



TD Economics

Special Report

November 6, 2007

OH CDOs, CDOs, WHEREFORE ART THOU CDOs?

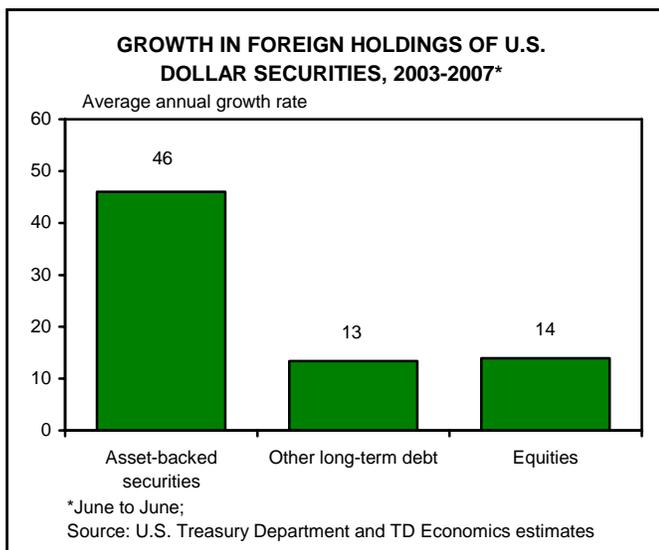
As the quarterly earnings season rolls forward, we are finally getting our first concrete statements as to exactly who lost what as a result of this summer's financial turmoil. So far, financial institutions have booked losses of around \$30 billion, with the grand total likely to come in at about double this amount when all is said and done. While not an insignificant sum, if spread evenly across investors worldwide, this would equate to just a nickel loss for every \$100 invested in global bond and stock markets.

A large amount of the losses was concentrated in asset-backed securities (ABS), and even more acutely in mortgage-backed securities (MBS). These are financial instruments in which a bond or note is backed by an asset or stream of revenue tied to that asset. Many of these instruments were spliced into complex financial instruments known as collateralized debt obligations (CDOs) that continue to be at the heart of financial market disruptions.¹

The cone of silence that descended on many financial

HIGHLIGHTS

- **There has been an unfortunate relationship – those investors with the least transparency have been increasingly buying the riskiest financial products.**
- **Two-thirds of U.S.-originated corporate mortgage-backed securities held by foreign investors went to offshore and intermediary financial centres such as the Cayman Islands.**
- **The uncertainty of the structure of these products is compounded by a hazy understanding of their ownership around the world.**
- **There will be further reported losses by financial institutions as a result of this summer's turmoil. On a global scale, though, the magnitude of these losses is manageable.**
- **However, the lack of clarity over their global flow is one factor slowing the resolution of the current market disruptions. After all, you can't fight what you can't see.**



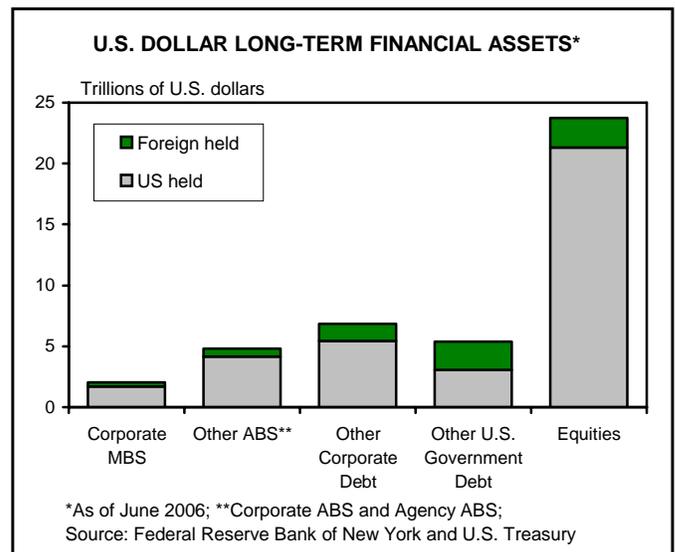
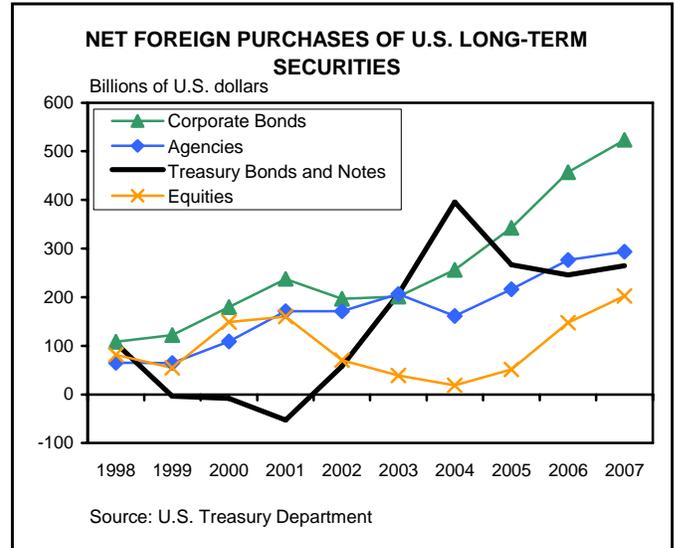
institutions this summer when it came to discussing exposures has made resolving market disruptions slower than it might have otherwise been. But the lack of transparency runs much deeper. Nearly two-thirds of U.S. originated MBS's held abroad went through offshore and intermediary financial centres which limit our ability to track their ultimate holder. In the aftermath of a crisis of confidence in global financial markets stemming from a lack of understanding and trust, this is not helpful to say the least. Nevertheless, in spite of selling off U.S. financial assets in August in record amounts, there appears to be an ongoing appetite for American financial products.

The current paper explores the rapid growth of asset-backed products in the United States, the extent to which these products found themselves distributed around the world, and how this has compared with demand for other U.S.-originated financial products. We differentiate U.S. assets by type and separate out major global players, including Offshore and Intermediary Financial Centres (OIFC), Sovereign Wealth Funds (SWF), and the other major emerging markets of Brazil, India, and Russia.

Go forth and multiply

Not all asset-backed securities are created equal or have been equally disruptive to financial markets. The main culprit has been MBS issued by the corporate sector. Outside of this, there are MBS products which are guaranteed by the U.S. government agencies Freddie Mac and Fannie Mae (together with non-MBS products, these are labeled Agencies). This latter group, as well as products backed by other assets – credit card receivables, auto loans, etc. – do not carry the same costs of potential default. They did not succumb to the same deterioration in lending standards seen in the U.S. mortgage market and have therefore recovered more quickly.

TD Economics estimates that the stock, as of June 2007, of U.S.-originated, long-term, asset-backed debt held outside the United States was about one-half of the size of U.S. equities held abroad and about one-third of the size of other U.S. debt held abroad. Its growth over the last several years, however, has been quite striking. In the four years from June 2003 to June 2007, the foreign holdings of U.S. asset-backed securities grew by an average of 46% each year, over three times the rate of growth of foreign



VALUE OF U.S. DOLLAR DENOMINATED SECURITIES HELD BY FOREIGNERS													
Stocks as of June of each year (Billions US\$)													
	Total	Short-term debt, total	Long-term									Memorandum	
			Total	Equity	Treasuries	Agency Debt			Corporate Debt			LT ABS Debt	Other LT Debt
						Total	ABS	Other	Total	ABS	Other		
2003	4,979	475	4,503	1,564	1,116	586	149	437	1,237	191	1,046	340	2,599
2004	6,006	588	5,418	1,904	1,462	623	176	447	1,429	275	1,154	451	3,063
2005	6,864	602	6,263	2,144	1,599	791	264	527	1,729	453	1,276	717	3,402
2006	7,778	615	7,163	2,430	1,727	985	386	599	2,021	594	1,427	980	3,753
2007f	8,471	2,632	1,977	1,287	580	706	2,575	965	1,610	1,546	4,293

f: Forecast by TD Economics as at October 26, 2007 based on U.S. Treasury Department data where available.
Source: U.S. Treasury Department

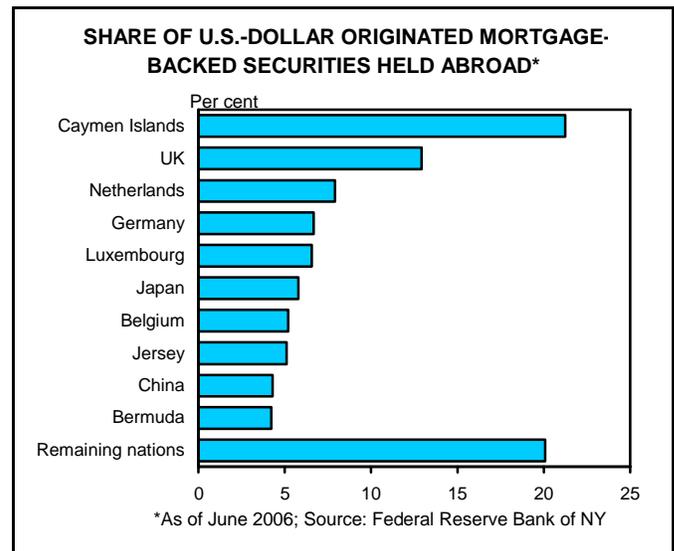
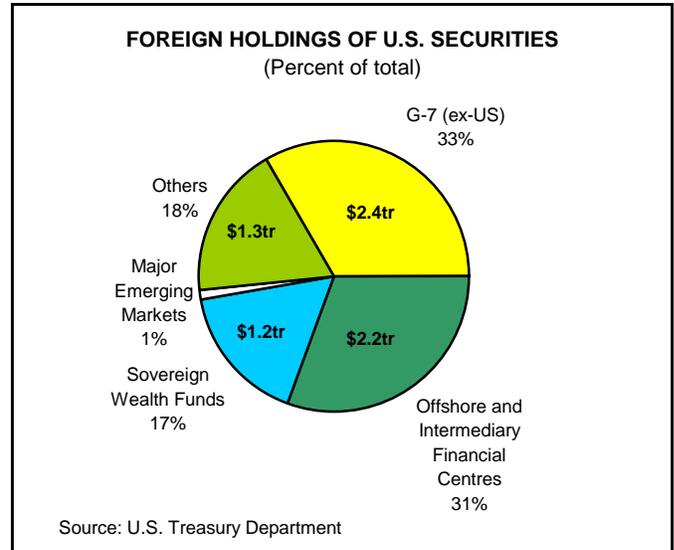
holdings of other U.S. debt or equities. This came from extremely low levels, however. In fact, while about 17% of U.S. corporate MBS and 13% of other ABS products were held abroad as of June 2006, this compares with nearly 21% of other non-ABS U.S. corporate debt and 43% of other U.S. government debt. So, global portfolios were eating these products up, but not in undue amounts relative to the shares of other U.S. debt products.

With U.S. Treasury yields being depressed at low levels – as have been long-term interest rates world-wide – there was a global demand for new fixed-income products.² MBS and ABS products offered the desired high yield, and, prior to this past summer, this extra yield was thought by many to be relatively risk-free. So while demand for U.S. fixed income products as a whole has grown at a fairly constant rate since 1999, waning demand for U.S. Treasuries since 2004 was replaced with increasing net foreign purchases of corporate bonds (which include MBS and ABS) and Agency debt.

Peek-a-boo, I see you

But where were all these financial products going? The pie chart on this page shows that with regards to the stock of total foreign holdings of U.S. securities, the G7 and OIFC each hold about one-third, while the SWF and Other categories evenly split the last third (the MEM’s hold just a negligible share). Looking at the table on page 8 for a breakdown of the stock of holdings as of June 2006 (the most recent detailed breakdown) and the series of charts on page 7 for the changes in stocks since then, we see that the G-7 nations continued to be the principal purchasers of U.S. securities, adding about \$700bn in new U.S. securities – more than 25% of their existing holdings – from July 2006-August 2007. In fact, the only category where the G-7 have not been the biggest player over the last year has been in agency debt, where SWFs – especially China – have been adding to their holdings of these higher yielding products. Driven by these strong purchases, SWF nations appear to have been ramping up their purchases of overall U.S. debt at a faster rate than non-G-7 groups while OIFC – which held roughly the same amount of debt as G-7 nations in the summer of 2006 – added very little to their holdings over the last year.

When it comes to purchasing corporate MBS, however, it looks as if investors were a bit shy about their holdings well before this summer’s financial disruptions. Fifty-



eight per cent of all U.S.-originated corporate MBS were bought through OIFC that tend to maintain investor anonymity. If we add to this amount just half of the MBS that flowed through the United Kingdom, as a guess as to the foreign investors using London as their financial intermediary, we have no way of tracking down the ultimate holders of roughly two-thirds of all of the risky corporate MBS which flowed outside the United States. Again looking at the charts on page 7 to see how holdings may have changed over the last year, all regions added to their holdings of corporate debt (in the monthly data there is no way to separate the ABS vs. non-ABS debt), although OIFC started to pare back their holdings in June 2007. Looking at MBS

Major Global Financial Players

The table on the last page of this report breaks U.S. financial assets into six broad classes and divides global investors into five main groups.³ The G-7 nations excluding the U.S. comprise Canada, Japan, the United Kingdom, France, Germany, and Italy. These nations tend to have a more stable demand for U.S. financial products. Offshore and Intermediary Financial Centres (OIFC) comprise those nations which are known to function predominantly as third-parties in global financial transactions, often have favourable tax treatment, and where investor confidentiality is often closely guarded. Because of this anonymity, discerning ultimate ownership of the assets flowing through these hubs is difficult at best.

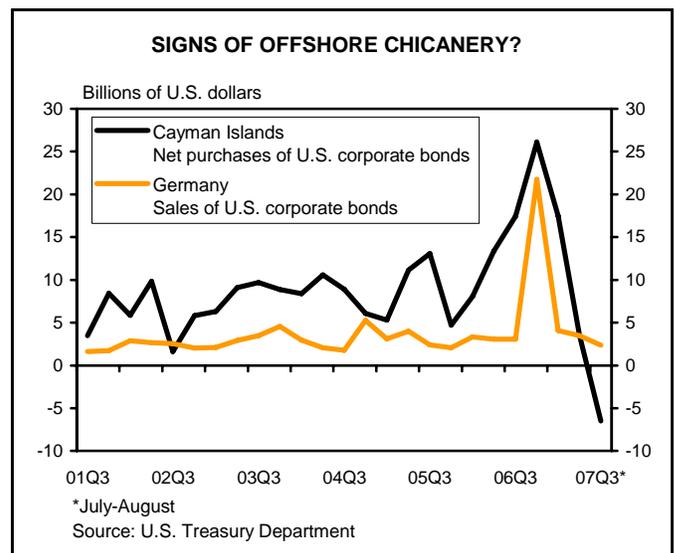
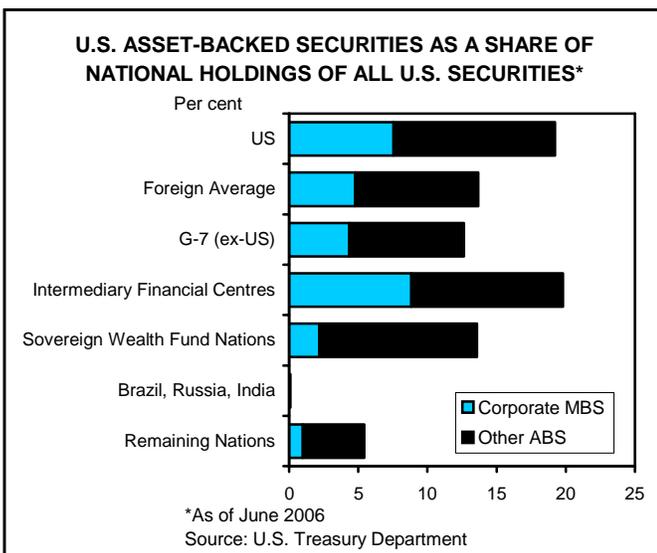
Sovereign Wealth Fund (SWF) nations comprise countries which contain some of the largest state-owned investment funds. In recent years, many of these funds have been mandated with diversifying out of low-yielding U.S. Treasury bonds, or to a lesser extent U.S. assets altogether, in search of higher returns elsewhere. There has also been concern that investments could potentially be driven more by politics than profits. We then include an aggregate of the Major Emerging Markets (MEM) of Brazil, India, and Russia – China is included among the SWF – and a last category aggregating the rest of the world.⁴

debt held by each nation as a share of their holdings of all U.S. debt, four out of every ten dollars held in the Channel Islands was a U.S. corporate MBS. Across all OIFC, nearly 10% of all U.S. securities held were corporate MBS and 20% were an ABS product of some kind. Both of these shares is roughly twice their average share within the U.S. dollar national portfolios of the other major regions and is a higher concentration than even the share of ABS debt held by U.S. residents.

The concerns in Europe over the subprime crisis also make more sense once we see that outside of the U.S., four of the top five holders of U.S.-originated corporate MBS are European countries. Moreover, outside of the OIFC, the largest concentration of corporate MBS as a share of total U.S. holdings was in Germany, where it ac-

counted for 12% of their national portfolio of U.S. holdings as of June 2006. Looking at the monthly changes since then, the initial reaction might be to think this exposure was lessened. From July 2006 through July 2007, German investors sold off about \$14bn in U.S. corporate debt (again which would include the ABS and MBS holdings) and added about \$14bn in U.S. non-corporate debt. There is a peculiar spike in the sale by German investors of U.S. corporate bonds in the fourth quarter of 2006; however, and an equally peculiar spike of nearly the same magnitude in net purchases of U.S. corporate bonds in the same quarter in – where else – the Cayman Islands.

This could be a mere coincidence in the data or it could be German companies selling to different off-shore investors or it could be German companies moving their assets

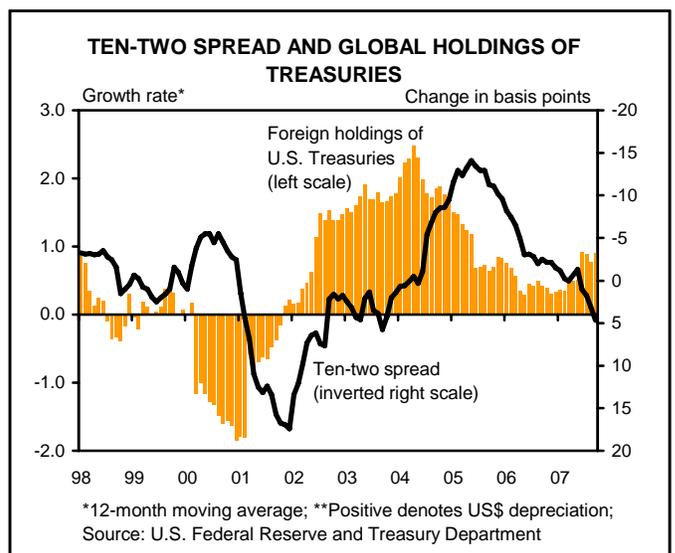
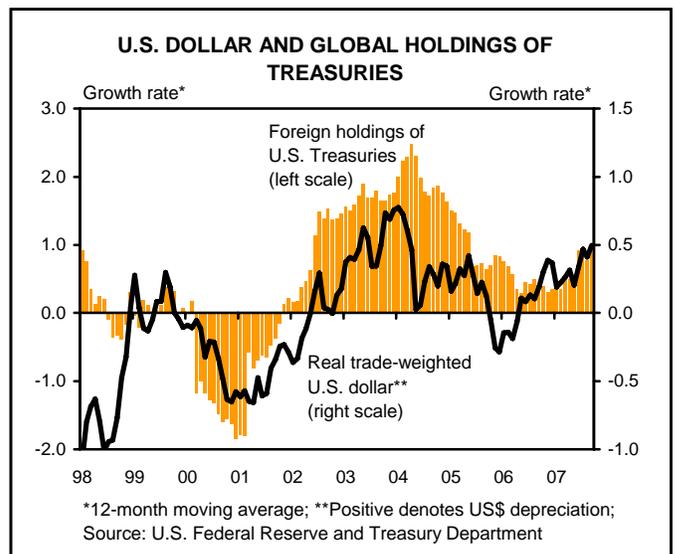


to their own off-shore accounts or structured investment vehicles (SIVs). These SIVs became warehouses for subprime-backed debt largely by buying ABS debt and issuing commercial paper at a lower interest rate to finance these purchases. Because of the high amount of debt relative to equity, these vehicles were susceptible to sudden market disruptions for commercial paper, as we've now seen, but more broadly, they appear to be part of a broad reorganization in global financial markets away from transparency and towards opaqueness. Some of this can be tied to the public accounting reforms put into place in the U.S. in 2002 – the Sarbanes-Oxley Act (SOX) – in response to various corporate accounting scandals. But creative accounting need not happen within national borders. The widespread perception that SOX regulations are unnecessarily onerous for U.S.-based firms to comply with has driven companies to more closely scrutinize precisely where they report their profits, losses, assets, and liabilities in order to skirt the good intentions of SOX with more creativity. This kind of tax- or regulatory-arbitrage is nothing new, but in the aftermath of a crisis of confidence in global financial markets stemming from a lack of understanding and trust, a lack of transparency is a hindrance, not a help. This does not necessarily mean it will lead to changes in the way financial markets operate, especially if looking at day-to-day volatility, but it certainly makes it harder to prepare for the next financial crisis because we may not be able to see it coming.

Buckle up for safety

In August 2007, foreigners sold U.S. securities to the tune of \$35 billion net, the largest monthly decline on record with 30 years of data. There has been a concern that the onerous regulatory environment, unfavourable investment climate, and now the subprime financial crisis will lead investors to blindly sell their holdings of U.S. assets. U.S. Treasury demand is often cited as one such product that will see flagging demand, especially given the stated desire of nations with large international reserves and/or SWFs to seek higher yielding assets. In fact, over the last year, only OIFC pared back their holdings of U.S. Treasuries, while SWF holdings were flat – at first accumulating Treasury wealth through the end of 2006 before selling off most of these gains by August 2007. The remaining regions' purchases still outweighed the sales, so foreign holdings of U.S. Treasuries have grown each year since 2002.

Even the argument that a weakening dollar implies a weakening of U.S. economic might and is likely to drive investors out of the U.S. financial markets appears to be flimsy. In fact, the relationship over the last decade has been in the opposite direction – a strengthening U.S. dollar tends to accompany net foreign sales of U.S. Treasuries while a weakening U.S. dollar tends to see net foreign purchases of U.S. Treasuries. The weakening dollar can signal global economic financial risks and the U.S. remains investor's preferred location when fleeing to safety. Also, a weakening dollar means increased purchasing power by those not holding U.S. dollars so perhaps this has been the dominant effect. The magnitude of these shifts – as well as the domestic U.S. economic events underpinning them – do seem to cause an echo in the spreads associated with



U.S. Treasuries so rising bond prices play a role, as well. Regardless, it does appear that demand for U.S. assets remains.

There are certainly many lessons still to be learned from this summer's tumult. Financial markets are still rethinking the new business models developed in recent years which employed rapid securitization and distribution of risk. The economic impact from these losses, though, still appears to be fairly contained, especially relative to the worst case scenarios imagined in July and August. Unfortunately, periods of rapid financial innovation tend to be followed only later by understanding. Additionally, there has been

an unfortunate relationship – those investors with the least transparency are increasingly buying the riskiest financial products. In the weeks and months to come, there will be more financial institutions around the world reporting more losses as a result of the summer's turbulence. These admissions are cathartic for financial markets. More progress needs to be made, however, to improve transparency, especially when it comes to the seemingly simple question of who is buying what? Our increasingly advanced and globalized financial markets have the tools they need to address current and future dislocations, but you can't fight what you can't see.

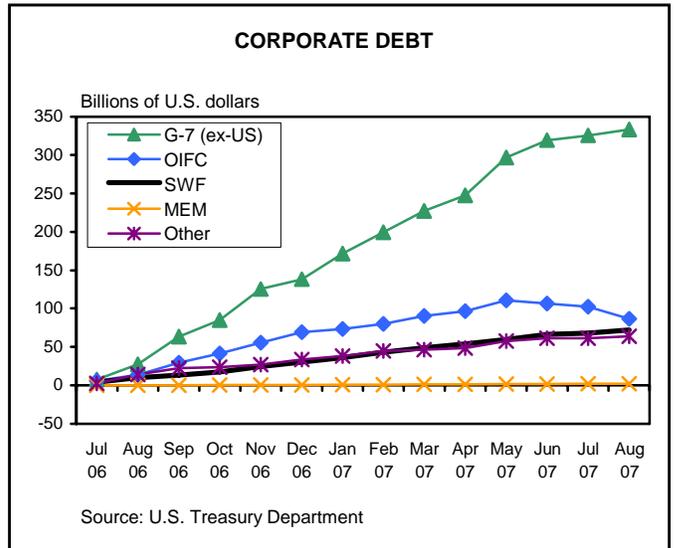
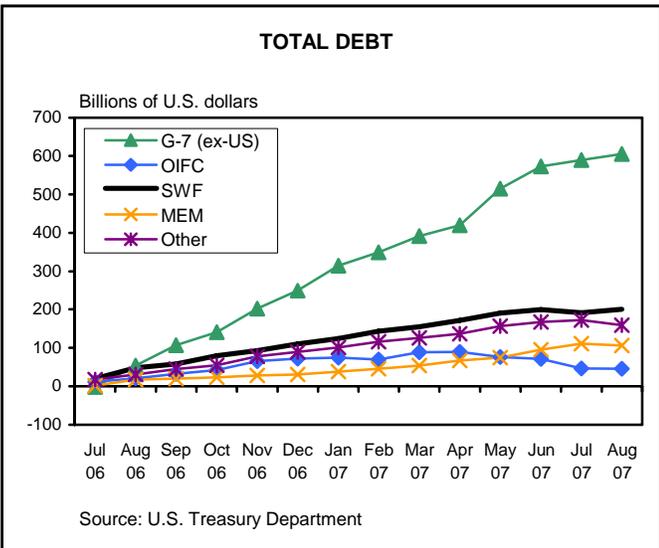
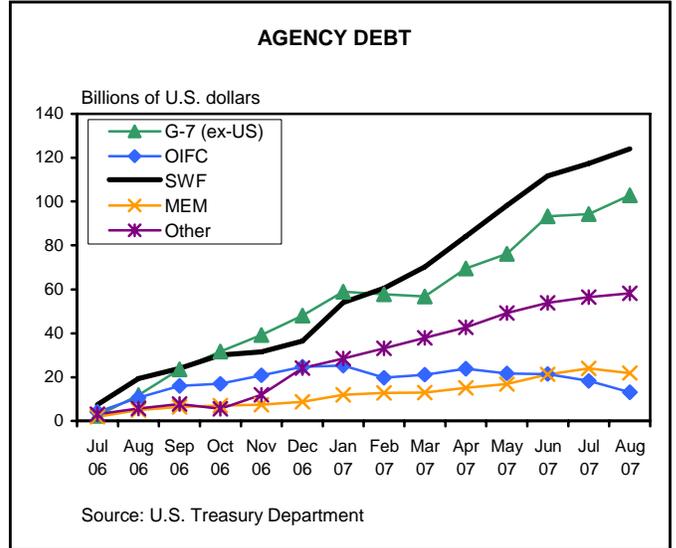
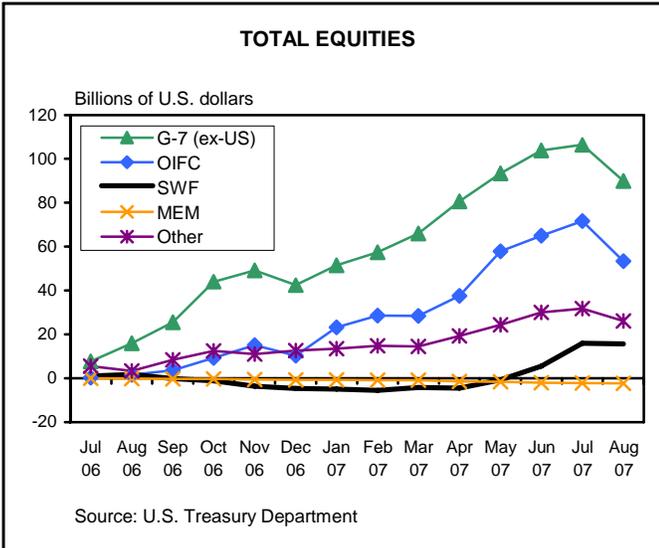
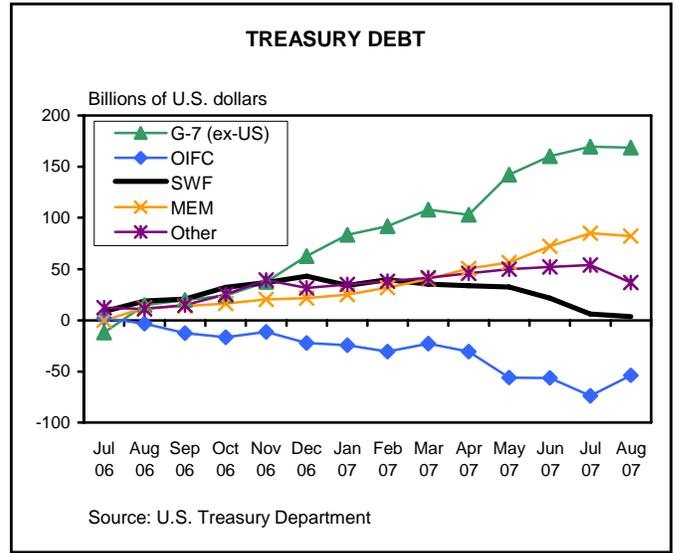
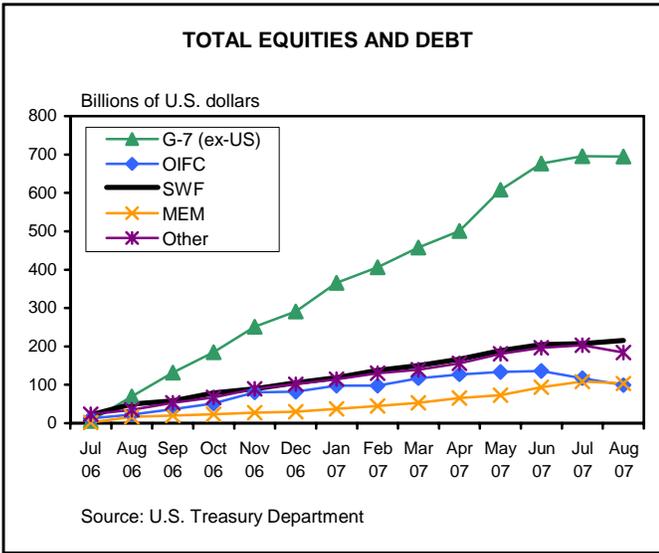
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Endnotes

- ¹ For more on these issues, see TD Economics report entitled The Grey Anatomy of the Current Credit Crunch here: http://www.td.com/economics/special/rk0807_grey.pdf.
- ² For more on the factors keeping yields low, see TD Economics report The Shape of Yields to Come here: http://www.td.com/economics/special/ca0607_rates.pdf.
- ³ The Treasury Department and Federal Reserve data these tables are based on are subject to revisions and margins of errors, but are the best data available on the subject of cross-border capital flows. Moreover, they measure holdings on a residency basis, which means a Canadian living in the United States would appear as U.S.-held while an American living in Canada would appear as Canadian-held. These issues can explain why mainland Chinese financial institutions have announced \$11.9 billion in U.S. subprime exposure but the table on page 8 here reports \$9.5 billion. Assuming the former is the correct exposure, this implies the \$2.4 billion discrepancy could be held offshore.
- ⁴ These categories are meant to be descriptive but are not perfect. For example, not all of the capital flows into SWF nations are flowing just into the sovereign wealth funds themselves. Moreover, while Russia does have a top ten sovereign wealth fund as measured by assets under management, these purchases appear to largely be made through OIFC's and therefore, do not appear in the national statistics. For this reason, Russia is included as a MEM nation and not in the SWF category.

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CUMULATIVE FOREIGN PURCHASES OF U.S. LONG-TERM SECURITIES



HOLDINGS OF LONG-TERM U.S. DOLLAR ORIGINATED SECURITIES

As of June 2006 (Billions US\$ unless otherwise stated)

	TOTAL HOLDINGS		HOLDINGS BY TYPE					Corporate ABS*			Agency Other			Other Equity			% of US\$ national holdings			% of foreign holdings						
	TOTAL HOLDINGS	42,838	Corporate ABS*		Other	Equity	MBS	Other	ABS	Corp	Other	Equity	MBS	Other	ABS	Corp	Other	Equity	MBS	Other	ABS	Corp	Other	Equity	Total	
			MBS	Other																						Agency
Total US\$ Securities**			2,044	991	3,812	6,857	5,383	23,750	3,038	4,803	12,240	23,750	7	11	29	55										
Total U.S. Owned**			1,703	738	3,426	5,430	3,057	21,320	2,697	4,164	8,488	21,320	8	12	24	60										
Total Foreign Owned			341	253	386	1,427	2,326	2,430	341	639	3,753	2,430	5	9	52	34										
G-7 (ex-US)			105	86	113	346	796	965	105	199	1,142	965	4	8	47	40										
Canada		368	8	13	1	53	20	274	8	13	73	274	2	4	20	74										
France		151	9	4	1	20	22	95	9	5	42	95	6	3	28	63										
Germany		196	23	8	7	39	46	73	23	15	86	73	12	7	44	37										
Italy		51	2	1	1	2	16	29	2	2	18	29	3	5	36	57										
UK		624	44	44	18	161	57	300	44	62	218	300	7	10	35	48										
Japan		1,022	20	16	85	72	634	194	20	102	706	194	2	10	69	19										
OIFC Nations***			196	140	103	676	267	834	196	243	943	834	9	11	43	38										
Belgium		326	18	23	1	208	55	21	18	24	263	21	5	7	81	7										
Bermuda		186	14	13	16	46	37	60	14	28	83	60	8	15	45	32										
Cayman Islands		454	72	31	31	116	26	178	72	62	142	178	16	14	31	39										
Ireland		167	11	7	19	46	17	69	11	26	62	69	6	16	37	41										
Jersey (Channel Islands)		41	17	10	0	2	2	10	17	10	4	10	42	24	9	25										
Luxembourg		517	22	28	19	183	72	193	22	47	255	193	4	9	49	37										
Netherlands		272	27	14	14	37	21	158	27	28	58	158	10	10	21	58										
Switzerland		253	14	14	4	37	39	145	14	18	76	145	6	7	30	57										
SWF Nations****			27	14	124	81	688	280	27	138	769	280	2	11	63	23										
China, total		782	15	7	113	49	573	26	15	120	622	26	2	15	80	3										
Mainland		682	9	5	107	44	512	4	9	113	556	4	1	17	82	1										
Hong Kong		99	5	2	5	5	60	22	5	7	65	22	5	7	66	22										
Macau		1	0	0	0	0	1	0	0	0	1	0	1	14	77	8										
Near East oil-exporters*****		202	3	2	6	8	73	111	3	9	80	111	1	4	40	55										
Norway		71	7	1	4	12	3	43	7	5	16	43	10	7	22	60										
Singapore		159	2	4	1	12	39	101	2	5	51	101	1	3	32	63										
Major Emerging Markets			88	0	0	1	85	2	0	0	85	2	0	0	97	2										
Brazil		39	0	0	0	1	36	1	0	0	37	1	0	0	96	4										
India		6	0	0	0	0	6	1	0	0	6	1	0	0	91	9										
Russia		43	0	0	0	0	42	0	0	0	42	0	0	0	99	1										
Others			13	13	45	325	574	350	13	59	899	350	1	4	68	27										

*Only ABS securities originated in the US, not in offshore accounts.

**Split between Corporate ABS/Other Corporate Debt for Total US\$ and Total U.S. Owned Securities is approximate due to issues in matching Treasury data on foreign holdings with Federal Reserve aggregate data.

***Offshore and Intermediary Financial Centres - places known to be conduits for overseas investments

****Sovereign Wealth Funds - Countries with major sovereign wealth funds. Nations included here maintain SWFs which represent about 65% of assets under management in all SWFs globally.

*****The data does not permit separating these out. Includes Kuwait, Saudi Arabia, and UAE, which have three of the top ten largest SWFs by asset value, as well as Bahrain, Iran, Iraq, Oman, and Qatar.

Sources: U.S. Treasury Department and Federal Reserve Flow of Funds