



# Presentation to the Treasury Borrowing Advisory Committee

U.S. Department of Treasury  
Office of Debt Management  
February 1, 2011





# Agenda

- Fiscal Developments
- Auction Demand & Market Trends
- Portfolio Metrics
- Long-term Challenges

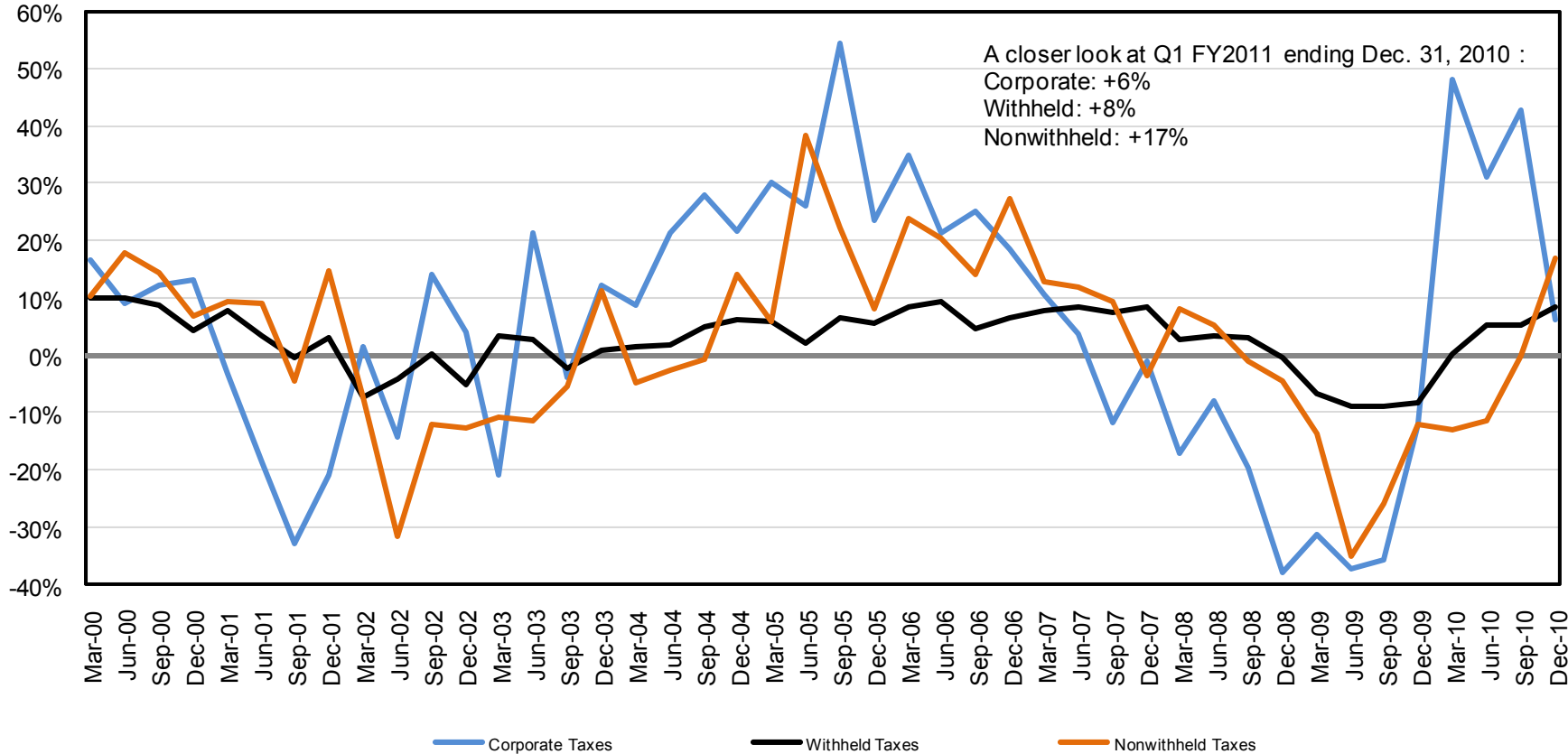
# FISCAL DEVELOPMENTS





# Steady Growth in Individual Tax Receipts

## Quarterly Tax Receipts Year-over-Year Percentage Change



Note: Adjusted for 9/11/01 Corporate Tax Receipts disruption  
Source: Monthly Treasury Statement

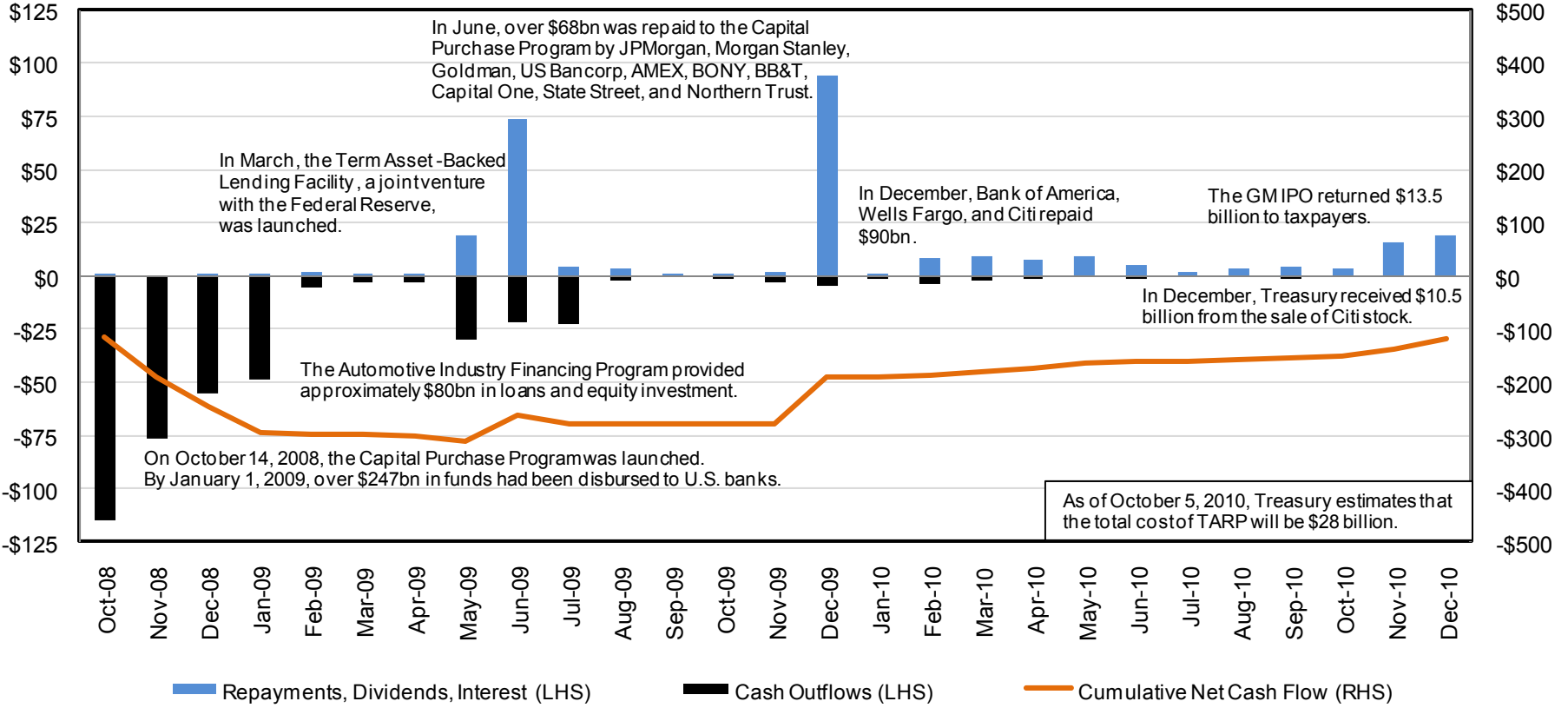
Note: Data plotted is year-over-year changes in quarterly receipts





# TARP Repayments Increased with Citi and GM Stock Sales

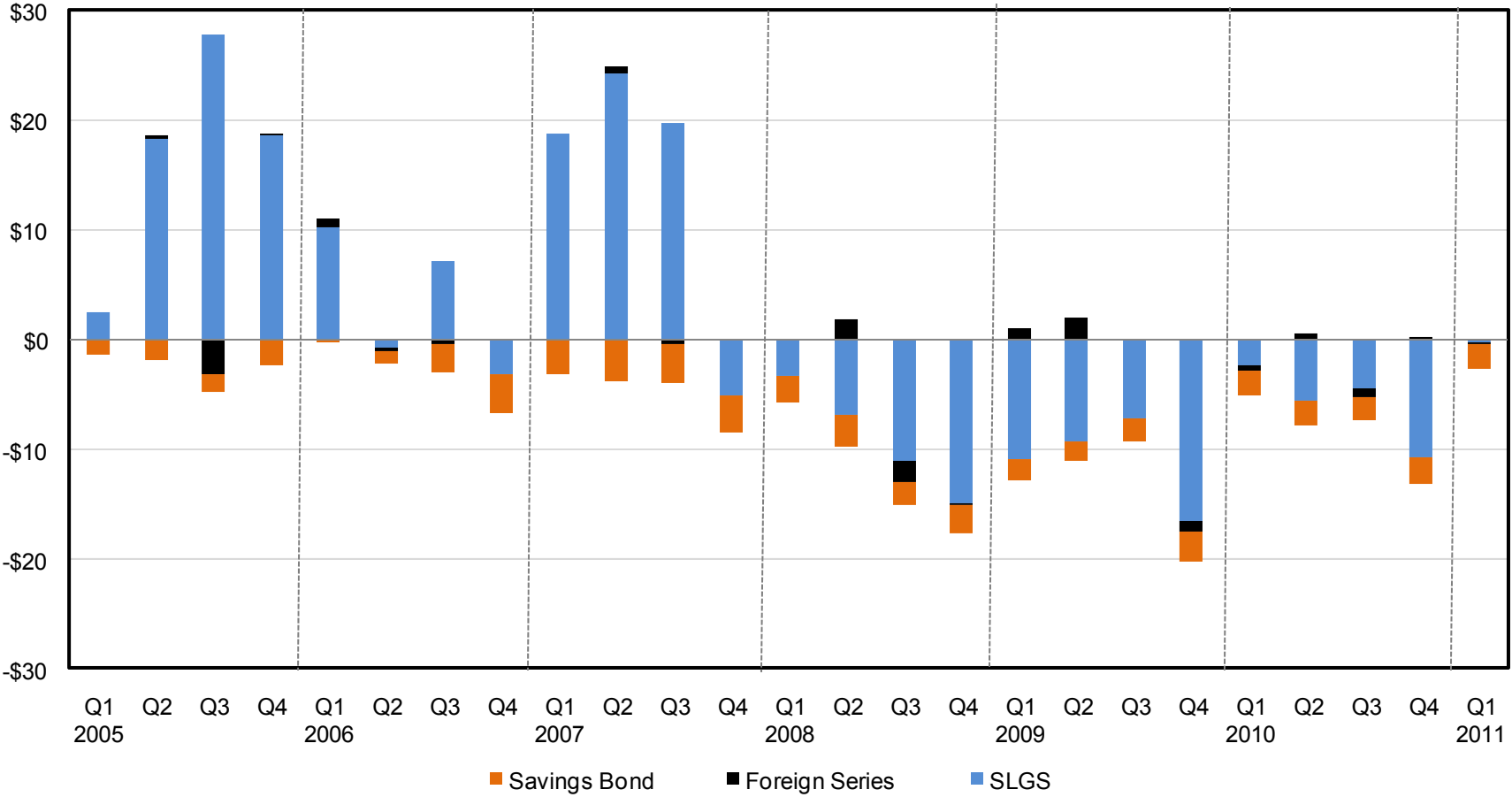
## TARP Cash Flows In Billions \$





# Non-Marketable Redemptions Slowed in Q1 FY2011

## Net Non-marketable Issuance In Billions \$



Source: Monthly Treasury Statement

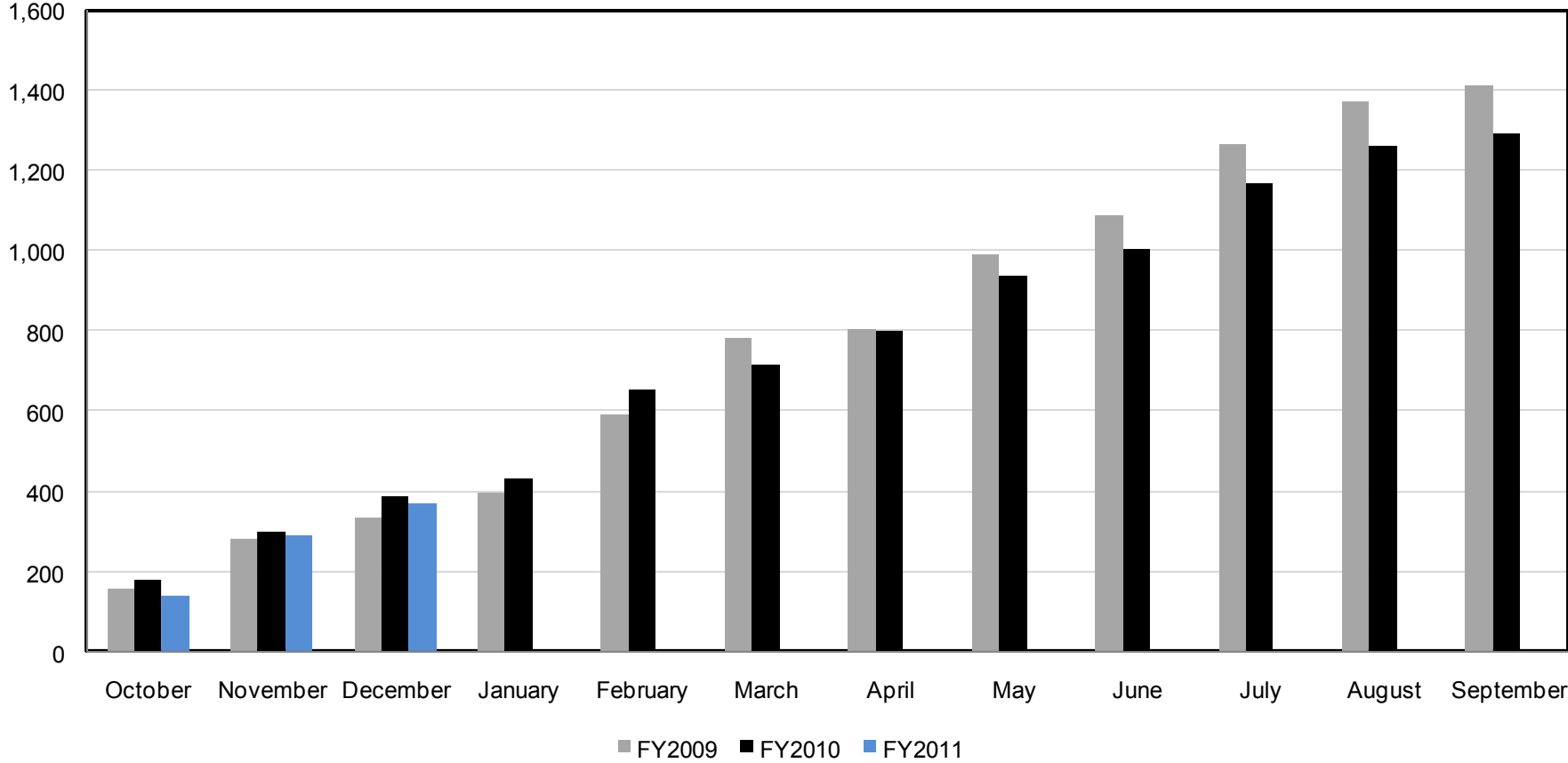




# Deficits Have Been Lower Year-over-Year through December

## Cumulative Budget Deficits by Fiscal Year

In Billions \$



Source: OMB for end of Fiscal Year, Monthly Treasury Statement for other months





# Primary Dealer and Government Deficit Estimates

## FY 2011-2013 Deficit and Borrowing Estimates In Billions \$

	Primary Dealers*	CBO	OMB
FY 2011 Deficit Estimate	1,363	1,480	1,416
FY 2012 Deficit Estimate	1,107	1,100	911
FY 2013 Deficit Estimate	932	704	736
FY 2011 Deficit Range	1,200-1,550		
FY 2012 Deficit Range	1,000-1,200		
FY 2013 Deficit Range	735-1,050		
FY 2011 Marketable Borrowing Range	1,050-2,116		
FY 2012 Marketable Borrowing Range	1,000-2,239		
Estimates as of:	Jan 2011	Jan 2011	July 2010

\*Based on Primary Dealer feedback on January 24, 2011. Deficit estimates are averages.

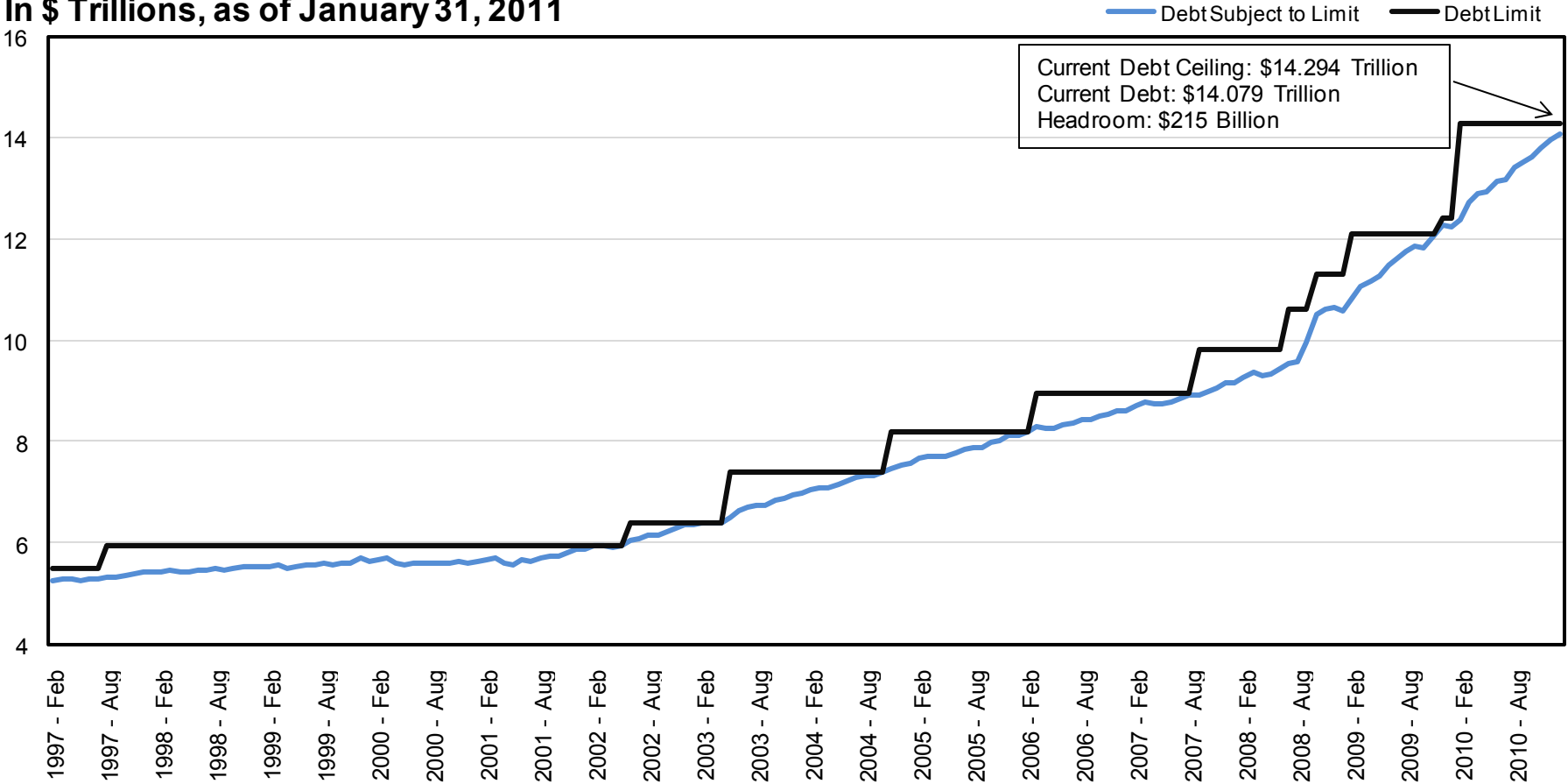






# Debt Outstanding is Approaching the Statutory Limit

## Total Public Debt Outstanding Subject to the Statutory Debt Limit In \$ Trillions, as of January 31, 2011



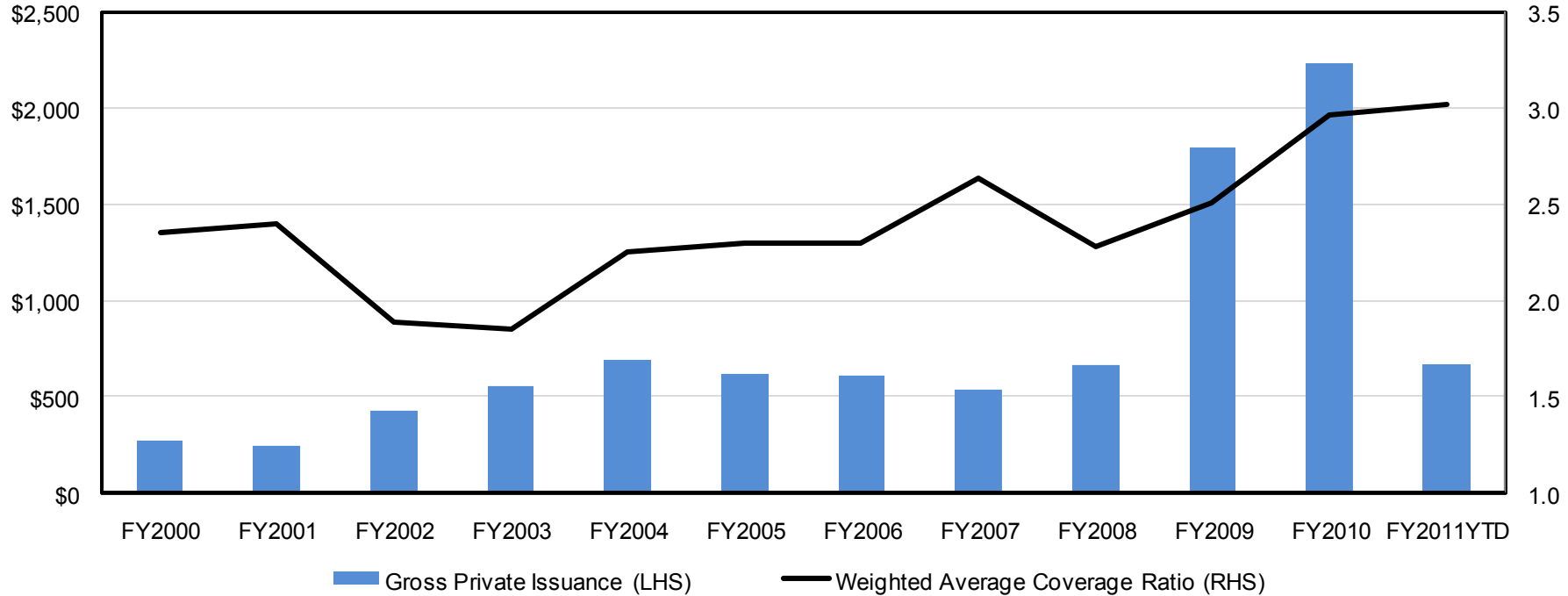
# AUCTION DEMAND & MARKET TRENDS





# Coverage Ratios Have Remained Strong in FY2011

## Weighted Average Coverage Ratio on Notes and Bonds In Billions \$, Coverage Ratio



Note: Excludes TIPS and Bills issuance.

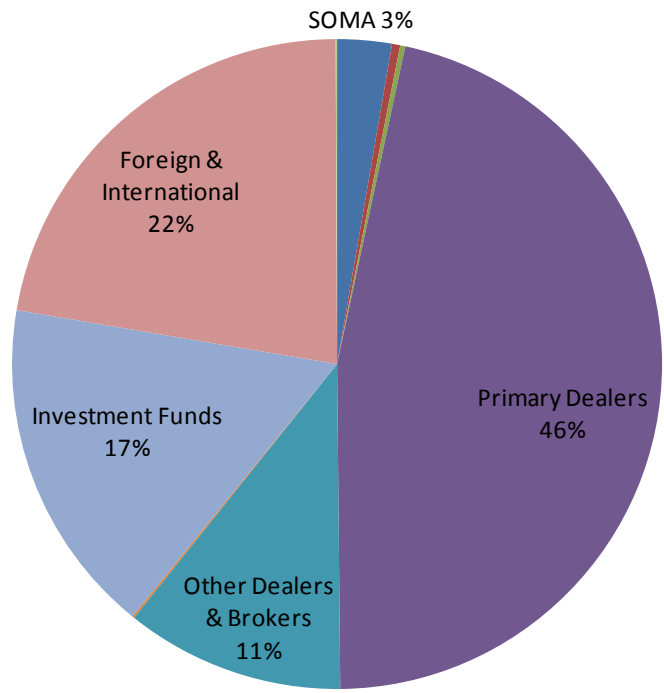
Source: Treasury Auction Data; Through 1/31/2011



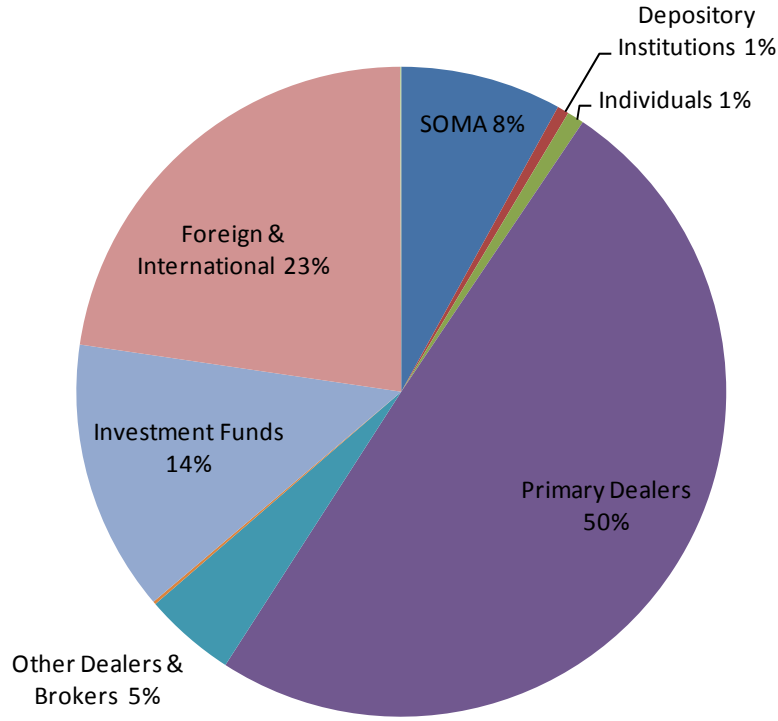


# Smaller Dealers Have Increased Nominal Coupon Auction Participation

### FY2011 YTD: Average Investor Class Allotments



### Five-Year Average of Investor Class Allotments\*



\*FY2006 through FY2010

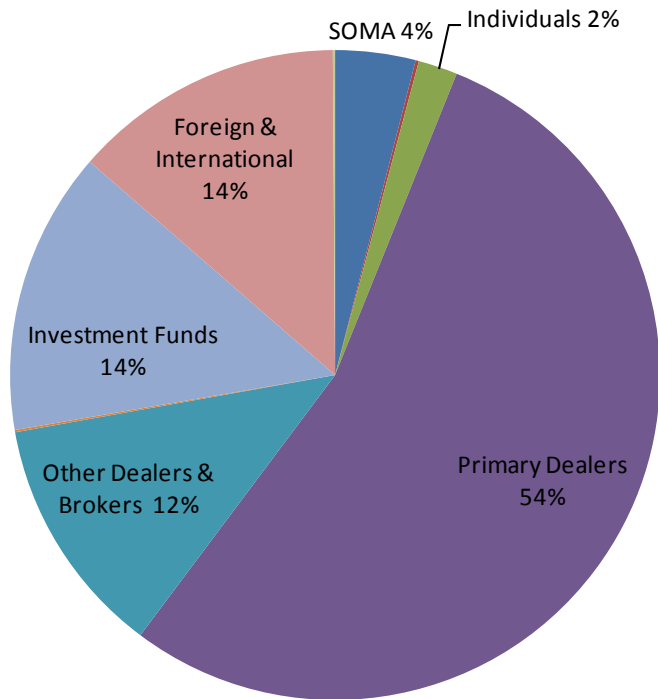
Source: Treasury Investor Class Data; Data through 1/15/2011



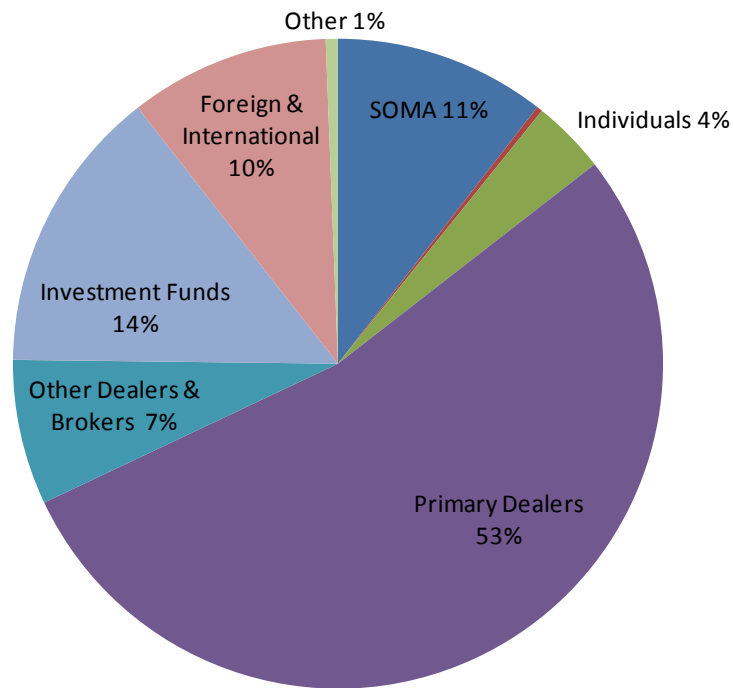


# Smaller Dealers Have Also Increased Bill Auction Participation

## FY2011 YTD: Average Investor Class Allotments



## Five-Year Average of Investor Class Allotments\*



\*FY2006 through FY2010

Source: Treasury Investor Class Data; Data through 1/27/2011



# PORTFOLIO METRICS

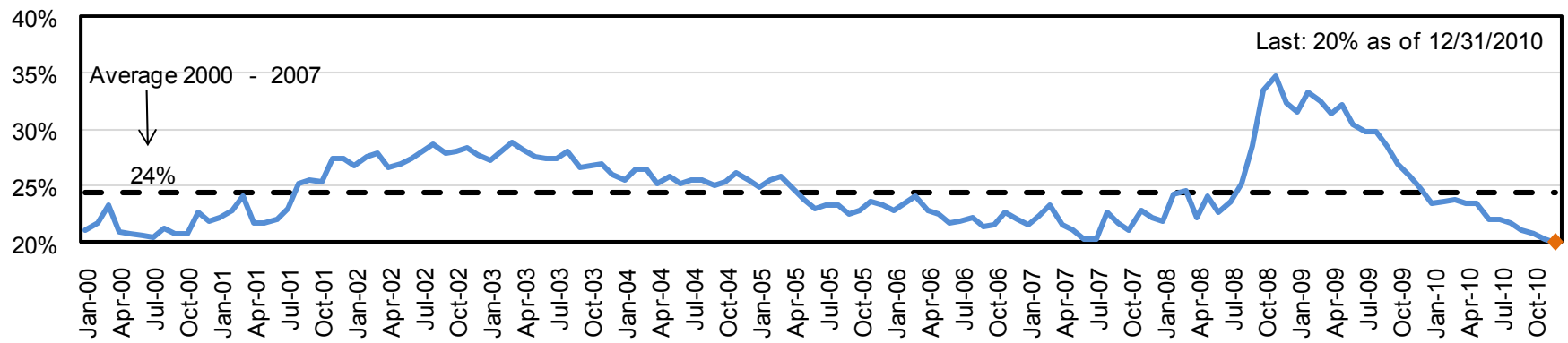




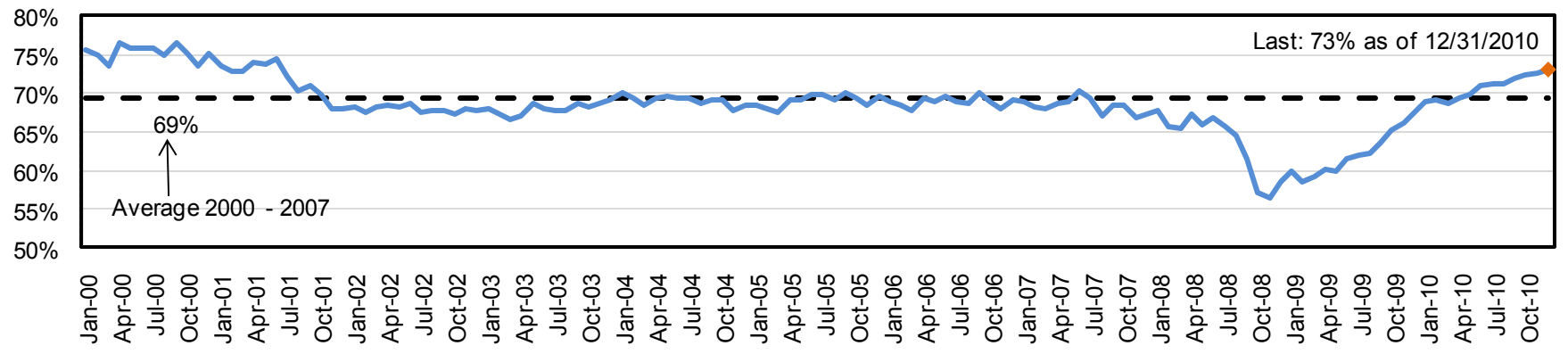
# Nominal Coupons and Bills as a Percentage of the Portfolio

## Bills Percentage of Total Portfolio

Notes: Includes SFP and CMBs



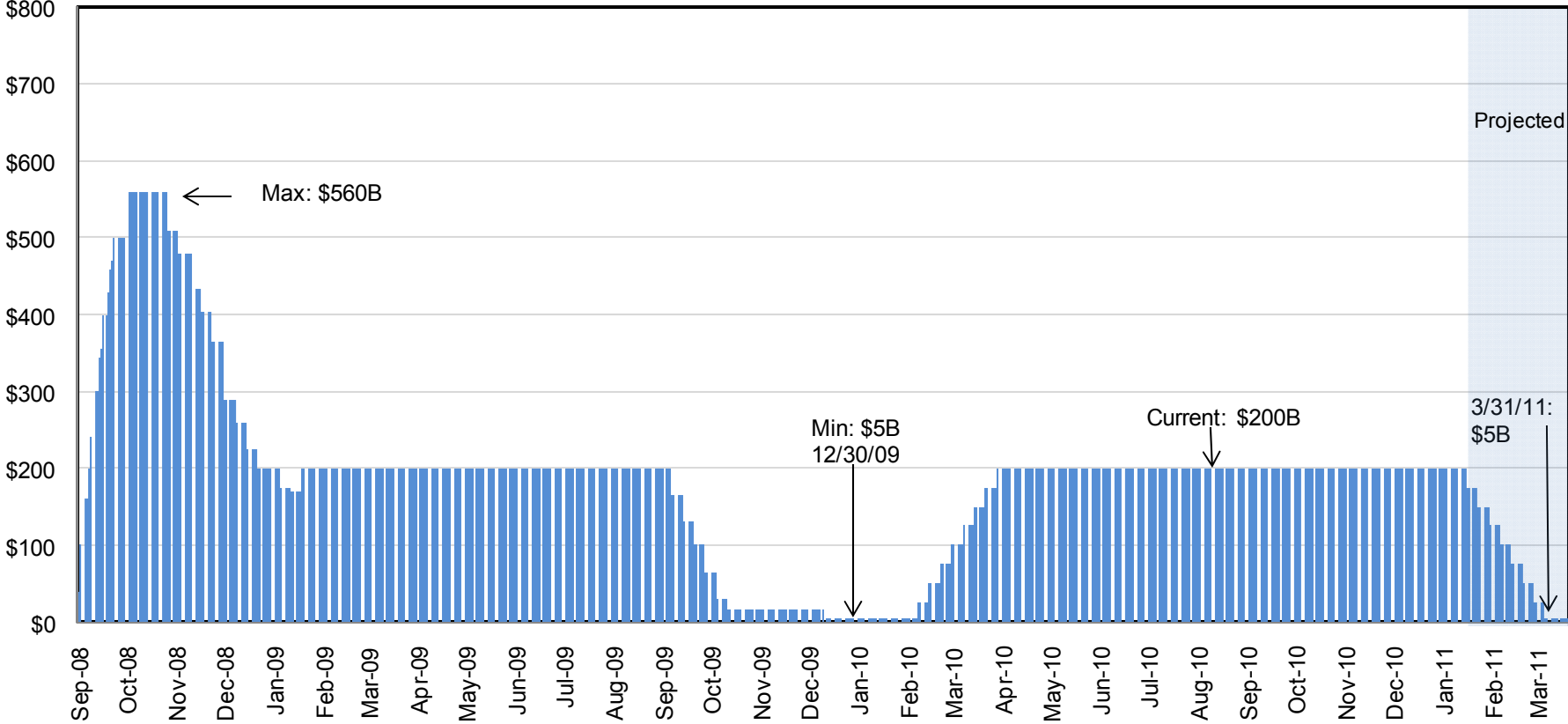
## Nominal Coupons Percentage of Total Portfolio





# Balances in the SFP Will Decline as the Debt Limit Approaches

## Treasury Supplementary Financing Program Cash Balance In Billions \$



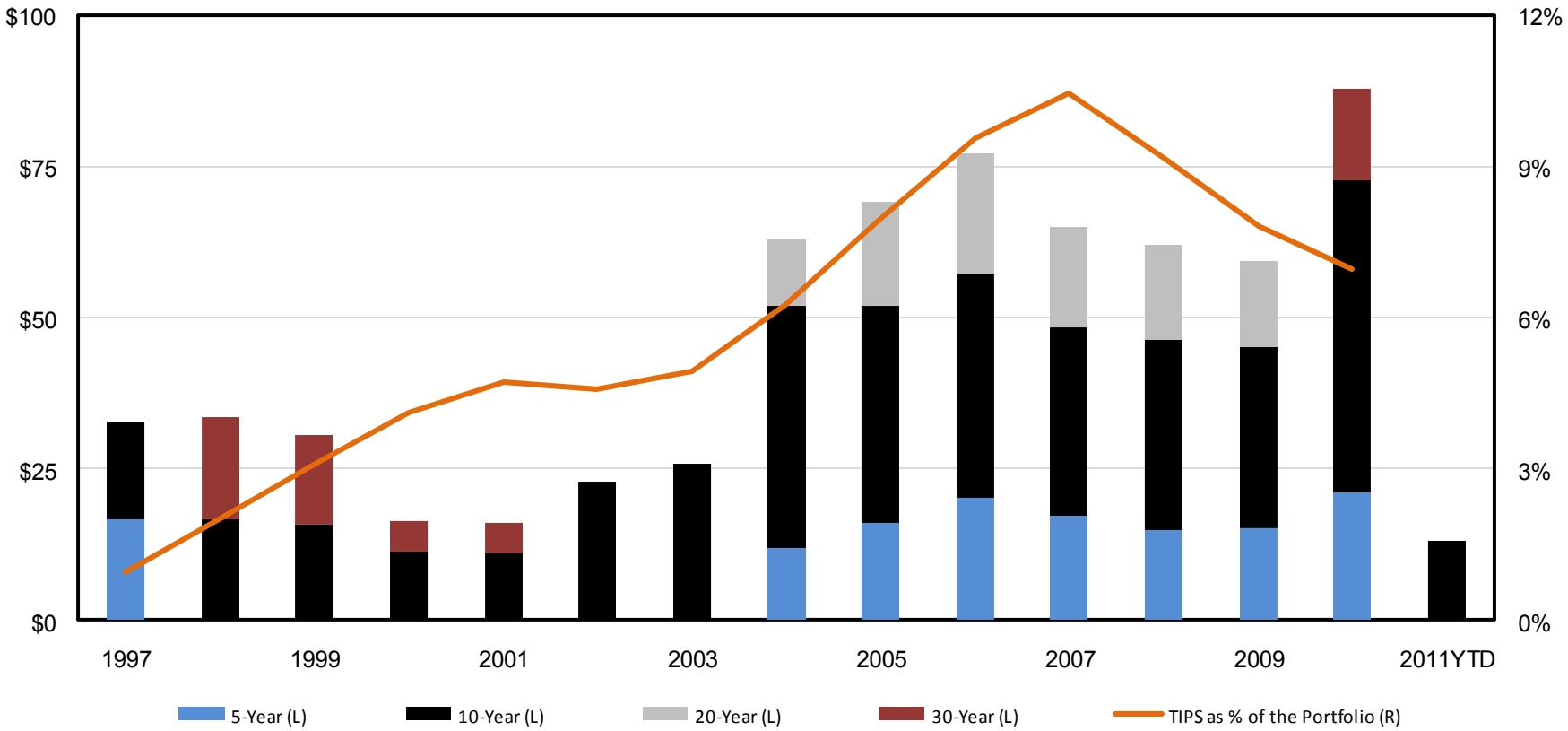




# TIPS Issuance Will Continue to Increase

## TIPS

### Calendar Year Issuance in Billions \$, Percentage of Portfolio



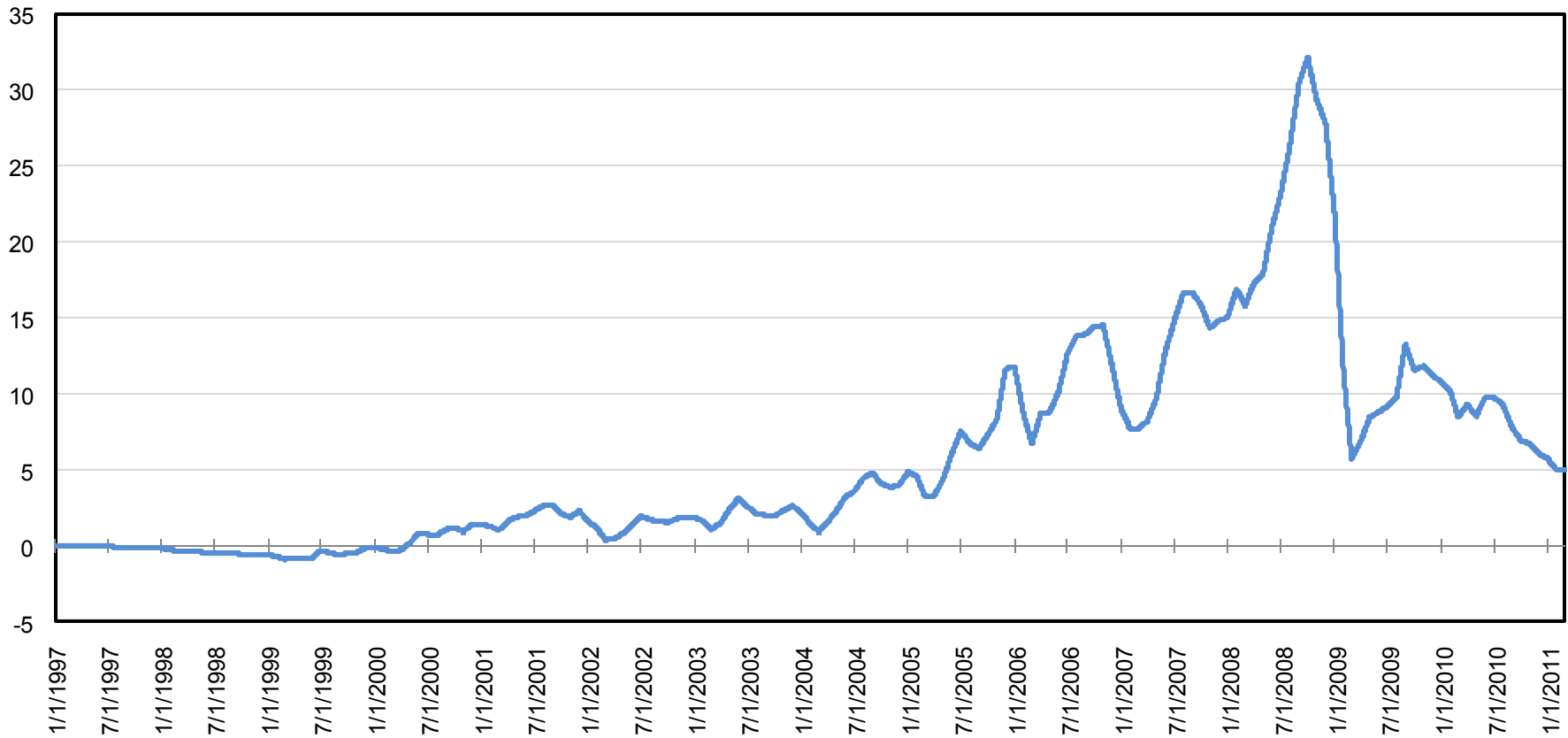
Note: Data through 1/21/2011





# The *Ex-Post* Cost of TIPS Issuance Continues to Decline

*Ex-Post* TIPS Cost Since Program Inception  
In Billions \$



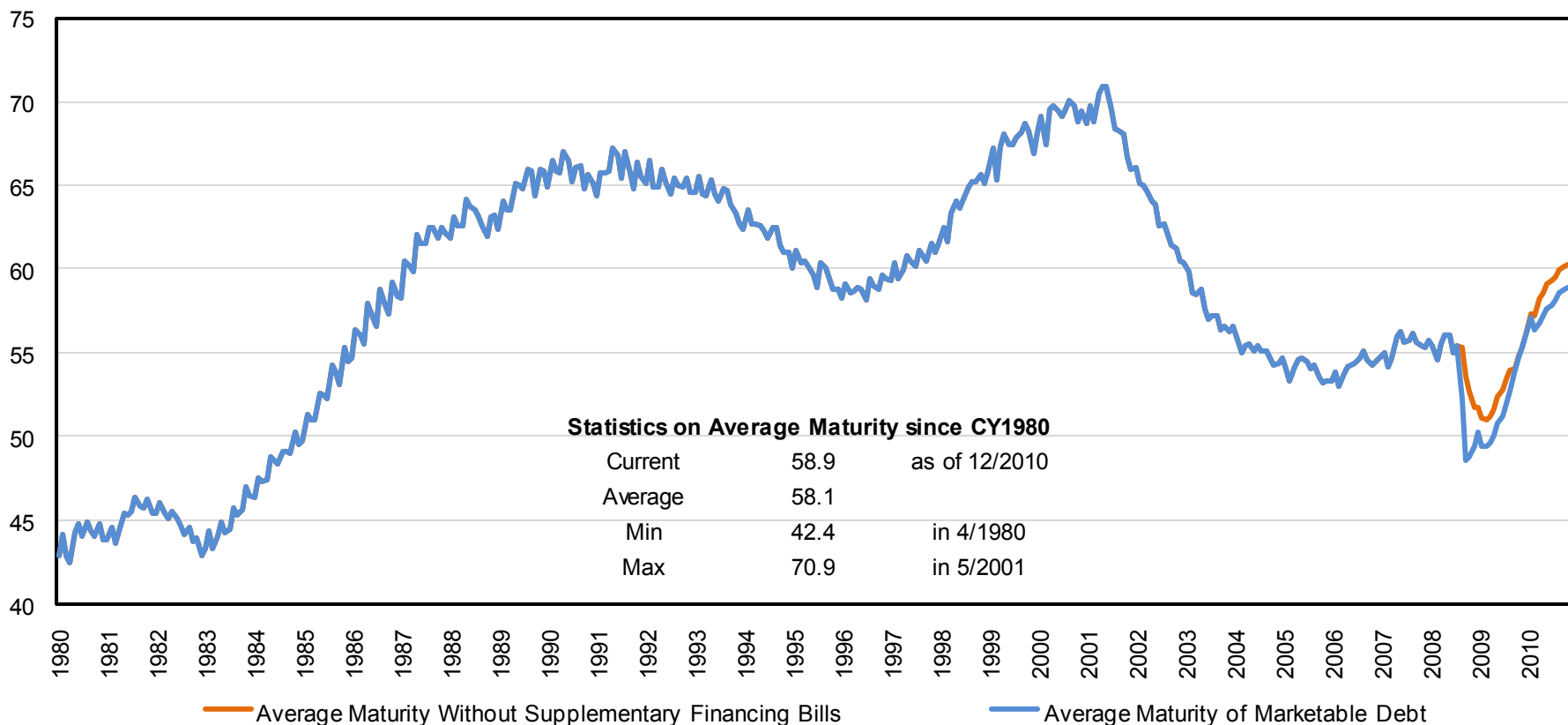
Note: Data through 3/1/2011





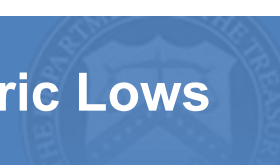
# Average Maturity of the Debt Continues to Lengthen

## Average Maturity of Marketable Debt In Months



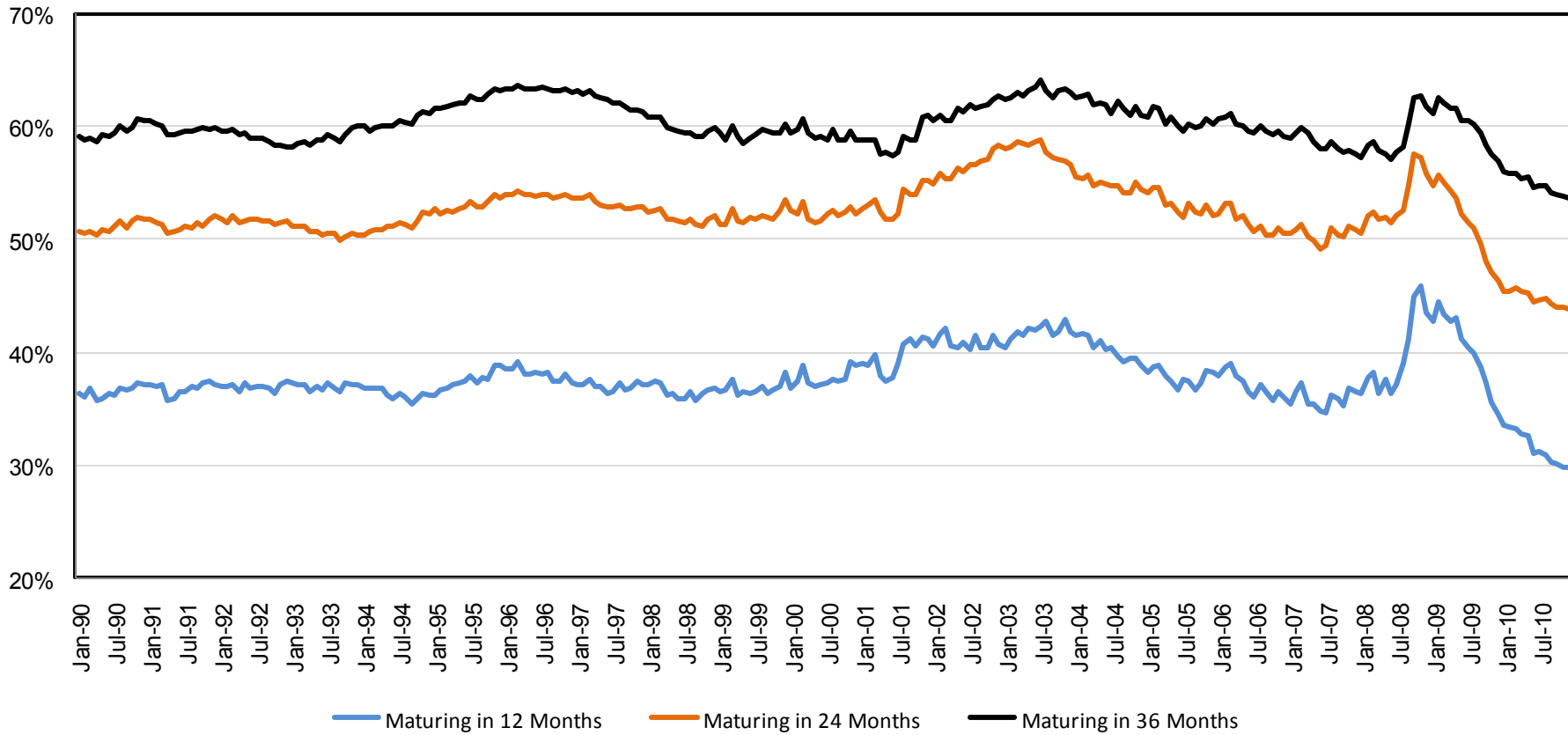
Note: Data through 12/31/2010





# Percentage of Debt Maturing in the Near-Term Remains at Historic Lows

## Percentage of Debt Maturing in Next 12 to 36 Months



Note: Data through 12/31/2010



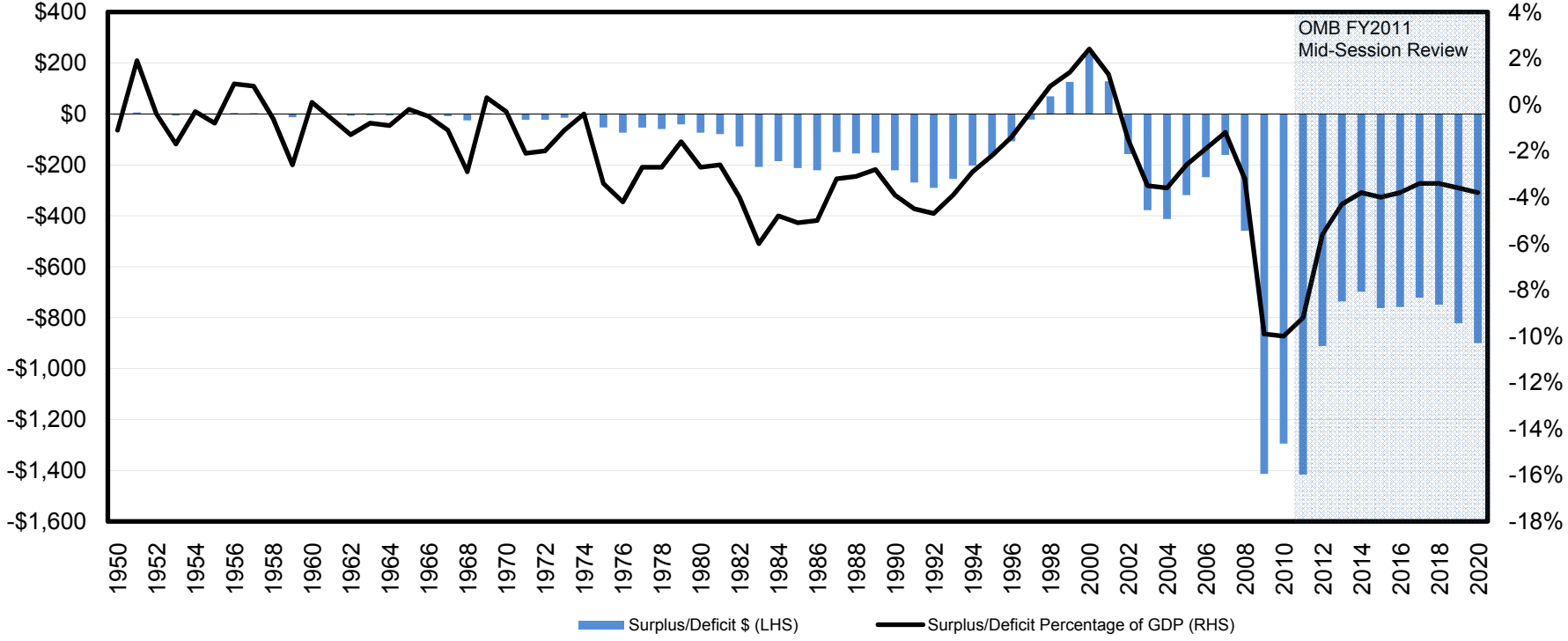
# LONG-TERM CHALLENGES





# OMB FY2011 Mid-Session Review Projections

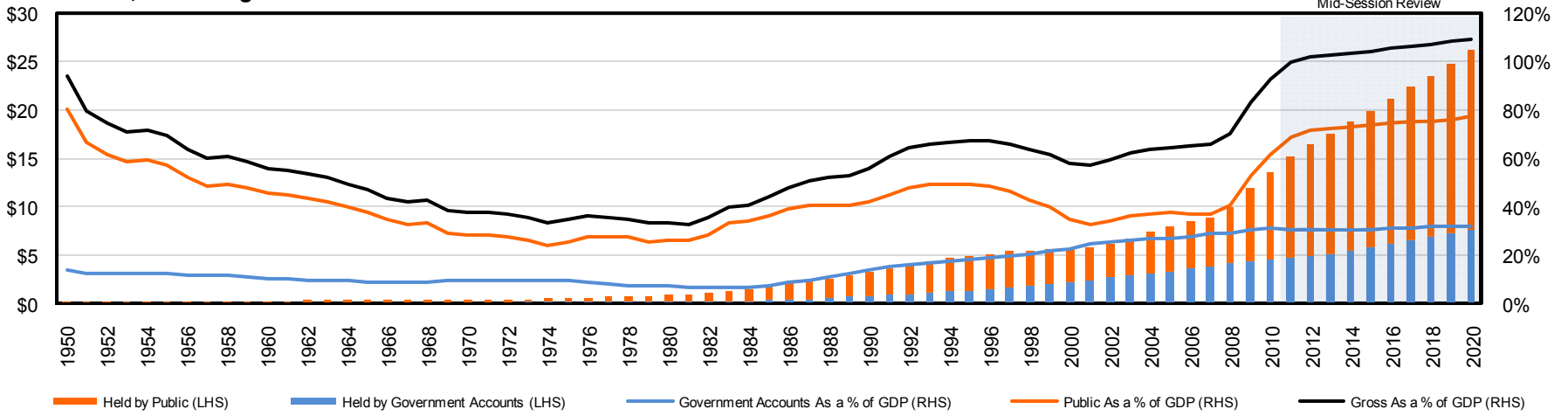
## Budget Surplus/Deficit In Billions \$, Percentage of GDP



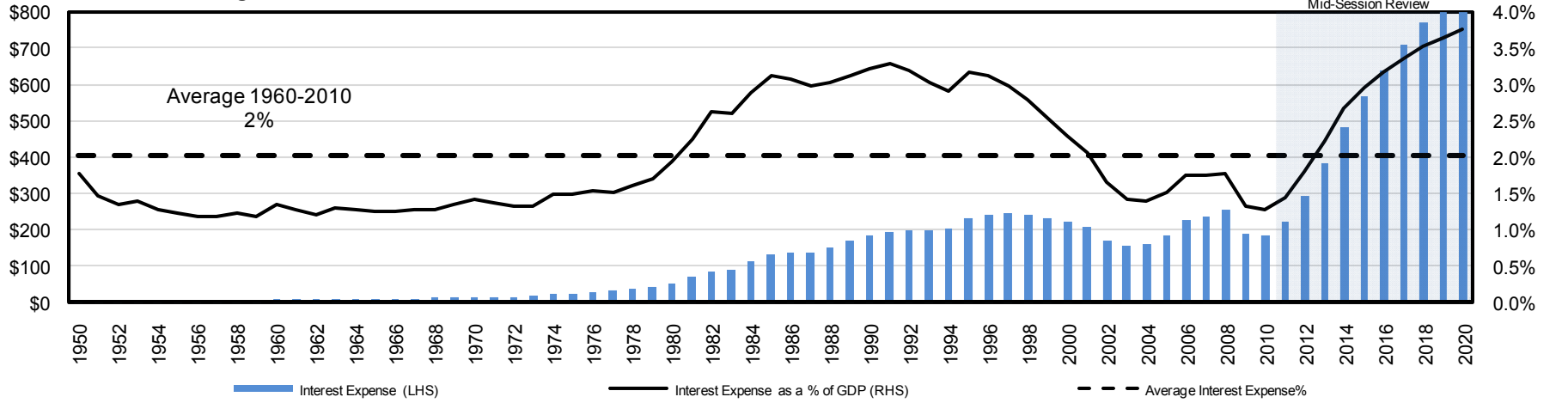


# OMB Long-Term Debt Metrics

## Fiscal Year Outstanding Debt In Trillions \$, Percentage of GDP



## Fiscal Year Interest Expense In Billions \$, Percentage of GDP



Note: Interest costs based on net interest on Treasury debt minus interest on trust funds and other income.





What adjustments to debt issuance, if any, should Treasury make in consideration of its financing needs in the short-, medium-, and long-term?







# U.S. Treasury Borrowing Advisory Committee Presentation to Treasury

February 1, 2011

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# **U.S. Treasury Financial Innovation: Opportunities and Challenges**

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## Charge Question #2

### Debt Management Tools and Strategy

Treasury continually seeks ways to minimize borrowing costs, better manage its liability profile, enhance market liquidity, and expand the investor base in Treasury securities. In light of these objectives, we would like the Committee to comment on the potential costs and benefits of new Treasury products that might assist Treasury in achieving some or all of these objectives. In addition, are there any other debt management tools that Treasury should consider? In answering the question, please review the practices and products employed by debt management authorities around the world.

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# Part I

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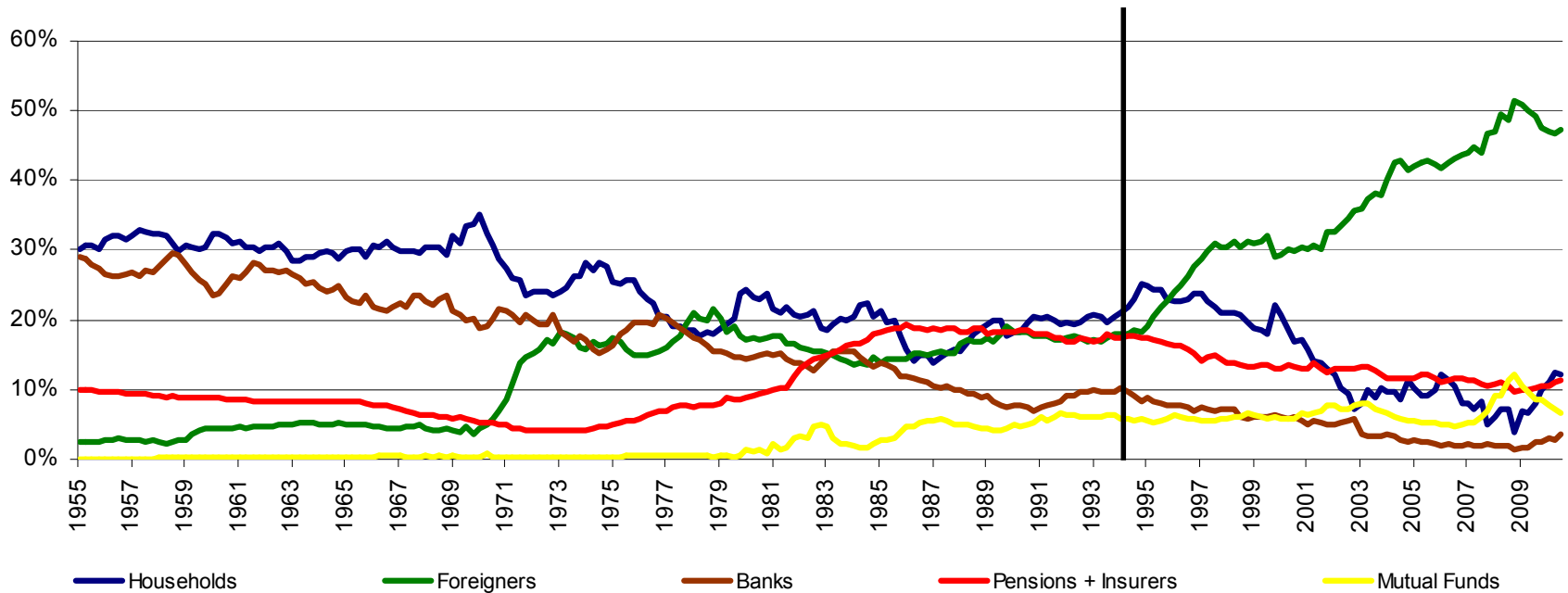
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## Overview

- The U.S. is heavily reliant on foreign ownership of Treasury debt.
- Treasury may wish to diversify its investor base in a way that does not cannibalize the current auction process by making sure new products are additive to demand.
- Treasury could take advantage of structural changes in the U.S. debt markets as well as regulatory developments.
- Treasury can benefit from the experience of other sovereign issuers.
- Treasury may wish to expand their current suite of debt instruments by adding other fixed-rate tenors, Floating Rate Notes (FRNs) and/or products with embedded options.
- These instruments, and their relative merits, are discussed in detail in the second part of this presentation.

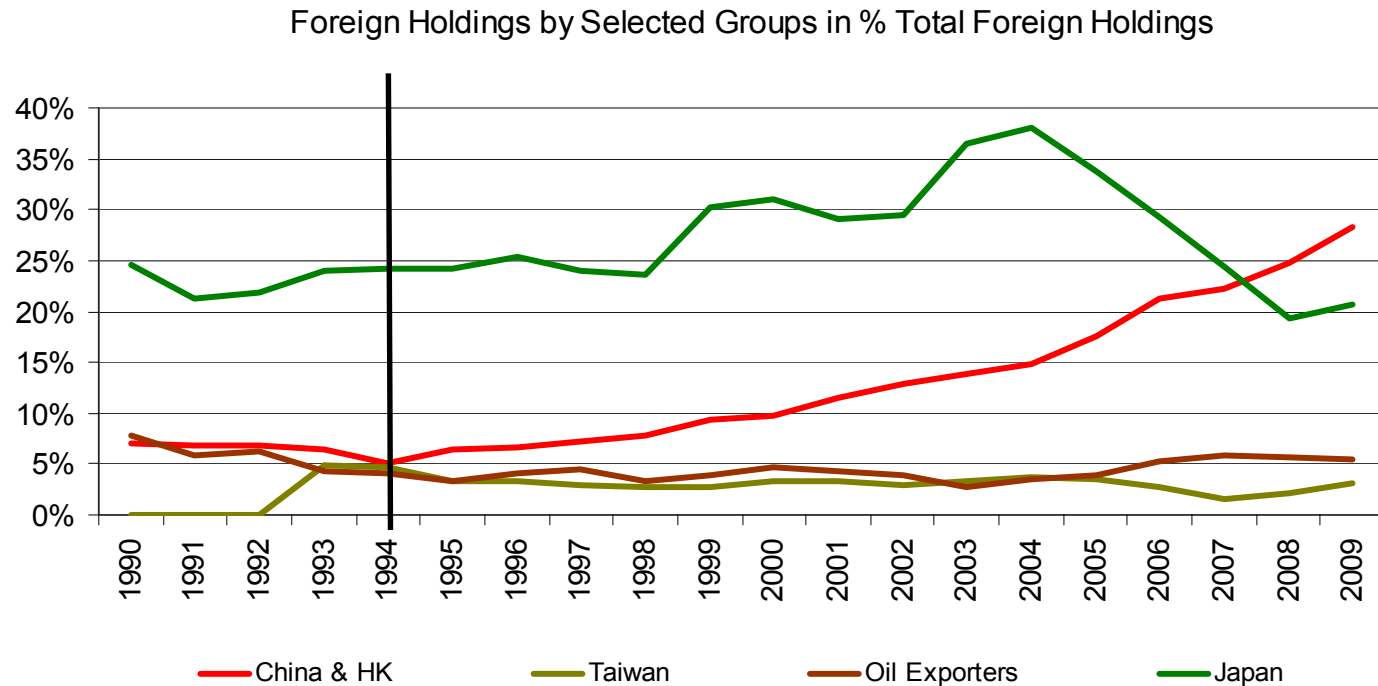
# How has Treasury Ownership Evolved Over Time?

Holdings of Treasuries by Agent as % Treasury Debt Outstanding



- **The foreign share has trended higher, crowding out the major domestic holders**
- The acceleration of foreign ownership coincided with the 50% Chinese devaluation of CNY/USD in early 1994.

# Foreign Ownership of Treasuries is Concentrated in a Few Countries

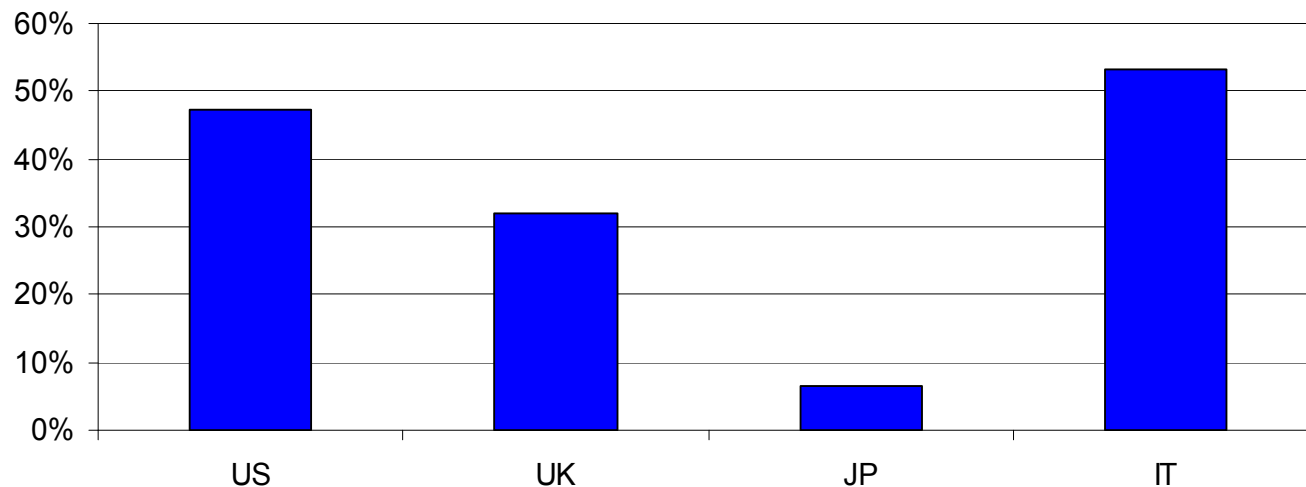


- China and other Non-Japan Asia hold nearly 20% of total Treasury debt outstanding, or 37% of debt held by foreigners. These ratios are up from 2% and 11%, respectively, in early 1994.
- Given the high concentration of foreign ownership, Treasury may wish to focus on alternative domestic sources of debt placement.
- A more diversified debt holder base would prepare the Treasury for a potential decline in foreign participation.

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# Treasury Could Benefit from Expanding the Current Investor Base

Foreign Ownership of Government Bonds



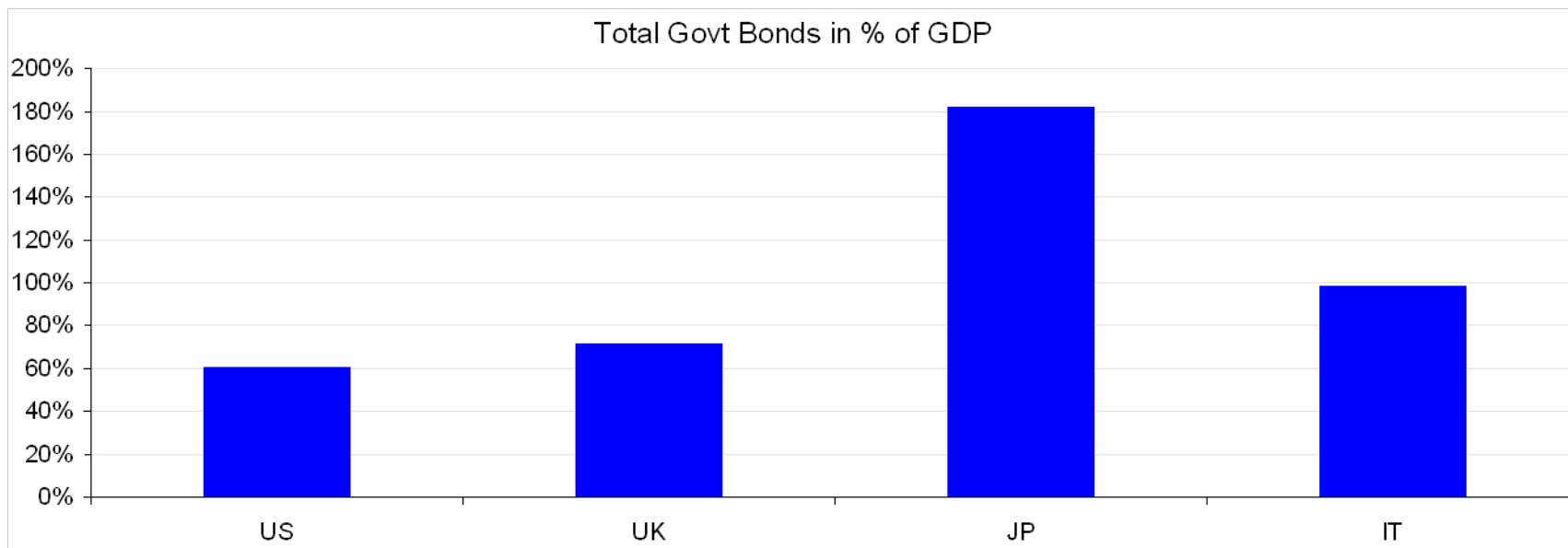
Treasury's strategy to increase domestic sponsorship could focus on:

- Learning lessons from the experience of other sovereigns.
- Following a targeted approach by investor class (Banks, Pensions and Insurers, Retail).
- Taking advantage of structural changes in the U.S. debt market.
- Taking advantage of legislative and regulatory reform, and
- Introducing new products that are aligned with investor needs.



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## Cross Country Comparisons



In addition to the evolution of Treasury ownership in the U.S., it is informative to look at some international metrics. We narrow our comparators to three countries:

- **Italy** and **Japan**, as they are historically large borrowers.
- The **U.K.**, because Treasury may wish to consider some tools that they have integrated into their funding program (syndication, ultra-longs).
- U.S. total debt is still relatively low by international standards, but the U.S. Treasury faces unique challenges.

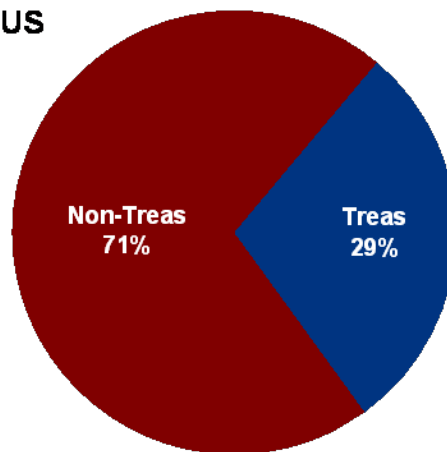
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## A Tougher Competitive Environment for Treasuries in the U.S. Debt Markets

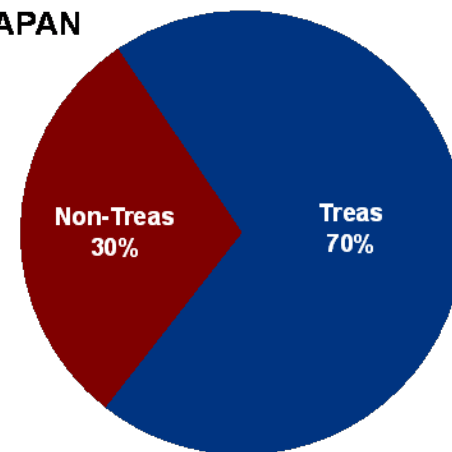
- In the U.S., Treasury debt accounts for a relatively small share of total domestic Debt.
- The Treasuries of two large borrowers, Italy and Japan, have a much larger slice of domestic debt pie.
- In Japan, Treasury Debt is the only game in town, Italy is a close second.

Treasury Debt as a share of Total Debt Securities Outstanding

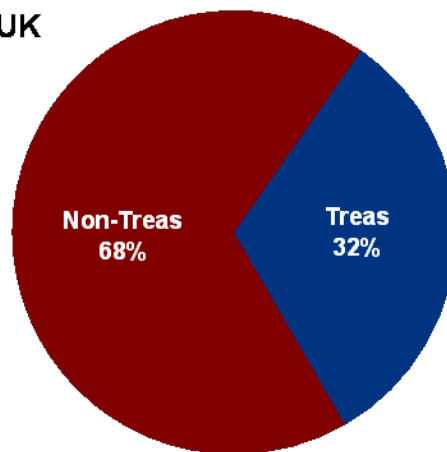
US



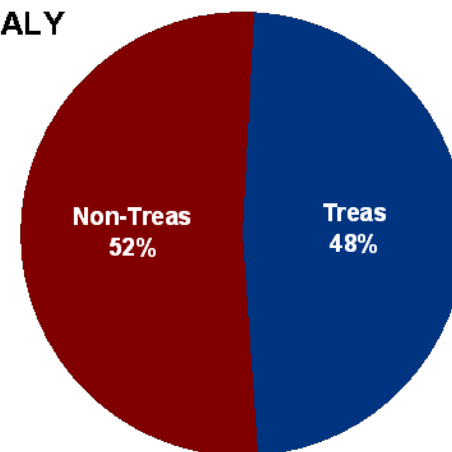
JAPAN



UK



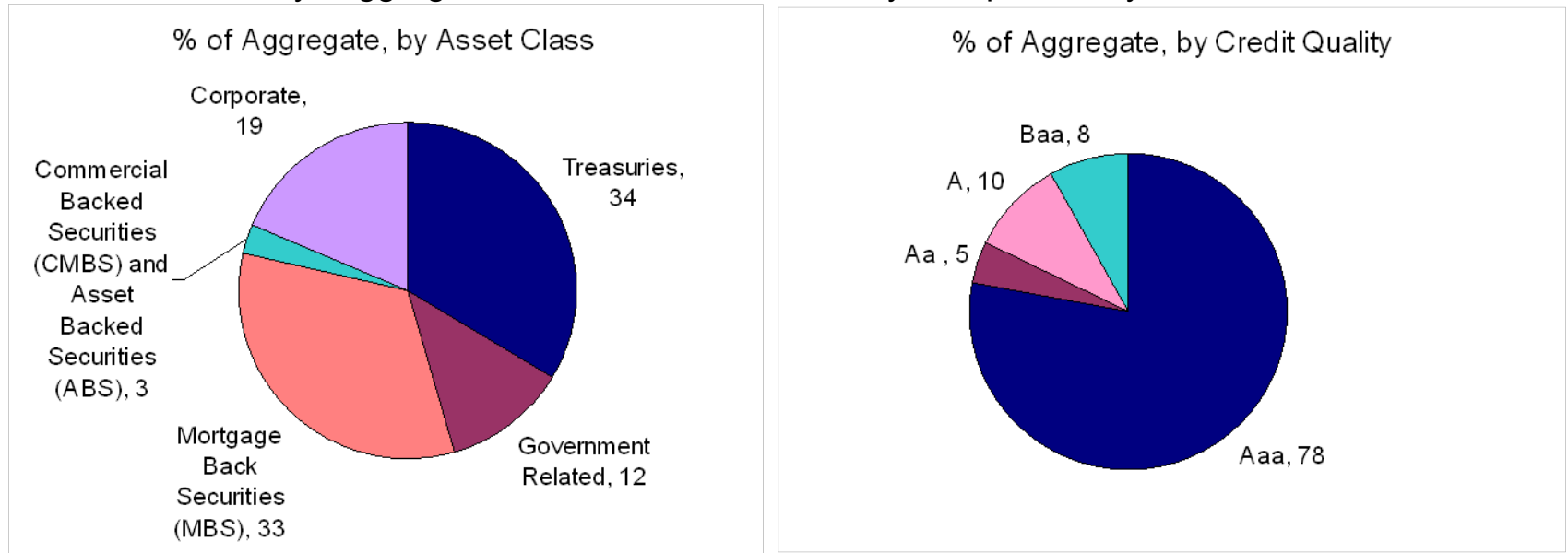
ITALY



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# A Tougher Competitive Environment for Treasuries in the U.S. Debt Markets

U.S. Barclays Aggregate Index Breakdown – Heavy Competition by other Aaa Assets



- The U.S., in contrast to our comparator countries, suffers from heavy competition from other Aaa asset classes.
- Treasuries represent only 1/3 of the aggregate index, but nearly 80% of this index is Aaa.
- As a result, there is a great degree of competition from higher-yielding Aaa products.

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## Taking Advantage of Market Changes (Adapt or Die)

Treasury may want to focus on areas where a product gap has developed in order to expand the demand base. The Government Sponsored Enterprises (GSEs) successfully followed this strategy, when Treasury issuance dropped dramatically in the late 90's, by introducing the Benchmark and Reference Note programs.

The current environment offers comparable opportunities for Treasury because of **dislocations** in several markets, as well as **regulatory and legislative** developments.

- **GSE debt issuance** is expected to decline, as the Agencies are required to shrink their balance sheet, diverting demand toward Treasury securities.
- The roll off of bank debt issued under the Temporary Liquidity Guarantee Program (**TLGP**) during the financial crisis will generate demand for high quality assets.
- **Muni credit** is coming into question, increasing demand for safe haven assets, like Treasuries.
- **Money Markets** face a dearth of short-term paper because of the contraction of the Commercial Paper (CP) market, boosting demand for short-term Treasury paper.
- Legislative and regulatory developments - **Dodd-Frank, pension reform by the Financial Accounting Standard Board (FASB), the Liquidity Cover Ratio (LCR) under Basel III** - have the potential to lead to greater demand for long dated securities and liquid, high quality products.

The above market dynamics could generate demand in the following products:

- Fixed rate vanilla term debt, especially in the long end.
- FRNs and other short-dated products.
- Callable and other yield-enhancement products.

These products and opportunities will be reviewed in detail in the second half of the presentation.

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## Where can the incremental demand come from?

### Potential Increase in Demand for Treasuries over the next 5 years (\$bn)

Source ==>	TLGP	GSE	LCR	Other	TOTAL
<b>Buyer:</b>					
Banks	400	600	675		1675
Insurers/Pensions				425	425
Retail				337	337
<b>GRAND TOTAL</b>					<b>2437</b>

- We will now focus on three key Treasury debt buyers:
  - Banks,
  - Pensions/Insurers and
  - Retail.
- These buyers could substantially increase their demand in light of the market dislocations, as well as the regulatory and legislative changes mentioned earlier.
- **We think Treasury could tap into an additional \$2.4 trn in demand from these three investor bases over the next 5 years, if the right products are offered to them.**

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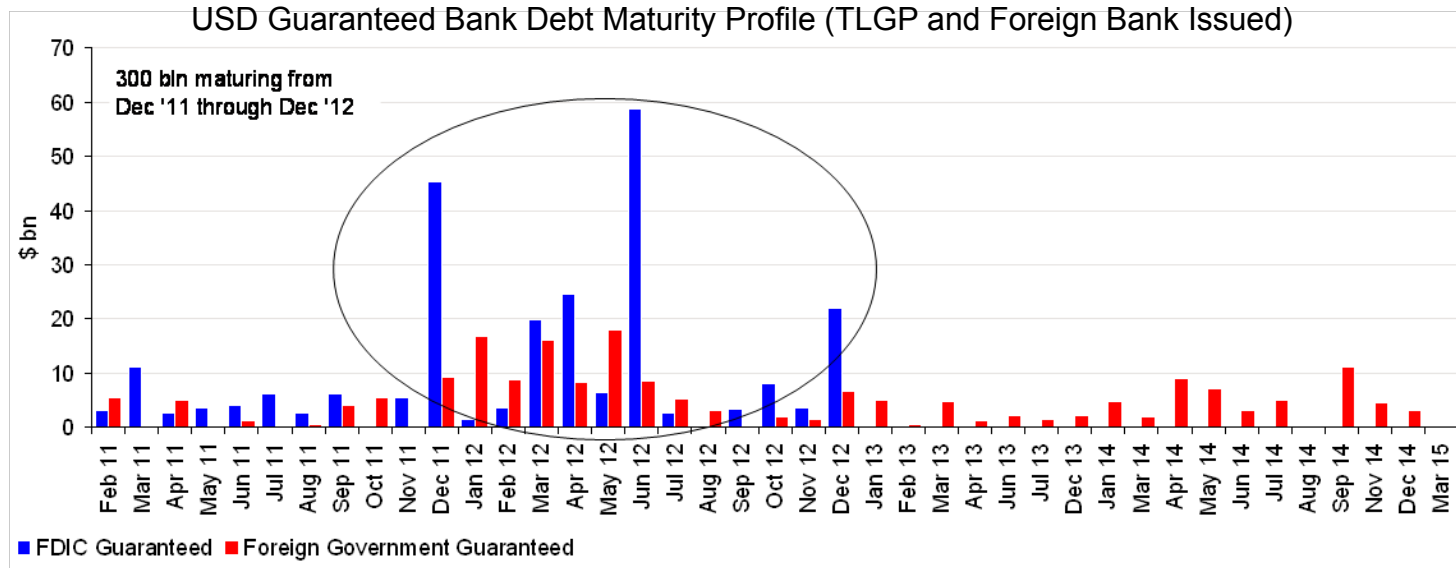
## **Banks:** Structural and regulatory forces should increase bank allocation to Treasuries

Bank demand for Treasuries is expected to be boosted by three key market developments:

- The gradual reduction in **GSE** balance sheets.
- The roll off of Government guaranteed bank debt issued during the financial crisis (**TLGP**), and
- Upcoming regulatory changes emanating from the **Basel III** framework.

We now turn to these developments.

# Banks: GSE Balance Sheet reduction and TLGP roll off generate potential demand for Treasuries



**The Debt Landscape for Aaa substitutes is changing, and this is supportive for Treasuries.**

GSEs -

- Fannie and Freddie are currently required to shrink their retained portfolios by 10% each year.
- The resulting reduction of the GSEs balance sheet should reduce their issuance by around 120 bln per year over the next 5 years. Buyers of GSE paper will have to find alternative use for their funds.

TLGP -

- The investment in government guaranteed bank debt (TLGP) will also need to shift to another asset as this paper matures, as the TLGP and other programs have expired. **There is almost \$370 bln of this debt maturing by the end of 2012, and nearly \$440 bln by March 2015.**

**Treasury could fill the gap left by the GSE size reduction and TLGP roll off.**

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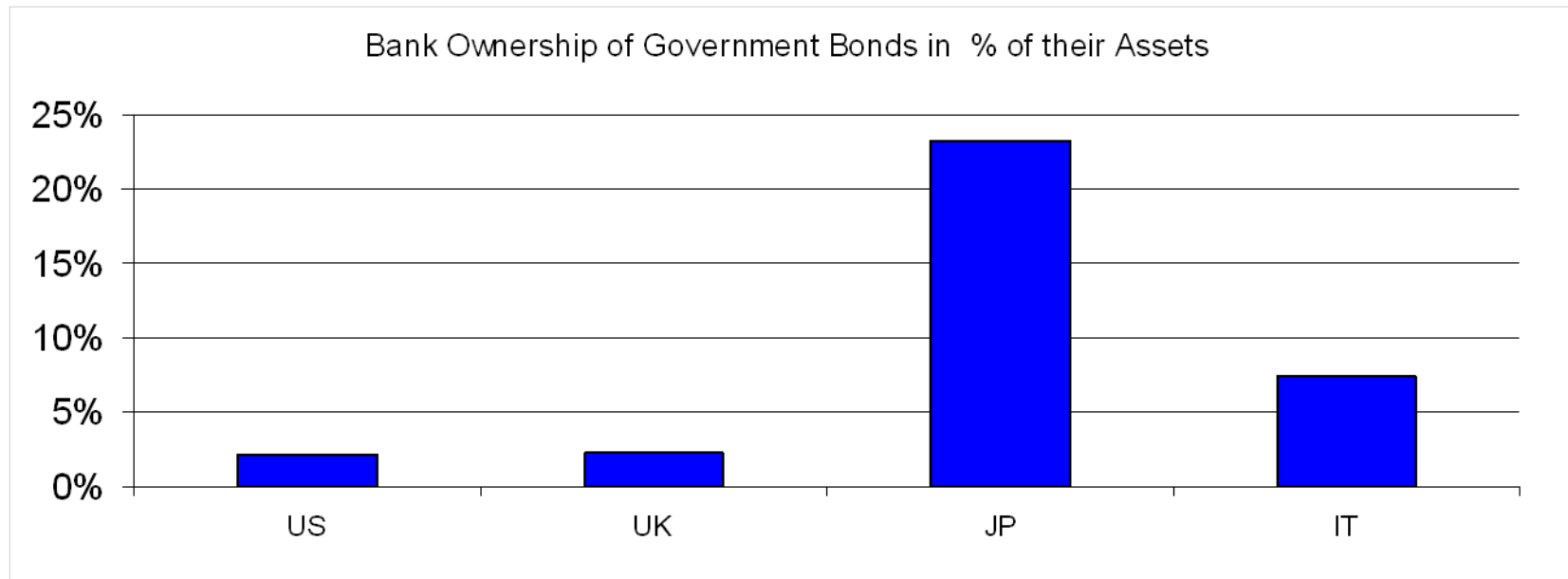
## **Banks:** Changes on the regulatory front should also help increase their demand for Treasuries

- The key regulatory change emanates from Basel III.
- The most important is the phasing in of the Liquidity Cover Ratio (LCR).
- Although the date of implementation has been pushed to January 2015, banks seem to be trying to get there sooner to gain investor confidence.
- When the Fed eventually unwinds QE and drains cash, domestic banks will be forced to replace it with liquid securities.
- Barclays Capital estimates that banks can buy roughly \$1 trn in liquid securities (split between Treasuries and Agency/other alternatives).
- If the current mix is maintained, we estimate **\$650-700 bln** could go into Treasuries.
- This projected flow into Treasuries is roughly twice that resulting from the TLGP roll off.



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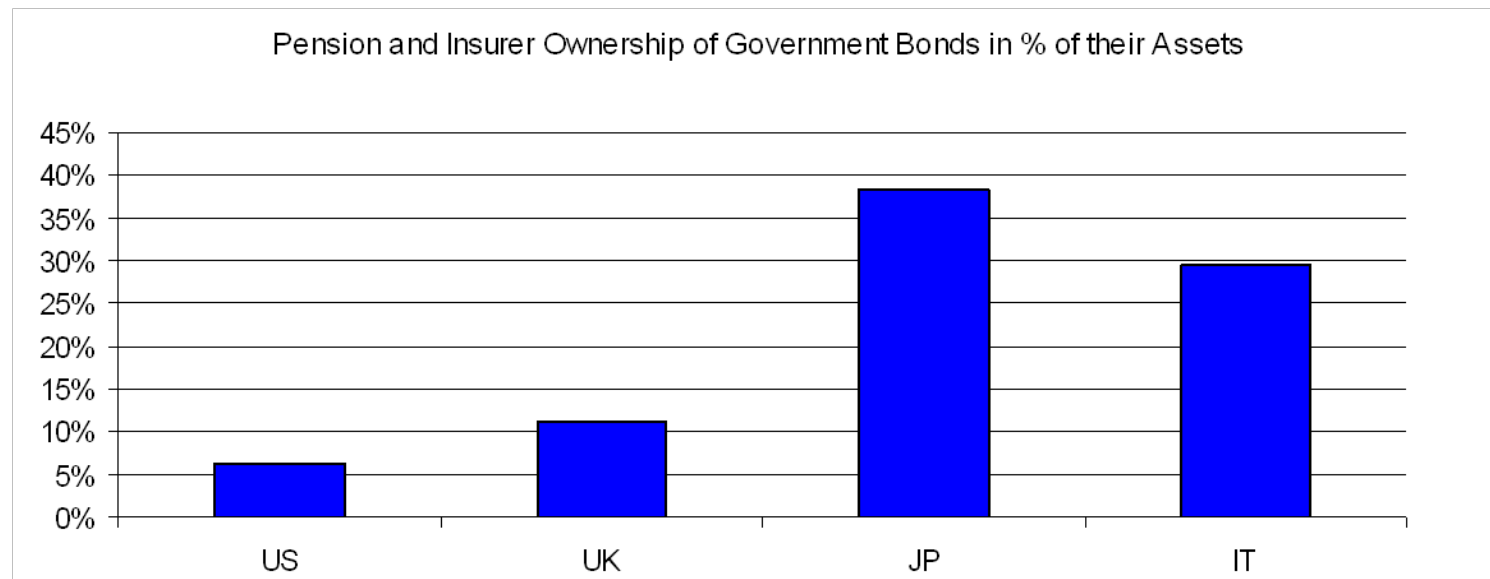
## Banks: U.S. banks are underinvested in Treasuries compared to other countries



- U.S. Bank holdings of Treasuries are relatively low due to crowding out by other high-quality asset classes (e.g. MBS, agency callables).
- Treasury can bridge the gap relative to other countries and maximize the benefits of the forthcoming structural and regulatory changes by identifying products suited to bank needs.
- These products (e.g., callables, Floating Rate Notes) are covered in detail in the second part of this presentation.

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## Pensions and Insurers: The impact of regulation is uncertain, but it has the potential to dramatically raise demand for Treasuries



- Treasury penetration into these institutions is small relative to other countries.
- This is in large part the result of lenient regulatory and legislative environments with respect to Asset-Liability matching by these institutions relative to other countries.
- Two regulatory developments could increase Treasury demand from these institutions going forward:
  - The Implementation of **Dodd-Frank**, and
  - The possible implementation of pension reform under **FASB**.

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## Pensions and Insurers: Important legislative and regulatory changes are coming

### Dodd – Frank

- The implementation of **Dodd Frank** imposes higher costs to the user of derivative instruments (e.g., posting of margins for exchange traded swaps).
- As a result institutions may turn to the Treasury market for acquiring long duration exposure, provided their demand can be met.

### FASB

- After tackling the balance sheet side of Pension Reform under Phase I, **FASB** is now pursuing the more complex Phase II addressing the income statement.
- In order to align the U.S. regulatory framework to international standards, regulatory Phase II is now awaiting progress by the International Accounting Standard Board (**IASB**).
- The final recommendations could and should generate additional demand for long dated fixed income assets in order to reduce the volatility of the plan sponsor's earnings.
- FASB has consistently shied away from taking a U.K.-style approach to pension reform. Their actions in the coming years has the potential for radically increasing the demand for Treasuries by the pension industry.

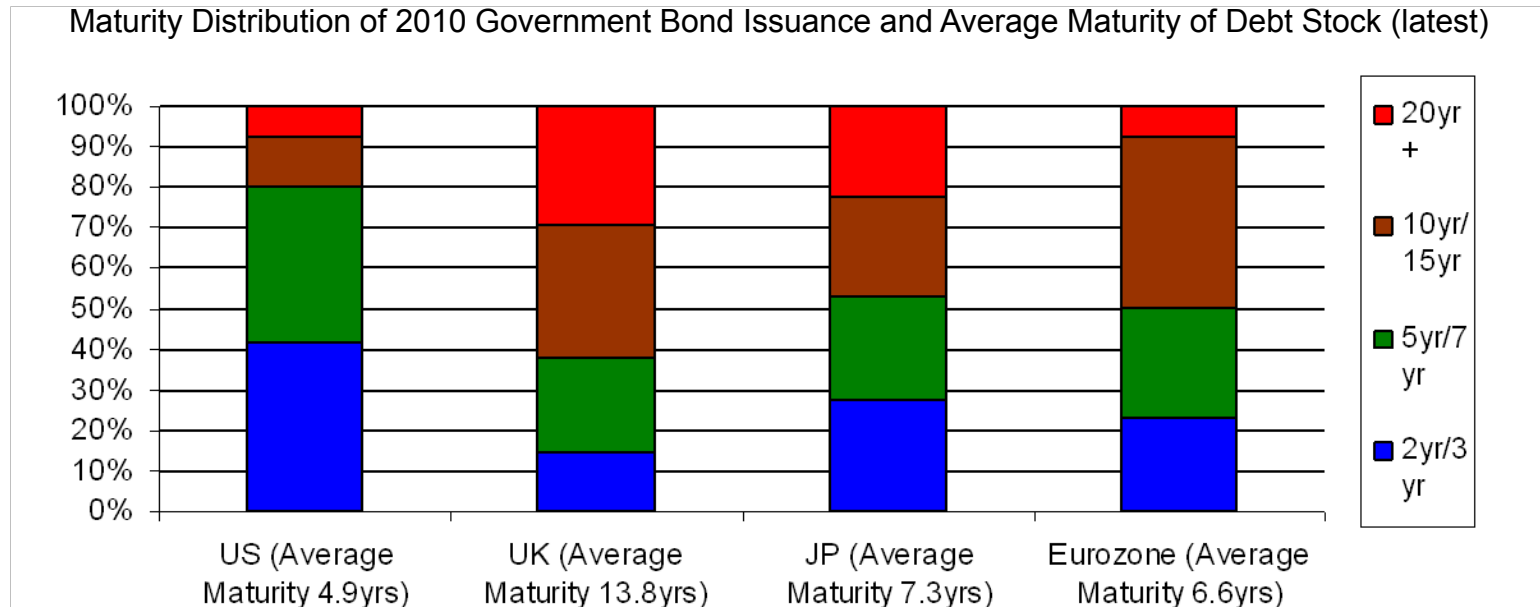
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## **Pensions and Insurers: How can Treasury capitalize on these changes?**

In order to capitalize on these important developments, Treasury may want to consider the following strategies:

- Issuing longer duration instruments, currently in scarce supply, and
- Creating a syndicate desk similar to that of the U.K. Debt Management Office (DMO).

## Pensions and insurers: The U.S. market is starved of high quality long duration securities



- Currently less than 10% of U.S. debt issuance has a maturity longer than 10yrs.
- By comparison, nearly 30% of the U.K. issuance is in the long end.
- The U.K., and to some extent Japan, have enjoyed a longer average maturity of debt. Over time, this has provided considerable protection during periods of market disruption.

The second part of the presentation will discuss in more detail the issuance of long dated Treasuries.

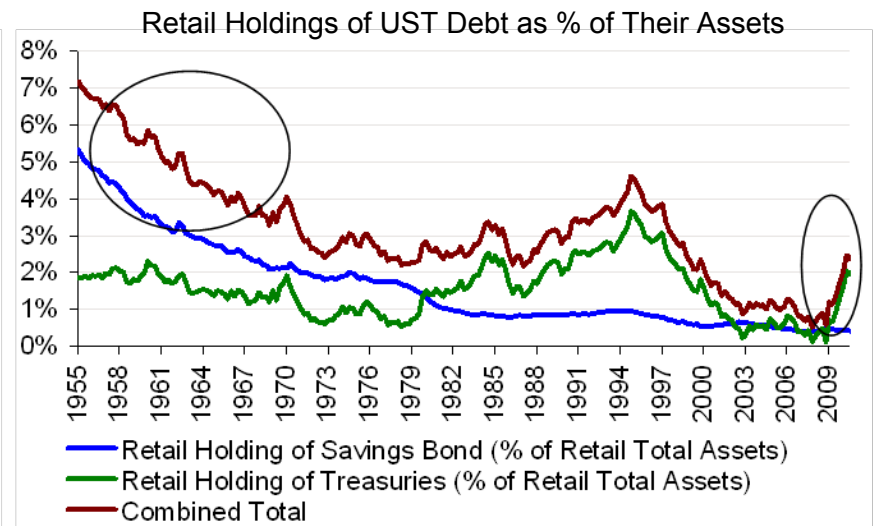
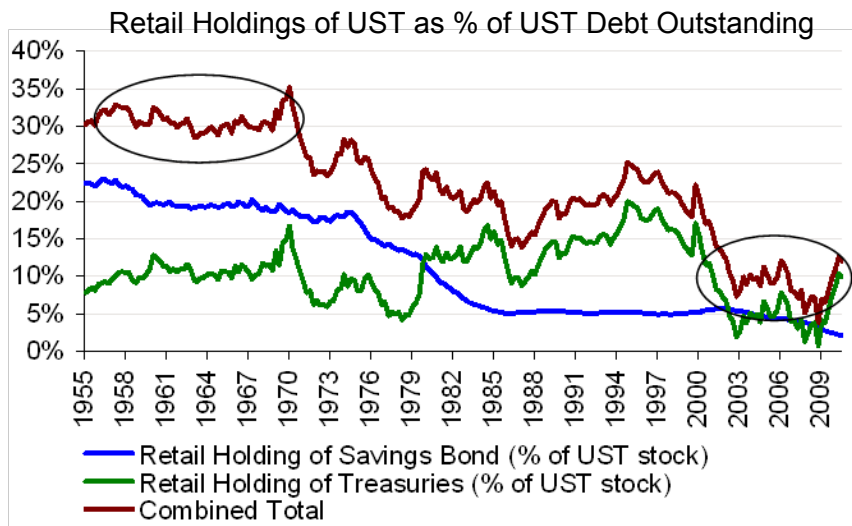
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## Pensions and Insurers: There should be demand for ultra-long bonds, and syndication may help their initial placement

- If ultra-long products are contemplated, Treasury may consider creating a syndicate desk, to aid in the pricing and distribution of these bonds. The U.K. has been very successful in employing the syndication-style of distribution.
  - Syndication has accounted for 15 % of issuance in the U.K. in the last two years.
  - This method has been used extensively for the placement of long dated paper.
  - The syndication process allows the borrower to gauge more closely market conditions and adjust size and tenor accordingly.
  - This would be especially critical during the early phase of the introduction of new ultra-long tenors.
  - A syndication desk would also be able to address reverse inquiries by lenders with specific needs (e.g., institutional investors, corporate treasurers, etc).
- Under a scenario of concrete progress on the pension regulatory front, and an expansion of long dated instruments issued by Treasury, it is reasonable to assume that the U.S. could close at least half of the existing gap with the U.K. in terms of allocation to fixed income by insurers and (private) pension portfolios.
- Such a move could expand Treasury demand by more than **\$400 bln.**

## Retail Sector: There Appears to be Room for Expansion

- Treasury is less successful in selling U.S. Treasuries (UST) to households, both relative to the past and compared to other sovereigns.
- Households' investment in UST has waned considerably since the 1950s: They currently hold roughly 3% of their assets in Treasuries, up from the 2007 lows but still well below the 5% level in '50s and '60s.
- Treasury used to place 30% of their debt to households; now they place only roughly 15%.



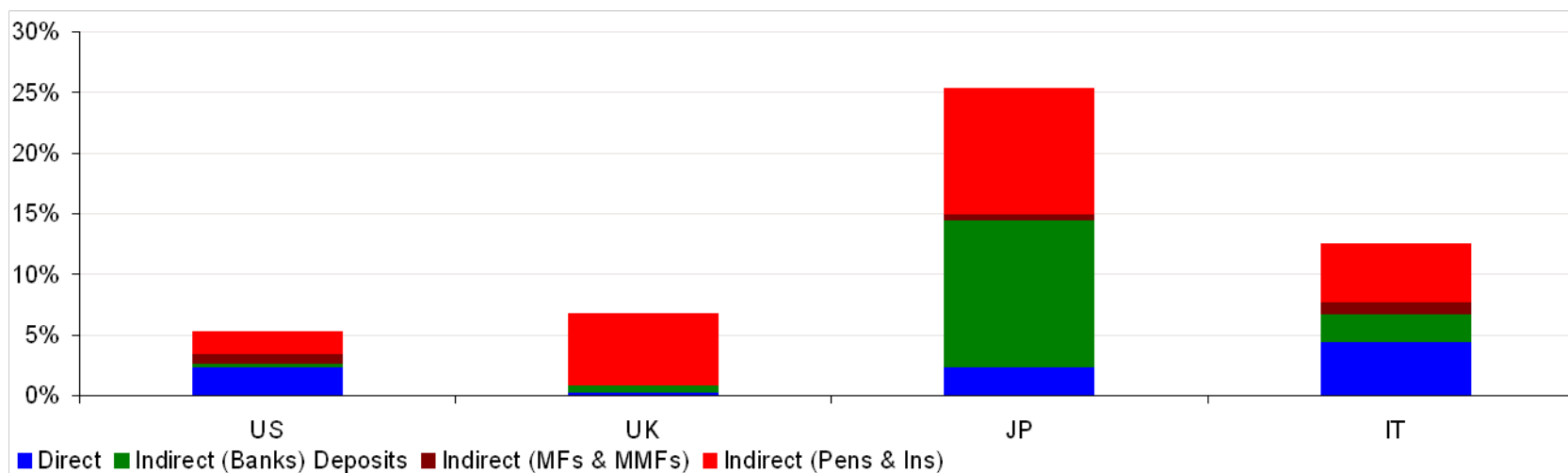
- Savings Bonds used to be ubiquitous in retail portfolios, but they are now a dying breed.
- Direct investment in Treasuries have failed to fill the gap left by their gradual disappearance.

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## Retail Sector – There are substantial differences in “indirect” retail ownership of Treasuries across countries

Direct ownership of Treasury debt in the U.S. is roughly in line with our comparator countries, but indirect ownership falls short.

Household Holdings of Government Bonds: Direct and Indirect Ownership as % Household Total Financial Assets



- This is at least in part due to lower bank holdings of Treasuries in the U.S. (they prefer higher yielding products like agency callables and MBS), and much higher Government bond holdings by Japanese banks.
- Here, “Indirect ownership” by retail is meant to capture Treasury debt holdings made as a result of household investments into other institutions, ie: through mutual funds, bank deposits, pension and insurance contracts.
- These entities then use the funds deposited by households and re-invest them into government bonds.
- Indirect ownership is estimated by taking share ownership of Treasury debt of 3 categories of buyers (Banks, Mutual Funds, and Pensions and Insurers) and multiplying it by the share of these buyers in the household portfolio.



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## Retail Sector: There are lessons to be learned from other sovereign borrowers

- Italy and Japan have both pursued strategies to increase household investment in government securities. While both countries have traditionally had higher savings rates than the U.S., Italy was far more successful in translating that into purchases of government bonds.
- **Italy:** The Italian Treasury followed the route of liquid, fungible instruments to place debt with individuals.
  - Retail investors used to invest almost exclusively in short term bills (BOTs).
  - The Italian Treasury was an innovator with the introduction of a Floating Rate Note (the 7yr CCT) which allowed the transition toward longer term borrowing by retail without the duration risk.
  - Once the retail community felt comfortable committing savings beyond the short term, they became more interested in long term fixed rate issuance (BTPs).
  - This was particularly important when rates fell, and ownership of BOTs declined sharply while ownership of CCTs and especially BTPs held up.
- **Japan:** MoF followed the route of dedicated (illiquid, non-fungible) instruments, and they were far less successful increasing direct investment by households.
- **The lesson learned is: stick primarily to liquid products.**

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## Retail Sector: In terms of Products and Marketing, it's all about yield, liquidity, and safety

### Products:

- Yield enhancement products would likely be well received by the retail account base.
- Other structured notes (callable range accruals etc.) offer an even greater degree of yield enhancement and are often purchased by more sophisticated retail investors.
- Floaters offer the benefits of being a liquid term instrument without significant duration risk. They could also offer some protection for individuals who have adjustable rate mortgages (ARMs).

### Marketing:

- Treasury may consider employing a marketing campaign to increase broader ownership of UST debt as an asset class in individual portfolios.
- Treasury could take a page from earlier efforts to promote individual ownership of UST debt.
- Current Savings Bonds are the offspring of WW I Liberty Bonds and WW II Defense Bonds.
- Defense Bonds (renamed War Bonds after Pearl Harbor) benefited from more than \$250m advertising donated during the first three years of the National Defense Savings Program.
- Through a combination of new attractive products, and aggressive marketing, Treasury could aim at growing the household ownership share of Treasuries to the average of the last 50 years.
- Such expansion would allow Treasury to place an additional **\$300-350 bln** of debt with retail accounts.

- 
- Over the course of the World War II, 85 million Americans purchased nearly \$50 bln of Savings Bonds, tripling their ownership share of Treasury debt to about 18%.
  - It worked then....

- We now turn to the second part of our presentation.
- There, we will address in more detail new securities and debt management techniques which Treasury may wish to consider to diversify its investor base.

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# Part II

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# Securities and Debt Management Techniques Discussed:

- Ultra-long bonds and associated strips: 40yr, 50yr, 100yr
- Bonds with embedded options
  - Callables
  - Puttables
- Money Market instruments
- Bonds for individual retail investors
- Floating rate bonds
  - Short floaters
  - CMT-style
- Other
  - GDP-linked bonds
  - A pure inflation security stripped from TIPS
- Debt management techniques: interest rate derivatives, buybacks, mini-tenders, debt exchanges

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# An Approach to Financial Innovation in the U.S. Treasury Market

- Identify areas of excess net product demand and unfilled investor niches
- Pricing analytics
- Limit rollover risk
- Lower interest cost volatility
- Expand investor base
- Liquidity
- Distribution Methods
- Time to develop market
- Ease of accounting and taxation mechanics for the U.S. Treasury and investors

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**Net Demand:** The market itself can be helpful in identifying opportunities for innovation. Potential new securities and innovations should be subject to rigorous “net demand testing.” Some underlying sources of demand are: duration, yield enhancement, protection, convexity, and market completeness.

- **Duration.** Insurance companies and some pension plans typically have very long dated, highly predictable liabilities. They face a scarcity of high quality debt instruments with which to fund these liabilities. Ultra-long bonds and associated strips could be a source of supply.
- **Yield.** Recently, financial turmoil and deleveraging has led to cut backs in issuance by some of the traditional sources of high-quality spread products: GSEs, mortgage, asset backed originators, and corporations. Meanwhile, yields are near historic lows and credit spreads have compressed to pre-crisis levels. These factors combine to create demand for instruments such as callables that offer enhanced yield.
- **Protection.** Many deposit-taking institutions have floating rate liabilities funded by fixed rate assets. They are exposed to losses in a rising rate environment. Individuals with floating rate mortgages are also exposed to rising rates.
- **Volatility and convexity.** Some entities such as mortgage servicers and insurance companies may have negatively convex earnings profiles. Such entities could offset this some of this risk by adding options and positively convex securities to their portfolios. Puttable bonds and ultra-long bonds could be sources of convexity.
- **Completeness.** Investor demand is generally more evenly spread across the maturity spectrum than supply, which is impacted by a combination of historical issuance patterns and the business cycle. This offers issuers an opportunity to fill in gaps in the existing yield curve, e.g. no current 20yr, with new maturities and to smooth out rollover bulges with buybacks.



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# Ultra-Long Bonds: Main Conclusions

- **Demand.** There is significant demand for high-quality, long-duration bonds from entities with long-duration liabilities such as insurance companies and pension funds.
- **Strips.** The arithmetic of the maturity-duration relationship (duration rises much more slowly than maturity for ordinary coupon bonds) suggests that if ultra-long bonds are issued, they be made strippable (the duration of strips rises linearly with maturity).
- **Pricing.** Dealers can determine where they see demand for the P-strip and then work backward to determine where to bid whole ultra-long coupon bond auctions.
- **Distribution.** P-strip demand will give dealers a solid basis for bidding ultra-long coupon auctions. Syndication methods have been successful in other countries and could further support the distribution process but normal reverse Dutch auction process may also be sufficient.
- **Costs.** Ultra-long bond yields are unlikely to be significantly higher than those in the 30yr sector, keeping issuing costs down. Spreads in the U.S. swap market and in overseas ultra-long bond markets are very tight to 30yr rates.

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# Long-Duration Liabilities vs. Assets: the case of insurance companies and pension funds

- **Assets**

- Duration of insurance company assets is typically: 6-10 years.

- **Liabilities**

- Duration of liabilities is typically much longer than 6-10 years and is actuarially relatively stable, inviting cash-matching funding strategies.

- **Sources of long-duration liabilities**

- Long term care (you pay up front and are covered in old age)

- Term life insurance: 20-year term is most popular and some companies offer 30-year term.

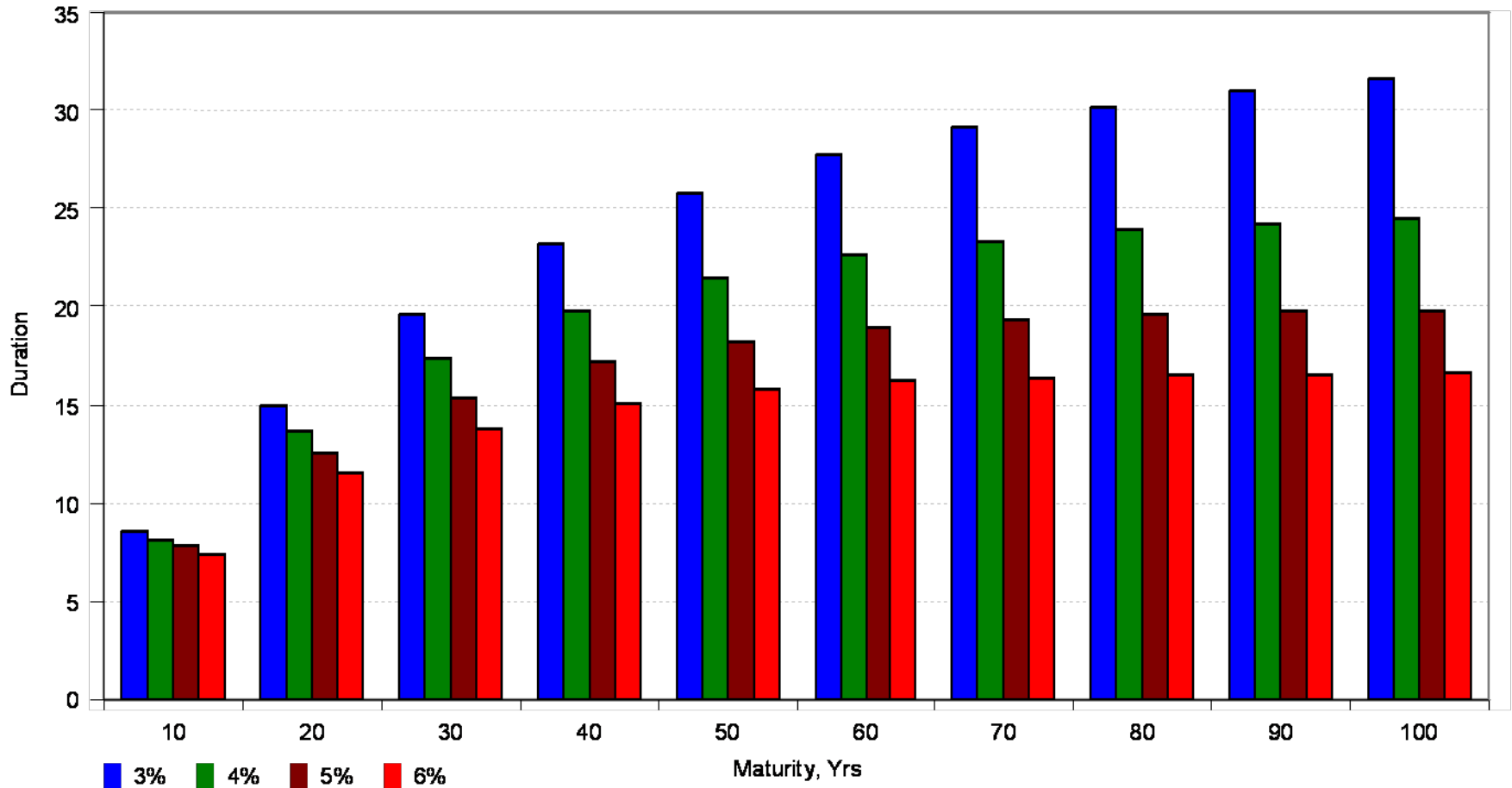
- Permanent life policies.

- Annuity products increasingly contain secondary guarantees such as of guaranteed minimum death benefits.

- Defined benefit pension plans.

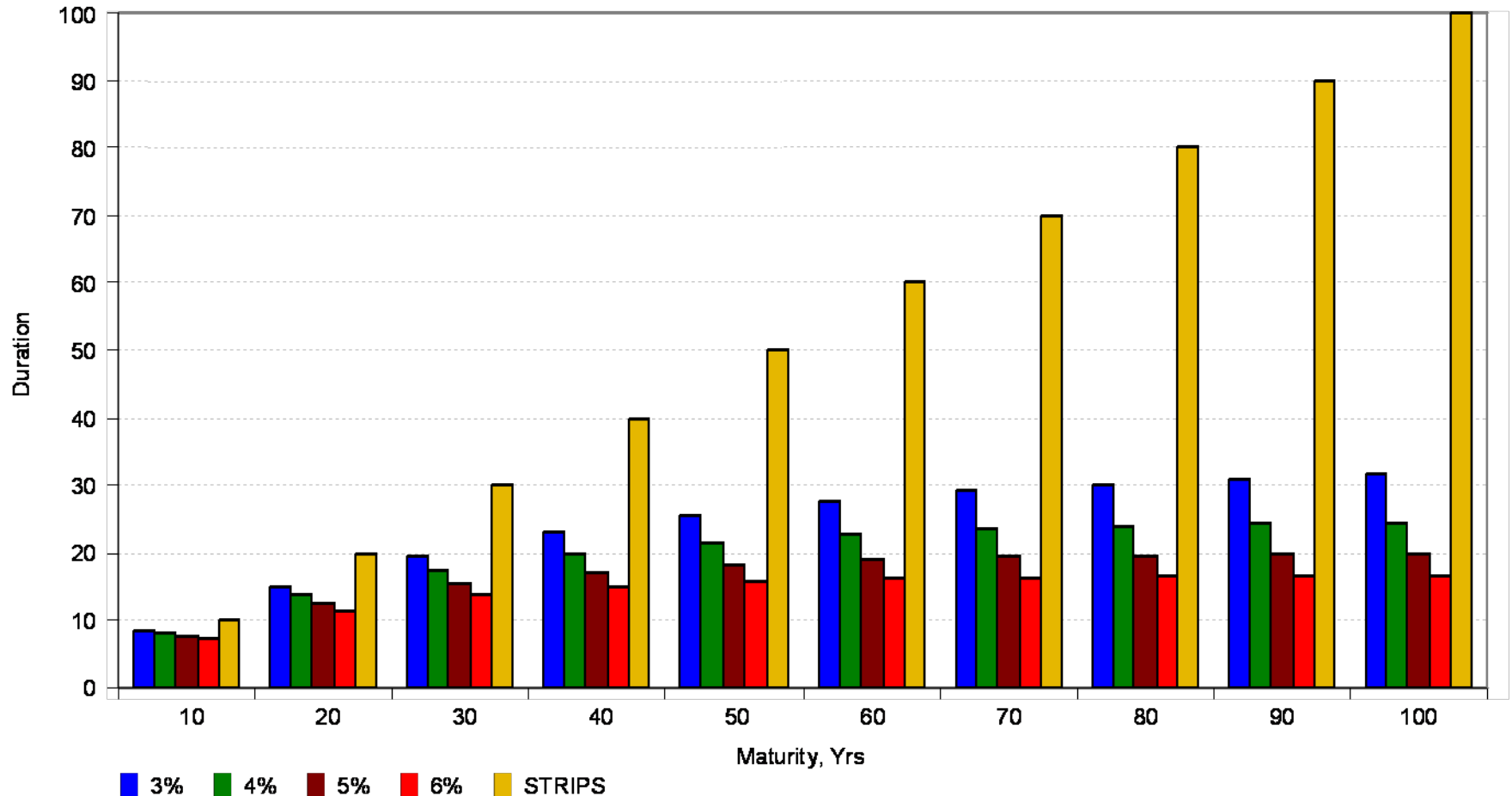
# Ultra-Long Analytics: Duration tapers off rapidly with maturity. This effect is greater at higher coupons.

Duration vs. Maturity at Various Coupons

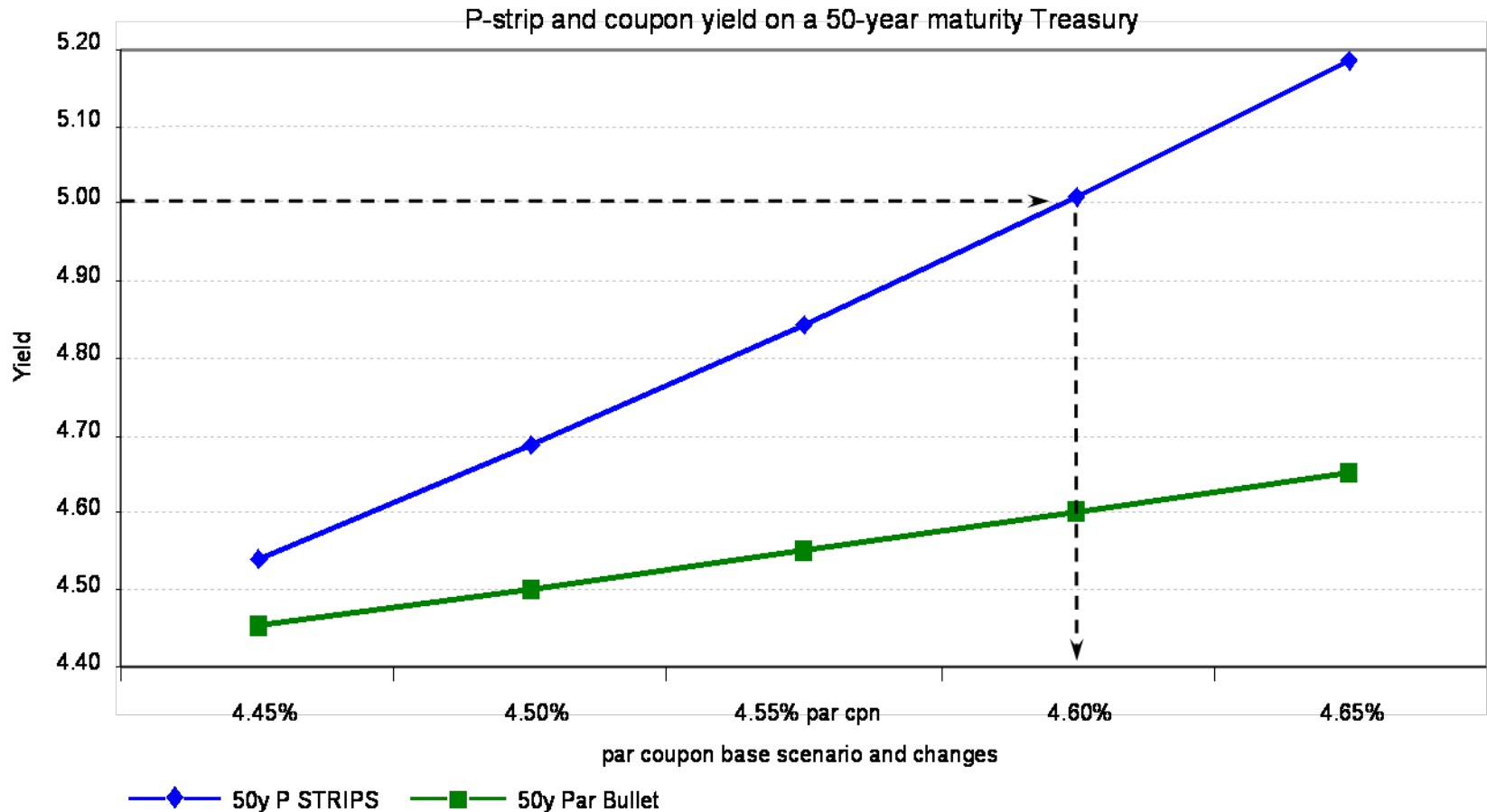


# Make Ultra-Longs Strippable: STRIPS duration, however, is a linear function of maturity, making STRIPS a good tool for increasing duration and for liability cash-matching

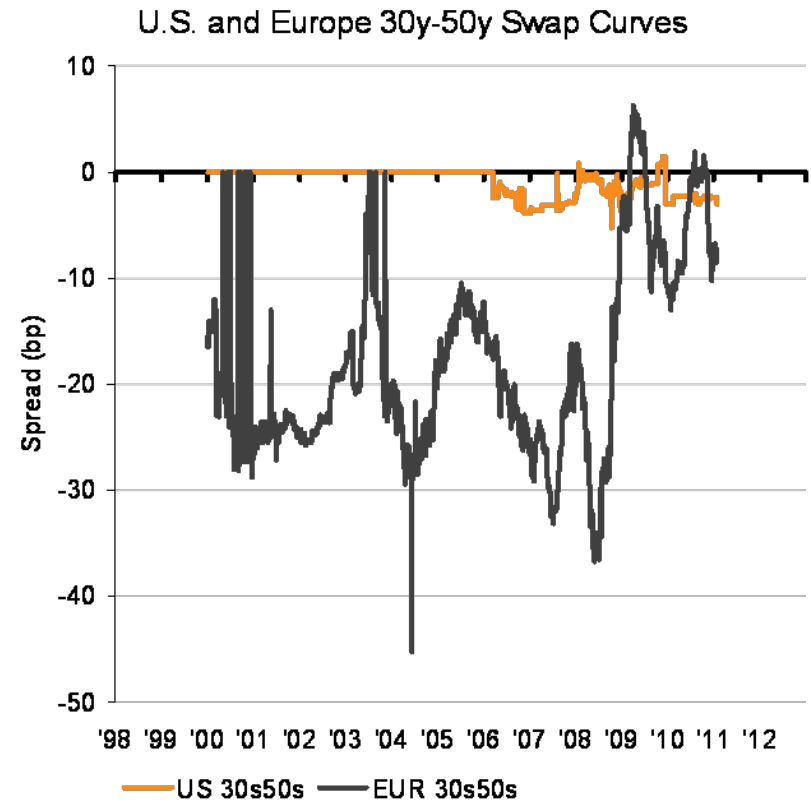
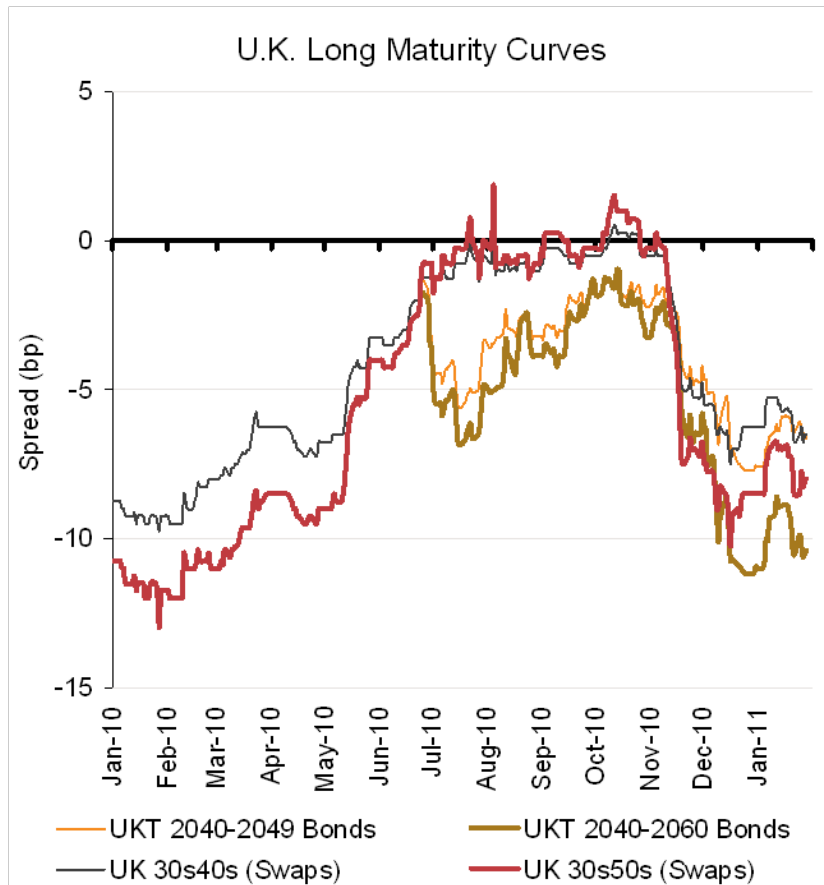
Duration vs. Maturity



**Pricing Ultra-Longs:** Dealers determine the demand for P-strips by investors at various yields and then decide where to bid for the ultra-long coupon issue, e.g. a 5% P-strip on a 50 year bond should have a coupon of around 4.60%

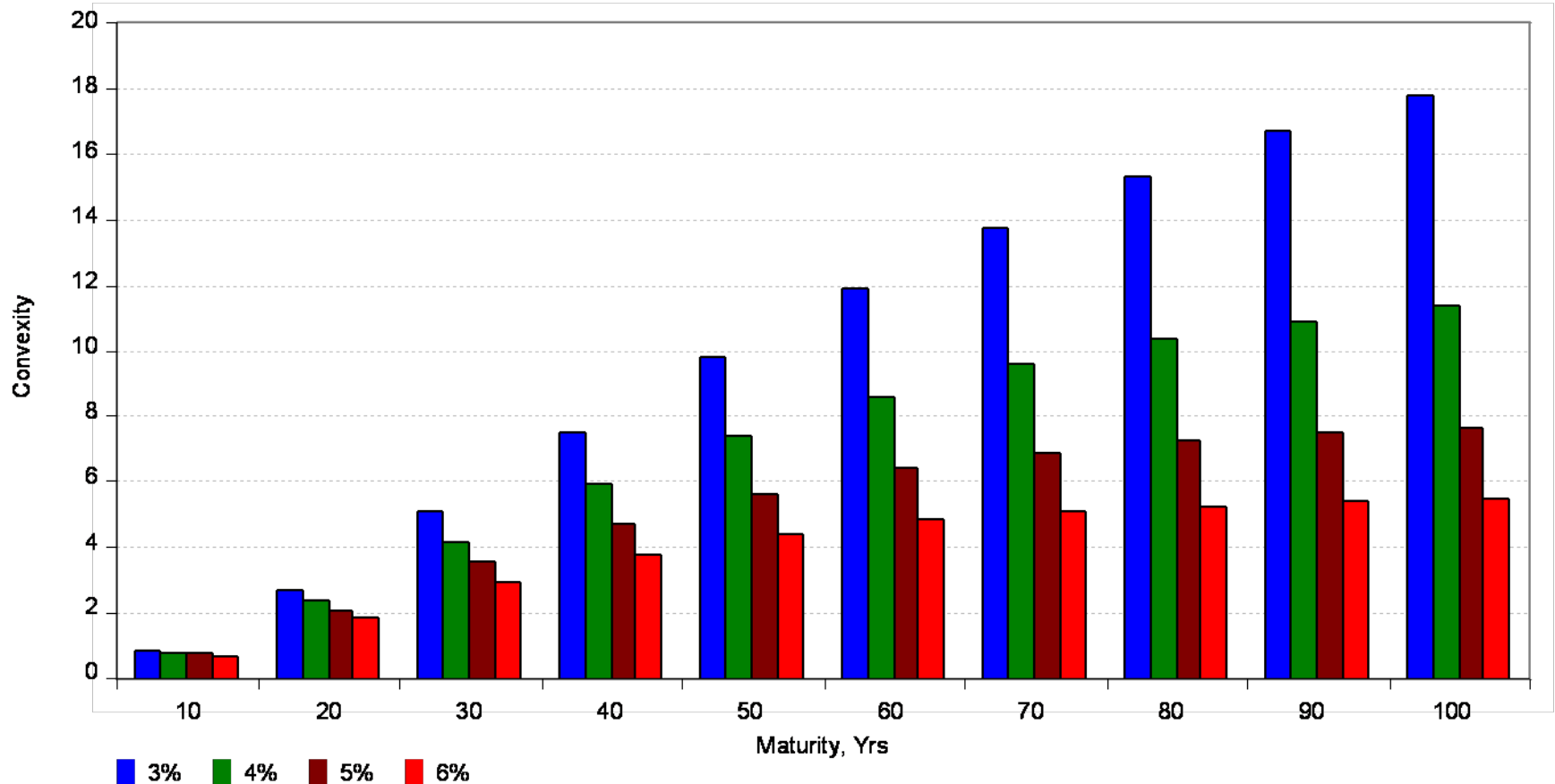


**Ultra-Long Spreads to 30yr Maturities:** Global 30y-50y swap and cash (U.K.) curves show that ultra-longs typically trade at lower yields than 30yr maturities. Dealers and Investors could use the swaps market to help price new and existing ultra-long debt issues.



**Convexity:** Ultra-long bonds are potential sources of convexity. Entities such as insurance companies and mortgage servicers have negatively convex earnings profiles.

Convexity vs. Maturity



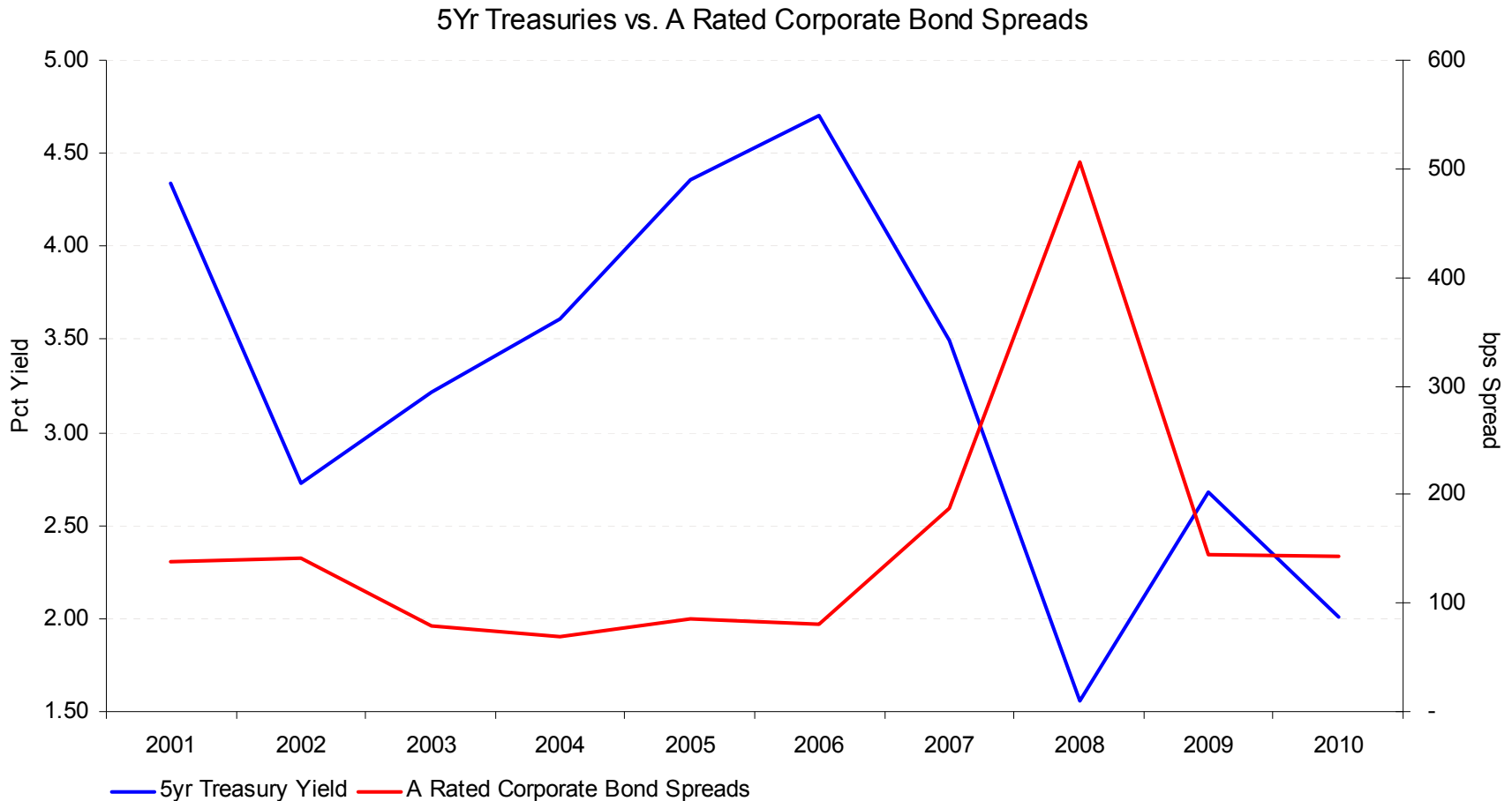
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# Callable Bonds: Main Conclusions

- **Demand-supply gap.** Callable Treasuries could fill an emerging gap between demand and supply.
  - Demand for instruments offering enhanced yields is being driven by the absolute low level of yields, spread compression, and regulatory changes.
  - Net supply of high quality spread product, including callables is likely to continue to fall due to the drop in issuance in the Agency, MBS, and structured product markets.
  - The demand for volatility has decreased due to falling home mortgage issuance and Treasury callable issuance can fill this gap.
- **Replacing GSE supply.** Treasuries are relatively close substitutes for Agencies.
  - The greatest opportunities for callable Treasury issuance may lie in the maturity ranges and lock outs that have been previously mapped by the GSEs. Popular maturities are 2-5 years and the lock outs are 6mo or 1yr.
- **Corporate callable issuance.** There may be demand for a regularly issued callable long maturity Treasury.
  - The bulk of the outstanding callable corporate bonds carry ratings of BBB or lower, making for less substitutability between them and Treasuries.
  - Corporate issuance is somewhat irregular. Corporate issuers generally tailor securities to suit their specific needs in terms of maturity and lockouts (project finance or cash outflow) rather than those of buyers.
- **Cost.** Pricing models suggest the incremental cost to Treasury of issuing callables is manageable, eg 18 bp for a 5yrNC1yr and 8 bp for a 2yrNC6mo.
- **Risk.** Demand for callables tends to fall off if investors expect rates are heading higher. Investors generally expect (hope) to be called. Once a rate-rise cycle gets underway or market volatility increases, Treasury may have to offer higher yield enhancement to maintain a regular issuance program or be willing to curtail the program.



# Treasury Yields are Low and Corporate Bond Spreads are Compressed, Increasing Demand for Yield Enhancement



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**Net Supply of High Quality Assets:** Trending lower even before  
QE2 removes \$600bln in Treasuries through June 2011

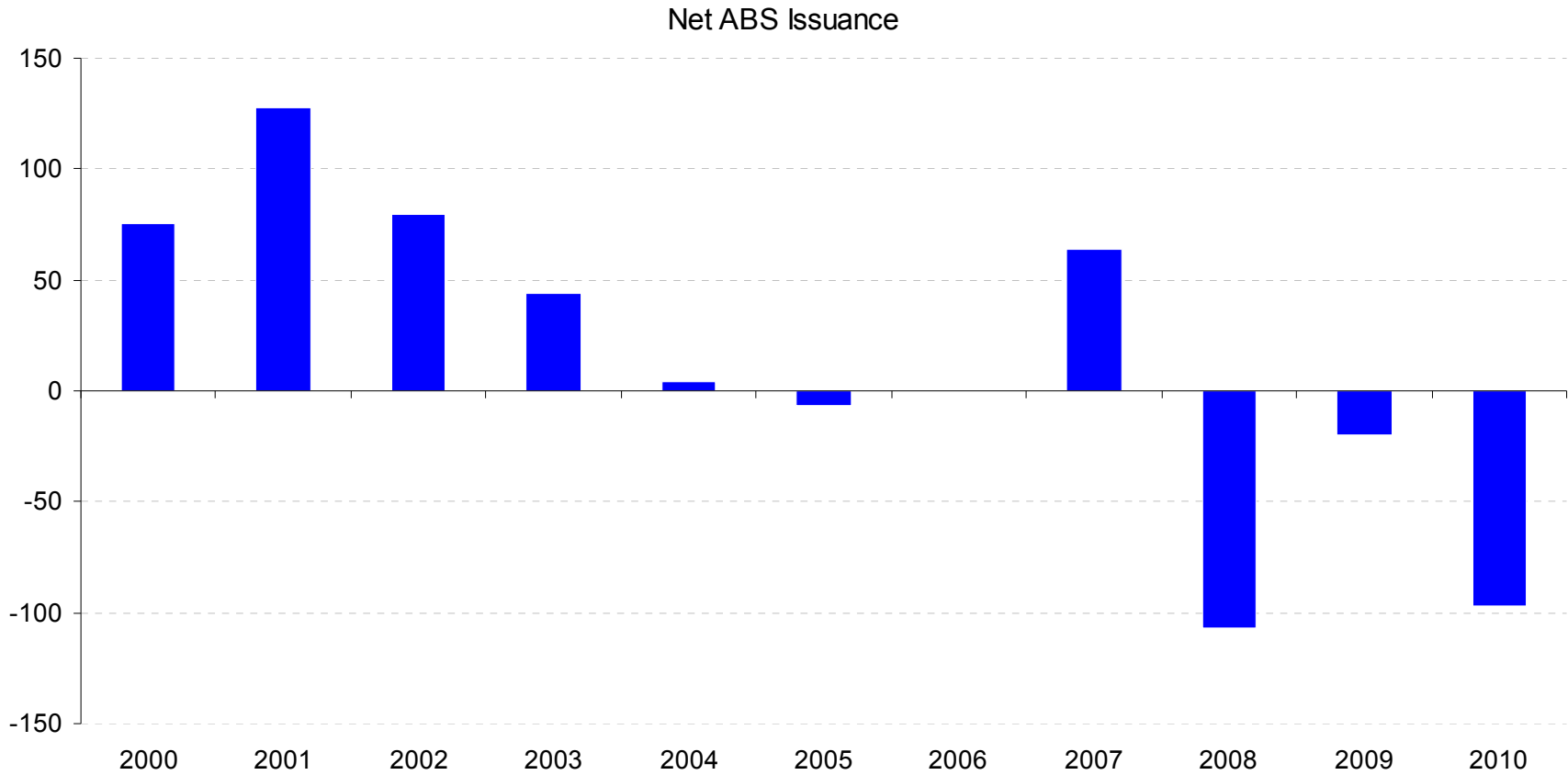
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<b>(bln)</b>	<b>2009</b>	<b>2010</b>	<b>2011</b>
Treasury	1284	1600	1200
Agency	-17	-202	-120
Agency MBS	445	-65	100
IG Corporate	239	286	159
<b>Total</b>	<b>1951</b>	<b>1619</b>	<b>1254</b>

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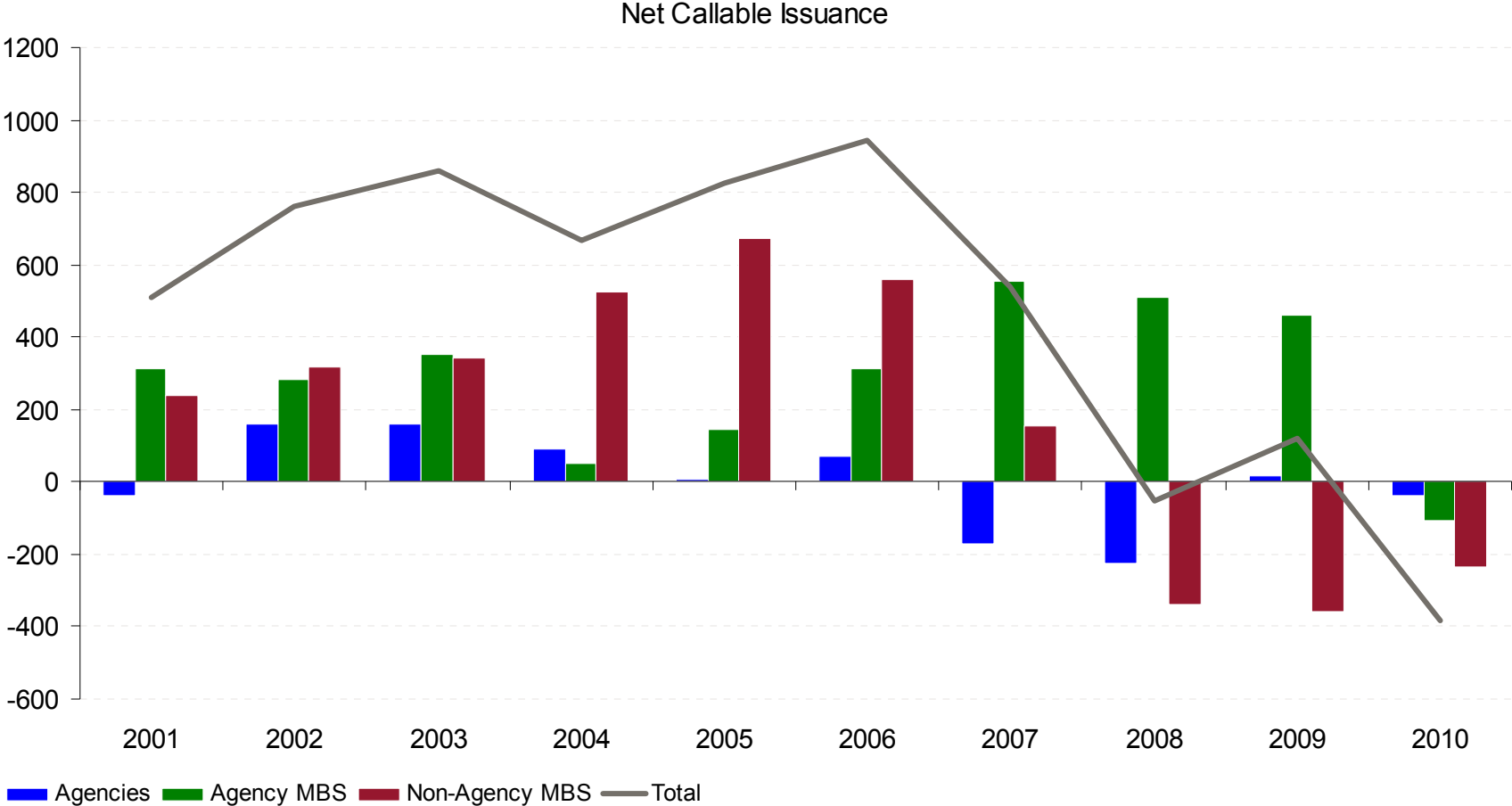
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# ABS Has Also Seen Negative Net Issuance (2010 net -\$97bln)



Includes Auto, Credit Card, Equipment, and Student Loan ABS.

# Overall Net Callable Issuance Declined in 2010 by \$384 bln



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# Agency Callables: A Closer Look at Investors

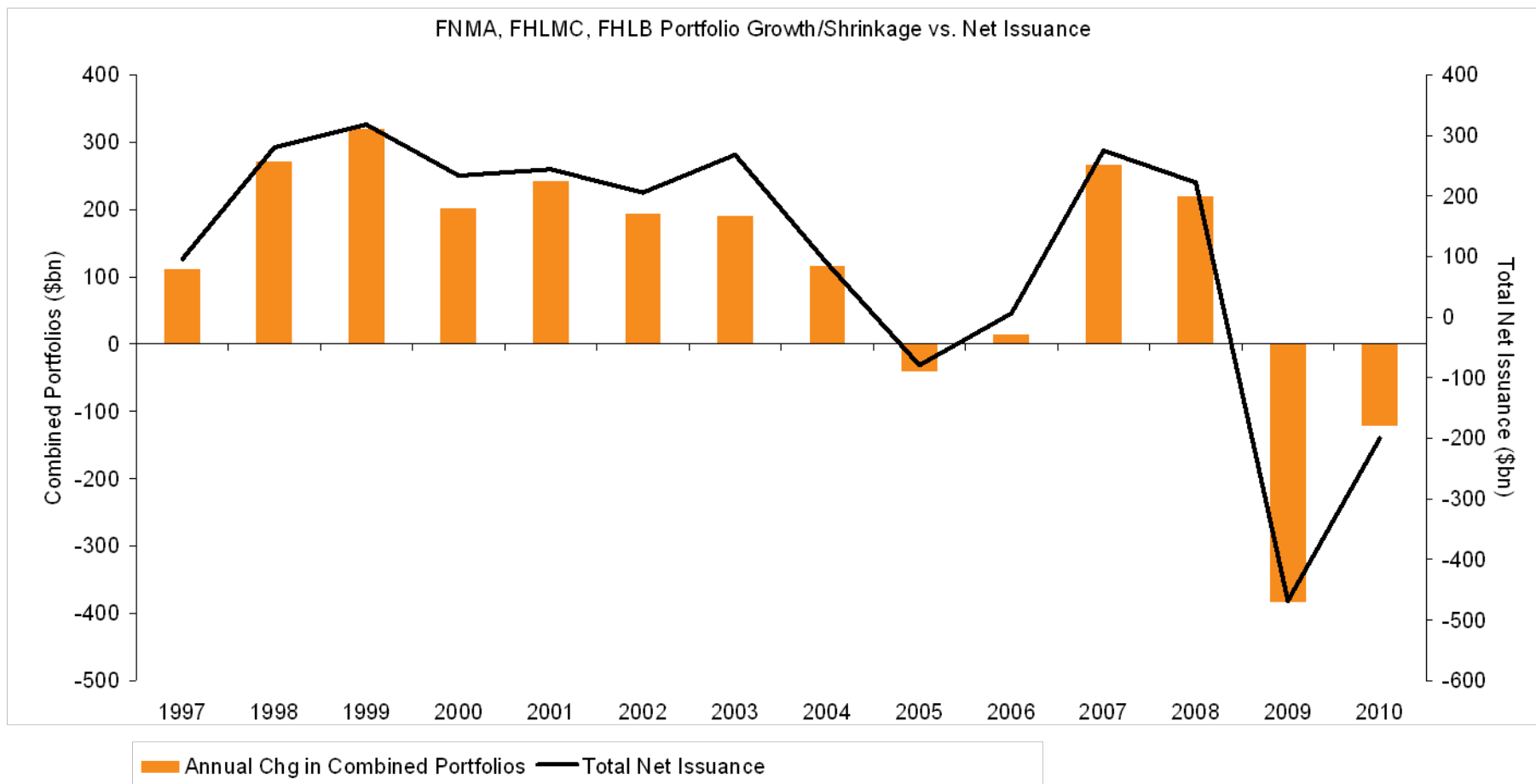
- **Domestic banks** – larger banks buy short maturity, liquid, high credit- quality product to enhance yield. Recent regulatory changes such as Dodd-Frank and Basel III will increase demand significantly in Treasury-based liquidity portfolios. Some smaller banks will purchase short lockout callables with maturities of 15yr as a substitute to mortgage loans.
- **Foreign Banks** – are opportunistic. Demand is strong when rates are low but tends to fade when rates rise and calls go out of the money.
- **State and local governments** – need securities with high liquidity, very high credit quality, and enhanced yields. They are often required by law to buy Treasury or GSE securities. Maturities favored are generally 3yrs and shorter; 6 month lock outs are favored but some entities will be opportunistic for yield pick up.
- **Fund Managers** – will overweight callables in order to attempt to outperform their index.
- **Insurance Companies and Pension Funds** – buy callable agencies opportunistically as a potential substitute for corporate bonds.
- **Foreign investors** – many foreign investors have backed away from the Agency market due to uncertainty surrounding future status of GSEs. Callable Treasuries might be welcomed by many of these former GSE buyers.

**Underlying Demand for Callable Agencies:** In 2010, gross issuance of Agency callables was \$829 bln; net issuance was negative. In 2010, a huge volume of Agencies were called as rates fell but the GSEs were able to replace most of them with new callable issues, indicating strong underlying investor demand.

<b>Gross 2010 Issuance</b>					
<b>\$bn</b>	<b>FNMA</b>	<b>FHLMC</b>	<b>FHLB</b>	<b>FFCB</b>	<b>Total</b>
<b>DNs</b>	446	482	1,216	416	2,144
<b>Bullets</b>	91	60	150	15	300
<b>Callables</b>	<b>309</b>	<b>219</b>	<b>301</b>	<b>72</b>	<b>829</b>
<b>Floaters</b>	63	53	82	32	198
<b>Total Non-DN</b>	463	331	533	118	1,327
<b>Total</b>	909	813	1,749	534	3,471

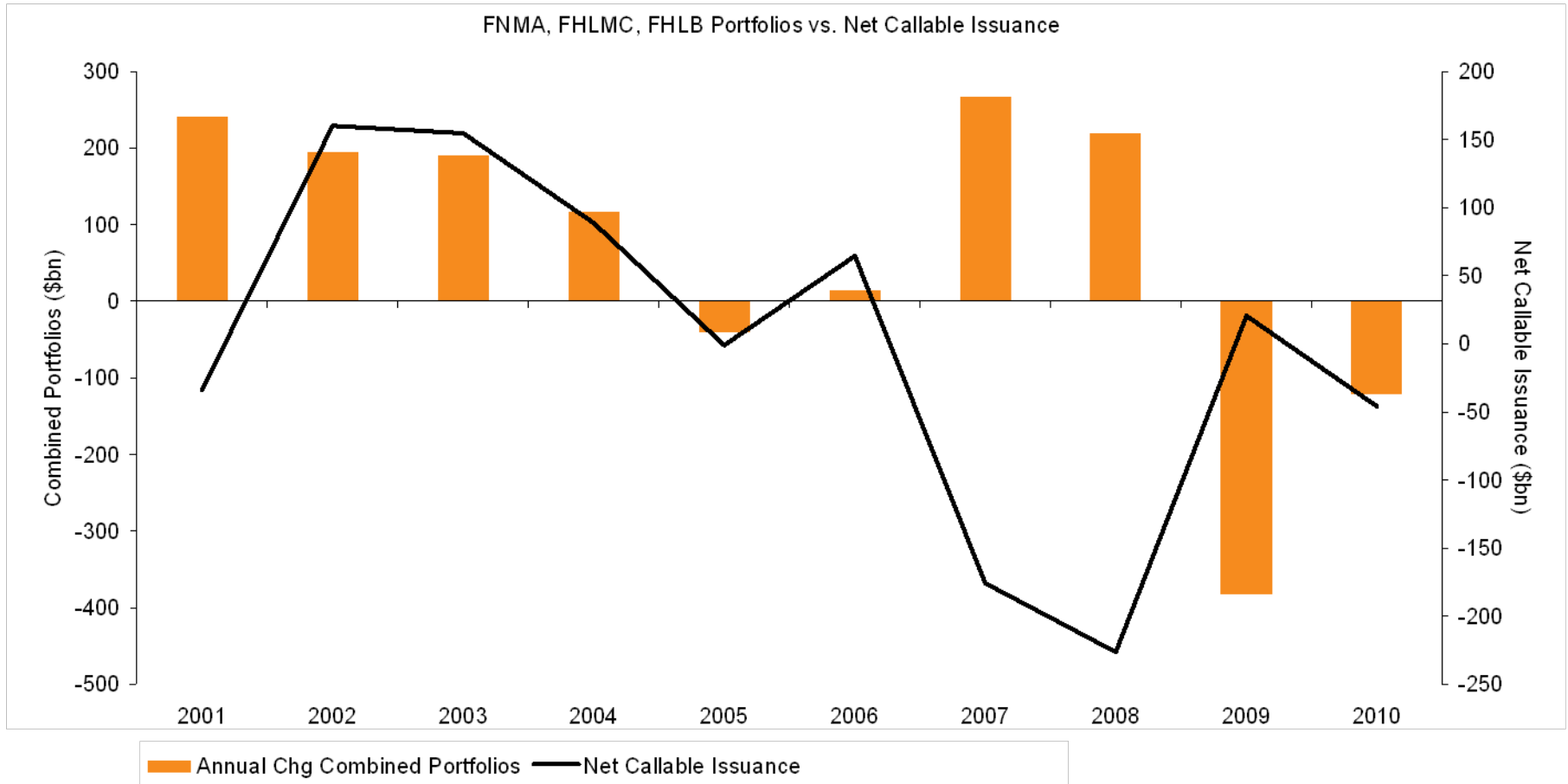
Note: FNMA estimated for Dec.

# GSE Portfolio Changes Drive Net Issuance Overall...



Note: FHLB is the combination of the advance and investment portfolios. Issuance includes discount notes, bullets, callables and floaters.

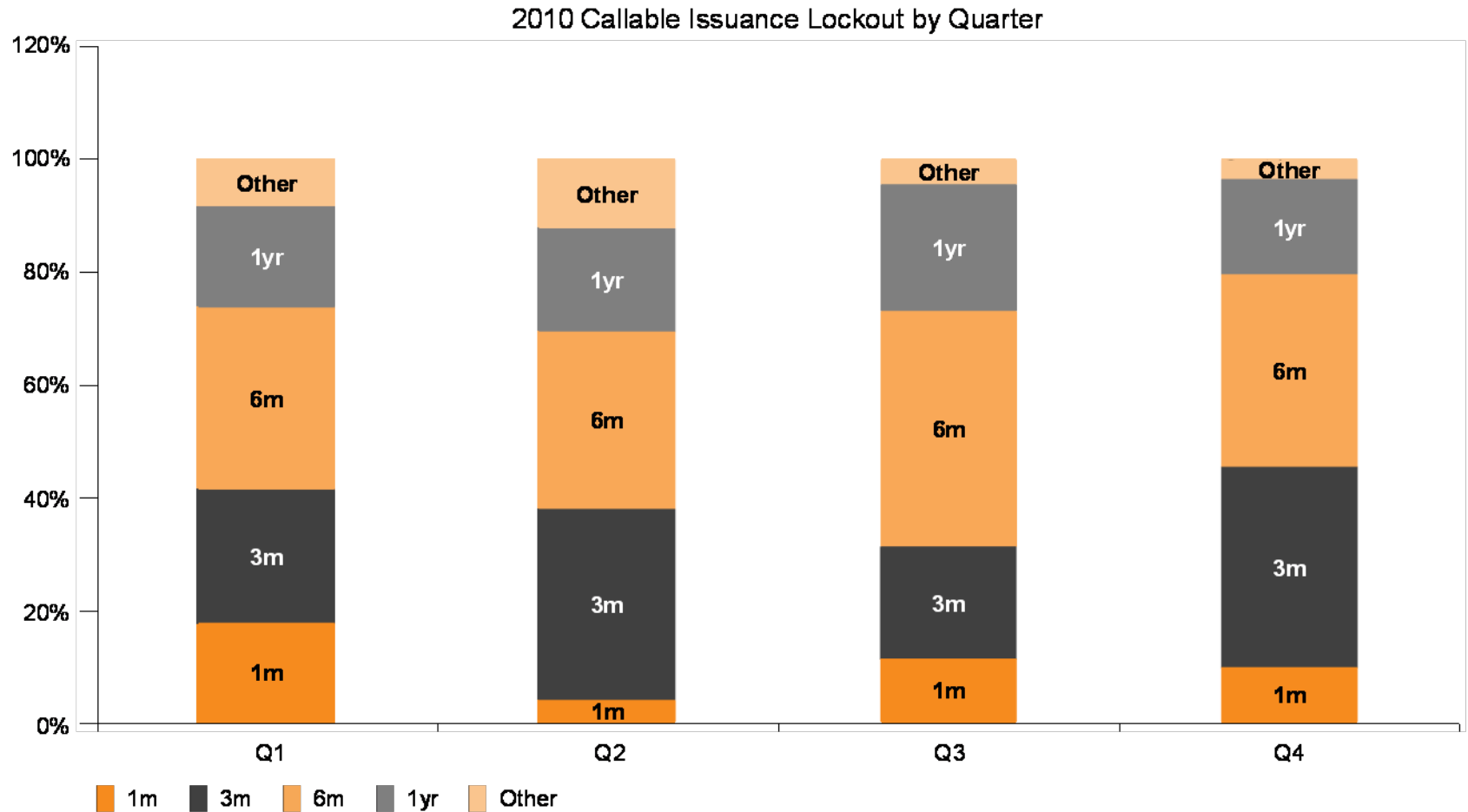
## ... Including Net Callable Issuance



Note: FHLB is the combination of the advance and investment portfolios. Issuance includes discount notes, bullets, callables and floaters. The decrease in net callable issuance in 2007/2008 was driven by an increase in FHLB discount note and floating rate notes while callable issuance decreased.



# Structure: Short lockouts (6mo and 1yr) dominate the Agency market



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# Callable Agency Market Liquidity

- The difference between new issue spreads and secondary spreads is 5-10 bp.
- But liquidity has been improving.
  - Deal sizes have increased.
  - Rising number of underwriters.
  - European call structures
  - Shorter maturities

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**Pricing and Cost to Treasury:** Incremental cost of issuing callables in the present Agency-range is estimated to be 8-22 bp according to fair value pricing models. Empirical evidence from the Agency market is consistent with these results.

Estimated Value of Embedded Call Options

	<b>10y NC 5y</b>	<b>5y NC 1y</b>	<b>3y NC 1y</b>	<b>3y NC 6m</b>	<b>2y NC 6m</b>
<b>bullet par cpn</b>	3.559	2.031	1.107	1.107	0.664
<b>forward rate</b>	5.435	2.481	1.515	1.297	0.828
<b>callable par cpn</b>	3.690	2.246	1.229	1.228	0.771
<b>pick-up, bp</b>	<b>13.1</b>	<b>21.6</b>	<b>12.1</b>	<b>12.0</b>	<b>10.6</b>
<b>vol</b>	0.229	0.4036	0.567	0.5	0.76

# Callable Yield vs. Bullets: Historical Spreads

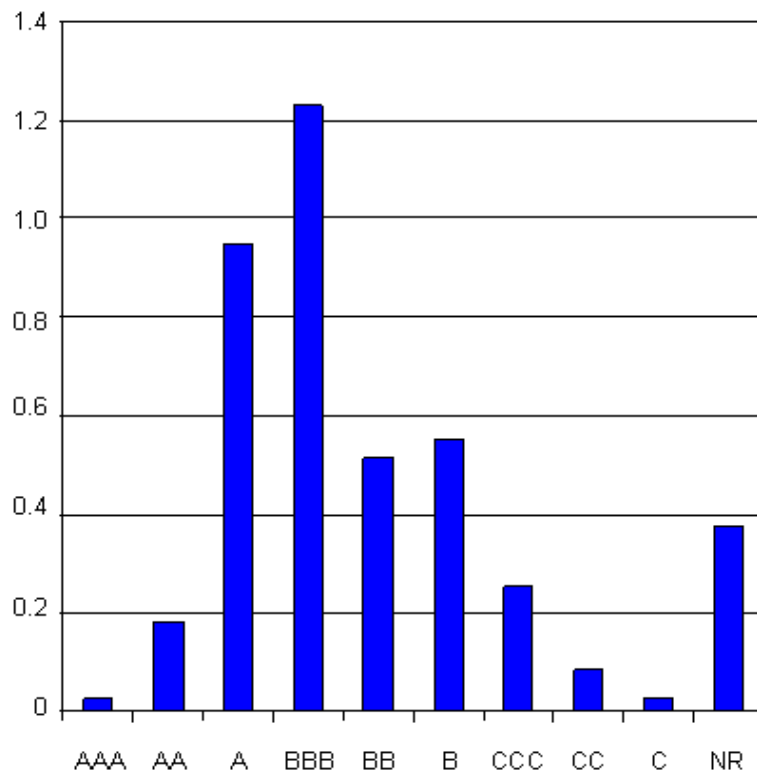
- Yield difference between new issue agency callable yields and par bullets averaged 11-24 bp in 2010 for 2-5yr maturities with European call options.

New Issue Indicative Callable Agency Sprd vs. Similar Maturity Par Agency Bullet (Average Annual Sprd: BP)						
	European Calls with 6 Month Locks			European Calls with 1 Year Locks		
	2/6m (1x)	3/6m (1x)	5/6m (1x)	2/1y (1x)	3/1y (1x)	5/1y (1x)
2005	12	22	30	10	23	34
2006	22	32	40	17	32	45
2007	34	44	53	23	36	49
2008	44	54	57	27	39	48
2009	22	26	37	22	27	38
2010	13	21	22	11	19	21
2011	12	24	21	11	21	17
1/2 1/11	10	21	20	9	20	16
12 M Range (Max vs. Min)	28	27	25	24	27	24

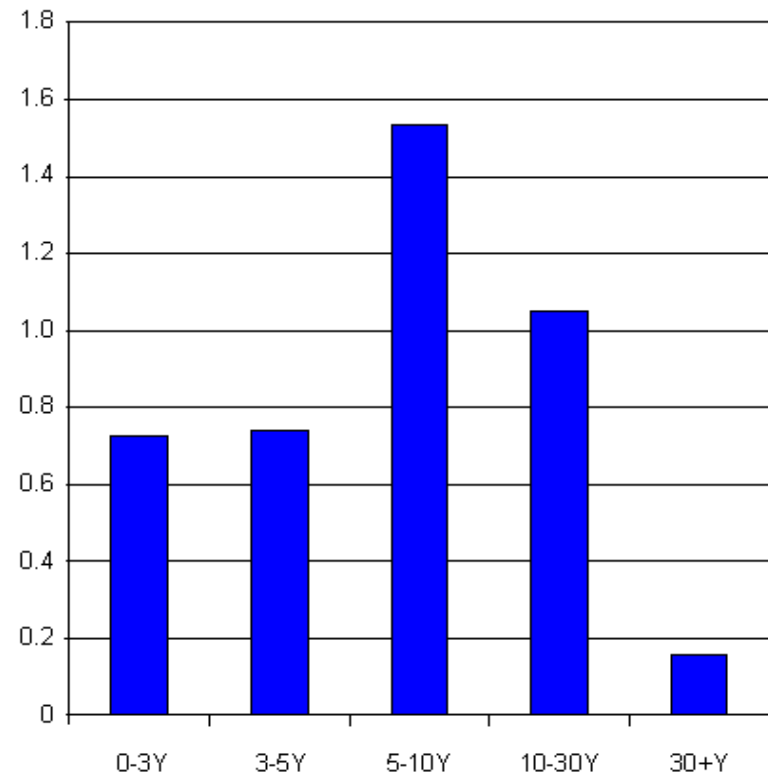
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**Callable Corporates:** The bulk of outstanding callable corporates are BBB or lower. Maturity peaks in the 5-10 year range but is fairly evenly distributed across the maturity spectrum. There may be opportunities for regular Treasury issuance in the beyond 10yr range.

Callable Bonds Outstanding by Rating Category  
(\$ trillion)



Callable Bonds Outstanding by Maturity Buckets  
(\$ trillion)

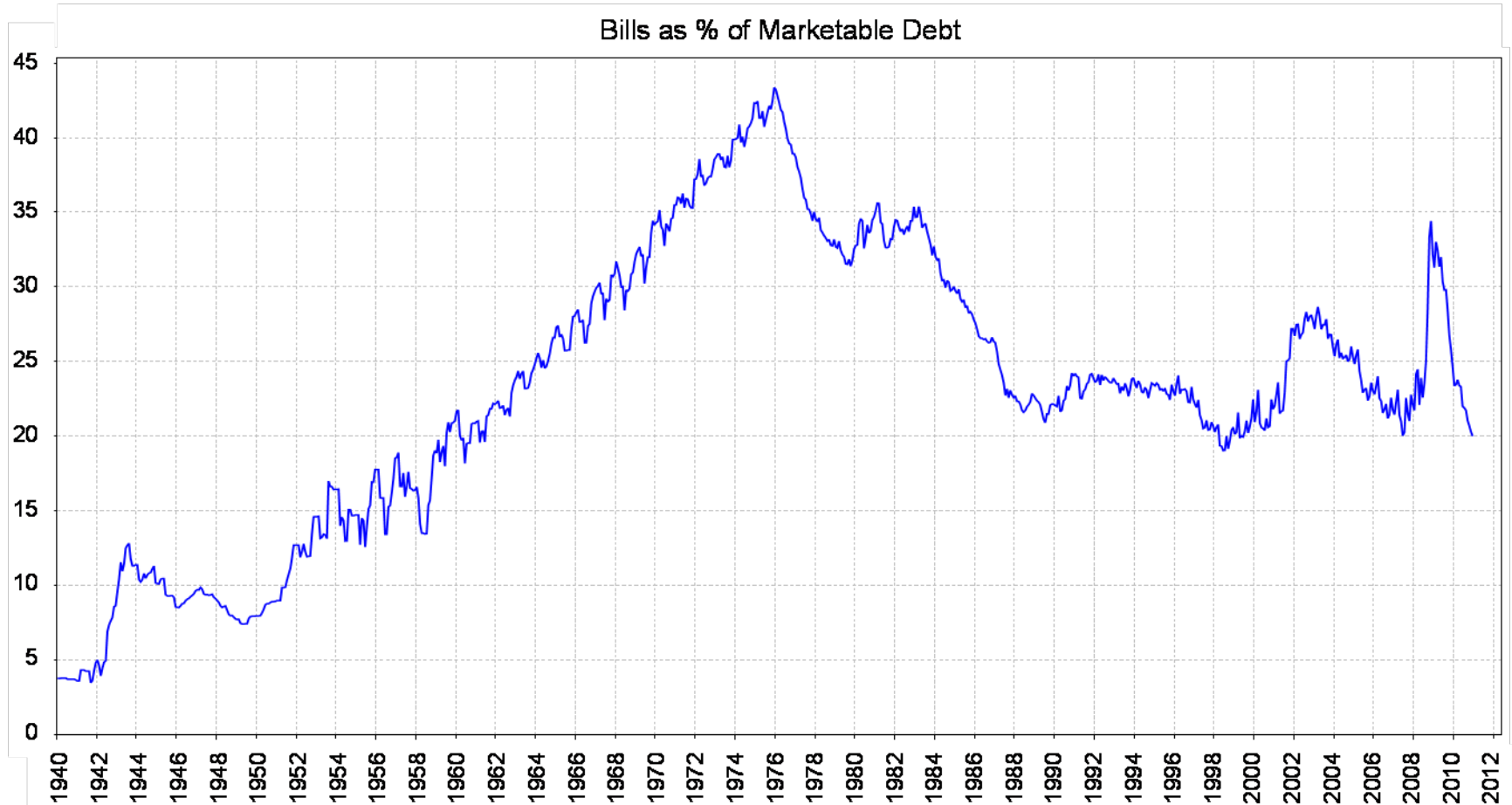


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# Money Market Instruments: Main Conclusions

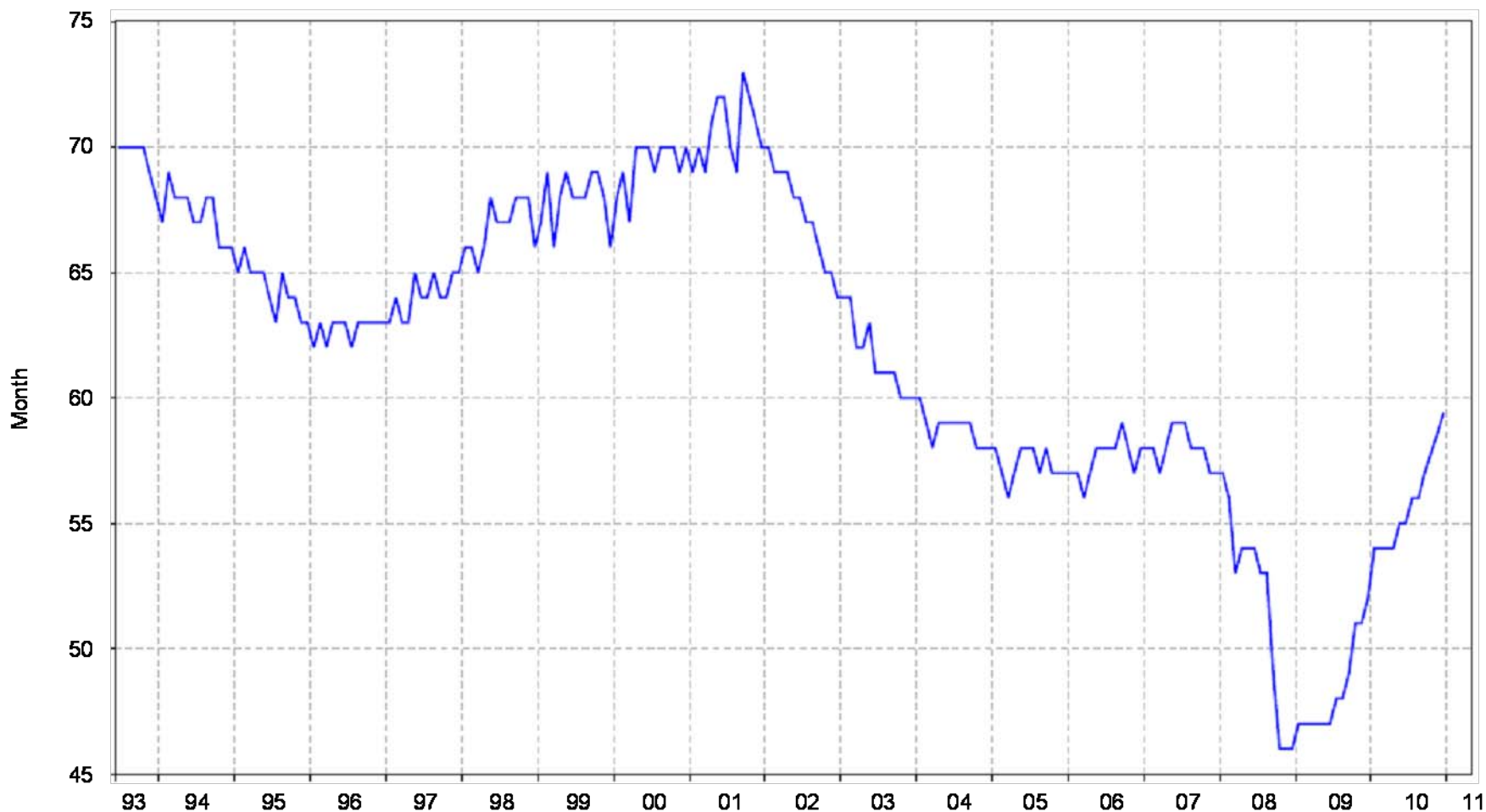
- Regulatory changes are creating new demand for short-term instruments such as Treasury bills and short callables.
  - Estimates of the overall increase in demand for government debt to meet the new liquidity requirements in order to comply with Basel III range from \$400-800 bln.
  - Most of the increased demand is likely to be for short maturity, highly liquid securities, whose risk weighting is zero.
- Money market mutual funds: regulatory changes are requiring them to shorten up on the maturity of their assets.
- Banks et al: at the same time, new regulations require banks and others to lengthen the maturity of their liabilities.
- The demand-supply gap will naturally widen further in a rising rate environment.
- Treasury has room to issue more bills if it desires to do so. Bills outstanding as a percent of total U.S. Treasury debt have returned to pre-crisis levels as has the average maturity of the debt.
- Costs. More bill issuance may conflict with objective of further lengthening the maturity of the debt and expose Treasury to rollover risk and higher funding costs in a rising rate cycle.

# Room to Issue More Bills: T-bills as percent of marketable debt have fallen back to around 20% from the almost 35% of 2008/2009



# Room to Issue More Bills: The average maturity of Treasury debt held by the public is up to ~59.5 months

United States, Maturity Distribution of Publicly Debt Held, average length, USD





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# Regulatory Paradox: Regulations are creating a possible niche for increased bill and callable issuance targeting money market mutual funds

- **Money Market Mutual Funds (MMMFs)**

- SEC 2a-7 regulations requires the MMMFs to shorten the term of their assets by bringing the weighted asset maturity to 60 days from 90 days and to maintain 30% of their assets have to mature within 7 days.
- This has increased the MMMFs demand for short-dated securities.

- **Banks and others**

- Basel III requires banks to lengthen their liabilities.

- **The gap**

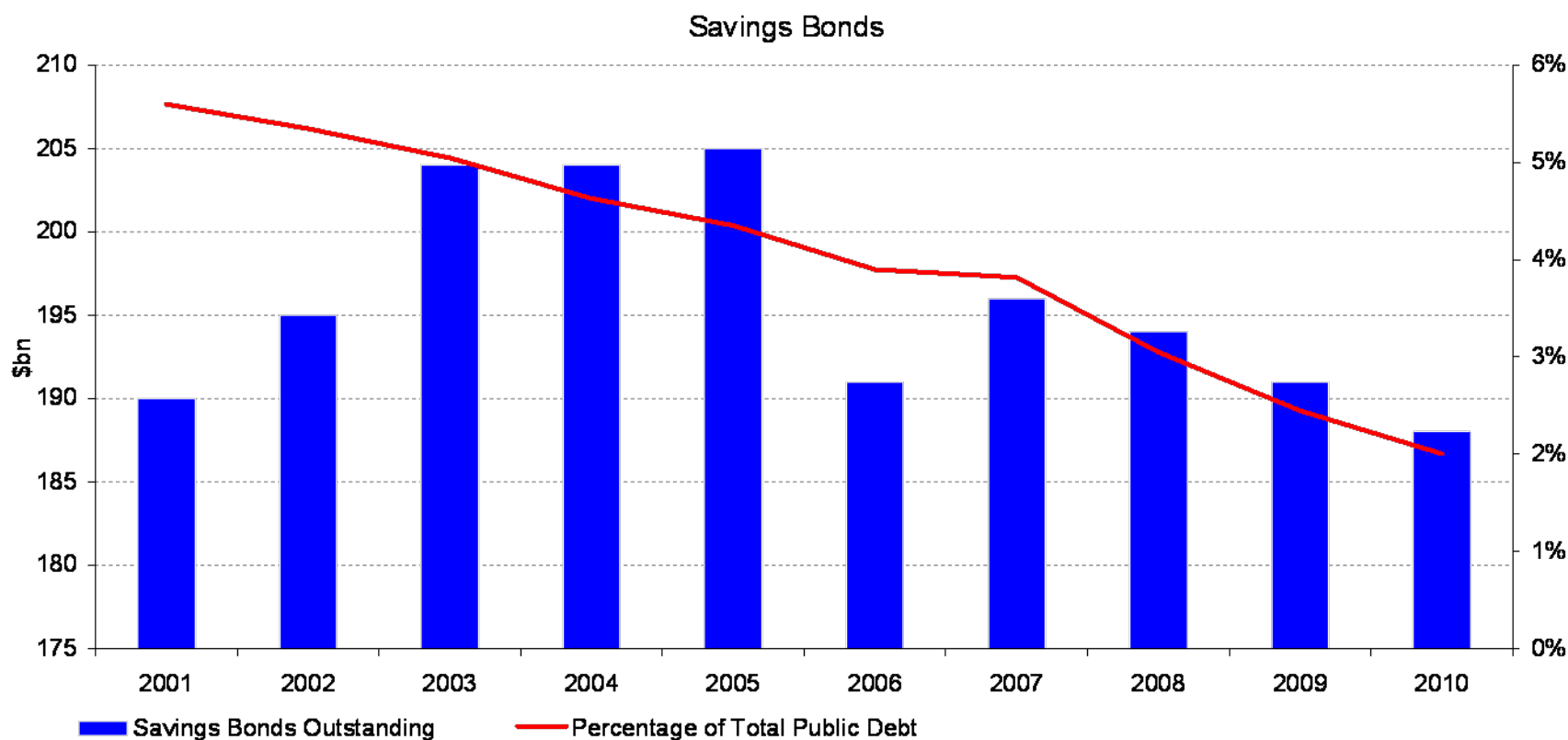
- There may be room for increased bill and callable issuance to fill the emerging gap between MMMFs and issuers that will be created by new regulations.
- This gap will naturally widen (MMMFs will want more short paper and banks and others will want to lengthen liabilities) if market participants expect that we are entering a rate hike cycle.
- Puttable securities with puts exercisable every 60 days would find interest among MMMFs and offer a lower nominal initial interest rate for the U.S. Treasury.

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## Bonds for Individual Investors: Main Conclusions

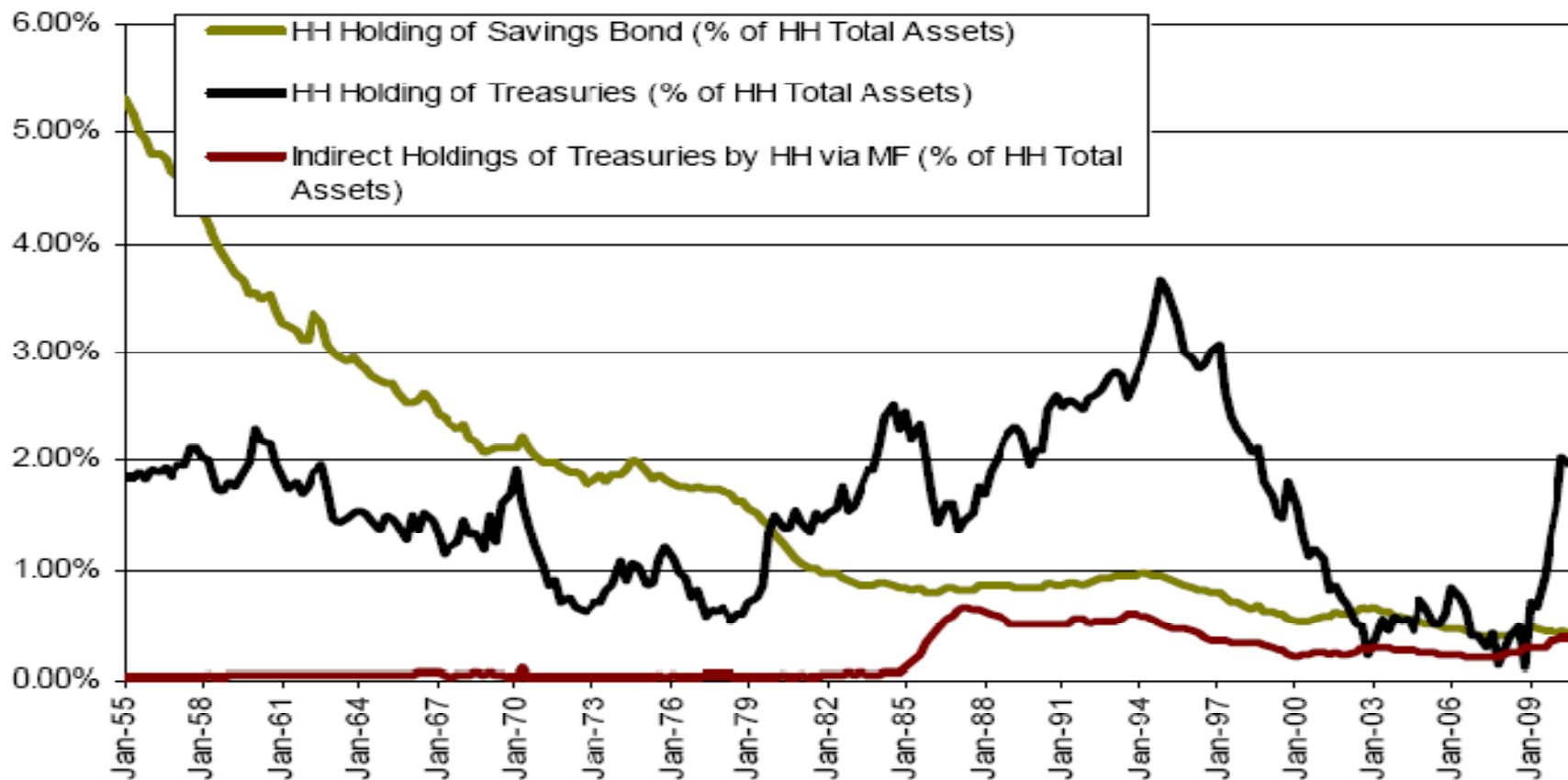
- Increasing household ownership of Treasuries has the potential to broaden the investor base significantly. Each 1% increase holdings as a percent of household assets = ~\$535 bln.
- Holdings of Treasuries by households are up sharply since the financial crisis and demographics favor further increases in the long run.
- But household holdings of savings bonds has been relatively stable for the past few years at low levels (\$190 bln).
- Households now have many, more liquid alternatives to savings bonds, which are simpler and which do not face severe penalties for early redemption.
- Treasury should focus on instruments that appeal to both households and institutional investors.
- It should consider stepping up marketing initiatives, including increased advertising geared toward retail investors, and it should consider new types of issues.

## Savings Bonds: Savings bonds outstanding are at the lowest level in years, and an increasingly small share of Total Public Debt



# Household Holdings of Treasury Debt has Increased Recently

HH Holdings of Treasury Debt % HH Total Assets



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# Floating Rate Securities with Short Dated Reference Rates: Main Conclusions

- A floating rate instrument, whose reset and reference rate are the same, eg a 6 mo reset with the 6 mo bill rate as its reference rate, would be a “convenience” product, allowing both individuals and institutions to avoid the inconvenience of rolling bill positions or incurring transaction costs in the secondary market.
- Holders would not be exposed to the significant curve risks associated with CMT-style floating rate instruments where there is a mismatch between reference rate maturity and reset frequency.
- Institutional demand for such instruments could be strong based on the likely increase in holdings of short term, high quality assets required by Basel III. And, there is a dearth of default-risk free floating rate assets.
- Demand will likely increase if rates are expected to rise.
- From Treasury’s point of view, such instruments are attractive because they reduce rollover risks.
- Treasury could set the maturity based on the distribution of its future redemptions to lessen market congestion. 5yr and 10yr maturities look promising from this point of view.
- For Treasury, these floaters do not of mitigate against increased debt service costs in a rising rate environment, but neither do they increase them.
- From a liability management perspective, floaters offer a counter-cyclical component, i.e. typically rates will rise in a stronger economy, and at the same time federal tax receipts will be increasing - mitigating the rise in debt-servicing costs.
- We assume that no fixed-margin discount or premium would be applied to the reference rate, implying that the convenience for investors and the advantages to Treasury are about equal, but this may not always be the case.

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**CMT-Style Floaters:** The reference rate is generally on a maturity that is much longer than the reset period, eg a 5yr reference rate and a 6 mo reset period. Japan and France have tried these with mixed success.

**Sample term sheet:**

- Maturity: 10yrs.
- Reference rate: 5yr auction rates set in the period just prior to the reset date.
- Margin: A “margin” is set at auction, which is subtracted (or added to) from the reference rates. The margin is fixed for the life of the bond.
- The margin reflects investors’ demand for floating rate assets at a spread to their floating rate liabilities.
- Floor: Future coupon payments can not go below zero.

**Demand:**

- These securities may be demanded by deposit-taking entities, which have floating rate liabilities that they fund at a spread using fixed rate assets. Such instruments give them a spread pick up and some protection from rising rates.
- Individuals, especially those who expect rising rates or who have floating rate mortgages, may also find these securities attractive.

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# Analytics: CMT-style floaters are simple to describe but relatively complex to price

- Computing the “fair value” of a CMT-style floater:
  - Extract the discount factors (zero coupon rates) associated with future coupon and principal payments from the current yield curve.
  - Estimate the expected future coupon payments from the current forward curve, making the usual adjustment for convexity.
  - In the case of a 10yr floater indexed to a 5yr reference rate with a 6mo reset, we need 15 yrs of discount factors and associated expected forward 5yr rates.
  - To value the zero-floor on coupon payments, we need to value an associated string of options on the index rate.
  - Volatility enters the valuation through its impact on the value of the floor and in the convexity adjustment.
- Sensitivity to the slope of the yield curve:
  - The fair value of CMT floaters is relatively sensitive to changes in the slope of the yield curve, increasing when the curve steepens and falling when it flattens.
  - This is because an increase in a zero coupon rate has two opposite effects on the fair value of a CMT-style floater:
    - A negative effect operating via the higher discount factors
    - A positive effect operating via the implied higher coupons
    - For shorter maturities, the discount effect dominates the coupon effect, but as maturity increases, the higher implied coupon effect dominates.
  - One implication of this is to avoid exceptionally long maturities for both the floater itself and the reference rate because this exposes deposit-taking entities to large and likely unanticipated changes in the very long end of the yield curve. This happened, for instance, in Japan.

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# GDP-Linked Bonds: Interesting but need more research to assess their potential

**Premise:** A GDP-linked bond pays a coupon based on a nation's growth. For example, if trend growth is 3%, and a nation regularly borrows at 7%, a GDP-linked bond's coupon will be 7% +/- the GDP deviation from trend growth (3% in this example).

## **Pros:**

- Dampens the relationship between the business cycle and interest expense.
- Reduces the pro-cyclicality of government spending by decreasing coupon payments in economic contractions, and vice-versa in economic expansions.
- Allows investors to express a view on the economy's future growth and may derive demand from equity index investors.

## **Cons:**

- Complicated structure, difficult to price. Premium may be required due to volatility of cash flows.
- Debate as to whether to adjust to the rate of growth of GDP, or the level of GDP.
- Economic data, which is the basis of the reference rate, is frequently revised.
- If GDP is strong, and coupons increase, investors may be concerned that the sovereign will "call" the bond or enact buybacks.
- Demand for GDP-linked structures is unknown, extremely limited comparisons are available.



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## Stripping Out the Inflation Uplift from TIPS: To create additional overall demand for TIPS

### Pros

- As much as 60% of long-dated nominal Treasury issues are held as strips, indicating significant demand for zero coupon securities.
- TIPS stripping, on the other hand, is very small partly because under existing rules, the final cashflow includes both the face value (unadjusted principal) and the accrual for inflation.
- Any type of increase to stripping activity will increase liquidity in the underlying bond.
- Separating the final cash flow into two components – an unadjusted principal and the inflation accrual or uplift (“pure” inflation) may increase the demand for TIPS overall.
- Demand for the pure inflation uplift could come from TIPS funds, pension funds, insurance companies, corporations, and retail investors.
- Similar demand for pure inflation uplift has been seen in other currencies.

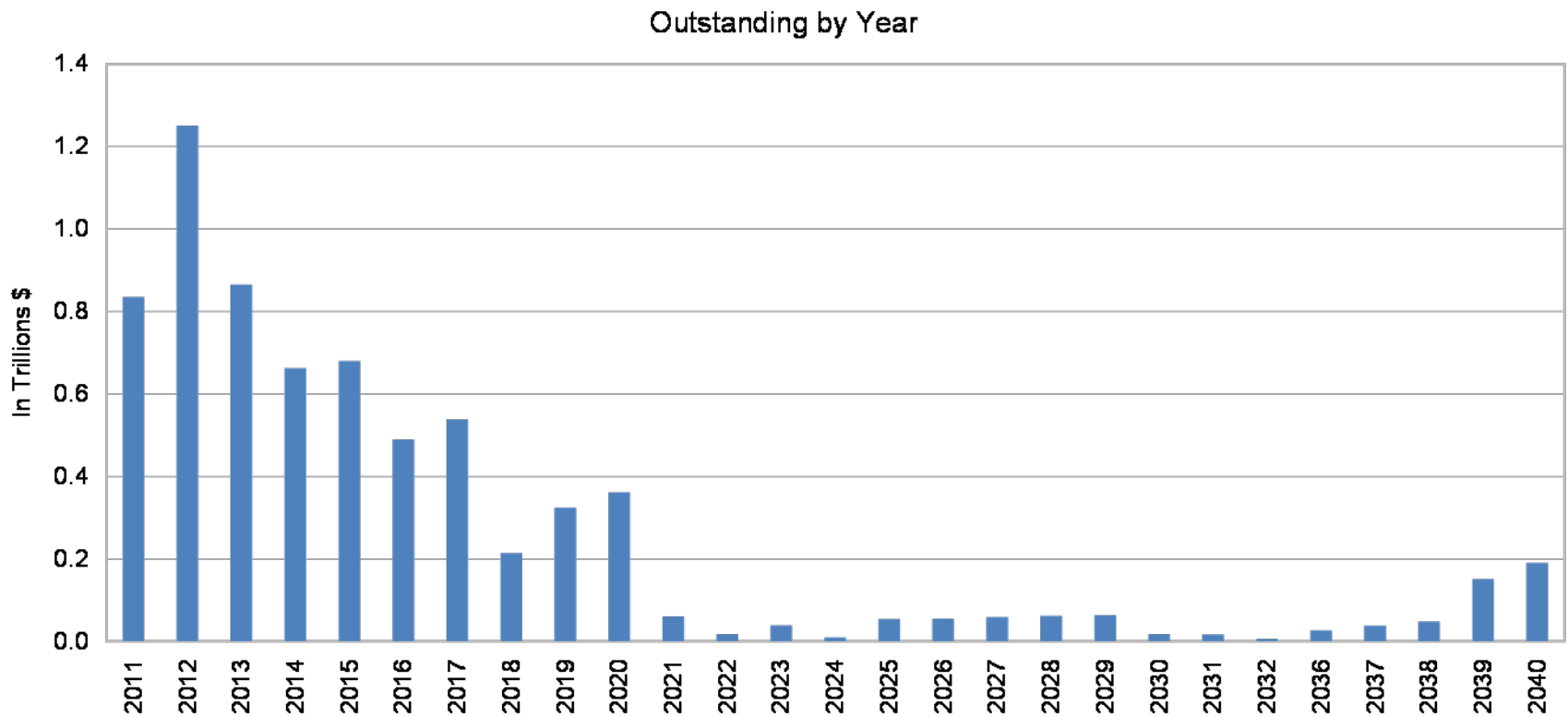
### Cons

- Dealers may be resistant to holding the residual strips, decreasing overall liquidity.
- Demand for the non-pure inflation component may be less robust than demand for the inflation uplift.
- Tax issues and fungibility issues with principal strips off conventional whole bonds.

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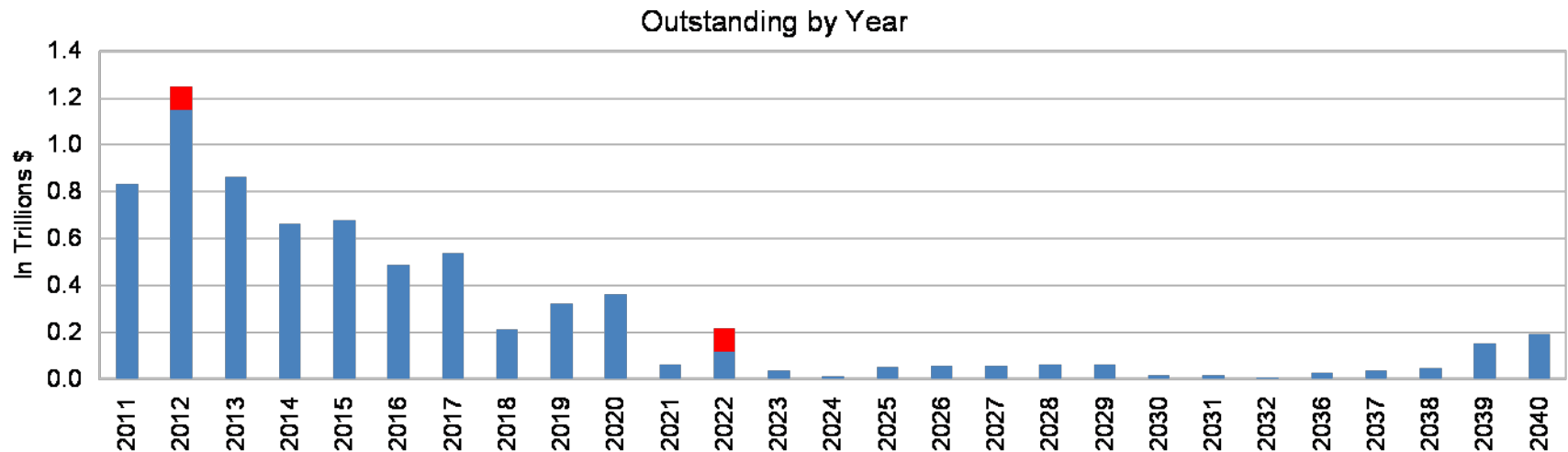
## Buybacks and Completeness: Treasury faces big rollovers from 2012-2015. There also may be room for a new maturity series such as a 20yr.

Note the chart below is a snapshot and does not take into account future issuance.



# Buybacks and Completeness:

- Buybacks can be effective in reducing “peaks” in maturities and smoothing out the debt profile. Japan used these effectively over a multi-year period earlier in the decade to smooth borrowing.
- Currently, there is a sharp rollover peak in 2012, and the 2011 deficit, estimated by CBO at \$1.5 trn, is relatively large.
- There is little time or room in the 2011 funding plan to implement a buyback program that would make a significant impact on the 2012 rollover peak. Moving \$100 bln from 2012 to 2022 increases the average maturity of the debt by approximately 1.2 months.
- As an example, with four quarters remaining in 2011, a \$100 bln buy-back program would only slightly shift the debt profile, but might risk disrupting the market, leading to increased borrowing costs.
- Post 2012, there may be more scope to introduce a buy-back program.
- Treasury may find it difficult to purchase shorter maturity bonds held by real-money investors.



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# Interest Rate Derivatives As a Tool for Liability Management

## Pros

- Treasury could use interest rates swaps to increase floating rate liabilities vs. fixed rate liabilities.
- It could take advantage of aberrations in the USD swap curve, eg currently in the 30yr maturities, swaps are trading around 30 bp below Treasuries of the same maturity. By paying fixed and receiving floating at this maturity, Treasury could potentially realize an arbitrage savings.
- Treasury could issue callable or puttable securities and hedge out the optionality through interest rate swaptions to create a straight, fixed rate liability, as is currently done in the corporate sector.
- Treasury could issue foreign-currency denominated securities that could be hedged back into U.S. dollars at possibly lower yields than those on its current USD-denominated issuance.

## Cons

- Treasury would be assuming counterparty risk, although this could be mitigated if swaps are exchange-cleared, as proposed by Dodd-Frank legislation.
- Treasury may face collateral management issues if swaps are cleared via an exchange or central clearing house.
- Lack of liquidity in certain segments of the swap market may limit scope of the opportunities.

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## Summary and Conclusions

- We found the following promising and deserving of further consideration:
  - Measures to expand retail investment in Treasury securities. These include: stepped-up marketing and advertising along with the addition of new securities that appeal directly to households as well as to institutions.
  - Ultra-long bonds with maturities of 40 or 50 years. Such bonds should be strippable.
  - Callable securities, especially those with relatively short maturities and lockouts, and possibly a regularly issued longer-maturity callable.
  - Instruments targeting the money markets and households, including FRNs where the reference rate and reset periods are short-dated and synchronized.
  - Changes in the structure of TIPS stripping program to enable investment in the “pure” inflation component of TIPS principal repayments in order to augment overall liquidity in the TIPS market.
  - Buybacks and similar measures to help Treasury smooth out the large increase in rollovers coming in the coming decade.
  - Interest rate derivatives to help manage liabilities and achieve cost-savings arbitrage.
- Measures we found less viable and requiring more study at this point were:
  - Longer-maturity CMT-style floaters, which are complex and expose investors to a high degree of yield curve risk.
  - GDP-linked bonds, where demand is uncertain and the index is subject to large revisions.
  - Puttable bonds, where demand for volatility and preferred structure are uncertain.
  - Foreign currency denominated bonds.