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Coming to Terms with New Market Dynamics

The 1980s and 1990s saw a boom in public participation in the equity markets with spectacular growth in the number of mutual funds and unit trusts along with a global expansion of new enterprises and access to the exchanges that traded their securities. Since the NASDAQ collapse in 2000, the role of the retail investor has diminished, as has the prevalence of buy and hold strategies as advocated by investment gurus such as Peter Lynch. The innovations that have been taking place in the investment/trading strategies practiced by institutional asset managers, who now more than ever predominate, have led to a quiet revolution in the behavior of the capital markets.

The growing importance of derivatives, the heightened focus on proprietary trading by the major investment banks and the proliferation of alternative asset management strategies have all been reshaping the investment landscape. To cite just one example, the hedge fund sector alone is now estimated to be responsible for more than 50% of current stock market volume.

New transaction technologies have reduced the costs of trading, disintermediation has all but eliminated certain tiers of the market, and a low interest rate environment has forced a rethinking of many previously accepted canons of asset allocation theory.

The growing role of long/short strategies and derivatives means that many traditional market indicators simply don't work anymore. Increasingly stocks are being traded like commodities and many of the traditional decision support tools for analyzing stock market behavior have become obsolete. Paradoxically just as the markets have become more oriented towards purely technical trading, many of the legacy elements from technical analysis can actually be misleading and hinder the active trader who wants to profit in today's markets.

If you are an active trader or investor it is vital that you come to terms with the new modes of market behavior. You need new pattern templates and analytical techniques that will enable you to identify the chart formations that reveal these new dynamics at work.

This book is designed to show the individual trader or investor how to successfully analyze the morphology of modern markets and how to implement long/short strategies that enable the management of risk in a world and market that contain many new uncertainties.

We shall also be discussing some innovative techniques that are designed to capture some of the activity that occurs beneath the surface on a daily basis in the market place and which allow the trader to differentiate between the "noise" and the true dynamics of price development

through price discovery. Along the way we will be examining some of the vital new forces and techniques that are influencing the way that markets behave. Some very bright and talented people are pushing innovations to the capital markets at a breakneck pace, and trying to monitor the research and new models that are being proposed and rapidly adopted is a challenging undertaking for finance professionals and traders alike. We shall also be examining a number of traditional techniques that, despite the major transformations that have taken place in the structure of the financial markets, have proved themselves to be remarkably resilient and effective at aiding the trader to discern the underlying value in market information.

In what follows we will look at stimulating research and analysis that is being done in the new discipline of econophysics, where models and quantitative techniques that have arisen in the study of the physical sciences are increasingly being applied to finance. The term "phynance" has been coined to reflect the fact that there is a growing constituency of PhDs from mathematics and pure science that are now working at major banks and hedge funds.[1] Affiliated with this is another source of new insights into the workings of the markets, their microstructure and *modus operandi*, and which can be called agent-based modeling. Inspired by ideas from artificial intelligence and algorithms that have been successfully applied in other models using computer simulations, there is a growing literature that provides insights into the complexity of behavior that *emerges* from modeling the markets as a dynamic and adaptive system with interacting agents whose "rules of engagement" are often stunningly simple.

Some might argue that very little of this research yields benefits that can be practically applied by the trader in real world situations, but we would suggest that there are invaluable insights and explanatory force behind ideas that have arisen in the science of complexity. We will serve notice now that we will not be applying chaos theory to the markets, and in reviewing the research for this book there seemed to be little of value to be taken from the finance community's love affair with this discipline in the 1980s and 1990s. However, we hope to show that the study of complex nonlinear systems in general, and more specifically the study of seismology, idealized sand piles, power laws, percolation lattices and other fascinating areas from the specialist literature, does have a payoff to the active trader. But we will return to these exciting and esoteric matters later.

To begin it would be good to think about the actual mechanics and practice of trading or what might also be described the "workflow of markets". Markets arise because people want to trade and the way they trade, the business process of placing trades and interacting with others in the conduct of their trading, should provide some important clues into the logic of price formation and the network dynamics that are markets. We also need to address the fact that there is a traditional notion of how markets work which is largely obsolete and handicaps an understanding of price formation and market dynamics. A more accurate notion of the contemporary trading workflow has to reflect the re-engineering that is constantly taking place in the trading process since the advent of ubiquitous computation technologies.

In 2006 as much as 30% of the trading activity that takes place each day in the U.S. equities market is performed entirely by software algorithms. While this automation of trading is ultimately supervised by the stakeholders in the markets, the actual trading process itself is conducted entirely by software algorithms and involves machine to machine communication. Equally as important for the price formation process is the fact that nominally trillions of dollars are committed to purely synthetic financial instruments that have a grounding in the real world economy of companies, customers, interest rates etc. but which are often only abstractly and remotely connected to a specific underlying variable that is widely understood by the nonspecialist. As an example the market for collateralized debt obligations (CDOs) is

estimated to be worth more than two trillion dollars and allows those who know what they are doing, or at least demonstrate great confidence that they know what they are doing, to trade in the "risk" of corporate debt.[2]

From time to time when there is a derivatives scare there may be some attention to this gargantuan market in synthetic instruments in the financial pages of the mainstream newspapers, but most of the time these markets churn enormous amounts of capital obligations under the surface and in an unexciting manner. Indeed, we have to hope that the trading in these remains unexciting as the "malfunctioning" of these instruments has the capacity for very serious financial consequences. When the debt of GM and Ford was downgraded in 2005 there were some serious consequences for several hedge funds and banks that are exposed to the vagaries of these "securities". Much more seriously, the Russian debt default in 1998 left some of the world's most astute finance academics and previously successful traders paralyzed as they watched a meltdown in their highly leveraged portfolio of complex trades predicated on arbitraging cash and derivative instruments. Will there be more such incidents? Undoubtedly there will be. Could the next one bring the financial world to the brink of total collapse? We don't know, but we would suggest that for practical purposes we adopt the defensive posture of the unlikely asteroid scenario. If an asteroid that is headed toward Earth is discovered there would be widespread alarm and panic as it surely would be "the end of civilization as we know it" unless some technology is developed to deflect it. If another financial debacle and liquidity collapse presents itself we have to hope that central bankers will also be able to deflect the impact and fallout. However, for most of us there are more mundane concerns to keep us well occupied.

Let us examine the traditional notion of the financial markets that is still part of the folklore and can still be found in text books that are used in the teaching of finance and business studies. To older readers who recall trading in the 1980s and 1990s this will be familiar territory but to the newer generation of traders Figure 1.1 will seem truly archaic.

Our point in showing the graphic is to illustrate that traditionally markets involved human intermediaries. The placing of orders, their execution and the logging of trades was done with a human being aware of the whole process, even if there were automated steps along the way.

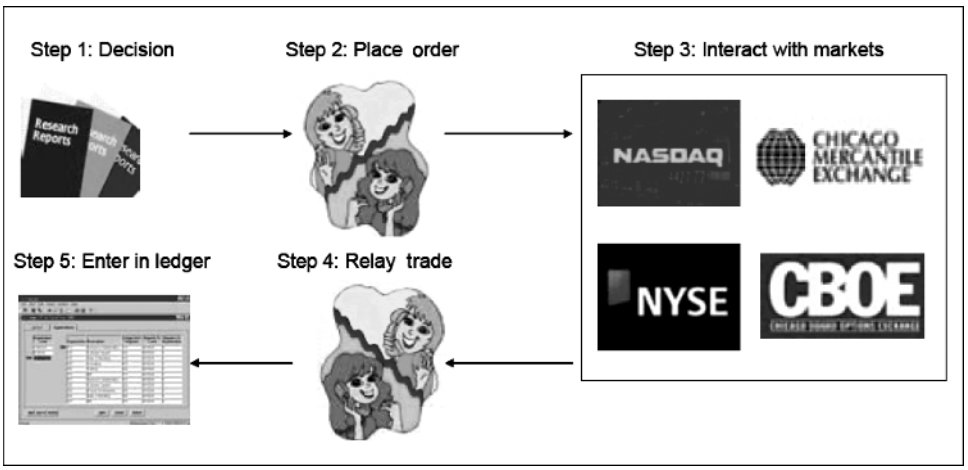

Figure 1.1 Traditional Trading workflow (*source*: TABB Group). Reproduced by permission of The Tabb Group LLC

Even today in the popular imagination when people think about markets they think of traders in the pits of the Chicago futures exchanges or the specialists stalls on the floor of the NYSE. These iconic images have a very powerful effect on our imagination and can subtly influence the way that we think about a business process or activity.

Why do news presenters stand outside the White House when discussing a news story about U.S. politics? Why does the monthly U.S. employment data need to be revealed on the steps of the U.S. Treasury building? Why does CNBC come "live from the floor of the New York Stock Exchange"? Why do stories about the entertainment industry often have the "HOLLYWOOD" sign that sits astride the Cahuenga Pass into the San Fernando valley? Most traders and financial decision makers do not literally work on Wall Street, more and more movies are made by people who do not live in Los Angeles or even depend on that city for their livelihood and why should we put greater credence in a news story if the presenter is standing outside the White House or U.S. Treasury? Iconic images serve a role as any good fiction writer, television producer or GUI programmer will attest but they sometimes have a way of confusing issues rather than clarifying them.

The reason we have gone through this exercise is that we sense that the icons and metaphors that creep into our thinking about markets have a way of distracting us from what is really going on. We deal with surface information and images, the "noise" of the markets rather than analyzing the underlying technical conditions of the market. If we are looking in the wrong places for the clues as to what the markets are telling us it is not too surprising that we will fail to get their message. Learning how to better understand what the markets are communicating can be one of the main payoffs from unraveling the elements in the new trading workflow.

To be specific, the contemporary financial markets have not only removed the human interaction at the level of order placement in the sense that orders can be executed directly into the market's order books by touching a screen or striking a keypad, but also that there is no need for a person to even touch a screen or "supervise" a fully automated process.

ALGORITHMIC TRADING

The best way to understand algorithmic trading is to consider the business problem that the technique of trading via algorithms was designed to solve. Large institutional traders leave large "footprints" in the marketplace. A large mutual fund that decides to place a very large buy or sell order into the market's order book runs several risks. The first kind of risk is that other traders will see the size of the order and know that there is an opportunity for exploiting the order flow by "front-running" the order which has the effect of moving the price away from the large fund in a costly and inefficient manner. If another brokerage or affiliated third party sees a massive buy order entering the books on the buy-side there is the possibility for very agile informed trading desks to position themselves quickly to benefit at the fund's expense. In effect the other participants are buying ahead of the fund, benefiting from the inevitable uplift that the large order will have on the price and taking a margin for ultimately selling their short-term purchases back to the fund at a slight premium. The fund may end up achieving the large purchase that it wished to achieve, but not without moving the market away from the price at which it wanted to execute the trade.

By digression there is an alternative scenario that is worth brief discussion which also illustrates the way in which order flow can be interpreted by market participants. This is the so-called "pump and dump" strategy in which a large fund or trading desk is keen to show to

the market that it has a particular interest in a large order. After revealing its intention for all to see, let us assume that it is a large buy order, the market reacts to the move by following through with positive price action thinking that the buyer must have some superior knowledge about the attractiveness of the particular security that is being purchased. In fact the buyer is hoping to sell unwanted inventory into the strengthening market. This highlights a theme that we shall return to repeatedly which is that nothing influences price development more than price development. Another saying that seems apropos is the beautifully ironic remark that Wall Street is the only place that puts its prices up when it wants to have a sale.

Returning to the concerns that large institutions have had about exposing their orders to the market, a new type of automated process has been developed to disguise the true intent of these large fund managers. The process, known as algorithmic trading, not only facilitates the more efficient execution of large orders, but can even introduce subtle false signals into the procedure which are designed to confuse the markets about the underlying transaction objectives. For example, if a fund wants to buy a large quantity of a particular stock, the order is "sliced and diced" into a series of much smaller sub-orders and then executed over a period of time where the objective is to achieve actual price executions at the optimal cost. In other words, the algorithms are capable of scattering the original trade objective into a fragmentary process which should no longer be transparent to other market players. As part of the procedure the algorithms can also throw off contrarian trades that will from time to time reverse the original motivation by, for example, creating a selling phase within a large buy order:

> The most common type of algorithm, called Volume Weighted Average Price (VWAP), slices the parent order into a series of child orders over a certain time frame, attempting to conceal the true size of the parent order. These algorithms are dynamic and in response to current market conditions, cancel and replace live orders. Each time an order is canceled and replaced, the information becomes part of the market data environment. Therefore, the use of algorithms has not only increased the number of trades that occur, but it has increased the amount of intraday market data.[3]

One of the consequences of this innovation is that the microstructural behavior of markets is changing. There is far less transparency at the order book level and even when a series of orders do appear on the Level 2 or DMA screens there is a real question mark as to how firm these "orders" really are. Access to the order books was originally seen as a giant step forward in increasing market transparency and leveling the playing field for smaller traders, but as with most innovations there are usually ingenious techniques designed to defeat the purpose. Traders, both large and small, welcome transparency as a great principle but in practice they would rather be able to operate anonymously and stealthily in the marketplace (other than in the "pump and dump" mode we discussed).

There has been a lot of innovation regarding the complexity of the algorithms that buy-side traders are now using and the motivations have extended beyond the original desire to "hide" large trades. Another important driver of the trend is the changing landscape between the buy-side (i.e. the large pension funds, mutual funds etc.) and the sell-side (i.e. the large brokerage operations that are focused on taking a small (and smaller) margin or commission from executing the trades of the large players on the buy-side). Issues such as the competitive nature of commission arrangements, the separation of research and trading costs and activities and the confidentiality of trading motives are also pushing this agenda. According to the TABB

Group in late 2005, more than 60% of buy-side managers were experimenting with algorithmic trading techniques.

We need to clarify the significance of these new techniques and to differentiate them from the more "traditional" notions of computerized trading known as "program trading". Algorithmic trading has very different objectives to program trading which was a technique pioneered in the 1980s designed to exploit temporary arbitrage opportunities that arose in the trading of cash instruments such as the S&P 500 cash index and its major constituent stocks, and the futures contracts that trade in parallel with the cash market. When the derivative (the futures contract) and the cash index ("the underlying") become misaligned a risk-free arbitrage opportunity arises and program trading takes advantage of these temporary spread discrepancies:

> Algorithms are a step up from the more familiar program trading, which institutions for years have used to buy or sell bundles of 15 or more stocks worth a combined $1 million. Algorithms handle trades in individual stocks, and the exchanges don't ban their use when trading becomes extremely volatile, as they have done with program trades since the 1987 market meltdown. As the use of algorithms moves from hedge funds and Wall Street's trading desks to mutual- and pension-fund managers, it will account for more than 40% of total U.S. equities trading on all markets by 2008, up from about 25% today, according to Boston-based researcher Aite Group.[4]

To highlight this realignment of the workflow between the major market players, the brokerage and investment banking business, which, largely pioneered the algorithmic trading technology and uses these platforms for conducting its own proprietary trading activities, is morphing its role with respect to large buy-side players:

> Many bulge-bracket firms – the major brokerage houses that underwrite and distribute securities as well as produce research – are taking on a consulting role, helping buy-side customers choose algorithms. Brokers say they'll advise buy-side firms on which electronic strategies to apply for particular trading styles and develop customized algorithms, as well as pre- and post-trade analysis tools, for clients.
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> In February, Goldman Sachs began providing a framework, known as the order-execution "Cube," to help buy-side customers classify their orders and segment their flow by methodology and venue. "The Cube maps orders into different execution strategies based on order size, liquidity, and trade urgency," says Andrew Silverman, head of U.S. algorithmic trading at Goldman Sachs, who explained the concept in April at a trading technology conference.[5]

Why should the individual trader be concerned about this issue? Surely it is only of relevance to the largest institutional players and has little bearing on the activities or concerns of the smaller fund manager and individual trader. But we would argue that because of these fundamental changes to the manner in which volume is recorded, and the fact that the use of algorithms has not only increased the number of trades that occur, but also the amount of intraday market data, there have been radical changes to the ground rules that are the basis for many technical indicators that are widely followed by practitioners of technical analysis. A substantial amount of the legacy indicators in technical analysis have assumptions about volume, money flow and other measures of accumulation and distribution. Can these be as valid today, given the nature

of the obfuscatory intent of algorithmic trading, as they were when the traditional trading workflow paradigm was in place?

For intraday traders the situation may be more acute than for swing traders who take their cues more from end of day data than analysis of more high frequency data. If a large fund is executing a large order over several hours using a sophisticated algorithmic trading platform, which not only decomposes the order into smaller granularities but also uses some deliberate false signals designed to confuse, will this not invalidate a number of assumptions upon which volume analysis is based? What effect does the sudden removal from the order book of several "published" bids and asks have on intraday liquidity? Are the numerous avalanches and price cascades that can be witnessed during intraday trading connected to these algorithms?

We certainly are not trying to suggest that these techniques are "dangerous" any more than we believe that "program trading" was the much publicized culprit for the October 1987 market crash, but we think that to pretend that these technical innovations have not radically changed the ground rules for technical analysis is an untenable position. Does this invalidate methods that have been constructed to analyze money flow and accumulation/distribution, for example? We believe that there is much evidence that these indicators no longer work as effectively as they should and we will propose some modifications and new techniques that can play the role that these techniques were designed for. Before we move on to consider one more important aspect of how the traditional trading workflow has changed and how it impacts on the interpretation of the market's technical condition we should mention that the developers of algorithmic trading technologies may not have achieved exactly what they intended. There is some evidence that these algorithms may not have the "stealth" advantage that their promoters claimed for them:

> Some critics say that when less experienced hedge- or mutual-fund traders use the software they've bought from Wall Street, they inadvertently expose their trades. How? Canny traders, mainly those who trade on behalf of big banks and brokerages with the firms' capital, may be able to identify patterns of algorithms as they get executed. "Algorithms can be very predictable," says Steve Brain, head of algorithmic trading at Instinet, the New York City-based institutional broker.[6]

We want to return to the workflow diagram in Figure 1.1 and consider another revolutionary change that is taking place in the manner in which the trading process is changing and which has had, an impact on market behavior that should be of interest and value to all well-informed traders. There have been remarkable advances in the logging of trades and positions and more specifically with the real time monitoring of the interim profit and loss account, risk exposure, and compliance with the margin requirements of (say) a prime broker. TABB Group estimates that during peak cycles, top tier prime brokers could be hit with close to 150 trades per second and more than 10 times as many orders per second, imposing a tremendous burden on the applications that must update and disseminate this data across the execution platform:

> Each time a trade occurs, the prime broker's system must immediately update the accounts positions, usually stored in their database. Their system will examine the trade and determine whether to create a new position or close an existing position. Only when this is complete can the broker accurately calculate items such as unrealized and realized gains, and more importantly, the trading limit (the amount of capital the trading firm has at its disposal) on the account. When the fund places an order, the broker must make sure it falls within the account's current

> trading limit. Typically, trading limits include the value of the existing position, the leverage (the amount of money the firm can borrow against its current value), the amount currently being borrowed and the potential cost of the existing open orders. When a broker cannot calculate trading limits as fast as its clients are placing orders, one of two undesirable scenarios can occur: either the prime broker imposes conservative margin requirements, which limit trading, or the firm allows the trading to occur but takes on additional counterparty risk.[7]

As hedge funds diversify their strategies across multiple asset classes, across international markets in both cash instruments and derivatives, there are enormous challenges presented to the IT systems that have to monitor the net balances of all of the various positions. Many of these contemporaneously held positions need to be constantly marked to the market while some other holdings of a less liquid nature can only be updated periodically. Within the prime broker's IT infrastructure a margin engine has to be continuously updated with the overall exposure of a complex portfolio of long and short positions in a bewildering variety of asset classes. Delays in processing all of the current open positions could result in a situation where the prime broker and the client are more exposed to risk than they believed, where they are under their required margin and where the eventual realization of this could impact very negatively on the client's and the prime broker's account.

As the velocity of trading accelerates, as the activities of algorithmic trading become ever more complex, as the degree to which large hedge funds are participating in certain illiquid markets, the sheer burden of computing the net "real time" exposure is sometimes falling behind. When the IT systems that are in place to monitor this real time exposure "catch up" and if, to keep the example simple, the margin engine has underestimated the exposure and requires additional margin, this can sometimes lead to sudden abrupt moves in different markets as hedge funds "square" their various asset allocations. According to some reports that have been surfacing in the London markets during May and June 2006 there is a possibility that the "liquidity crisis" and financial contagion effect that began to affect global markets in late April 2006 and really picked up momentum in May could be attributable to precisely this kind of overloading of the systems designed to monitor in real time the exposure of certain major hedge funds:

> The market's slide, which accelerated towards the end of the trading day as hedge funds squared losing derivatives positions – what's become known as the "four o'clock shock" – followed heavy falls in Asian markets.[8]

The London markets cease trading each day at 4.30 pm and if the back office infrastructures are "struggling" to maintain the integrity with respect to all of a fund's varied and complex trade executions during a session, then it may be that in the last half hour each day the fund has to adjust its positions, perhaps dramatically, in order to remain in compliance with its obligations to the prime broker.

Other commentators have called this effect the "four o'clock cliff" and it is perhaps slightly ominous that during the period of May 2006 where the volatility of many different markets, equities, energy, metals and even currencies shot up dramatically there were several episodes that affected the London markets (and perhaps the New York and Chicago markets equally) that seemed to match this description.

We will examine financial contagion and "correlated liquidity crises" in what follows but our reason for spending the time we have on the impact of the various innovations in the

"workflow" of the trading process is to highlight the fact that today's capital markets are fundamentally different than they were when a lot of trading methodologies and technical analyses were developed. There are some who may want to downplay these innovations and claim that the more things change the more they stay the same and that the fundamental characteristics of markets are just as they always were. Our view is different. We certainly do not wish to appear alarmist and hope that the reader is not sensing a knee jerk reaction to derivatives and computerized trading. That is most certainly not our intention, and in fact we have strong sympathies with greater accessibility to intermarket trading opportunities and the benefits of cross-sectional hedging strategies based on quantitative analysis of the wide variety of financial market instruments.

There are essentially two points that we would wish to make in concluding this brief review of the changed market landscape. The first point is that the dynamics and workflow of trading have changed so dramatically during the most recent 10 year period that there is reason to doubt that the legacy tools from technical analysis are still appropriate to analyzing and understanding modern markets. This does not mean that they are obsolete under all market circumstances but that they may have less to offer especially when markets are in critical or extreme conditions. The second point that we would make is that the innovations have been so rapid, the velocity of trading is increasing dramatically and the room for miscalculations is also increasing at a rate that could lead to some significant accidents. Throughout economic history there have been numerous crises and accidents so this is nothing new. Perhaps more than ever the operations of the capital markets and the financial economy are far removed from the understanding of most people. The traditional models and metaphors that have been used to educate and explain markets are based on outmoded concepts that now seem quaint and obsolete.

The trade in financial instruments, especially fixed income instruments and their derivatives, far surpasses the trade in physical goods and services. Market "fundamentals" such as price – earnings ratios and other ratios based on traditional economic and accounting principles certainly still have the capacity to shape and influence the markets but there is increasingly a sense that the financial economy is becoming a self-organizing entity which is detaching from the underlying "Main Street" economy. It is our view that, and we shall elaborate and develop some of these ideas more fully in what follows, the capital markets have become a highly complex game, played by very smart people (much smarter than those in the public sector that have to "police" their activities) that have access to almost limitless amounts of notional capital, vast resources of computing power and a social and political environment that does not really understand what these markets are doing but which cannot realistically allow them to fail.

The recent episodes of financial crisis – the Asian crisis of 1997, the Russian debt crisis and LTCM debacle, the collapse of the internet inspired "New Economy" stocks and the bursting of the NASDAQ bubble in 2000/1, the perilous situation of the financial markets from the summer of 2001 through to the Iraq invasion of March 2003, resulting in negative interest rates in the U.S. and Japan, and even more recent episodes such as the GM/Ford downgrades in May 2005 and the inflation scare and liquidity crisis of May/June 2006 – are all pointing to a changed financial system. When Alan Greenspan convened a meeting with the major U.S. investment banks in September 1998 to "rescue" the global financial system from the fallout of the LTCM collapse and when the world's central banks "inject liquidity" in overwhelming amounts at times of crisis to stave off the collapse of the markets it suggests that the main cultural and political priorities of our age are to protect the integrity of the capital markets, perhaps *at all costs.*

During the later years of his term as governor of the Federal Reserve, the notion of the *Greenspan put* became widely discussed and many would argue that it is a fact of modern economic life. This does not mean, of course, that the markets are a one way bet and that individual traders, both large and small, are immune to large doses of financial pain and failure. It does mean, however, that, because of the gargantuan nature of the contractual commitments that are implied in multi-party risk sharing and the interdependence of asset returns to the overall health of the financial system, we need to be more vigilant than ever. What may seem like a normal market episode at one point or from one perspective can very soon thereafterwards take on all of the characteristics of a full blown crisis.

It is the *immanence* of risk that has changed. As traders we have to live with the fact that highly unlikely events and big accidents are now more likely. Small accidents tend to cluster and previously observed low correlations between unlikely events can now turn on a dime, and suddenly all assets are moving together – downwards. Finally we will suggest crashes are probably best seen as corrections that didn't stop.[9] We may be in much the same position with regard to predicting market crashes and crises that we are with our ability to predict major seismic events. To the extent that we have learned something of the "signatures" of the underlying dynamics of these different kinds of critical events, we may be given some clues as to when a major event or "crash" is more likely than at other times. But for all practical purposes we are in the dark and at the mercy of unknown forces. But as anyone who lives in a seismically active region of the world knows, it is very prudent to always be prepared for the worse.

From our perspective the only sane way to approach contemporary markets as a trader is to recognize the *immanence of critical events* or "crashes" and always trade with a safety net. How this can be achieved in practice, how to devise strategies that always require your trading account to be somewhat immune from the overall direction of the market, lies at the foundation of the methodology that will be advocated. Not only can the use of a well-planned strategy of always having long and short positions in one's portfolio provide a large degree of protection from overall macro-market risk, but if properly implemented it can generate the other desirable requirement – positive alpha. How this strategy can be implemented with a methodology to enable one to select the most opportune trades and the correct portfolio construction techniques will be the central theme in what follows.

One of the great fallacies of investors is that they tend to believe that they can see far enough ahead to know when it is the right time to be seeking safety. Even if, as in the late 1990s, the markets were behaving irrationally and any company with the moniker "dot.com" was selling at absurd multiples, the average fund manager and trader thought that they could ride the wave of euphoric price development and know when it was time to get off the ride. There is also the complacent notion that we will somehow read warnings to get out of the way before an avalanche of selling occurs. There are no warnings, or if there are they are so well hidden that most market participants don't get out of the way in time.

The worst time to be looking to hedge one's exposure or liquidate one's positions is when the market is correcting wildly. This is why we emphasize that crashes are immanent. It is not that we are unduly pessimistic and have a tendency to expect the worst, rather it is a realization that we cannot expect any warnings. The best time to apply hedging techniques is during periods, which are the "normal" or typical times for the markets, when there is a lot of disagreement about the direction of prices, interest rates, outlooks and so on. In these circumstances, markets are fractious, they are multi-faceted with many traders operating in different time frames all seeking out a multitude of price targets and other agendas. In other words, these are times when

the markets are liquid and when it is most prudent to putting a defensive or hedge strategy in place.

When markets lose this fractiousness and when all opinions about direction and outlook become aligned, they cease to have their "normal liquidity" and trading activity becomes extremely coherent. It is not always the case that in these circumstances that they are preparing to crash because sometimes the alignment of opinions can be of a highly positive nature and markets can be said to "boom". It is to these extreme trend days that we shall now turn.