

Turning stocks into bonds using options

The search for yield is strong and rational

The search for yield is stronger than ever as exhibited by the flows into bond funds, the rapid decline in bond yields, and the recent outperformance of dividend paying stocks. In our view, the search for yield is rational given our economists' expectations for below consensus US GDP growth and the non-trivial risk of recession or deflation. We believe there is an equity market alternative for investors in search of the fixed-yield, reduced-risk profile offered by bonds.

Bond-like risk/returns with stock and options

We explore a simple options overlay (put-spread-collar) which allows stockholders to generate yield and gain downside protection. We show how this combined position is similar to that of a bond from a theoretical perspective and how the risk/return has been similar over the past 15 years. In fact, we find that this simple overlay strategy allowed investors to achieve risk-adjusted returns that were higher than bonds and nearly double that of the stocks over the period.

Yield in equity market is higher than bonds

We are focused on this opportunity now because we find that yields harvested from the equity market are attractive relative to bond yields in the current environment. Equity implied volatility remains at above average levels, but corporate bond yields are at 40-year lows. For the average stock in the S&P top 50, we estimate you can collect 20% more yield than the bond market while still maintaining full of downside protection for up to a 24% decline in the stock.

Attractive bond-like opportunities today

We identify companies where our analysts rate the shares Buy, with upside to their price targets and options prices are unusually elevated. We highlight the specific strikes that can be used to target 20% more yield than the bonds while maintaining a large degree of downside protection on the stock.

co.	Yield	Protection	co.	Yield	Protection	co.	Yield	Protection
T	5.9%	14%	ABC	4.6%	19%	UPS	3.8%	24%
MMM	5.4%	15%	DIS	4.5%	23%	LOW	3.7%	31%
AMT	5.4%	16%	HAL	4.0%	35%	WMT	3.6%	16%
GE	4.9%	24%	EOG	3.8%	29%	UTX	3.5%	27%

Goldman Sachs Research estimates, see page 8 for other all opportunities.

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Portfolio manager summary

Interest in fixed-income, reduced-risk investments is high and we believe it is rational in the context of our market outlook. In this report, we explore a simple structure that replicates the risk/return profile of corporate bonds to aid equity investors in their search for yield and expand the opportunity set for credit investors. The alternative strategy we discuss had strong risk-adjusted returns in our 15 year study, and is especially attractive in today's environment. Elevated options market implied volatility drives attractive yields in equity/options strategies relative to depressed bond yields.

We expect slow growth. Our economists' expectations for below consensus US GDP growth and the non-trivial risk of recession or deflation underpin our focus on yield opportunities. GS Credit Strategist Charlie Himmelberg expects a slow growth environment that favors corporate bonds; even with yields at a 40-year low, he believes the risk/reward profile of corporate bonds is attractive at current prices. Given that demand for bonds has outstripped supply in recent months, we look to replicate the risk/return of corporate bonds.

Replicating bond returns and risk with stock and options. In this report, we explore a strategy that includes holding a stock, selling a call to generate yield, and buying a put spread to protect against downside moves in a range. This put-spread-collar overlay is a simple structure that transforms a stock into an instrument whose risk/return profile approaches that of a corporate bond.

Strong risk adjusted returns over time. Our analysis of this strategy on a variety of companies over the past 15 years shows strong risk adjusted returns that exceed the return from bonds on the same companies and are nearly double the risk adjusted return of the stocks.

Options provide more yield with a big cushion in today's environment. Yield harvested from the equity market appears higher than normal vs the bond market. We estimate that you can collect 20% more yield than the corresponding bonds for the average company in the S&P top 50, while still maintaining protection against an unexpected decline in the stock of up to 24% below the current price. We estimate that corporate bond yields for the S&P 500 companies have fallen from 5% at the beginning of 2007 to 3.2% today. In contrast, we estimate a risk neutral equity/options market yield of 5% in 2007 that has only fallen to 4% today.

This bond-like structure allows fundamental equity analysts to monetize range-bound stock views where they couldn't otherwise. Equity investors often spend long hours researching a company only to determine that the company has solid prospects, but that the stock is fairly valued. This structure allows investors to extract yield from the view that the stock is unlikely to decline meaningfully.

Exhibit 1: Top opportunities to harvest elevated yield in the equity options market with a put-spread-collar overlay

Yield of stock with the options overlay; downside protection provided by the options strategy

co.	Yield	Protection	co.	Yield	Protection	co.	Yield	Protection	co.	Yield	Protection	co.	Yield	Protection
T	5.9%	14%	ABC	4.6%	19%	UPS	3.8%	24%	WHR	4.8%	35%	KSS	3.7%	28%
MMM	5.4%	15%	DIS	4.5%	23%	LOW	3.7%	31%	DVN	3.8%	27%	COST	2.7%	23%
AMT	5.4%	16%	HAL	4.0%	35%	WMT	3.6%	16%	BAX	3.7%	22%	DHR	3.5%	22%
GE	4.9%	24%	EOG	3.8%	29%	UTX	3.5%	27%	MON	3.6%	33%			

Source: Goldman Sachs Research estimates.

How to turn a stock into a bond using options

We find that the simple strategy of overlaying a put-spread-collar on a stock position transforms the exposure into a position that strongly resembles a bond and, in many cases, has historically allowed investors to outperform bonds with lower volatility. Low bond yields coupled with above average options yields make this an attractive opportunity today.

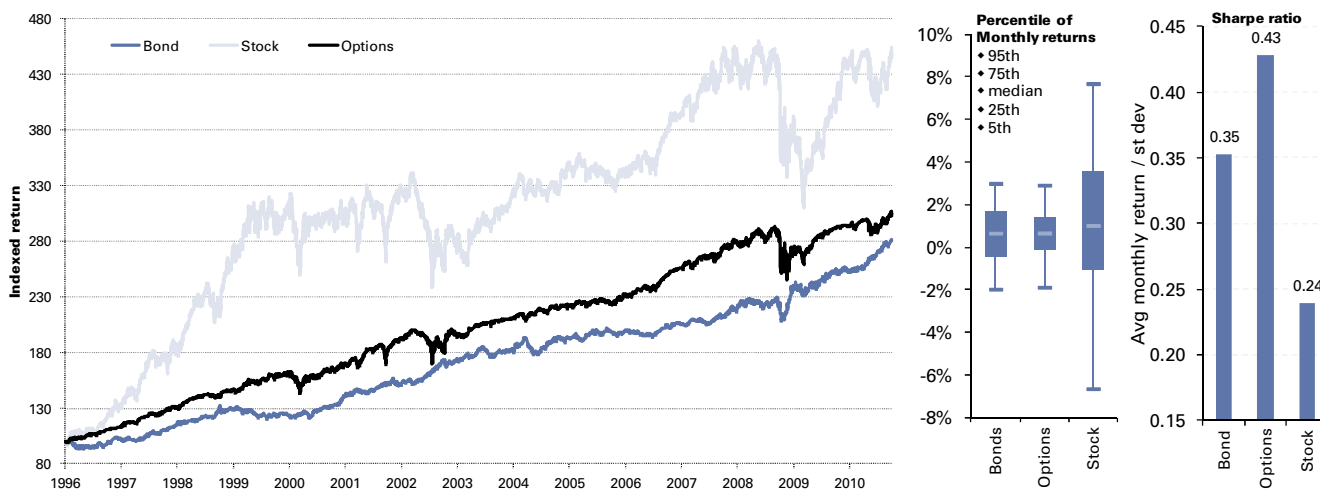
Stock+put-spread-collar replicated bond risk and outperformed

We compared the total returns of stocks, bonds and our stock+put-spread-collar strategy including transaction costs over the past 15 years for a portfolio of 9 major companies chosen due to liquidity and data availability. The goal of the exercise was not to show find an optimized strategy, but to explore the ability of the strategy to replicate the performance of the bond in a variety of market environments.

- **Higher return than bonds:** The compound annual growth rate for the stock+put-spread-collar position (+10.0%) was above that of bonds (+9.5%) over the period.
- **Similar risk to bonds:** The standard deviation of monthly returns for the stock+put-spread-collar position (1.5%) was lower than that of the bonds (1.7%)
- **Higher Sharpe ratio than stocks or bonds:** The risk adjusted returns of the stock+put-spread-collar strategy (average monthly return/standard deviation = 0.42) surpassed that of bonds (0.35) and stocks (0.24) over the period analyzed.

Exhibit 2: Stock+put-spread-collar ("Options") outperformed bonds with similar volatility 1996 to present

Growth of \$1 invested in stock, bonds, the stock+options strategy in 1996; distribution of monthly returns; portfolio Sharpe ratio



Source: Goldman Sachs Research estimates; the nine companies used in the analysis are ABT, DD, IBM, JNJ, PFE, PG, UTX, WMT, XOM.

Mechanics of replicating a bond with stock and options

We estimate that, on average for the top 50 companies in the S&P you can collect 4.2% (20% greater than the current 10 year bond yield) over the next year while still maintaining downside protection to 24% below the current price. Investors can customize the strategy to achieve their desired risk/reward.

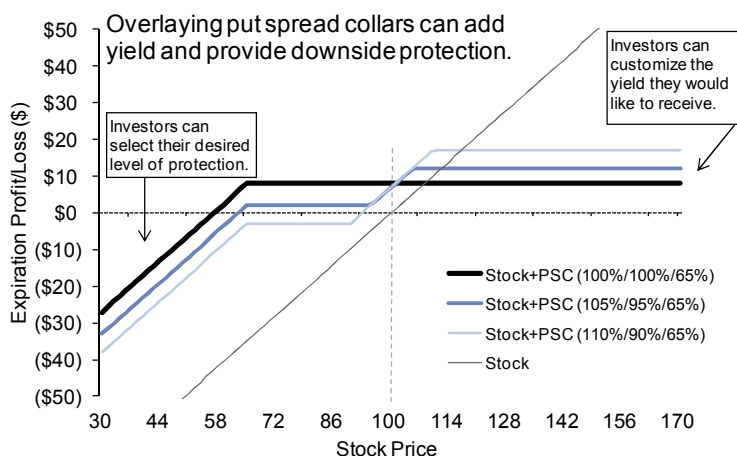
The recipe for replicating corporate bond returns over time is simple: (1) buy the stock, (2) sell a call to generate yield, (3) buy a put spread to protect against downside moves in a

range. The resulting position allows the investor to collect dividends on the stock, collect yield from the call sale, gain protection from the put spread and lock in interest rates. We find that the mark-to-market exposure of this position closely resembles that of a bond even in extreme cases; for a more detailed discussion see page 13.

The options overlay harvests yield and provides downside cushion.

Exhibit 3: Payoff diagram of a collar overlay provides yield and cushions downside

Expiration profit or loss at various stock prices



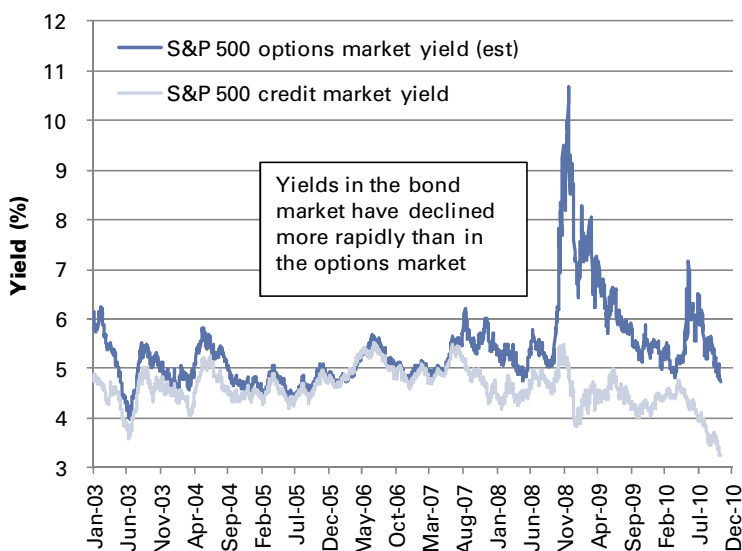
Source: Goldman Sachs Research estimates.

Why now? Range-bound equities view; options prices are elevated

We believe the search for yield is rational given our economists expectations for below consensus US GDP growth and the non-trivial risk of recession or deflation. Easy monetary policy and strong flows towards fixed income funds have driven bond yields to post-war lows. We focus on yield opportunities in equity options as the yields have not declined as rapidly as in the corporate bond markets.

Exhibit 4: Yields in the options market are attractive relative to bonds

Estimated yields: 10 year treasury rates plus idiosyncratic yield from 12 month options (using 70% protection) & corporate bonds (using yield from 5 year CDS spreads of S&P 500 companies)



Source: Goldman Sachs Research estimates.

Muted market outlook: we favor high yielding, lower risk strategies

We believe high yielding strategies look attractive given our expectation for below consensus GDP growth in the US. This view is shared by our Portfolio Strategy team and Tactical Research group who advocate strategies that favor high yielding stocks (see 20-Sep report). The strength of flows out of equities and into bonds in recent months is evidence of the popularity of strategies that not only provide yield, but have lower perceived risk than buying equities. We suggest using options as an overlay on top of an equity portfolio to generate more yield than the bond market can provide in many cases while reducing expected volatility of the positions to something more in-line with a bond portfolio.

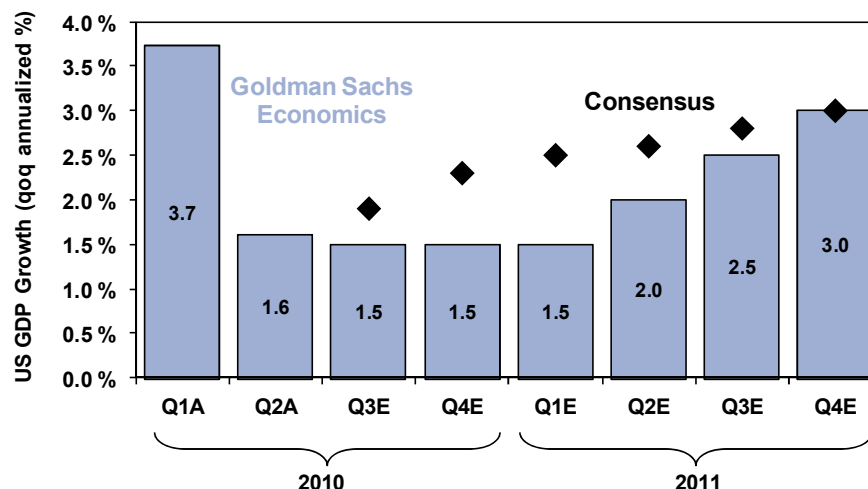
Our economists and macro strategists do not expect a sharp recovery

Our Economists expect below consensus US GDP growth; they expect only 1.8% growth for 2011. Looking ahead to the fourth quarter of 2010 and the first quarter of 2011, our Economists expect: (1) sluggish consumer spending, (2) rebounds in starts and sales from post-tax-credit paybacks (but further declines in construction outlays), (3) a stall in industrial activity, (4) renewed (but modest) labor market deterioration, and (5) a slight slowing in core inflation. Their forecast is consistent with US ISM falling to 50 by year-end, with risk to the downside. They note that despite their US outlook being well below consensus, most indicators have surprised them to the downside over the past three months.

In line with this view, our Portfolio Strategy team shifted to a more defensive positioning last month, increasing their weightings in higher-yielding Telecom and Consumer Staples sectors, and lowering their weighting in Industrials.

Exhibit 5: Our US Economists expect US GDP growth to be slower than consensus for the next few quarters

US GDP forecast, data as of September 16, 2010



Source: Goldman Sachs Research estimates.

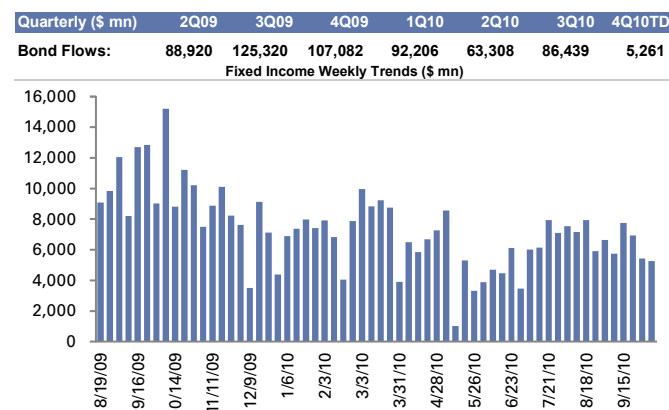
High yielding strategies have been popular

Based on the current environment and our views, high yielding strategies that don't require a notable rise in equity markets look appealing. This has not gone unnoticed by investors:

- Fund flows the bond markets (corporate and government) have been strong all year, especially compared to equities. Given expectations of slow growth, many investors have flocked into fixed income financial instruments where they view the principal as likely to be returned.
- High dividend yield strategies have outperformed. Our portfolio strategy team's recommended basket of High Dividend Growth stocks (GSTHDIVG) has a YTD total return of 14% vs. the S&P 500's 8% total return. High-yielding sectors such as REITs, MLPS, and Telecoms have outperformed as well and are among the top sectors in the market YTD.

Exhibit 6: Flows into bonds have been consistent and strong over the past two years

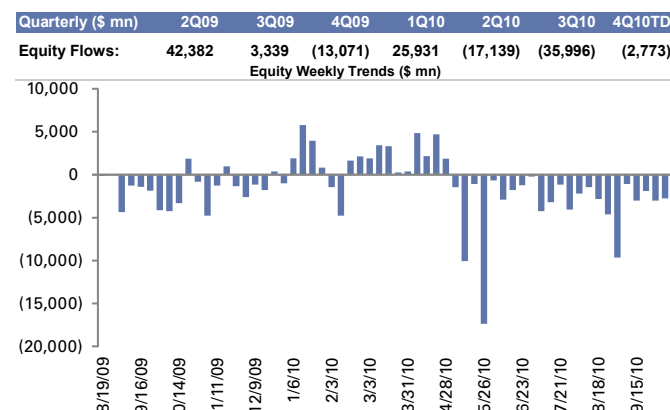
Weekly flows into bond mutual fund products



Source: Investment Company Institute, AMG data, GS Research estimates.

Exhibit 7: ...while equity fund flows have been negative on average over the past two years

Weekly flows into equity mutual fund products



Source: Investment Company Institute, AMG data, GS Research estimates.

The search for "safety" and yield has sent bond yields to near 40-year lows; options provide an attractive alternative

The rush into treasuries and corporate bonds has driven yields dramatically lower. For many portfolio managers, this makes achieving their target rate of return increasingly difficult with just corporate bonds. Despite these low yields, fund flows continue. Our Credit Strategist, Charlie Himmelberg believes these flows are rational and expects corporate bonds to continue to produce attractive returns as they produce some of the strongest yield in the broad bond market and are likely to benefit from continued flow of funds if growth remains low.

We agree with this market view and see the equity options market as a more attractive source of yield than usual. While bond yields are near post-war lows, the yield available in the options market is above its multi-decade average.

Current opportunities: strikes/prices for turning stocks into bonds

In this section we identify current opportunities for investors: (1) we detail attractive opportunities based on our analysts' fundamental views, and (2) we detail pricing on bond-like strategies for the top 50 companies in the S&P 500. We identify the specific strikes that produce a premium that is 20% above the bond yield on the closest to a 10 year bond in the same company. We use 12 month over-the-counter options.

(1) Fundamentally attractive opportunities: We identify opportunities we believe are currently attractive for stock-holders to overlay put-spread-collars to achieve a bond-like risk/return profile. We screen for companies where:

- Our equity rate the stock Buy and see upside to their price target.
- Implied volatility is elevated relative to the sector.
- Price targets that are not in excess of 2 times the annual volatility of the stock. Those are likely companies where returns are strongly dependant on economic or specific growth and may be indicative of a profile that would favor an investment in the stock.

Exhibit 8: Put-spread-collar overlays that allow investors to target 20% greater yield than current bond yields

put-spread-collar strikes necessary to target the specified 1 year yield; 5 yr percentile of the yield acquired with options vs bonds

		Put-spread-collar to target yield				5 year comparison			
Company		Stock Price	Dividend yield	Buy collar and sell this put strike	Protection until % OTM	target yield	Bond yield 8-10y	PSC yield %-ile rank	Bond yield %-ile rank
WHR	Whirlpool	84.27	2.1%	54.78	35%	4.8%	4.0%	83	2
HAL	Halliburton	34.84	1.1%	22.81	35%	4.0%	3.3%	86	2
MON	Monsanto	52.25	2.2%	35.09	33%	3.6%	3.0%	75	2
LOW	Lowe's Companies	22.03	2.0%	15.25	31%	3.7%	3.1%	80	1
EOG	EOG Resources	98.91	0.7%	70.08	29%	3.8%	3.2%	77	1
KSS	Kohl's	53.46	0.0%	38.53	28%	3.7%	3.1%	59	1
UTX	United Technologies	72.98	2.4%	53.29	27%	3.5%	2.9%	88	1
DVN	Devon Energy	66.84	1.0%	49.12	27%	3.8%	3.2%	74	1
UPS	United Parcel Service	67.24	2.8%	50.96	24%	3.8%	3.1%	84	1
GE	General Electric	17.19	3.0%	13.11	24%	4.9%	4.1%	72	1
COST	Costco Wholesale	63.34	1.3%	48.51	23%	2.7%	2.3%	69	1
DIS	Walt Disney	34.48	1.1%	26.50	23%	4.5%	3.8%	84	1
DHR	Danaher	41.36	0.2%	32.13	22%	3.5%	2.9%	100	1
BAX	Baxter International	49.42	2.4%	38.76	22%	3.7%	3.1%	91	2
ABC	AmerisourceBergen	32.06	1.0%	25.96	19%	4.6%	3.9%	100	27
AMT	American Tower	50.62	0.0%	42.37	16%	5.4%	4.5%	80	1
WMT	Wal-Mart Stores	53.92	2.3%	45.17	16%	3.6%	3.0%	75	1
MMM	3M Company	88.15	2.4%	75.08	15%	5.4%	4.5%	84	1
T	AT&T	28.39	5.9%	24.60	13%	5.9%	2.9%	80	1
average			1.9%		25%	4.0%		79	2

On average, you can sell an ATM call,
buy an ATM put and sell a put that is 25% OTM
to target a yield of 4.0%

Source: Goldman Sachs Research estimates; the put strike detailed above generates the target yield specified if the investor trades a 100%/100% collar; if a wider collar is traded (e.g. 105/95), then the put strike to generate the yield may be slightly different.

(2) Put-spread-collar strikes for the S&P 500 top 50: For investors that would like to overlay put-spread collars to transform the return profile of their stock positions to be more like bonds, we identify the specific strikes that produce a premium 20% greater than the yield on the closest to a 10 year bond in the same company.

Exhibit 9: Put-spread-collar overlays that allow investors to target 20% greater yield than current bond yields

put-spread-collar strikes necessary to target the specified 1 year yield; 5 yr percentile of the yield acquired with options vs bonds

		Put-spread-collar to target yield				5 year comparison			
Company	Stock Price	Dividend yield	Buy collar and sell this put strike	Protection until % OTM	target yield	Bond yield 8-10y	PSC yield %-ile rank	Bond yield %-ile rank	
ABT	Abbott Laboratories	53.51	3.4%	43.23	19%	3.7%	3.1%	87	1
AMGN	Amgen Inc	55.94	0.0%	43.10	23%	3.7%	3.1%	82	1
APA	Apache Corp	101.57	0.6%	78.51	23%	4.8%	4.0%	80	1
AXP	American Express Co	38.54	1.7%	26.95	30%	4.7%	3.9%	76	1
BA	Boeing	70.22	2.5%	46.91	33%	3.6%	3.0%	88	1
BAC	Bank of America Corp	13.52	0.3%	10.02	26%	5.6%	4.7%	69	2
BMJ	Bristol-Myers Squibb	27.23	4.7%	21.88	20%	4.7%	2.6%	85	1
C	Citigroup Inc	4.24	0.0%	3.10	27%	5.6%	4.6%	60	1
CAT	Caterpillar	79.34	2.2%	53.74	32%	3.7%	3.1%	76	1
CMCSA	Comcast Corp	18.02	2.1%	12.69	30%	4.4%	3.7%	82	1
COP	ConocoPhillips	59.61	3.8%	44.48	25%	3.8%	3.0%	84	1
CSCO	Cisco Systems Inc	22.62	0.0%	16.40	28%	3.7%	3.1%	87	1
CVS	CVS Caremark Corp	30.95	1.1%	23.59	24%	4.3%	3.6%	88	2
CVX	Chevron Corp	83.84	3.6%	63.27	25%	3.6%	2.7%	87	1
DD	El du Pont de Nemours	46.29	3.7%	32.79	29%	3.7%	3.1%	82	1
DIS	Walt Disney	34.48	1.1%	26.50	23%	4.5%	3.8%	84	1
EMR	Emerson Electric	53.00	2.5%	37.22	30%	3.6%	3.0%	85	1
F	Ford Motor	13.78	0.0%	11.04	20%	6.9%	5.7%	23	1
GE	General Electric	17.19	3.0%	13.13	24%	4.9%	4.1%	72	1
HD	Home Depot Inc	31.43	3.0%	23.73	24%	4.3%	3.6%	75	1
HPQ	Hewlett-Packard Co	41.35	0.8%	29.59	28%	3.3%	2.7%	87	1
IBM	IBM	139.85	1.9%	113.24	19%	3.8%	3.1%	85	1
JNJ	Johnson & Johnson	63.29	3.5%	52.70	17%	3.5%	2.8%	88	1
JPM	JPMorgan Chase	40.42	0.5%	29.45	27%	4.7%	3.9%	69	1
KFT	Kraft Foods Inc	31.15	3.8%	26.18	16%	4.4%	3.7%	85	1
KO	Coca-Cola Co/The	59.60	3.0%	48.89	18%	3.4%	2.8%	87	1
LLY	Eli Lilly & Co	37.36	5.4%	32.26	14%	5.4%	2.9%	80	2
MCD	McDonalds	75.58	3.0%	62.16	18%	3.6%	3.0%	78	2
MDT	Medtronic Inc	33.41	2.7%	24.80	26%	3.7%	3.1%	90	1
MET	MetLife Inc	39.19	1.9%	25.96	34%	4.4%	3.7%	78	5
MO	Altria Group Inc	24.54	6.3%	21.90	11%	6.3%	4.4%	84	2
MRK	Merck & Co Inc	36.64	4.1%	27.70	24%	4.1%	2.8%	85	1
MSFT	Microsoft Corp	24.83	2.1%	18.18	27%	3.4%	2.9%	87	5
ORCL	Oracle Corp	27.95	0.7%	20.73	26%	3.9%	3.2%	87	1
PEP	PepsiCo Inc/NC	66.08	2.9%	54.90	17%	3.6%	3.0%	88	1
PFE	Pfizer Inc	17.47	4.2%	13.05	25%	4.2%	2.9%	88	1
PG	Procter & Gamble	62.02	3.2%	50.71	18%	3.3%	2.7%	87	1
PM	Philip Morris Int.	57.18	4.6%	45.67	20%	4.6%	3.4%	73	1
SLB	Smith International	62.66	1.4%	43.82	30%	4.2%	3.5%	82	1
T	AT&T Inc	28.39	5.9%	24.55	14%	5.9%	2.9%	80	1
TGT	Target Corp	54.74	1.9%	41.27	25%	3.7%	3.1%	64	1
TWX	Time Warner Inc	31.07	2.8%	23.19	25%	4.3%	3.6%	24	1
UNH	UnitedHealth Group	35.02	1.4%	26.06	26%	3.9%	3.3%	74	1
UNP	Union Pacific Corp	83.46	1.6%	61.89	26%	4.1%	3.4%	83	1
UPS	United Parcel Service	67.24	2.8%	50.96	24%	3.8%	3.1%	84	1
UTX	United Technologies	72.98	2.4%	53.29	27%	3.5%	2.9%	88	1
VZ	Verizon Comm.	32.54	5.8%	28.11	14%	5.8%	3.6%	88	1
WFC	Wells Fargo & Co	25.98	0.8%	17.03	34%	3.9%	3.2%	67	1
WMT	Wal-Mart Stores Inc	53.92	2.3%	45.17	16%	3.6%	3.0%	75	1
XOM	Mobil Corp	64.70	2.8%	53.95	17%	4.2%	3.5%	84	1
average			2.5%		24%	4.2%	3.3%	79	1

On average, you can sell an ATM call,
buy an ATM put and sell a put that is 24% OTM
to target a yield of 4.2%

Source: Goldman Sachs Research estimates; the put strike detailed above generates the target yield specified if the investor trades a 100%/100% collar; if a wider collar is traded (e.g. 105/95), then the put strike to generate the yield may be slightly different.

Customizing the strikes and term of the strategy

Investors can customize the options overlay to increase or decrease yield and expected volatility. In general, a reduction in the collar range and a decrease in the put strike will reduce volatility of the returns, but lower the yield.

Collar range: Adjusting the collar range can increase/decrease equity exposure of the strategy. Widening a symmetric collar around the stock price will increase the sensitivity of returns to movements in stock price. Widening of the collar range will also have the effect of lowering the net premium collected due to put skew in the options market; generally out-of-the-money puts cost more than out-of-the-money calls. In the tables above, we have provided the put strikes necessary to target 20% more yield than bonds if investors choose to trade an ATM collar or a 5% OTM call and 5% OTM put.

Put strike: raising the downside put strike will increase the volatility of the net position while raising the net premium collected at the beginning of the strategy.

Term and frequency of trading: We chose to simulate the option strategy by buying 12 month put spread collars and holding to expiration. We wanted to keep the analysis simple and long-term. It may be possible to achieve better returns and/or a lower volatility by choosing a different term or different roll rules.

What if I don't own stock, but would like to extract yield from the options market?

Investors need not own the stock to collect yield from the options market. The options strategy is closely related to a fully collateralized put selling strategy. Investors that sell the out-of-the-money put and hold cash equivalent to the stock price in an account as collateral have a similar risk/reward to those investors in the options strategy. One key difference is that put sellers do not collect the dividend like stockholders and they do not realize the mark-to-market change in the stock position relative to the collar position as it moves.

Risks to the options strategy relative to bonds

We are most focused on the risks that stocks with our options overlay strategy do not perform like bonds.

- Risk that defensive fund flows support bonds over equities: This could support bonds more than one would expect based on the modeled relationships. From April to August, this caused bonds to outperform relative to the options structure. This has somewhat reversed in September and we see the potential for this beneficial reversal to continue.
- Risk of a spike in implied volatility: This could cause an adverse move in the net value of the put spread collar and underperformance of this position relative to bond performance.
- Risk of a further drop in rates: This is a risk to the options strategy relative to bonds. Bonds tend to rally as treasury yields decline, all else equal. As rates decline, the forward price of the stock declines, which would cause the forward price of the stock to be closer to the lower put strike and could result in marginal underperformance.
- Risk of the stock being called away: There is risk that if the stock rises early in the period, that the call that has been sold will be exercised early and the investor would not receive the dividends. Using OTC European options will eliminate that risk.

In a broader sense, stocks with our options overlay strategy are exposed to:



- a substantial decline in the value of the firms assets that lead to a decline in equity price
- an increase in implied volatility that makes the risk of a large move in shares to below the lower put strike more likely and leads to a negative mark-to-market on the put-spread-collar.



Theoretical comparison: replicate bond returns using stock/options

We look to the options market to modify the exposures inherent in equities into exposure that performs more like bonds. We find that the distribution of returns from the stock + put-spread-collar position we analyze has historically been similar to a bond. Options allow the investor to customize the exact mix of yield and risk that is desired. We aim to alter equity exposure in two ways:

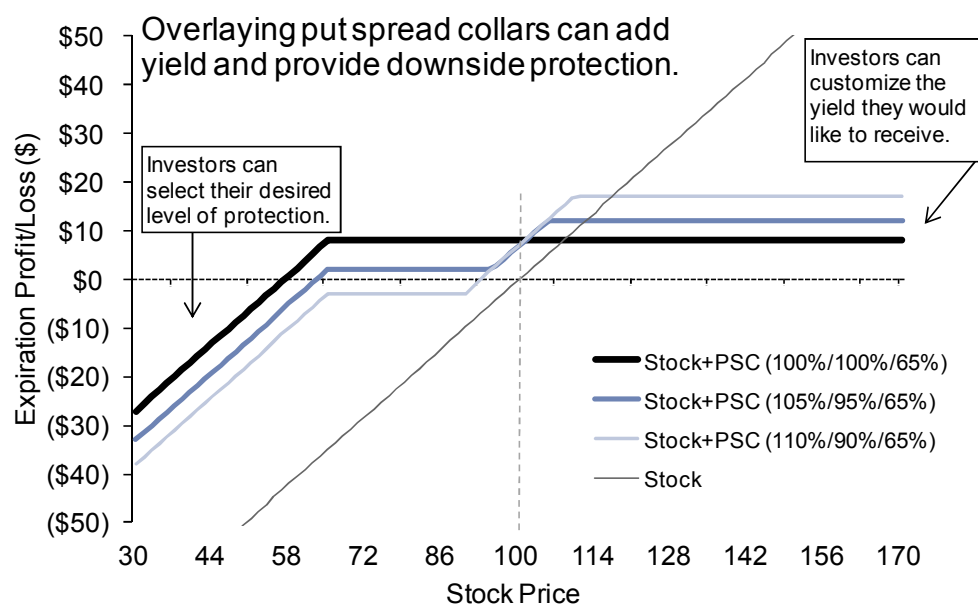
- **Yield:** extract yield from the equity position that is not based on market performance
- **Risk reduction:** Reduce the risk of loss in an extreme downside scenario and lower mark-to-market volatility

We consider put-spread-collars to achieve these goals with a structure that is as simple as possible. Simplicity can reduce transaction costs and can often make the position easier to track. Put spread collars are made up of three distinct parts that give the net position its attractive characteristics:

- sell a call to generate yield,
- buy a put to hedge against downside in the share price in a range,
- sell an out-of-the-money put to generate additional yield.

We illustrate the net exposure of a stock with a put spread collar overlay for different potential share prices on the day of expiration. The investor receives the up-front net premium plus dividends paid over the period. If shares rise, the investor benefits from upside to the call strike. If shares fall, the investor is protected in a range between the upper put strike and the lower put strike; however, the investor is exposed to share price declines beyond the lower put strike.

Exhibit 10: Payoff diagram of a collar overlay provides yield and cushions downside
Mark-to-market profit or loss at various stock prices at various points over the next year



Source: Goldman Sachs Research estimates.

Bond vs the stock + the options strategy in various scenarios

We would expect returns of the stock + options strategy to approximate bond returns in a wide variety of scenarios as we demonstrate in a stylized example. The value of both of these positions varies based on the value of the firm. We consider hypothetical returns for a variety of firm values as we ponder the question, "Can investors replicate risk/return profile of a corporate bond using stock and options?"

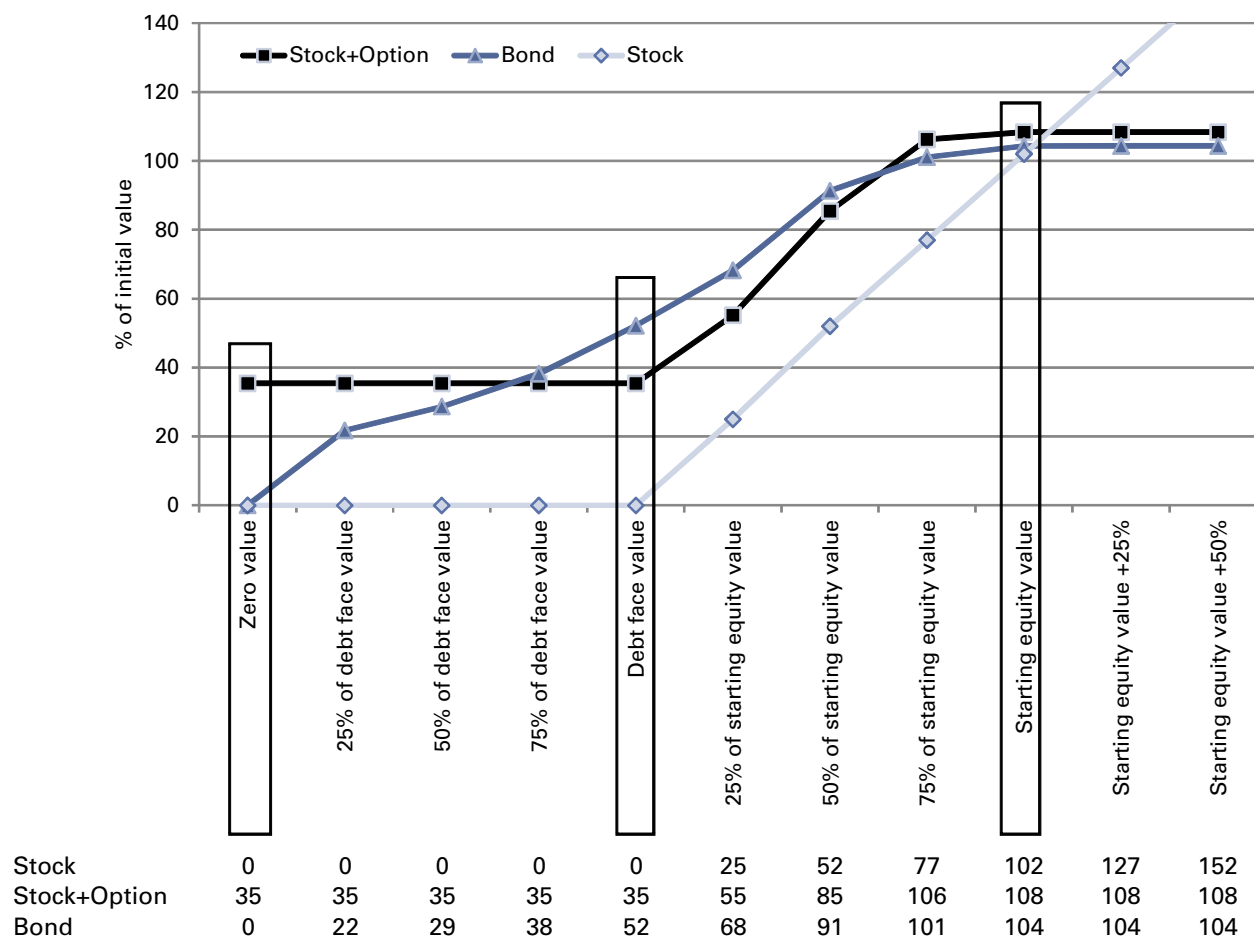
Assets we consider in our comparison:

- 1. Corporate bond:** \$100 face value 10 year bond with a \$8 annual coupon paid semiannually that is currently trading at a \$15 premium to face value where rates are such that you expect the price of the bond to accrete \$3 towards par over the year.
- 2. The options strategy: Stock + put-spread-collar:** \$100 stock that pays a \$2 dividend where investors collect \$4 for a 12-month put spread collar (sell a call with a strike of 100% of the forward, buy a put with a strike of 100%, sell put with a strike of 70%). Net outlay \$96.
- 3. Stock:** \$100 stock that pays a \$2 dividend.

We consider the potential value of each asset based on a change in the value of the total firm over the course of one year. We use dramatic asset price shocks to consider the potential returns on various strategies in extreme scenarios.

Exhibit 11: Payoff diagram of Bonds, Stock, and Collared stock

Hypothetical value of various investments at various scenarios of firm value at the end of the period



Source: Goldman Sachs Research estimates.

Below we summarize the mechanics behind the hypothetical returns given various asset values:

Zero value scenario: Value of the firm is at zero. In the case where the value of the firm degrades rapidly and there is no value left to pay bondholders at the end of the year, bond holders would receive a value approaching zero. Equity holders receive a value near zero for their stock and likely do not receive any dividends. Holders of the options strategy receive \$34, but likely do not receive dividends; they collected \$4 upfront for the put spread collar and they receive a payout of \$30 on the put spread collar (upper put strike minus the lower put strike). Rarely are companies liquidated and have zero recovery value, but in that extreme case, the options strategy could greatly outperform.

Liquidation scenario: Value of the firm is significantly less than the value of the debt such that debt holders decide to liquidate the assets of the company. For stock holders and holders of the options strategy, the scenario is the same as the above. Debt holders are able to recover the value of the assets. Our credit strategists currently use an estimate of 35%-40% of face value for the recovery rate on corporate bonds. Given that the average investment grade bond is trading at a \$15 premium to face value, a 35% of face value recovery would be equivalent to a 30% recovery on the original investment. This is slightly lower than the recovery on the options strategy of 35%.

Distressed scenario: Value of the firm is estimated by the market as equal to the debt value. Equity holders lose significant value as the stock price moves towards zero and dividends may be suspended. The options strategy loses value as the stock drops below the lower put strike; the minimum value of the net position of the options strategy is \$34 (35% of initial investment). Bond holders receive coupons, but likely face a mark-to-market loss as it becomes more likely that the company defaults in the future. The average price of 10 distressed bonds we analyzed during the 2008 crisis was \$55. In this scenario, the bond recovery (52%) may outperform the options strategy recovery (35%).

Flat scenario: Value of the firm remains constant. Bond holders receive a yield on their bonds made up on coupons and any accretion of the bond value toward par. Equity holders receive a dividend and the mark to market on their stock moves. Holders of the options strategy receive the net yield collected at the beginning of the period, dividends and the difference between the starting price and the forward price.

Upside scenario: Value of the firm rises sharply. Equity holders receive the dividend and any appreciation in the stock. Bond and options strategy investors receive the same as above which is similar to each other. We consider European options in this analysis to avoid the potential for the stock to be called away early. Investors that sell American call options may have the risk of early exercise by the holder if the call is significantly in the money and the expected dividend is large.

Sources of yield in the stock + options strategy compare directly with bonds

Risk/reward is similar because the drivers of the returns are similar. From a theoretical perspective, we have shown how the returns of the options strategy are similar to that of a bond. Bond returns are driven by the rates, coupons, company specific risks, and forward rate expectations. The returns of the options strategy are driven by three of those four factors. Collaring the stock at the forward price locks in current rates and expected dividends, while the put sale generates yield. Bond returns are also driven by forward rate expectations; this effect is more difficult to replicate with short term options. Given the bond market has recently seen a dramatic decline in rate expectations (driving strong returns), we are not as worried about this limitation in the near-term.

Exhibit 12: Drivers of returns in bonds and the options strategy are similar

Description of major return drivers for bonds and the options strategy

Driver of returns	Bond specific	Options strategy
Income	The company is obligated to pay the agreed upon coupon at the time specified.	Expected dividends are embedded in the forward price of the stock. The options strategy allows the investor to lock in the dividend regardless of whether the company decides to pay the dividend or not.
Rates (current)	Higher interest rates on treasuries drive higher yields on corporate bonds.	Rates drive the forward price of the stock higher. Collar pricing allows the options investor to lock in the current rates embedded in the forward price of the stock.
Company specific yield	Investors demand higher bond yields for companies that are higher risk. This additional yield comes in the form of spread over treasuries (Z-spread).	Investors receive more premium for selling a put on a higher risk company, all else equal.
Forward rate expectations	The price of the bond can be affected if expected rates for the remaining life of the bond change.	LIMITATION: unless the maturity of the options strategy matches that of the bond, it is difficult to capture this effect. In our study we partially compensate for this by targetting double the current rates. This helps to compensate for reinvestment risk.

Source: Goldman Sachs Research estimates.

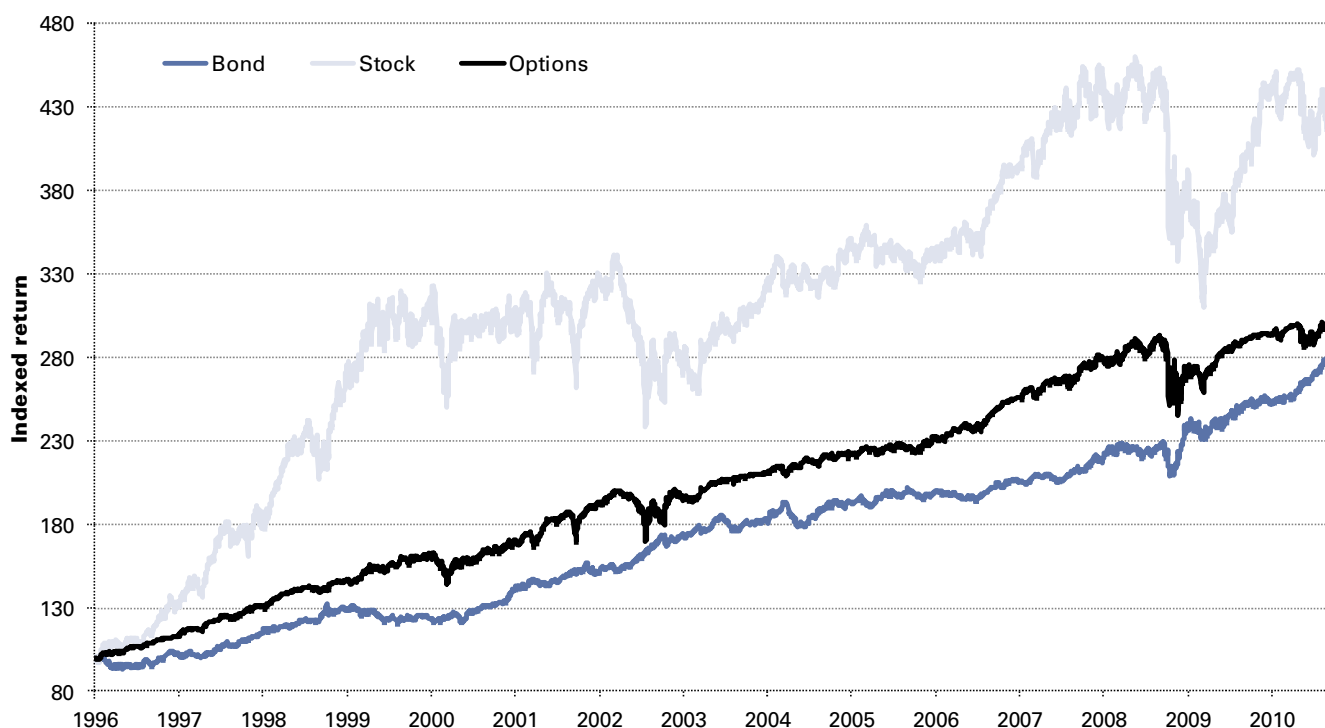


Practical comparison: 15 year study of returns

The return profile of the options strategy has been similar to that of a bond over the last 15 years for the portfolio of nine companies that we analyzed. Below, we show the compound annual growth of \$1 invested in bonds, the stocks, and the stock + options strategy. The yield generating and volatility dampening effects of the options strategy is immediately apparent. During periods where stocks rise rapidly, the options strategy generates its maximum yield. During periods where stock returns are negative or volatile, the options strategy dampens the volatility and absorbs a large portion of the losses.

Exhibit 13: Portfolio of all nine companies: comparison of bond, stock and the options strategy

Total return January 1996 to September 2010



Source: Goldman Sachs Research estimates.

Our analysis is based on the total returns for three assets on 9 companies chosen based on liquidity and data availability:

- **Bonds:** we calculate the total return for a bond investment assuming coupons are reinvested. We target the closest to a 10 year maturity bond and roll every 4 years.
- **Stock:** we calculate the total return for a stock assuming dividends are reinvested.
- **The options strategy:** we calculate the total return for a stock investment assuming dividends are reinvested and assuming the investor enters into a 12 month put-spread-collar on the first day of the year that expires on the last day of the year. For this analysis, we analyze selling a call at the forward price of the stock, buying a put at the forward price of the stock and selling an out of the money put. The collar portion of the options overlay locks in current rates and dividends. We position the out of the money put such that investors collect 1.2X the yield of the bond used in the analysis at the beginning of the period. We follow the daily mark-to-market of the combined strategy. Our analysis assumes that the stock is not called away early and the investor receives the dividends.

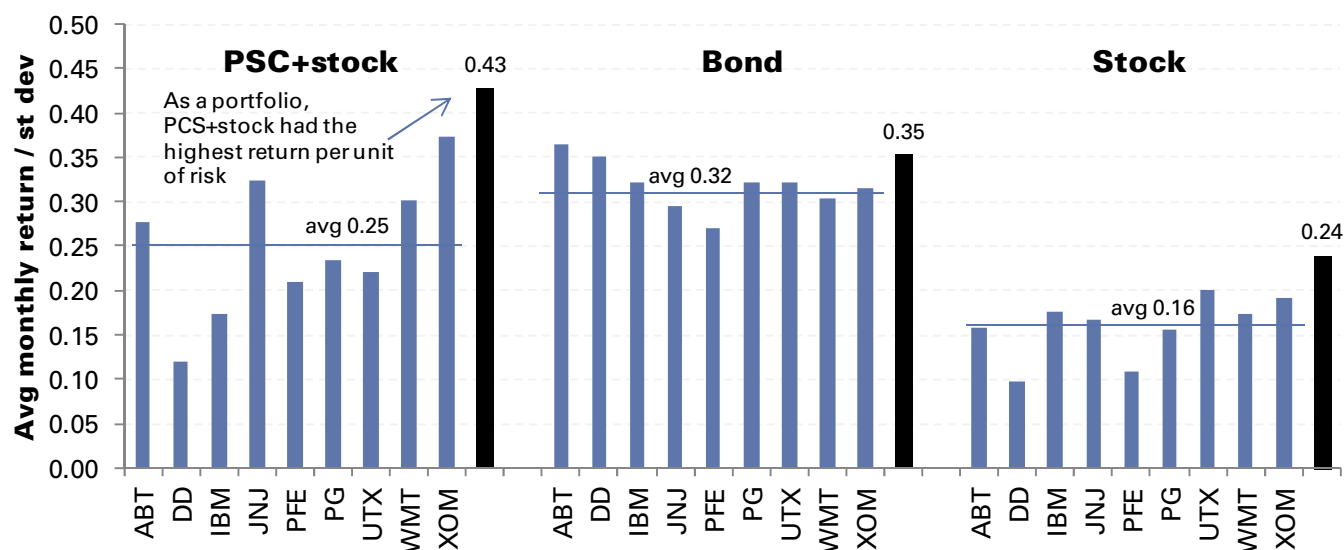
Risk-adjusted returns

We find that the options strategy had a higher risk-adjusted return than either stocks or bonds over the past 15 years if you consider our portfolio of nine names. We analyze the risk adjusted return using average monthly total return divided by the standard deviation of those monthly returns. We find that the risk-adjusted returns of the options strategy over the past 15 years has been similar to that of bonds. Observations:

- **Risk-adjusted returns for the options strategy were far above that of stocks and closer to that of bonds on average over the past 15 years.** For the nine companies analyzed, the options strategy's risk adjusted return of 0.25 was sharply higher than for the comparable stocks (0.16) and near that of the average bond in the analysis (0.32).
- **Returns were more homogeneous in bonds than in the stock + options strategy, suggesting that stock pickers may have an advantage in bond replication strategies.** The value of each corporate bond is highly correlated to government bonds leading to similar performance across companies. While stocks values (and by extension, the options strategy) are linked to common factors such as interest rates, the links are not as strong. We found that when these nine companies were combined to form a basket of names, there were more significant diversification benefits for holders of the stock and options strategy than for the holders of bonds.

In the appendix, we present results for each of the nine companies analyzed.

Exhibit 14: Options enabled equity investors to achieve bond-like returns with lower volatility than bonds
January 1996 to September 2010; monthly average returns / standard deviation of monthly returns



Source: Goldman Sachs Research estimates.

Performance during various periods

Our goal was not to prove that the options strategy we have chosen to compare is superior to bond performance, but rather to show how similar it has been over the time period where data is available. There are time periods where external factors drove the options strategy to outperform or underperform bonds. The options strategy may be able to mimic the risk and risk profile of bonds over time, but flow of funds factors may drive short-run divergences.

Period 1: Strong stock returns with elevated interest rates and inflation (1996-1999):

Rapid economic growth fueled strong performance of stocks. Corporate bond yields began the period at elevated levels and rising government interest rates (in an effort to cool the economy and inflation) eroded some of the value of corporate bonds. The options strategy maxed-out in almost every year. This led to the options strategy outperforming bonds, but underperforming stocks.

Period 2: Equity values volatile in a range while interest rates drop (2000-2002):

the total return for stocks in our analysis was flat to down for this period. Volatility for the combined strategy was somewhat limited and the cushion provided by the options strategy protected against losses in most of the names, allowing for the full yield to be realized. Corporate bonds outperformed the options strategy modestly during this period as interest rates (and yields) declined and bonds appreciated.

Period 3: Strong stock performance and rising rates (2003-2007):

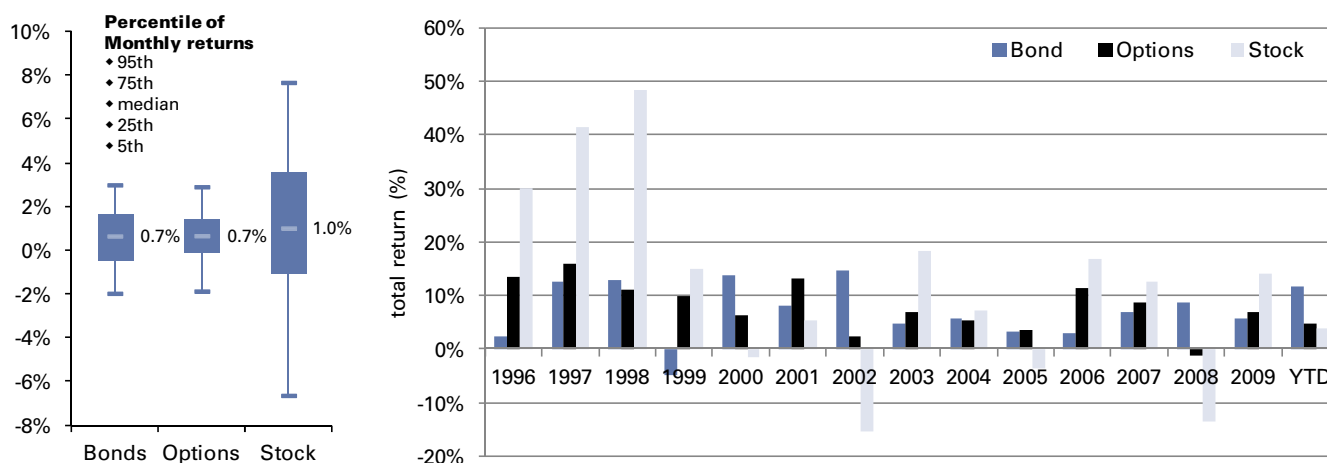
Relative performance of stocks, bonds and the options strategy were similar during this period as in 1996-2000. Steady performance of the options strategy increased with each year as the target yield increased along with rising yields in the corporate bond market. These rising yields also dampened returns on corporate bonds as the bond price fell.

Period 4: Asset price crisis and an extreme drop in interest rates (2008-present):

The stocks in our analysis dropped an average of 17% in 2008, but their total return was bolstered by a 3.5% dividend yield. The stock + options strategy only posted a 1.4% drop in total return over 2008 as it cushioned the first 15% of losses. Bonds experienced a strong return as interest rates dropped to historic lows and flows into bond funds increased sharply. Overall, the options strategy underperformed bonds during 2008 and 2010.

Exhibit 15: Portfolio of all nine companies: comparison of stock, bonds and the options strategy

Total return January 1996 to September 2010; distribution of monthly returns, annual % returns by year



Source: Goldman Sachs Research estimates.

Appendix: Methodology and case studies

We discuss some of the relevant details of our methodology below and show the nine case studies that we used in our analysis. Our methodology was designed to be as simple as possible to allow the comparison of returns from a generic strategy as a starting point for discussion. We acknowledge that there are likely ways that the strategy could be modified to increase the risk-adjusted returns over the period analyzed. We chose the nine companies in our analysis due to option and bond data availability. There are surprisingly few companies that have had liquid options and bonds for the entire period we analyzed. We use these as a starting point for exploration.

Methodology: The options strategy

Choosing the put-spread-collar strikes: In this strategy, we target yield generation that is significantly higher than the bond yield. The call sale at the forward price and the put purchase at the forward price lock in the current interest rate and the dividend payment. Additionally, we target a yield equal to 1.2x the total yield on the bond through the put sale. This results in especially high yields when rates are high. We set the strikes at the beginning of each year based on the yield-to-maturity of the closest to a 10 year bond on the same company. We chose to use this measure of “expected yield” rather than using the subsequent total returns on the bonds so as not to bias our results with perfect foresight. We used 1.2x the bond yield as we believe that investors today would be looking at a strategy to collect more yield than is available in the bond market. In years where the yield to maturity was high due to high rates environments or high perceived risk, the options strikes were positioned to collect a large amount of yield. When interest rates are low, the yield targeted in the options position is lower.

(1) The call sale: A call is sold at the 12-month forward price of the asset. The forward price is generally derived from interest rates and adjusted for expected dividend payments. Selling this call monetizes the upside volatility that is priced into the options market.

(2) The put purchase: A put is purchased at the 12-month forward price of the asset. This protects against any unexpected decline in the stock price over the year. Due to put/call parity, you would expect this put purchase to cost the same as the call sale above. Together with the call, these positions allow stockholders to collect the dividend and current interest rates.

(3) The put sale: A put is sold at a strike that is as low as possible while still enabling the investor to collect the required yield. When bond market yields are high, the put strike is closer to the money (times like 1996). When yields in the bond market are low (like now), the put that needs to be sold is far from the money. On the average company in the S&P top 50, the puts strike is currently 29% out of the money. In some cases in the early years of the analysis, implied volatility was so low that it was necessary to sell puts that were at-the-money to generate the required yield.

Data source: For 1996 to 2003, we used listed options prices from OptionMetrics. For 2003 to present, we used OTC options prices based on our Goldman Sachs data. While we would have preferred to use OTC options prices for the time period, we favored the reliability of actual listed options prices for the early periods where pricing OTC options can be challenging. When using listed strikes, we chose the strikes where data was available for the relevant time period and were closest to the OTC strikes we would have chosen.

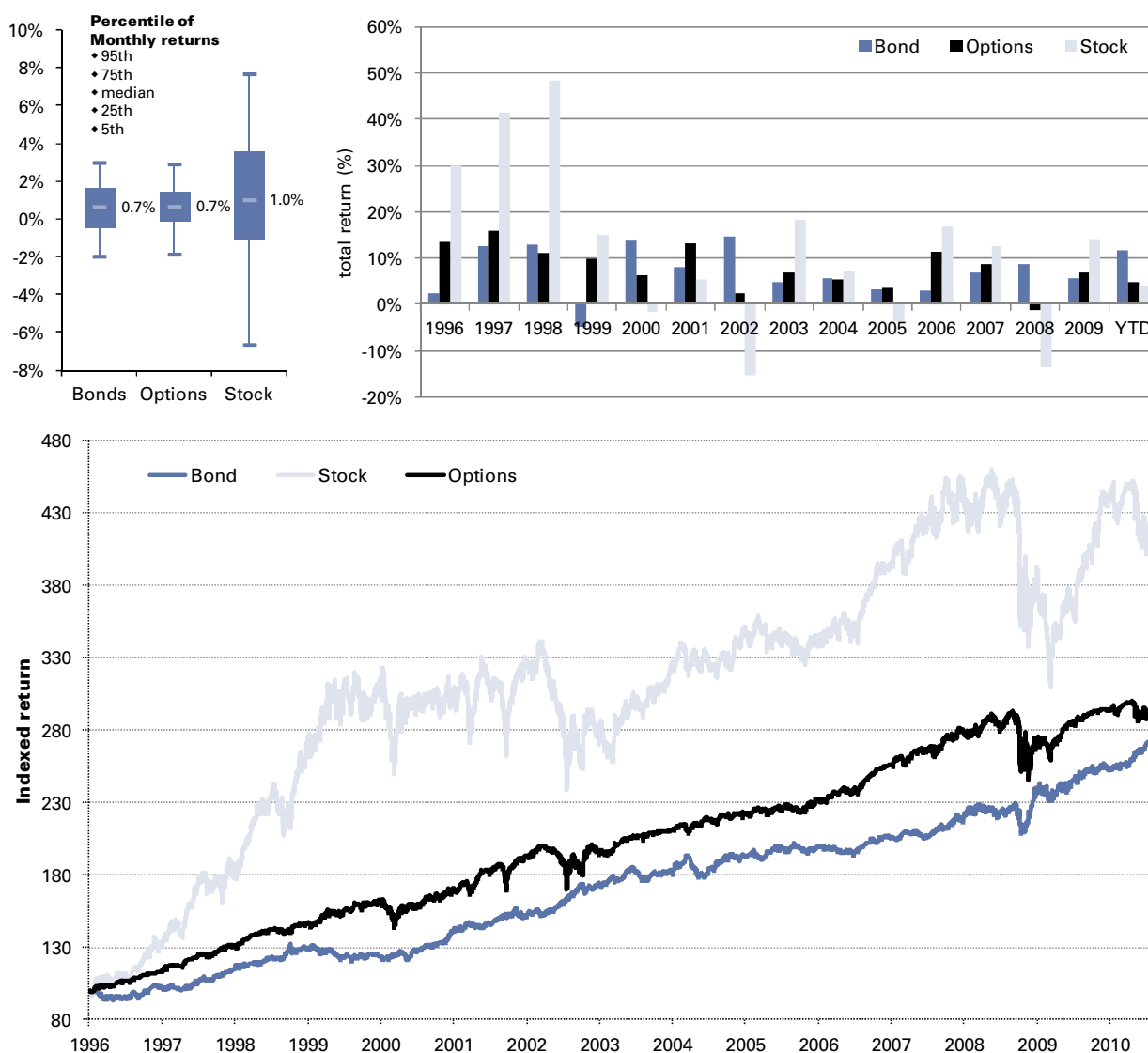
Transaction costs: To be conservative, we included transaction costs for the options strategy, but assumed no transaction costs for the stock or bond strategies. We assumed a transaction cost of 2% of the net put spread collar position each year. We estimated this transaction cost based on today’s markets. We find that the risk adjusted returns of the

strategy are not greatly affected even if we use 5X the current transaction costs due to the fact that there is only one transaction at the beginning of each year. In the analysis we reinvested bond coupons semiannually and rolled bonds every 4 years; however, we did not including transaction costs for bonds to be conservative in our comparison with the stock + options strategy we discuss. Bond transaction costs are substantial.

Early exercise risk of the calls: For investors that sell American style calls, there is the potential for the stock to be called away at some point during the trade if the stock rises and the call is far enough in the money to warrant early exercise to receive the dividend payment. Our analysis assumes that the stock is not called away early and the investor receives the dividends. We believe this is a reasonable assumption as we simulated the same strategy with using European options for the upper call and put strike, and the yields were roughly equivalent. American options are worth slightly more than European options due to this extra optionality, but because the investor is selling a call and buying a put at the same strike in our analysis, we find the yield ramifications of changing those two options to European from American are negligible.

Exhibit 16: Portfolio of all nine companies: comparison of stock, bond and the options strategy

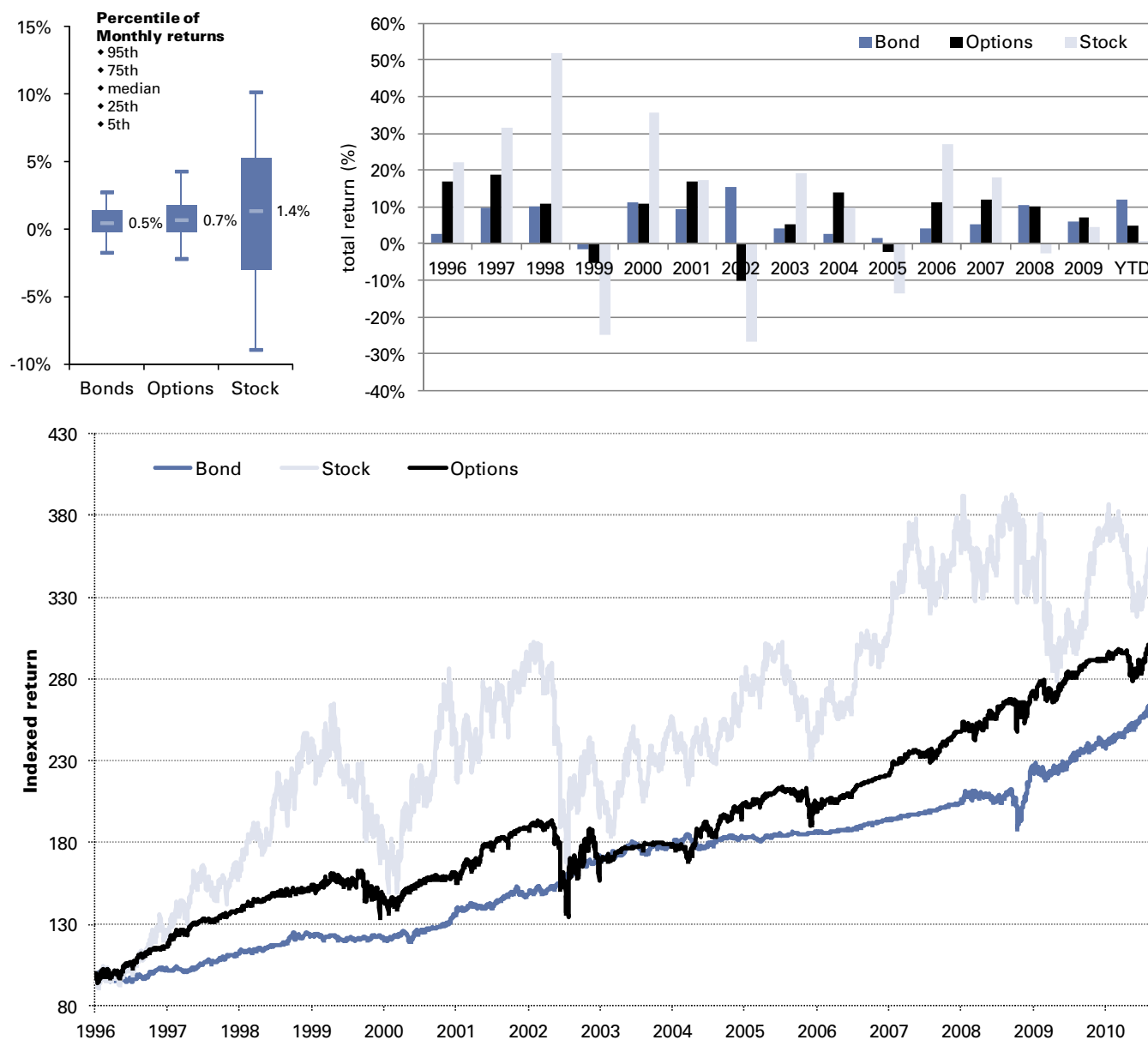
Total return January 1996 to September 2010; compound growth, annual returns, distribution of monthly returns



Source: Goldman Sachs Research estimates.

Exhibit 17: Abbott (ABT): comparison of stock, bond and the options strategy

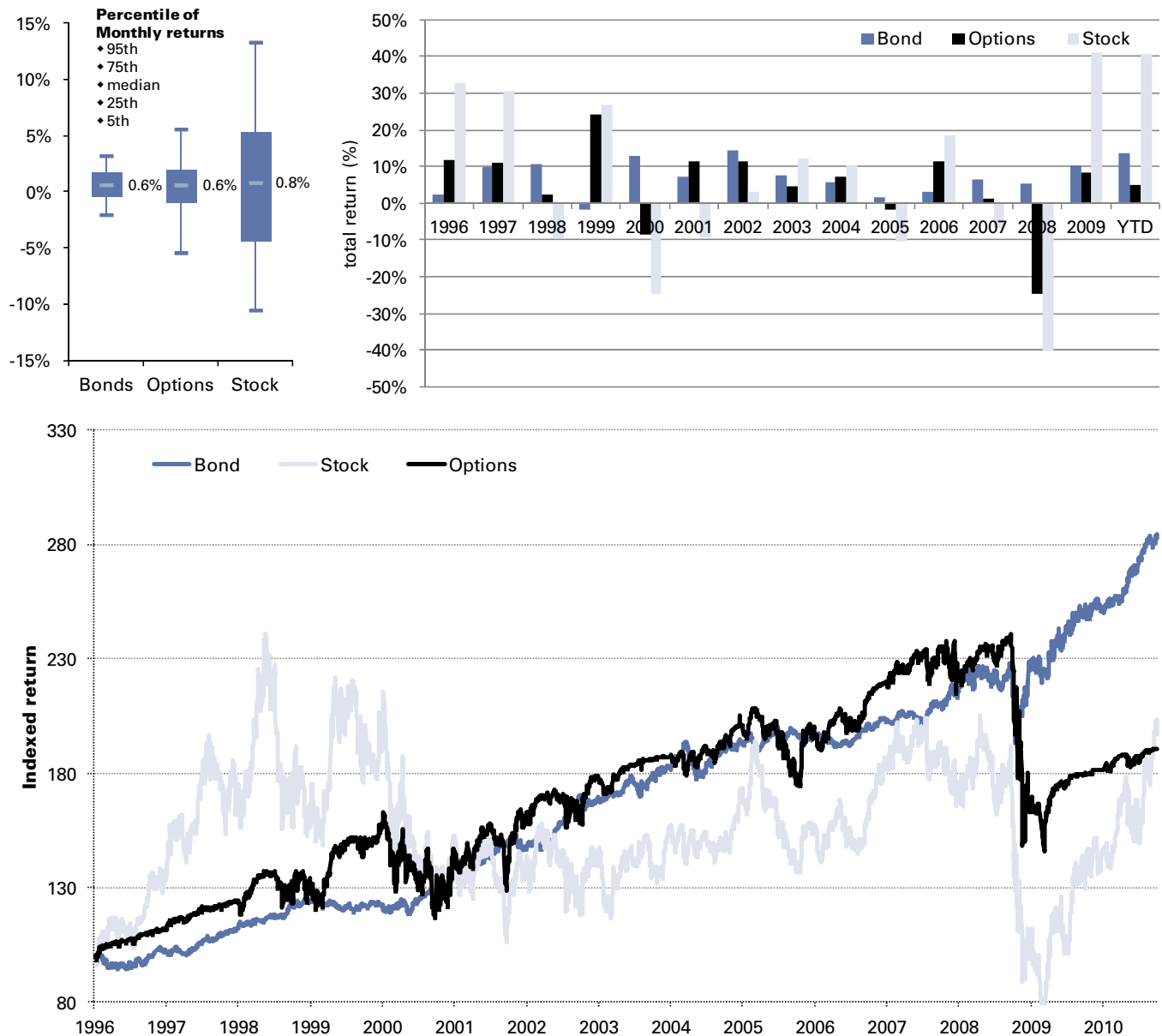
Total return January 1996 to September 2010; compound growth, annual returns, distribution of monthly returns



Source: Goldman Sachs Research estimates.

Exhibit 18: Dupont (DD): comparison of stock, bond and the options strategy

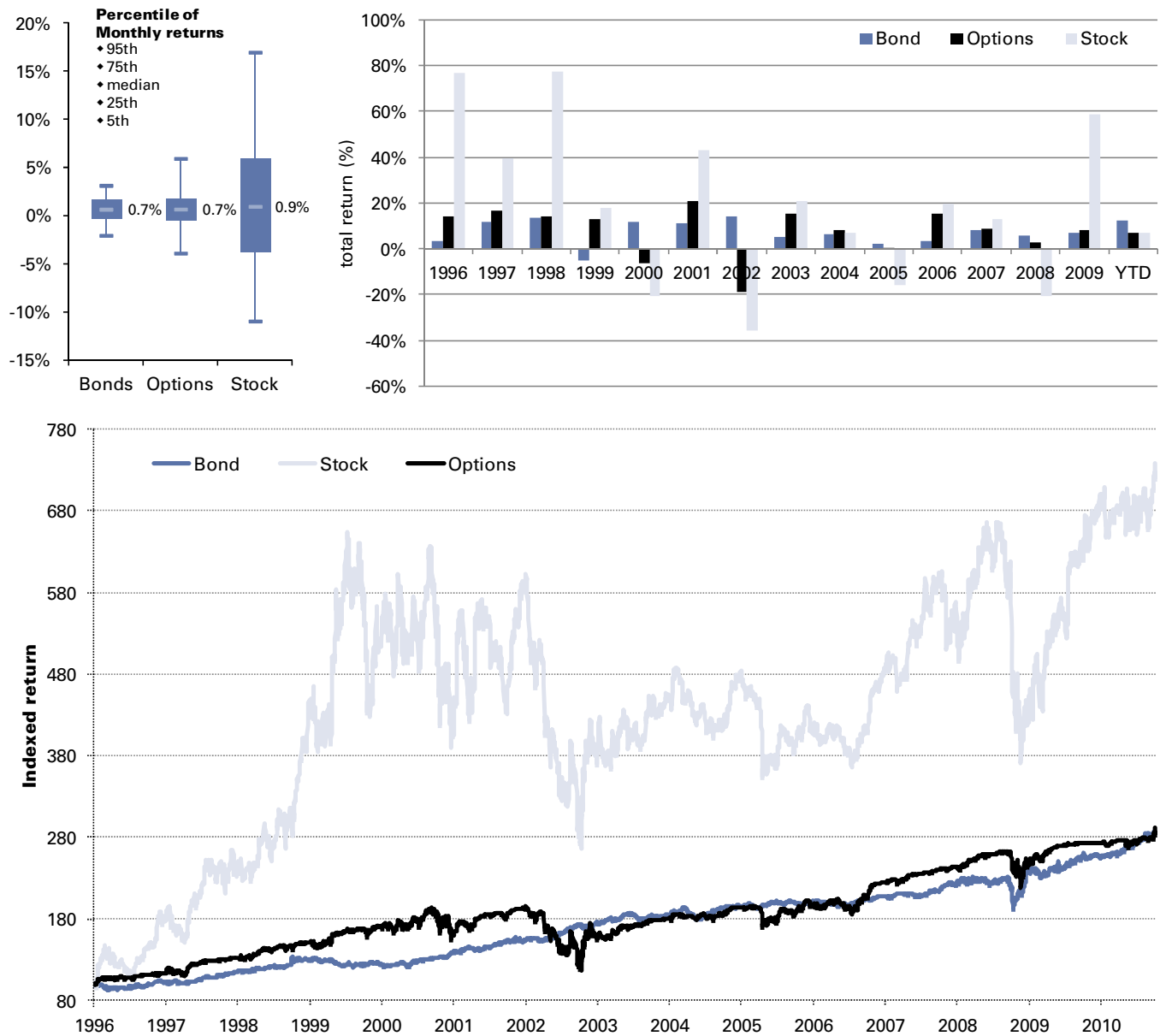
Total return January 1996 to September 2010; compound growth, annual returns, distribution of monthly returns



Source: Goldman Sachs Research estimates.

Exhibit 19: International Business Machines (IBM): comparison of stock, bond and the options strategy

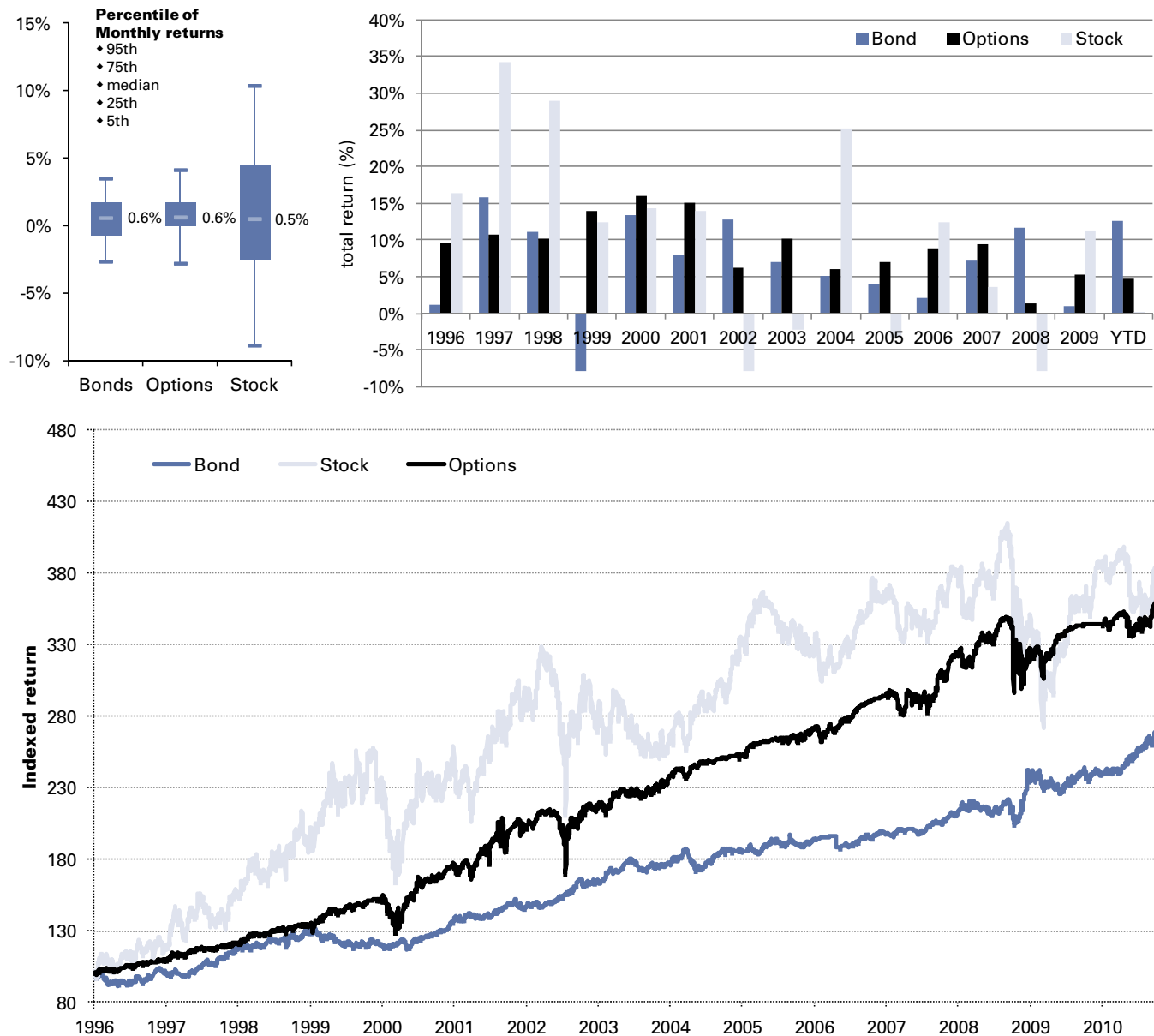
Total return January 1996 to September 2010; compound growth, annual returns, distribution of monthly returns



Source: Goldman Sachs Research estimates.

Exhibit 20: Johnson and Johnson (JNJ): comparison of stock, bond and the options strategy

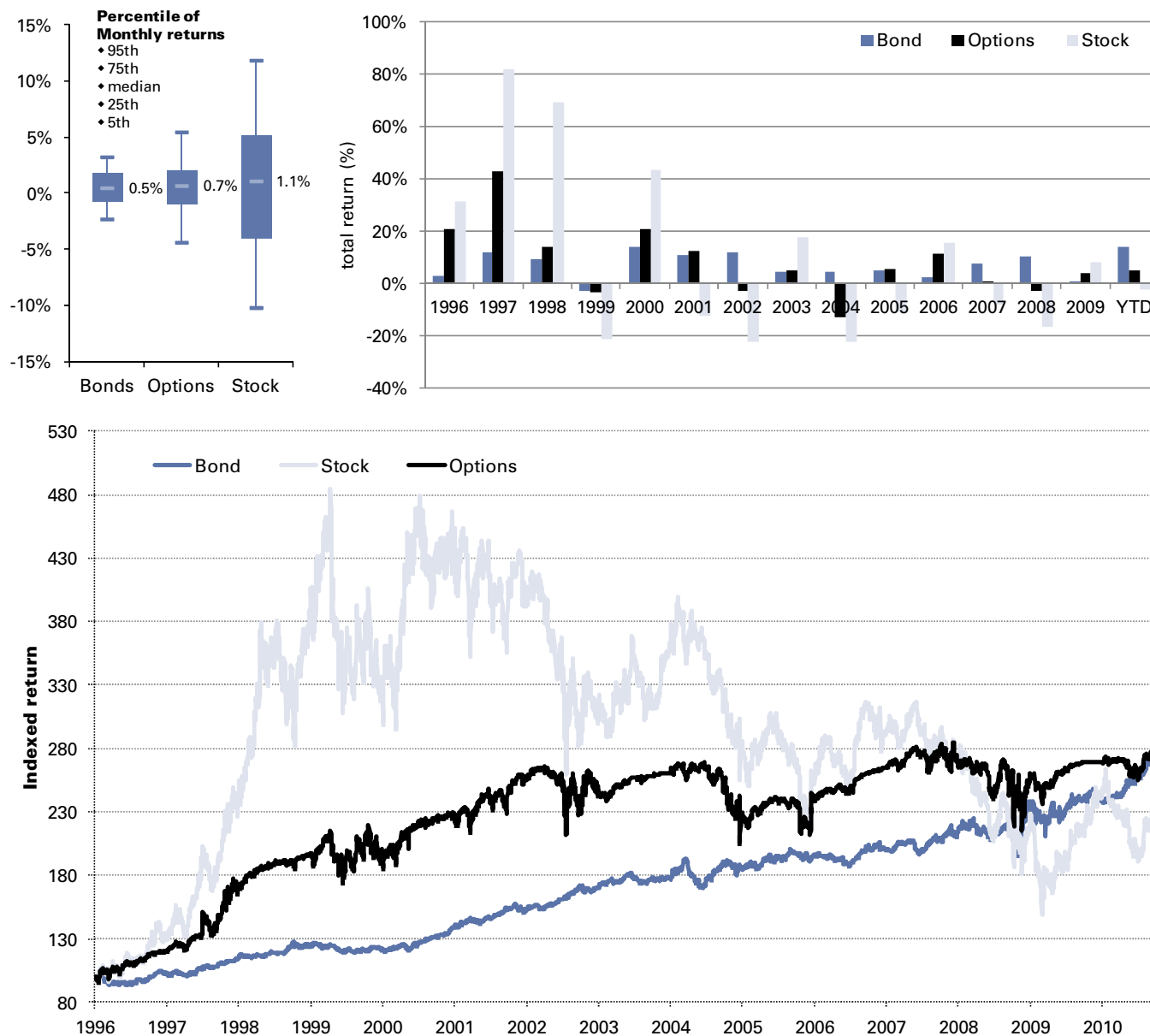
Total return January 1996 to September 2010; compound growth, annual returns, distribution of monthly returns



Source: Goldman Sachs Research estimates.

Exhibit 21: Pfizer (PFE): comparison of stock, bond and the options strategy

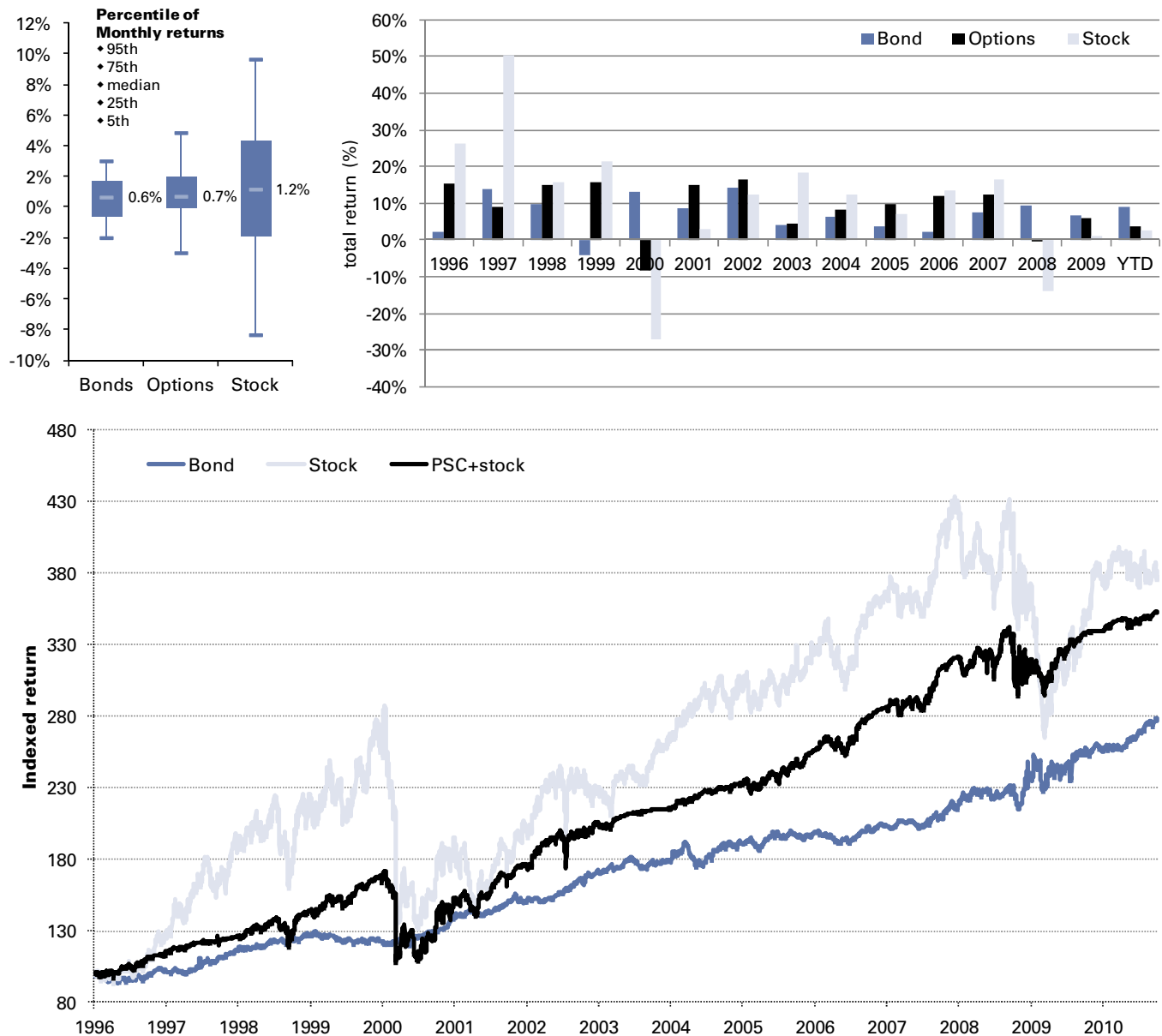
Total return January 1996 to September 2010; compound growth, annual returns, distribution of monthly returns



Source: Goldman Sachs Research estimates.

Exhibit 22: Procter and Gamble (PG): comparison of stock, bond and the options strategy

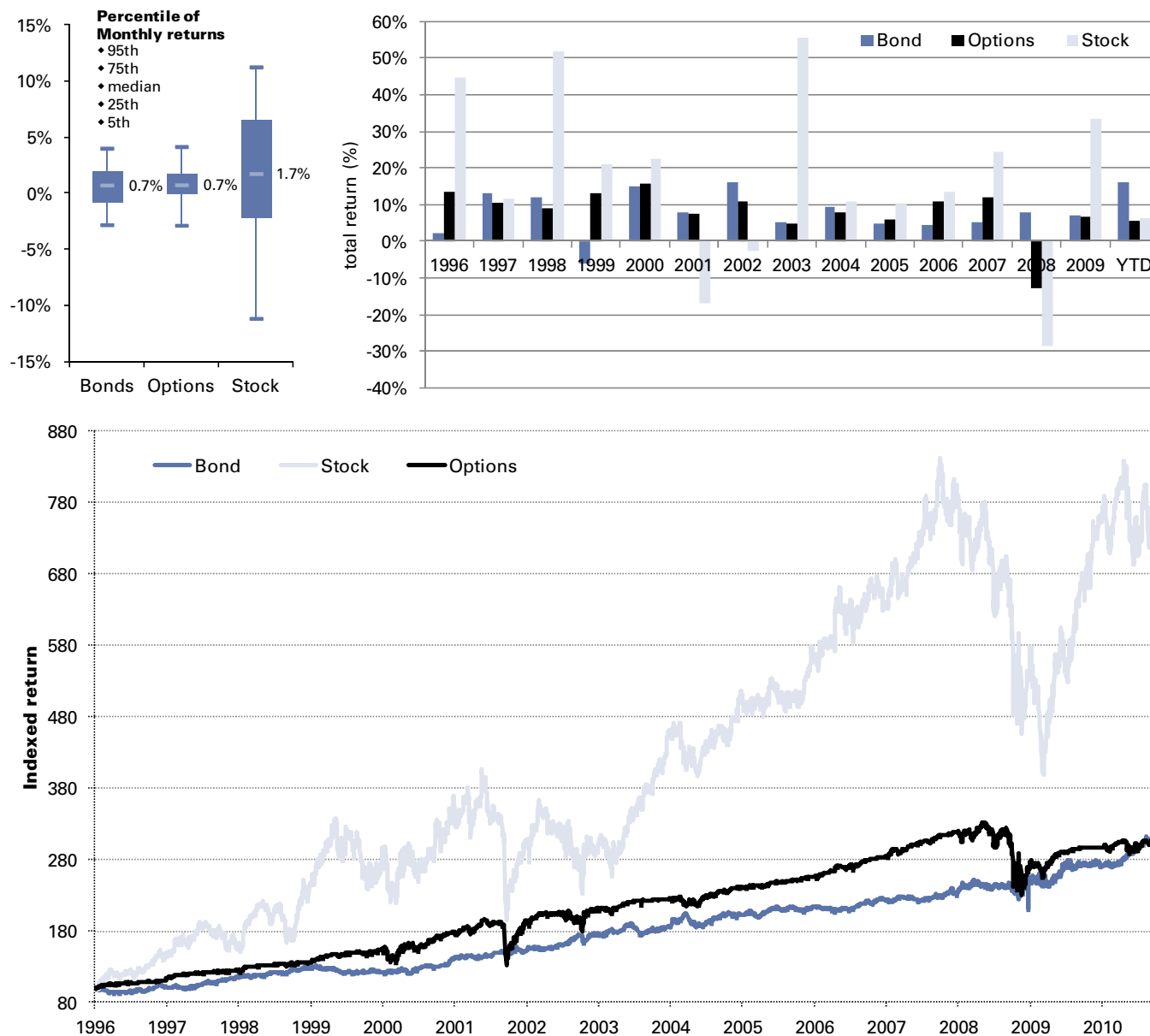
Total return January 1996 to September 2010; compound growth, annual returns, distribution of monthly returns



Source: Goldman Sachs Research estimates.

Exhibit 23: United Technologies (UTX): comparison of stock, bond and the options strategy

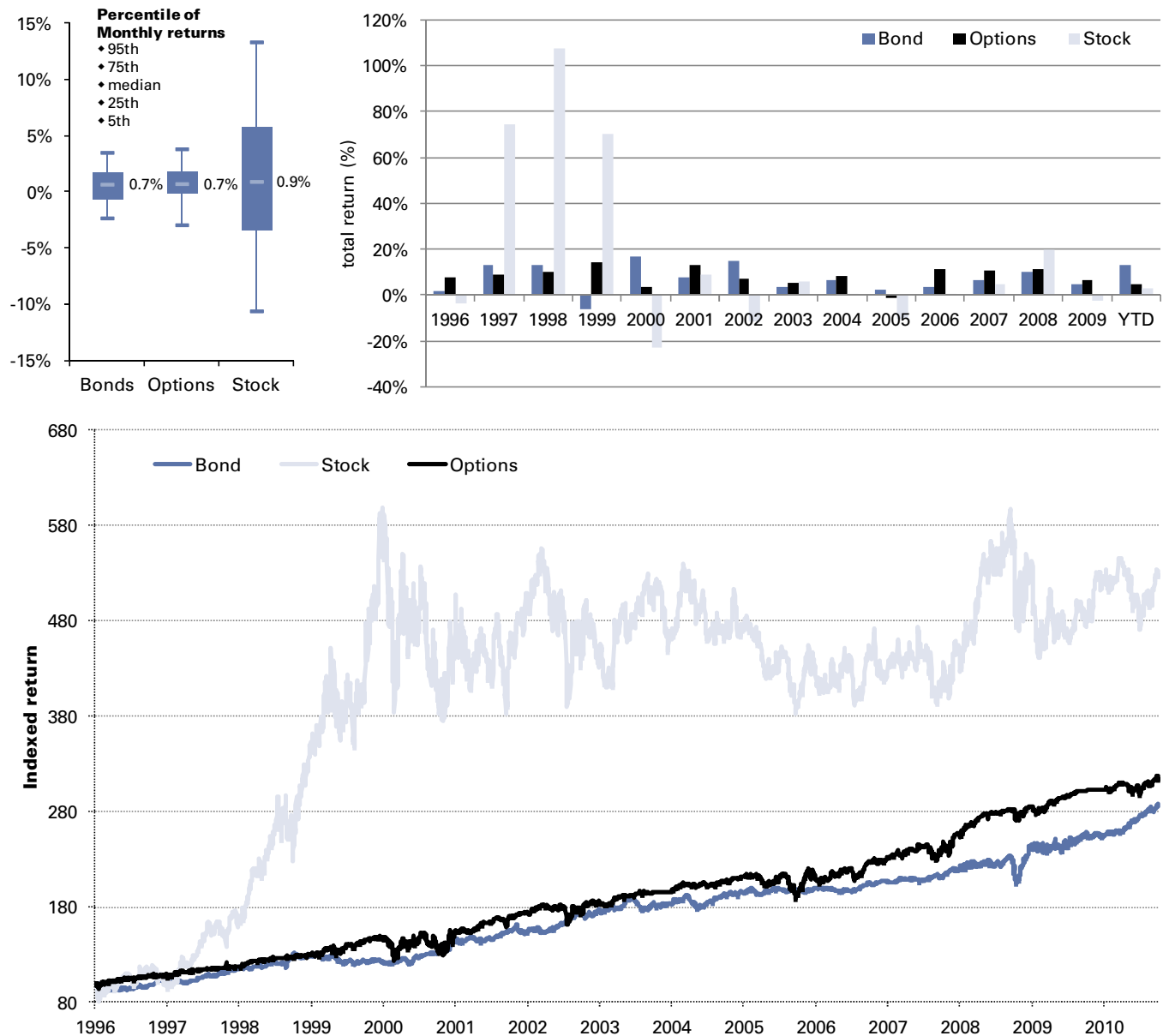
Total return January 1996 to September 2010; compound growth, annual returns, distribution of monthly returns



Source: Goldman Sachs Research estimates.

Exhibit 24: Wal-Mart (WMT): comparison of stock, bond and the options strategy

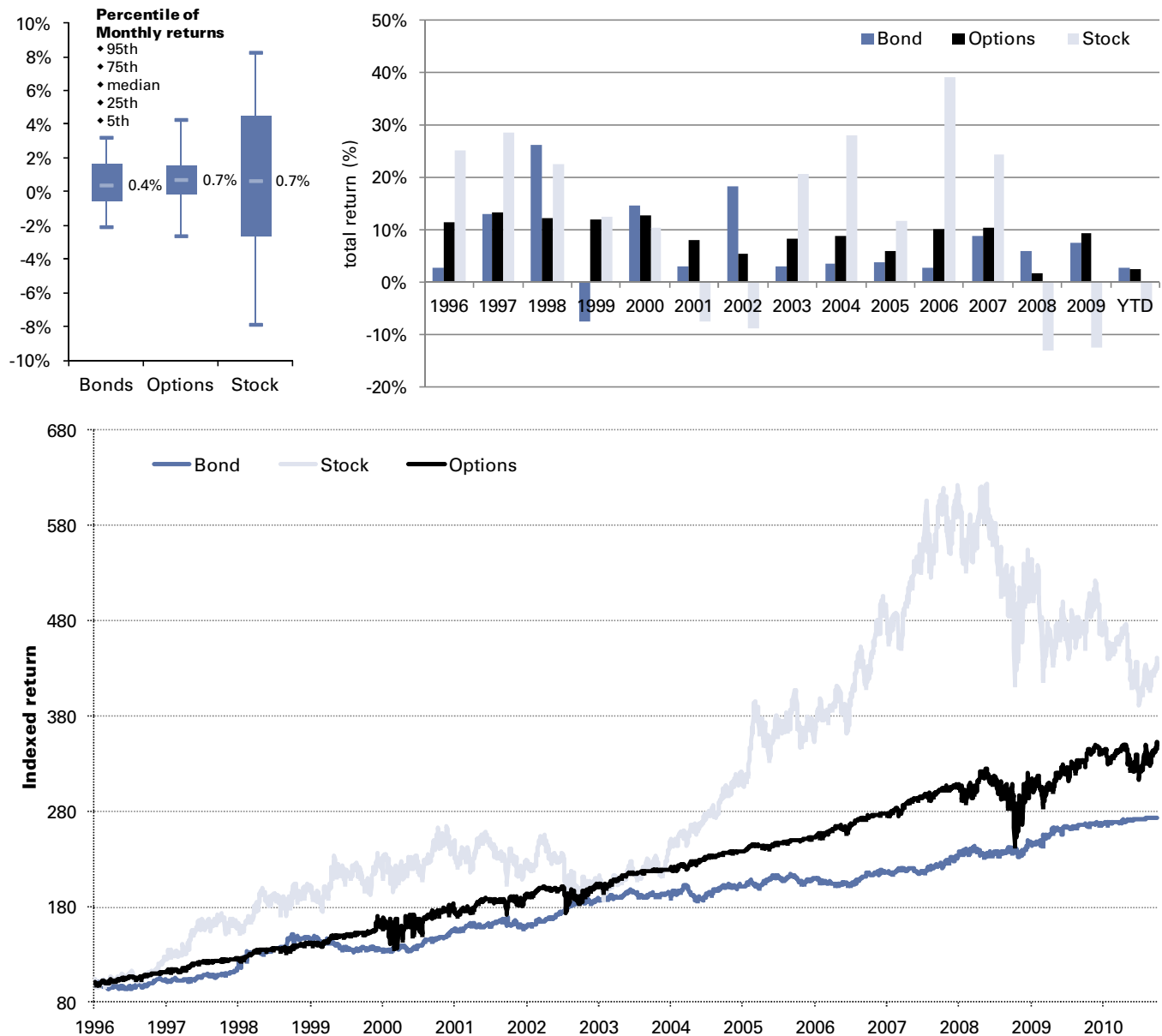
Total return January 1996 to September 2010; compound growth, annual returns, distribution of monthly returns



Source: Goldman Sachs Research estimates.

Exhibit 25: Exxon (XOM): comparison of stock, bond and the options strategy

Total return January 1996 to September 2010; compound growth, annual returns, distribution of monthly returns



Source: Goldman Sachs Research estimates.

Reg AC

I, John Marshall, hereby certify that all of the views expressed in this report accurately reflect my personal views about the subject company or companies and its or their securities. I also certify that no part of my compensation was, is or will be, directly or indirectly, related to the specific recommendations or views expressed in this report.

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Price target methodology: Please refer to the analyst's previously published research for methodology and risks associated with equity price targets.

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For options settled by physical delivery, the above risks assume the options buyer or seller, buys or sells the resulting securities at the settlement price on expiry.

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