Analyzing the Impact of Stock Market Fluctuations on Financial Strategies in the Sports Industry

Jiao Meng[1*]

Abstract

This paper explores the influence of stock market fluctuations on the financial strategies within the sports industry from 1998: Q1 to 2018: Q1. Utilizing advanced econometric techniques such as the Johansen co-integration test, vector error correction model, and Granger causality test, we analyze the interplay between stock market performance and financial decision-making in sports organizations. Our empirical research reveals that variations in stock prices can significantly impact the financial management practices of sports enterprises, particularly in terms of investment, funding, and sponsorship activities. The results indicate a long-term relationship between stock market behavior and financial strategy adaptations in the sports sector, with stock price volatility influencing the availability and demand for monetary resources within these organizations. The study highlights the need for sports financial managers to consider stock market trends as a critical factor in planning and forecasting, suggesting that fluctuations in stock prices are a significant indicator of future economic conditions that could affect sports-related financial decisions. This awareness is crucial not only for anticipating changes in operational funding and sponsorship engagements but also for strategic planning to safeguard the financial health of sports organizations against economic downturns.

Keywords: Stock Price, Empirical Research, Economic Activity.

Introduction

The interplay between stock market fluctuations and financial strategies within the sports industry represents a critical area of study, especially given the substantial financial operations and investments inherent in sports enterprises. This paper explores how variations in stock prices impact the financial management practices of sports organizations, from funding and sponsorships to budget allocations for athlete salaries and facility upgrades.

The Economic Context of Sports Financial Management

Sports organizations operate in a dynamic financial environment where decisions are significantly influenced by external economic factors, including stock market trends. These entities are not only subject to the general economic climate but also to investor sentiment and market dynamics, which can affect their capital structure and financial stability. The financial demand in sports is multifaceted, encompassing operational costs, capital investments, and strategic expansions, all of which may be impacted by the liquidity and capital available through stock market engagements.

Theoretical Frameworks Influencing Financial Decisions in Sports

Building on the foundational economic theories of Keynes and Friedman, this study examines how traditional concepts of money demand and financial management adapt within the sports industry context. Keynes's emphasis on liquidity preference and Friedman's analysis of money demand as influenced by a broader array of assets provide a theoretical backdrop for understanding how sports organizations manage financial resources amid fluctuating stock prices. These theories underscore the dual impact of stock market performance, showcasing both substitution effects, where higher stock prices might reduce liquid cash preferences, and wealth effects, where increases in stock values potentially elevate spending capacities.

Adapting Economic Theories to Sports Financial Management

In sports, the effects of stock market fluctuations are observed in several ways:

Investment Strategies: Sports entities often hold diverse portfolios that include significant investments in stocks. The performance of these assets can influence overall financial strategies and operational funding.

Sponsorship and Revenue Streams: Corporate sponsorships linked to larger companies whose performance is stock dependent may see fluctuations in sponsorship funds based on the companies' stock performance.

Long-term Financial Planning: The stability and growth of stock investments can affect how sports organizations plan long-term investments, including training facilities and youth academies.

[1] Bank of Guangzhou, Nanjing 210000, Jiangsu Province, China.
*Correspondence: 15000340220@xs.hnit.edu.cn

Objective of the Paper

This paper aims to delve into the specific impacts of stock market dynamics on the financial strategies employed by sports organizations. By applying established economic theories to the sports industry, we intend to reveal how fluctuations in stock prices could dictate financial planning and operational adjustments within this unique sector.

Methodological Approach

Utilizing a combination of quantitative data analysis and case study reviews, this paper will examine the correlations between stock market trends and financial strategy changes in prominent sports organizations. The analysis includes a review of financial statements, stock performance, and strategic financial disclosures from various sports clubs and enterprises, providing empirical evidence to support theoretical predictions. Understanding the nexus between stock market performance and financial management in the sports industry is crucial for stakeholders, including managers, investors, and policymakers. By exploring this relationship, this paper will provide valuable insights into effective financial planning and risk management practices that can help sports organizations navigate the complexities of economic fluctuations and maintain financial health in a competitive market landscape.

Literature Review

Numerous macro-variables, e.g., asset price, interest rate, consumption, etc. are affected by people's willingness and scale to hold money Therefore, the demand for money has always acted as the core of monetary theory research (Ajaz et al., 2017; Bhatti & Alkhozaim, 2023). The existing theory (Mishkin, 2007) has suggested that stock prices affect the macroeconomic via four processes: (1) Investment: investment expenditure will increase when the stock market value is larger than the replacement cost, which in turn stimulates the expansion of aggregate demand and output (Antonakakis, Gupta, & Tiwari, 2017). (2) Wealth effect: Modigliani asserts that the rise in stock prices makes the wealth of the resident's sector to increase, thus promoting the current and future consumption of residents increased, and the corresponding stimulus to aggregate demand and output growth (Ashworth, Barlow, & Evans, 2014). (3) Balance sheet channel: stock prices rise, and the corporate wealth is appreciated. The net increase in the value of the company led to the expansion of business investment, aggregate demand and output. (4) Liquidity: The rise in share prices has increased the amount of liquidity held by consumers, thus stimulating the expansion of aggregate demand and output. The above four processes suggest that the stock price and total expenditure have the same direction of change, which will lead to a positive correlation between national income, general price levels and stock prices (Baharumshah, 2004; Baharumshah, Mohd, & Masih, 2009). Based on basic economic knowledge, when central Banks conduct expansionary monetary policies, the public will find that they have more money in their hands, leading to increased willingness to spend. This could make them buy more stocks, thus raising the stock price (Baharumshah & Soon, 2015). When the Tobin q is defined as the ratio of the company's market value to the cost of capital replacement, the rise in the stock market price will raise the Tobin q and stimulate the investment. Furthermore, if the stock market falls, the decline in the price of the stock can also increase the wealth of the public, thus increasing the consumption (Bissoondeeal et al., 2010). Whether it is increasing investment or consumption, it will eventually increase the output (Mishkin, 2007). Furey studied the impacts of financial transactions on money demand over various time periods and drew different conclusions (Furey, 1993). In the money demand model, adding stock market data works better without stock market data. Therefore, the effect of monetary policy can be reduced if the influence of stock price trading amount on monetary demand is not taken into account. At the same time, it also shows that the volatility of dollar trading volume in financial markets has a significant impact on currency demand. From Palley 's empirical study of monetary demand and non-GDP transactions (Palley, 1995), he provides empirical estimates of the models of M2 and M1 money demand, containing transaction agents of financial asset and real estate. The noted variables contain positive theoretical prediction signals (Fethi & Katircioglu, 2015), being statistically significant, and improving the noted samples' prediction.

In my opinion, the trading of financial rights and interests such as stocks should be conducted through cash or deposits, so as to increase the demand for money (Dobnik, 2013). Money demand partly reflects portfolio decisions. Stock market changes can impact money demand since the stock market turns a significant reserve for household wealth. A standard money demand equation includes revised earnings forecasts and stock market volatility (Mabkhot & Ghouri, 2023; Malm, Jakobsson, & Isaksson, 2019). The results show that in the stock market, there are differences of statistical significance among variables. This is capable of reducing money demand model's error as well.

So, the risk of owning a stock increases, and the currency becomes more attractive to investors than the stock if stock price volatility rises, leading to an increase in money demand (Carpenter & Lange, 2003). Certainly, Cook and Choi stressed the significance of financial market risk in analyzing American broad money demand (Choi, 2007; Song, 2023). After financial market risk control, money demand has been relatively stable in recent 35 years. At the industry level, household currency holdings have continued to hold steady, the traditional pattern of controlling the decline in mutual fund transaction costs in the early 1990s. In contrast, Commercial currency holdings have a positive correlation with credit risk. Therefore, money demand is associated with liquidity risk in the stock market or credit risk in the corporate bond market (Pate et al., 2000). When the liquidity risk of the stock market increases or the liquidity of the stock market decreases, investors tend to hold more liquid capital, such as cash. In fact, the results show a positive correlation between money demand and liquidity risk in the stock market. Since the 1980s, the impact of the financial market on money demand has aroused the attention from the public. At that time, due to the sharp rise of financial assets, especially stock prices, people seek to hold large amounts of money in financial markets for transactions (Kokko et al., 2015). As a result, this part of the currency has been separated from the real economy and become the medium in financial transactions. From practical experience, answers vary with scholars.

Panetta tested the association between the stock market and many other economic variables using Italy data (Panetta, 2002). He found the instability of the relationship between them. Based on the theory of Friedman, By studying the relationship between the stock markets of Canada and the United States and the demand for money, Choudhry concluded that the stock price had a significant impact on the demand function of real M1 and real M2 (Choudhry, 1996), which is similar to the conclusion of Friedman. Using the error correction model, Hafer and Kutan tested the Chinese monetary demand function for 1952-1988 years (Hafer & Kutan, 1994). The results suggest that there is a co-integration relationship between money demand and real national income, one-year term deposit rate and expected inflation rate. Moreover, Caruso uses the annual data of 25 countries in 1961-1998 years and the quarterly data of six industrial countries (Japan, Britain, France, Germany, Switzerland, and Italy) to conduct an empirical study (Caruso, 2001). The stock market is found to be negatively associated with the speed of currency turnover, whereas it also shows a positive phase for some countries including Italy (Ham, Kruger, & Tudor-Locke, 2009). He further points out that if the real income of the stock is positively associated with the formation rate of capital and its actual rate of return (Fama, 1981). Then, by affecting the present value of the total amount of capital in the economy the stock price may also affect the non-financial wealth, which has an indirect effect on the amount of money. According to the research of these papers, the stock market has become an important factor influencing the money demand, but the influence of the stock market on the money demand is inconsistent in any country or the same country (Sudeck & Pfeifer, 2016; Wee et al., 2018).

Methodology and Data

At first, economists studied the demand for money using the logarithmic linear model. Yet there was a serious defect in this model, which could cause a series of problems. Thus, they have studied other ways: one is to correct the theoretical basis, and the other is to improve the dynamics of the model. The former leads to the relevant research of Buffer-stock Model (BSM), and the latter leads to the Error-correction Model (ECM). BSM, as a starting point for the preventive monetary demand, holds that one of the motivations for holding money is to prevent unexpected spending. Hence, a range of currency fluctuations will be accepted without immediate adjustment. Since the BSM ignores the consistency of theory and data, the empirical results are not satisfactory (Milbourne, 1988). General speaking, the ECM falls into two steps: first, unit root test and co-integration test are performed, and then ECM is built in line with the test results (Pal & Mittal, 2011).

In terms of the co-integration test, there are two main methods, namely, Engle-Granger test (EG test), Johansen test or JJ test. If co-integration exists among variables, the error co-integration model can be built through the EG model and the Autoregressive Distributed Lag model (ADL). Vector Auto Regression Models (VAR) can be constructed if there is no co-integration among variables. If there is a real relationship between the economic variables, these variables should have an equilibrium relationship in the long run, and the co-integration relationship can be considered as a statistical representation of the equilibrium relationship, which is the starting point of establishing and testing the model. As a matter of fact, if the variables do not have co-integration relationship, then the regression equation can be the "spurious regression" equation, and it does not have the explanation. Given this, we should build the regression equation, all of which should be tested by the co-integration test. However, co-integration has a precondition that it can only be carried out if there is a co-integration relationship between stationary sequences and single order sequences (Altemani, 2015). The sequence cannot be co-integrated if this condition is not available. Therefore, to reduce unnecessary links, we proceed to first test the stationarity of sequences. Most macroeconomic variables are found to be non-stationary, which leads to a false regression. To avoid this problem, we perform a unit root test to check that the variable is stable. If the variables are unstable, they must be differentiated once or more until they are stable. The order of integration of these variables shows how many times they change before they become smooth. Generally speaking, most economic data are stable after the difference is taken. To test the stability of variables, this paper starts with the unit root test. The unit root is a non-stationary autoregressive (AR) or autoregressive moving average (ARMA) time series process, which may include intercept and/or trend; The simplest example is a random walk including xt = xt − 1 + εt where εt are random innovations. The unit root test deals with the null hypothesis of the unit root and the alternative hypothesis of the stationary (or trending stationary) time series. These processes are commonly applied in the economic and financial fields. In this paper, it uses four methods to test the unit root of the original sequence and the first order difference sequence (ADF, PP, Ng-Perron, and KPSS tests). It uses the Augmented Dickey-Fuller test (ADF) to test the null hypothesis that the unit root exists in the time series sample. The other hypothesis is different depending on the test version used, but it is usually stable or trending. It expands the Dickey-Fuller test of the larger, more complex set of time series models. ADF statistic used in the test is a negative number. The higher the degree of negativity, the more negative the credibility of the unit root. From statistical perspective, the Phillips-Perron test is also a unit root test. In other words, the null hypothesis employed to test that time series are ordered integrals in time series analysis. It is based on the test of null hypothesis's Dickey-Fuller test $\boldsymbol{\rho = 1}$ in $\boldsymbol{\Delta y_t = (\rho - 1) y_{t-1} + u_t}$, where $\boldsymbol{\Delta}$ denotes the first difference operator. The process generation data for yt may have a high level of auto-correlation ratio that acknowledges the failure of Dickey-Fuller test in the testing equation-making process, e.g., the ADF test and the Phillips -perron test address problem. The expanded dickey-fuller test solved this problem by introducing the lag time of $\boldsymbol{\Delta y_t}$ as the regression function in the test equation, while the Phillips-Perron test made non-parametric corrections to the t-test statistic. In the perturbation process of the test equation, the test of uncertainty autocorrelation and heteroscedasticity is robust. Perron and Ng developed unit-root test statistics that can be significantly adjusted for horizontal distortion correction, which seems to have become the preferred choice for traditional ADF and PP testing. In comparison with other unit root tests, NP test has stronger robustness, can avoid horizontal distortion and maintain a higher test effect, which has extensive application value in empirical analysis. Kwiatkowski–Phillips–Schmidt–Shin (KPSS) examines the null hypothesis that an observable time series revolves around a deterministic trend rather than the replacement of unit roots. Contrary to most unit root tests, the existence of unit root is not the null hypothesis, but the alternative hypothesis. Moreover, there is no proof that unit root is not stable in KPSS tests, but a proof of design trend stability. This is a significant distinction since time series can be unstable, with no unit roots, but with a stable trend. In the process of unit root and trend stabilization, the mean value increases or decreases with time. However, the unit root process will have a permanent effect on mean value when the impact occurs, the trend stationary process is mean regression. The KPSS test is a reverse test of null and alternative assumptions employed in the other unit root tests listed above. The null hypothesis of the above test theory should set the differential stationary model as the null hypothesis. However, the null hypothesis that the deterministic trend in the observable time series was stable was applied in the KPSS stationary test, which should be contrary to the choice of the unit root. Once you have determined the order of integration, you need to consider the possible co-integration of variables in the model. The co-integration test can be used to determine whether there is a co-integration relationship between these non-stationary time series, because the variables in the model are non-stationary and the first-order function is also non-stationary, I (1). More precisely, our goal is to understand whether these variables have an inherent tendency to move together in the long run or in the long run. The existence of co-integration between variables in the model indicates the existence of long-term equilibrium. This information is critical because it suggests the correct model specification. If all the variables considered are integrals of the first-order variable I (1), but they are not co-integrals, the only valid regression model is to use the first difference of the variable to estimate the equation. If they are found to be synergistic, then an error correction model (ECM) should be used to predict stock prices and currency demand, since it combines short-term dynamic and long-term equilibrium conditions. Subsequently, in the co-integration analysis of variables, the two most commonly used test methods, Engle and Granger as well as Johansen based on the residual, and Johansen and Juselius, were employed to test the stationary hypothesis of the long-term money demand function (Johansen & Juselius, 1990). For brevity, both tests are called EG and JJ tests, respectively. Yet only the Johansen test is applied in this paper. Transforming the co-integration test of the vector into the analysis of the matrix and test the co-integration relationship by checking the number of the non-zero eigenvalues of the matrix is considered as the basic principle of the Johansen test.

The J test has two types of test methods, i.e., the Trace test and the Max Eigenvalues. The optional hypothesis is at most r co-integration vectors, and the original hypothesis is that there are r co-integration vectors. The result of J test shows that the long-term co-integration relationship between variables can satisfy the condition of causality test and the causality test can be conducted among variables. In this paper, we analyze the causal relationship between variables using the Granger causality test. Co-integration equation describes the long-term interaction between variables. However, to explore more specific interaction relationships among variables, the causal relationship between variables should be analyzed. Subsequently, this paper examines the concrete manifestation of causality between variables. Co-integration tests suggest that there is a unique Co-integration relationship between variables. Thus, the Granger causality test can be applied in the original sequence. On the one hand, on the basis of the result of Co-integration test, if there is a Co-integration relationship between variables, the Chow test can be performed to test whether the structure of the model is stable. The Chow test is a method employed to judge whether there is a structural break at a given time point. This method has the characteristic of dividing the time series data into two parts, and the boundary point is the time point to test whether structural break occurs. On that basis, to determine whether the structure has changed, F test is performed to verify N data of the previous part, and whether the parameters obtained are equal to those obtained by the M data in the latter part. The significant level of the F test employed in the Chow test is determined by the analyst independently. The Chow test can test whether the structural changes at some point. Yet it cannot judge whether the change is temporary or persistent. So, the Chow test determines that the structure is at a certain point. After the change, if the continuity is the critical point, it is necessary to further judge whether the interruption of the economic benefits of high-tech penetration at this time is sustained. On the other hand, according to the co-integration relationship among data sets, it is more appropriate to establish a VEC model. We built a model with a lag order of 2 and 1 co-integration relationships. In the analysis of VEC model, since VEC is based on a non-structural method and there are no innate variables it is usually unnecessary to focus on the influence of one variable on another variable. Accordingly, there are more variations of error term variables in dynamic response analysis and other variables in the system. For the VECM, there is a type of procedure that is used: (1) the Granger causality tests; (2) the impulse response; (3) the variance decomposition.

Through Granger causality, we can identify the causal relationship between sequences. As Granger said (Granger, 2001), the sequence will have a causal relationship when a particular variable helps predict the future value of another variable in the present or past. The variance decomposition of the predictive error enables us to evaluate how a variable respond to an impact on a particular variable, and the impulse response function is based on the behavior of the existing impulse analysis variable in another variable. Namely, it demonstrates the effect of the error term on the value of current and future endogenous variables over a given period. More specifically, after examining the influence of various factors on the demand for money, to study the dynamic characteristics of the interaction between various variables, we used the impulse response function based on the error correction model to observe the change of error term. As a result, the endogenous variable can help to analyze the dynamic influence of error term on the system in the instant and positive change. We use impulse response function to measure the influence of random disturbance on the current and future values of endogenous variables and try to describe the trajectory of these influences. This suggests how does a variable disturbance affect other variables through the model and finally back to its own process. The longitudinal axis represents the response degree of the dependent variable to the explanatory variable, and the horizontal axis represents the tracking period of the response function. After the analysis of the impulse response function using VEC model, variance decomposition can also be performed. Variance decomposition studies the magnitude of the contribution of a structural shock to variable changes, thus differentiating the importance of different structural shocks. The contribution degree is expressed as a percentage. The impulse response function fixates on the impact of the impact of a variable on other variables over time, while the variance decomposition method can be employed to study the dynamic characteristics of the model. The major idea is to decompose the fluctuation of each endogenous variable (a total of m) in the system (k step prediction mean square) to the m components associated with the new interest of the equations, to understand the relative importance of the random new interest to the endogenous variables of the model. The contribution degree of a structural impact to the influence of endogenous variables can be analyzed through variance decomposition. The contribution degree is expressed as a percentage. Given the difference of the contribution degree of impact on the impact of different structures, we can distinguish the significance of the impact of structural impact on endogenous variables. Based on the variance decomposition of the error correction model, the influencing factors and the size of the influencing variables are analyzed. In the present paper, the long-term monetary demand relationship between the first quarter of 1998 and the first quarter of 2018 is modeled using the data set applied in the quarterly frequency data and statistical analysis. All series are seasonally unadjusted. Three-month Treasury bond yields are used as interest rates, broad money M2 as currency, and quarterly real GDP as a measure of output. Yields on US Treasury bonds serve as foreign interest rates. Stock prices are provided by the Financial Times Stock Exchange 100 Index (FTSE100). The real stock price index is derived from a contraction in the consumer price index (CPI). The table shows that 'mp' is the real money, which is the M2 divided by the CPI; 'y' denotes the GDP divided by CPI; 'r1' is the three-month treasury bond yield, as well as 'r2', is the foreign interest rates; stock prices are showed as 'sp'. All the data originated from the international monetary fund (IMF), the bank of England (BoE), OECD and the world bank.

Empirical Research and Analysis of Results

Before the empirical test, to get a relatively accurate result, the real M2, real GDP, and stock prices are logarithmized since they are too large. Subsequently, the unit root test is performed, and co-integration test is performed on the basis of unit root test to estimate the error correction model. After all the work is done, the Chow test is performed to determine whether the money demand function is structurally changed. Besides, Granger causality test , impulse response and variances decomposition are employed to analyze the relationship between variables.

Unit Root Tests

The Unit root tests, co-integration test, and their application have been greatly developed since the 1980s. Their analysis is based on the expansion of the classical stability of non-stability, which has a revolutionary impact on economics and econometrics, and their application has permeated all directions of economics and finance. By the expression theorem of Granger, the co-integration relationship between variables is derived by VAR (Granger, 2001). The establishment of the co-integration relationship suggests that there is a long-term stable or equilibrium relationship between variables entering the co-integration equation, and ECM is also derived from the co-integration relationship. Under the condition of co-integration, the time series model is transformed into the co-integration model. Because of the existence of false correlation and spurious regression, whether it is to establish the classical econometric model, or to reduce the variation of the variable itself, the stability of the time series variables used should be first tested by the unit root test. Stationarity is important because if the series is non-stationary then all the typical results of the classical regression analysis are not valid. Regression of a nonstationary series may not have the meaning and is therefore called 'spurious'. There are many ways to test the stability, the most commonly used is the ADF test, which was originally proposed by Dickey and Fuller. The null hypothesis is that the tested sequence has a unit root process, the alternative hypothesis is stationary or stationary. Generally, the ADF test is divided into three common situations, i.e., it does not contain intercept and intercept items, including intercept and trend. In addition to determining the intercept or trend item in the regression model, we should select the appropriate lag truncation parameters for the ADF test. The stationary regression factor is assumed in the standard derivation process of the regression model. If the time series is an unstable sequence, then a stable regression factor is assumed. The spurious regression will result in many standard results no longer applicable. Therefore, when analyzing the time series, we should first judge its stationarity. The form of ADF test for time series Yt is as follows:

$$\Delta Y_t = \beta_1 + \beta_2 t + \delta Y_{t-1} + \alpha_i \sum_{i=1}^{m} \Delta Y_{t-1} + \varepsilon_i$$

where $\Delta Y_{t-1} = Y_{t-1} - Y_{t-2}$, the test formula contains sufficient lagging terms, making the error term $\varepsilon_i \sim \mathbf{I}(\mathbf{0})$. The virtual hypothesis $H_0: \delta = 0$, suppose that there is a unit root (i.e., Yt is non-stationary). According to previous studies, most of the economic time series have a unit root, i.e., the I (1) process.

To determine the integration sequence, four tests were performed in this paper: ADF, PP, Ng Perron, and KPSS. PP, Ng Perron tests are similar to ADF, their null hypothesizes is the variable has a unit root, i.e., the variable is non-stationary. However, PP testing is non-parametric. KPSS test is opposite compare with them with the null of stationarity (Marques, Fuinhas, & Marques, 2013). From the overall results, each original sequence is not stable, while the first-order difference sequence is stable, so all the sequences are I (1) sequences. To be specific, ADF statistics, Ng Perron and PP test are all left side unilateral tests, while the KPSS test is unilateral right side tests. The original hypothesis is that the sequence is stable, and the results also show that the five sequences are first-order single integer sequences, so co-integration tests can be carried out.

Table 1(a)

Results of Variables

Test/Variables	ADF Statistics		Ng Perron	
	No Trend	Trend	No Trend	Trend
Level				
Lnmp	0.2412	-2.7340	-1.4529	-2.7947*
Lny	-2.6138*	-2.5535	-2.3778*	-2.5886
R1	-2.1230	-3.7824***	-1.2047	-7.2394***
R2	-2.0664	-3.7742***	-1.1710	-7.0024***
Lnsp	-1.9554	-2.4818	-2.0277**	-2.3693
First Difference				
Dlnmp	-7.1199***	-7.0650***	-4.2275***	-4.2565***
Dlny	-6.8981***	-6.8750***	-4.1981***	-4.2310***
Dr1	-4.1660***	-4.1970***	-3.4093***	-3.4418***
Dr2	-4.3104***	-4.3308***	-3.4855***	-3.5087***
Dlnsp	-6.4933***	-6.5361***	-3.6273***	-3.9829***
Test/Variables	PP test		KPSS test	
	No trend	Trend	No trend	Trend
Level				
Lnmp	-2.3241	-2.5714	-7.0927**	0.1563**
Lny	-2.4098	-2.3771	0.2134	0.1703***
R1	-1.8791	-2.1813	0.7789***	0.0623

Table 1(b)

Results of Variables

Test/Variables	ADF Statistics		Ng Perron	
	No Trend	Trend	No Trend	Trend
R2	-1.8544	-2.1966	0.7776***	0.0612
Lnsp	-1.7219	-2.0870	0.3599*	0.1343*
First Difference				
Dlnmp	-7.0728***	-7.0927***	0.0575	0.0553
Dlny	-6.8901***	-6.8679***	0.0588	0.0598
Dr1	-4.3003***	-4.3373***	0.0796	0.0484
Dr2	-4.4576***	-4.4835***	0.0778	0.0501
Dlnsp	-6.5259***	-6.5336***	0.0928	0.0438

All variables in table 1 are given in natural logarithms. The null hypothesis of the ADF, Ng Perron, and PP tests is that the series tested has a unit root. KPSS test's null hypothesis is that the series tested has not a unit root. Critical values at the 1% significance level are approximately -4.07 for levels and -3.51 for first differences (MacKinnon 1996). A star (*) suggests when the null hypothesis can be rejected at the 1% level. Lag lengths for the unit root tests were chosen using the Schwarz information criterion (not reported). A constant and a trend were included for tests on level series; a constant was included for tests on first differences. From the results of the table, it can be seen that the results of the four tests of integration order are consistent, all variables are I (1). In other words, the original sequence of all the variables is nonstationary, but the first order difference sequence is stationary, so all-time series variables are the first order single whole process.

To test the existence of co-integration, Johansen test, Engle-Granger test and Phillips Perrron test can be performed. Johansen test is used in this paper. According to the unit root test, the results show that the variables are co-integration. The results show that the vector error correction model (VECM) is feasible.

Co-integration Test

Since the variables in the model are non-stationary and the first-order I (1) is the same. To determine whether there is a co-integration relationship between these non-stationary time series, the co-integration test can be used. Johansen test is adopted in this paper. To determine the existence of co-integration vectors in nonstationary time series, maximum likelihood is used by Johansen method. This method detects the number of co-integration vectors and allows hypothesis testing of the elements of co-integration vectors (Choudhry, 1996).

Table 2

Variables: Lnmp, Lny, R1, R2, Lnsp

Variables: Lnmp, Lny, R1, R2, Lnsp					
No. of CE(s)	**Eigenvalue**	**Trace-λ**	**C.V.(0.05)**	**Max-λ**	**C.V.(0.05)**
None *	0.3819	77.0796	69.8189	36.0830	33.8769
At Most 1	0.2346	40.9965	47.8561	20.0495	27.5843
At Most 2	0.1236	20.9471	29.7971	9.8939	21.1316
At Most 3	0.1057	11.0532	15.4947	8.3776	14.2646
At Most 4	0.0350	2.6756	3.8415	2.6756	3.8415

After the unit root test, the J test is performed. The core rule of the Johansen test is to transform the co-integration test of the vector into the analysis of the matrix and test the co-integration relationship by checking the number of the nonzero eigenvalues of the matrix.

The J test has two types of test methods, namely, Max Eigenvalues and the Trace test. The original hypothesis is that there are r co-integration vectors, and the optional hypothesis is at most r co-integration vectors. The results of the J test are listed in the table.

As the results suggest, at the 5% significant level, the trace test and the max eigenvalues all show that there are one co-integration relationships between the five variables. Therefore, VECM can be established for further analysis, see (Table 2).

Table 3

Estimated Co-Integration Vector (Normalized on Lnmp)

Estimated Co-Integration Vector (Normalized on Lnmp)				
LNMP	**LNY**	**R1**	**R2**	**LNSP**
-1.0000	0.8118	1.3486	-1.489291	1.0770
	(-0.0314)	(-0.6891)	(-0.6955)	(-0.1148)

According to this equation of Table 3, MP has a positive correlation with Y, R1, and SP as well as negatively associated with R2. From the result, if other conditions remain unchanged, the GDP increase by 0.8118% in the long term, the real money demand will increase by 1%. R1 and R2 are negatively related. Also, the real money demand will be reduced, if the stock prices become expensive. As the above co-integration test results suggest, there is a long-term co-integration relationship between monetary demand, GDP, interest rate and stock price. Next, the author will use variance decomposition analysis and impulse response function analysis to conduct empirical analysis on the impact of stock price index change on monetary demand. From the above empirical analysis, it can be seen that in the long run, the UK stock market positively impacts money demand. That is, the substitution effect of the stock market on money is smaller than that of other impact demand, including wealth effect, portfolio effect and trading effect. The stock's pre-return rate increases by 1 percentage points and the real money demand will be reduced by 1.077% less.

Granger Causality Test

The long-term co-integration relationship between variables can satisfy the condition of causality test and the causality test can be conducted among variables, as the result of J test suggests. Here, the causal relationship between variables is analyzed by performing the Granger causality test. Though the co-integration equation describes the long-term interaction between variables, the causal relationship between variables should be explored to explore the more specific interaction between variables. Therefore, this paper then examined the specific manifestations of causality between variables. There is a unique co-integration relationship between variables, as the co-integration test suggests. Therefore, granger causality tests can be used in the original sequence.

Table 4

Results of Causality Testing

	Lnmp	**Lnsp**	**Lny**	**R1**	**R2**
Lnmp	-	9.2707***	3.7666	1.6824	1.5208
Lnsp	5.3581*	-	6.0228*	0.3528	0.4483
Lny	1.4770	8.7936**	-	1.8511	1.7010
R1	0.3799	5.5888*	0.1435	-	26.6418***
R2	0.3356	5.1378*	0.0820	18.1649***	-

Notes: “All” denotes the causality test organized for all independent variables. ***, **, and * denote significance at 1%, 5%, and 10%, respectively. Wald tests based onχ2statistic with 2 df, except for “All”, 12 df.

Table 5

Dependent Variable

	Dependent Variable				
	Dlnmp	**Dlnsp**	**Dlny**	**Dr1**	**Dr2**
Dlnmp	-	0.5654	1.3927	0.2065	0.2385
Dlnsp	2.8967	-	2.9867	0.6654	0.6652
Dlny	1.1785	0.5112	-	0.1647	0.1580
Dr1	1.4791	2.3779	1.0679	-	32.7460***
Dr2	1.6031	2.1378	1.1107	24.1087***	-

The null hypothesis of the Granger causality test in this paper is that there is no Granger cause between the variables, so it can be seen from the first table that MP is not the Granger cause of Y, R1 and R2, i.e., to test the null hypothesis that there is no Granger cause between the variables. Under the 10% significant level, SP affects MP and y, so rejecting the null hypothesis that SP is the Granger cause for MP. In addition, at the three significant levels of 1%, 5%, and 10%, MP, y, R1, and R2 are all the granger causes of SP. However, because of the variables are stationary after first difference, the author employed the differenced variables to perform the Granger causality test again. It is suggested from the second table that there is no Granger causality relationship between variables, i.e., stock prices cannot affect real money demand and real GDP. As Granger said the expression "Granger causes Y" does not mean that y is the result or effect of X (Granger, 2001) (Table 4, 5). Granger causality test measures whether the advance information of X contributes to the reduction of mean square error (MSE) when y is predicted and uses it as the criterion of causality. Compared with previous information without x, MSE has no change. It means that X is no causal relationship with y in the sense of Granger; otherwise, when the early information of X contributes to the reduction of MSE, it means that X is a causality relationship with y in the sense of Granger.

ECM and Chow Test

On the one hand, because there is a co-integration relationship between time series, the error correction model is established for them, all the variables are introduced into the system, and the error term is obtained by the least square estimation of the logarithmic variables. Then the error correction model is established for the variables and the error terms after the first order difference, and the equation is obtained by the estimation:

Table 6

Analysis of Error Correction Modeling

Variable	Coefficient	Std.error	T-statistic	Prob.
D(LNSP,1)	-0.096906	0.045831	-2.114414	0.038
D(LNY,1)	0.991454	0.009217	107.5728	0
D(R1,1)	0.137349	0.069766	1.968709	0.0529
D(R2,1)	-0.142094	0.069273	-2.051207	0.0439
RESID01(-1)	-0.047927	0.023203	-2.065537	0.0425
C	0.007645	0.002345	3.260245	0.0017

$\mathbf{D(LNMP) = 0.007645 - 0.096906D(LNSP) + 0.991454D(LNY) +}$
$\underline{t} = \mathbf{(3.260245)(-2.114414)(107.5728)}$
$\mathbf{0.137349D(R1) - 0.142094D(R2) - 0.047927ECT(-1)}$
$\mathbf{(1.968709)(-2.051207)(-2.065537)}$
$\mathbf{DW = 1.626478R^2 = 0.994054}$
Adjusted $\mathbf{R^2 = 0.993636F = 2374.149}$

Where D denotes differential and ECT is the error correction term in the error correction model. The Chow test is a method used to judge whether there is a structural break at a given time point (Table 6).

This method has the feature of dividing the time series data in two parts. Besides, the boundary point is the time point to test whether structural break occurs. On this basis, the F test is used to verify N data of the previous part.

Whether the parameters obtained are equal to those obtained by the M data in the latter part, so as to determine whether the structure has changed. According to the above equation, the Chow test can be carried out to determine whether there is a structural break in the model, and the results are as follows:

Table 7

Chow Test as a Statistical Breakpoint Analysis Tool

F-Statistic	2.786419	Prob. F(6,65)	0.0179
Log Likelihood Ratio	17.62478	Prob. Chi-Square (6)	0.0072
Wald Statistic	16.71851	Prob. Chi-Square (6)	0.0104

The Chow test selects the fourth quarter of 2008 as a breakpoint. As the table shows that the log likelihood ratio is 17.62478, the P value is 0.0072, which less than 0.01. It is concluded that the structure of the money demand function with M2 as the dependent variable has changed during this period, which may be influenced by the financial crisis at that time. The fourth quarter of 2008 was chosen as the breakpoint analysis of the Chow test, this is because the financial crisis in this period caused a great impact on the financial market in the UK. Britain's banks have shrunk in large denominations and are heavily indebted. Sterling has fallen sharply, dropping 27% against the dollar since 2008 (Lindström & Giordano, 2016). British companies are struggling to survive, including the most popular supermarket ---- Marks & Spencer, which closed 25 food stores in the UK because of a slump in sales, see (Table 7).

VECM

On the other hand, according to the co-integration relationship among data sets, it is more appropriate to establish a VEC model. We set up a model with a lag order of 2 and 1 co-integration relationships. When analyzing with VEC model, it is usually not necessary to pay attention to the influence of one variable on another variable, because VEC is based on a non-structural method and there are no innate variables, so more attention should be paid to the variation of error term variables of dynamic response analysis and other variables of the system. The specific model setting is as follows:

$$\Delta Y_t = \alpha.ecm_{t-1} + \emptyset_1 \Delta Y_{t-1} + \emptyset_2 \Delta Y_{t-2} + \varepsilon_t$$

$$\mathbf{Y} = (lnmp, lny, r1, r2, lnsp)$$

Table 8

Analysis of Parameter in VEC Models

ECM	D(LNMP)	D(LNY)	D(R1)	D(R2)	D(LNSP)
ECT	-0.32424	-0.38964	-1.10113	-1.08477	0.08356
	[-1.14414]	[-1.37715]	[-3.49149]	[-3.58749]	[1.17670]
D(LNMP(-1))	1.83770	1.76243	2.75980	2.65926	-0.30767
	[1.06754]	[1.02546]	[1.44061]	[1.44779]	[-0.71328]
D(LNMP(-2))	-0.64528	-0.55031	3.14917	3.39611	0.02405
	[-0.40004]	[-0.34171]	[1.75432]	[1.97321]	[0.05949]
D(LNY(-1))	-1.49945	-1.40598	-2.85893	-2.75737	0.30870
	[-0.87877]	[-0.82531]	[-1.50558]	[-1.51452]	[0.72202]
D(LNY(-2))	0.63185	0.53730	-2.86239	-3.10118	-0.02023
	[0.39635]	[0.33758]	[-1.61345]	[-1.82319]	[-0.05063]
D(R1(-1))	-1.25102	-1.17972	4.15966	4.39494	0.44692
	[-1.20845]	[-1.14140]	[3.61060]	[3.97880]	[1.72290]
D(R1(-2))	-1.31182	-1.21249	0.91706	1.12978	0.32634
	[-1.25005]	[-1.15726]	[0.78526]	[1.00898]	[1.24106]
D(R2(-1))	1.66037	1.57808	-3.84028	-4.07325	-0.46168
	[1.56472]	[1.48957]	[-3.25204]	[-3.59759]	[-1.73639]
D(R2(-2))	0.96059	0.87438	-0.43124	-0.64412	-0.27722
	[0.95015]	[0.86627]	[-0.38330]	[-0.59711]	[-1.09432]
D(LNSP(-1))	-0.92002	-0.95502	0.11354	0.16952	0.24974
	[-1.73245]	[-1.80126]	[0.19213]	[0.29918]	[1.87680]
D(LNSP(-2))	-0.25752	-0.27327	-1.10449	-1.03196	-0.03941
	[-0.46286]	[-0.49198]	[-1.78390]	[-1.73840]	[-0.28270]
C	-0.00066	-0.00787	-0.04252	-0.04374	0.00775
	[-0.02012]	[-0.23975]	[-1.16147]	[-1.24619]	[0.93970]
R-Squared	0.28027	0.29138	0.64987	0.67836	0.21038

After a series of tests, EViews software was used to estimate the parameters of the VEC model, and the result of the above table was obtained. There are 5 columns in the table, representing a VEC system composed of 5 estimating equations. The t value of the digits in the parentheses below the estimated values. According to the results of the parameter estimation, it can be seen that some of the estimated values are not significant, because their t values are low. But for the VEC model, it is important to establish a system and carry out an impulse response analysis, not to make the estimated values of each parameter significant (Table 8). The results of the vector error correction model with MP as dependent variable are as follows:

D(LNMP) = -0.32424ECT + 1.83770 D (LNMP (-1)) – 0.64528 D (LNMP (-2)) – 1.49945 D (LNY (-1)) + 0.63185 D (LNY (-2)) – 1.25102 D (R1 (-1)) – 1.31182 D (R2 (-2)) + 1.66037 D (R2 (-1)) + 0.96059 D (R2 (-2)) – 0.92002 D (LNSP (-1)) – 0.25752 D (LNSP (-2)) – 0.00066 R^2 = 0.28027

Where D denotes differential and ECT is the error correction term in the error correction model. From the error correction model with MP as the dependent variable, the goodness of fit is 28.03% and the fitting degree is low. The error correction coefficient is negative, which suggests that the long-term co-integration relationship can play a correction role for the short-term equilibrium of MP, and the deviation of MP can be adjusted by the previous period. The absolute value of the coefficient is 0.32424, suggesting that the 32% of the deviation can be adjusted by the last period, and the money demand is very strong and fast from the short-term deviation to the long-term equilibrium, i.e., the long-term co-integration relationship is partial to the real money demand. The adjustment is significant.

Impulse Response

After examining the influence of various factors on the demand for money, to study the dynamic characteristics of the interaction between various variables, this paper uses the impulse response function based on the error correction model to observe the change of an error term to make the endogenous variable in the immediate and forward change, to analyze the change of an error term. The dynamic effects on the system. The impulse response function is used to measure the influence of stochastic differential impact on the current and future values of endogenous variables under random perturbation, and the trajectory of these influences is attempted to describe, expressing how any variable disturbance can be acted on the other variables through the model and finally back to its own process. The horizontal axis represents the tracking period of the response function, and the vertical axis represents the response degree of the dependent variable to the explanatory variable. To give a positive impact on SP, y, R1, and R2 respectively, and analyze the response of MP in the 10-period to this impact. The obtained impulse response diagram is shown in the following diagram.

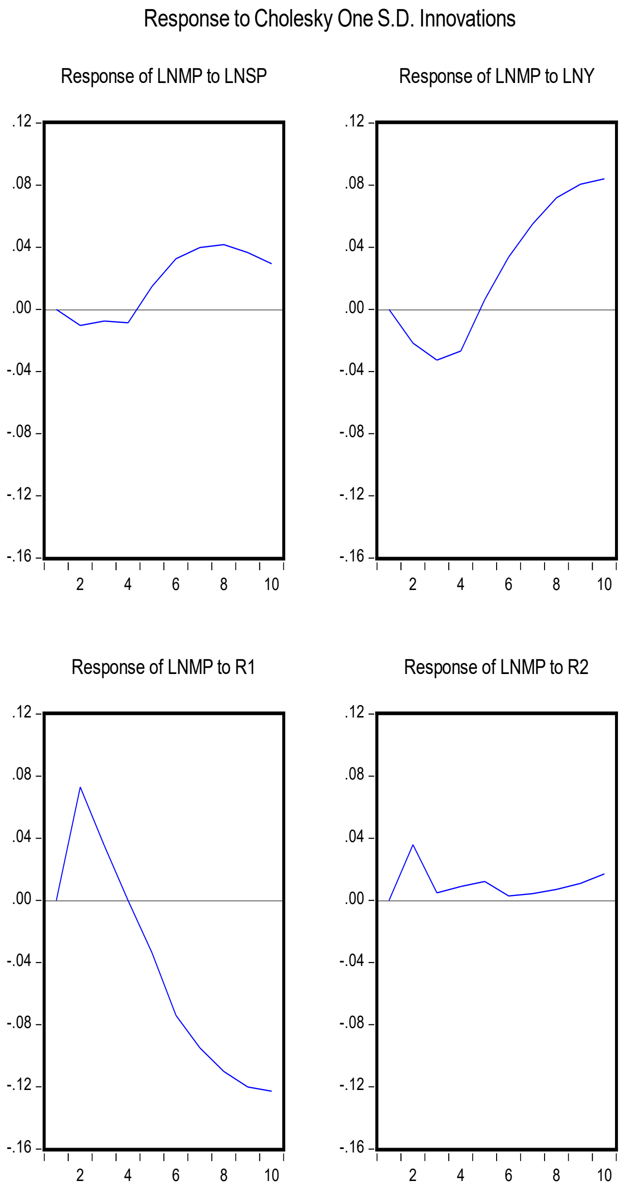

Figure 1: Response to Cholesky One S.D. Innovations.

From the above Figure 1, it can be seen that after a positive impact on SP and y, both SP and Y fell to negative values first, and began to rise from the fifth phase, especially the continuous rise of y. This suggests that a certain impact of stock index will have a certain negative impact on GDP, while the development of stock market will have a negative impact on real GDP in the short term. From long term perspective, however, the impact is still better. As you can see from the following two diagrams, when a positive impact on MP is given, that is to increase the values of R1 and R2, R1 and R2 produce the same impact in the short term, their response values increase rapidly from 0 and reach the highest point at about third periods, suggesting that money demand is sensitive to R1 and R2 for the short-term change. After that, R1 fell all the way, while R2 began to fluctuate and remained positive. This shows that in the short term, for the impact of R1, the impact has a promotion, the stock market wealth effect is more obvious, the stock price increases will cause the increase in money demand; but in the long run, the impact of the impact of the reverse impact on the R1, the substitution effect is more significant, the stock price increases the demand for money.

Variance Decomposition

After analyzing the impulse response function using VEC model, variance decomposition can also be carried out. Variance decomposition studies the magnitude of the contribution of a structural shock to variable changes, thus differentiating the importance of different structural shocks. The contribution degree is expressed as a percentage. The impulse response function focuses on the impact of a variable on other variables over time. To study the dynamic characteristics of the model, the method of variance decomposition can be employed. The major idea of variances decomposition is to understand the relative importance of random endogenous variables of the new interest model by understanding the equations related to the m components of each endogenous variable fluctuation (a total of m) system (k prediction mean square). The contribution degree of a structural influence to the influence of endogenous variables can be analyzed by variance decomposition. The contribution degree is expressed as a percentage. According to the difference of the contribution degree of impact on the impact of different structures, the importance of the impact of structural impact on endogenous variables can be distinguished. Based on the variance decomposition of the error correction model, the paper analyzes the factors impact. The size of the contribution of the impact on the variable. For the specific results of the variance decomposition of MP, see the following figure 2:

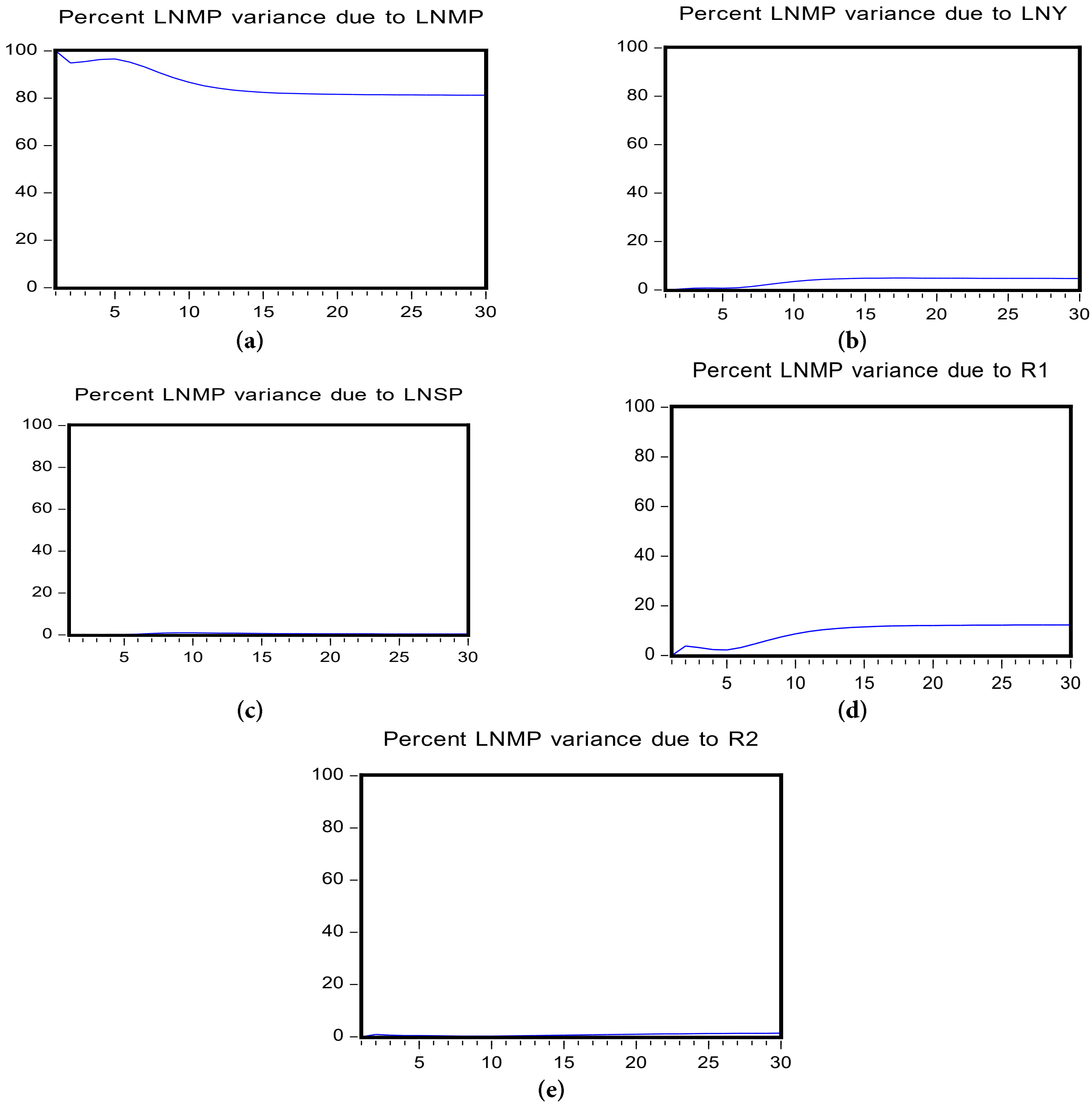

Figure 2: Results of the Variance Decomposition of MP.

The change of money demand is primarily explained by itself. Over time, the contribution of MP to its own influence is decreasing, while the contribution of Y and R1 is increasing, and SP and R2 almost have no effect. Specifically, the contribution of Y and R1 to MP increases gradually as time goes by, and the growth rate of contribution decreases. The contribution of Y to the influence of MP gradually increased in the 1-10 phase. After the tenth period reached the maximum, it began to decrease and then stabilized; and the interval of R1 growth was longer than that of Y, and the maximum R1 degree appeared at the time of about fifteenth and became stable after the 15 phases. The result of variance decomposition shows that real GDP and interest rate have the largest statistical explanation on the change of money demand in the long run, except the influence of the real money demand itself. In this model, GDP and interest rates should be the main sources of change in money demand.

Conclusion

This investigation into the impact of stock market fluctuations on the financial strategies of sports organizations has provided a deeper understanding of the complex interplay between macroeconomic forces and sports industry-specific financial management. The application of traditional economic theories and econometric models, such as the Buffer-stock Model (BSM) and the Error-correction Model (ECM), has allowed us to contextualize and analyze the financial behaviors of sports enterprises in response to external economic shocks, particularly those originating from stock market dynamics.

Key Findings

Buffering Against Volatility: The study confirms the utility of the Buffer-stock Model in sports financial management, illustrating how sports organizations maintain liquidity buffers to guard against unforeseen financial needs triggered by market volatility. This strategy is especially crucial in sports, where cash flow can be highly seasonal and dependent on fluctuating performance and consumer interest.

Error Correction in Financial Planning: The Error-correction Model has proven effective in delineating how sports organizations quickly adjust their financial strategies in response to the deviation from long-term equilibrium conditions. This rapid adjustment is critical in maintaining financial stability and sustaining operations amidst the unpredictable nature of sports revenues and expenditures.

Influence of Stock Market on Financial Decisions: The empirical analysis has highlighted a significant correlation between stock market performance and strategic financial decisions within sports organizations. A buoyant market tends to enhance spending on marketing, athlete salaries, and infrastructure development, while a downturn prompts a tightening of financial outlays and increased caution in long-term financial commitments.

Implications for Sports Management

The findings from this study carry profound implications for sports managers and policymakers:

Strategic Financial Planning: Sports organizations must integrate sophisticated financial forecasting and risk management tools to navigate the complexities introduced by stock market fluctuations. This integration helps in aligning short-term financial tactics with long-term strategic goals.

Dynamic Adjustments: There is a need for dynamic financial management practices that can adapt to rapid changes in the economic landscape, ensuring that sports enterprises remain resilient in the face of market downturns and capitalize on opportunities during market upswings.

Educational and Training Needs: There is a clear demand for enhancing the financial acumen of sports managers through targeted educational programs that focus on economic theory, econometric modeling, and financial strategy formulation in the context of sports.

Future Research Directions

While this study has made significant strides in understanding the economic impacts on sports financial management, several areas warrant further investigation:

Comparative Analysis across Different Sports: Future research could explore how different types of sports organizations (e.g., team sports vs. individual sports) variably respond to economic changes, considering factors like revenue streams, fan base size, and market reach.

Global Perspective: Expanding the research to include sports organizations in various economic environments across the globe could provide insights into how different regulatory and economic contexts influence financial strategies.

Longitudinal Studies: Long-term studies following the financial trajectories of sports organizations in relation to ongoing economic fluctuations would offer a more detailed picture of the strategies' effectiveness over time.

Concluding Remarks

In conclusion, as the sports industry continues to evolve amid a rapidly changing economic backdrop, understanding the nuanced effects of stock market fluctuations on sports financial management is more critical than ever. This study not only sheds light on these dynamics but also provides a foundational framework for sports organizations to develop robust financial strategies that ensure stability, promote growth, and enhance their competitive edge in the global sports marketplace.

Acknowledgements

The author is grateful for the useful comments and suggestions from an anonymous referee and the Editor of this journal on an earlier draft. Special thanks to Dr. David Barlow for his assistance. Any views expressed and all remaining errors are the responsibility of the authors.

References

Ajaz, T., Nain, M. Z., Kamaiah, B., & Sharma, N. K. (2017). Stock prices, exchange rate and interest rate: evidence beyond symmetry. *Journal of Financial Economic Policy, 9*(1), 2-19. https://doi.org/10.1108/JFEP-01-2016-0007

Altemani, A. (2015). Accuracy of intraoperative consultation in the evaluation of salivary gland tumors. *Jornal Brasileiro de Patologia e Medicina Laboratorial, 51*(1), 6-6. https://doi.org/10.5935/1676-2444.20150001

Antonakakis, N., Gupta, R., & Tiwari, A. K. (2017). Has the correlation of inflation and stock prices changed in the United States over the last two centuries? *Research in International Business and Finance, 42*, 1-8. https://doi.org/10.1016/j.ribaf.2017.04.005

Ashworth, J., Barlow, D., & Evans, L. (2014). Sectoral Money Demand Behaviour and the Welfare Cost of Inflation in the UK. *The Manchester School, 82*(6), 732-750. https://doi.org/10.1111/manc.12047

Baharumshah, A. Z. (2004). Stock prices and long-run demand for money: Evidence from Malaysia. *International Economic Journal, 18*(3), 389-407. https://doi.org/10.1080/1016873042000270027

Baharumshah, A. Z., Mohd, S. H., & Masih, A. M. M. (2009). The stability of money demand in China: Evidence from the ARDL model. *Economic Systems, 33*(3), 231-244. https://doi.org/10.1016/j.ecosys.2009.06.001

Baharumshah, A. Z., & Soon, S.-V. (2015). Demand for broad money in Singapore: does wealth matter? *Journal of Economics and Finance, 39*, 557-573. https://doi.org/10.1007/s12197-013-9267-x

Bhatti, M. A., & Alkhozaim, S. M. (2023). Effects of Perceived Values (Personal, Social, Economic) and Destination Attributes on Tourist Satisfaction: Moderating Role of Destination Product Knowledge. *Cultura, 20*(3), 48-76. https://culturajournal.com/submissions/index.php/ijpca/article/view/250

Bissoondeeal, R. K., Jones, B. E., Binner, J. M., & Mullineux, A. W. (2010). Household-Sector Money Demand for the UK. *The Manchester School, 78*, 90-113. https://doi.org/10.1111/j.1467-9957.2010.02207.x

Carpenter, S. B., & Lange, J. (2003). Money demand and equity markets. Board of Governors of the Federal Reserve System (US). *Finance and Economics Discussion Series, 3*, 1-22. https://www.federalreserve.gov/pubs/feds/2003/200303/200303pap.pdf

Caruso, M. (2001). Stock prices and money velocity: A multi-country analysis. *Empirical Economics, 26*, 651-672. https://doi.org/10.1007/s001810100076

Choi, W. G. (2007). Financial market risk and US money demand. *IMF Working Paper No. 07/89*, 1-35. https://papers.ssrn.com/sol3/papers.cfm?abstract_id=986817

Choudhry, T. (1996). Real stock prices and the long-run money demand function: evidence from Canada and the USA. *Journal of International Money and Finance, 15*(1), 1-17. https://doi.org/10.1016/0261-5606(95)00041-0

Dobnik, F. (2013). Long-run money demand in OECD countries: what role do common factors play? *Empirical Economics, 45*, 89-113. https://doi.org/10.1007/s00181-012-0600-6

Fama, E. F. (1981). Stock returns, real activity, inflation, and money. *The American Economic Review, 71*(4), 545-565. https://www.jstor.org/stable/1806180

Fethi, S., & Katircioglu, S. (2015). The role of the financial sector in the UK economy: evidence from a seasonal cointegration analysis. *Economic Research-Ekonomska Istraživanja, 28*(1), 717-737. https://doi.org/10.1080/1331677X.2015.1084476

Furey, K. (1993). The effect of trading in financial markets on money demand. *Eastern Economic Journal, 19*(1), 83-90. https://www.jstor.org/stable/40426310

Granger, C. W. J. (2001). Developments in the study of cointegrated economic variables. In *Essays in econometrics: collected papers of Clive WJ Granger* (pp. 173-188). ACM. https://dl.acm.org/doi/abs/10.5555/781840.781850

Hafer, R. W., & Kutan, A. M. (1994). Economic reforms and long-run money demand in China: implications for monetary policy. *Southern Economic Journal, 60*(4), 936-945. https://doi.org/10.2307/1060431

Ham, S. A., Kruger, J., & Tudor-Locke, C. (2009). Participation by US adults in sports, exercise, and recreational physical activities. *Journal of Physical Activity & Health, 6*(1), 6-14. https://doi.org/10.1123/jpah.6.1.6

Johansen, S., & Juselius, K. (1990). Maximum likelihood estimation and inference on cointegration--with applications to the demand for money. *Oxford Bulletin of Economics and Statistics, 52*(2), 169-210. https://doi.org/10.1111/j.1468-0084.1990.mp52002003.x

Kokko, S., Selänne, H., Alanko, L., Heinonen, O. J., Korpelainen, R., Savonen, K., Vasankari, T., Kannas, L., Kujala, U. M., & Aira, T. (2015). Health promotion activities of sports clubs and coaches, and health and health behaviours in youth participating in sports clubs: the Health Promoting Sports Club study. *BMJ Open Sport & Exercise Medicine, 1*(1), e000034. https://doi.org/10.1136/bmjsem-2015-000034

Lindström, M., & Giordano, G. N. (2016). The 2008 financial crisis: Changes in social capital and its association with psychological wellbeing in the United Kingdom–A panel study. *Social Science & Medicine, 153*, 71-80. https://doi.org/10.1016/j.socscimed.2016.02.008

Mabkhot, H., & Ghouri, A. M. (2023). Effects of Supportive Culture, Innovative Culture and Knowledge Technology Capabilities on Employees Performance: Mediating Role of Employees Commitment. *Cultura, 20*(2), 114-139. https://culturajournal.com/submissions/index.php/ijpca/article/view/246

Malm, C., Jakobsson, J., & Isaksson, A. (2019). Physical activity and sports—real health benefits: a review with insight into the public health of Sweden. *Sports, 7*(5), 127. https://doi.org/10.3390/sports7050127

Marques, L. M., Fuinhas, J. A., & Marques, A. C. (2013). Does the stock market cause economic growth? Portuguese evidence of economic regime change. *Economic Modelling, 32*, 316-324. https://doi.org/10.1016/j.econmod.2013.02.015

Milbourne, R. (1988). Disequilibrium buffer stock models: a survey. *Journal of Economic Surveys, 2*(3), 187-208. https://doi.org/10.1111/j.1467-6419.1988.tb00044.x

Mishkin, F. S. (2007). *The Economics of Money, Banking, and Financial Markets*. Pearson Education. https://thuvienso.hoasen.edu.vn/bitstream/handle/123456789/8420/Contents.pdf?sequence=4

Pal, K., & Mittal, R. (2011). Impact of macroeconomic indicators on Indian capital markets. *The Journal of Risk Finance, 12*(2), 84-97. https://doi.org/10.1108/15265941111112811

Palley, T. I. (1995). The demand for money and non-GDP transactions. *Economics Letters, 48*(2), 145-154. https://doi.org/10.1016/0165-1765(94)00605-2

Panetta, F. (2002). The stability of the relation between the stock market and macroeconomic forces. *Economic Notes, 31*(3), 417-450. https://doi.org/10.1111/1468-0300.00093

Pate, R. R., Trost, S. G., Levin, S., & Dowda, M. (2000). Sports participation and health-related behaviors among US youth. *Archives of Pediatrics & Adolescent Medicine, 154*(9), 904-911. https://doi.org/10.1001/archpedi.154.9.904

Song, W. (2023). Environmentality, Sustainability, and Chinese Storytelling. *Cultura, 20*(1), 55-66. https://doi.org/10.3726/CUL012023.0005

Sudeck, G., & Pfeifer, K. (2016). Physical activity-related health competence as an integrative objective in exercise therapy and health sports–conception and validation of a short questionnaire. *German Journal of Exercise and Sport Research, 2*(46), 74-87. https://doi.org/10.1007/s12662-016-0405-4

Wee, I., Ong, C. W., Syn, N., & Choong, A. (2018). Computational fluid dynamics and aortic dissections: panacea or panic? *Vascular & Endovascular Review, 1*(1), 27-29. https://doi.org/10.15420/ver.2018.8.2