

Introduction and Applications of the Investment Clock Theory

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Abstract. This paper is based on the broad asset allocation theory proposed by Merrill Lynch & Co. known as the "Merrill Lynch Investment Clock Theory." Further asset allocation optimisation and decision making on the Merrill Lynch Investment Clock Theory, starting with forecasting recessions and inflation, combined with yield curve term spreads and risk premiums. Further, according to the literature, it is found that the term spread, and risk premium indices have good prediction results for recession. But simply considering these is not enough, need to introduce term spreads and risk premiums into the traditional Merrill Lynch investment clock theory to reassemble the financial investment clock portfolio, the principle is to change the traditional division of the economic cycle.

Keywords: Merrill Lynch Investment Clock Theory, Financial Investment Clock, Yield curve inversion, Risk premium, Mean-variance model.

1. Introduction

Merrill Lynch Investment Clock Theory is a research report released by Merrill Lynch in 2004, the economic growth rate of GDP and inflation rate of CPI two macro-indicators of the high and low cleverly divided into four phases of the economic cycle, respectively, is the recession period, the recovery period, overheating and stagflation period. Merrill Clock Theory empirically demonstrates different asset choices for different phases: Bonds, Equities, Commodities, Cash. The Merrill Lynch Clock links the four major assets, the four major economic cycles, sector rotation, and bond yields to help investors identify important turning points in the economic cycle in order to achieve the goal of excess returns. Finding the returns of different broad asset classes in the capital market over different economic cycles is significant. It is a very practical investment tool to guide asset allocation. Figure 1 shows the traditional Merrill Lynch clock investment theory, reflecting the relationship between broad asset classes and economic cycles.

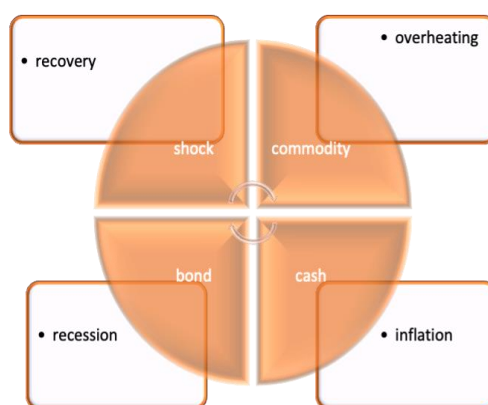


Figure 1. Merrill Lynch clock theory

Classical investment clock theory tends to be based on the fact that factors of production such as labour, capital and technology determine the potential output and long-term trend of the economy, but in the short term, the economy is likely to undergo regular deviations from potential output, leading to regular cyclical variations in the performance of the economy [1]. With the development of China's economy, people's disposable wealth is slowly increasing, due to China's current institutional factors and the characteristics of China's financial market itself, relatively speaking, the investment channels are relatively narrow. The market is changing rapidly, how can this paper grasp

the market changes in the ever-changing market, by adjusting the asset allocation to increase returns is the answer that every investor is looking for. This paper analyses the Merrill Lynch Investment Clock's grasp of market cycle changes and applies it to asset allocation to give investors some insight.

2. The Investment Clock Theory and its Development

Three phases of each of the recovery period (initial, intermediate, and final) is characterized by increasing interest rates and steep and normal yield curves. In the three phases of the overheating period, interest rates are increasing, and the yield curve has a normal and inverted form. In the three stages of recession, interest rates are decreasing, and the yield curve is reversing and normal. In the three stages of stagflation, interest rates are decreasing, and the yield curve is steep [2-4]. The best sectors for each of the four stages of the economic cycle are Defensive Sectors, Cyclical Growth, Cyclical Value, and Defensive Value [5].

2.1. The Investment Clock Theory

An in-depth look at the concepts of Merrill Lynch's clock investment theory, starting with an introduction to economic cycles. Widely known that Merrill Lynch Clock Investing divides the economic cycle into four phases: recession, recovery, overheating and stagflation.

2.1.1 Recessionary phase

Recession means stagnation of economic growth, which leads to excess capacity and lower inflation driven by falling commodity prices. Corporate earnings are weak and real yields fall. Short-term interest rates need to be adjusted by the central bank to stimulate the economy, which in turn leads to a sharp downward movement of the yield curve. Bonds are the best choice in this phase, which is characterized by lower GDP and lower CPI.

2.1.2 Recovery phase

Economic recovery means a slowing down of the economy, which accelerates the GDP growth rate and puts it above its potential. At the same time, because the vacant production capacity has not been exhausted so that inflation continues to fall, corporate earnings rose sharply, this stage is the "golden age" of equity investors, stocks for this stage of the best choice, the stage is characterized by higher GDP lower CPI.

2.1.3 Overheating phase

Economic overheating is, as the name suggests, an overdevelopment of the economy to a transgressive level. At this point firms begin to face capacity constraints, growth slows, and inflation rises. The economy is cooled down by central bank interest rate hikes, at which point GDP growth remains above potential, the upward trend of the yield curve slows down, and the return on investment in equities depends on the trade-off between profit growth and declining valuations, with commodities being the best option, and its stage is characterized by higher GDP and higher CPI. The overheating phase, in microeconomic terms, is a concept where supply does not meet demand, demand increases, and supply fails to keep up with the increase in demand. The intersection of supply and demand increases. Prices rise and inflation increases [6].

2.1.4 Stagflation phase

Economic growth is in a slack phase, with GDP growth falling below potential, but inflation continues to rise, output slumps, and firms raise product prices in order to maintain profitability, leading to a wage-price spiral. Central banks can only do something if inflation is above its peak, which limits the pace of recovery in the bond market. Corporate earnings deteriorate and equities perform extremely poorly. At this point, cash is the best option, and this phase is characterized by lower GDP and higher CPI.

2.2. The Development of the Investment Clock Theory

In the Merrill Clock Theory, some of the literature has attempted to modify the Merrill Clock Theory to better explain and predict the phenomenon of earnings rotation for many assets [7]. Most of the literature in modifying the Merrill Clock Theory is based on the excellent improvements in GDP and CPI chosen by Merrill Lynch. The next step in building on the traditional Merrill Lynch clock theory is to reclassify the four economic cycles using term spreads and risk premiums. While constructing the financial investment clock, the performance of numerous assets within the phases obtained from the division is tested. The traditional Merrill Lynch investment clock model divides the economic cycle into four phases based on economic growth and inflation. However, this division ignores the impact of financial factors. The standardized theory is now transformed to reclassify the economic cycle based on the rotation of term spreads (TS) and risk premiums (KCFSI).

In the first phase of the economic cycle, term spreads rose, and risk premiums fell. Due to the impact of last winter, i.e., the economic crisis, the risk premium index was still at a high level. Through the government's regulation of the yield curve, the long-end interest rate rose, and the spread gradually recovered, so the risk rate index also gradually declined, the market pressure was eased, the economy quickly recovered to a sustainable level, and the economic cycle gradually recovered. In the second stage, term spreads fell back, and risk premiums declined. As GDP growth continues to rise, the market heats up and the risk premium index falls to its lowest level. To prevent the economy from overheating, the government adopts a tightening policy, short-term interest rates rise and term spreads fall. In the third stage, term spreads fall, and the risk premium rises. With the emergence of an overheating economy, the yield curve flattens, and market expectations reach a low point. Long-term interest rates fall causing the yield curve to begin to invert and market pressures gradually rise. In the fourth stage, term spreads rise and risk premiums increase. The government enacts easing measures, and the market enters a cold winter. The economy loses its upward momentum. The risk premium index rises to its highest level and the government intervenes to rescue the market and prevent huge losses. As a result, the fall in short-term interest rates leads to a rise in long-term spreads.

Having a reallocated four major economic cycle divisions, revised theory proceed to screen for the optimal assets under each phase. Referring to the relationship between term spread TS, risk premium KCFSI and broad asset class returns, and the broad asset class returns in each interval of the financial investment clock, revised theory provide support for the broad asset class allocation strategy. In analyzing the relationship between term spread TS, risk premium KCFSI and broad asset class returns, a cointegration model is used. The results of the presentation of broad asset class returns under each band of the financial clock are made clearer through the cyclical rotation relationship between term spreads and risk premiums, with equities and commodities showing the most volatile returns during the four phases of the economic cycle, and better performance during the second and third phases of the cycle. In contrast, cash and bonds are more stable and perform better during the first and fourth stages of a recession. To summaries briefly, during the first phase of the economy, i.e., the end of the recession, there was heavy investment in commodities. Invest in equities during the second phase of the economy, i.e., the early stages of economic growth. In the third stage of the economy, at the end of the expansion, invest in cash; in the fourth stage of the economy, invest in bonds. Commodities performed best, followed by stocks, bonds and finally cash [7].

3. The Applications of Investment Clock Theory

With an understanding of Merrill Lynch's investment clock theory, constructing models where static mean-variance becomes dynamic under Merrill Lynch's clock theory and elaborate on the application of asset class allocation based on the dynamic mean-variance model.

The mean-variance model is, as the name suggests, a combination of return on investment and risk and was proposed by Markowitz. The expected return in the model is taken to represent the return and the variance of the expected return represents the risk of the investment. The purpose of using the mean-variance model in the investment clock framework is to increase the quantitative study of

asset allocation ratios. The rotation strategy is the broad asset class allocation strategy corresponding to the Merrill Lynch Investment Clock Theory, which selects the broad asset class with the highest return according to the Investment Clock Theory at each economic stage. This strategy has the single objective of maximising investment returns and does not consider risk reduction through diversification [8]. In the mean-variance single-period model, the available return on assets data can be used to derive the efficient frontier for investment through quadratic programming methods. However, the mean-variance model leads to a greater degree of sensitivity to the smile deviation of the forecast data. So, it may result in the weights of the respective shares of assets being affected by small deviations. The shortcoming of mean-variance is that it is only a theoretical concept and is not sufficient for use in allocating broad asset classes. Here are two mean-variance theories formulas with explanations.

Formula 1: Minimum risk formula with a defined level of expected return,

$$\min \sum_{ij=1}^n X_i X_j \sigma_{ij}, \text{ st. that } \sum_{i=1}^n X_i R_i (R_i \text{ hat}) = E(R_p), \sum_{i=1}^n X_i = 1, X_i \geq 0, (i = 1, 2, \dots, n) \quad (1)$$

Formula 2: Formula for calculating the maximum expected rate of return at a defined level of risk,

$$\max \sum_{i=1}^n X_i R_i (R_i \text{ hat}), \text{ st. } \sum_{ij=1}^n X_i X_j \sigma_{ij} = \sigma_p^2; \sum_{i=1}^n X_i = 1; X_i \geq 0. (i = 1, 2, 3 \dots, n) \quad (2)$$

Where X_i and X_j means return on assets for both i and j , σ_{ij} means the correlation between i and j . $E(R_p)$ means expected return of the portfolio, σ_p^2 means the variance of the portfolio.

The application of Chinese capital market in Merrill Lynch's investment theory as the second angle of analysis. The economic cycle of China's capital market is dominated by the government and depending on the situation from the perspective of China's economic cycle, the "overheating period" and "recessionary period" are the mainstream of the government-led economic cycle. The difference is reflected in the significant framework of monetary policy formulation between China and the US. The assumptions and logic of the Merrill Lynch Clock are perfectly suited to the Federal Reserve's monetary policy framework, thus providing strong guidance for asset allocation in the U.S. economic market. However, in China, due to the government's intervention in the economic cycle, the central bank's monetary policy framework must take all factors into account, which results in no directional correlation between the macroeconomic conditions of the Chinese market and the performance of broad asset classes. In fact, on the other hand, our asset allocation is not available under the Merrill Lynch clock theory. This is because inflation indicators like CPI, price statistics, crude oil prices, and output gaps are difficult to access in our national context [9]. The shortcoming of the investment clock theory is that China, as the world's second largest economy, faced the global financial crisis in 2008 and the escalation of the debt crisis in Europe, the external shocks, so that the domestic economy was subjected to short-term strong policy stimulus, and did not satisfy the traditional Merrill Lynch investment clock theory of the four major economic cycles of the rotation, which are in accordance with the recession, the economic recovery, the economy of the overheating and the stagnation of the economy. Instead, there was a backward shift, and sometimes a direct skip of a certain stage [10].

4. Conclusion

This paper combines previous literature to draw a unified conclusion. Firstly, the term spread TS and risk premium KCFSI are used to forecast recession and inflation to combine and optimize the Merrill Lynch investment clock, also called the recombination of the Merrill Lynch clock theory and the reclassification of the economic cycle. The recombination theory of Merrill Lynch investment theory is confirmed. While gradually approaching the perfection of the theory, this paper needs to correct the prediction of economic recession on the failure to consider the differences in the monetary system of different countries, but only on the previous literature to cite the example of a particular country to study. This is where this literature is flawed. However, in addition to this, the rotation of the term spread T S and the risk premium KSFSI with respect to the economic cycle is highly subjective and thus lacks a scientifically rigorous econometric model to optimize this study. Clever

use of the mean-variance model for applied analytical theory as well as the formulae, but does not consider combining the mean, semi-variance model, mean-variance model, etc. with the investment clock theory for the study of broad asset class allocation. Limitations in the application of Merrill Lynch's investment clock theory to the Chinese asset allocation market. This difference is reflected in the important framework of monetary policy making between the US and China, resulting in a lack of directional correlation between the macroeconomic conditions of the Chinese market and the performance of broad asset classes. Asset allocation in China under the Merrill Lynch clock theory is difficult to access inflation indicators such as CPI, price statistics, crude oil prices, and output gaps.

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