Swaps as a Synthetic Asset Class

TERRENCE M. BELTON AND PAVAN WADHWA

TERRENCE M. BELTON
is a managing director at JPMorgan Chase in Chicago, IL.
terry.belton@jpmorgan.com

PAVAN WADHWA
is a vice president at JPMorgan Futures Inc. in New York, NY.
pavan.wadhwa@jpmorgan.com

The interest rate derivatives market has witnessed explosive growth in the last decade. Notional outstanding in U.S. dollar interest rate swaps is currently more than $21 trillion, while daily trading volume exceeds $160 billion *(see Exhibit 1)*. Widespread liquidity in the swap market has allowed asset managers to use interest rate swaps as both a risk management tool and for improvement of portfolio returns.

We describe how swaps can be used to construct synthetic assets and enhance returns, and discuss current opportunities in the market. We describe the historical behavior and important drivers of swaps spreads in an appendix.

I. CONSTRUCTING SYNTHETIC ASSETS WITH SWAPS

One may create a synthetic asset by receiving fixed in an interest rate swap and investing cash in a portfolio of short-duration money market assets (LIBOR-plus instruments such as floating credit card or other asset-backed paper). The swap position extends the duration of the portfolio, while the short-duration investment provides income in the portfolio.

Exhibit 2 shows the cash flows to the investor from the synthetic asset. The investor receives a fixed rate of 3.70% in a five-year swap, pays floating one-month LIBOR, and buys five-year credit card floating paper in the primary or secondary market. The strategy generates excess returns if swaps outperform the investor's benchmark asset class.

These strategies are particularly attractive when short-dated assets become cheap to LIBOR, such as during the LTCM/emerging markets crisis of summer 1998 and the Y2K-related crisis in 1999, when credit card asset-backed paper cheapened dramatically to LIBOR *(see Exhibit 3)*. Exhibit 4 provides a bird's eye view of commonly used short-duration investment vehicles, such as credit card and student loan-backed paper, which offer superior liquidity and excellent rating stability.

A synthetic asset strategy offers several advantages. First, interest rate swaps are extremely liquid relative to other spread products. During periods of severe market turmoil (such as fall 1998, when Long-Term Capital Management collapsed and spread markets froze), swaps are sometimes the only instrument making it possible to quickly and efficiently reduce exposure to spread markets at reasonable cost *(see Exhibit 5)*.

Indeed, corporate bid-offer spreads are wide even today due to a crisis of confidence resulting from corporate governance and accounting concerns. Replacing corporates and other spread products with swaps will enhance the liquidity of the portfolio, allowing the manager to more actively manage exposure to spread markets.

EXHIBIT 1

Open Interest and Average Daily Trading Volume of U.S.$ Interest Rate Swaps

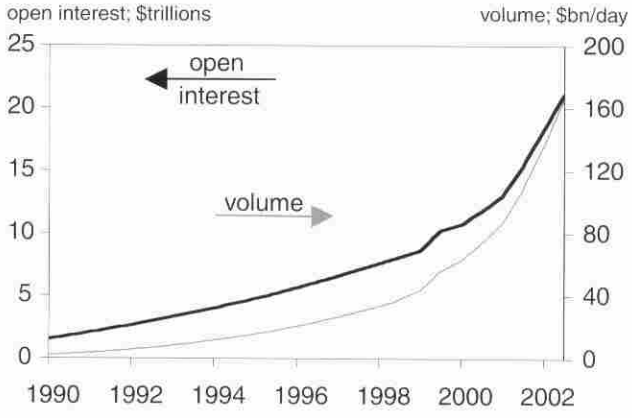
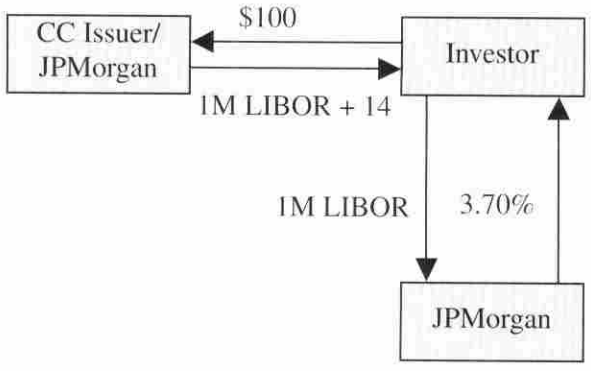


EXHIBIT 2

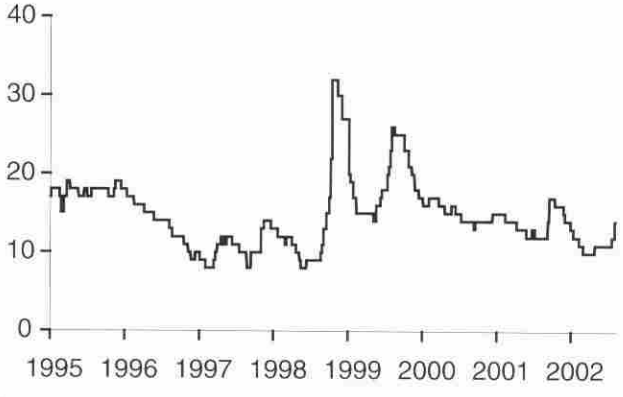
Synthetic Asset Cash Flows



Investor receives fixed in a 5-year swap (3.70%) while paying 1M LIBOR; invests cash in 5-year credit card ABS paying 1M LIBOR + 14 bp.

EXHIBIT 3

Spread of 5-Year Class-A Floating Credit Card Paper to 1M LIBOR*



**Class A represents the highest level of ownership interest in the trust, and is comparable to an S&P rating of AAA.*

EXHIBIT 4

Credit Card and Student Loan Floating-Rate Paper

	Credit Card	Student Loans
Volume outstanding in U.S.	$ 290 bn	$ 59 bn
2002 estimated supply	$ 60 bn	$ 20 bn
Industry trends	New regulatory guidelines on credit card lending should improve asset quality	Move to uncapped floaters
Typical new issue size	$750 MM-$1 Bn	$1 Bn-$2 Bn
Rating stability	Very stable	Underlying FFELP loans guaranteed by US govt
Collateral maturity	Perpetually revolving	10 years
Bid-offer spread	1bp (Top); 2bp (Lower tier)	1-2 bp
Current spread	1M LIBOR + 15 bp (5Y)	3M LIBOR + 14 bp (7Y)

Second, exposure to swaps allows the manager to diversify away from firm-specific names. Swap yields are theoretically determined by banks' funding costs (forward three-month LIBOR) and, short of a complete collapse of the banking system, should be relatively unaffected by bank name-specific risk. Swap transactions do not involve an exchange of principal and are almost always collateralized, reducing the risk of a default on the transaction itself. Additionally, credit risk of short-dated cash investments is easier to manage than credit risk of longer-maturity corporate bonds.

EXHIBIT 5

Range of Bid-Offer Spreads for Various Assets*

	Pre 1998	1998 Crisis	Current
Swaps	1-2	3-4	1-2
Corporate Bonds			
Top tier	1-3	5-10	5-7
2nd tier	5-10	10-20	10-20
Bottom tier	10-20	Not quoted	0.5-2.0 pts

**bp unless otherwise noted.*

EXHIBIT 6

Total Return for Different Asset Classes (%)*

	1/01-8/01	8/01 - 8/02
10-Year Treasury	9.56%	9.84%
10-Year Agency	10.31%	11.79%
10-Year Swap	10.97%	12.57%
10-Year AA Industrials	10.10%	12.69%
10-Year BBB Industrials	5.99%	8.07%
10-Year BBB Utilities	6.77%	6.57%
30-Year MBS index	6.60%	8.48%

**Total return equals mark-to-market gains + interest income; interest income for swaps is generated by investing cash at 3M LIBOR.*

Finally, in certain market environments, synthetic assets constructed with swaps are expected to outperform other spread markets. Indeed, over the last couple of years the swaps market has outperformed most other spread markets, as swap spreads have narrowed even in weak economic environments when credit spreads have been widening.

For example, ten-year spreads have narrowed from a high of 137 basis points in mid-2000 to 52 bp in late 2002. In fact, swaps have outperformed virtually every other asset class over the last year (*see Exhibit 6*).

II. SWAPS AS A SUBSTITUTE FOR CORPORATES

Swaps, in some sense, represent high-quality bank credit, because the fixed rate on the swap is determined by banks' funding costs, or forward three-month LIBOR, which itself is driven by the credit risk of banks. Indeed, swap spreads are highly correlated with other high-quality spreads such as AA Industrials (*see Exhibit 7*). Swaps, when combined with a short-duration cash investment, therefore work well as synthetic high-quality paper.

The relationship between swap spreads and lower-rated paper such as BBB Industrials is more tenuous. Swap spreads can diverge significantly from lower-rated spreads. While the correlation with AA Industrials is consistently high, the correlation with BBB Industrials breaks down at times (*see Exhibit 8*). The correlation between swaps and lower-rated paper is high when spreads are driven by factors specific to the Treasury curve, and low when driven by changes in the credit outlook.

EXHIBIT 7

10-Year Swap Spreads Against 10-Year AA Industrial Spread to Treasuries (bp)

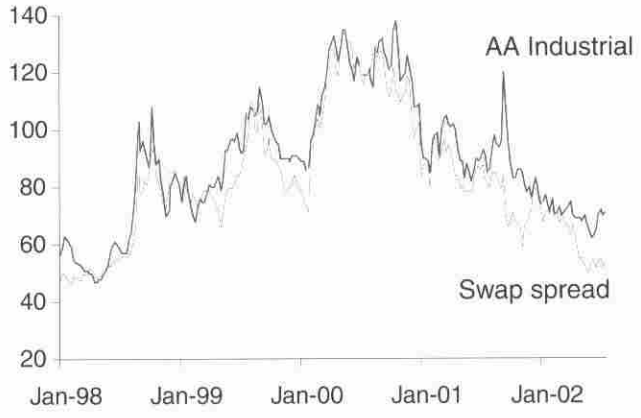


EXHIBIT 8

1-Year Rolling Correlation Between 10-Year Swap Spreads and 10-Year AA/BBB Rated Industrial Spreads to Treasuries (weekly data—%)

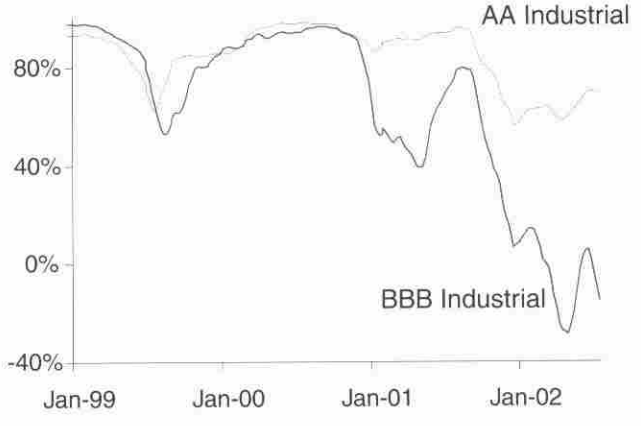


Exhibit 9 shows the old ten-year Treasury yield plotted against ten-year AA and BBB Industrial spreads to LIBOR. Two patterns are clear from the graph. First, BBB spreads to LIBOR have trended wider since mid-2000, as the economy weakened and credit risks increased. AA spreads to LIBOR have, on the other hand, stayed relatively stable. Second, during flight to quality regimes, such as fall 1998 and summer 2002, BBB spreads to LIBOR widened sharply as credit markets lost liquidity, particularly in lower-rated paper.

EXHIBIT 9

Old 10-Year Treasury Yield versus 10-Year AA and BBB Industrial Spreads to LIBOR

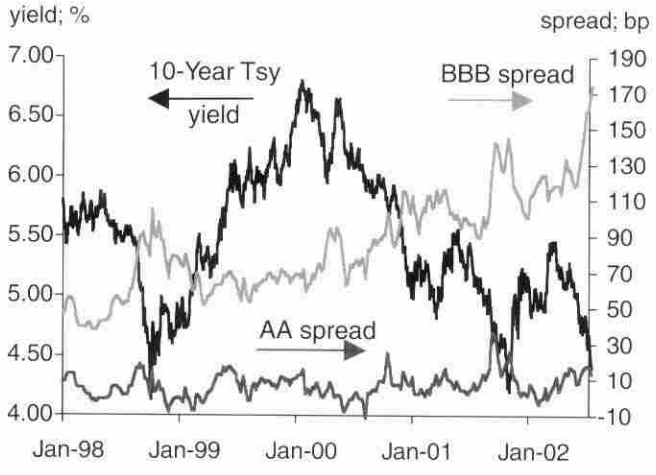


EXHIBIT 10

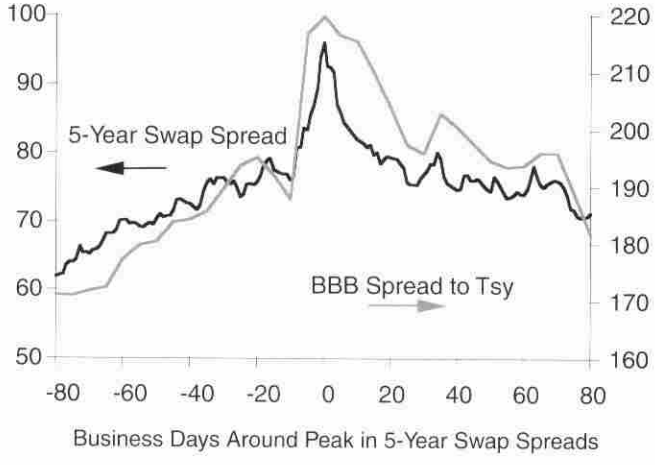
Correlation Between 10-Year Swap Spreads and Spreads on 10-Year Fixed-Rate Product (01/98–07/02)*

High-Quality		Lower-Quality	
AA Industrials	95%	BBB Industrials	61%
AA Financials	82%	BBB Financials	35%
AA Banks	88%	BBB Banks	62%
AA Utilities	74%	BBB Utilities	71%
AA CMBS	89%	BBB CMBS	75%
A Fixed Credit Card	95%		
FN 30-Yr Fixed MBS	93%		

**Daily data, except corporate spread data, which are weekly.*

EXHIBIT 11

Average of 5-Year Swap Spreads versus Average of 10-Year BBB Spreads to Treasuries During Prior Flight to Quality Regimes (bp)*



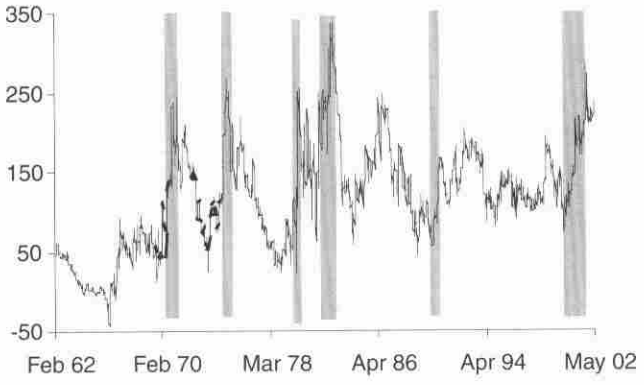
**Swap spread data are daily; BBB spread data are weekly. Data are from: October 1987, banking crisis of 1990-1991, Fall 1998, September 2001.*

An identical pattern emerges over the long run with other asset classes; correlations with high-quality paper are higher in general (*see Exhibit 10*). These observations let us put forth some rules of thumb:

- Correlation of swaps with high-quality paper such as AA is generally high, allowing investors to create synthetic assets with swaps that mimic returns on high-quality paper.
- Correlation of swaps with lower-rated paper is high when spread movements are driven primarily by factors specific to the Treasury market (such as increases in Treasury supply). In such environments, swaps can be used effectively as synthetic assets even for lower-quality paper.
- Correlation of swaps with lower-rated paper is high during flight to quality regimes when investors flock toward Treasuries. During previous flight to quality regimes (October 1987, the banking crisis of 1990-1991, fall 1998, and September 2001), swap spreads and spreads on lower-quality paper moved in tandem, first as spreads widened and later as they narrowed (*see Exhibit 11*).
- Correlation of swaps with lower-rated paper is low when spread movements are driven by credit events or changes in economic conditions that impact lower-rated spreads differently from higher-rated spreads. In such environments, synthetic assets allow an investor to take a view on corporate spread movement relative to LIBOR.
- Swaps are likely to outperform lower-rated corporates when the economy weakens, or is likely to go into a recession. Conversely, swaps typically underperform when the economy comes out of a recession and the Fed starts tightening (*see Exhibits 12 and 13*).

EXHIBIT 12

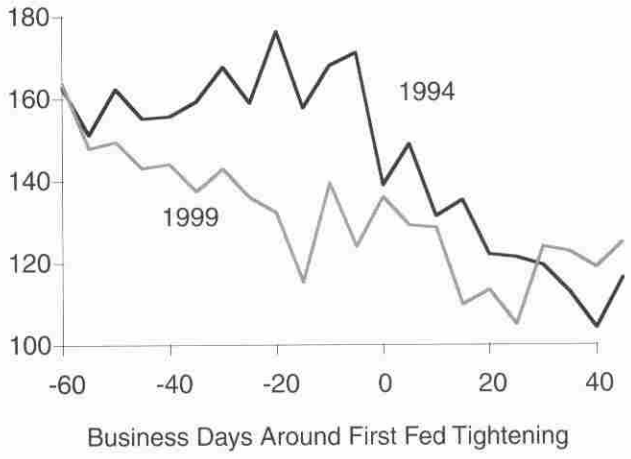
BBB Corporate Asset Swap Spreads (bp)*



**Grey bars highlight previous economic recessions.*
Source: JPMorgan, Federal Reserve, and NBER.

EXHIBIT 13

BBB Corporate Asset Swap Spreads Around the Start of Previous Fed Tightening Regimes (bp)



III. VARIATIONS ON A THEME

Synthetic assets can be constructed using swaps in a variety of ways.

Total Return Swaps

A synthetic asset may be created by combining a long position in a total return swap that tracks price changes on an underlying benchmark with an investment in a portfolio of short-duration assets (invested in LIBOR-plus instruments). The swap position is designed to track price changes in the underlying benchmark, while the short-duration investment provides income in the portfolio. The strategy will generate returns in excess of the benchmark if the cash investment earns a return higher than the floating-rate payment on the total return swap. Exhibit 14 provides the indicative spread to one-month LIBOR for the floating side of various index swaps, along with the size and maturity of typical trades.

Consider a money manager whose $100 million portfolio is indexed to the JPMorgan 30-year fixed MBS index. The manager can either buy select cash MBS in an attempt to outperform the index or enter into a total return swap with JPMorgan to receive the total return on the MBS index and pay LIBOR – 15 bp on $100 million notional. By investing the cash in short-duration floaters paying (say) LIBOR + 10 bp, the manager can outperform the benchmark by a total of 25 bp. This is because the floating payment on the swap is 15 bp below LIBOR, while the cash earns LIBOR+ 10 bp.

EXHIBIT 14

Indicative Levels and Liquidity of Total Return Swaps on Various Indexes

Index	Spread	Typical Size	Maturity
JPM Global Govt.	L – 6	$5-200 MM	2-5 years
JPM U.S. Govt.	L – 8	$10-200 MM	1-3 years
JPM MBS	L – 15	$25-500 MM	Up to 3 years
JPM EMBI+	L – 55	$5-100 MM	1-2 years

Using total return swaps to beat benchmark indexes is an active rather than a passive portfolio management strategy and offers several advantages. First, it allows portfolio managers to unbundle relative-value decisions from exposure to the benchmark. Indeed, the manager can now focus on finding assets that are cheap to the LIBOR curve, rather than being forced to find assets that are correlated with the benchmark.

Second, the strategy allows expertise in one investment arena to be exported to other asset classes (alpha transport). Third, by their very structure, total return swaps offer virtually no tracking error to the benchmark.

Limitations of synthetic assets constructed using total return swaps include lower liquidity and higher unwind costs than plain vanilla swaps.

Forward Starting Swaps

Investors may exploit the differential in the slope of the swaps curve relative to a cash curve (such as agency, Treasury, or corporate) by extending duration along the curve that is steep and reducing duration along the curve that is relatively flat (see "ABS Yield Enhancement" [1996]).

Consider a simple example, where two- and five-year agencies are trading at a yield of 2.53% and 3.96%, while two- and five-year swaps are at 2.75% and 4.09%, respectively. An investor who is long the two-year agency may extend out the agency curve by selling the two- and buying the five-year agency, thereby picking up 143 bp (3.96% – 2.53%). To bring the duration back down, the investor needs to pay fixed in five-year swaps, while concurrently receiving fixed in two-year swaps, thereby giving up 134 bp (4.09% – 2.75%) of yield. Since the agency curve is steeper than the swaps curve, the investor picks up 9 bp more than is given up (143 – 134 bp) (*see Exhibit 15*). The strategy is profitable if there is convergence between the two curves.

Instead of paying fixed in five-year and receiving fixed in two-year swaps, the investor would be better off paying fixed in a three-year swap starting in two years. This will result in identical yield pickup while saving one leg of the trade.

We backtested this strategy over the last five years on the old 2s/10s Treasury asset swap spread curve (ASW, or the spread between cash bond and LIBOR). Specifically, we develop a multiple regression model for the ASW curve, with the old 2s/10s Treasury curve and the level of the old ten-year swap spread as explanatory variables. We put on spread curve steepener-flattener trades whenever the ASW curve deviates more than 2.0 standard deviations from model prediction. The trade is reversed after one month, and the profit and loss is computed as the difference between spot ASW curve at trade reversal and one-month forward ASW curve at trade initiation.

Exhibit 16 provides the profit and loss for this trading rule. We put on a total of 33 trades, of which 22 were profitable. The average P&L is +4.2 bp with a standard deviation of 6.8 bp. Instead of reversing the trade mechanically at the end of one month, if trade reversal is determined actively by the portfolio manager, the strategy will potentially yield higher average P&L.

EXHIBIT 15
Picking Up Yield

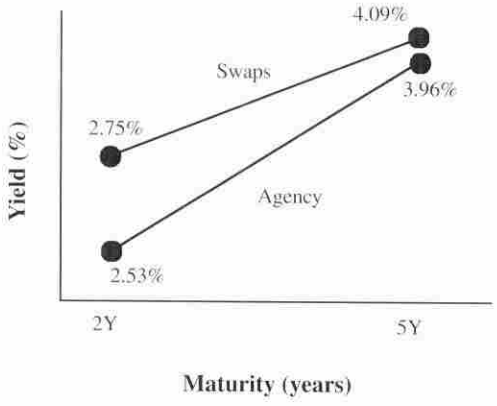


EXHIBIT 16
P&L Statistics on Trading the Old Treasury 2s/10s Asset Swap Spread Curve

Time Period	07/97 - 07/02
No. of trades	33
No. of profitable trades	22
Percentage of profitable trades	67%
Average P&L	4.2 bp
Std Dev of P&L	6.8 bp

Asset-Swapping Bonds

A common way to capture relative value between swaps and cash bonds is through an asset swap. In its most basic form, this combines the purchase of a specific cash bond (government, agency, corporate, or MBS) with an (off-market) interest rate swap to exchange the fixed-rate cash flows of the bond for a series of floating-rate payments (usually three-month LIBOR plus the asset swap spread). This creates an equal and opposite set of cash flows so that the portfolio has little sensitivity to movements in absolute yield levels or the yield curve.

The net result is a synthetic floating-rate note with exposure primarily to the spread between the cash bond and the swap—in other words, the asset swap spread. The trade is profitable if the cash bond outperforms swaps, i.e., if the asset swap spread declines.

The advantage of asset swaps is that all bonds can be put on a common benchmark for valuation, accounting for differences in yield curve and duration exposures of the different bonds. Risks to the asset swap include a widening of the asset swap spread, and a potential increase in the cost of financing the bond (the repo rate), which may result in reduced carry.

Another risk in the asset swap is a default on the underlying bond, which exposes the investor to a short-duration position on the swap. This risk may be mitigated by entering into a swap that automatically terminates at par upon a default of the underlying bond (a "clean asset swap").

A spread widening view may be expressed by entering into a reverse asset swap, which is a mirror image of an asset swap (sell cash bond, invest cash in reverse repo, receive fixed in a swap while paying the floating-rate plus asset swap spread). This has the effect of extending duration out on the swap curve, while shortening duration on the cash bond curve. The position is profitable if the cash bond underperforms the swap, i.e., the asset swap spread increases.

IV. CURRENT OPPORTUNITIES

The recent cheapening of asset-backed paper has resulted in opportunities for creating synthetic assets. We suggest that investors substitute high-quality AAA and AA-rated paper with receiving fixed in swaps, and invest the cash at LIBOR + 18 by asset-swapping five-year fixed-rate credit card paper, which is trading close to its highs of the last two years (*see Exhibit 17*). Assuming no tracking error between swaps and high-quality assets, this position will outperform high-quality paper by 18 bp. Risks to the trade include an outperformance of high-quality paper relative to swaps and a widening of the asset swap spread of fixed-rate credit card paper.

The third quarter of 2002 has witnessed a classic flight to quality (FTQ) regime, with declining equity markets, corporate malfeasance, and increased credit risks. With stabilization of equity markets somewhat, flight to quality risks appear to be dissipating.

The ends of previous FTQ regimes have been characterized by a narrowing of credit spreads in general, and lower-rated spreads in particular. Indeed, BBB-rated paper has outperformed swaps by an average of 20 bp in the three months following the end of the previous four FTQ regimes (*see Exhibit 18*).

We suggest investors take advantage of this by creating synthetic cash; i.e., overweighting lower-rated paper and paying fixed in swaps, or asset-swapping BBB-rated paper. Risks to the trade include a widening of BBB asset swap spreads and higher financing rates.

EXHIBIT 17

5-Year Fixed-Rate Credit Card Asset Swap Spread versus 2-Year Floating-Rate Credit Card Spread to LIBOR (bp)

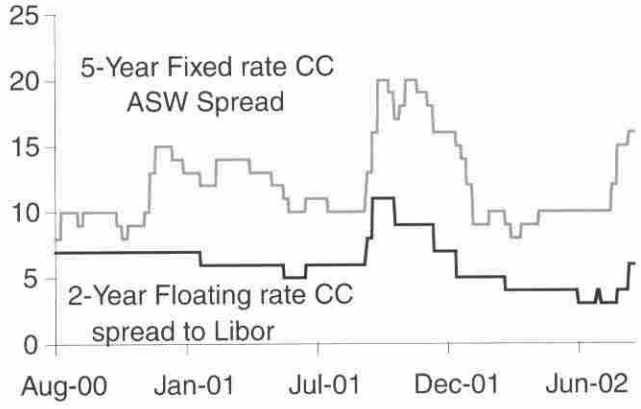
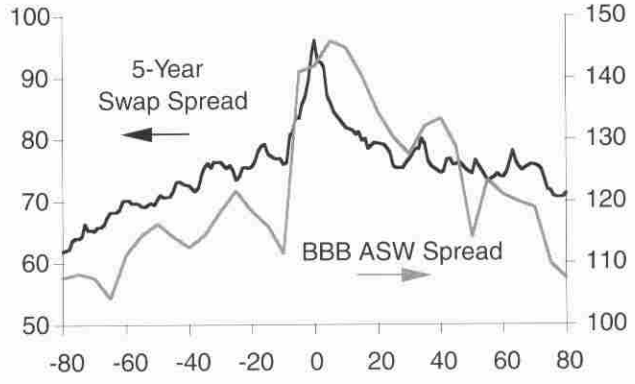


EXHIBIT 18

Average of 5-Year Swap Spreads versus Average of 10-Year BBB Asset Swap Spreads During Prior Flight to Quality Regimes (bp)*



**Swap spread data are daily; BBB spread data are weekly. Data are from: October 1987, banking crisis of 1990-1991, Fall 1998, and September 2001.*

EXHIBIT A-1

Increasing Volatility in Swap Spreads—10-Year Swap Spread (bp)

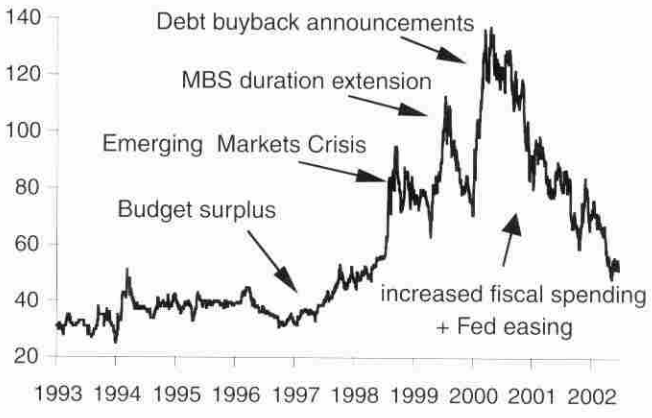
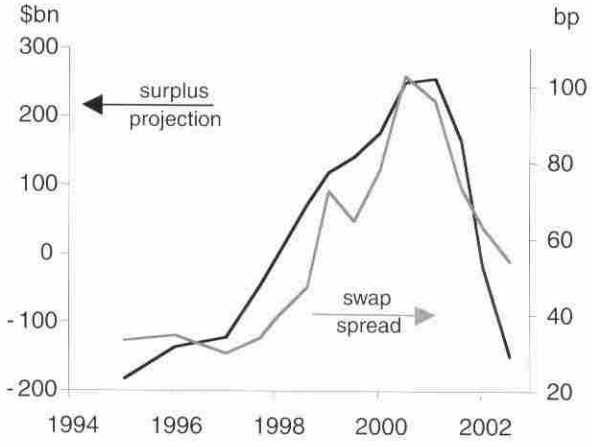


EXHIBIT A-2

Six-Month Moving Average of Off-the-Run 10-Year Swap Spreads versus Budget Surplus Projections



APPENDIX
A Historical Perspective on Swap Spreads

Swap spreads, once considered relatively stable, have become volatile lately. Spreads are driven by Treasury supply and Fed activity, among other factors. With the achievement of federal government budget surpluses in 1997 and the resulting expectation of shrinking Treasury issuance, an overriding bid in the Treasury market caused swap spreads to start widening (*see Exhibit A-1*).

The emerging markets crisis and the demise of Long-Term Capital Management in summer/fall 1998 exacerbated the volatility in spreads, causing them to widen farther. Just as the market was quieting down, the Fed started raising rates in mid-1999, causing spreads to widen again. The U.S. Treasury's buy-back program, announced in January 2000, caused the Treasury market to rally, again negatively impacting spreads.

More recently, spreads have narrowed dramatically, as a slowing economy combined with higher fiscal spending in the wake of the September 2001 terrorist attacks, have led to sharply higher expectations of Treasury supply. This combination of factors has lent immense volatility to swap spreads.

Factors that have exerted strong influence on swap spreads include Treasury supply, Fed activity, and technicals such as mortgage market participants and corporate swapping activity.

The recent deterioration in economic conditions, resulting in lower tax receipts by the federal government, has led to a worsening deficit picture. This, combined with higher defense outlays in the wake of the September 2001 attacks, swiftly changed the budget surplus into a deficit. For some perspective, recall that two years back the Congressional Budget Office was forecasting a $6 trillion surplus over the following ten years; today the forecast is a surplus around $1 trillion. Increasing budget deficits have raised the specter of increased Treasury issuance, resulting in a sell-off of Treasuries relative to swaps, thereby compressing swap spreads (*see Exhibit A-2*).

Beginning in early 2001, the Fed started pumping unprecedented liquidity into the market in response to deteriorating economic conditions and later the terrorist attacks. The federal funds rate was cut from 6.50% to 1.75% in less than 12 months, which resulted in narrower swap spreads as rates fell in response to the increased liquidity.

Additionally, declining yields prompted corporations to issue more debt, resulting in higher levels of swapping activity as the yield curve steepened. Lower yields also caused mortgage portfolio durations to decline (due to negative convexity), prompting mortgage market participants to receive fixed in swaps in an attempt to bring their portfolio durations back up. These technical factors put further narrowing pressure on spreads.

Our research indicates that: 1) every $100 billion increase in the annual budget deficit reduces ten-year swap spreads by 15 bp; 2) a 100 bp increase in the federal funds rate widens spreads by 8 bp; and 3) a 100 bp increase in ten-year yields increases spreads by 3.3 bp.

REFERENCE

"ABS Yield Enhancement with Eurodollars." JPMorgan, March 1, 1996.

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