Financial Markets Dynamics

A new approach to active funds allocation*

By Raffaele Mugno, RCM Trust Founder & Portfolio Manager

Forecasting markets movements is at the heart of the financial industry, from traders to policymakers.

Contemporary economists, continue to pursue the perfect economic forecast despite abundant evidence that it does not, and cannot, exist.

In the economics profession the leading inheritors of this communistic mindset are the proponents of rational-expectations theory, which assumes that the economy and the individuals within it act with perfect foresight. Equally weak are the more fashionable school of behavioural economics, or at least those of its practitioners who claim that although people are irrational, their irrationality can be modelled so precisely that the future can be forecast with great precision.

There is nothing new in economics about the idea that people must make decisions based on imperfect knowledge. Frank Knight gave his name to “Knightian uncertainty” thanks to his 1921 book, “Risk, Uncertainty and Profit”, which noted that most business decisions involve a step into an unknown that is to some degree immeasurable. And John Maynard Keynes observed that “human decisions affecting the future, whether personal or political or economic, cannot depend on strict mathematical expectation, since the basis for making such calculations does not exist.”

Basing my model on imperfect-knowledge, the main aim is to show that financial markets dynamics present regularities that can be classified and used to effectively allocate funds.

In Keynes’s sense, uncertainty is related not only to economic data, but more interestingly to the very structure of the models adopted to interpret the economic reality. Hence, the existence of different points of view on the evolution of the economy, even when the valuations are based on the same information set. Adding to this is the existence of different objectives characterising different financial institutions (for instance between a hedge fund and a life insurance company), which also imply different time horizons hence distinct reaction functions. Therefore, in a system characterized by uncertainty markets dynamics depend on complex interactions. To start with, the new information is filtered and interpreted, generating also conflicting valuations on the new fair price. (For instance, the recent FED funds rate cut –12/2/07– and the coordinated auctions –12/13/07–12/19/07– from the market, not an immediate adjustment, which depends on the complex interaction among different models and different functions of reaction. Third, the specific price path is diversely interpreted by different market participants. Some of them can consider the price getting closer to its new equilibrium, while others may interpret that dynamics as an accumulation of disequilibria. Moreover, the specific market dynamics can, with time, lead some market participants to change their view on the level of the new equilibrium.

At last, normally the appearance of new interpretative models initially polarizes the reaction functions, being followed by its assertion as the new sector’s best practices, hence producing market homogeneity of reactions.

Despite such a complex system, the methodology presented in this note shows that a finite number of dynamic regularities are observable, and can be classified and consequently used to anticipate market movements and build strategies to actively allocate funds. To this end, an optimization process is run to analyse the frequency of regularities occurring, and a stochastic model is built to compute the probability that any given pattern of behaviour will complete.

Though not perfect, this methodology often gives a high probability of anticipating the forthcoming market movement.

To show how this works, I have defined three major market dynamics and examined the Mini Dow Jones Industrial Average futures market (YM) from 2002 to 2007 on daily price bars –continuous contract, regular trading hours-. These model’s conditions have been validated with simulated trades recorded in official Audit Reports from a major international Brokerage House.

Model’s Pillars

In my analysis, financial markets are complex adaptable systems, where participants determine market cycles.

Model cycles are the results of participants’ reactions to the inflow of information, which includes all types of markets related news, from a quarterly result to a FOMC voting member speech.

All this information inflow, will lead to short term and long term patterns of behaviour that will form different, yet repetitive, market dynamics. For the sake of simplicity and to avoid deviations from the main aim of this note, I am not going to refer to “micro types” dynamics and risk management model applied to portfolio allocation. Instead, I will concentrate on three major market dynamics, which show participants interactions at a macro-market level.

Macro market dynamics

1) The first macro market dynamic is a pattern of behaviour determining a trend-up or down. As the trend develops, regular prices retracements are observable, which take a symmetrical form as shown by the red segments in Chart 1, where YM 2007 Daily Open-High-Low-Close (OHLC) price bars are represented. This is a down-trend Symmetric dynamic where the markets are driven by a predominant presence of big size traders who re-determine the market value. These phases are characterized by above average volume. The High-Low range over the trend period is medium to large.

2) The second macro market dynamic is a pattern of behaviour determining regular and repetitive Ups and Downs of prices, which take a Zig-Zag form as shown by green (Ups) and red (Downs) segments in Chart 2, where YM 2006

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Daily OHLC price bars are representative. This is a Zig-Zag dynamic, where the markets are influenced by medium-big size traders who preserve and determine regular and continuous turning points in the market cycles. These phases are characterized by average volumes. The high-low spread over the Zig-Zag period is significant.

Chart 2: Repetitive market dynamics

Repetition of expectations can lead to every business activity, where the participants need to adjust their economic decisions according to the information flow. Since the repetition of expectations can be seen as a ‘universal’ process, it also should be possible to find the same regularities on different markets. In other words, once the information inflow defines short and long term patterns of behaviour, those should form different, yet repetitive, dynamics over a range of markets.

Reveiion of expectation as a ‘universal’ process

Revision of expectations applies to every business activity, where the participants need to adjust their economic decisions according to the information flow. Since the repetition of expectations can be seen as a ‘universal’ process, it also should be possible to find the same regularities on different markets. In other words, once the information inflow defines short and long term patterns of behaviour, those should form different, yet repetitive, dynamics over a range of markets.

Evidential approach: The results validated up to now are encouraging. However, the model must demonstrate that it can consistently maintain explanatory power over a range of markets. In order to do so, I am undertaking the RCM Trust Portfolio Manager Project. It is a certified portfolio management simulation. The tests of all transactions occurring in any account will be registered by a state of the art trading platform and recorded in the official Audit reports from a major international Brokerage House.

The portfolio will be monitored USD 2,000,000 real time in daily price bars. It is composed of two simulated trading accounts each funded with USD 1,000,000. The model will be tested on 12 US electronic futures markets. In particular: Mini DIA, Mini S&P 500, Mini Nasdaq 100, Mini Russel 2000, 10 Year US Treasury Notes, EUR/USD Futures, Mini Sweet Crude, Mini Natural Gas, Gold 100 Troy oz, Wheat, Com, Soybeans.

3) The third macro dynamic is a pattern of behaviour determining sudden price spikes out of low volume and volatility trading. Although with different forms (Random) price spikes preceded and followed by low volume volatility trading are always observed. In Chart 3, where YM 2005 Daily OHLC price bars are represented, the grey segments represent the low volume volatility periods, the green and red ones are the up and down prices spikes respectively. This is a Random dynamic.
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Dr Pézier has been with the ICMA Centre since 2002. He teaches courses in Portfolio Management, Hedging, Fixed Income and Financial Engineering for MSc students. He carries research with his PhD students in asset management, risk management and financial engineering.

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31 Financial Markets Dynamics: Despite the financial systems complexity, the methodology presented in this paper shows that a finite number of dynamic regularities are observable hence can be classified and used to somewhat anticipate market movements and build strategies to actively allocate funds.

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Gale Gong is Head of Global Research for Lionhart. Lionhart is a global multi-strategy hedge fund with a strong track record across all time zones and across all asset classes. The fund was set up by Dr Jacques Pézier and the Lionhart Investment Limited Head of Global Research, Gaile Gong is Head of Global Research for Lionhart. Lionhart Investment Limited

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