PART I

A Practical Guide to the Industry

CHAPTER 1

Understanding Returns

The purpose of this chapter is to bridge the gap between the world of conventional money management, where return has a natural and well-understood meaning, and the world of futures, where the idea of return by itself makes no sense. The disconnect between the two markets is simply this: Real assets tie up real cash. To buy a portfolio of real stocks, for example, one invests real cash. The stocks then spin off dividends, which constitute part of the return, and the prices of the stocks rise or fall, which constitutes the rest. The resulting gains or losses are converted into a return using a denominator equal to the value of the cash invested in the stocks.

Once you leave the world of fully invested, conventional assets, reckoning returns becomes more of a challenge. What, for example, is the return to a long/short strategy in which the market values of your positions are exactly offsetting? This is, in fact, the case with futures, which behave like fully leveraged or geared positions in the underlying commodity. Their purpose in applied finance is to capture changes in the price of the underlying, which allows them to be used equally well for both hedging and trading. The real usefulness of futures stems from the fact that they are almost always less expensive to trade than are their underlying commodities. And in the hands of CTAs, they are building blocks from which highly diversified portfolios of positions—both long and short—in the world's financial and commodities markets can be built.

To understand how a CTA works and how to interpret a CTA's returns, you need to know a few key things about how futures and the futures industry works. In the sections that follow, we cover most of what you will need to feel comfortable with the industry. The key points include:

- Risk and cash management in futures markets
- Trading levels, funding levels, and the idea of notional funding

- Stability of CTAs' return volatilities
- Basic futures mechanics (using S&P 500 futures as a worked example)
- Managing cash and collateral
- A typical trend-following CTA's portfolio of futures
- Converting profits and losses into returns and return volatilities
- Different share classes in CTA funds

Risk and Cash Management

Although futures are like forwards in the sense that they both behave like fully leveraged positions in the underlying commodity, the futures industry has must stricter risk and cash management practices than the over-the-counter derivatives market. And the way the futures market approaches risk has important implications for the way CTAs do business and for the way you may choose to invest in this market.

As a stepping-off point, consider these three key points:

1. Futures markets require gains and losses to be settled in cash daily.
2. Futures contracts have no net liquidating value.
3. Futures markets require participants to post collateral to cover potential daily losses.

The first point has important consequences for the way you organize your investment in CTAs. The practice of settling up gains and losses every day in cash produces an ongoing stream of small transactions costs. Minimizing these costs is an important objective for CTAs and their investors. The cash that flows into or out of your account also affects your ultimate return. Cash that flows in can be invested, while the cash that flows out must be financed, either explicitly or out of pocket.

The second point actually follows from the first and is truly fundamental. Because all gains and losses are settled in cash daily, futures contracts never have any net liquidating value except for whatever they accumulate over the course of a single trading day. As a result, there is no natural denominator for reckoning the return on a futures position.

The importance of the third point also becomes apparent when you decide how to structure your investment in CTAs. In Chapter 3 we walk you through a decision process that allows you to compare an investment in CTAs' funds with an investment in managed accounts, or with a hybrid investment using a CTA investment platform. What you earn on any cash or collateral

invested in a fund or posted as collateral in a managed account is part of your return. You also care about the security of your cash investment.

Trading, Funding, and Notional Levels

To cope with these features of the futures market, the CTA industry has adopted three specialized terms that investors must know—trading level, funding level, and notional level.

The three terms can be defined as:

Trading level: Trading level is simply the choice of denominator. It is the dollar number that the CTA uses to translate futures profits and losses into returns. It is also the dollar number that the CTA uses to calculate ongoing management fees.

Funding level: Funding level is the total amount of cash or collateral that you post or invest. The rock-bottom minimum funding level for any futures position or portfolio is the total value of margin collateral required by the various futures exchanges.

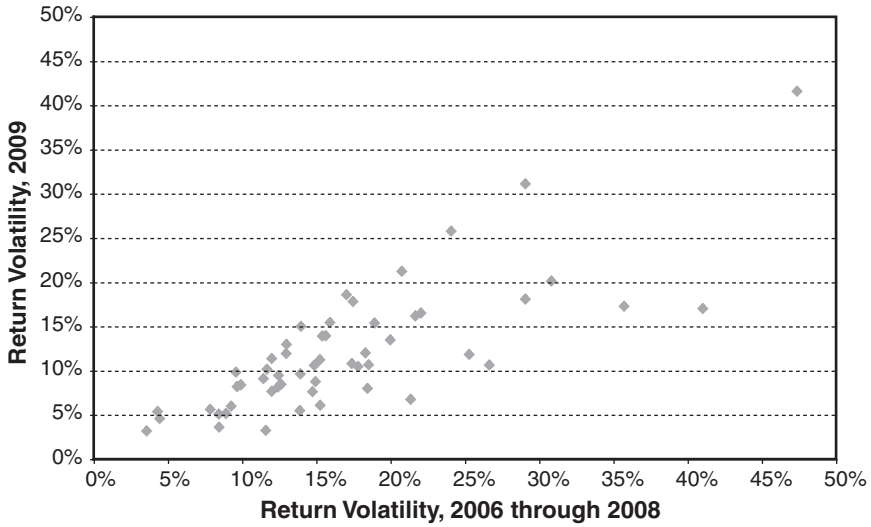
Notional level: Exchange margins tend to be small relative to the face values or portfolio equivalent values of the contracts themselves. And in a diversified portfolio of futures contracts, the actual day-to-day risk in the portfolio can be smaller still. As a result, funding levels can be lower than trading levels. If they are, the difference between the trading and the funding levels is known as the *notional level* or as *notional funding*.

The Stability of Return Volatilities

One of the important consequences of the way CTAs approach their choice of trading level is that they can control the volatility of their returns. For that matter, unlike real money managers, who must live with the return volatility they are given in their respective stock and bond markets, CTAs appear to actively manage the size and mix of their futures positions so that, given their choices of trading levels, their returns exhibit a high degree of predictability from year to year.

Exhibit 1.1 illustrates this point. For a collection of 54 CTAs (chosen because they all had $100 million or more under management and four years of reported returns), we have calculated the annualized volatilities of reported

EXHIBIT 1.1 Past and Future Return Volatility



Source: Barclay Hedge.

returns for 2006 through 2008, which are measured on the horizontal axis, and for 2009, which are measured on the vertical axis. We say a lot more about this in Chapter 11, but for now it is enough to know that this kind of relationship is typical. You can choose nearly any look-back and look-forward periods you like, and you will find that a CTA whose returns are low this year (or for the past two or three years) will be likely to have low returns next year (or for the next two or three years).

This kind of predictable return volatility is extremely helpful when constructing portfolios of CTAs.

Basic Futures Mechanics

Most of what you need to know about futures and futures markets can be illustrated using one of the industry's most actively traded contracts—the E-mini S&P 500 contract. It is especially helpful that the underlying is a widely recognized index of stock prices and that the futures contract, when combined with the appropriate amount of cash, can behave like a small diversified portfolio of stocks. In this section, we cover basic contract terms, the S&P 500 futures contract, cash/future price relationships, and combining futures with cash to create a synthetic stock portfolio.

Contract Terms

Strictly speaking, futures are governed by exchange rule books, which lay out in considerable detail just how various members of the exchange are to deal with the exchange and, if they have any, with their non-member clients. Many of the rules are common to all of the futures traded on the exchange, but each futures contract requires a few key contract specifications that govern that particular contract. These basic terms include, at a minimum:

- A definition of the underlying commodity or index
- The dollar (or other currency) value of a 1-point change in the price of the commodity or of the value of the index
- The minimum change in the futures price
- The months in which the contract expires
- Last trading day
- Final settlement terms
- Ticker symbol(s)
- Limit price moves

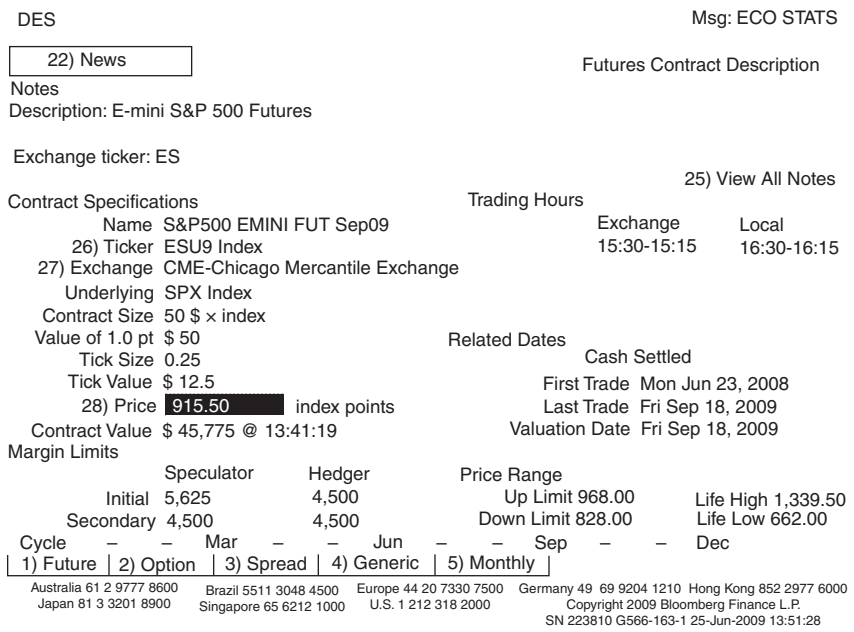
The exchange, or its clearing house, also determines the amounts of margin collateral that must be maintained by the clearing broker to support any open futures positions.

The S&P 500 Futures Contract

All of the important features of futures can be illustrated with the E-mini S&P 500 futures contract. The relevant contract terms, as they apply to users, are shown in Exhibit 1.2, which is a standard page available on Bloomberg. In this case, we are looking at the September 2009 contract. Its ticker symbol is ESU9, in which the *ES* stands for the E-mini S&P 500 contract, the *U* stands for September (don't ask), and the *9* stands for 2009. It is typical to use a 2-letter code for the market, a 1-letter code for the contract's expiration or delivery month, and a single numeral to describe the year.

The underlying is the SPX index, which is simply the S&P 500 stock price index. The contract size is said to be \$50 times the value of the index, which means that each index point is worth \$50. The tick size is the minimum price change allowed by the exchange and is set at 0.25 price points, which makes the value of a tick \$12.50 [= \$50 · 0.25]. The value of the contract's price at the time this snapshot was taken on June 25, 2009 was 915.50. When multiplied by \$50, we find a contract value of \$45,775 [= \$50 · 915.50].

EXHIBIT 1.2 S&P 500 Contract Specifications



Source: Bloomberg Financial LP.

The exchange has set initial and secondary margin limits for speculators and hedgers. As a practical matter, once a position is open and maintained from day to day, the relevant number from the exchange's standpoint is $4,500.

Under related dates, you can see that the contract was first listed for trading on June 23, 2008. Its last trade date is Friday, September 18, 2009. The contract is said to be cash settled, which means that its final settlement price is set equal to the value of the S&P 500 at the time the contract expires. In this case, the final settlement value is set equal to the value of the index calculated using prices for all 500 stocks as established at the market open for each stock.

Cash/Futures Price Relationships

The force that ties a futures price to the price of the underlying commodity or asset is *arbitrage*. If futures are rich relative to fair value, the arbitrageur can buy the underlying asset and sell the futures. Or if futures are cheap relative to fair value, the arbitrageur can sell the underlying asset and buy the futures. Just how effective these arbitrage forces are depends on the costs of buying

and selling the underlying commodity, the costs of financing, availability of arbitrage capital, and so on.

Because of these arbitrage forces, the relationship between futures prices and spot prices can be thought of generally as:

$$\text{Futures price} = \text{Spot price} + \text{Financing and other storage costs} - \text{Convenience yield}$$

where spot price represents the price of the underlying asset of commodity.

For financial assets, financing is the main cost of holding or storing the asset. For physical assets, holding costs can include wastage, the costs of maintaining a ranch or drilling platform, and so on. Convenience yield depends on the asset or commodity. For equities, convenience yield would include dividends and, possibly, income from securities lending. For bonds, convenience yield would include accrued coupon income. For currencies, convenience yield would include interest on the foreign currency. For physical assets, convenience yields are small, although those who hold gold may enjoy some rental income.

The way this relationship works for the E-mini S&P 500 contract is illustrated in Exhibit 1.3, which is another standard Bloomberg page. This snapshot was taken on June 25, 2009. Under "Cash," you find that the value of the S&P 500 index is 918.87. From this, the reasoning is that one could buy a diversified portfolio of stocks using the S&P 500 index weights as a guide to how much of each of the 500 stocks one would hold. At $50 per index point, the total value of this diversified portfolio would be $45,943.50 [= $50 · 918.87].

The cost of financing this purchase is assumed to be the risk-free rate of 0.60 percent. The contract expires September 18, 2009, which is 85 days from June 25.

The convenience yield includes expected dividends, which are calculated in index points. Between June 25 and September 18, Bloomberg's *consensus* sources suggest that the holder of the portfolio can expect to receive dividends worth 5.16 index points.

Taken together, these pieces of information suggest that the fair value of the September 2009 futures contract is

$$\textit{Fair Futures} = \textit{Spot}\left(1 + \textit{Financing rate}\frac{\textit{Days}}{360}\right) - \textit{Dividends}$$

EXHIBIT 1.3 S&P 500 Futures Fair Value

<HELP> for explanation. Index **FVD**
ENTER ALL VALUES AND HIT <GO>

EQUITY INDEX FAIR VALUE (DETAIL)

S&P 500 INDEX	Cash	Future	Theo. Future	Fair Value	Spread (Basis)	Upper Bound	Lower Bound
1) ESU9vsSPX	918.87	915.00	915.02	–3.85	–3.87	–2.69	–5.01
Risk Free:	.60%	Expire:	9/18/09	Dividend:	5.16	Dvd Yld:	2.38%
Implied Rate:	.59%	Days:	85	Percent of Gross Dividend :			100.0%
				Enter 3<GO> for BDVD projections			
2) ESZ9vsSPX	918.87	911.25	913.14	–5.73	–7.62	–4.57	–6.90
Risk Free:	1.07%	Expire:	12/18/09	Dividend:	10.55	Dvd Yld:	2.35%
Implied Rate:	.65%	Days:	176	Percent of Gross Dividend :			100.0%
				Enter 4<GO> for BDVD projections			

Note: use RDFL <go> for the risk free rate default.

Percent/Index Points — Transaction Costs

Buy-Stocks Sell-Futures		(Upper Bound)		Sell-Stocks Buy-Futures		(Lower Bound)	
Stock Bid/Ask Spread	=			Stock Bid/Ask Spread	=		
				Stock Borrowing Cost	=		
Stock Commission	=			Stock Commission	=		
Future Bid/Ask Spread	=			Future Bid/Ask Spread	=		
Commission Futures	=			Commission Futures	=		
Other (Stamp, Currcy..)	=			Other (Stamp, Currcy..)	=		
Total Transaction Cost	=	0.13%	1.16	Total Transaction Cost	=	0.13%	1.16

Hit <#> Go to monitor the intra-day spread of cash & futures (Basis)

Source: Bloomberg Financial LP.

which, in this example, becomes

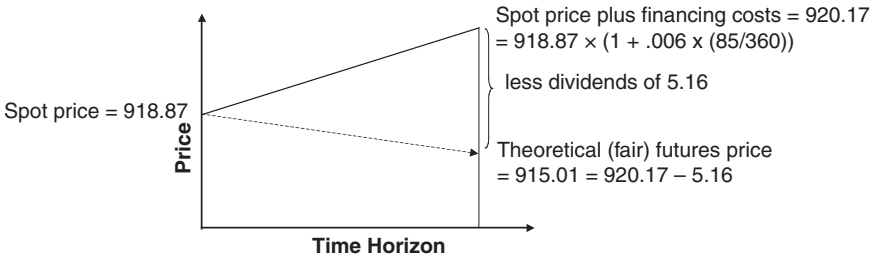
$$915.01 = 918.87\left(1 + .006\frac{85}{360}\right) - 5.16$$

which is .01 less than Bloomberg's 915.02 because of a small amount of rounding. Notice that the market value of the futures price is shown as 915.00, which is less than its calculated fair value. This same relationship is also illustrated in Exhibit 1.4.

The futures price in this case is below the spot price because expected dividend income is greater than the cost of financing the position. The fair value of the "spread" or difference between the futures and spot prices is shown as –3.85 [= 915.02 – 918.87] while its market value of basis is shown as –3.87 [= 915.00 – 918.87].

With any three pieces of information, one can use the above expression to solve for the fourth. For example, using the cash and futures prices of 918.87

EXHIBIT 1.4 Fair Value of an S&P 500 Futures Contract



Bloomberg shows a fair futures price of 915.02, which reflects a rounding error somewhere.

and 915.00 and the expected dividend value of 5.16, one can solve for the financing rate that would cause the futures price to be "fair." This is shown as the implied rate of 0.59 percent.

Creating a Synthetic Stock Portfolio

This cash/futures arithmetic can be used to combine cash and futures to create a synthetic alternative to an actual stock portfolio. Instead of buying stock, one could combine $45,943.50 invested in an 85-day term money market instrument with one long futures contract. The resulting combination would, to a very close approximation, exhibit the same gains and losses as those on a real stock portfolio. Moreover, the returns on the synthetic portfolio would be identical to those on the underlying stock. In other words, a futures position, when combined with the appropriate amount of cash, exhibits the same risk as the underlying asset.

To confirm that this is true, consider the possible outcomes shown in Exhibit 1.5, which shows the gains or losses on two portfolios—one a fully invested position of $45,943.50 in real stocks, the other a combination of futures and an amount of cash equal to the value of the real stock portfolio. Three outcomes are shown: stock prices (the index value) unchanged at 918.87, stock prices down 50 points to 868.87, and stock prices up 50 points to 968.87.

Consider the unchanged case first. The real stock portfolio produces dividend income of $258.00 [= 50 · $5.61] and no capital gain or loss for a total gain of $258.00. The synthetic stock portfolio produces interest income of $65.09 [= .006 · 85/360 · $45,943.50] and a gain on the futures contract of $193.00 [= $50 · (918.87 – 915.01)] because at expiration the futures price equals the value of the stock index. Notice that the gain on the futures contract makes up exactly for the difference in the dividend income on the

EXHIBIT 1.5 Returns on Real and Synthetic Stock Portfolios as Stock Prices Rise and Fall

Portfolio 1 (Stock)
Buy $45,943.50 of a diversified portfolio of stock at an index value of 918.87

Portfolio 2 (Synthetic stock)
Buy 1 futures contract at 915.01
Invest $45,943.50 at 0.6% for 85 days

Portfolio Gains and Losses

	S&P500 at Futures Expiration		
	868.87	918.87	968.87
Stock Portfolio			
Stock	–2500.00	0.00	2500.00
Dividends	258.00	258.00	258.00
Total	*–2242.00*	*258.00*	*2758.00*
Synthetic Stock Portfolio (Futures Plus Cash)			
Futures	–2307.00	193.00	2693.00
Interest	65.09	65.09	65.09
Total	*–2241.91*	*258.09*	*2758.09*

Source: Bloomberg, Newedge Prime Brokerage Research.

stock and the interest income on the cash. As a result, the two portfolios produce the same final gain, just in different combinations. (The extra $.09 on the synthetic futures portfolio is there because we assume we buy the futures at 915.01, which is ever so slightly lower than the contract's fair value of 915.0117.)

In the other two cases, the two portfolios produce the same loss or the same gain, in both cases because what you lose on the futures is less than what you lose on the stock, or what you make on the futures is more than what you make on the stock. In both cases, the differences are the difference between dividend income on the stocks and interest income on the cash.

In practice, on the days between contract expirations, the futures price may trade either higher or lower than fair value by amounts that are limited by the possibilities of cash/futures arbitrage. For the most part, these departures from fair value are small, and if we were to track the return volatility on the synthetic stock portfolio, it would look almost exactly like the return volatility on the real stock portfolio. One would hardly be able to slide a piece of paper between the two series.

However, the futures position could be made to appear a lot riskier by combining with futures only with enough cash to cover the exchange's required margin of $4,500 (the secondary or hedger margin shown in Exhibit 1.2).

Because this is roughly 10 percent of the portfolio equivalent value of the contract, the resulting return volatility would be roughly 10 times higher. With stock price volatility that varies between 10 and 20 percent, the leverage portfolio could be made to exhibit volatilities of 100 to 200 percent if desired.

In contrast, the riskiness of a futures position can be reduced to zero—or to that of a money market instrument, by combining the futures with an offsetting position in the underlying stock. That is, the same arithmetic can be used to create a synthetic term money market instrument. If one were to buy the stock outright and sell the futures, the resulting position would pay an 85-day term money market return of 0.59 percent, and it would exhibit the price risk of an 85-day term money market investment.

A Typical Futures Portfolio

One way to make this more concrete is to consider a futures portfolio that would be typical, or at least representative, of the kind of portfolio one would find with a CTA described as a systematic trend follower. We track several generic trend-following models on a daily basis. The portfolio shown in Exhibit 1.6 shows the positions that a 20/140-day moving average crossover model might have held on March 9, 2010. We explain how such a model works and the reasoning behind the choices of numbers of contracts in Chapter 4.

The example is a good one because it shows how one can have exposure to a broad range of financial and commodities markets. In this case, the contract mix covers equities, interest rates, foreign exchange, and commodities. The mix of contracts within each sector has been chosen to give roughly equal volatility weighting to each contract. The sizes of the four sectors have been chosen in this example so that roughly 30 percent of the portfolio's return volatility comes from each of the three financial sectors and 10 percent of its volatility from commodities. The overall position sizes have been chosen to produce a return volatility of approximately 15 percent on a $2 billion portfolio, although the numbers of contracts in each market have been limited to no more than 1 percent of open interest and 5 percent of average daily volume in their respective markets.

This example is also good because it is both rich and realistic and allows us to illustrate a wide range of issues related to how cash is used in such a trading model. In the course of this discussion, we will touch on the following:

- Minimum (SPAN) margin requirements
- Multi- and single currency margining

EXHIBIT 1.6 Sample Futures Portfolio for 20/140 Moving Average Model (March 9, 2010)

	Market and Contract	Position
Equity	SPI 200	–499
	CAC 40	–731
	DAX	–214
	Euro S TOXX 50	–969
	FTSE 100	499
	Hang Seng	–242
	IBEX 35	–267
	KOSPI	473
	MIB	–241
	NASDAQ 100 Mini	1,271
	Nikkei 225	325
	S& P 500 E-mini	744
	Swedish OMX	3,110
	Russell 2000 Mini	573
Interest Rates	Australian 10 Year	1,566
	Australian 3 Month	1,083
	Euro 3 Month Rate (Euribor)	6,475
	German 5 Year (BOBL)	2,197
	German 10 Year (BUND)	1,412
	German Schatz	5,206
	Japan 10 Year (JGB)	261
	Japan 3 Month	990
	UK 10 Year (Gilt)	–1,023
	UK Short Sterling	3,435
	US 10 Year	1,474
	US 2 Year	2,853
	US 30 Year	–971
	US 3 Month Rate (Eurodollar)	4,989
	US 5 Year	2,265
Foreign Exchange	British Pound	–1,812
	Canadian Dollar	1,899
	Euro	–1,114
	Japanese Yen	1,466
	Mexican Peso	4,223
	New Zealand Dollar	–1,935
	Swiss Franc	–1,570
	Australian Dollar	1,499
Commodity	Cocoa	–358
	Coffee	–545
	Copper	135
	Corn	–1,972
	Cotton #2	553
	Crude Oil	–461
	Gold	760
	Heating Oil	–420
	Lean Hog	654
	Live Cattle	–810
	Natural Gas	–527
	RBOB	426
	Silver	–584
	Soybean Oil	–952
	Soybeans	–875
	Sugar # 11	2,688
	Wheat	–1,001

Source: Bloomberg, Newedge Prime Brokerage.

- Daily variation margin settlements
- Exposure to foreign currency risk
- Interest income and cash management costs
- Margin-to-equity ratios
- Trading and funding levels

Minimum (SPAN) Margin Requirements

First, Exhibit 1.7 shows how much margin would have been required in various currencies for such a portfolio on March 9, 2010. The total dollar margin shown in the exhibit is $131,845,566.99. This is the minimum value of the collateral that the various exchanges would require the clearing broker to post to guarantee performance. The trader's clearing broker is free to require more.

The industry standard for determining minimum margin or collateral requirements is known as SPAN, which is derived loosely from Standard Portfolio Analysis of Risk. The system was designed originally by the Chicago Mercantile Exchange to integrate positions that included both futures and options on those futures by doing scenario or "what-if" analysis as a way of dealing with the nonlinear risks in options. It has since been expanded and extended to allow for the effects of diversification on risk in a futures portfolio.

The basic objective of SPAN margins is to make sure that on most days, the amount of margin on hand would be enough to cover the day's losses. As a rule of thumb, these minimum SPAN margins are considered adequate if they cover roughly 95 percent of all losses, which would correspond to a couple of standard deviations' worth of changes in the portfolio's value.

In fact, the minimum margin on a globally diversified portfolio would be more than enough to meet this objective because allowances for diversification

EXHIBIT 1.7 Margin, Collateral, and Cash Summary for Sample Portfolio

Market by Currency	Margin 3/9/10	P/L 3/10/10	Margin 3/10/10	FX Rates ($/FX) 3/9/10	FX Rates ($/FX) 3/10/10
U.S. dollar	83,229,369.00	–6,166,097.69	83,229,369.00	1.00000	1.00000
Australian dollar	7,370,730.00	–74,492.06	7,370,730.00	0.91345	0.91585
Euro	18,076,359.50	–2,275,927.50	18,111,973.50	1.35945	1.36530
Swedish kroner	0.00	4,198,500.00	0.00	1.49870	1.49800
British pound	3,578,829.00	483,817.50	3,578,829.00	0.12885	0.12885
Hong Kong dollar	15,584,800.00	605,000.00	15,584,800.00	0.01112	0.01105
Japanese yen	281,580,000.00	17,672,500.00	281,580,000.00	0.14015	0.14045
Korean won	7,727,164,500.00	47,300,000.00	7,727,164,500.00	0.00088	0.00089
Converted total	131,845,566.99	–7,739,778.80	132,028,927.42		

Source: Bloomberg, Newedge Prime Brokerage Research.

are made only within a given clearing house. In this portfolio, several clearing houses are involved. Each clearing house assesses margins that cover the risks in the contracts that it clears without regard to positions held in other markets.

Multi- and Single-Currency Margining

In practice, each clearing house requires that margins be posted in their local currency. In our example, the trader's clearing broker would have to have posted margin in seven different currencies—U.S. dollars, Australian dollars, euros, British pounds, Hong Kong dollars, Japanese yen, and Korean won—in the amounts shown in Exhibit 1.7.

One way for the trading client to handle this, of course, would be to maintain pools of appropriate collateral denominated in each of these currencies. The chief advantage of securing one's positions this way would be the elimination of transactions costs associated with daily conversions of one currency into another to keep all positions square. The chief disadvantage would be the exposure to changes in foreign currency prices associated with the cash positions one would have in each of these currencies.

The solution to *multi-currency margining* from the client's standpoint is known as *single-currency margining*. With this approach, as the name suggests, the trading client can post the full margin in the form of dollars (or euros, or any other currency shown in the exhibit). Under this arrangement, the clearing firm is responsible for converting the client's cash into collateral that is acceptable to the various exchanges around the world.

Daily Variation Margin Settlements

Second, you can see that the passing of one day produced gains and losses in various currencies. It is standard practice in futures markets to settle all gains and losses in cash every day. These daily cash settlements of gains and losses are sometimes known as *variation margin*. In this example, the gains in Swedish kroner, British pounds, Hong Kong dollars, Japanese yen, and Korean won would represent inflows of cash in those currencies. The losses in U.S. and Australian dollars would represent cash outflows in those currencies. Part of the clearing broker's job is to handle these cash flows efficiently on a daily basis.

You can also see that the margin requirement to continue holding the position increased slightly as of the close of business on March 10. The positions haven't changed, but the margin required to hold European positions has increased slightly.

Foreign Currency Exposure

One benefit of using futures to take market positions is that they come with a built-in currency hedge. This is because futures contracts have no net liquidating value. As a result, a position in Eurostoxx futures makes or loses money only when the index rises or falls. A change in the dollar price of the euro would by itself produce neither a gain nor a loss because you have no cash position in euros.

In contrast, the return to a fully funded, unhedged dollar investment in Eurostoxx would be, to a first approximation, the sum of the return on Eurostoxx as viewed by a euro-based investor and the dollar return on the euro. Conventional money managers are well aware of the problems raised by currency risk because currency risk is potentially very large. Exhibit 1.8, for example, plots monthly changes in the dollar price of the euro against monthly changes in the value of the Stoxx index. From this scatter, one can see that returns on the Stoxx index are somewhat more widely distributed than are dollar returns on the euro, but not by much. During most of the months for the past 20-plus years, currency risk could be counted on to be as important a source of risk to a dollar-based investor as was risk in the foreign asset.

EXHIBIT 1.8 Sources of Risk in a Dollar-based Investment in European Stocks (Monthly Percent Changes in Stoxx and Dollar Price of the Euro, 1987–2010, correlation = –0.17)

Source: Bloomberg, Newedge Prime Brokerage Research.

For CTAs, the only foreign currency risk associated with using futures to trade comes from the value of cash or collateral balances that are the result of posting margin collateral or that are the result of accumulating gains or losses in currencies in which the contracts are denominated. Because these balances tend to be small relative to the notional values of the positions taken, foreign currency risk is, for all practical purposes, decoupled from the risks associated with the underlying assets or commodities. This decoupling allows CTAs to take much more nuanced views on currency exposure than is possible for most conventional money managers, for whom hedging currency exposure can be costly.

Interest Income and Cash Management Costs

The collateral posted by the trading client with the clearing broker remains the property of the trading client and is frequently segregated from the clearing broker's funds. In principle, then, the client stands to earn interest or dividends on whatever collateral he has posted. Just how much, though, is limited by the costs of managing cash and the kind of collateral that the various clearing houses require. Unless the trading client posts exactly the kind of collateral that each clearing house requires and in exactly the right amounts, the clearing broker will incur costs in converting whatever the client has deposited into whatever the clearing houses want. Also, the daily settlement of gains and losses will require that collateral be bought and sold in various currencies, and this entails costs as well. As a result, the trader faces a steady tension between maximizing income and minimizing costs that occupies a great deal of time, energy, and attention in managing a futures portfolio efficiently and well.

Margin-to-Equity Ratios

One consequence of having to settle gains and losses daily is that cash flows into and out of an account as it makes or loses money overall. This leads to a practical question of how much collateral the client will be asked to leave with the clearing broker or how much collateral the client will want to leave with the clearing broker.

From the clearing broker's perspective, the task is one of posting the minimum amounts of margin at the various exchanges. If a client has lost money at any clearing house, additional collateral must be posted to make up the loss. However, if a client has made money, collateral may be freed up. If required margins exceed the value of the client's account with the clearing broker, the clearing broker is required to incur a capital charge. Therefore,

it is in the clearing broker's interest to have a collateral cushion that allows losses to be covered in a timely way.

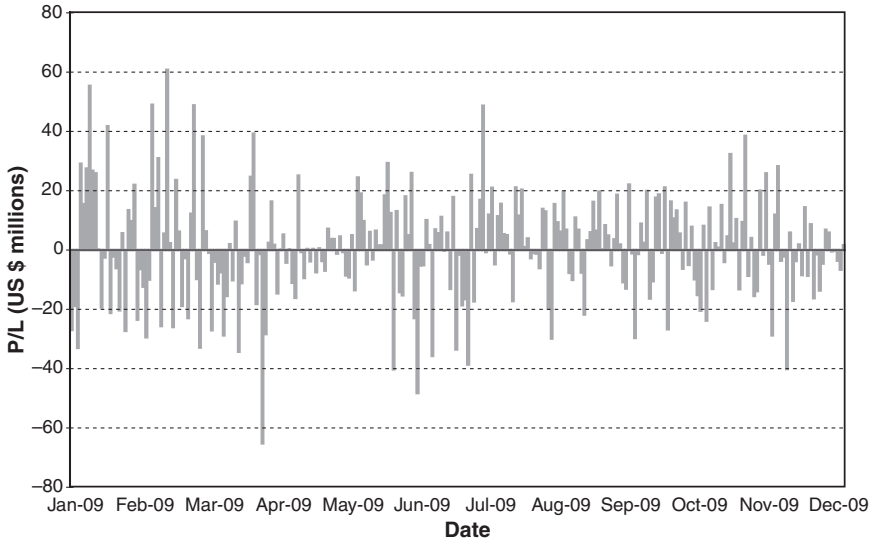
From the trading client's perspective, there is a clear advantage of maintaining control over collateral, but there is an ongoing cost to wiring money in and out of an account on a regular basis. Therefore, it is in the trading client's interest to maintain a cash buffer with the clearing broker that absorbs typical flows of cash into and out of the account on a daily basis.

Just how large the buffer should or must be is the result of the clearing broker and the trading client balancing risks and costs. Whatever the outcome, though, it is common for the trading client's equity (i.e., open trade equity) to exceed the margin required by the various clearing houses. This results in a margin-to-equity ratio, or margin/equity ratio, that is less than 1.0.

Turning Profits and Losses into Rates of Return

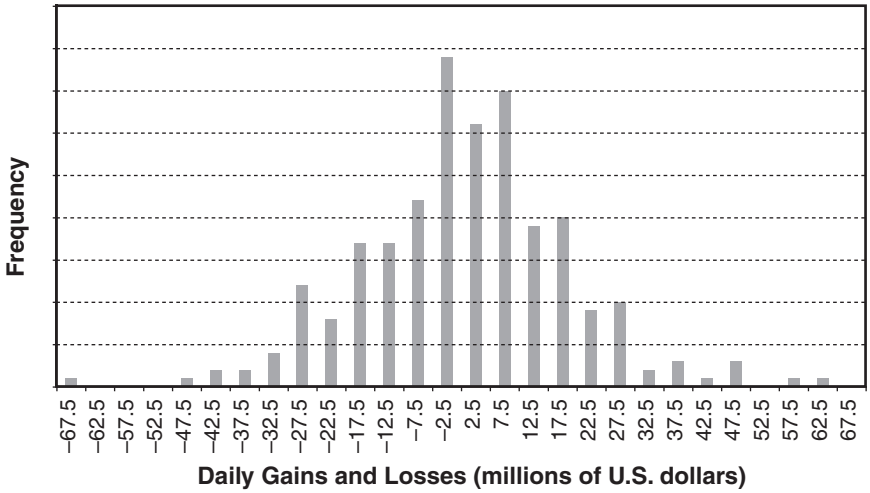
To expand on this example, consider the daily gains and losses produced in 2009 by a 20/140 moving average crossover system with the kind of contract weights shown in Exhibit 1.6. Daily profits and losses are charted in Exhibit 1.9, and the distribution of these daily gains and losses is shown in

EXHIBIT 1.9 Daily Gains and Losses for a 20/140 Moving Average Model (Dollars, 2009)



Source: Bloomberg, Newedge Prime Brokerage Research.

EXHIBIT 1.10 Distribution of Daily Gains and Losses for a 20/140 Moving Average Model (Dollars, 2009)



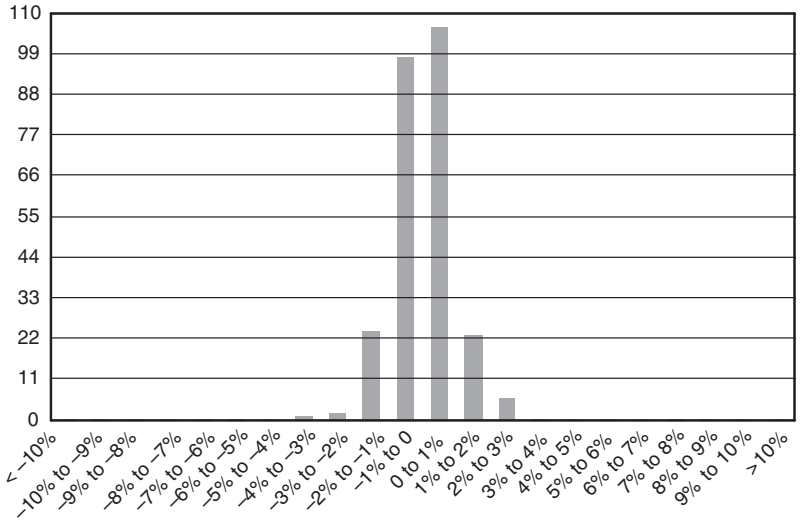
Source: Bloomberg, Newedge Prime Brokerage Research.

Exhibit 1.10. As it happened, the key summary statistics for this distribution were:

Mean	$650.94
Standard Deviation	$18,041,348
Skew	0.06
Excess Kurtosis	1.08
Maximum	$60,712,266
Minimum	($65,217,082)

And to help complete the picture, a net asset value analysis, which allows us to track high- and low-water marks and drawdown experience, is shown in Exhibit 1.11.

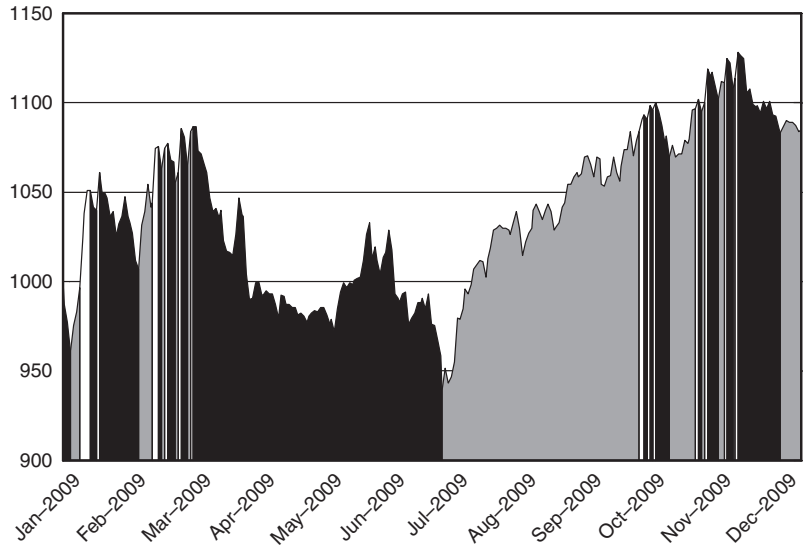
EXHIBIT 1.11A P/L Summary for Model MA20–140 in 2009 Inception Analysis (January 2, 2009–December 31, 2009), Distribution of Daily Returns



Source: Bloomberg, Newedge Prime Brokerage Research.

	Summary Stats	
	Arithmetic	**Logarithmic**
Rates of Return		
Daily	0.04%	0.03%
Annual	8.83%	7.87%
Standard Deviations		
Daily	0.87%	0.87%
Annual	13.89%	13.88%
Shape		
Skewness	0.08	0.04
Kurtosis (Excess)	1.15	1.15
Risk/Return		
Sharpe Ratio	0.62	0.56
Return/Risk	0.64	0.57
Sortino Ratio (0%)	0.94	0.83

EXHIBIT 1.11B P/L Summary for Model MA20–140 in 2009 Inception Analysis (January 2, 2009–December 31, 2009), NAV Analysis



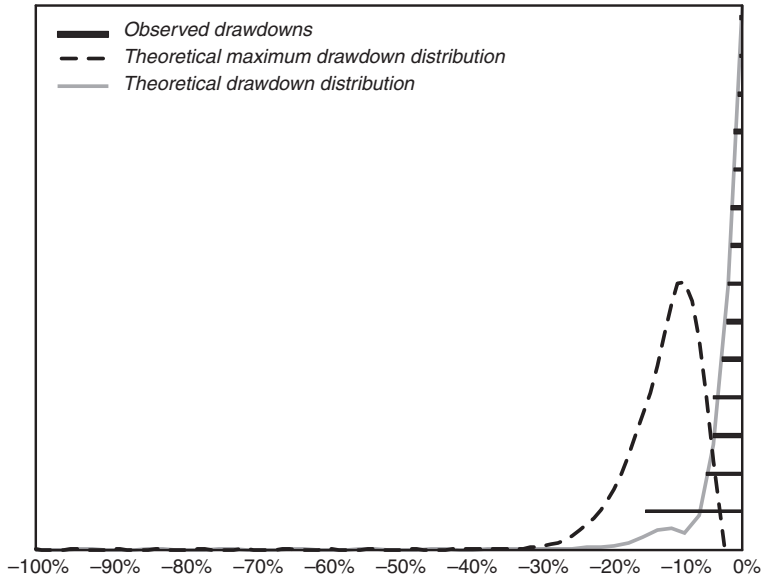
Source: Bloomberg, Newedge Prime Brokerage Research.

Drawdown Stats

Period	Drawdown
Mar. 6, 2009–Jul. 8, 2009	–13.60%
Jan. 20, 2009–Feb. 9, 2009	–5.08%
Dec. 1, 2009–Dec. 22, 2009	–3.94%
Jan. 1, 2009–Jan. 6, 2009	–3.94%
Oct. 21, 2009–Oct. 28, 2009	–2.78%
Feb. 23, 2009–Feb. 26, 2009	–2.06%
Mar. 2, 2009–Mar. 4, 2009	–1.96%
Nov. 16, 2009–Nov. 20, 2009	–1.52%
Nov. 25, 2009–Nov. 27, 2009	–1.48%
Feb. 18, 2009–Feb. 19, 2009	–1.21%
Jan. 15, 2009–Jan. 19, 2009	–1.04%

Assets under management: 0.0 Mil.

EXHIBIT 1.11C P/L Summary for Model MA20–140 in 2009 Inception Analysis (January 2, 2009–December 31, 2009), Drawdown Analysis



Source: Bloomberg, Newedge Prime Brokerage Research.

Rates of Return

First consider the question of turning these profits and losses into rates of return. As we explain in some detail in Chapter 4, we chose this particular collection of futures to produce an expected volatility of returns of 15 percent on a $2 billion portfolio. As it turned out, if we had begun the year with $2 billion, the resulting year's arithmetic return was 8.83 percent with an annualized standard deviation of 13.89 percent, which was close to the 15 percent target.

The $2 billion as our choice of denominator is arbitrary, of course, and could as easily have been $1 billion or $4 billion, in which case the annualized return volatilities could have been almost 28 percent or just under 7 percent.

Trading, Funding, and Notional Levels

In the terminology of managed futures, the $2 billion denominator, if that is what the CTA chooses, is known as the trading level. There remains, then,

the question of actual funding level and its complement, the notional funding level.

In many CTAs' funds, you would be fully invested in cash so your funding level would equal your trading level. In fact, however, the trading program does not require this much cash. For example, in Exhibit 1.7, we see that the minimum exchange margin for a similar portfolio, although on a different day, was $131.8 million, which is far less than $2 billion. And in Exhibit 1.10, we see that the program's maximum drawdown during the year was 13.6 percent. Of course, the maximum drawdown could have been worse, but at 13.6 percent, one could have posted an additional $272 million [= 0.136 · $2 billion] and not have had a margin call at any time during the year.

In fact, one of the advantages of managed accounts and of CTA investment platforms, which we discuss at length in Chapter 3, is that they allow you to economize on the use of cash. In the fully invested program, you are counting on the CTA to invest the excess cash wisely and well. In a managed account, you invest the excess cash in whatever way suits you best. In a managed account, the funding level is negotiated, and the difference between the trading level and this mutually agreed-upon funding level is known as the *notional funding* level. The CTA does not actually have the cash, but the sum of the actual and notional funding levels produces the hypothetical trading level on which all return and fee calculations are based.

Where Is the Cash and How Is it Managed?

Once you get to the point of investing in a CTA, you will find that the devil is in the details. It is one thing to talk about cash, collateral, and foreign exchange in the abstract. But the difference between a good CTA and an excellent CTA will come down to the way they handle the complexities of collateral, segregated funds (various forms and provisions), single-currency margining, and costs and noise in managing forex balances.

Exchanges have well-defined ideas about the kinds of collateral they accept, while many investors have strong ideas of their own about the kinds of collateral they want to hold. Segregation of funds is common in the futures industry, but the regulatory meaning of segregation can vary in hugely important ways across jurisdictions. Futures clearing firms can provide single-currency margining for their clients, but extract a fee for the service. CTAs can be highly attentive to their control of foreign currency exposure or they can be relaxed. All of these considerations can have important effects on your rates of return and on the safety of your cash and collateral investments.

How and where cash and collateral are managed and held are important considerations also in whether you are more comfortable with an investment in a CTA's fund or with a managed account. With a fund, your cash is controlled by the CTA. With a managed account, your cash is controlled by you. Each approach has its strengths and drawbacks, and examples like those provided in this chapter can be used as a foundation for evaluating the two approaches, which we address at some length in Chapter 3.