

The Quest for Value in Global Bonds

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The Bond Yield Sudoku

- We posit that 10-yr rates are a function of:

(i) The current stance of policy (3-mth rates, or SR_x); and

(ii) Expectations on the future trajectory of policy, as influenced by economic activity (IP_x) and inflation (INF_x)

- We allow for changes in one country's term premium to influence the level of bond yields abroad, as described by the following equation:

$$LR_x = \beta_{x,0} + \beta_{x,1} \times IP_x + \beta_{x,2} \times INF_x + \beta_{x,3} \times SR_x + \\ + \beta_{x,4} \times LR_x^* + \varepsilon_x$$

Where LR_x^* is a global bond yield variable specific to county X constructed as the weighted-average of foreign long rates, using trade shares with countries A, B, etc. as weights*.

$$LR_x^* = \omega_{x,A} \times LR_A + \omega_{x,B} \times LR_B + \dots$$

: Our approach draws on the GVAR-VARX framework as described in, for example, Pesaran and Smith (2006).

A Simultaneous Macro Pricing Approach

We concentrate on 4 countries: **US, Japan, Germany, UK**, using monthly data starting 1986.

We employ a 2-stage least square estimation procedure:

In 1st stage of estimation, each of the endogenous foreign rates is instrumented by macro variables.

In the 2nd stage, the fitted values are substituted in the structural form system for estimation. The reduced-form coefficients γ are functions of the structural form coefficients β .

$$LR_{US} = \beta_{US,0} + \beta_{US,1} \times IP_{US} + \beta_{US,2} \times INF_{US} + \beta_{US,3} \times SR_{US} + \beta_{US,4} \times LR_{US}^* + \varepsilon_{US}$$

$$LR_{GR} = \beta_{GR,0} + \beta_{GR,1} \times IP_{GR} + \beta_{GR,2} \times INF_{GR} + \beta_{GR,3} \times SR_{GR} + \beta_{GR,4} \times LR_{GR}^* + \varepsilon_{GR}$$

$$LR_{JP} = \beta_{JP,0} + \beta_{JP,1} \times IP_{JP} + \beta_{JP,2} \times INF_{JP} + \beta_{JP,3} \times SR_{JP} + \beta_{JP,4} \times LR_{JP}^* + \varepsilon_{JP}$$

$$LR_{UK} = \beta_{UK,0} + \beta_{UK,1} \times IP_{UK} + \beta_{UK,2} \times INF_{UK} + \beta_{UK,3} \times SR_{UK} + \beta_{UK,4} \times LR_{UK}^* + \varepsilon_{UK}$$

$$LR_{US} = \gamma_{US,0} + \gamma_{US,1} \times IP_{US} + \gamma_{US,2} \times INF_{US} + \gamma_{US,3} \times SR_{US} + \gamma_{GR,1} \times IP_{GR} + \gamma_{GR,2} \times INF_{GR} + \gamma_{GR,3} \times SR_{GR} + \gamma_{JP,1} \times IP_{JP} + \gamma_{JP,2} \times INF_{JP} + \gamma_{JP,3} \times SR_{JP} + \gamma_{UK,1} \times IP_{UK} + \gamma_{UK,2} \times INF_{UK} + \gamma_{UK,3} \times SR_{UK} + \nu_{US}$$

Yields Abroad Influence Domestic Ones

- Shifts in yields implied by the relationship between bonds and macro factors in one country have a direct bearing on the level of yields in other markets.

- Most coefficients are statistically significant at the conventional levels, and display little sensitivity to varying samples.

- The model corrects for first order autocorrelation of error terms, arising from persistent nature of departures from 'equilibrium'.

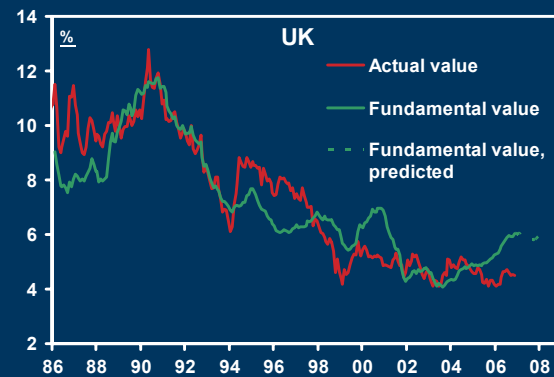
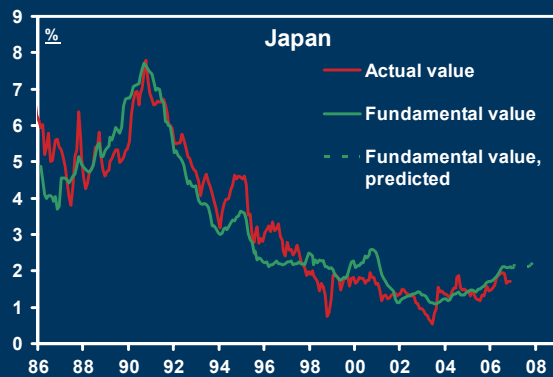
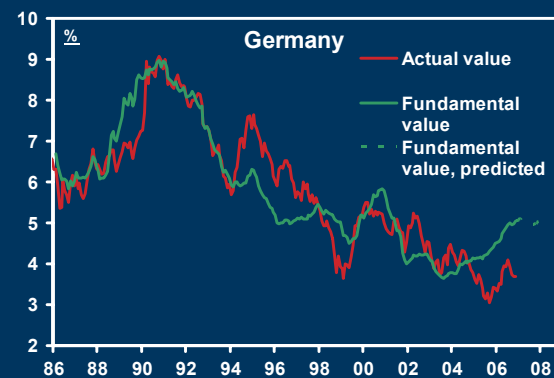
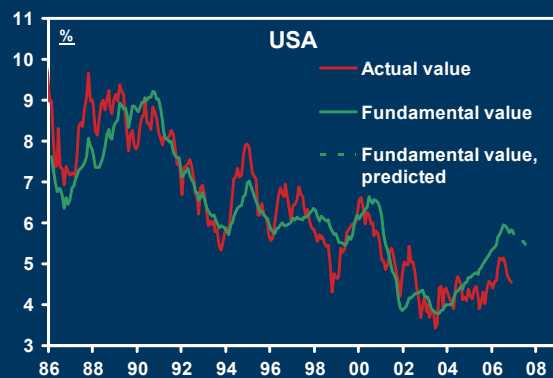
- The model's residuals are stationary (hence, the non-stationary variables in the system are co-integrated).

Estimation results*

	US	Germany	Japan	UK
$\beta_{x,0}$	1.94 (4.94)	1.18 (1.96)	-0.67 (-0.84)	-0.32 (-0.40)
$\beta_{x,1}$	0.05 (2.72)	0.00 (0.64)	0.01 (1.10)	0.03 (2.49)
$\beta_{x,2}$	0.04 (0.71)	0.03 (0.87)	-0.05 (-1.41)	0.03 (0.47)
$\beta_{x,3}$	0.26 (3.99)	0.23 (3.19)	0.51 (5.35)	0.12 (1.28)
$\beta_{x,4}$	1.39 (6.41)	1.21 (5.12)	1.03 (2.92)	1.54 (6.13)
AC coefficient	0.89 (27.02)	0.95 (44.92)	0.89 (29.11)	0.93 (41.18)
DW statistics	1.98	2.33	1.93	2.12
Observations	244	244	244	244

* t-statistics in parenthesis.

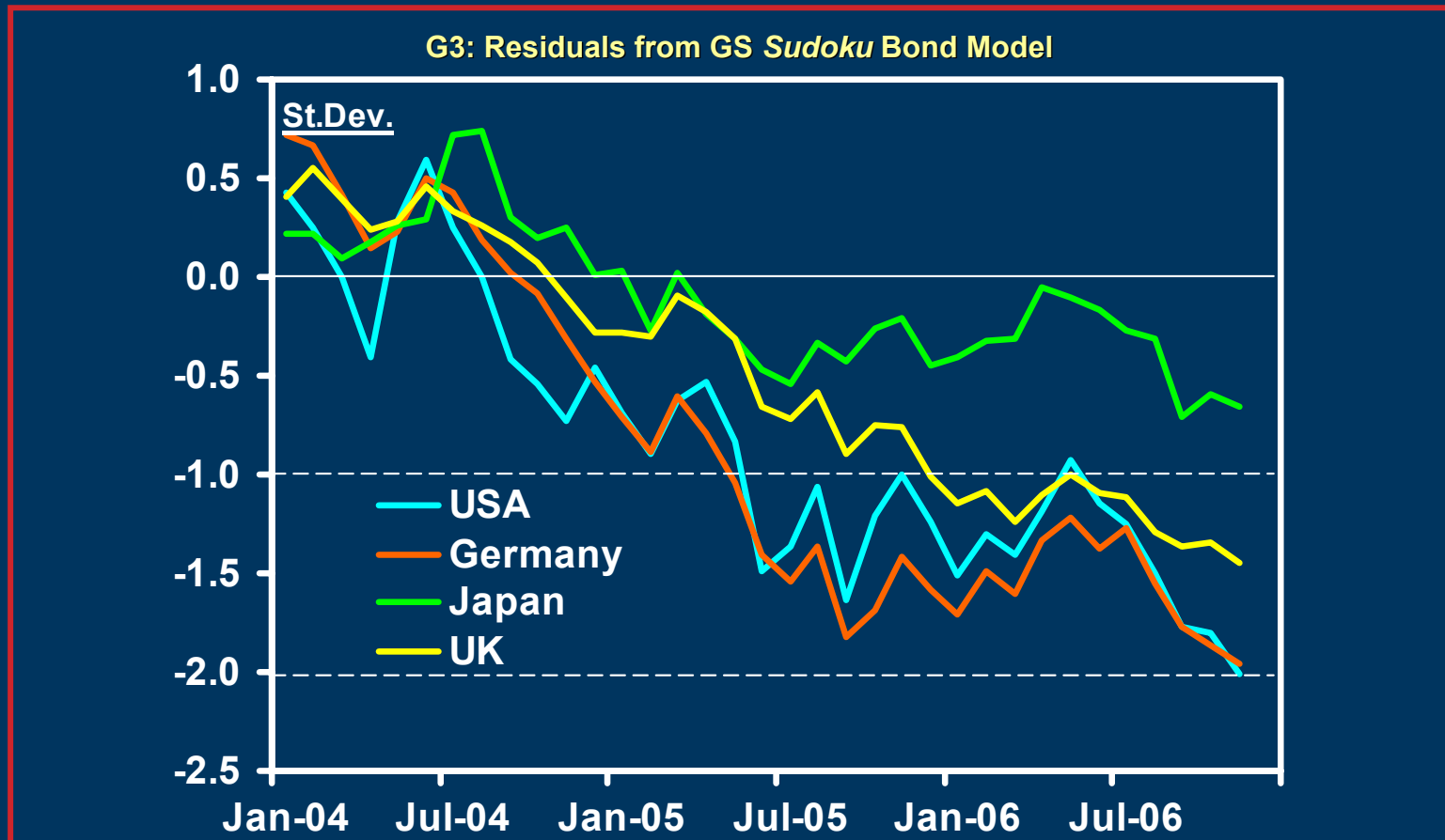
Bonds Are Still Expensive Across the Board...



Source: Goldman Sachs

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...And Approaching a 2 Std. Dev. Event! Why?

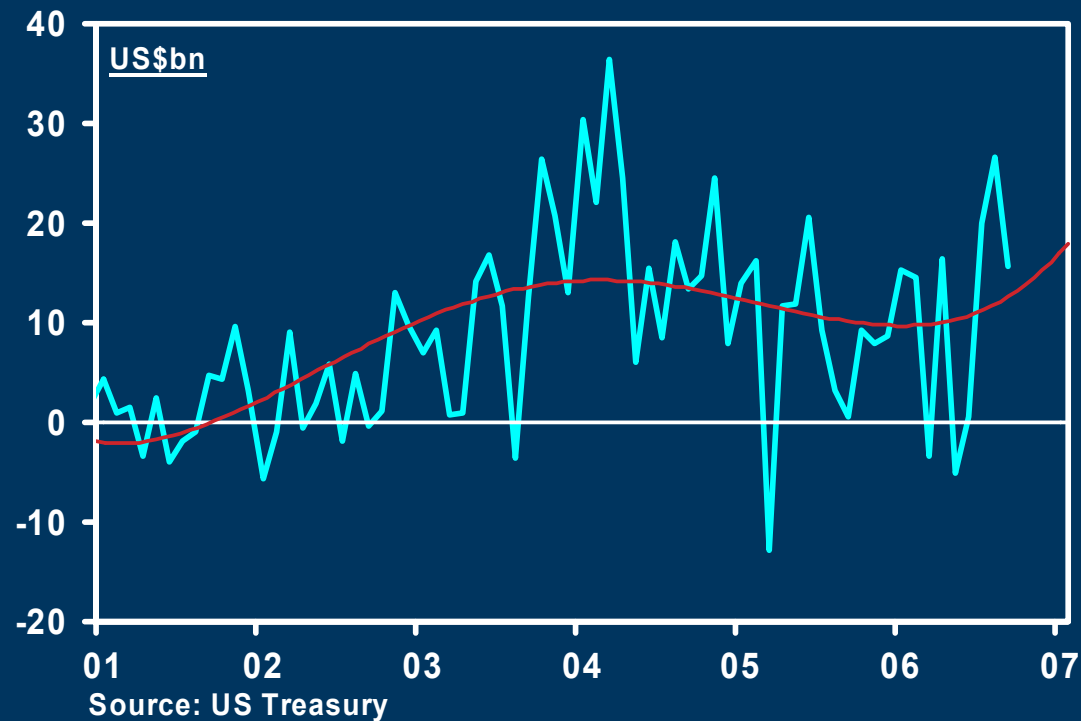


Source: Goldman Sachs

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Sachs

A: Official Buying Is on the Rise Again...

TIC Data: Official Purchases of UST and Agencies

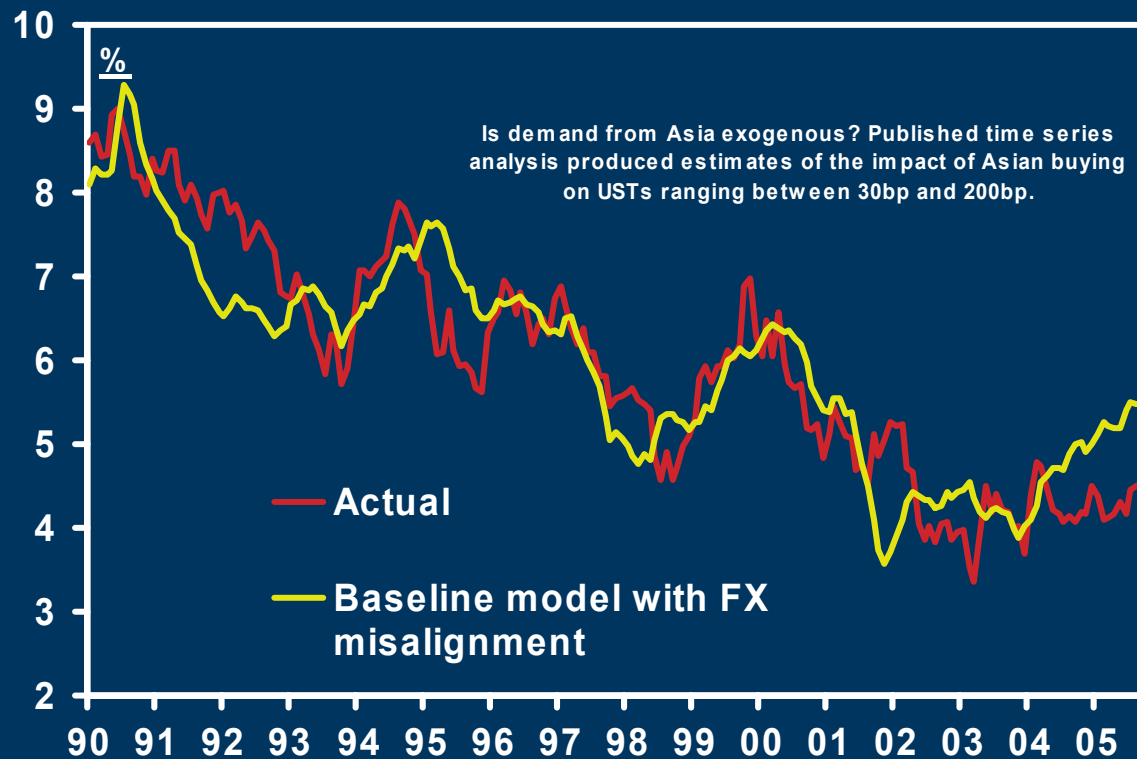


Source: Goldman Sachs

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A: ...But 'Asia' Is No Solution to 'Bond Puzzle'

US 10-yr Rates, Actual vs. Model

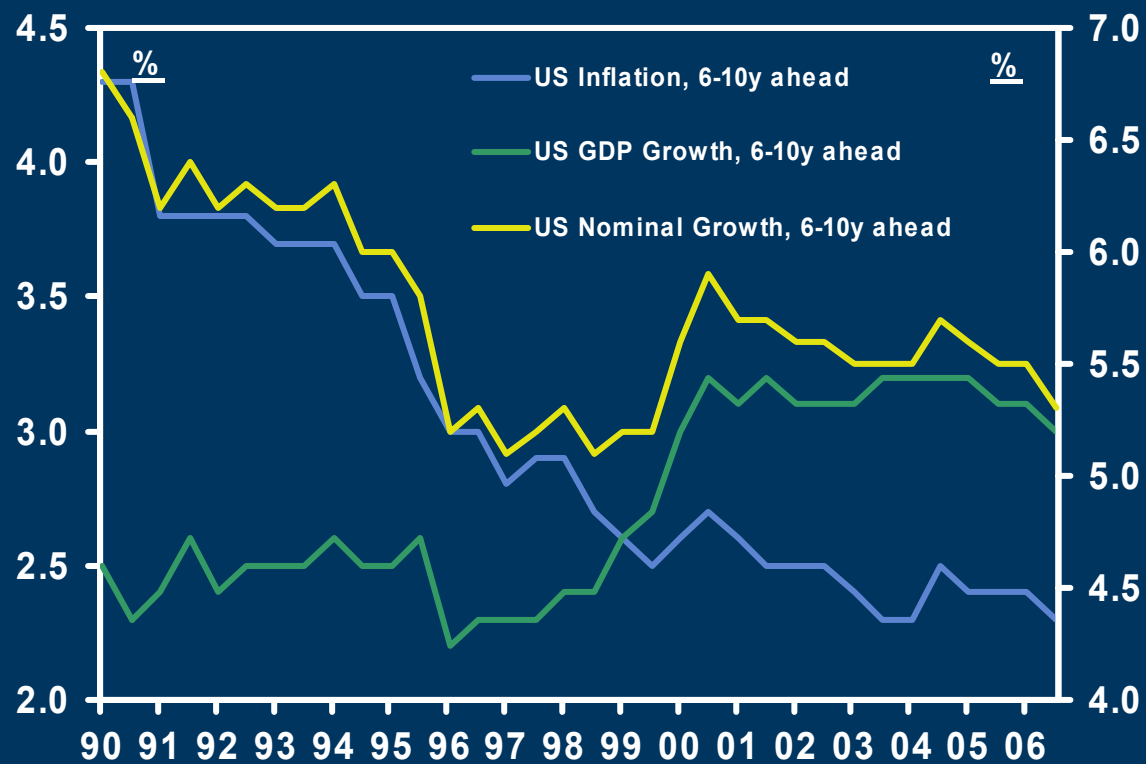


Source: Goldman Sachs

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B: The Growth-Inflation Trade-off Has Improved

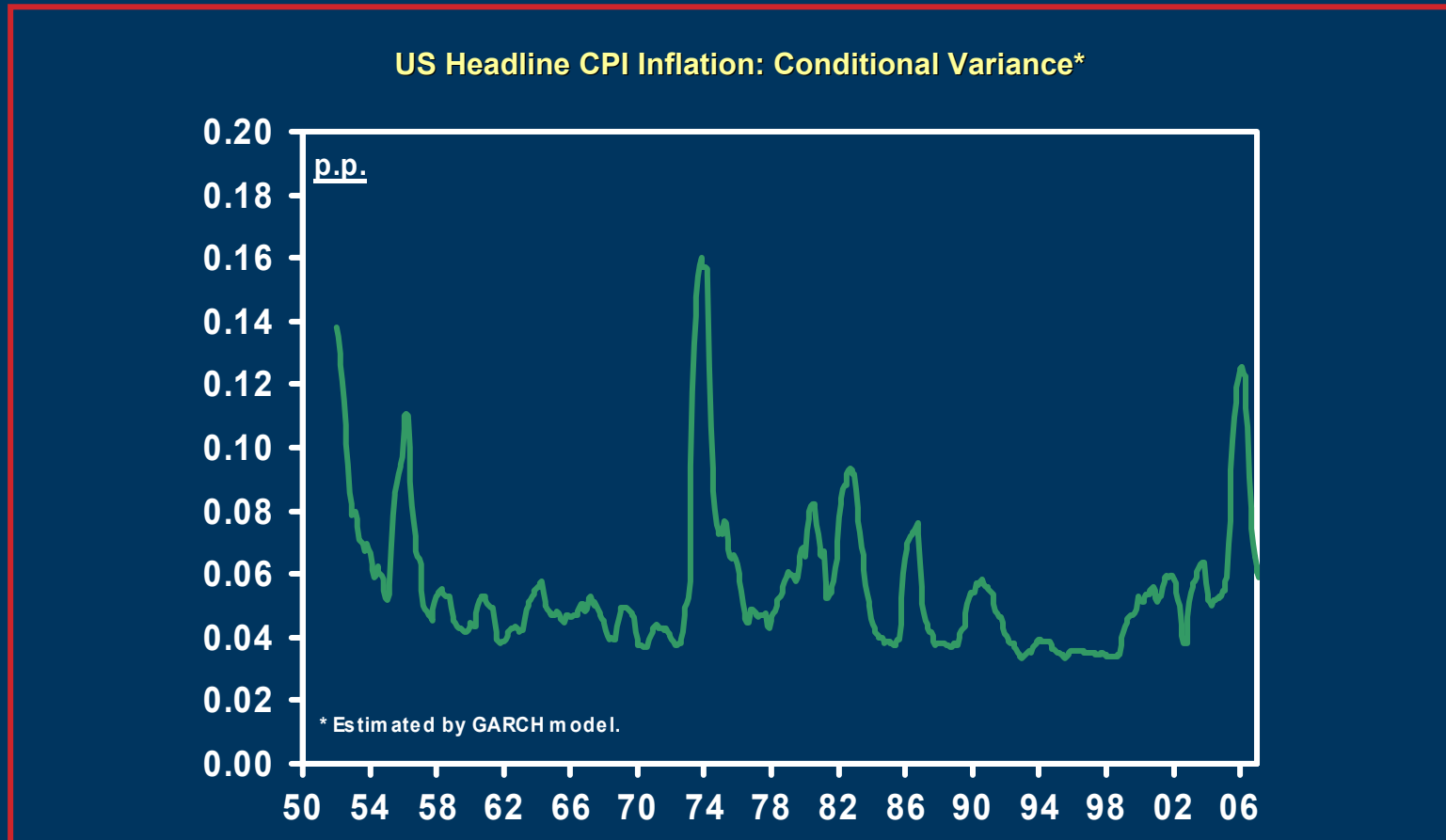
Consensus Expectations on US Real Growth and Inflation, 6-10y ahead



Source: Goldman Sachs

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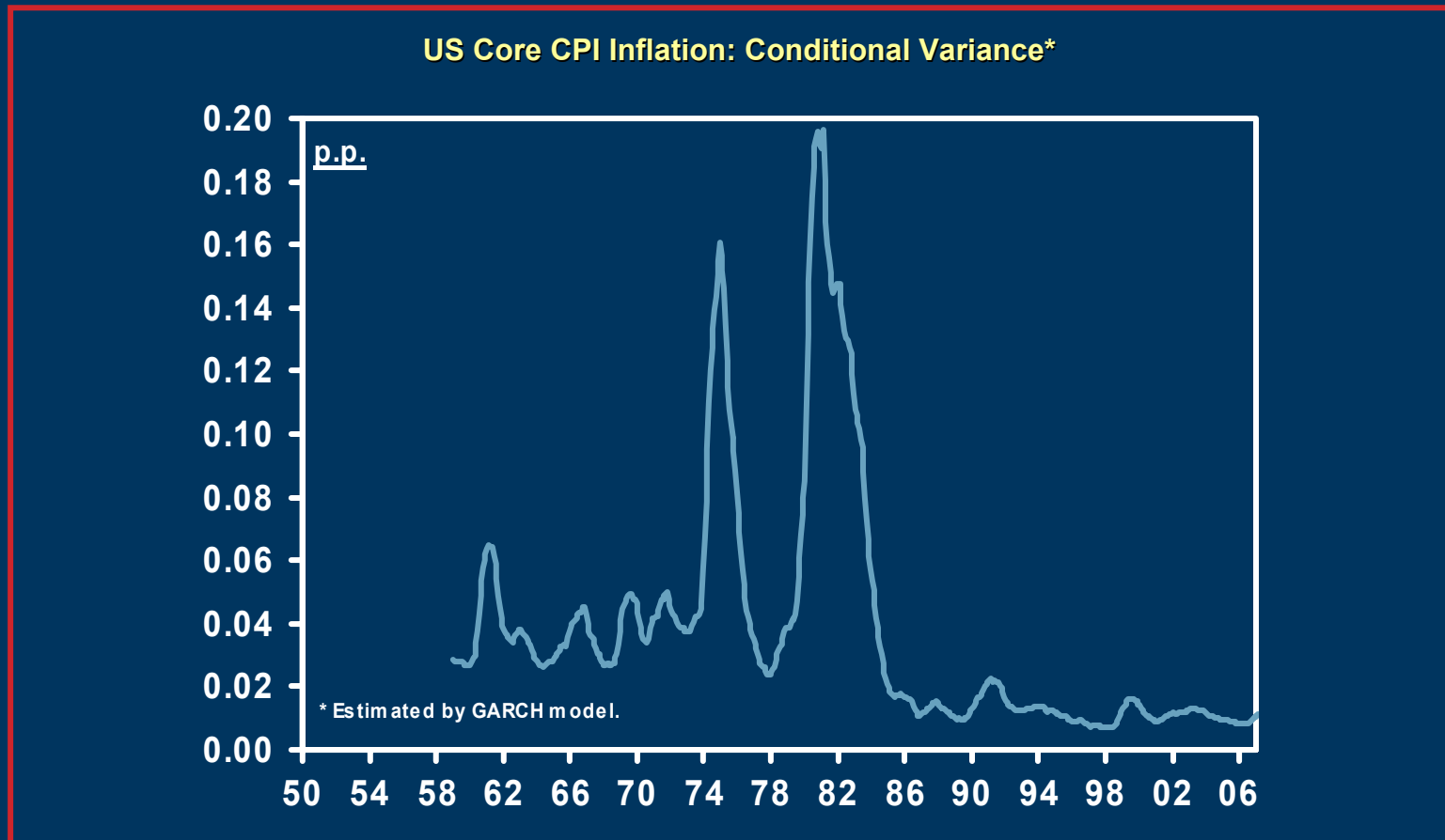
B: Same Magnitude of CPI Shocks as in the '70s...



Source: Goldman Sachs

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B: But a Much Lower Pass-Through to 'Core'

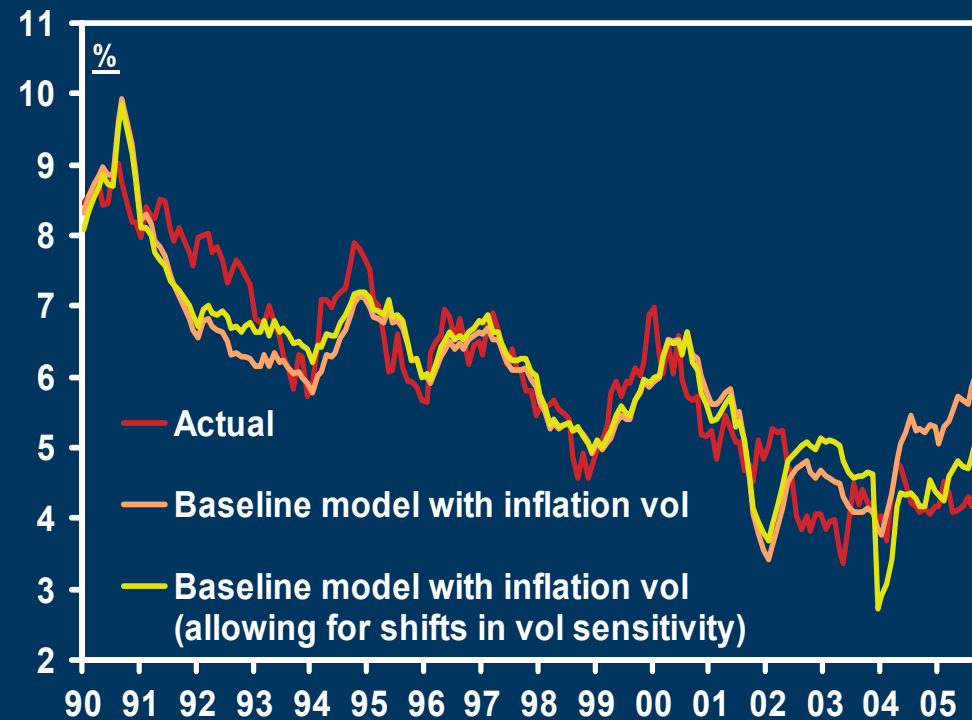


Source: Goldman Sachs

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B: Are We More Relaxed About Inflation?

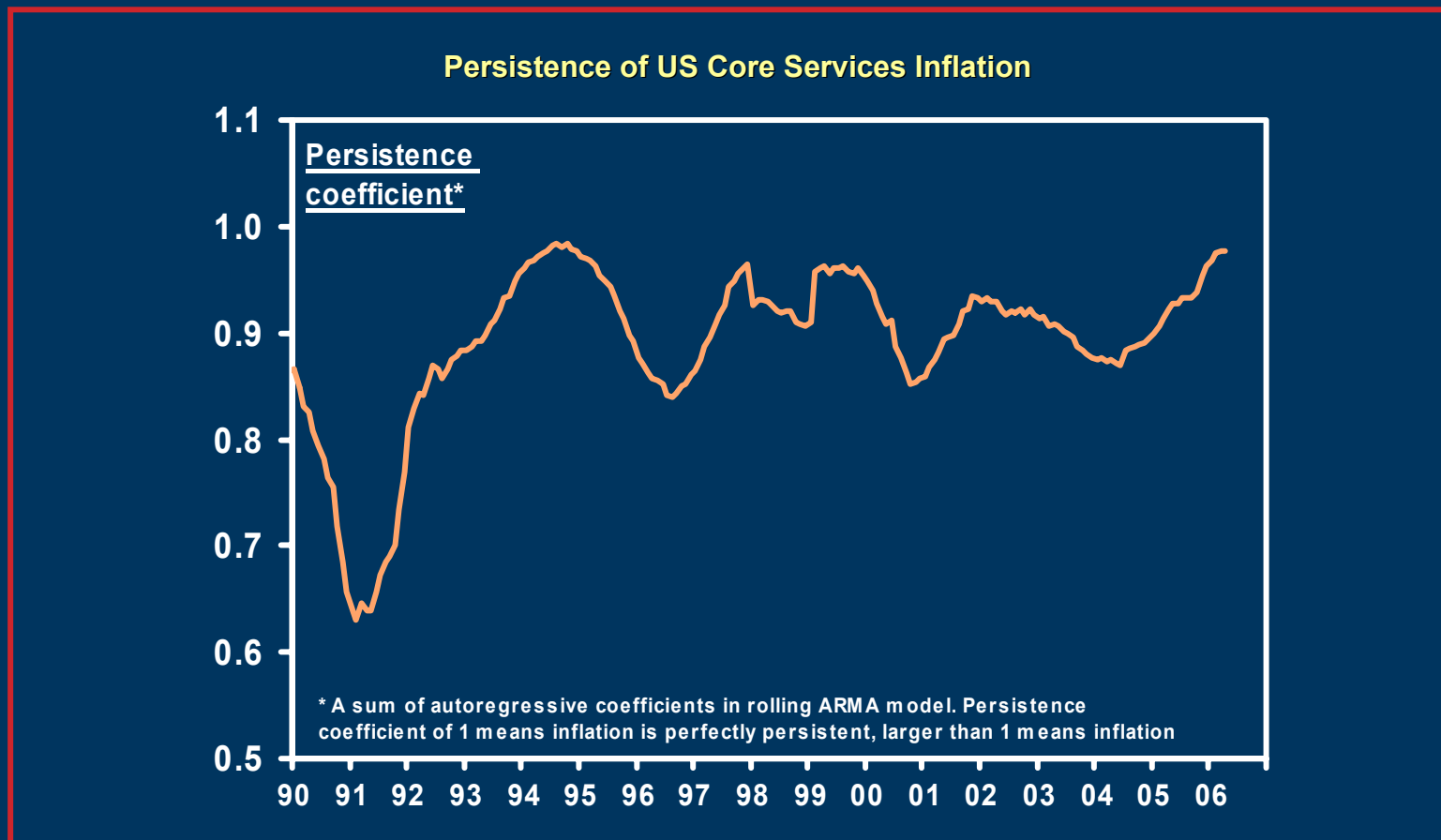
US 10-yr Rates, Actual vs. Model



Source: Goldman Sachs

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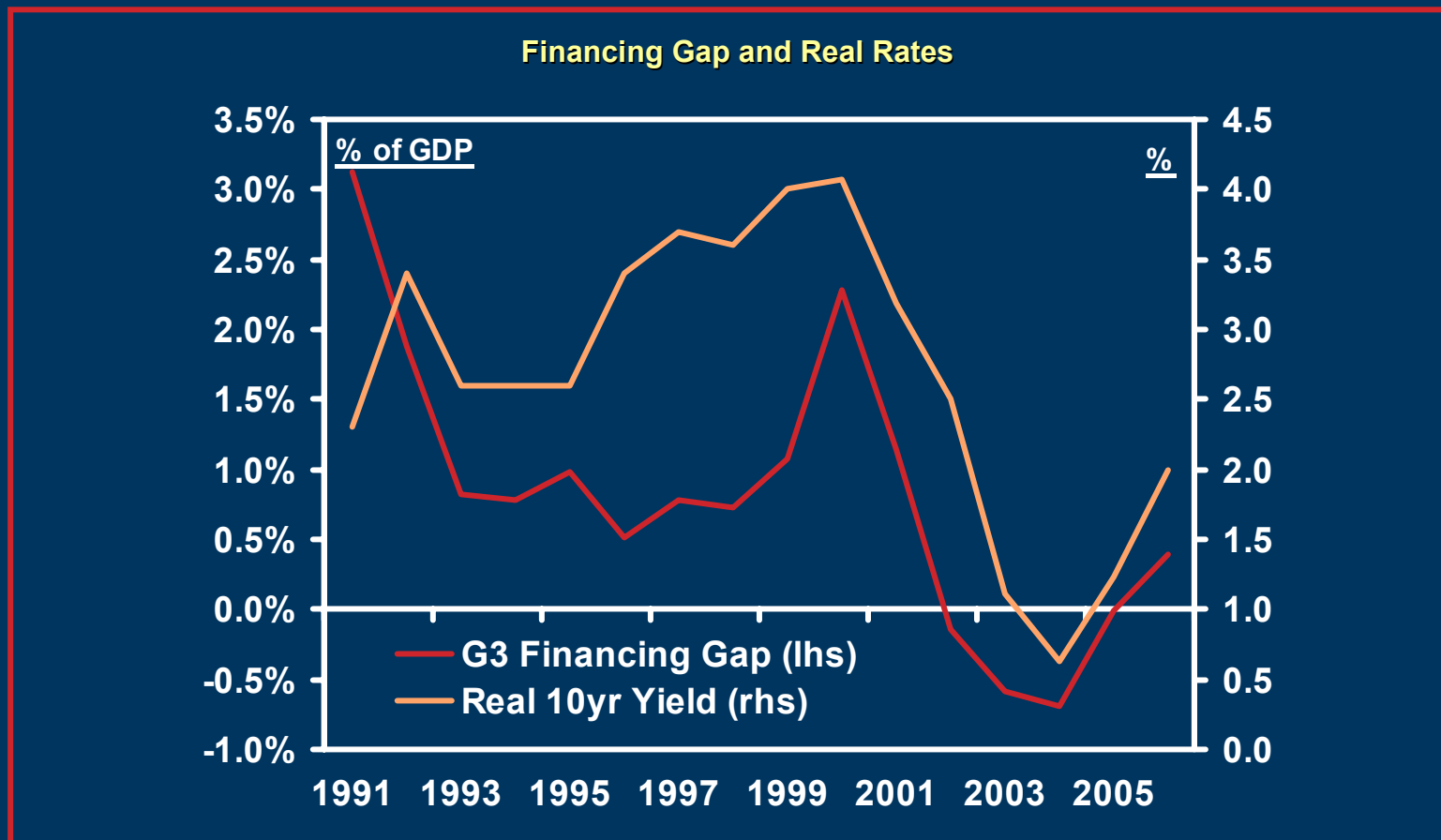
B: Caveat: Service Inflation Shows Strong Inertia



Source: Goldman Sachs

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C: Lower Corporate Borrowing, Lower Yields

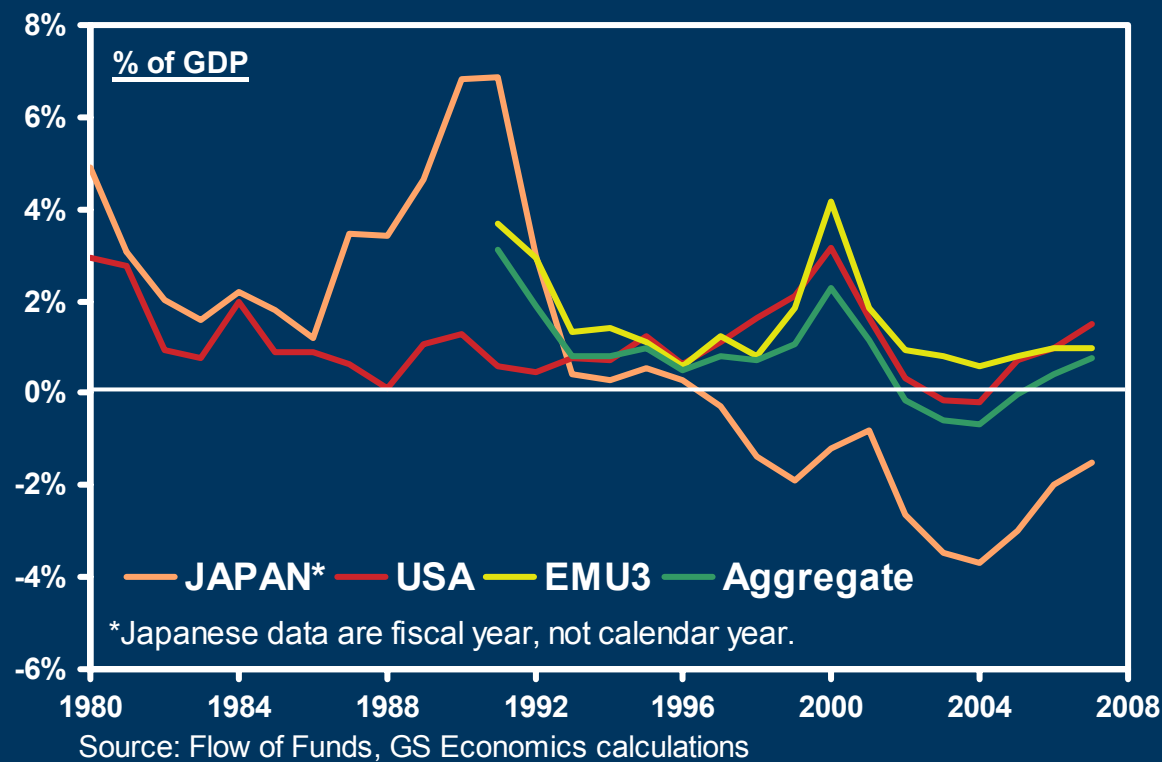


Source: Goldman Sachs

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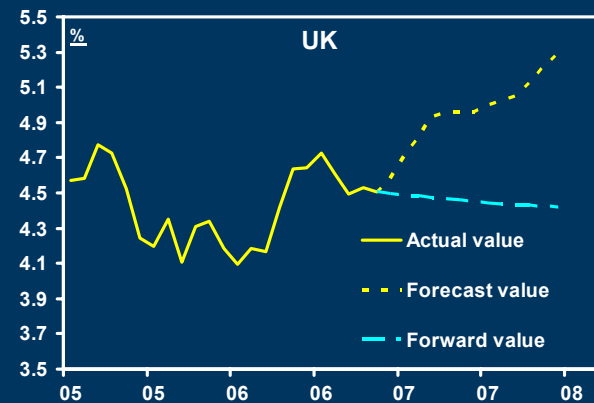
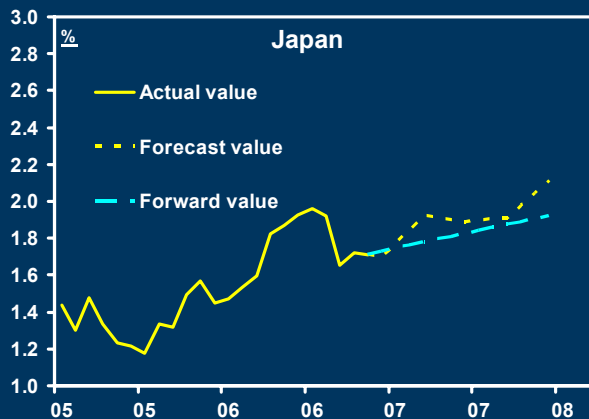
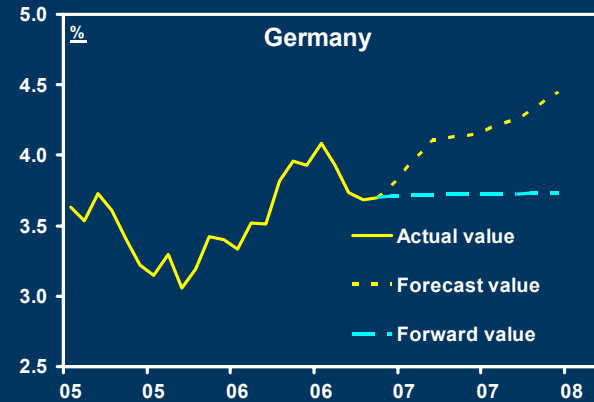
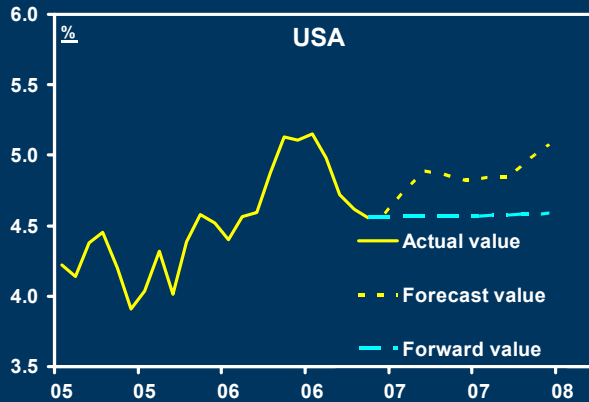
C: But Free Cash Flow Surge Gradually Turning

Nonfinancial Corporate Financing Gap in G-3 Economies



Source: Flow of Funds tables from national central banks; Goldman Sachs calculations.

On a Relative Basis, Japan More Attractive



Source: Goldman Sachs

Goldman Sachs

USTs on Safer Cyclical Ground than Bunds

%	US 10-yr Bonds													Total	
	Fundamental Factors											Misvaluation	Total		
	Local Factors			Global Factors			Contribution of Factors					Total			Total
	Growth	Inflation	3mth rates	Growth	Inflation	3mth rates	Local	Global	Growth	Inflation	3mth rates				
Nov-06													5.84		4.56
+ 3mth	-0.05	0.00	-0.11	0.00	0.02	0.05	-0.16	0.06	-0.05	0.02	-0.06	-0.09	0.32	0.23	
+ 6mth	-0.11	-0.01	-0.23	-0.01	0.01	0.08	-0.35	0.08	-0.11	0.00	-0.15	-0.26	0.55	0.29	

%	Germany 10-yr Bonds													Total	
	Fundamental Factors											Misvaluation	Total		
	Local Factors			Global Factors			Contribution of Factors					Total			Total
	Growth	Inflation	3 mth rates	Growth	Inflation	3 mth rates	Local	Global	Growth	Inflation	3 mth rates				
Nov-06													5.05		3.70
+ 3mth	0.00	0.04	0.06	-0.02	0.00	-0.02	0.09	-0.04	-0.03	0.04	0.04	0.05	0.25	0.30	
+ 6mth	-0.01	0.04	0.06	-0.05	-0.01	-0.05	0.10	-0.11	-0.06	0.03	0.01	-0.01	0.45	0.44	

Source: Goldman Sachs

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Stay Put on Gilts, Watch the BoJ!

Japan 10-yr Bonds															
%	Fundamental Factors												Misvaluation	Total	
	Local Factors			Global Factors			Contribution of Factors						Total		Total
	Growth	Inflation	3 mth rates	Growth	Inflation	3 mth rates	Local	Global	Growth	Inflation	3 mth rates	Total			
Nov-06													2.12		1.71
+ 3mth	-0.01	0.00	0.10	-0.02	0.01	-0.02	0.09	-0.03	-0.03	0.01	0.08		0.06	0.07	0.14
+ 6mth	-0.01	-0.01	0.17	-0.04	0.01	-0.07	0.15	-0.10	-0.05	0.00	0.10		0.05	0.13	0.19

UK 10-yr Bonds															
%	Fundamental Factors												Misvaluation	Total	
	Local Factors			Global Factors			Contribution of Factors						Total		Total
	Growth	Inflation	3 mth rates	Growth	Inflation	3 mth rates	Local	Global	Growth	Inflation	3 mth rates	Total			
Nov-06													6.02		4.50
+ 3mth	0.00	0.00	0.00	-0.04	0.04	0.02	0.00	0.03	-0.03	0.04	0.02		0.02	0.30	0.32
+ 6mth	0.00	-0.01	-0.01	-0.07	0.03	-0.02	-0.02	-0.06	-0.08	0.02	-0.02		-0.08	0.53	0.45

Source: Goldman Sachs

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The 'Bond Scorecard'

	Valuation ¹	Business Cycle ²	Technicals ³	Strategy
TYZ6	very negative (2 std dev)	very positive (- 9-26 bp in 3-6mths)	neutral (range 4.53%-4.85%)	Long 5yr 5yr real vs Euroland; long 2yr inflation vs Euroland; long 10yr breakeven
RXZ6	very negative (2 std dev)	neutral (flat in 3-6mths)	neutral (range 3.60%-3.90%)	Breakeven steepeners
JBZ6	slightly negative (1/2 std dev)	slightly negative (+ 5-6 bp in 3-6mths)	neutral (range 1.58%-1.87%)	Long 10yr breakeven
G Z6	negative (3/2 std dev)	positive (- 8 bp in 3-6mths)	neutral (range 4.44%-4.77%)	Neutral

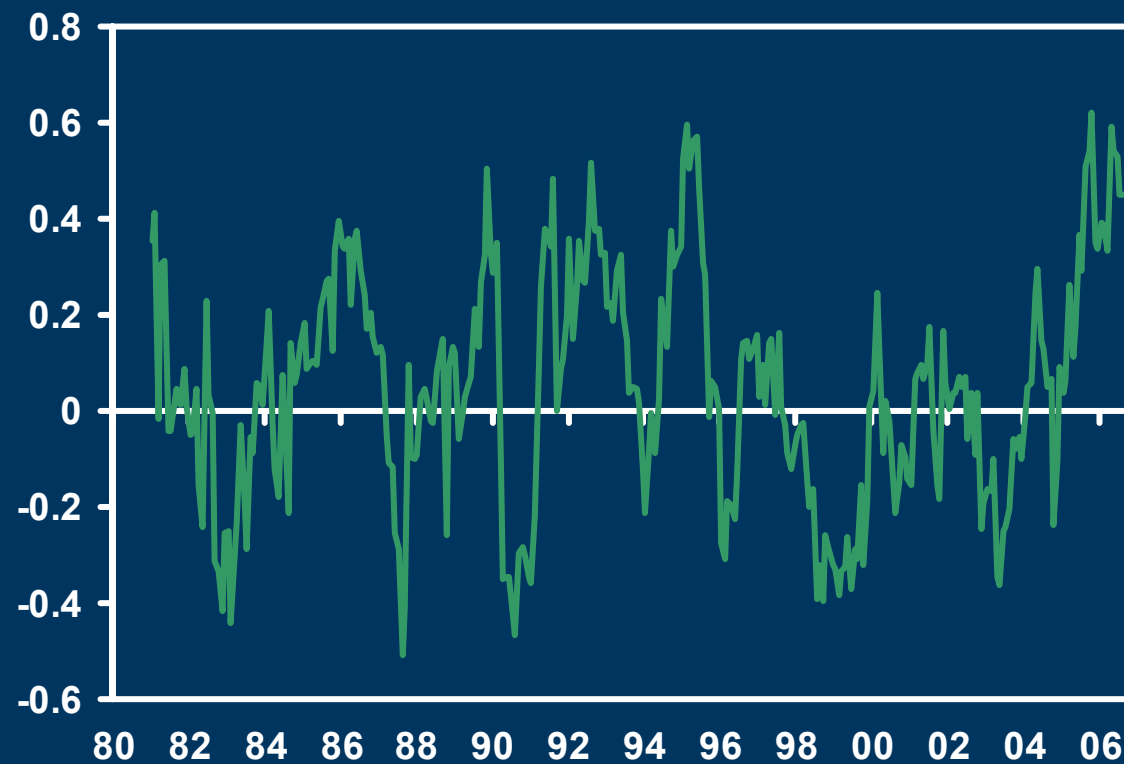
¹: Based on the long-run equilibrium estimates from GS' *Sudoku* model; see chp. 12 of our 2006 *FX Annual* for details.

²: Based on GS' *Sudoku* model, fed with factor forecasts taken from our global macro team, and assuming no 'error correction'.

³: Technical analysis inputs from Kevin Edgeley, London (kevin.edgeley@gs.com).

Bond-Equity Return Correlation Unstable...

Correlation Between Bunds and DAX Returns



Source: Goldman Sachs

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...But Inflation Tends to Increase It

Correlation Between Bund and DAX Returns

		Correlation*
Short Rates	↑	↑
	↓	↓
Inflation	↑	↑↑
	↓	↑↑
Growth	↑	↑
	↓	↓↓

* Impacts on correlation are calculated using an OLS regression of the rolling 1-year correlation between Bund and DAX returns on changes in the level of short rates, yoy CPI inflation and yoy industrial production growth between time t and time t-12, estimated on a monthly sample from 1981:M07 to 2006:M07.

Source: Goldman Sachs

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Credit Spreads Supported by Fundamentals

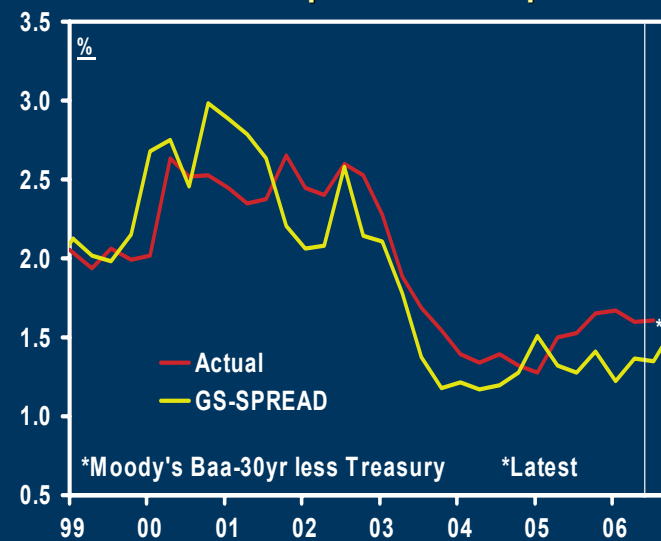
US: GS-SPREAD Model

GS-Spread Long-Term Multipliers

	If our Variables Then Spreads
Real GDP Growth	↑ by 1% yoy	↓ by 18bp
Financing Gap	↑ by 1% of GDP	↑ by 45bp
Stock Market Volatility	↑ by 5% annual	↑ by 25bp
30-yr Bond Yield	↑ by 100bp	↑ by 03bp

Based on the long-run parameter estimates from the ARDL model.

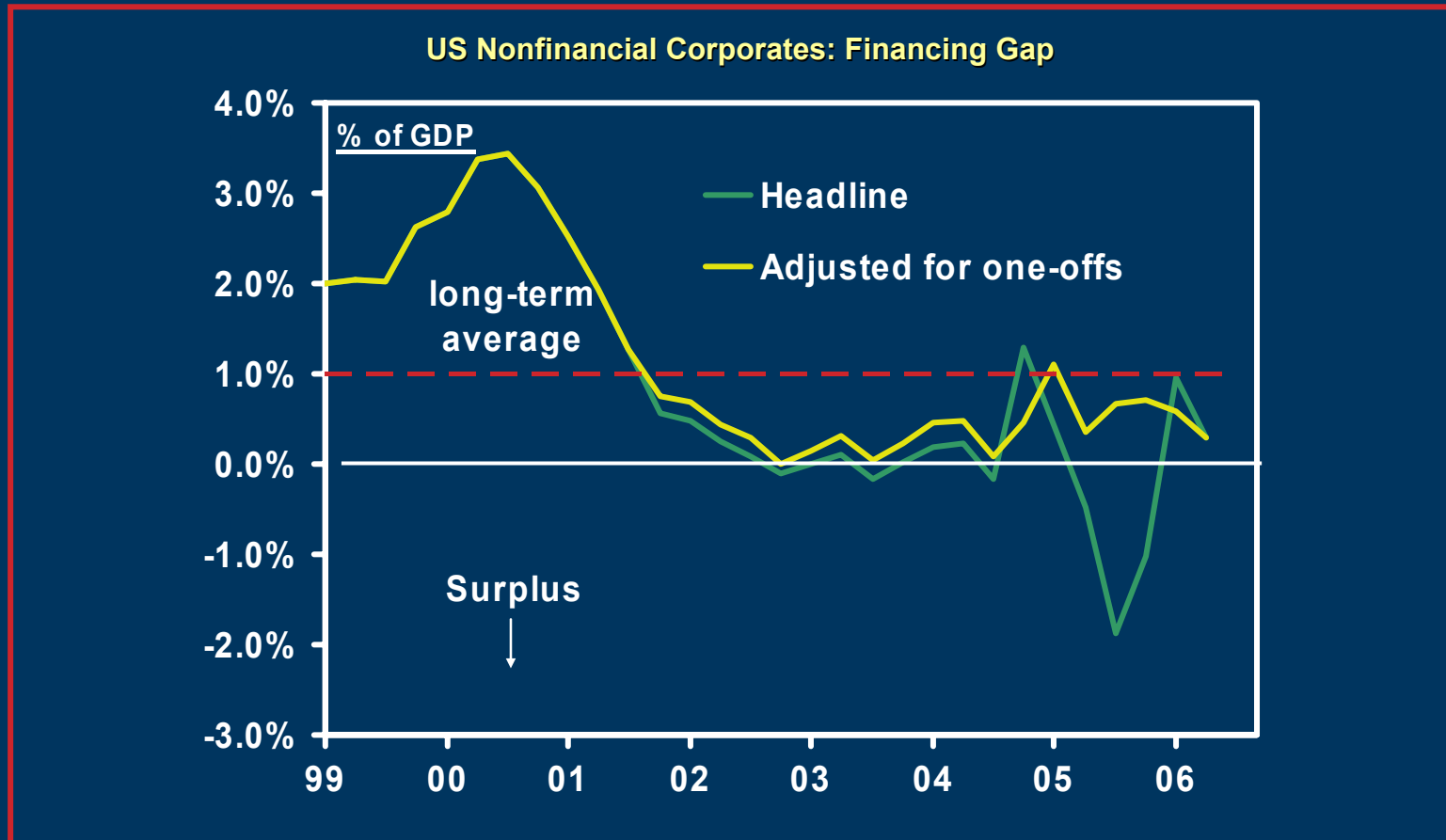
US: Baa Corporate Bond Spread*



Source: Goldman Sachs

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Free Cash Flow Remains Abundant



Source: Goldman Sachs

Goldman Sachs

Relative Debt and Growth Trends Matter

Fundamental Impact on 10-year EMU Government Spreads

Basis Points	Pre-EMU	Post-EMU
1% Increase in Growth Differential †	2.4*	-0.2*
1% Increase Debt/GDP Differential †	0.4*	0.4*
1% Increase Surplus/GDP Differential †	-5.6*	-1.3**
100bp Increase Baa-Treasury Spread	2.1*	2.1*

† Relative to the average of Germany and France

* Significant at 95% level or above; ** Significant at 85% level (White std.err.)

Source: Goldman Sachs calculations. See: *Have Bond Market Vigilantes Lowered Their Guard*, 27 July '05.

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