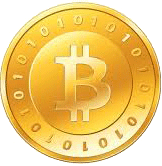
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**BITCOIN TRADING FORECAST**

* **INTRODUCTION**
* **Treading on the market** – Let me preface by saying I’m very new in the Bitcoin trading states of nature – future events which are not under the control of the decision maker, the trader. Good judgment, intuition, and an awareness of the state of the market may fill a trader a rough idea or “feeling” of what is likely to happen in the future. However, it is often difficult to cover this filling into a number that can be used as next period’s sales volume or next time’s currency cost.

We will certainly want to review the actual collected sales data for the digital currency (called “[Bitcoin](http://en.wikipedia.org/wiki/Bitcoin#Block_chain)”) of interest trough time. Suppose we have actual historical deals, known as a financial (non-stationary) *time series* data for certain period of time (hereinafter called “Tail”) – a set of observations measured at successive points over the past time. Using this Tailwe can identify the general level of sales and determine whether or not there is any trend, such as increase or decrease in sales volume over time.

* **Procedure** used to analyze the Bitcoin exchange evolutionary processes – there are *quantitative* and *qualitative* forecasting methods. We exercise both.
* the past **3 trades** on the exchange.
* **QUANTITATIVE FORECASTING**[[1]](#footnote-1)

**We practice** two time series [casual forecasting](http://www.businessdictionary.com/definition/causal-forecasting.html) methods: ***[i]*** *moving averages* and ***[ii]*** *exponential smoothing*, for Tails of past values restricted to three series – ① [short position](http://www.businessdictionary.com/definition/short-position.html)*[i****]***, ② operational position *[ii]*, and ③ [long](http://www.businessdictionary.com/definition/long-position.html) *[ii]*. The objective of this analyses will be to provide good quantitative forecasts or predictions of the Weighted Moving Averages Exponential Smoothing various time series in next period primary for operational position trading and also for long positions as the case so requires.

**Weighted Moving Average Exponential Smoothing Method** – providesgood quantity forecasts or predictions of future values *time series* e.g. Sales.**[[2]](#footnote-2)** It is combination of both, ***[i]*** and ***[ii]*** methods (sea above) where ***[i]*** averages the Sales in 10 periods 6 minutes each (e.g., depending upon the particular application).

**In time series analyses** the data may be collected every moment they appear at *equal* intervals. For appearing at ***un****equal* intervals we apply special averaging methods as “catchall” *irregular components* that account for the random variability and reduce the deviation from what we expect given the effect of the trend of the Sales in the short position ①. Any exchange **deal** is a typical nonrecurring, so that use the average of the most recent *n* data values in the Sales as the forecast for the next **deal** (***d***) or (***t***).

**The *Weighted Moving Averages*** (WME), compute the forecast from selected different weights for the data values. WME we use for computation of weighted 3-period moving average forecast in the short position of trading on the Bitcoins market. The principle (the theorem) is: the computation of weighted **3**-**deal** moving average, where the most recent observation receives a weight **3** times as great as that given the oldest observation, and the next oldest observation receives a weight twice as great as the oldest. The weighted average forecast for the first next **deal** in 4 period would be computed as follows:

Weight moving average forecast for **deal** F4 = 3/6 Y3 + 2/6 Y2 + 1/6 Y1 = 3/6 19 + 2/6 21 + 1/6 17 = 19.33 [see example]. Note that the sum of the weights is equal to 1.

*This would be also true for the simple moving average, where each weight would be 1/3, and the unweighting forecast 19.*

* **Exponential Smoothing** – uses a weighted average of Tail’s values to forecast the value in next period/Sale . (for more information see the model in the endnote addendum)[[3]](#endnote-1) This model we use[[4]](#footnote-3) in Operational and Long positions, ② and ③. When Tail contents substantial random variability (less common and less interesting case) the software program automatically selects the smallest computed value of the smoothing constant **α**; since much of the forecast error is due to random variability, in contrary, and we don’t want with our choice to overreact and adjust the forecast too quickly. In contrary, for a Sales-line with relatively little random of the values on the market, the largest constant **α** is automatically transferred for quickly adjusting of the forecasts allowing the forecast and the dealer to react faster to changing conditions of the market.
* **Trend Projection**
* The Financial Model is assigned to interpret the real business venture in figures and formal functional dependencies accomplishing a maximal isomorphism between them. The ultimate goal is an optimal control of the financial resource provided by the lender and/or investor - maximal profitability with minimum financial risk. To achieve those objectives it is expected the model to be formed in a hierarchical structure (pyramid), in this case of four stratification layers.

This project is an extract from a software package part of financial model for capital investment and operational online control. The financial model is supposed to interpret the description of the business such as it is – in figures and formal function dependences, carrying a maximum isomorphism between them. It is upbuild in hierarchical structure (see below) which prevents of errors and omissions following the professional qualifications of the experts and the designers of the financial model. Each level of this structure is a formal system with rules, functions and links, representing information to the upper stratification level, where the rules remain valid. And thus to the top level of the model wherefrom through a feedback is controlled the whole system for successfully high yield operating with high value of profitability, and the risk management that form the minimal expenses for its achievement.

All materials, textual and tabular, are saturated with images and various colors – solid and fill effects. Painting materials are perceived 60,000 times faster than the written.

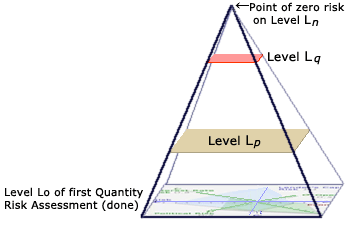
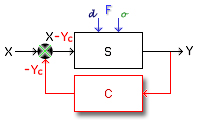
[](http://www.iic-london.co.uk/ctrl/practice/Risk/Formal%20Systems.docx)**In** the above cases our mathematical model of risk management works. It is based on the two fundamental principles of Cybernetics as the science of control—(i) hierarchical structure (a pyramid in this scenario) of series of formal systems, **levels of control**, where information is transmitted from the bottom level up 🡱, and imperatives descend from the top down 🡳 to the lower levels; *and* (ii) on each level the Subject **S**, whose rules and axioms are described by symbols in mathematical formulas[[5]](#endnote-2)

Fig. 5 Fig. 6

of its formal system, is under control by negative feedback Controller **C** in order to optimally compensate the disturbing effects caused by the Risk **F**actors **F**. [More about the applied method](#FS).

The rules of operation of the formal system on Level 1 [Worksheet Cap.Goods ] are deter-mined by the rules of the upper Level 2 [Worksheet Budget ], which in turn are defined by the functional rules of Level 3 [Worksheet Bayes ]. The meta-rules of top-level cannot be changed because there is not a higher level over it, which has rules that specify how to modify these rules. This is the principle of creating the model, which significantly reduces the probability of mistakes in the design of the model and in the operation with it during the loan life.

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* **QUALITATIVE FORECASTING**

**Application** – in situation where no **tail** is available.

1. This Summary is generally assumed to be used online. The URL links on the electronic copy facilitate following the content when read. References to external sources are intended for people who are using assistive technologies, and for non-financial experts—administrators, business managers, entrepreneurs, translators. [↑](#footnote-ref-1)
2. Here the ordinary terminology is adapted: *time series* is the function Sales; *periods of data* and *past time series* are Tail; and *period of time* is **deal** [↑](#footnote-ref-2)
3. *Exponential smoothing model*

   ***F***t+1= **α*Y****t* + ***F****t*(1 - **α**)

   where

   ***F****t*+1 = forecast of the Sales for **deal** ***t*** + 1

   ***Y****t* = actual value of the Sales in **deal** ***t***

   ***F****t* = forecast of Sales for **deal** ***t***

   **α** = *smoothing constant* (0 ≤ α ≤ 1)

   **The forecast** for any **deal** is a weighted average of the Tail‘s values for the Sales; to get started, let ***F***1 equal the actual value of the Sales for the first deal, ***F***1 = ***Y***1. Hence, the forecast for **deal** 2 is equal to actual value of the first **deal** (1):

   ***F***2 = **α*Y***1 + ***F***1(1 - **α**) = ***Y***1

   For deal 3 substitute ***F***2 = ***Y***1 : ***F***3 = **α*Y***2 + ***Y***1(1 - **α**) → Substitute this expression in the expression for ***F***4:

   ***F***4 = **α*Y***3 + ***F***3(1 - **α**) = **α*Y***3 + [**α*Y***2 + ***Y***1(1 - **α**)](1-**α**)

   = **α*Y***3 + **α**(1 - **α**)***Y***2 + ***Y***1(1-**α**)2

   By continuing computing we are able to determine the dozen forecast values and the corresponding dozen forecast errors [as shown in Table 2 of the Worksheet FORECAST]. Some other values of **α** ≠ 0.2 selected by the Scroll Bar might yield better forecast. For better understanding of this option let rewright the basic model as follows:

   ***F***t+1= **α*Y****t* + ***F****t*(1 – **α**)  
    ***F***t+1= **α*Y****t* + ***F****t* – **α*F***1

   ***F***t+1= ***F****t* + **α**(***Y****t* – ***F****t*)

   Forecast of **Period** ***t*** Forecast Error for **Period** ***t***

   The forecast in period *t* + 1 is obtained by adjusting the forecast in previous period *t* by a fraction which is **α** times the most recent of the fraction error. [↑](#endnote-ref-1)
4. Quantitative methods for business / David Anderson, Dennis Sweeney, Thomas Williams — 5th ed. [↑](#footnote-ref-3)
5. [⮝](#OCFCS_)[back](#FS_) Practitioners from the engineering society who are interested in the theory of pattern recognition and events of the practice  
   through numerical methods of mathematical logic could find more information about this method by reviewing a special application.

   [Click here](http://www.iic-london.co.uk/ctrl/practice/Risk/Formal%20Systems.docx) to download. [↑](#endnote-ref-2)