phase of the plan increased by \$133.5bn.

This increase, however, came at a significant cost to the taxpayers. By computing the value of the preferred equity and the warrants the Government will receive in exchange for the \$125bn investment we obtain an estimate between \$89 and \$112 bn. Hence, the equity infusion costs taxpayers between \$13bn and \$36bn. We also estimate the cost of the debt guarantee extended by the FDIC on all the new bank debt to be worth \$95bn. This brings the total taxpayers' cost at between \$107bn and \$130bn. Hence, in the banking sector the plan created little or no value.

During the event window (Oct 10-14), however, Mitsubishi confirmed the \$9bn investment in Morgan Stanley. Consequently, part of Morgan Stanley return may be attributed to this positive news. When we exclude Morgan Stanley from the calculations, we estimate the plan net benefit between \$19bn and -\$13. In other words, the Paulson's plan simply amounts to a redistribution of money from taxpayers to the investors in the major financial institutions.

This result might not be surprising: the plan was enacted to benefit the economy, not the banking sector. Yet, it is hard to see how the former objective can be accomplished without the latter. If the goal of the plan was to stop a run on the banking sector, the enterprise value of banks, saved from inefficient runs, should have increased more than the money taxpayers put in them. Similarly, if the plan's goal was to alleviate the undercapitalization of the banking sector and in so doing regenerate the incentives for banks to lend to the economy, we should observe banks' enterprise value to increase unless the borrowers capture all the value of the new lending.¹ These results do not allow us to conclude that the plan was useless: it could have succeeded in helping the economy through other channels, for instance by stopping investors' panic.

Given the extreme volatility of markets during this period one may wonder whether the observed outcome represents a fair assessment of the intervention's effects. For this reason, we evaluate the plan on an ex ante basis by using the standard Black and Scholes (1973) and Merton (1974) model of equity as an option on the value of the underlying assets. This model estimates that in the absence of the debt guarantee the shareholders would have lost \$25bn and the debtholders would have gained \$39bn. By

¹ This would required that the banking sector is perfectly competitive, a hard assumption given the extremely high rate of return of equity enjoyed by banks in recent years.

adding the value of the debt guarantee we are able to approximate fairly well the market value increase of the debt. By contrast, the model overestimates the negative impact of the plan on equityholders. The model predicts a loss of \$25bn when the actual loss from variation in market prices is only \$3bn. The difference could be due to the fact that part of the benefit of the debt insurance is captured by equity since the company has to pay less to finance the debt.

Finally, we try to evaluate whether the same objective could have been achieved at a lower cost to taxpayers. If the main goal was to make banks solvent, we assume that the objective is to achieve a reduction in the CDS prices equivalent to the one observed in the data after the plan. We analyze four alternative plans: the original Paulson plan where bank's assets were purchased at market value, the original Paulson plan with bank's assets purchased above market (we assume a 20% above), a British-style equity infusion without any debt guarantee, and a debt-for-equity swap. We rate these alternatives on the basis of up front investment required by the Government, taxpayers' expected cost, taxpayers' value at risk, and Government ownership of banks. We find that the revised Paulson plan is the most expensive for the taxpayers, but it limits the value at risk and the Government ownership of banks.

The rest of the paper proceeds as follows. Section 1 describes the 2008 financial crisis and discusses the potential reasons for a government intervention. It also describes the details of the plan announced by U.S. Treasury and FDIC on October 13, 2008. Section 2 analyzes the effect of the plan on the prices of the bonds, the common equity, and the preferred. Section 3 computes the net cost of the equity infusion and the debt guarantee. Section 4 analyzes the plan from an ex ante point of view. Section 5 studies the cost of alternative plans that would have achieved the same objective. Conclusions follow.

Figure 1: CDS Spreads

All the spreads are in basis points per year. Source: Datastream

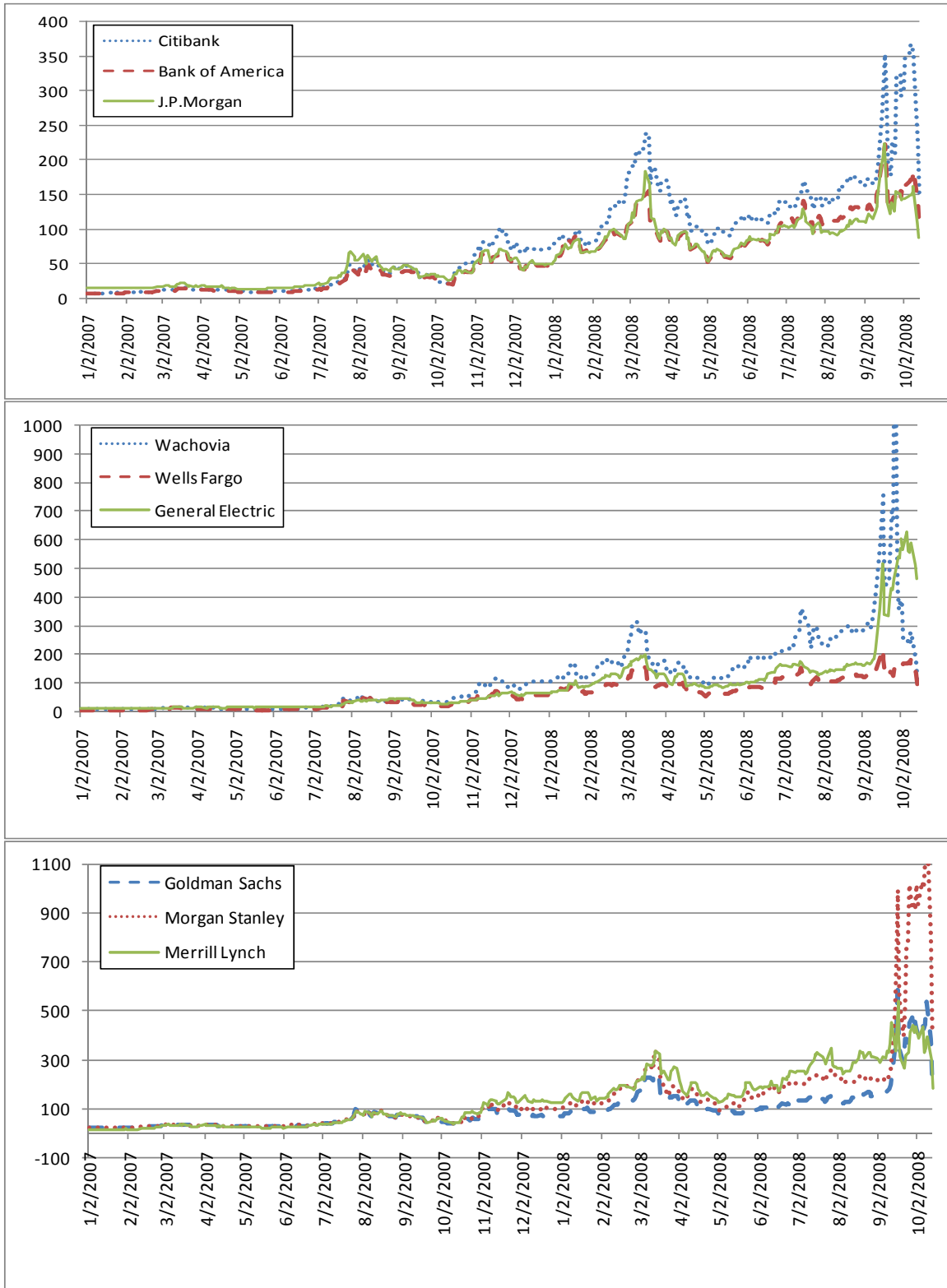


Figure 2: The Bank Run Index

The figure plots the difference $R_t = P_t(1) - P_t(2)$, where $P_t(n)$ is the conditional probability of default in year n after t , conditional on not defaulting before n . These conditional probabilities are inferred from the term structure of CDS spreads.

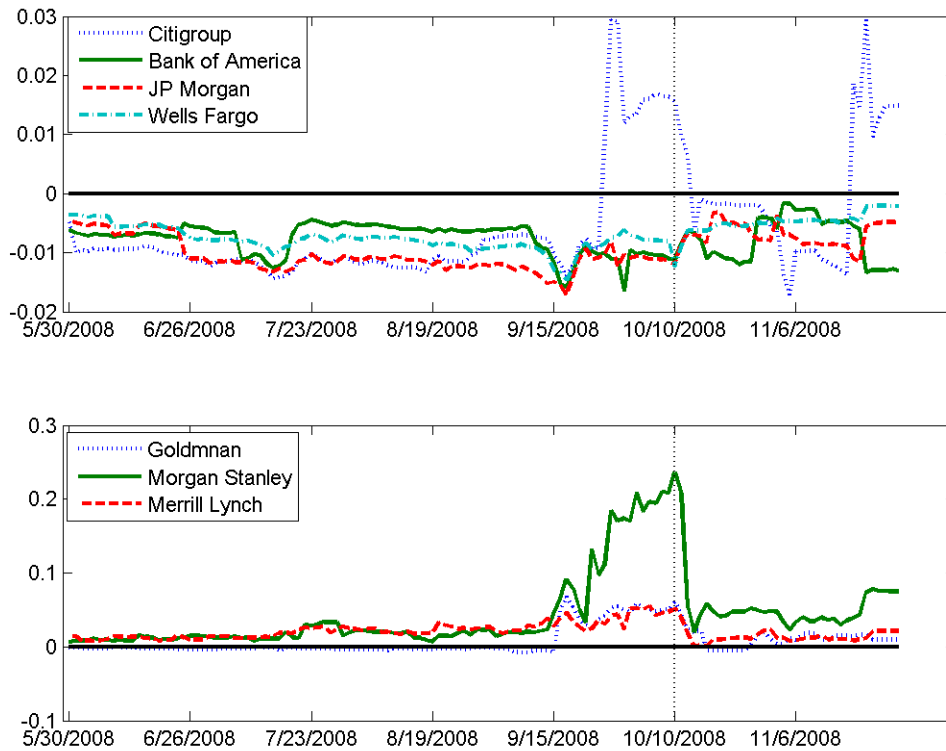


Figure 3: The Fear Index VIX

This figure plots the CBOE VIX index, the expected risk neutral volatility obtained from short term options. The vertical dotted line corresponds to the 10/10/2008.

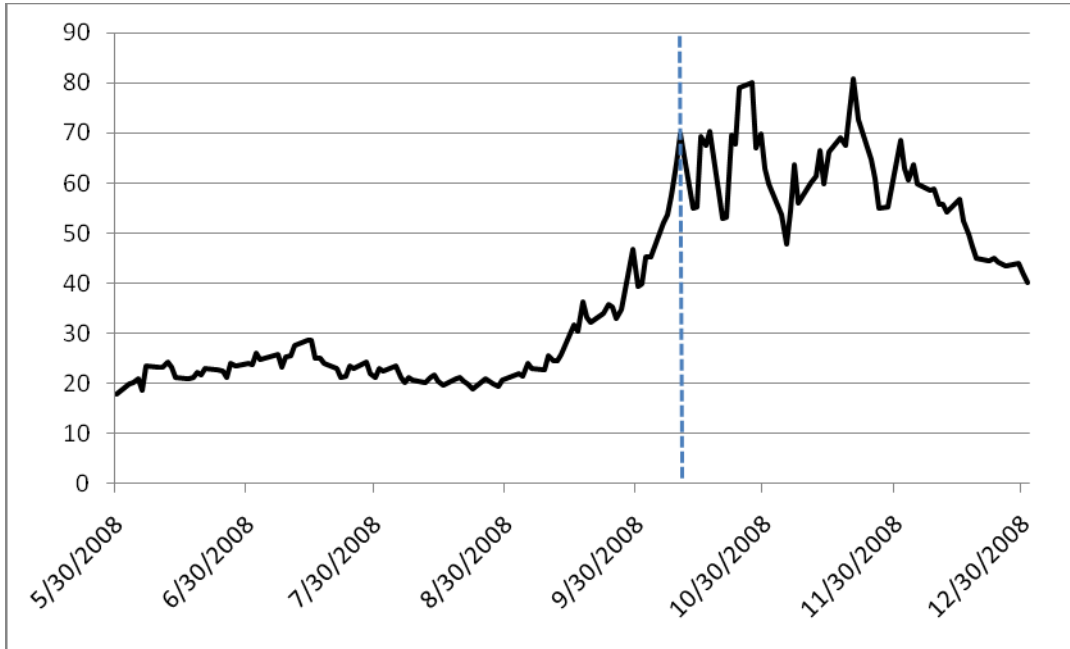


Figure 4: An Illustration of the Model

Assets $A(t)$ move over time. At T_S there is the rollover of short term debt and deposits. However, at this time, there is also a probability p of a liquidity shock, which reduces the value of assets by x , that is, if the liquidity shock hits then $A(T_S) = x A(T_S^-)$. If at T_S $A(T_S) < D_S$, there is default at T_S . In this case, equity and long term debt holders are wiped out, while short term bond holders receive $A(T_S)$. If $A(T_S) > D_S$, assets $A(t)$ evolve according to a lognormal model until T_L . At T_L , default occurs if $A(T_L) < D_L$. In the computations we further divide the short term debt in deposits and short term debt, while long term debt include also other liabilities.

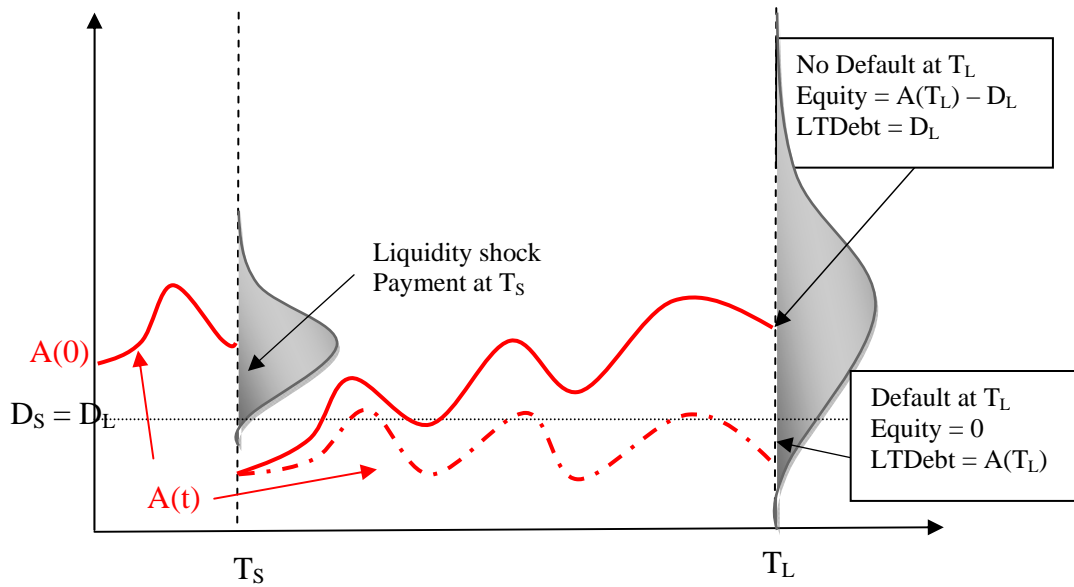


Figure 5: Difference in Equity Infusion

This figure compares the equity infusion under the Revised Paulson Plan and the equity infusion needed to match the observed adjusted reduction in the CDS prices observed after the announcement of the revised Paulson Plan (see Table 3). All the numbers are in billions of US\$.

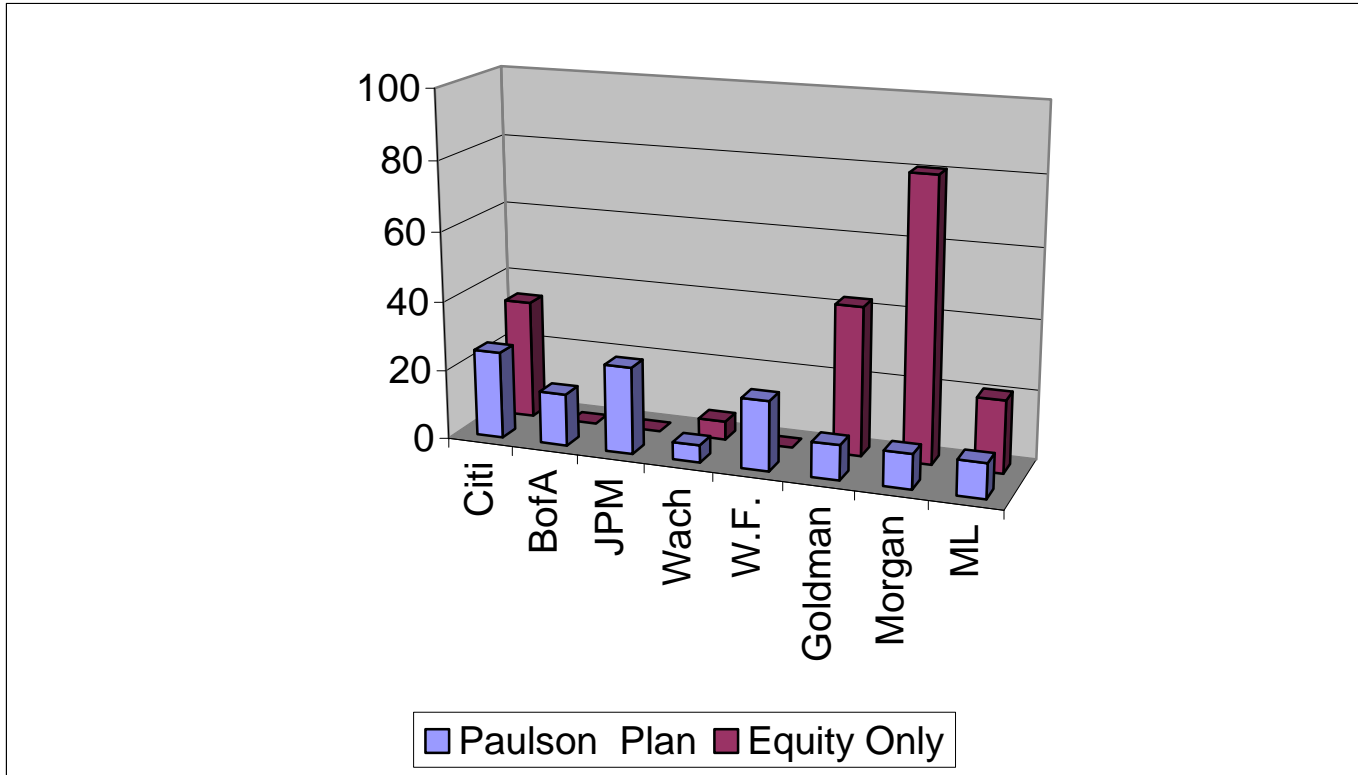


Table 1: The Revised Paulson Plan

Equity infusion is the amount of money (in billion of US\$) the Government will invest in each of these banks according to the revised Paulson Plan. The price is the market value of common equity stock at closing on 10/14/2008. The number of shares (in billion) are as of 9/30/2008 as from the latest company filings. The number of warrants is 15% of the equity infusion divided by the price of common on 10/14/2008. The dilution factor, which is used to price the warrants, equal $1/(1+m/n)$, where m is the number of warrants and n the number of shares. The amount of guaranteed debt is 125% of the sum of the short term debt plus the long term debt maturing before June 30 2009.

	Equity infusion	Price 10/14/2008	# of outstanding shares	# of warrants	Dilution factor	Guaranteed debt
Citigroup	25	18.62	5.45	0.20	0.96	491.3
Bank of America	15	26.53	5.02	0.08	0.98	567.5
JP Morgan Chase	25	40.71	3.73	0.09	0.98	378.2
Wachovia	5	6.31	2.15	0.12	0.95	113.0
Wells Fargo	20	33.52	3.32	0.09	0.97	124.6
Bank of NY Mellon	3	34.76	1.15	0.01	0.99	15.1
State Street Corp	2	56.69	0.44	0.01	0.99	29.1
Goldman Sachs	10	122.9	0.43	0.01	0.97	520.3
Morgan Stanley	10	21.94	1.11	0.07	0.94	428.6
Merrill Lynch	10	18.24	1.60	0.08	0.95	328.5
Total	125.0					2,996.2

Table 2: Main Data on Banks Targeted by the Plan

Panel A reports balance sheet information for the banks targeted by the first phase of the plan. The information comes from the banks' 10Q filing as of 09/30/2008 (except Goldman Sachs and Morgan Stanley, whose data are as of 08/31/2008), which were the latest available on 10/10/2008. The data for the end of the third quarter are very similar. All figures in billions of US\$. Panel B report some additional market information used in the analysis. Market capitalization is in billions of US\$. The implied volatility is extracted from at-the-money call options on 10/10/2008 with the longest maturity available. Actual volatility is the annualized daily standard deviation of daily returns estimated during the period July-September 2008. The preferred yield is computed using the most recent preferred issue by each company that is trading. Dividend per share is obtained multiplying the last quarterly dividend times four.

Panel A: Balance Sheet data

	Short term		Long Term		Tot liab.	Equity	Total assets
	Deposits	Debt	Debt	Other			
Citigroup	780.3	352.3	396.1	395.7	1,924.4	126.1	2,050.5
Bank of America	874.1	371.5	257.7	166.8	1,670.1	161.0	1,831.2
JP Morgan Chase	722.9	267.5	277.5	374.7	1,642.5	133.2	1,775.7
Wachovia	389.5	58.2	183.8	90.2	721.7	70.2	791.9
Wells Fargo	339.1	86.1	103.9	31.9	561.1	48.0	609.1
Bank of NY Mellon	174.2	20.3	15.5	30.0	240.0	27.5	267.5
State Street Corp	150.9	100.2	4.1	17.4	272.5	13.1	285.6
Goldman Sachs	29.1	388.5	202.0	416.6	1,036.2	45.6	1,081.8
Morgan Stanley	36.8	285.2	202.3	427.3	951.6	34.5	986.1
Merril Lynch	100.5	217.0	275.6	338.3	931.4	34.8	966.2
Total	3,597	2,147	1,919	2,289	9,952	694	10,645

Panel B: Other Market Information

	Cap 10/14/08	Implied Volatility	Actual Volatility	Preferred yields	Dividends per share
Citigroup	101.4	77.59%	170.76%	12.46%	1.28
Bank of America	133.1	77.75%	193.52%	8.83%	2.56
JP Morgan Chase	151.7	57.37%	152.34%	8.84%	1.52
Wachovia	13.6	79.08%	696.48%	11.33%	0.20
Wells Fargo	111.3	56.48%	125.54%	8.73%	1.36
Bank of NY Mellon	40.0	85.79%	177.78%	8.16%	0.96
State Street Corp	24.7	67.00%	166.84%	7.25%	0.96
Goldman Sachs	52.6	67.73%	90.50%	7.79%	1.40
Morgan Stanley	24.3	88.57%	151.25%	11.16%	1.08
Merril Lynch	29.2	82.23%	177.94%	11.55%	1.40
Average	68.2	73.96%	210.29%	9.61%	1.27
Total	681.8				

Table 3: Change in the Value of Long Term Debt around the Announcement of the Revised Paulson Plan

CDS prices refer to a five year debt instrument and are expressed in basis points per year. The source is Bloomberg. The probability of default is calculated as $(1 - \text{CDS price}/100)/(1 - \text{Recovery rate})$, where we assume the recovery rate to be 20%. The adjusted gain is the present value of the reduction in insurance costs paid on all the debt outstanding, with the actual structure of maturity, as a result of a drop in the CDS prices, adjusted for the percentage reduction in GE cost (GE-labeled columns), or the CDX- implied insurance cost reduction (CDX labeled columns). As a discount rate we use 3.5%. The debt and the adjusted gain data are in billion of US\$.

	5 year		5 year		Long Term Debt		Net Derivative Payables	
	CDS spread 10/10/08	CDS spread 10/14/08	Raw Decline	Adjusted Decline	LT Debt 09/30/08	Adj. Gain 09/30/08	Net Derivative payables 09/30/08	Adj. Gain 09/30/08
Citigroup	341.7	144.6	197.1	72.9	396.1	21.0	103.4	3.6
Bank of America	186.2	99.2	87.0	0.0	257.7	4.1	26.5	0.3
JP Morgan	162.5	88.0	74.5	0.0	277.5	3.8	85.8	0.8
Wachovia	267.5	109.2	158.3	34.1	183.8	7.4	13.4	0.4
Wells Fargo	186.7	89.8	96.9	0.0	103.9	1.6	10.8	0.1
Bank of NY Mellon					15.5			
StateStreet					4.1			
Goldman	540.0	201.7	338.3	214.1	202.0	19.9	103.9	6.6
Morgan Stanley	1300.9	427.1	873.8	749.6	202.3	51.4	68.4	11.8
Merrill Lynch	398.3	182.5	215.8	91.6	275.6	15.3	55.6	2.5
General Electric Capital	590.0	465.8	124.2					
CDX Index	213.0	176.8	36.2					
Total					1,919	124.4	467.8	26.1

Table 4: Change in the Value of Equity around the Announcement of the Revised Paulson Plan

Panel A refers to common equity, while Panel B to preferred equity. The market capitalization is price per share on 10/10/2008 times the number of shares outstanding. The betas are estimated from daily stock prices during the period 1/1/07-10/9/08. The daily prices are from Bloomberg. As a price for the preferred equity we use the most recently issued preferred of each company, assuming that all preferred of each bank have the same characteristics. The abnormal return equals raw return – beta * market return, where the market return (measures as S&P 500) increased by 11% over those two trading days. Value increase is the product of the initial market capitalization time the abnormal return. Market capitalizations and value increases are in billion of US\$.

Panel A: Common Equity

	Market cap 10/10/2008	Estimated Beta	Raw return	Abnormal return		Value increase	
				Beta =1	Est. beta	Beta =1	Est. beta
Citigroup	76.89	1.97	0.32	0.21	0.10	16.1	7.9
Bank of America	104.71	2.08	0.27	0.16	0.04	16.9	4.4
JP Morgan Chase	155.19	1.77	-0.02	-0.13	-0.22	-20.5	-33.6
Wachovia	11.07	4.28	0.23	0.12	-0.24	1.3	-2.7
Wells Fargo	93.99	1.73	0.18	0.07	-0.01	7.0	-0.5
Bank of NY Mellon	30.48	1.85	0.31	0.20	0.11	6.2	3.3
State Street Corp	18.79	1.70	0.31	0.20	0.13	3.8	2.4
Goldman Sachs	38.01	1.60	0.38	0.27	0.21	10.4	7.9
Morgan Stanley	10.74	2.19	1.27	1.16	1.03	12.4	11.0
Merril Lynch	25.20	2.47	0.16	0.05	-0.11	1.2	-2.8
Total	565.1					54.8	-2.8
Average		2.16	0.34	0.23	0.10		

Panel B: Preferred Equity

	Market cap 10/10/2008	Estimated Beta	Raw return	Abnormal return		Value increase	
				Beta =1	Est. beta	Beta =1	Est. beta
Citigroup	9.48	1.35	0.37	0.26	0.22	2.4	2.1
Bank of America	11.28	0.19	0.22	0.11	0.20	1.2	2.2
JP Morgan Chase	5.32	0.45	0.12	0.01	0.07	0.0	0.4
Wachovia	5.90	1.27	0.20	0.09	0.06	0.5	0.3
Wells Fargo	0.34	0.36	0.22	0.11	0.18	0.0	0.1
Bank of NY Mellon							
State Street Corp							
Goldman Sachs	0.74	0.50	0.21	0.10	0.15	0.1	0.1
Morgan Stanley	0.30	1.14	1.13	1.02	1.01	0.3	0.3
Merril Lynch	4.50	1.03	0.39	0.28	0.28	1.3	1.2
Total	37.9					5.9	6.7
Average		0.79	0.36	0.25	0.27		

Table 5: Aggregate Effects of the Revised Paulson Plan

The changes in the value of common and preferred equity come respectively from Table 4a and Table 4b. The changes in the value of the debt come from Table 3. The total benefit is the sum of the three above components. The net cost of equity infusion comes from Table 6 and the net cost of the debt insurance from Table 7. The total cost is the sum of these two above components. The net benefit is the difference between the total benefit and the total cost. All figures are in billion of US\$.

	Benefits					Costs			Net Benefit
	Change in the value of common equity	Change in the value of preferred equity	Change in the value of debt	Change in the value of net derivative liabilities	Total	Net cost of equity infusion	Net cost of debt insurance	Total	
Citigroup	7.9	2.1	21.0	3.6	34.6	4.8	11.1	15.9	18.7
Bank of America	4.4	2.2	4.1	0.3	11.0	1.2	0.6	1.8	9.2
JP Morgan Chase	-33.6	0.4	3.8	0.8	-28.7	1.8	0.8	2.6	-31.3
Wachovia	-2.7	0.3	7.4	0.4	5.4	0.7	1.3	2.0	3.4
Wells Fargo	-0.5	0.1	1.6	0.1	1.2	1.5	0.0	1.4	-0.2
Bank of NY Mellon	3.3	0.0			3.3	0.1			3.3
State Street Corp	2.4	0.0			2.4	0.0			2.4
Goldman Sachs	7.9	0.1	19.9	6.6	34.5	0.1	22.3	22.4	12.1
Morgan Stanley	11.0	0.3	51.4	11.8	74.4	1.4	45.4	46.8	27.6
Merril Lynch	-2.8	1.2	15.3	2.5	16.3	1.7	13.0	14.7	1.6
Total (optimistic case)	-2.8	6.7	124.4	5.2	133.5	13.2	94.5	107.7	25.8
Total (pessimistic case)	-2.8	6.7	124.4	5.2	133.5	35.8	94.5	130.3	3.2
Total (oversight panel)	-2.8	6.7	124.4	5.2	133.5	28.4	94.5	122.9	10.6
Without Morgan Stanley									
Total (optimistic case)	-13.8	6.4	73.0	2.9	68.5	11.8	49.1	60.9	19.0
Total (pessimistic case)	-13.8	6.4	73.0	2.9	68.5	32.7	49.1	81.8	-13.3
Total (oversight panel)	-13.8	6.4	73.0	2.9	68.5	22.6	49.1	71.6	-3.2

Table 6: Shareholders' Net Gain from the Government's Equity Infusion

This table provides two estimates of the present value of the claims the government is receiving in exchange for the equity infusion. In Panel A the present value of the preferred is computed using the yield to maturity of the bonds and the warrant is assumed to have a maturity of ten years. In Panel B the present value of the preferred is computed using the CAPM assuming a beta of 1, while the warrant is assumed to have an effective maturity of 3 years since it is not protected against the payment of dividend after that date

Panel A: Optimistic

	Equity Infusion	Theoretical Value of Preferred	Theoretical Value of Warrant	Total Theoretical Value Claim	Difference	Congressional Oversight Report	Difference
Citigroup	25	18.1	13.6	20.2	4.8	15.5	9.5
Bank of America	15	12.7	7.4	13.8	1.2	12.5	2.5
JP Morgan Chase	25	21.2	13.3	23.2	1.8	20.6	4.4
Wachovia	5	3.8	3.3	4.3	0.7	4.6	0.4
Wells Fargo	20	17.0	10.2	18.5	1.5	18.6	1.4
Bank of NY Mellon	3	2.6	2.2	2.9	0.1	2.6	0.4
State Street Corp	2	1.8	1.4	2.0	0.0	1.8	0.2
Goldman Sachs	10	8.9	7.0	9.9	0.1	7.5	2.5
Morgan Stanley	10	7.7	6.4	8.6	1.4	5.8	4.2
Merril Lynch	10	7.5	5.4	8.3	1.7	7.2	2.8
Total	125.0	101.3	70.0	111.8	13.2	96.6	28.4

Panel B: Pessimistic

	Equity Infusion	Theoretical Value of Preferred	Theoretical Value of Warrant	Total Theoretical Value Claim	Difference
Citigroup	25	16.5	10.1	18.0	7.0
Bank of America	15	9.6	5.8	10.5	4.5
JP Morgan Chase	25	17.3	8.4	18.6	6.4
Wachovia	5	1.9	2.2	2.2	2.8
Wells Fargo	20	14.0	6.5	15.0	5.0
Bank of NY Mellon	3	2.0	1.5	2.3	0.7
State Street Corp	2	1.4	0.8	1.5	0.5
Goldman Sachs	10	7.2	4.3	7.9	2.1
Morgan Stanley	10	6.2	4.7	6.9	3.1
Merril Lynch	10	5.8	4.1	6.4	3.6
Total	125.0	81.9	48.4	89.2	35.8

Table 7: Cost of the Bank Debt Guarantee Provided by the FDIC

The CDS prices, in basis pints, are for a three year debt instrument. They come from Bloomberg. All the balance sheet information is as of 06/30/08, apart from Goldman Sachs and Merrill Lynch whose values are as of 05/31/08. The total debt guaranteed is 125% of the sum of the short term debt plus the long term debt maturing before June 30 2009. The total cost of the Government guarantee is discounted value of the difference between the value of this guarantee (CDS price time the value of the debt guaranteed) minus the cost to the banks (75 basis points time the value of the debt guarantee) over the period of the guarantee (the next three years). All values in billions of US\$, exception made for the price of CDS.

	Short term	Long term maturing in 2008	Long term maturing in 2009	CDS spread 10/14/2008	Total Guaranteed debt	Total cost of insurance	Total Saving from Put Option
Citigroup	352.3	11.8	41.5	155.9	481.0	11.2	0.1
Bank of America	371.5	13.3	49.5	79.1	512.1	0.6	0.0
JP Morgan Chase	267.5	10.9	48.4	82.3	378.2	0.8	0.0
Wachovia	58.2	11.0	36.3	117.3	109.1	1.3	0.0
Wells Fargo	86.1	4.9	17.2	74.5	124.6	0.0	0.0
Bank of NY Mellon	20.3	5.2	8.8		37.4		
State Street Corp	100.2	0.5	2.8		127.6		
Goldman Sachs	388.5	6.6	25.3	227.7	509.8	22.3	0.0
Morgan Stanley	285.2	10.0	20.6	490.3	381.9	45.5	0.0
Merril Lynch	217.0	14.0	63.5	213.5	328.5	13.0	0.0
Total	2,146.9	88.3	313.9		2,990.2	94.7	0.1

Table 8: Value Transferred to Long Term Debt by Equity Infusion

This table estimates the changes in the value of equity due only to the infusion of equity. The first two columns report the value in the model of long term debt and equity before the equity infusion, columns 3 and 4 report the value of long term debt and equity after the equity infusion reported in column 5. Columns 6 and 7 report the difference in the value of debt and equity as a result of the equity infusion. The last column reports what fraction of the equity infusion goes to increase the value of the long term debt. All values in billions of US\$, exception made for the fraction of equity infusion to debt.

	Value Before Equity Infusion		Value After Equity Infusion		Amount of Equity Infusion	Difference		Fraction of equity infusion to debt	
	Announc.		Announc.			LT	LT		
	Bonds	Equity	Bonds	Equity			Bonds		Equity
Citigroup	346.3	86.4	355.7	101.7	25	9.4	15.3	0.38	
Bank of America	240.1	116.0	243.4	127.6	15	3.3	11.6	0.22	
JP Morgan Chase	265.9	160.5	270.3	181.1	25	4.3	20.6	0.17	
Wachovia	163.9	17.0	166.4	19.5	5	2.5	2.5	0.49	
Wells Fargo	103.0	94.3	105.6	111.7	20	2.6	17.3	0.13	
Bank of NY Mellon	0.0	0.0	0.0	0.0	3	0.0	0.0	0.00	
State Street Corp	0.0	0.0	0.0	0.0	2	0.0	0.0	0.00	
Goldman Sachs	166.9	38.7	170.4	44.2	10	3.5	5.4	0.35	
Morgan Stanley	122.8	11.0	129.7	13.4	10	6.9	2.3	0.69	
Merril Lynch	235.8	29.7	240.9	34.4	10	5.1	4.7	0.51	
Total	1644.8	553.6	1682.3	633.6	125.0	37.5	79.9	0.29	

Table 9: Summary of Robustness Check Results

This table reports the final aggregate results from numerous robustness checks. Each column reports the final net benefit of the government intervention from Table 5. The four cases corresponds to the four assumptions we made in the calculations, namely optimistic / pessimistic in terms of the valuation of the securities the U.S. government received in exchange of the capital infusion (see Table 6) and with or without Morgan Stanley, whose price moved also because of the announcement of a capital infusion from Mitsubishi. Each row reports the parameter we changed compared to the base case, reported in the first row.

	Oversight			W/o Morgan Stanley Oversight		
	Pessimistic	Report	Optimistic	Pessimistic	Report	Optimistic
Base Case	3.2	10.6	25.8	-13.3	-3.2	19.0
CDS recovery 0%	11.6	19.0	34.2	-9.4	0.8	23.4
CDS recovery 40%	-8.5	-1.1	14.1	-18.9	-8.7	12.8
LIBOR discount	2.8	10.2	25.4	-13.5	-3.3	18.8
Defuse Bank Run	10.6	18.0	33.2	-6.5	3.7	25.9
Control by CDX	20.2	27.7	42.9	-0.7	9.4	33.0
Beta - 2 St. Err	12.8	20.3	35.5	-3.9	6.3	28.5
Beta + 2 St. Err	-6.5	1.0	16.2	-22.8	-12.6	9.6
100% Derivatives Exposure	24.0	31.5	46.7	-1.9	8.3	19.0
50% Derivative Exposure	11.0	18.5	33.6	-9.1	1.1	19.0

Table 10: Explaining the Changes in the Market Value of Debt and Equity

This table confronts the changes in the value of debt (panel A) and equity (panel B) predicted by the model with the actual changes observed in the market place. The changes in the value of the debt should be the value transferred as a result of the equity infusion (first column) and of the debt guarantee (second column). The changes in the value of equity after the equity infusion is announced (but before it is executed) are the sum of the expected gain from the equity infusion due to the fact that the government pays more than what he receives (see Table 6) minus the transfer to the debtholders (Table 8). The previous to the last column reports the fraction of the debt guarantee that does appear to have been absorbed by debtholders (last column of Panel A). The last column is the difference between the market value changes (column IV), the total predicted value changes (column 3) and the residual benefit of debt guarantee (column 5). All the figures are in billions of US\$.

Panel A: Changes in the Value of Debt

	Transfer from equity	Net insurance benefits	Total	Market changes	Difference
Citigroup	9.4	10.9	20.3	22.1	-1.8
Bank of America	3.3	0.6	3.9	3.3	0.6
JP Morgan Chase	4.3	0.8	5.1	3.8	1.3
Wachovia	2.5	1.3	3.7	6.9	-3.1
Wells Fargo	2.6	0.0	2.6	1.6	1.0
Bank of NY Mellon	0.0		0.0		
State Street Corp	0.0		0.0		
Goldman Sachs	3.5	21.8	25.3	20.4	4.8
Morgan Stanley	6.9	44.4	51.3	53.5	-2.2
Merrill Lynch	5.1	12.7	17.9	15.3	2.5
Total	37.5	92.5	130.1	126.9	3.1

Panel B: Changes in the Value of Equity

	Net gain from equity infusion	Transfer to debt	Total	Change in Market value	Equity share of debt guarantee	Difference
Citigroup	4.8	9.4	-4.6	7.9	0.0	12.5
Bank of America	1.2	3.3	-2.1	4.4	0.6	5.9
JP Morgan Chase	1.8	4.3	-2.5	-33.6	1.3	-32.5
Wachovia	0.7	2.5	-1.8	-2.7	0.0	-1.0
Wells Fargo	1.5	2.6	-1.1	-0.5	1.0	-0.4
Bank of NY Mellon	0.1	0.0	0.1	3.3	0.0	3.2
State Street Corp	0.0	0.0	0.0	2.4	0.0	2.4
Goldman Sachs	0.1	3.5	-3.4	7.9	4.8	6.4
Morgan Stanley	1.4	6.9	-5.5	11.0	0.0	16.5
Merrill Lynch	1.7	5.1	-3.5	-2.8	2.5	-1.9
Total	13.2	37.5	-24.3	-2.8	10.3	11.2

Table 11: Cost of Alternative Plans

This table measures the Revised Paulson Plan along four dimensions and compares it along these dimensions with four alternatives. The four dimensions are: the amount of funds required by the plan, the ex ante cost of the plan for taxpayers, the value at risk for taxpayers (5% probability of a loss in one year), and the percentage of ownership the Government would have acquired if it invested in straight equity. All the plans in Panel A are constrained to deliver a reduction in CDS prices at least as big as the adjusted decline reported in Table 3. All the plans in Panel B are constrained to deliver a reduction in CDS prices at least as big as the raw decline reported in Table 3. All the figures are in billions of US\$.

Panel A: Target = adjusted reduction in CDS prices

	Revised Paulson Plan	Original Paulson Plan: Purchase of assets for cash		Pure Equity Infusion	Long-term Debt for Equity Swap
		no over payment	20% over payment		
Investment required	125	4,521	1,061	189	0
Net cost to taxpayers	137	0	177	65	0
5% 3 year Value at Risk	172	534	119	163	0
% of banks owned by Government	20%	0	0	25%	0

Panel B: Target = raw reduction in CDS prices

	Revised Paulson Plan	Original Paulson Plan: Purchase of assets for cash		Pure Equity Infusion	Long-term Debt for Equity Swap
		no over payment	20% over payment		
Investment required	125	8,782	7,643	581	0
Net cost to taxpayers	137	0	1,274	132	0
5% 3 year Value at Risk	172	1,038	856	499	0
% of banks owned by Government	20%	0	0	47%	0