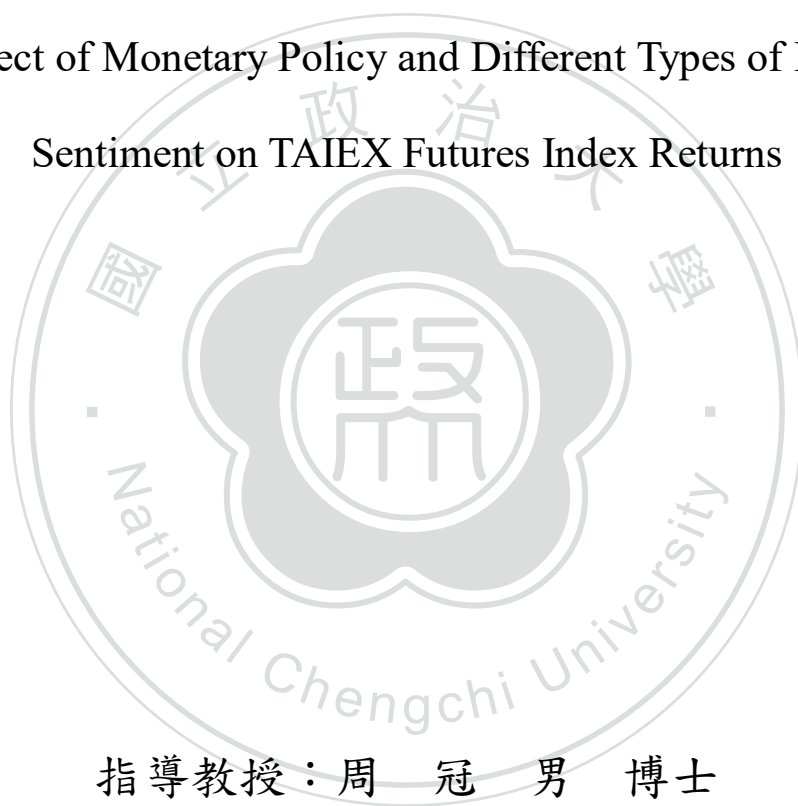國立政治大學財務管理學系研究所

碩士學位論文

貨幣政策與不同類型投資人情緒對台股期貨報酬的影響

The Effect of Monetary Policy and Different Types of Investors

Sentiment on TAIEX Futures Index Returns

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謝辭

歲月如梭，轉瞬間兩年的研究所生涯與半年的交換學生體驗即將畫下句點。一路上太多貴人的扶持與幫助，讓建勳感激萬分。首先便要感謝指導教授—周老師。猶記當初在周老師的引領下，揭開行為財務領域的神秘面紗並對於該領域深感興趣，也很榮幸能成為師長的指導學生，繼續在此領域下深究鑽研。在師長一次次的 meeting 下，從論文題目的確定、研究方向的掌握至文獻的蒐集，逐步完成論文的藍圖，此外老師對於建勳每次的提問都能精闢的解惑，讓論文進度步步地向前邁進。

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最後，感謝家人在求學生涯的一路協助，讓我能無憂無慮的在學習的道路上向前邁進，並提供我機會能到中國大陸進行交換學生的體驗，讓我開闊眼界，體會到中國大陸龐大的內需市場與人才濟濟。除了課業的學習外，更行萬里路遊歷各地，體會不同的人文風情。在交換的最後一個月，你們還特地飛來北京找我，讓我深感愧疚與感恩。如今求學生涯即將告一段落，也是父母親該退休享清福的階段，不必再為我們操勞煩心。

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摘要

　　本研究第一部份在探討實際、非預期與非預期的緊縮與寬鬆的貨幣政策對期貨報酬的影響，是否具有不對稱效果，而第二部分將進一步分析在不同類型投資人處於高情緒的情況下，貨幣政策對於報酬的影響。

　　研究發現，實際或非預期的貨幣政策對於期貨報酬影響性低，然而非預期寬鬆 M2 貨幣政策對於報酬有顯著正向影響；此外，當區分於不同景氣狀態時，在牛市中，實際與非預期的重貼現率對於報酬皆有顯著正向關聯，而非預期緊縮與寬鬆重貼現率則在熊市影響較顯著，具有不對稱效果。

　　此外，我們更進一步研究當各類型投資人在高情緒的情況下，貨幣政策對於報酬的影響。發現於實際、非預期與非預期的緊縮或寬鬆的貨幣政策中，幾乎在各類型投資人處於高情緒的情況下，貨幣政策會顯著影響期貨報酬，且以隔夜拆款利率影響為最。區分景氣狀態後發現在實際、非預期與非預期的緊縮或寬鬆貨幣政策中，不同類型投資人處於高情緒時，在不同景氣狀態下貨幣政策對於報酬呈現顯著性。

關鍵字：貨幣政策、期貨報酬、情緒、成交量

Abstract

The paper analyzes the relationship between actual, unexpected and unexpected tight and easy monetary policy and TAIEX futures index returns at first and attempt to know whether there are asymmetric reactions. It makes a further effort to examine the correlation between monetary policy decisions and the returns when different types of investors' sentiments are high.

The results show that the coefficients of actual or unexpected monetary policies are not statistically significant. However, the unexpected easy M2 monetary policy has significant and positive influence on the returns. Besides, when dividing the data into different regimes, we can discover the asymmetric reactions that actual and unexpected rediscount rate has significant and positive influence in bull market, and unexpected tight and easy monetary policy rediscount rate is more effective in bear market, indicating that there are asymmetric reactions in different regimes.

On whether there are different influences of the monetary policy decisions for each of the investors in high sentiment, it turns out that the actual, unexpected and unexpected tight and easy monetary policy decisions greatly affect the returns when investors' sentiment are high, especially the overnight rate. Moreover, when data is divided into different regimes, in the actual, unexpected and unexpected tight and easy monetary policy, the relationship between monetary policies and rate of return are significant when each of the investors in high sentiment in different regimes.

Keywords: Monetary policy, Future index returns, Sentiment, Trading volume

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1. Introduction

1.1 Motivation of the study

Because of the 2007-08 financial crisis, the authorities employed a series of monetary policies to save the aggravated economic environment during the last quarter of 2008. For example, the Fed utilized the quantitative easing policy (QE) with the view to stimulating the economy, such as purchasing financial assets and increasing the money supply. On the other hands, some central banks made use of the easy monetary policy like decreasing in the discount rate in order to bring new vigor and vitality in times of economic downturn.

In addition to the monetary policy, a great number of countries took the fiscal policy to boost the economy. For instance, the Chinese government spent a great amount of money on the financial subsidies project which mentioned "Home appliances going to the countryside" and aimed to expand sales of electric appliances in the countryside; besides, they also invested capital on the construction of infrastructure. In Taiwan, the authority tried to achieve the economic growth by giving vouchers to native directly. But it took lots of time to pass laws in Legislative Yuan and attain the objectives of fiscal policies, which might miss the opportunity to give a quick shot of energy to the fragile economy; however, monetary policies, like open market operations, discounts or required reserve rations could affect our market immediately.

Therefore, it is important to know the tools of monetary policy and the transmitting mechanism of monetary policy. According to central bank of R.O.C. mentions the basic structure of monetary policy, it may use open market operations, discount window, reserve requirements to control the money supply and interest rate which would finally reach three primary goals: price stability, financial soundness and economic growth.

Additionally, Kuttner and Mosser (2002) make the summary and show that the

monetary policy transmission will start by open market operations and then proceeds through interest rate channel, wealth channel, board /narrow credit channel, exchange rate channel and monetarist channel to increase or reduce the overall level of aggregate demand.

However, it has caused controversy in the effectiveness of monetary policy. Many scholars devote themselves in researching about how the monetary policy can affect financial markets. Bernanke and Kuttner (2005) show that stock prices is primarily driven by unexpected monetary policy decision fed fund target rate; however, Durham (2003) discovers that recently the relationship between monetary policy and stock return are not significant among 16 countries because most investors can predict the next step of central bank accurately.

Take the financial crisis of 2007–09 as example. It seemed to revive and prosper by utilizing a string of measures. Some experts said it likes V-shaped while global stock markets rebounded strongly in 2009. After Dow Jones Industrial Average hit bottom at 6,763 points in March, it reversed fast. Besides, SSE Composite Index and HANG SENG Index continued to rise at the same time. In Taiwan, TAIEX index was falling to 3,955 points and then added 4,233 points at the end of 2009. Those policies were considered as effective methods to help our economic atmosphere became better.

Moreover, there are possible asymmetries in the effects of monetary policy. Gulley and Sultan (2003) discover tight monetary policies have bigger influence than easy monetary policies. In addition, several studies discover that the monetary policies have much larger influence on equity returns in bear market. Basistha and Kurov (2008) find the impact of stocks to monetary policy is at least twice larger in tight credit situations and recessions than in prosperity. From Kurov (2010) studies, it is obvious that equity market responds to monetary surprises more strongly in bear market.

Second, when we observe the performance in equity market, we can find some investors would overreact or underreact when the authorities announce measures. It seems that the financial markets are inefficient and investors aren't all rational expectations. It makes us wonder that the financial market not only would be affected by the monetary policy decisions, but also would be affected by investors sentiment.

Moreover, we could find that different investors might have their sentiment separately, and the fluctuation of individual sentiment is stronger than others. It also makes us curious that different investors sentiment on account of the adjustment of monetary policy decisions have different effects. Bernake and Kuttner (2005) not only mention that an unexpected rate cut would increase the stock prices, but also propose a viewpoint that most of the reaction of stock prices to monetary policy might not due to interest rate, but owing to investor overreaction or excess sensitivity.

On the other hands, Kurov (2010) tries to combine the behavior finance with traditional economic domain, and use unexpected monetary policy fed fund rate on S&P 500 in different regimes. He mentions that market inefficiency which is driven by investor behavior may contribute to the strong effect of monetary news on stock returns; moreover, monetary policy shocks have a strong impact on the investor sentiment in bear market periods.

Due to those reasons, we want to understand how monetary policy directly affects the financial markets return. Furthermore, we try to understand if it has the asymmetric effect on monetary policy in different regimes on future market. However, because some papers mention that the monetary policies which have been expected by those investors have little effect on the market because most investors speculate those portfolios before the policies announcement, we still use unexpected change in monetary policies to show how it can affect our future market, and still distribute those data into bull and bear market, too.

Second, we also try to exam whether investor sentiment plays a significant role in the effect of monetary policy on the financial markets. In comparison with equity market Kurov (2010) used, we attempt to exam if investor sentiment has a significant impact on future market. Moreover, we still want to understand if it has different influence on futures index returns due to distinct investors sentiment.

1.2 Objective of the study

First of all, we want to confirm whether the monetary policy will affect the TAIEX futures index returns or not. Furthermore, we still attempt to know if there are the asymmetric effects in different regimes. We utilize rediscount rate, overnight rate and M2 as our monetary policy and split the monetary policy into the actual monetary policy, unexpected monetary policy and unexpected tight and easy monetary policy. We attempt to see whether TAIEX futures index returns are driven by the effect of unexpected monetary policy. Durham (2003) mentions that the expected monetary policy can't influence the equity returns. Besides, Bernanke and Kuttner (2005) discover that unexpected fed funds target rate influences primarily expected excess returns.

Furthermore, Sung (2013) finds that only the exchange rate and the money supply have a significant effect on the TAIEX. Moreover, From the Ou (2013) studies, she analyses the relationship between stock returns and unexpected monetary policy decisions in two different periods. Her study is the same as most of the researches in Taiwan market that the coefficients are much more significant in bear market and unexpected easy monetary policy from 1981 to 2012. Therefore, we may expect that the coefficient of unexpected easy monetary policy-M2 is much more significant in bear market.

Besides, Kurov (2010) utilizes the data S&P 500 index return and finds that monetary policy decisions have a significant effect on investors sentiment. We take the further step to examine the relationship between the monetary policy and the rate of return when investors sentiment is high.

On the other side, there are many ways to measure investor sentiment. From Lo (2011) studies, there is an obvious effect and positive relationship between the excess return and the change of trading volume. Besides, Chang (2009) also uses the trading volume of TAIEX futures as an investor sentiment variable and discovers that the trading volume has a positive effect on TAIEX futures index returns in whole sample period. So we use trading volumes of TAIEX futures as our dummy variable of investor sentiment. We may anticipate that when investor sentiment is higher than average, the coefficients of monetary policy and the rate of return are significant.

From Kumar and Lee (2006) studies, they use the trading data of retail investors and find those retail investors would influence stock returns that the same as noise trader models; furthermore, from Tsai (2009) studies, she divides the investor into four types (including domestic individuals, domestic dealers, domestic institutions, and foreign institutions) and finds the proportion of domestic individuals' transactions are not proportional to their effect in TAIEX futures. Chang (2015) mentions that various types of institutional investor sentiment have significant influences on futures returns. She also further discovers that domestic institutional investors have less effect than foreign institutions because most domestic institutions are short-swing trading. So, we further divide the investor sentiment into five types of investors: domestic individuals, domestic corporations, domestic institutions, domestic dealers and foreign institutions and we want to understand the effect of investor sentiment on TAIEX futures index returns respectively.

Then, we want to see whether there are different influences among those five

different types of investors sentiment and if it has asymmetric effect in high sentiment in different regimes. We may expect that the monetary policy in high sentiment is more significant in bear market.

At last, former chairman of the federal reserve Alan Greenspan made the statement during the FOMC meeting: "The problem that we have here is that monetary policy works through its effect on overall financial markets. ..." It means that whatever our central bank use to achieve terminal goals will affect future and spot market. From Chan (1992) studies, the futures market has more market-wide information owing to lower transaction costs and higher expected profit; moreover, the results describe that it is obvious that futures lead the equity market, and most informed traders would prefer futures market. As a result, we want to confirm that whether the effect of monetary policy on TAIEX futures index returns is driven mainly by the influence of the policy on investor sentiment.

1.3 Chapter outlines

The remainder of this research is organized as follows. Chapter 2 delineates the relevant literatures of the efficiency of monetary policy, the asymmetry effect of monetary policy actions, the asymmetry effect of monetary policy actions in different regimes, empirical evidence about the impact of trading volumes on the market returns relation, the relationship between monetary policy, market returns and the investor sentiment; besides, we may also focus on the relationship between the equity index and equity index futures. Chapter 3 delineates the data we collect and the methods we utilize. Chapter 4 shows the consequents of empirical tests we analyze. Finally, in chapter 5 we present the conclusions and provide some suggestions.

2. Literature review

We divide this chapter into six parts to review the literatures on the efficiency of monetary policy decisions, the asymmetry effect of monetary policy actions, the asymmetry effect of monetary policy actions in different regimes, empirical evidence about the impact of trading volumes on the market returns relation, the relationship between monetary policy, market returns and the investor sentiment, as well as the relationship between the equity index and equity index futures.

2.1 Empirical evidence on the efficiency of monetary policy

It has been widely discussed by scholars for many years that the correlation between the monetary policy and stock prices. Kraft and Kraft (1977) make a conclusion that there is no relationship between money supply, the change of the money supply (M1) and stock prices. Their results also support the efficient market hypothesis which mentions from Fama (1970) studies that stock prices reflect all available information; moreover, from Durham (2003) study, it is not significant on relationship between monetary policy and stock returns or excess stock returns among 16 countries. He tries to explain this phenomenon and mentions that due to obvious adjustment signal by the authority or the accuracy of investors' estimates, the stock return can't influence by the expected monetary policy considerably.

Therefore, most researchers infer that only the unexpected monetary policies have statistically significant predictive power and start to find how the monetary surprises affect the market returns. Rigobon and Sack (2004) utilize the event-study approach and develop the heteroskedasticity-based estimator which makes the change of the policy surprise bigger than all other surprises and discover that the relation between market index and short-term interest rate are negative; besides, the Nasdaq index has

bigger influence than S&P 500 index. Bernanke and Kuttner (2005) find that the 1% increase in stock prices when the unexpected 25 basis point rate decrease. In addition, they also discover that the reactions differ considerably across industries. In comparison with energy and utilities sectors which might not be influenced significantly by monetary policy, high-tech and telecommunications sectors presenting a response half again as big as the market index.

2.2 The asymmetric effect of monetary policy actions.

Furthermore, recent papers develop the different between the positive monetary policy and negative monetary policy and most of them discover that restrictive monetary policy has much more significant impact on output and stock returns than easy monetary policy. Cover (1992) use two-step procedure and find that positive money-supply shocks have a smaller and less important effect on output than negative shocks. Moreover, Morgan (1993) provides the following possible reasons why easy monetary policy affects the economy less than tight monetary policy: First, because investors are much more pessimistic in depression period than optimistic during prosperity, which the same as the recent scenario that most companies don't borrow money to invest even though the low interest rate was caused by the authority. Second, tight monetary policy results are difficult to borrow money owing to credit constraints which led by capital providers; however, easy monetary policy wouldn't lead to more borrow by those companies. Besides, Karras (1996) also finds the same condition in Europe. The conclusion shows that both the money supply and interest rate have asymmetric effect on output in the period from 1953 to 1990, and among 18 countries.

Still, there are also many papers reveals that unexpected tight monetary policy has a significant effect on stock returns. Lobo (2000) employs the S&P 500 index daily data

in the period from 1990 to 1998 and find that risk aversion grows before the announcement of the monetary policy. He also discovers that in comparison with the good news (rate decreases), the stock prices tend to overreact in the bad news (rate rises). Gulley and Sultan (2003) use a multivariate GARCH model and discover it has negative relationship between change in fed fund futures rate and stock return, and furthermore show the asymmetric effects on equity market and tight monetary policies have bigger influence than easy monetary policies

In this paper, we want to confirm whether there is asymmetric effect between the stock returns and monetary policy. However, there are some papers mention that the easy monetary policy decisions have much influence than tight monetary policy decisions. Jensen and Johnson (1995) analyze the data and find that changes in discount rate affects the security market returns in the long periods. Besides, their conclusions also present that the decrease of discount rate has a greater influence than the increase of discount rate, which means easy monetary policy is much more significant in the period from 1962 to 1991. On the other hands, Farka (2009) utilizes the intraday data of the changes in S&P 500 futures as well as federal funds futures as monetary policy and discover that while the authority utilizes the unanticipated easy monetary policy, the decrease of stock price is much more significant than tight policy due to the weak economic environment. In Taiwan, most of researches mention that unanticipated easy monetary policy has a bigger influence on stock returns. Take Chiu, Lee and Lee (2002) studies as example, they make use of the nonlinear joint estimation method and show that unexpected restrictive monetary policy has less effect than easy monetary policy.

2.3 The asymmetric effect of monetary policy actions in different regimes.

On the other side, the asymmetry effect still exists in different regimes, and most papers find that the monetary policy actions have more impact in bear market. Chen (2007) uses money aggregates (M2), discount rates (DR), federal funds rates (FF), and VAR-based as monetary policy. He not only empirically examines the impacts of monetary policy on stock returns but also discovers that monetary policy has considerable effects on stock returns in bear markets. His results also provide evidence to support those recently models with agency costs of financial intermediation which agents almost act like they are constrained financially due to information asymmetry in bear market. Equally, Basistha and Kurov (2008) find that during periods of economic feebleness and in tight market environment, the stock returns have stronger response to unexpected changes in the federal funds target rate. They also present that in comparison with those unconstrained firms, financially constrained firms react even larger to monetary shocks in tight credit conditions that supports the credit channel of monetary policy transmission. Jansen and Tsai (2010) find that the effect of a surprise monetary policy is negative, large and statistically significant in a bear market; besides, they also discover that the company which has ability to borrow money and mitigates the bigger influence of monetary policy is considerably important in bear market

Besides, Wang (2015) shows different viewpoints that monetary policy has larger influence in bull market than in bear market in Taiwan. Besides, she employs different types of monetary policy and mentions that both M1b and M2 have negative relationship with stock returns in bear market.

2.4 Empirical evidence about the impact of trading volumes on the market returns relation.

Because it is broadly defined of investor sentiment in recent years, some researches will choose single factor as the investor variable, such as turnover, put/call ratios…etc. and attempt to discover the relationship between the investor sentiment and the rate of return. Simon and Wiggins (2001) utilize the volatility index, the put/call ratios and the trading index as sentiment indicators. They find that all of them are contrarian factors and the coefficients of those indicators are statistically significant. While others may select the index of investor sentiment which is composed of multiple types of investor factors, for example, Baker and Wurgler (2006) provide the investors sentiment changes which comprise NYSE turnover, closed-end fund discount, number of IPOs, first-day return on IPOs, the equity share in new issues and the dividend premium. In this paper, we select the trading volume of TAIEX futures as investor sentiment. From Ying (1966) empirical studies, he finds the following significant results that the fall in price is often accompanied with the small trading volume and the rise in price is often accompanied with the large trading volume; besides, he also discovers that either the large rise in price or the large fall in price is often accompanied with the large add in volume. Moreover, From Lo (2011) studies, we can understand that when we used the change in trading volume as a proxy for investor sentiment, investor sentiment has a positive and significant influence on excess returns on Taiwan equity market. On the other hand, Chang (2009) employs different types of investor sentiment and discovers a positive relation between the trading volume of TAIEX futures and returns at the same period. Therefore, we can infer that the relationship between market returns and the trading volume are positive in Taiwan.

2.5 The relationship between monetary policy, market returns and the investor sentiment.

Bernanke and Kuttner (2005) try to make the conclusion that policy surprises influence equity prices by affecting expected excess returns in the future, and it is one of the reasons. They make an example when the authority utilizes the unexpected tight monetary policy, the investors will increase the expected stock premium and then the stock prices would decline. This result takes place by increasing the costs of capital which makes the company risky or changing the investors attitude that makes them become risk-aversion due to the loss of expected wealth. However, they also propose a replacement answer that investors become more sensitive or overreaction of equity prices and move the excess returns due to the change of monetary policy. The result implies that investor sentiment might play a significant role when the authority adjusts the monetary policy decision. Besides, from Baker and Wurgler (2006) as well as Kumar and Lee (2006) studies, they find that the equity prices are influenced by investor sentiment, and then influences the anticipated returns.

Kurov (2010) not only discovers that monetary policy shocks have a stronger influence on the investor sentiment in bear market periods, but also utilizes the monthly excess returns on the stock which includes 465 firms as independent variable and shows that sentiment has considerably impact on target rate changes on equity returns in bear market. It represents that the investors sentiment plays an important role in the relationship between the returns and monetary policy.

2.6 The relationship between the equity index and equity index futures.

Each of the equity index futures has its underlying index. In this paper, the underlying index of TAIEX futures is Taiwan Stock Exchange Capitalization Weighted Stock Index (TAIEX). The market returns on equity index and equity index futures are perfect positive correlation if it is efficient market. Even though financial markets are not efficient in Taiwan, there are highly positive relationship between TAIEX and TAIEX futures. Therefore, we can infer that the effect of monetary policy decisions on the equity index returns may similar to equity index futures returns.

Besides, it is interesting for many investors to figure out true value of assets and whether it would have chances to arbitrage. Hasbrouck (1995) also mentions that both price discover and price information are the most important things in security markets. However, most papers show that the ability of price discover in future market is better than equity markets. From Stoll and Whaley (1990) study, they discover both MM and S&P 500 index futures returns may lead the returns on spot market around five minutes or even more. On the other hand, Chan (1992) inspects that the spot index falls behind the future index as well as future market make a response to new information much faster than spot market. Due to lower costs and higher leverages, most informed traders tend to trade on the futures markets in comparison with the equity markets.

In conclusion, there are significant relationship between the equity index and equity index futures and future market may have the lead.

3. Data and Methodology

3.1 Data Description

There are two primary topics in this paper, the first topic is the relationship between TAIEX futures index returns and monetary policy decisions, and the second topic is the relationship between TAIEX futures index returns and monetary policy actions when investor sentiment is high respectively. Therefore, there are several variables in our research. We use the sample period which extends over eight years for 1982 trading days, 96 months from January 2001 to December 2008 by an event study approach.

3.1.1 Sample variable

The following descriptions are the sample variables we use in this paper. Table 1 presents the descriptive statistics of sample variables

(1) The TAIEX futures index monthly returns

The eq. (1) is the TAIEX futures index monthly returns. The TAIEX futures have different deliver months which include spot, next calendar and next three quarterly months that have different index, but most of trading volume was centered on spot month. However, when the day near the last trading day, the trading volume of spot month and next calendar month become more and more closer, or even exceed the spot month. When we calculate monthly returns of TAIEX futures, we utilize the trading volume as the standard to decide which day we should transfer the index of spot month to next calendar month. While the trading volume of next calendar month exceeds the spot month, we change the index from spot to next calendar month.

$$R_t = \frac{\text{Index of TX}_t - \text{Index of TX}_{t-1}}{\text{Index of TX}_{t-1}} \qquad (1)$$

(2) The change of rediscount rate

The eq. (2) is the change of rediscount rate. The rediscount rate is one of the discount window policy. When banks feel tight during the recession, they can send bills which receive from customers to central bank and make the loan. Besides, central bank will change the discount rate to influence market interest rate. But according to Central Bank of the R.O.C. describes that it is not obvious effect when it utilizes this measure without other monetary policy tools.

On the basis of Central Bank of the R.O.C. data from January 2001 to December 2008, it includes 35 decisions made by board meeting. We use the information and calculate the change of rediscount rate by monthly.

$$\Delta \text{rediscount} = \frac{\text{rediscount}_t - \text{rediscount}_{t-1}}{\text{rediscount}_{t-1}} \qquad (2)$$

(3) The change of overnight rate

The overnight rate is one of the measures for banks to attain the reserve ratios which required by central bank. Due to many reasons, some banks will lack of money to meet the standard when their capital outflow. We use the information and calculate the change of overnight rate by monthly.

$$\Delta \text{overnight} = \frac{\text{overnight}_t - \text{overnight}_{t-1}}{\text{overnight}_{t-1}} \qquad (3)$$

(4) The M2 (YoY, Averages of daily figures)

M2 is a wilder money definition than M1 and M1b, and it contains cash, checking deposits and savings deposits. We use M2 averages of daily figures, YoY as our money supply term.

3.1.2 Market regimes

We want to understand that whether monetary policy has a larger effect on TAIEX futures return in bear market than in bull market. Besides, when investor sentiment is

high, we try to know whether there are asymmetry effects of monetary policy due to different market regimes. We utilize Cooper et al. (2004) methods and divide our market into bull and bear market, and we would find that bull market contains 1361 trading days and bear market contains 621 trading days.

According to Cooper et al. (2004), N represents the TAIEX futures index returns of the N month. It means bull market of the N month when the sum of TAIEX futures index returns last 36 months before the N month is positive or zero, that is to say, it means bear market of the N month when the sum of TAIEX futures index returns last 36 months before the N month is negative.

3.1.3 Investor sentiment measures

We utilize the trading volume of TAIEX futures as investor sentiment in this study, and calculate the change of trading volume in the eq. (4); besides, we use the dummy variable and further divide the change of trading volume into high trading volume that trading volume above the average and dummy variable is 1 as well as low trading volume which trading volume below the average and dummy variable is 0. Furthermore, it represents investor sentiment is high while the dummy variable is 1. We try to know how do different types of investors sentiment affect TAIEX futures return. We examine the relationship between the rate of return and the monetary policy decisions when investor sentiment is high. We choose the trading volume of different types of investors as sentiment and Table 2 shows the summarized information; besides, Table 3 presents the descriptive statistics of the trading volume of TAIEX futures.

$$\Delta\text{volume} = \frac{\text{volume}_t - \text{volume}_{t-1}}{\text{volume}_{t-1}} \qquad (4)$$

3.2 Research Methodology

3.2.1 Unit root rest

The unit root test would like to confirm whether those variables in the regression are stationary or not. Granger and Newbold (1974) show that if our data are non-stationary using autoregressive model, we confronted with the problem of spurious regression which represents that those results of the regression are meaningless. Therefore, we have to test that those time series variables are stationary that the expectation value and variance don't change by the time, the covariance isn't related to the time, but the spacing.

Dickey and Fuller (1979) show the Dickey-Fuller Test (D-F Test) testing whether there is a unit root in the autoregressive model. There are three versions of the unit root test:

1. Unit root without intercept and time terms:

$$\Delta y_t = \rho y_{t-1} + e_t \tag{5}$$

2. Unit root with intercept:

$$\Delta y_t = \alpha_0 + \rho y_{t-1} + e_t \tag{6}$$

3. Unit root with intercept and time terms:

$$\Delta y_t = \alpha_0 + \beta t + \rho y_{t-1} + e_t \tag{7}$$

Where Δy_t is the first order difference, the α_0 is intercept, and t is the time terms or deterministic time trend and e_t is the error term. We make a null hypothesis that H_0: there is a unit root.

However, there are limitations to the Dickey-Fuller Test that can be used, and which only can use in the series is an AR(1) process. Therefore, Said and Dickey (1984)

further provided the augmented Dickey–Fuller test (ADF), which added the lagged terms of the dependent variable for higher-order correlation. There are also three versions of the unit root test, discussed below

1. Unit root without drift and deterministic time trend:

$$\Delta y_t = \rho y_{t-1} + \sum_{i=1}^{p} \gamma_i \Delta y_{t-i} + e_t \tag{8}$$

2. Unit root with drift:

$$\Delta y_t = \alpha_0 + \rho y_{t-1} + \sum_{i=1}^{p} \gamma_i \Delta y_{t-i} + e_t \tag{9}$$

3. Unit root with drift and deterministic time trend:

$$\Delta y_t = \alpha_0 + \rho y_{t-1} + c_t \sum_{i=1}^{p} \gamma_i \Delta y_{t-i} + e_t \tag{10}$$

Where Δy_t is the first order difference, the α_0 is intercept, and c_t is the deterministic time trend and e_t is the error term. If we reject the null hypothesis H_0: there are unit root which means those variables in the regression are stationary.

3.2.2 Autoregressive Integrated Moving Average (ARIMA) Model

Fama (1970) proposed efficient market hypothesis (EMH) that security price could completely respond available information from markets because most investors are rational and further advocated strong form tests, semi-strong form tests as well as weak form tests, which means that only unexpected monetary policy will cause the volatility of stock price. Besides, Bernanke and Kuttner (2005) discover that unexpected changes in fed funds target rate is the main reason that lead to the stock prices fluctuate in equity market.

On the other side, Cover (1992) find only tighten policy has a significant effect by utilizing two-step procedure and defining residual series as unexpected monetary policy shocks. Following Cover (1992), we try to use this concept and use ARIMA model to forecast and use Akaike Information Criterion (AIC) as model selection tool.

An ARIMA(p,d,q) model is given by:

$$Y_t = c + \alpha_1 Y_{t-1} + \alpha_2 Y_{t-2} + \cdots + \alpha_p Y_{t-p} + \beta_1 u_{t-1} + \beta_2 u_{t-2} + \cdots + \beta_q Y_{t-q} + \mu_t \quad (8)$$

where α_i are the parameters of the autoregressive part of the model, β_i are the parameters of the moving average part, μ_t are error terms and assumed to fit white noise hypothesis and d is differencing which in order to make time series data become stationary. Now Y_t is a pth-order autoregressive AR(p) as well as qth-order moving average MA(q).

We try to divide the residual series by using actual series minus the ARIMA forecasting series into two parts. When our monetary policy actions are rediscount rate and overnight right, the series positive (MP^+) means tighten monetary policy; on the other hands, when our monetary policy action is money supply, then the series positive (MP^+) means easy monetary policy.

$$MP^+ = \text{Max}(MP_t, 0), \text{ or}$$

$$MP^- = \text{min}(MP_t, 0)$$

3.3 Hypotheses Development

Hypothesis 1: Actual monetary policy decisions have no relationship with TAIEX futures index returns.

Hypothesis 2: The relationship between actual monetary policy decisions and TAIEX futures index returns have much more influence in bear market than in bull market. There are asymmetric reactions in different regimes.

Hypothesis 3: The unexpected monetary policy decisions have significant relationship with TAIEX futures index returns.

Hypothesis 4: The relationship between the unexpected monetary policy decisions and TAIEX futures index returns have much more influence in bear market than in bull market. There are asymmetric reactions in different regimes.

Hypothesis 5: The unexpected easy monetary policy decisions have significant relationship with TAIEX futures index returns and there are asymmetric reactions.

Hypothesis 6: The relationship between the unexpected tight and easy monetary policy decisions and TAIEX futures index returns have much more influence in bear market than in bull market. There are asymmetric reactions in different regimes.

Hypothesis 7: Actual monetary policy decisions have considerable relationship with TAIEX futures index returns when the investor sentiment is high.

Hypothesis 8: The relationship between actual monetary policy decisions and TAIEX futures index returns have much more influence in bear market than in bull market when the investor sentiment is high. There are asymmetric reactions in different regimes.

Hypothesis 9: The unexpected monetary policy decisions have significant relationship with TAIEX futures index returns when the investor sentiment is high.

Hypothesis 10: The relationship between the unexpected monetary policy decisions and TAIEX futures index returns have much more influence in bear market than in bull

market when the investor sentiment is high. There are asymmetric reactions in different regimes.

Hypothesis 11: The unexpected easy monetary policy decisions have significant relationship with TAIEX futures index returns and there are asymmetric reactions when the investor sentiment is high.

Hypothesis 12: The relationship between the unexpected tight and easy monetary policy decisions and TAIEX futures index returns have much more influence in bear market than in bull market when the investor sentiment is high. There are asymmetric reactions in different regimes.

4. Empirical Results

4.1 Unit root test

Before analyzing the data, we have to confirm that those variables which we use are stationary. We exam whether those series are stationary or not by unit root test in order to avoid the problem of spurious regression. In this paper, we use Augmented Dickey-Fuller (ADF) test for a unit root in a time series sample. Dickey and Fuller (1979) showed three main versions of the test and we try to use the test for a unit root with drift.

The Table 4 presents the unit root test measure of each variable. Clearly, most of variables reject the null hypothesis that means those series variables are stationary which excluding the M2 (YoY, Averages of daily figures) variable. We try to test the M2 for unit root in first order difference and show that it is stationary which coefficient is statistically significant at 1% level.

4.2 Effect of actual monetary policy decisions on TAIEX futures index returns.

We start by looking at the effect of the actual monetary policy decisions which made by Central Bank of the Republic of China on the TAIEX futures index returns. We forecast the following regressions of the monthly TAIEX futures index returns on the component of the change of the rediscount rate, the change of the overnight rate and the M2 (YoY, Averages of daily figures) :

$$R_t = \alpha + c_{11}X_t + c_{12}R_{t-1} + c_{13}E_t + \epsilon_t, \tag{9}$$

$$R_t = \alpha + c_{21}Y_t + c_{22}R_{t-1} + c_{23}E_t + \epsilon_t, \tag{10}$$

$$R_t = \alpha + c_{31}Z_t + c_{32}R_{t-1} + c_{33}E_t + \epsilon_t, \tag{11}$$

where R_t is the monthly TAIEX futures index returns, and X_t is the change of the rediscount rate, Y_t is the change of the overnight rate and Z_t is the M2 (YoY, Averages of daily figures). R_{t-1} is the TAIEX futures index returns on month t – 1 to take account of the cluster effects of volatility. E_t is the change of exchange rate.

The regression results report in Panel A, B and C of Table 5, showing that both of the change of the rediscount rate and the M2 (YoY, Averages of daily figures) move on the same direction with the TAIEX futures index returns. However, our result on the change of rediscount rate is inconsistent with the economic viewpoints that the authority could try to use a tight monetary policy, the equity returns or TAIEX futures index returns would decrease. Unlike the rediscount rate, the board meeting can attempt to decrease the overnight rate and rise the growth of the M2 supply to enhance the rate of return.

Besides, each policy has different effect, and the M2 (YoY, Averages of daily figures) has the greatest influence among those decisions. When the M2 (YoY, Averages of daily figures) rises 100-basis point, the TAIEX futures index returns lead to around 1.0668% increase; however, the change of overnight rate has the lowest influence on the rate of return, which only about 0.0461% increase while the change of overnight rate decrease 100-basis point.

Moreover, we can discover that there are not statistically significant in all of the actual monetary policy actions. The conclusion is in line with our hypothesis 1 that actual monetary policy decisions have no relationship with TAIEX futures index returns. Because the more transparency in central bank in recent years, the more precision in anticipating policy decisions by the community. We would further analyze the unexpected monetary policy decisions due to Durham (2003) inferences could let the results to be significant.

4.3 Effect of the actual monetary policy decisions on TAIEX futures index returns in different market regimes.

Additionally, we still attempt to understand that whether there are asymmetric reactions of TAIEX futures index returns to monetary policy decisions. The following regressions are similar to Eq. (9), Eq. (10) and Eq. (11) and divide into bull and bear market regimes.

The regression results report in Table 6. We can understand that all of the monetary policy decisions move on the same direction with the TAIEX futures index returns in bull market. Our results on the change of rediscount rate and overnight rate aren't correspond with the traditional economic points. However, in bear market, only the change of overnight rate moves on the opposite direction with the TAIEX futures index returns.

Besides, each policy also has different impact on the rate of return, and the M2 (YoY, Averages of daily figures) has the greatest influence of all policies in both bull and bear regimes, when the M2 (YoY, Averages of daily figures) rises around 100-basis point, the rate of return of TAIEX futures index rise around 0.7223% in bull market, and 1.7869% in bear market. However, the change of overnight rate has the lowest influence on the rate of return in bull market and the change of rediscount rate has the lowest influence on the rate of return in bear market.

On the other hand, the p-value of the change of rediscount rate is statistically significant at 5% level in bull market, and it is not in accordance with our hypothesis 2 that the relationship between actual monetary policy decisions and TAIEX futures index returns have much more influence in bear market than in bull market, even though there are asymmetric reactions in different regimes. Thaler and Johnson (1990) mention that most of people become risk-seeking and willing to bear the losses due to prior gains,

and they call this is the house money effect. We would infer that because it is relatively easy to earn money in bull market, most of the investors will invest more money due to prior gains. Besides, from Black (1986) studies, he discovers that people would believe the noise as information and use it to trade. However, De Long, Shleifer, Summers, and Waldmann (1990) present a model and observe that noise traders can earn expected returns larger than rational investors because they hold the risky asset even more.

Therefore, when the authority increases the rediscount rate in bull market, which releases the signal that it is in bull market, and most investors will invest even more due to house money effect. Besides, domestic individuals account for very great proportion of the future market, and most of them are noise traders and could earn money because they hold lots of risky assets.

4.4 Effect of unexpected monetary policy decisions on TAIEX futures index returns.

In the section 4.2, we could observe that there is no relationship between TAIEX futures index returns and the actual monetary policy decisions. Furthermore, we forecast the following regression of the monthly TAIEX futures index returns on the component of the unexpected monetary policy decisions the change of the rediscount rate, the change of the overnight rate and the M2 (YoY, Averages of daily figures)：

$$R_t = \alpha + d_{11}X_t + d_{12}R_{t-1} + d_{13}E_t + \epsilon_t, \tag{12}$$

$$R_t = \alpha + d_{21}Y_t + d_{22}R_{t-1} + d_{23}E_t + \epsilon_t, \tag{13}$$

$$R_t = \alpha + d_{31}Z_t + d_{32}R_{t-1} + d_{33}E_t + \epsilon_t, \tag{14}$$

where R_t is the monthly TAIEX futures index returns, and X_t is the change of the rediscount rate, Y_t is the change of the overnight rate and Z_t is the M2 (YoY,

Averages of daily figures). R_{t-1} is the TAIEX futures index returns on month t – 1 to take account of the cluster effects of volatility. E_t is the change of exchange rate.

The regression results report in Panel A, B and C of Table 7, presenting that all of the unexpected monetary policy decisions move on the same direction with the TAIEX futures index returns. However, our results on the change of rediscount rate and the change of overnight rate are not inconsistent with the economic viewpoints, either.

Besides, the M2 (YoY, Averages of daily figures) has the greatest influence among those decisions. When the M2 (YoY, Averages of daily figures) rises 100-basis point, the TAIEX futures index returns lead to around 0.9240% increase; however, the change of overnight rate has the lowest influence on the rate of return, which only about 0.1272% decrease while the change of overnight rate decrease 100-basis point.

Moreover, we can discover that there are not statistically significant in all of the unexpected monetary policy actions. The conclusion is not in line with our hypothesis 3 that the unexpected monetary policy decisions have significant relationship with TAIEX futures index returns. We further divide the unexpected monetary policy into tight monetary policy and easy monetary policy and attempt to know which would influence the rate of return.

4.5 Effect of the unexpected monetary policy decisions on TAIEX futures index returns in different market regimes.

Even though we couldn't find the strong relationship between the unexpected monetary policy and TAIEX futures index returns. We still try to understand that whether there are asymmetric reactions of TAIEX futures index returns to monetary policy decisions. The following regressions are similar to Eq. (12), Eq. (13) and Eq. (14) and divide into bull and bear market regimes.

The regression results report in Table 8. We can understand that all of the monetary policy decisions move on the same direction with the TAIEX futures index returns in bull and bear market.

Besides, each policy has different impact, and the M2 (YoY, Averages of daily figures) has the greatest influence of all policies in bull and bear regimes. When the M2 (YoY, Averages of daily figures) rises around 100-basis point, the rate of return of TAIEX futures index rises around 0.9910% in bull market and 0.9843% in bear market. However, the change of overnight rate has the lowest influence on the rate of return in both bull market and in bear market.

On the other hand, the p-value in the change of rediscount rate is statistically significant at 10% level in bull market, and it is not in accordance with our hypothesis 4 that the relationship between the unexpected monetary policy decisions and TAIEX futures index returns have much more influence in bear market than in bull market, even though there are asymmetric reactions in different regimes. The reason we attempt to explain in section 4.3.

4.6 Effect of the unexpected tight and easy monetary policy decisions on TAIEX futures index returns.

Finally, we forecast the following regressions of the monthly TAIEX futures index returns on the component of the dummy variable of unexpected tight and easy monetary policy decisions because the coefficients are not statically significant in both actual and unexpected monetary policy：

$$R_t = \alpha + e_{11}MP_{tRtight} + e_{12}MP_{tReasy} + e_{13}R_{t-1} + e_{14}E_t + \epsilon_t, \quad (15)$$

$$R_t = \alpha + e_{21}MP_{tOtight} + e_{22}MP_{tOeasy} + e_{23}R_{t-1} + e_{24}E_t + \epsilon_t, \quad (16)$$

$$R_t = \alpha + e_{31}MP_{tMtight} + e_{32}MP_{tMeasy} + e_{33}R_{t-1} + c_{33}E_t + \epsilon_t \quad (17)$$

where R_t is the monthly TAIEX futures index returns, $MP_{tRtight}$ is the unexpected tight monetary policy of the change of rediscount rate, and MP_{tReasy} is the unexpected easy monetary policy of the change of rediscount rate, $MP_{tOtight}$ is the unexpected tight monetary policy of the change of overnight rate, and MP_{tOeasy} is the unexpected easy monetary policy of the change of overnight rate, $MP_{tMtight}$ is the unexpected tight monetary policy of the M2 (YoY, Averages of daily figures), and MP_{tMeasy} is the unexpected easy monetary policy of the M2 (YoY, Averages of daily figures). R_{t-1} is the TAIEX futures index returns on month t – 1 to take account of the cluster effects of volatility. E_t is the change of exchange rate.

The regression results report in Panel A, B and C of Table 9, the unexpected tight or easy monetary policy of the M2 (YoY, Averages of daily figures) has the greatest influence among those decisions. When the unexpected tight monetary policy M2 (YoY, Averages of daily figures) decreases 100-basis point or unexpected easy monetary policy M2 (YoY, Averages of daily figures) increases 100-basis point, the TAIEX futures index returns lead to around 3.0939% and 5.5631% increases.

Moreover, we can discover that it is only statistically significant in the M2 (YoY, Averages of daily figures) as unexpected easy monetary policy and it is in line with our hypothesis 5 that the unexpected easy monetary policy decisions have significant relationship with TAIEX futures index returns and there are asymmetric reactions, which the same as Sung (2013) study. She found that only the exchange rate and the money supply have a significant effect on the TAIEX; however, the rediscount rate has unobvious impact on the TAIEX. Moreover, it is in accordance with the empirical research in Taiwan that it is more statistically significant in easy monetary policy.

Besides, from Ou (2013) study, she provides two viewpoints try to explain that why it isn't significant in the change of rediscount rate: First, because of little change

on the rediscount rate, it could not explain the equity returns which changes more frequent precisely; on the other side, it is less for those banks to borrow money from this source. Besides, our central bank also mentions that it is unobvious to use the discount rate without other monetary policy tools.

4.7 Effect of the unexpected tight and easy monetary policy decisions on TAIEX futures index returns in different market regimes.

Still, we want to know that whether there are asymmetric reactions of TAIEX futures index returns to unexpected tight and easy monetary policy decisions. The following regressions are similar to Eq. (15), Eq. (16) and Eq. (17) and divide into bull and bear market regimes.

The regression results report in Panel A, B and C of Table 10, showing that each policy has different impact. The unexpected tight and easy monetary policy of the M2 (YoY, Averages of daily figures) has the greatest influence in both bull and bear market, when the unexpected tight monetary policy decreases 100-basis point or unexpected easy monetary policy of the M2 (YoY, Averages of daily figures) increases 100-basis point, the TAIEX futures index returns lead to around 2.057% and 5.041% increases in bull market. Besides, in bear market, when the unexpected tight monetary policy decreases 100-basis point or unexpected easy monetary policy of the M2 (YoY, Averages of daily figures) increases 100-basis point, the TAIEX futures index returns lead to around 15.6003% and 8.1902% increases.

Moreover, we can discover that it's only statistically significant in the change of rediscount rate. Furthermore, the tight monetary policy of the change of rediscount rate has a larger effect on TAIEX futures index returns in bear market and the unexpected

easy monetary policy is significant both in bull and bear market. The conclusion is in line with our hypothesis 6 that the relationship between the unexpected tight and easy monetary policy decisions and TAIEX futures index returns have much more influence in bear market than in bull market and there are asymmetric reactions in different regimes.

4.8 Effect of investor sentiment and the actual monetary policy on TAIEX futures index returns.

Our hypothesis is that the monetary policy moves TAIEX futures index returns, in part, through its effect on each of the investors sentiment. To test the hypothesis, we estimate the following regressions and using TAIEX futures index returns as the dependent variable and the change of the monetary policy as independent variable; moreover, we also use the trading volume about different investors as dummy variable and dummy variable multiplies the change of monetary policy as the interaction terms.

$$R_t = a + f_{11}X_t + f_{12}D_j + f_{13}X_tD_j + f_{14}R_{t-1} + f_{15}E_t + \varepsilon_t \tag{18}$$

$$R_t = a + f_{21}Y_t + f_{22}D_j + f_{23}Y_tD_j + f_{24}R_{t-1} + f_{25}E_t + \varepsilon_t \tag{19}$$

$$R_t = a + f_{31}Z_t + f_{32}D_j + f_{33}Z_tD_j + f_{34}R_{t-1} + f_{35}E_t + \varepsilon_t \tag{20}$$

where R_t is the monthly TAIEX futures index returns, and X_t, Y_t and Z_t are different types of monetary policy decisions. R_{t-1} is the TAIEX futures index returns on month t − 1 to take account of the cluster effects of volatility. E_t is the change of exchange rate. D_j is a dummy variable of trading volume as investors sentiment, and j from 1~5 that represents each of investors sentiment, which is equal to 1 if the trading volume is above 50th percentile during our sample period, and zero otherwise, and those include domestic individuals, domestic corporations, domestic institutions, domestic dealers and foreign institutions. X_tD_j, Y_tD_j and Z_tD_j are interaction terms

which use dummy variable to multiply the change of monetary policy. ε_t is the error term.

<u>Domestic individuals</u>

In Table 11, when the change of rediscount rate rises 1%, the rate of return also rises around 0.3730% on the same direction. However, the coefficient of dummy variable has little effect on the rate of return; moreover, we can inspect that the rediscount rate will have considerable influence when the sentiment of domestic individuals is high by observing the interaction term. When the investor sentiment is high, the rate of return will downturn 0.4111% while the change of rediscount rate rises 100-basis points.

Furthermore, when the change of overnight rate rises 1%, the rate of return also rises around 0.0588% on the same direction. However, the coefficient of dummy variable has little effect on the rate of return; moreover, we can inspect that the overnight rate will have considerable influence when the sentiment of domestic individuals is high by observing the interaction term. When the investor sentiment is high, the rate of return will downturn 0.1598% while the change of overnight rate rises 100-basis points.

On the other side, when the M2 (YoY, Averages of daily figures) rises 1%, the rate of return also rises around 3.1681% on the same direction. However, the coefficient of dummy variable has little effect on the rate of return; moreover, we can inspect that the M2 (YoY, Averages of daily figures) will have considerable influence when the sentiment of domestic individuals is high. When the investor sentiment is high, the rate of return will downturn 4.8281% while the M2 (YoY, Averages of daily figures) rises 100-basis points.

In conclusion, we can see that the coefficients of the change of rediscount rate, the M2 (YoY, Averages of daily figures) and the dummy variable multiplies the M2 (YoY,

Averages of daily figures) are statistically significant in 10% level. It means that the monetary policy M2 has obviously impact on the rate of return when the sentiment of domestic individuals is high and the absolute value of the coefficient is much bigger than only the actual monetary policy term. Besides, we also discover that all of the monetary policy decisions have opposite effect by high sentiment. We can further infer that when the investor is in high sentiment, the monetary policy would have more impact.

Domestic corporations

In Table 12, when the change of rediscount rate rises 1%, the rate of return also rises around 0.4964% on the same direction. However, the coefficient of dummy variable has little effect on the rate of return; moreover, we can inspect that the rediscount rate will have considerable influence when the sentiment of domestic corporations is high. When the investor sentiment is high, the rate of return will downturn 0.6363% while the change of rediscount rate rises 100-basis points.

Furthermore, when the change of overnight rate rises 1%, the rate of return also rises around 0.3846% on the same direction. However, the coefficient of dummy variable has little effect on the rate of return; moreover, we can inspect that the overnight rate will have considerable influence when the sentiment of domestic corporations is high. When the investor sentiment is high, the rate of return will downturn 0.8697% while the change of overnight rate rises 100-basis points.

On the other side, when the M2 (YoY, Averages of daily figures) rises 1%, the rate of return also rises around 0.7013% on the same direction. However, the coefficient of dummy variable has little effect on the rate of return; moreover, we can inspect that the M2 (YoY, Averages of daily figures) will have considerable influence when the sentiment of domestic corporations is high. When the investor sentiment is high, the

rate of return increase 1.3615% while the M2 (YoY, Averages of daily figures) rises 100-basis points.

In conclusion, we can see the coefficients of the change of rediscount rate and the dummy variable multiplies the change of rediscount rate are statistically significant in 5% level. Still, we can also observe that the coefficients of the change of overnight rate and the dummy variable multiplies the change of overnight rate are statistically significant in 10% and 1% level respectively. It represents the monetary policy rediscount rate and overnight rate have obviously impact on the rate of return when the sentiment of domestic corporations is high and the absolute value of the coefficients are much bigger than only actual monetary policy terms. Besides, we also discover that most of the monetary policy decisions have opposite effect by high sentiment except the M2. We can further infer that when the investor is in high sentiment, the monetary policy would have more impact.

Domestic institutions

In Table 13, the change of rediscount rate has little influence on the rate of return. However, the coefficient of dummy variable has little effect on the rate of return, too; moreover, we can inspect that the rediscount rate will have considerable influence when the sentiment of domestic institutions is high. When the investor sentiment is high, the rate of return will increase 0.2484% while the change of rediscount rate rises 100-basis points.

Furthermore, when the change of overnight rate rises 1%, the rate of return also downturns around 0.0902% on the opposite direction. However, the coefficient of dummy variable has little effect on the rate of return; moreover, we can inspect that the overnight rate will have considerable influence when the sentiment of domestic institutions is high. When the investor sentiment is high, the rate of return will downturn

0.1022% while the change of overnight rate rises 100-basis points.

On the other side, when the M2 (YoY, Averages of daily figures) rises 1%, the rate of return also rises around 0.1961% on the same direction. However, the coefficient of dummy variable has little effect on the rate of return; moreover, we can inspect that the M2 (YoY, Averages of daily figures) will have considerable influence when the sentiment of domestic institutions is high. When the investor sentiment is high, the rate of return increase 1.0883% while the M2 (YoY, Averages of daily figures) rises 100-basis points.

In conclusion, the coefficients of all of the dummy variables are significant but the absolute value of the coefficients are small. Besides, we also discover that none of the interaction terms is statistically significant.

Domestic dealers

In Table 14, when the change of rediscount rate rises 1%, the rate of return also rises around 0.3641% on the same direction. However, the coefficient of dummy variable has little effect on the rate of return; moreover, we can inspect that the rediscount rate will have considerable influence when the sentiment of domestic dealers is high. When the investor sentiment is high, the rate of return will downturn 0.4281% while the change of rediscount rate rises 100-basis points.

Furthermore, when the change of overnight rate rises 1%, the rate of return also rises around 0.6333% on the same direction. However, the coefficient of dummy variable has little effect on the rate of return; moreover, we can inspect that the overnight rate will have considerable influence when the sentiment of domestic dealers is high. When the investor sentiment is high, the rate of return will downturn 0.9439% while the change of overnight rate rises 100-basis points.

On the other side, when the M2 (YoY, Averages of daily figures) rises 1%, the rate

of return also rises around 2.3164% on the same direction. However, the coefficient of dummy variable has little effect on the rate of return; moreover, we can inspect that the M2 (YoY, Averages of daily figures) will have considerable influence when the sentiment of domestic dealers is high. When the investor sentiment is high, the rate of return decreases 3.2723% while the M2 (YoY, Averages of daily figures) rises 100-basis points.

In conclusion, we can see the coefficients of the change of rediscount rate, the change of overnight rate and the dummy variable multiplies the change of overnight rate are statistically significant in 10%, 5% and 1% level respectively. It represents the monetary policy overnight rate has obviously impact on the rate of return when the sentiment of domestic dealers is high and the absolute value of the coefficient is much bigger than only the actual monetary policy term. Besides, we also discover that all of the monetary policy decisions have opposite effects by high sentiment. Further, we can infer that when the investor is in high sentiment, the monetary policy would have more impact.

Foreign institutions

In Table 15, when the change of rediscount rate rises 1%, the rate of return also rises around 0.4642% on the same direction. However, the coefficient of dummy variable has little effect on the rate of return; moreover, we can inspect that the rediscount rate will have considerable influence when the sentiment of foreign institutions is high. When the investor sentiment is high, the rate of return will downturn 0.4670% while the change of rediscount rate rises 100-basis points.

Furthermore, when the change of overnight rate rises 1%, the rate of return also rises around 0.8101% on the same direction. However, the coefficient of dummy variable has little effect on the rate of return; moreover, we can inspect that the

overnight rate will have considerable influence when the sentiment of foreign institutions is high. When the investor sentiment is high, the rate of return will downturn 1.1827% while the change of overnight rate rises 100-basis points.

On the other side, when the M2 (YoY, Averages of daily figures) rises 1%, the rate of return also rises around 1.2537% on the same direction. However, the coefficient of dummy variable has little effect on the rate of return; moreover, we can inspect that the M2 (YoY, Averages of daily figures) will have less influence when the sentiment of foreign institutions is high. When the investor sentiment is high, the rate of return decreases 0.2627% while the M2 (YoY, Averages of daily figures) rises 100-basis points. This result is different from those situations we mention before.

In conclusion, we can see the coefficients of the change of rediscount rate, the change of overnight rate and the dummy variable multiplies the change of overnight rate are statistically significance in 5%, 1% and 1% level respectively. It represents the monetary policy overnight rate has obviously impact on the rate of return when the sentiment of foreign institutions is high and the absolute value of the coefficient is bigger than only the actual monetary policy term. However, the interaction term of the M2 supply has less impact in foreign institutions in comparison with the other data we analyze before. Besides, we also discover that all of the monetary policy decisions have opposite effects by high sentiment. Further, we can infer that when the investor is in high sentiment, the monetary policy would have more impact.

4.9 Effect of investor sentiment and the actual monetary policy on TAIEX futures index returns in different regimes.

Furthermore, we still attempt to understand whether there are asymmetric reactions in different regimes due to the conclusions announced by Kurov (2010) that

the equity returns are change sensitively in bear market because the investor sentiment was influenced by the unexpected monetary policy decisions. However, we first use the actual monetary policy decisions in this sections, and then use unexpected monetary policy decisions in the section 4.11 and unexpected tight and easy monetary policy decisions in the section 4.13. The following regressions are similar to Eq. (18), Eq. (19) and Eq. (20) and divide into bull and bear market regimes.

<u>Domestic individuals</u>

The regression results reported in Panel A, B and C of Table 16, and which is showing that each of the monetary policy decisions moves on the same direction with the TAIEX futures index returns in bull market. However, in bear market, the change of rediscount rate and the M2 (YoY, Averages of daily figures) move on the same direction with TAIEX futures index returns, but the change of overnight rate moves on the opposite direction with TAIEX futures index returns.

Besides, each of the policies has the different effect, and the M2 (YoY, Averages of daily figures) has the biggest influence of all decisions in bull market. Similarly, the M2 (YoY, Averages of daily figures) has the biggest effect among three actions in bear market. Furthermore, most of the investor sentiment have opposite and little effect on TAIEX futures index returns.

Second, when we focus on our hypothesis whether actual monetary policy decisions have significant effect in high investor sentiment, we could find that each of monetary policy decisions has considerable effect on different regimes. In the bull market, the change of rediscount rate has positive influence on the TAIEX futures index return; on the other sides, the change of overnight rate and the M2 (YoY, Averages of daily figures) have negative impact in high sentiment. Besides, the change of rediscount rate and the M2 (YoY, Averages of daily figures) have huge negative impact in high sentiment in the bear market, but the change of overnight rate doesn't.

In conclusion, the TAIEX futures index returns tend to react more strongly to the dummy variable of trading volume M2 (YoY, Averages of daily figures) and the dummy variable of trading volume multiplies the M2 (YoY, Averages of daily figures) in bull market, and those p-value are statistically significant at 10% level. To further discuss in the investor sentiment, we could find that there is asymmetric reaction in different regimes and monetary policy decisions have more influence in bull market when the sentiment of domestic individuals is high.

Domestic corporations

The regression results reported in Panel A, B and C of Table 17, showing that the change of rediscount rate and the change of overnight rate move on the same direction with the TAIEX futures index returns, and the M2 (YoY, Averages of daily figures) moves on the opposite direction with the TAIEX futures index returns in bull market. But when we see the results in bear market, all of monetary policy decisions move on the same direction with TAIEX futures index returns.

Besides, each of the policies has the different effect, and the change of rediscount rate has the greatest influence of all decisions in bull market; on the other side, the M2 (YoY, Averages of daily figures) has the greatest effect among three actions in bear market. Furthermore, the investor sentiment of the domestic corporations has opposite and little effect on TAIEX futures index returns.

Second, when we focus on the interaction terms, we could find that each of monetary policy decisions has huge effect on different regimes. In the bull market, the change of rediscount rate and the change of overnight rate, in high sentiment, have negative effect on the TAIEX futures index returns; on the other side, the M2 (YoY, Averages of daily figures) has positive effect. Besides, In the bear market, all of the monetary policy decisions have huge negative impact in high sentiment.

In conclusion, the TAIEX futures index returns tend to react more strongly to the change of rediscount rate and the dummy variable of trading volume multiplies the change of overnight rate in bull market, and those p-value are statistically significant at 5% and 10% level respectively. To further discuss in sentiment, we could find that there is asymmetric reaction in different regimes, and the same as the domestic individuals, the monetary policy decisions have more influence in bull market when the sentiment of domestic corporations is high.

Domestic institutions

The regression results reported in Panel A, B and C of Table 18, observing that all of monetary policy decisions move on the same direction with TAIEX futures index returns in bull market. But when we see the results in bear market, all of monetary policy actions move on the opposite direction with the TAIEX futures index returns.

Besides, each of the policies has the different effect, and the M2 (YoY, Averages of daily figures) has the greatest influence of all decisions in bull market, and the M2 (YoY, Averages of daily figures) still has the greatest effect among three actions in bear market. Furthermore, most of the investor sentiments have opposite and little effect on TAIEX futures index returns.

Second, when we focus on our hypothesis whether monetary policy decisions have significant influence on investor sentiment, we could find that each of monetary policy decisions has huge effect on different regimes. In the bull market, the change of rediscount rate in high investor sentiment has positive effect on the TAIEX futures index returns; on the other sides, the change of overnight rate and the M2 (YoY, Averages of daily figures) have negative impact in high sentiment. Besides, In the bear market, all of the monetary policy decisions have huge positive impact in high sentiment.

In conclusion, the TAIEX futures index returns tend to react more strongly to the dummy variable of trading volume in among three monetary policy actions in bull market, and those p-value are statistically significant at 1% level. To further discuss in sentiment, we could find that there is asymmetric reaction in different regimes. In bear market, the TAIEX futures index returns tend to react more strongly to the interaction term of the M2 (YoY, Averages of daily figures). It is the same as our hypothesis that monetary policy decisions have more influence in bear market when the sentiment of domestic institutions is high.

Domestic dealers

The regression results reported in Panel A, B and C of Table 19, showing that the change of rediscount rate and the M2 (YoY, Averages of daily figures) move on the positive direction with the TAIEX futures index returns, and the change of overnight rate moves on the opposite direction with the TAIEX futures index returns in bull market. But when we see the results in bear market, all of monetary policy decisions move on the same direction with TAIEX futures index returns.

Besides, the M2 (YoY, Averages of daily figures) has the greatest influence both in bull and bear market. Furthermore, most of the investor sentiments have opposite and little effect on TAIEX futures index returns.

Second, when we focus on our hypothesis whether monetary policy decisions have significant effect while the investor sentiment is high, we could find that each of monetary policy decisions has considerable effect on different regimes. In the bull market, the change of rediscount rate and overnight rate in high investor sentiment have positive effect on the TAIEX futures index returns; on the other sides, the M2 (YoY, Averages of daily figures) has negative impact in high sentiment. Besides, In the bear market, all of the monetary policy decisions have huge negative impact in high

sentiment.

In conclusion, the TAIEX futures index returns tend to react more strongly to the dummy variable of trading volume in among three monetary policy actions in bull market, and those p-value are statistically significant at 5% level. To further discuss in sentiment, we could find that there is asymmetric reaction in different regimes. In bear market, the TAIEX futures index returns tend to react obviously to the change of overnight rate and the interaction term of the change of overnight rate. It is the same as the previous hypothesis that the monetary policy decisions have more influence in bear market when the sentiment of domestic dealers is high.

Foreign institutions

The last part of this section, we focus on the foreign institutions. The regression results reported in Panel A, B and C of Table 20, presenting that all of the monetary policy decisions move on the same direction with the TAIEX futures index returns in bull market and bear market.

Besides, each of the policies has the different effect, and the change of overnight rate has the greatest influence among three decisions in bull market; on the other side, the M2 (YoY, Averages of daily figures) has the greatest effect in bear market. Furthermore, most of the investor sentiments have opposite and little influence on TAIEX futures index returns.

Second, when we focus on our hypothesis whether monetary policy decisions have significant effect when investor sentiment is high, we could find that each of monetary policy decisions has huge effect on different regimes. In the bull market, the change of rediscount rate and the M2 (YoY, Averages of daily figures) have positive effect on the TAIEX futures index returns while the investor sentiment is high; on the other sides, the change of overnight rate has negative impact. Besides, In the bear market, all of the

monetary policy decisions have huge negative impact in high sentiment.

We can make a conclusion that the TAIEX futures index returns tend to react more strongly to the dummy variable of trading volume in the change of rediscount rate and the M2 (YoY, Averages of daily figures) in bull market, and those p-value are statistically significant at 5% and 10% level. However, in bear market, The TAIEX futures index returns tend to react more strongly to the change of overnight rate and the interaction term of the change of overnight rate. To further discuss in sentiment, we could find that there is asymmetric reaction in different regimes. It is still the same as the previous hypothesis that monetary policy decisions have more influence in bear market when the sentiment of foreign institutions is high.

4.10 Effect of investor sentiment and the unexpected monetary policy on TAIEX futures index returns.

Our hypothesis 9 is that the unexpected monetary policy not only directly moves TAIEX futures index returns, but also influences indirectly due to its effect on each of the investors sentiments. To test the hypothesis, we estimate the following regressions using TAIEX futures index returns as the dependent variable and the change of unexpected monetary policy decisions as independent variable; moreover, we also utilize the trading volume of different investors as dummy variable which stands for investor sentiment and the change of unexpected monetary policy decisions multiplies the dummy variable of trading volume as the interaction terms.

$$R_t = a + g_{11}X_t + g_{12}D_j + g_{13}X_tD_j + g_{14}R_{t-1} + g_{15}E_t + \varepsilon_t \qquad (21)$$

$$R_t = a + g_{21}Y_t + g_{22}D_j + g_{23}Y_tD_j + g_{24}R_{t-1} + g_{25}E_t + \varepsilon_t \qquad (22)$$

$$R_t = a + g_{31}Z_t + g_{32}D_j + g_{33}Z_tD_j + g_{34}R_{t-1} + g_{35}E_t + \varepsilon_t \qquad (23)$$

where R_t is the monthly TAIEX futures index returns, and X_t, Y_t and Z_t are different types of unexpected monetary policy decisions. R_{t-1} is the TAIEX futures index returns on month $t-1$ to take account of the cluster effects of volatility. E_t is the change of exchange rate. D_j is a dummy variable of trading volume as investors sentiment, and j from 1~5 that represents each of investors sentiments, which is equal to 1 if the trading volume is above its 50th percentile during our sample period, and zero otherwise, and that include domestic individuals, domestic corporations, domestic institutions, domestic dealers and foreign institutions. $X_t D_j$, $Y_t D_j$ and $Z_t D_j$ are interaction terms which represent dummy variable multiplies the change of unexpected monetary policy. ε_t is the error term.

<u>Domestic individuals</u>

In Table 21, when the change of rediscount rate rises 1%, the rate of return also rises around 0.3280% on the same direction. However, the coefficient of dummy variable has little effect on the rate of return; moreover, we can inspect that the when the investor sentiment is high, the rate of return will downturn 0.2419% while the change of rediscount rate rises 100-basis points, but the coefficient is not significant.

Furthermore, when the change of overnight rate rises 1%, the rate of return also rises around 0.4445% on the same direction. However, the coefficient of dummy variable has little effect on the rate of return; moreover, we can inspect that the overnight rate will have considerable influence when the sentiment of domestic individuals is high. While the investor sentiment is high, the rate of return will downturn 0.8264% while the change of overnight rate rises 100-basis points.

On the other side, when the M2 (YoY, Averages of daily figures) rises 1%, the rate of return also rises around 3.0348% on the same direction. However, the coefficient of dummy variable has little effect on the rate of return; moreover, we can inspect that the M2 (YoY, Averages of daily figures) will have considerable influence when the

sentiment of domestic individuals is high. When the investor sentiment is high, the rate of return will downturn 5.8574% while the M2 (YoY, Averages of daily figures) rises 100-basis points.

In conclusion, even though the coefficients of unexpected term aren't significant, we can see that the coefficients about the dummy variable multiplies the change of overnight rate and the M2 (YoY, Averages of daily figures) are statistically significant in 10% level. It means that the monetary policy overnight rate and the M2 have obviously impact on the rate of return when the sentiment of domestic individuals is high and the absolute value of the coefficients are much bigger than only the unexpected monetary policy term. Besides, we also discover that all of the monetary policy decisions have opposite effects by high sentiment.

Domestic corporations

In Table 22, when the change of rediscount rate rises 1%, the rate of return also rises around 0.3128% on the same direction. However, the coefficient of dummy variable has little effect on the rate of return. Besides, when the investor sentiment is high, the rate of returns will downturn 0.1257% while the change of rediscount rate rises 100-basis points, but the coefficient is not significant.

Furthermore, when the change of overnight rate rises 1%, the rate of return also rises around 0.3748% on the same direction. However, the coefficient of dummy variable has little effect on the rate of return, too; moreover, we can inspect that the change of overnight rate will have considerable influence when the sentiment of domestic corporations is high. When the investor sentiment is high, the rate of return will downturn 0.7297% while the change of overnight rate rises 100-basis points.

On the other side, when the M2 (YoY, Averages of daily figures) rises 1%, the rate of return also rises around 1.9848% on the same direction. However, the coefficient

of dummy variable has little effect on the rate of return, too; moreover, when the investor sentiment is high, the rate of returns will downturn 4.5842% while the M2 (YoY, Averages of daily figures) rises 100-basis points, but the same as the policy of rediscount rate that coefficient is not significant.

In conclusion, we can see the coefficient of the dummy variable multiplies the change of overnight rate is statistically significant in 10% level. It represents the monetary policy overnight rate has obviously impact on the rate of return when the sentiment of domestic corporations is high and the absolute value of the coefficient is much bigger than only unexpected monetary policy terms. Besides, we also discover that the monetary policy decisions have opposite effect by high sentiment.

<u>Domestic institutions</u>

In Table 23, both the change of rediscount rate and the coefficient of dummy variable have little influence on the rate of return, but the coefficient of dummy variable is significant; moreover, we can inspect that when the investor sentiment is high, the rate of return will increase 0.4105% while the change of rediscount rate rises 100-basis points, but the coefficient is not significant.

Furthermore, when the change of overnight rate rises 1%, the rate of return also downturns around 0.2264% on the opposite direction. However, the coefficient of dummy variable has little effect on the rate of return; moreover, we can inspect that the overnight rate will have considerable influence when the sentiment of domestic institutions is high. When the investor sentiment is high, the rate of return will increase 0.7104% while the change of overnight rate rises 100-basis points.

On the other side, when the M2 (YoY, Averages of daily figures) rises 1%, the rate of return also rises around 0.7399% on the same direction. However, the coefficient of dummy variable has little effect on the rate of return; moreover, we can inspect when

the investor sentiment is high, the rate of return decreases 0.5969% while the M2 (YoY, Averages of daily figures) rises 100-basis points, but the coefficient is not significant, either.

In conclusion, the coefficients of all of the dummy variable are significant but the absolute value of the coefficients are small. Besides, we can see the coefficient of the dummy variable multiplies the change of overnight rate is statistically significant in 10% level. It represents the monetary policy overnight rate has obviously impact on the rate of return when the sentiment of domestic institutions is high and the absolute value of the coefficient is much bigger than only unexpected monetary policy term.

Domestic dealers

In Table 24, when the change of rediscount rate rises 1%, the rate of return also rises around 0.4694% on the same direction. However, the coefficient of dummy variable has little effect on the rate of return; moreover, we can inspect that when the investor sentiment is high, the rate of return will downturn 0.5110% while the change of rediscount rate rises 100-basis points, but the coefficient is not significant.

Furthermore, when the change of overnight rate rises 1%, the rate of return also rises around 0.5841% on the same direction. However, the coefficient of dummy variable has little effect on the rate of return; moreover, we can discover that the overnight rate will have considerable influence when the sentiment of domestic dealers is high. When the investor sentiment is high, the rate of return will downturn 1.0252% while the change of overnight rate rises 100-basis points.

On the other side, when the M2 (YoY, Averages of daily figures) rises 1%, the rate of return also rises around 2.3097% on the same direction. However, the coefficient of dummy variable has little effect on the rate of return; moreover, we can inspect that when the investor sentiment is high, the rate of return decreases 4.9260% while the M2

(YoY, Averages of daily figures) rises 100-basis points, but the coefficient is not significant.

In conclusion, we can understand the coefficient of the change of rediscount rate, the change of overnight rate and the dummy variable multiplies the change of overnight rate are statistically significant in 10%, 5% and 5% level. It represents the monetary policy overnight rate has obviously impact on the rate of return when the sentiment of domestic dealers is high and the absolute value of the coefficients is much bigger than only the unexpected monetary policy term. Besides, we also discover that all of the monetary policy decisions have opposite effects by high sentiment.

Foreign institutions

In Table 25, when the change of rediscount rate rises 1%, the rate of return also rises around 0.0751% on the same direction. However, the coefficient of dummy variable has little effect on the rate of return; moreover, we can inspect that when the investor sentiment is high, the rate of return will increase 0.5211% while the change of rediscount rate rises 100-basis points, but the coefficient is not significant.

Furthermore, when the change of overnight rate rises 1%, the rate of return also rises around 0.7641% on the same direction. However, the coefficient of dummy variable has little effect on the rate of return, too; moreover, we can inspect that the overnight rate will have considerable influence when the sentiment of foreign institutions is high. When the investor sentiment is high, the rate of return will downturn 1.4351% while the change of overnight rate rises 100-basis points.

On the other side, when the M2 (YoY, Averages of daily figures) rises 1%, the rate of return also rises around 0.4714% on the same direction. However, the coefficient of dummy variable has little effect on the rate of return; moreover, we can inspect that when the investor sentiment is high, the rate of return increases 2.1128% while the M2

(YoY, Averages of daily figures) rises 100-basis points.

In conclusion, we can understand the coefficient of both the change of overnight rate and the dummy variable multiplies the change of overnight rate are statistically significant in 1% level. It represents the monetary policy overnight rate has obviously impact on the rate of return when the sentiment of foreign institutions is high and the absolute value of the coefficients is much bigger than only the unexpected monetary policy term.

4.11 Effect of investor sentiment and the unexpected monetary policy on TAIEX futures index returns in different regimes.

In addition, we would like to confirm whether there are asymmetries or not of interaction terms in different regime. The following regressions are similar to Eq. (21), Eq. (22) and Eq. (23) and we divide them into bull and bear market regimes.

<u>Domestic individuals</u>

The regression results reported in Panel A, B and C of Table 26, showing that each of monetary policy decisions moves on the same direction with the dependent variable in both bull and bear market.

Besides, the M2 (YoY, Averages of daily figures) has the greatest influence in all of three monetary policy decisions in bull and bear market. In addition, most of the investor sentiments have opposite and little effects on TAIEX futures index returns.

Second, we could observe that each of monetary policy decisions has huge effect on different regimes when we look at the interaction term. In the bull market, the change of rediscount rate has positive effect on the TAIEX futures index returns when the investor is in high sentiment. On the other sides, the change of overnight rate and the M2 (YoY, Averages of daily figures) have negative impacts while investors are in high

sentiment. Besides, In the bear market, all of the monetary policy decisions have big and negative impacts in high sentiment.

In conclusion, all of the coefficients of the interaction terms aren't statistically significant while the domestic individuals' sentiment is high. It is the same as previous research in section 4.4 that we could discover that the unexpected monetary policy decisions have no significant influence both in bull and market when the sentiment of domestic individuals is high.

Domestic corporations

The regression results reported in Panel A, B and C of Table 27, presenting that each of monetary policy decisions moves on the same direction with the TAIEX futures index returns in bull market. But when we see the results in bear market, we can find that the change of rediscount rate moves on the opposite direction with TAIEX futures index returns.

Besides, each of the policies has different effect, and the M2 (YoY, Averages of daily figures) has the greatest influence of all decisions both in bull and bear market, too. Furthermore, most of the investor sentiment of the domestic corporations have opposite but little effect on TAIEX futures index returns.

Second, we attempt to know that our hypothesis whether monetary policy decisions have significant effect due to high investor's sentiment. In the bull market, the change of rediscount rate and overnight rate influence negatively on the TAIEX futures index returns, but the M2 (YoY, Averages of daily figures) affects positively on the TAIEX futures index returns. On the other side, in bear market, the change of rediscount rate moves on the same direction with dependent variable, and others don't.

In conclusion, The TAIEX futures index returns tend to react obviously to the dummy variable of trading volume multiplies the M2 (YoY, Averages of daily figures)

in bear market, and the p-value is statistically significant at 10% level. Besides, we could find that there is asymmetric reaction in different regimes, and in line with the previous hypothesis 10, the monetary policy decisions have more influence in bear market when the sentiment of domestic corporations is high.

Domestic institutions

The regression results reported in Panel A, B and C of Table 28, and we can observe that the change of rediscount rate and the M2 (YoY, Averages of daily figures) move on the same direction with TAIEX futures index returns in bull market, but the change of overnight rate doesn't. On the other hand, when we see the results in bear market, each of monetary policy decisions moves on the opposite direction with the TAIEX futures index returns.

Besides, the M2 (YoY, Averages of daily figures) has the greatest influence of all of the decisions in bull and bear market, which is the same as the previous investors. Furthermore, most of the investor sentiment of the domestic institutions have opposite but little effect on TAIEX futures index returns.

Second, we focus on our hypothesis and observe the interaction terms. In the bull market, the change of rediscount rate and the change of overnight rate positively influence on the TAIEX futures index returns. On the other sides, the M2 (YoY, Averages of daily figures) has negative impact when investor's sentiment is high. Besides, In the bear market, all of the monetary policy decisions have huge positive impact in high sentiment.

Therefore, we can conclude that the TAIEX futures index returns tend to react obviously to the dummy variable of trading volume multiplies the change of rediscount rate in bull market and the change of overnight rate in bear market. Those p-value are statistically significant at 10% and 5% level. The monetary policy decisions have

considerable influence in both bull and bear market when the sentiment of domestic institutions is high.

Domestic dealers

The regression results reported in Panel A, B and C of Table 29, presenting that the change of rediscount rate and the M2 (YoY, Averages of daily figures) move on the same direction with the TAIEX futures index returns, but the change of overnight rate moves on the opposite direction with the TAIEX futures index returns in bull market. On the other side, when we observe the bear market, all of the monetary policy decisions move on the same direction with TAIEX futures index returns.

Besides, both in bull and bear market, the M2 (YoY, Averages of daily figures) has the greatest influence of all decisions. Furthermore, most of the investor sentiment have opposite but little effect on TAIEX futures index returns.

Second, when we focus on our hypothesis whether monetary policy decisions have significant effect in high investor sentiment, we will find that each of monetary policy decisions has huge influence on different regimes. In the bull market, the change of rediscount rate and overnight rate have positive effect on the TAIEX futures index returns. On the other sides, the M2 (YoY, Averages of daily figures) has negative impact. Besides, In the bear market, all of the monetary policy decisions have huge negative impact in high sentiment.

In conclusion, we could find that there are asymmetric reactions in different regimes. In bear market, The TAIEX futures index returns tend to react obviously to the interaction term of the change of rediscount rate, the change of overnight rate and the M2 (YoY, Averages of daily figures), and those p-value are statistically significant in 5%, 5% and 10% level. It is the same as the previous hypothesis that the monetary policy decisions have more influence in bear market when the sentiment of domestic

dealers is high.

<u>Foreign institutions</u>

We enter into the last part of this topic, and the regression results reported in Panel A, B and C of Table 30. We can discover that the change of overnight rate and the M2 (YoY, Averages of daily figures) move on the same direction with the TAIEX futures index returns in bull market and bear market; however, the change of rediscount rate doesn't.

Besides, the change of overnight rate has the greatest influence among three decisions in bull market, and it is different from the previous investors we mention. On the other side, the M2 (YoY, Averages of daily figures) has the greatest influence among three actions in bear market. Furthermore, most of the investor sentiment have opposite but little influence on TAIEX futures index returns.

Second, when we focus on our hypothesis whether monetary policy decisions have significant effect when investor sentiment is high, we could find that each of monetary policy decisions has huge effect on different regimes. In the bull market, the change of rediscount rate and the M2 (YoY, Averages of daily figures) influence positively on the TAIEX futures index returns. On the other sides, the change of overnight rate has negative impact in high sentiment. Besides, In the bear market, both the change of overnight rate and the M2 (YoY, Averages of daily figures) have huge negative impact in high sentiment, but the change of rediscount rate doesn't.

In conclusion, The TAIEX futures index returns tend to react strongly to the dummy variable of trading volume multiplies the change of rediscount rate in bull market, and the p-value is 5% level. However, in bear market, The TAIEX futures index returns tend to react obviously to the interaction term of the change of overnight rate and this p-value is 5% level. Finally, we could find that there are asymmetric reactions

in different regimes.

4.12 Effect of investor sentiment and the unexpected tight and easy monetary policy on TAIEX futures index returns.

Our hypothesis 11 is that the unexpected tight and easy monetary policy moves TAIEX futures index returns, in part, through its effect on each of the investors sentiment. For the purpose of testing the hypothesis, we utilize TAIEX futures index returns as the dependent variable and the dummy variables of the unexpected monetary policy decisions as independent variables; moreover, we also employ the trading volume from each of the investors as dummy variable and dummy variable of unexpected monetary policy decisions multiply the dummy variable of trading volume as the interaction term.

$$R_t = a + g_{11}MP_{tRtight} + g_{12}MP_{tReasy} + g_{13}D_j + g_{14}MP_{tRtight}D_j +$$
$$g_{15}MP_{tReasy}D_j + g_{16}R_{t-1} + g_{17}E_t + \varepsilon_t \tag{24}$$

$$R_t = a + g_{21}MP_{tOtight} + g_{22}MP_{tOeasy} + g_{23}D_j + g_{24}MP_{tOtight}D_j +$$
$$g_{25}MP_{tOeasy}D_j + g_{26}R_{t-1} + g_{27}E_t + \varepsilon_t \tag{25}$$

$$R_t = a + g_{31}MP_{tMtight} + g_{32}MP_{tMeasy} + g_{33}D_j + g_{34}MP_{tMtight}D_j +$$
$$g_{35}MP_{tMeasy}D_j + g_{36}R_{t-1} + g_{37}E_t + \varepsilon_t \tag{26}$$

where R_t is the monthly TAIEX futures index returns, $MP_{tRtight}$, MP_{tReasy}, $MP_{tOtight}$, MP_{tOeasy}, $MP_{tMtight}$ and MP_{tMeasy} are different unexpected monetary policy decisions. R_{t-1} is the TAIEX futures index returns on month t – 1 to take account of the cluster effects of volatility. E_t is the change of exchange rate. D_j is a dummy variable of trading volume as investor sentiment, and j from 1~5 that represents each of investors sentiment, which is equal to 1 if the trading volume is above its 50th percentile during our sample period, and zero otherwise, and include domestic

individuals, domestic corporations, domestic institutions, domestic dealers and foreign institutions. $MP_{tRtight}D_j$, $MP_{tReasy}D_j$, $MP_{tOtight}D_j$, $MP_{tOeasy}D_j$, $MP_{tMtight}D_j$, and $MP_{tMeasy}D_j$ are interaction terms. ε_t is the error term.

<u>Domestic individuals</u>

In Table 31, when the change of rediscount rate rises 1%, the rate of return decreases around 0.2163% in the tight monetary policy decisions and decreases 0.7622% in the easy monetary policy decisions while the change of rediscount rate decreases 1%. However, the coefficient of dummy variable has little effect on the rate of return; moreover, we can inspect that the rediscount rate will have considerable influence when the sentiment of domestic individuals is high. When the investor sentiment is high, the rate of return will decrease 0.1574% in the tight monetary policy while the change of rediscount rate rises 100-basis points and increase 0.6847% in the easy monetary policy while the change of rediscount rate decreases 100-basis points.

Furthermore, when the change of overnight rate rises 1%, the rate of return rises around 0.3654% in tight monetary policy decisions and increase 0.1932% in the easy monetary policy decisions while the change of overnight rate decreases 1%. However, the coefficient of dummy variable has little effect on the rate of return; moreover, we can inspect that the overnight rate will have considerable influence when the sentiment of domestic individuals is high. When the investor sentiment is high, the rate of return will downturn 0.9516% in the tight monetary policy while the change of overnight rate rises 100-basis points and increase 0.0689% in the easy monetary policy while the change of overnight rate decreases 100-basis points.

On the other side, when the M2 (YoY, Averages of daily figures) decreases 1%, the rate of return also increases around 3.3940% in the tight monetary policy decisions and increases 8.6701% in the easy monetary policy decisions while the M2 (YoY, Averages of daily figures) increases 1%. However, the coefficient of dummy variable

has little effect on the rate of return; moreover, we can inspect that the M2 (YoY, Averages of daily figures) will have considerable influence when the sentiment of domestic individuals is high. When the investor sentiment is high, the rate of return decreases 2.7496% in the tight monetary policy decisions while the M2 (YoY, Averages of daily figures) reduces 100-basis points and decreases 14.6064% in the easy monetary policy while the M2 (YoY, Averages of daily figures) increases 100-basis points.

In conclusion, we can see the coefficient of the change of rediscount rate in the easy monetary policy decisions is statistically significant in 10% level. Besides, in the easy monetary policy decisions, the coefficient of the M2 (YoY, Averages of daily figures) and the interaction term are statistically significant in 5% level. It represents the monetary policy M2 has obviously impact on the rate of return when the sentiment of domestic individuals is high in the easy monetary policy decisions. Besides, we also discover that most of the monetary policy decisions have opposite effect by high sentiment. Further, we can infer that when in high sentiment, the monetary policy would have more impact.

Domestic corporations

In Table 32, when the change of rediscount rate rises 1%, the rate of return decreases around 0.2381% in the tight monetary policy decisions and decreases 0.7852% in the easy monetary policy decisions while the change of rediscount rate decrease 1%. However, the coefficient of dummy variable has little effect on the rate of return; moreover, we can inspect that the rediscount rate will have considerable influence when the sentiment of domestic corporations is high. When the investor sentiment is high, the rate of return will increase 0.1268% in the tight monetary policy while the change of rediscount rate rises 100-basis points and increase 0.8819% in the easy monetary policy while the change of rediscount rate decreases 100-basis points.

Furthermore, when the change of overnight rate rise 1%, the rate of return rises around 0.2796% in tight monetary policy decisions and decreases 0.5205% in the easy monetary policy decisions while the change of overnight rate decreases 1%. However, the coefficient of dummy variable has little effect on the rate of return; moreover, we can inspect that the overnight rate will have considerable influence when the sentiment of domestic corporations is high. When the investor sentiment is high, the rate of return will downturn 0.3928% in the tight monetary policy while the change of overnight rate rises 100-basis points and increase 1.0684% in the easy monetary policy while the change of overnight rate decreases 100-basis points.

On the other side, when the M2 (YoY, Averages of daily figures) decreases 1%, the rate of return increases around 1.7351% in the tight monetary policy decisions and increases 6.9137% in the easy monetary policy decisions while the M2 (YoY, Averages of daily figures) increases 1%. However, the coefficient of dummy variable has little effect on the rate of return; moreover, we can inspect that the M2 (YoY, Averages of daily figures) will have considerable influence when the sentiment of domestic corporations is high. When the investor sentiment is high, the rate of return increases 10.6196% in the tight monetary policy decisions while the M2 (YoY, Averages of daily figures) decreases 100-basis points and reduces 1.6876% in the easy monetary policy while the M2 (YoY, Averages of daily figures) rises 100-basis points.

In conclusion, we can see the coefficient of the change of rediscount rate and the M2 (YoY, Averages of daily figures) in the easy monetary policy decisions as well as the interaction term of overnight rate in the easy monetary policy decisions are statistically significant in 5%, 10% and 5% level. It represents the monetary policy overnight rate have obviously impact on the rate of return when the sentiment of domestic corporations is high in the easy monetary policy decisions. Besides, we also discover that most of the monetary policy decisions have opposite effect by high

sentiment. We can further infer that when in high sentiment, the monetary policy would have more impact.

Domestic institutions

In Table 33, when the change of rediscount rate rises 1%, the rate of return increases around 0.3497% in the tight monetary policy decisions and rises 0.4936% in the easy monetary policy decisions while the change of rediscount rate decreases 1%. However, the coefficient of dummy variable has little effect on the rate of return; moreover, we can inspect that the rediscount rate will have considerable influence when the sentiment of domestic institutions is high. When the investor sentiment is high, the rate of return will decrease 0.4315% in the tight monetary policy while the change of rediscount rate rises 100-basis points and reduce 0.8704% in the easy monetary policy while the change of rediscount rate decreases 100-basis points.

Furthermore, when the change of overnight rate rises 1%, the rate of return rises around 0.2891% in tight monetary policy decisions and increases 0.5102% in the easy monetary policy decisions while the change of overnight rate decreases 1%. However, the coefficient of dummy variable has little effect on the rate of return; moreover, we can inspect that the overnight rate will have considerable influence when the sentiment of domestic institutions is high. When the investor sentiment is high, the rate of return will downturn 0.1576% in the tight monetary policy while the change of overnight rate rises 100-basis points and reduces 0.2151% in the easy monetary policy while the change of overnight rate rises 100-basis points

On the other side, when the M2 (YoY, Averages of daily figures) decreases 1%, the rate of return rises around 2.2804% in the tight monetary policy decisions and increase 3.2378% in the easy monetary policy decisions while the M2 (YoY, Averages of daily figures) increases 1%. However, the coefficient of dummy variable has little

effect on the rate of return; moreover, we can inspect that the M2 (YoY, Averages of daily figures) will have considerable influence when the sentiment of domestic institutions is high. When the investor sentiment is high, the rate of return increases 1.4456% in the tight monetary policy decisions while the M2 (YoY, Averages of daily figures) reduces 100-basis points and increases 2.5952% in the easy monetary policy decisions while the M2 (YoY, Averages of daily figures) increases 100-basis points.

In conclusion, the coefficient of all of the unexpected monetary policy decisions as well as the interaction terms aren't statistically significant. It represents the unexpected tight and easy monetary policy decisions don't have obviously impact on the rate of return when the sentiment of domestic institutions is high. Besides, we also discover that most of the unexpected tight monetary policy decisions have the opposite effect by high sentiment, and the unexpected easy monetary policy decisions have the positive effect by high sentiment. Further, we can infer that when in high sentiment, the monetary policy would have more impact.

Domestic dealers

In Table 34, when the change of rediscount rate rises 1%, the rate of return decreases around 0.1366% in the tight monetary policy decisions and decreases 0.4403% in the easy monetary policy decisions while the change of rediscount rate decreases 1%. However, the coefficient of dummy variable has little effect on the rate of return; moreover, we can inspect that the rediscount rate will have considerable influence when the sentiment of domestic dealers is high. When the investor sentiment is high, the rate of return will increase 0.0131% in the tight monetary policy while the change of rediscount rate rises 100-basis points and rise 0.1190% in the easy monetary policy while the change of rediscount rate decreases 100-basis points.

Furthermore, when the change of overnight rate rises 1%, the rate of return

decreases around 0.3531% in tight monetary policy decisions and downturns 1.4170% in the easy monetary policy decisions while the change of overnight rate decreases 1%. However, the coefficient of dummy variable has little effect on the rate of return; moreover, we can inspect that the overnight rate will have considerable influence when the sentiment of domestic dealers is high. When the investor sentiment is high, the rate of return will rise 0.7686% in the tight monetary policy while the change of overnight rate rises 100-basis points and rise 2.0438% in the easy monetary policy when the change of overnight rate decreases 100-basis points.

On the other side, when the M2 (YoY, Averages of daily figures) decreases 1%, the rate of return increases around 3.1171% in the tight monetary policy decisions and increases 8.0949% in the easy monetary policy decisions while the M2 (YoY, Averages of daily figures) increases 1%. However, the coefficient of dummy variable has little effect on the rate of return; moreover, we can inspect that the M2 (YoY, Averages of daily figures) will have considerable influence when the sentiment of domestic dealers is high. When the investor sentiment is high, the rate of return increases 1.0122% in the tight monetary policy decisions while the M2 (YoY, Averages of daily figures) deceases 100-basis points and decreases 11.0318% in the easy monetary policy decisions while the M2 (YoY, Averages of daily figures) increases 100-basis points.

In conclusion, we can see, the coefficient of the change of overnight rate in easy monetary policy decisions and the interaction term in the easy monetary policy decisions are statistically significant in 1% level. It represents the monetary policy overnight rate have obviously impact on the rate of return when the sentiment of domestic dealers is high in the easy monetary policy decisions. Besides, we also discover that most of the monetary policy decisions have opposite effect by high sentiment. Further, we can infer that when in high sentiment, the monetary policy would have more impact.

<u>Foreign institutions</u>

In Table 35, when the change of rediscount rate rises 1%, the rate of return decreases around 0.6113% in the tight monetary policy decisions and downturns 0.7432% in the easy monetary policy decisions when the change of rediscount rate reduces 1%. However, the coefficient of dummy variable has little effect on the rate of return; moreover, we can inspect that the rediscount rate will have considerable influence when the sentiment of foreign institutions is high. When the investor sentiment is high, the rate of return will increase 1.3887% in the tight monetary policy while the change of rediscount rate rises 100-basis points and rises 0.9235% in the easy monetary policy while the change of rediscount rate decreases 100-basis points.

Furthermore, when the change of overnight rate rises 1%, the rate of return increases around 0.1264% in tight monetary policy decisions and increases 1.2817% in the easy monetary policy decisions when the change of overnight rate reduces 1%. However, the coefficient of dummy variable has little effect on the rate of return; moreover, we can inspect that the overnight rate will have considerable influence when the sentiment of foreign institutions is high. When the investor sentiment is high, the rate of return will rise 0.1784% in the tight monetary policy while the change of overnight rate rises 100-basis points and rise 1.9337% in the easy monetary policy while the change of overnight rate decreases 100-basis points.

On the other side, when the M2 (YoY, Averages of daily figures) decreases 1%, the rate of return increases around 5.2280% in the tight monetary policy decisions and increases 6.1465% in the easy monetary policy decisions when the M2 (YoY, Averages of daily figures) increases 1%. However, the coefficient of dummy variable has little effect on the rate of return; moreover, we can inspect that the M2 (YoY, Averages of daily figures) will have considerable influence when the sentiment of foreign institutions is high. When the investor sentiment is high, the rate of return decreases

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5.8487% in the tight monetary policy decisions while the M2 (YoY, Averages of daily figures) decreases 100-basis points and decreases 0.8362% in the easy monetary policy decisions while the M2 (YoY, Averages of daily figures) rises 100-basis points.

In conclusion, we can see in easy monetary policy decisions, the coefficient of all of the monetary policy decisions are statistically significant. Besides, the interaction term of rediscount rate has huge impact in tight monetary policy and statically significant at 10% level; on the other hand, the interaction term of overnight rate has considerable influence in easy monetary policy and is statically significant at 1% level. It represents the monetary policy have obviously impact on the rate of return when the sentiment of foreign institutions is high both in the tight and easy monetary policy decisions. Besides, we also discover that most of the monetary policy decisions have opposite effect in easy monetary policy by high sentiment. Further, we can infer that when in high sentiment, the monetary policy would have more impact.
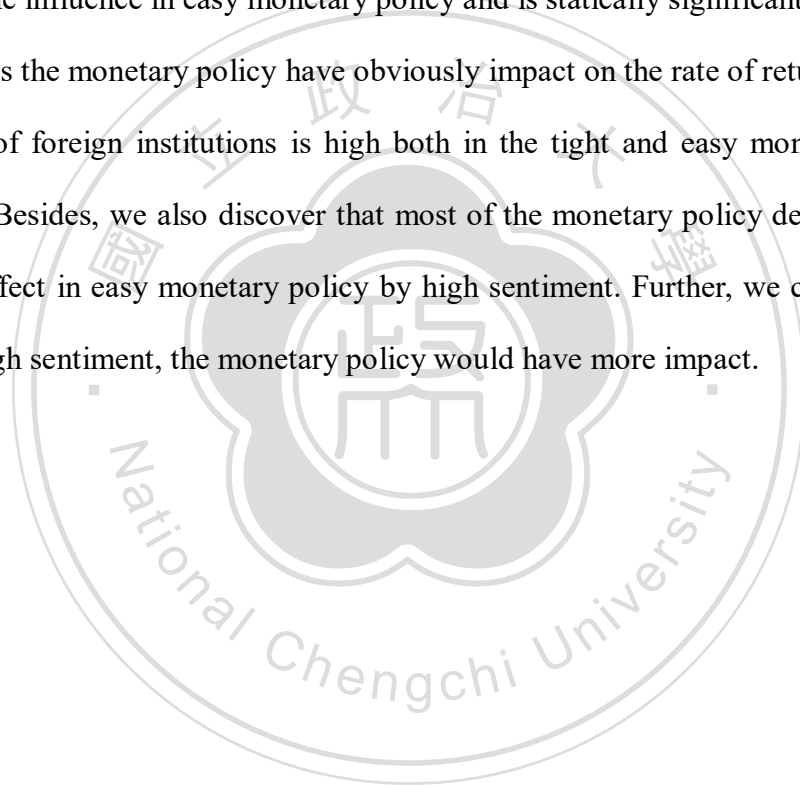
4.13 Effect of investor sentiment and the unexpected tight and easy monetary policy on TAIEX futures index returns in different regimes.

<u>Domestic individuals</u>

The regression results reported in Panel A, B and C of Table 36, and we can inspect that both unexpected tight policy decision and unexpected easy monetary policy decision have obvious influence and the coefficients are statistically significant at 5% level when we utilize the change of rediscount rate as monetary policy decision. On the other hand, when we focus on the monetary policy about the M2 (YoY, Averages of daily figures), unexpected easy monetary policy decision is statistically significant at 10% level in bull market.

Furthermore, we cannot discover the asymmetric reaction in different regimes when investor sentiment is high on account of the coefficients of interaction terms in both bull and bear market are not statistically significant. In conclusion, when domestic individuals' sentiment is high, there is no considerable effect in both market.

<u>Domestic corporations</u>

The regression results reported in Panel A, B and C of Table 37. When we utilize the change of rediscount rate as the monetary policy decision, we can see that the unexpected tight monetary policy decision has obvious influence in bear market and the coefficient is statistically significant at 5% level; however, the unexpected easy monetary policy decision has obvious influence and the coefficient is statistically significant at 10% level in bull market. On the other hands, when we focus on the monetary policy about the change of overnight rate, the unexpected easy monetary policy is statistically significant at 5% level in bull market.

Furthermore, there is an asymmetric reaction in different regime when investor sentiment is high. While utilizing the change of overnight rate as the monetary policy decision, we could find that the easy monetary policy has bigger effect on TAIEX futures index returns in bull market and the coefficient is statistically significant at 5% level. Due to this reason, we attempt to make a conclusion that the TAIEX futures index returns tend to react strongly to unexpected tight and easy monetary policy decisions on account of different market regimes; besides, when in high sentiment, the unexpected easy monetary policy decisions have considerable effect in bull market.

Domestic institutions

The regression results reported in Panel A, B and C of Table 38, we can inspect that the coefficient of monetary policy decisions and the interaction terms are not statistically significant both in tight and easy monetary policy in bull or bear market.

In conclusion, The TAIEX futures index returns tend to react weakly to unexpected tight and easy monetary policy decisions on account of different market regimes.

Domestic dealers

The regression results reported in Panel A, B and C of Table 39, we can understand that the coefficient is statistically significant at 5% level in tight monetary policy decision in bear market while focusing on the change of rediscount rate.

Furthermore, there are asymmetric reactions in different regimes. When we focus on the easy monetary policy of the change of overnight rate, we could find that in bear market has bigger effect on TAIEX futures index returns than in bull market, and the coefficient is more statistically significant at 5% level. Besides, when we focus on the tight monetary policy of the change of overnight rate, we could find that in bull market has larger effect on TAIEX futures index returns than in bear market, and the coefficient

is more statistically significant at 10% level. On the other hand, when we focus on the tight monetary policy of the M2 (YoY, Averages of daily figures), we would discover that in bear market has bigger effect on TAIEX future index returns than in bull market, and the coefficient is more statistically significant at 10% level.

In conclusion, when in high sentiment, we could discover that there are asymmetric reactions in different regimes according to easy or tight monetary policy.

Foreign institutions

The regression results reported in Panel A, B and C of Table 40, we can inspect that in bear market, the unexpected tight monetary policy decisions of the change of rediscount rate has obvious influence and the coefficient is more statistically significant at 5% level and unexpected easy monetary policy actions of the change of rediscount rate has significant effect in 10% level; moreover, the unexpected easy monetary policy decisions of the M2 (YoY, Averages of daily figures) has obvious influence and the coefficient is statistically significant at 10% level.

Furthermore, there are asymmetric reactions in different regime. When we focus on the easy monetary policy of the change of rediscount rate, we could find that in bull market the coefficient has bigger effect on TAIEX futures index returns than in bear market, and the coefficient is more statistically significant at 10% level. However, while we concentrate on the change of overnight rate, we could discover that in bear market has bigger effect of TAIEX futures index returns than in bull market, and the coefficient is more statistically significant at 5% level.

In conclusion, The TAIEX futures index returns tend to react strongly to unexpected monetary policy decisions in bear market. Besides, when in high sentiment, the unexpected easy monetary policy decisions have considerable effect either in bull or bear market.

4.14 Summary statistics of empirical result

Table 41 presents the summarized interaction terms which are significant of actual monetary policy. First of all, we can find that all of the coefficients are negative, which mean when the investors sentiment is high, the monetary policy decisions have negative relationship with the rate of return. Besides, most of the investors have at least one monetary policy which will influence the returns significantly when in high sentiment except for the domestic institutions, especially the overnight rate. The authority could try to influence the overnight rate and attain its goals and the conclusion is in line with our hypothesis 7.

Furthermore, Table 42 presents the summarized interaction terms which are significant of actual monetary policy in different regimes. We could find there are asymmetric effect among different types of investors. The coefficient of domestic individuals and domestic corporations are significant in bull market; on the other hands, the coefficient of domestic institutions, domestic dealers and foreign institutions are significant in bear market. The conclusion isn't in line with our hypothesis 8.

According to Chen (2007), he discovers that monetary policy has a bigger influence in bear markets due to financial limits confronted by corporations. Besides, From Kurov (2010) studies, he finds that policy shocks have a considerable effect on investor sentiment in bear market. Therefore, we suppose when the investor sentiment is high, the monetary policy has more influence in bear market. However, Table 42 shows that both domestic individuals and domestic corporations have more influence in bull market. Possible explanations might home money effect we mention before or both of them are have considerable disposition effect according to Hsieh (2016). Because it is a signal for them to realize the gains when the authority adjusts the monetary policy in bull market. However, in bear market, they try to avoid the losses even if the authority

utilizes the easy monetary policy.

Table 43 presents the summarized interaction terms and we can understand that some of them are significant. First of all, we can find that most of the coefficients are negative except the domestic institutions, which means when the investors sentiment is high, the unexpected monetary policy decisions have negative relationship with the rate of return. Besides, all of the investors have at least one monetary policy which will influence the returns when in high sentiment, especially the overnight rate, which is the same as the actual monetary policy. The authority could try to influence the overnight rate and attain its goals and the conclusion is in line with our hypothesis 9.

Furthermore, Table 44 presents the summarized interaction terms which are significant of unexpected monetary policy in different regimes. We could find there are asymmetric effect among different types of investors, but the domestic individuals don't. On the other hands, the coefficients of domestic corporations and domestic dealers are significant in bear market. Besides, the coefficients of domestic institutions and foreign institutions are significant in both bull and bear market due to different monetary policy. The conclusion isn't in line with our hypothesis 10.

Table 45 presents the summarized interaction terms which are significant of unexpected tight and easy monetary policy. It is the same as Table 41 that most of the coefficients are negative. Besides, the results are in accordance with the researches in Taiwan markets that unexpected easy monetary policy has much more influence than unexpected tight monetary policy and show the asymmetric effects. The conclusion is in line with our hypothesis 11.

When we go further to see the interaction terms in different regimes which summarized in Table 46, we could find that the coefficient of domestic corporations is significant in bull market and we mention the reasons before. On the other hand, the coefficients of domestic dealers and foreign institutions are significant in both bull and

bear market due to different monetary policy. The conclusion isn't in line with our

hypothesis 12.

5. Summary and conclusion

Because it has caused controversy in the effectiveness of monetary policy in recent years. Durham (2003) study mentions that the equity market reaction would be driven by the unanticipated monetary policy decisions. Our conclusions are the same as most of the papers that it is not significant in all of the actual monetary policy decisions. However, when we take further step to divide the data into bull and bear market, we can find there is asymmetric reaction in the change of rediscount rate and it is much more significant in bull market.

Besides, when we examine how unexpected monetary policy influences the TAIEX futures index returns, it isn't statistically significant, either. Still, we divide those data into different regimes, and the results are in line with the actual monetary policy that the change of rediscount rate is significant in bull market. Next, we further divide the unexpected monetary policy into tight monetary policy and easy monetary policy and attempt to know which would influence the rate of return.

We employ the methodology from Chan (1992) studies and separate the unexpected monetary into two parts, tight and easy monetary policy decisions. We find that the coefficient of the unexpected easy monetary policy the M2 (YoY, Averages of daily figures) is significant. It's in accordance with the studies from Sun (2013) and Ou (2013) that the rediscount rate has less influence over the past few years. Nevertheless, when we put the data in different regimes, either tight or easy monetary policy, we also find it is significant in the change of rediscount rate in bear market. It represents there is asymmetric reaction and the unexpected monetary policy is much more significant in bear market. Our results are the same as most of the papers, and the reason might be the financial limits faced by corporations.

Furthermore, Kurov (2010) discovers that policy surprises have a considerable

effect on investor sentiment. We make further efforts to examine that whether there are different influences of the monetary policy decisions for each of the investors in high sentiment. First of all, we utilize the actual monetary policy as independent variables. Our results show that most investors have significant influences by one or two monetary policy decisions while the investors sentiment is high in addition to the domestic institutions. Still, we also attempt to use the unexpected policy as independent variables, and the conclusion is similar to the actual monetary policy. It means that the investor sentiment plays a sizeable role in the relationship between the monetary policy and the TAIEX futures index returns.

On the other hand, when we divide into two parts, bull and bear market, the results of actual monetary policy show that there are asymmetric reactions and the coefficients of interaction terms in domestic individuals and domestic corporations are much more significant in bull market, but the coefficients of interaction terms in domestic institutions, domestic dealers and foreign institutions are significant in bear market.

Furthermore, when we analyze the unexpected monetary policy in bull and bear market. In bear market, the coefficients of domestic corporations and domestic dealers are significant; moreover, the coefficients of domestic institutions and foreign institutions are significant in both bull and bear market.

Besides, when we use the unexpected tight and easy monetary policy as independent variables, we could discover that the monetary shocks will considerably affect the returns by each of the investors in high sentiment except for domestic institutions. On the other side, we can further inspect that the easy monetary policy decisions have significant negative influence. It's consistent with the finding from Yu (2005) studies that easy monetary policy actions are more significant in Taiwan.

The last but not least, our results show that there are asymmetric reactions in

different market regimes by unexpected tight and easy monetary policy. The coefficient of domestic corporations is more significant in bull market. However, the coefficients of domestic dealers and foreign institutions are significant both in bull and bear market.

In conclusion, we find that monetary policy decisions have asymmetric reactions in different regimes. Besides, the investors sentiment plays an important role in the relationship between the returns and monetary policy, and when investor sentiment is high, there are asymmetric reactions in different market regimes. We recommend that further researches can choose different indicators as investor sentiment to analyze and investigate to make it more complete.

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Table 1 Descriptive statistics of the sample variables

Sample Variable	Mean	Median	Standard deviation
TAIEX futures index returns	0.25%	0.34%	7.84%
The change of rediscount rate	-0.70%	0.00%	5.63%
The change of overnight rate	-1.46%	-0.08%	7.11%
M2 (YoY, Averages of daily figures)	4.97%	5.56%	1.84%

Table 2 Trading percentage of five types of investors in whole sample period

	Whole period	Bull market period	Bear market period
Types of Investors		Trading Percentage	
Domestic individuals	74.07%	71.63%	83.10%
Domestic corporations	0.80%	0.78%	0.85%
Domestic institutions	1.10%	1.16%	0.89%
Domestic dealers	16.98%	18.50%	3.82%
Foreign institutions	7.05%	7.93%	11.35%
Total	100%	100%	100%

Table 3 Descriptive statistics of the change of trading volume of different investors

Sample Variable	Mean	Median	Standard deviation
Domestic individuals	6.93%	1.64%	33.19%
Domestic corporations	7.75%	-1.21%	40.32%
Domestic institutions	20.28%	7.54%	70.50%
Domestic dealers	9.80%	5.71%	32.67%
Foreign institutions	131.27%	6.39%	1064.76%

Table 4 Results from ADF tests on each variable

Variable	Level	1 st difference
TAIEX futures index returns	-10.1664***	
The change of rediscount rate	-2.7468*	
The change of overnight rate	-3.6035***	
M2(YoY, Averages of daily figures)	-2.0016	-6.078834***
The change of trading volume-		
Domestic corporations	-13.1470***	
Domestic individuals	-14.7721***	
Domestic dealers	-16.3677***	
Domestic institutions	-11.2732***	
Foreign institutions	-9.9818***	

*Coefficient is statistically significant at 10% level; **coefficient is statistically significant at 5% level; ***coefficient is statistically significant at 1% level.

Table 5 Effect of the actual monetary policy decisions on TAIEX futures index returns.
Panel A. The change of rediscount rate

Independent Variables	Dependent Variables: Rate of Return
Intercept	-0.0014
	(0.0070)
The change of rediscount rate	0.2146
	(0.1547)
R_{t-1}	-0.0047
	(0.1081)
E_t	-2.0043***
	(0.6037)
R^2	0.1492

Panel B. The change of overnight rate

Independent Variables	Dependent Variables: Rate of Return
Intercept	-0.0033
	(0.0073)
The change of overnight rate	-0.0461
	(0.1456)
R_{t-1}	0.0119
	(0.1106)
E_t	-1.9523***
	(0.6091)
R^2	0.1169

Panel C. M2 (YoY, Averages of daily figures)

Independent Variables	Dependent Variables: Rate of Return
Intercept	-0.0034
	(0.0069)
M2 (YoY, Averages of daily figures)	1.0668
	(1.3003)
R_{t-1}	0.0210
	(0.1051)
E_t	-1.9566***
	(0.5901)
R^2	0.1299

*Coefficient is statistically significant at 10% level; **coefficient is statistically significant at 5% level; ***coefficient is statistically significant at 1% level. Standard errors are shown in parentheses.

Table 6 Effect of actual monetary policy decisions on TAIEX futures index returns in different market regimes.

Panel A. The change of rediscount rate in different market regimes.

Independent Variables	Dependent Variables: Rate of Return	
	Bull Market	Bear Market
Intercept	-0.0074	0.0010
	(0.0074)	(0.0230)
The change of rediscount rate	0.5311**	0.0882
	(0.2385)	(0.3238)
R_{t-1}	0.0104	-0.0762
	(0.1335)	(0.2077)
E_t	-1.5701***	-3.2185*
	(0.5868)	(1.7241)
R^2	0.2163	0.1375

Panel B. The change of overnight rate in different market regimes.

Independent Variables	Dependent Variables: Rate of Return	
	Bull Market	Bear Market
Intercept	-0.0047	-0.0163
	(0.0075)	(0.0269)
The change of overnight rate	0.1240	-0.2827
	(0.1905)	(0.3763)
R_{t-1}	0.1094	-0.0907
	(0.1317)	(0.2156)
E_t	-1.5002**	-2.8261
	(0.6108)	(1.7628)
R^2	0.1424	0.1537

Panel C. M2 (YoY, Averages of daily figures) in different market regimes.

Independent Variables	Dependent Variables: Rate of Return	
	Bull Market	Bear Market
Intercept	-0.0032	-0.0057
	(0.0073)	(0.0174)
M2(YoY, Averages of daily figures)	0.7223	1.7869
	(1.3757)	(3.1125)
R_{t-1}	0.1047	-0.0732
	(0.1313)	(0.1988)
E_t	-1.5787**	2.9781*
	(0.6002)	(1.5981)
R^2	0.1428	0.1467

*Coefficient is statistically significant at 10% level; **coefficient is statistically significant at 5% level; ***coefficient is statistically significant at 1% level. Standard errors are shown in parentheses.

Table 7 Effect of the unexpected monetary policy decisions on TAIEX futures index returns.
Panel A. The change of rediscount rate

Independent Variables	Dependent Variables: Rate of Return
Intercept	-0.0047
	(0.0070)
The change of rediscount rate	0.2857
	(0.2046)
R_{t-1}	-0.0527
	(0.1107)
E_t	-1.8344***
	(0.5916)
R^2	0.1234

Panel B. The change of overnight rate

Independent Variables	Dependent Variables: Rate of Return
Intercept	-0.0065
	(0.0069)
The change of overnight rate	0.1272
	(0.2096)
R_{t-1}	0.0162
	(0.1068)
E_t	-1.8964***
	(0.5818)
R^2	0.1278

Panel C. M2 (YoY, Averages of daily figures)

Independent Variables	Dependent Variables: Rate of Return
Intercept	-0.0034
	(0.0069)
M2 (YoY, Averages of daily figures)	0.9240
	(1.6232)
R_{t-1}	0.0271
	(0.1053)
E_t	-1.9141***
	(0.5988)
R^2	0.1264

*Coefficient is statistically significant at 10% level; **coefficient is statistically significant at 5% level; ***coefficient is statistically significant at 1% level. Standard errors are shown in parentheses.

Table 8 Effect of the unexpected monetary policy decisions on TAIEX futures index returns in different market regimes.

Panel A. The change of rediscount rate in different market regimes.

Independent Variables	Dependent Variables: Rate of Return	
	Bull Market	Bear Market
Intercept	-0.0059	-0.0078
	(0.0076)	(0.0180)
The change of rediscount rate	0.4699*	0.1461
	(0.2698)	(0.3736)
R_{t-1}	0.0176	-0.1329
	(0.1419)	(0.2072)
E_t	-1.3890**	-2.9947*
	(0.5945)	(1.6028)
R^2	0.1420	0.1433

Panel B. The change of overnight rate in different market regimes.

Independent Variables	Dependent Variables: Rate of Return	
	Bull Market	Bear Market
Intercept	-0.0099	-0.0081
	(0.0093)	(0.0210)
The change of overnight rate	0.3200	0.0282
	(0.3562)	(0.4408)
R_{t-1}	0.0555	-0.0391
	(0.1367)	(0.1935)
E_t	-1.5398**	-2.8519*
	(0.6024)	(1.5654)
R^2	0.1437	0.1328

Panel C. M2 (YoY, Averages of daily figures) in different market regimes.

Independent Variables	Dependent Variables: Rate of Return	
	Bull Market	Bear Market
Intercept	-0.0032	-0.0048
	(0.0073)	(0.0178)
M2(YoY, Averages of daily figures)	0.9910	0.9843
	(1.5845)	(5.2014)
R_{t-1}	0.1080	-0.0638
	(0.1309)	(0.2011)
E_t	-1.5145**	-3.0141*
	(0.6093)	(1.6093)
R^2	0.1445	0.1359

*Coefficient is statistically significant at 10% level; **coefficient is statistically significant at 5% level; ***coefficient is statistically significant at 1% level. Standard errors are shown in parentheses.

Table 9 Effect of the unexpected tight and easy monetary policy decisions on TAIEX futures index returns.

Panel A. The change of rediscount rate

Independent Variables	Dependent Variables: Rate of Return
Intercept	0.0043
	(0.0101)
$MP_{tRtight}$	-0.2137
	(0.3730)
MP_{tReasy}	0.3987
	(0.2701)
R_{t-1}	0.0243
	(0.1072)
E_t	-1.8070***
	(0.5985)
R^2	0.1448

Panel B. The change of overnight rate

Independent Variables	Dependent Variables: Rate of Return
Intercept	-0.0132
	(0.0093)
$MP_{tOtight}$	0.3363
	(0.2991)
MP_{tOeasy}	-0.2688
	(0.2013)
R_{t-1}	0.0257
	(0.1061)
E_t	-1.9231***
	(0.5915)
R^2	0.1474

Panel C. M2 (YoY, Averages of daily figures)

Independent Variables	Dependent Variables: Rate of Return
Intercept	-0.0187*
	(0.0109)
$MP_{tMtight}$	-3.0939
	(2.9225)
MP_{tMeasy}	5.5631*
	(3.0557)
R_{t-1}	0.0558
	(0.1055)
E_t	-1.8145***
	(0.5964)
R^2	0.1569

*Coefficient is statistically significant at 10% level; **coefficient is statistically significant at 5% level; ***coefficient is statistically significant at 1% level. Standard errors are shown in parentheses.

Table 10 Effect of the unexpected tight and easy monetary policy decisions on TAIEX futures index returns in different market regimes.

Panel A. The change of rediscount rate in different market regimes.

Independent Variables	Dependent Variables: Rate of Return	
	Bull Market	Bear Market
Intercept	0.0008	0.0576*
	(0.0100)	(0.0314)
$MP_{tRtight}$	0.1702	-2.5524**
	(0.3543)	(1.1160)
MP_{tReasy}	0.9063*	0.8471*
	(0.4561)	(0.4906)
R_{t-1}	0.0187	0.1263
	(0.1359)	(0.2014)
E_t	-1.1868*	-3.1640**
	(0.6127)	(1.4767)
R^2	0.2106	0.3061

Panel B. The change of overnight rate in different market regimes.

Independent Variables	Dependent Variables: Rate of Return	
	Bull Market	Bear Market
Intercept	-0.0101	-0.0299
	(0.0096)	(0.0255)
$MP_{tOtight}$	0.2545	2.1249
	(0.2790)	(2.4913)
MP_{tOeasy}	-0.0597	-0.5341
	(0.2684)	(0.4150)
R_{t-1}	0.1104	-0.0658
	(0.1330)	(0.1981)
E_t	-1.5253**	-2.7988*
	(0.6092)	(1.5977)
R^2	0.1540	0.2015

Panel C. M2 (YoY, Averages of daily figures) in different market regimes.

Independent Variables	Dependent Variables: Rate of Return	
	Bull Market	Bear Market
Intercept	-0.0181	-0.0284
	(0.0127)	(0.0239)
$MP_{tMtight}$	-2.0570	-15.6003
	(2.9332)	(12.6061)
MP_{tMeasy}	5.0410	8.1902
	(3.3285)	(7.1396)
R_{t-1}	0.1594	-0.0400
	(0.1337)	(0.1973)
E_t	-1.4361**	-2.4151
	(0.6078)	(1.6274)
R^2	0.1747	0.2101

*Coefficient is statistically significant at 10% level; **coefficient is statistically significant at 5% level; ***coefficient is statistically significant at 1% level. Standard errors are shown in parentheses.

Table 11 Effect of trading volume of domestic individuals and the monetary policy on TAIEX futures index returns.

Panel A. The change of rediscount rate

Independent Variables	Dependent Variables: Rate of Return
Intercept	0.0064
	(0.0097)
The change of rediscount rate	0.3730*
	(0.2029)
D	-0.0201
	(0.0146)
D*The change of rediscount rate	-0.4111
	(0.3212)
R_{t-1}	0.0194
	(0.1144)
E_t	-2.0179***
	(0.6113)
R^2	0.1801

Panel B. The change of overnight rate

Independent Variables	Dependent Variables: Rate of Return
Intercept	0.0039
	(0.0096)
The change of overnight rate	0.0588
	(0.1177)
D	-0.0198
	(0.0151)
D*The change of overnight rate	-0.1598
	(0.2138)
R_{t-1}	0.0207
	(0.1127)
E_t	-1.9770***
	(0.6063)
R^2	0.1420

Panel C. M2 (YoY, Averages of daily figures)

Independent Variables	Dependent Variables: Rate of Return
Intercept	0.0036
	(0.0094)
M2 (YoY, Averages of daily figures)	3.1681*
	(1.7119)
D	-0.0174
	(0.0142)
D*M2 (YoY, Averages of daily figures)	-4.8281*
	(2.6517)
R_{t-1}	-0.0129
	(0.1078)
E_t	-1.8414***
	(0.5930)
R^2	0.1769

*Coefficient is statistically significant at 10% level; **coefficient is statistically significant at 5% level; ***coefficient is statistically significant at 1% level. Standard errors are shown in parentheses.
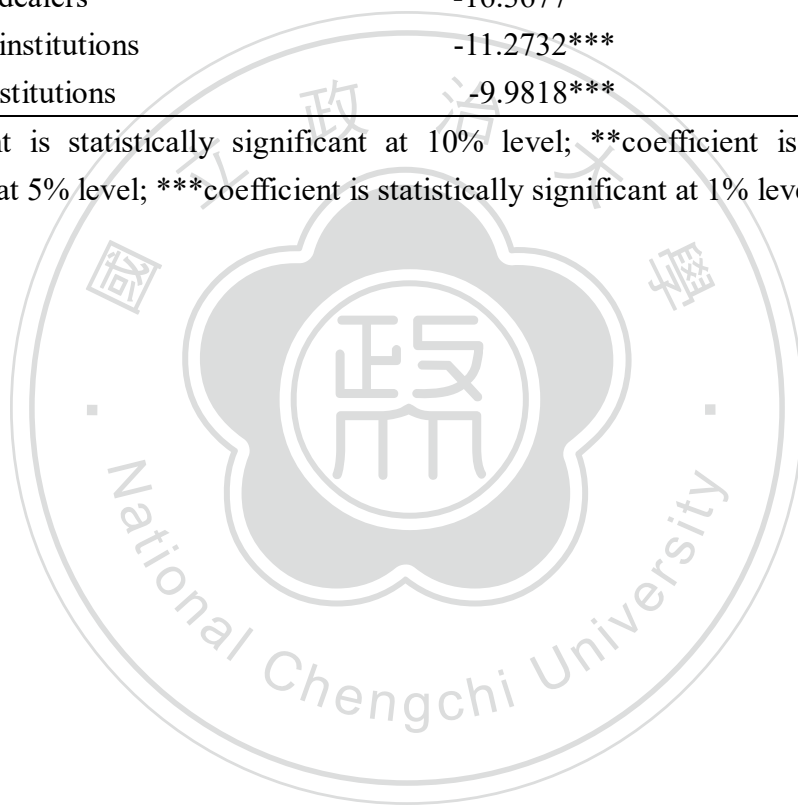
Table 12 Effect of trading volume of domestic corporations and the monetary policy on TAIEX futures index returns.

Panel A. The change of rediscount rate

Independent Variables	Dependent Variables: Rate of Return
Intercept	0.0023
	(0.0095)
The change of rediscount rate	0.4964**
	(0.2059)
D	-0.0120
	(0.0149)
D*The change of rediscount rate	-0.6363**
	(0.3027)
R_{t-1}	-0.0048
	(0.1083)
E_t	-2.0074***
	(0.6274)
R^2	0.1953

Panel B. The change of overnight rate

Independent Variables	Dependent Variables: Rate of Return
Intercept	-0.0035
	(0.0094)
The change of overnight rate	0.3846*
	(0.2049)
D	-0.0121
	(0.0155)
D*The change of overnight rate	-0.8697***
	(0.2870)
R_{t-1}	-0.0175
	(0.1080)
E_t	-1.9192***
	(0.6164)
R^2	0.2074

Panel C. M2 (YoY, Averages of daily figures)

Independent Variables	Dependent Variables: Rate of Return
Intercept	-0.0011
	(0.0094)
M2 (YoY, Averages of daily figures)	0.7013
	(1.5713)
D	-0.0080
	(0.0149)
D*M2 (YoY, Averages of daily figures)	1.3615
	(2.8976)
R_{t-1}	0.0137
	(0.1081)
E_t	-1.9984***
	(0.6202)
R^2	0.1346

*Coefficient is statistically significant at 10% level; **coefficient is statistically significant at 5% level; ***coefficient is statistically significant at 1% level. Standard errors are shown in parentheses.

Table 13 Effect of trading volume of domestic institutions and the monetary policy on TAIEX futures index returns.

Panel A. The change of rediscount rate

Independent Variables	Dependent Variables: Rate of Return
Intercept	0.0109
	(0.0088)
The change of rediscount rate	0.0046
	(0.2620)
D	-0.0298**
	(0.0144)
D*The change of rediscount rate	0.2484
	(0.3176)
R_{t-1}	0.0169
	(0.1072)
E_t	-1.7557***
	(0.5952)
R^2	0.2040

Panel B. The change of overnight rate

Independent Variables	Dependent Variables: Rate of Return
Intercept	0.0120
	(0.0091)
The change of overnight rate	-0.0902
	(0.2038)
D	-0.0398***
	(0.0147)
D*The change of overnight rate	-0.1022
	(0.2825)
R_{t-1}	0.0116
	(0.1060)
E_t	-1.6982***
	(0.5909)
R^2	0.1935

Panel C. M2 (YoY, Averages of daily figures)

Independent Variables	Dependent Variables: Rate of Return
Intercept	0.0106
	(0.0088)
M2 (YoY, Averages of daily figures)	0.1961
	(1.7497)
D	-0.0333**
	(0.0140)
D*M2 (YoY, Averages of daily figures)	1.0883
	(2.6442)
R_{t-1}	0.0240
	(0.1016)
E_t	-1.7516***
	(0.5976)
R^2	0.1883

*Coefficient is statistically significant at 10% level; **coefficient is statistically significant at 5% level; ***coefficient is statistically significant at 1% level. Standard errors are shown in parentheses.

Table 14 Effect of trading volume of domestic dealers and the monetary policy on TAIEX futures index returns.

Panel A. The change of rediscount rate

Independent Variables	Dependent Variables: Rate of Return
Intercept	0.0064
	(0.0096)
The change of rediscount rate	0.3641*
	(0.1887)
D	-0.0152
	(0.0144)
D*The change of rediscount rate	-0.4281
	(0.3354)
R_{t-1}	0.0248
	(0.1131)
E_t	-2.1962***
	(0.6187)
R^2	0.1741

Panel B. The change of overnight rate

Independent Variables	Dependent Variables: Rate of Return
Intercept	0.0043
	(0.0094)
The change of overnight rate	0.6333**
	(0.2829)
D	-0.0188
	(0.0144)
D*The change of overnight rate	-0.9439***
	(0.3302)
R_{t-1}	0.0333
	(0.1090)
E_t	-2.2308***
	(0.6012)
R^2	0.2034

Panel C. M2 (YoY, Averages of daily figures)

Independent Variables	Dependent Variables: Rate of Return
Intercept	0.0019
	(0.0094)
M2 (YoY, Averages of daily figures)	2.3164
	(1.6591)
D	-0.0112
	(0.0141)
D*M2 (YoY, Averages of daily figures)	-3.2723
	(2.7514)
R_{t-1}	0.0158
	(0.1070)
E_t	-1.9000***
	(0.6051)
R^2	0.1507

*Coefficient is statistically significant at 10% level; **coefficient is statistically significant at 5% level; ***coefficient is statistically significant at 1% level. Standard errors are shown in parentheses.

Table 15 Effect of trading volume of foreign institutions and the monetary policy on TAIEX futures index returns.

Panel A. The change of rediscount rate

Independent Variables	Dependent Variables: Rate of Return
Intercept	-0.0018
	(0.0092)
The change of rediscount rate	0.4642**
	(0.2205)
D	-0.0022
	(0.0146)
D*The change of rediscount rate	-0.4670
	(0.3130)
R_{t-1}	0.0268
	(0.1114)
E_t	-1.9000***
	(0.6171)
R^2	0.1808

Panel B. The change of overnight rate

Independent Variables	Dependent Variables: Rate of Return
Intercept	0.0010
	(0.0087)
The change of overnight rate	0.8101***
	(0.2562)
D	-0.0109
	(0.0142)
D*The change of overnight rate	-1.1827***
	(0.3006)
R_{t-1}	0.0299
	(0.1043)
E_t	-1.8669***
	(0.5709)
R^2	0.2635

Panel C. M2 (YoY, Averages of daily figures)

Independent Variables	Dependent Variables: Rate of Return
Intercept	-0.0031
	(0.0091)
M2 (YoY, Averages of daily figures)	1.2537
	(1.6071)
D	-0.0025
	(0.0145)
D*M2 (YoY, Averages of daily figures)	-0.2627
	(2.8237)
R_{t-1}	0.0269
	(0.1073)
E_t	-2.0191***
	(0.6016)
R^2	0.1380

*Coefficient is statistically significant at 10% level; **coefficient is statistically significant at 5% level; ***coefficient is statistically significant at 1% level. Standard errors are shown in parentheses.

Table 16 Effect of trading volume of domestic individuals and monetary policy on TAIEX futures index returns in different market regimes.

Panel A. The change of rediscount rate in different market regimes.

Independent Variables	Dependent Variables: Rate of Return	
	Bull Market	Bear Market
Intercept	0.0048	0.0171
	(0.0113)	(0.0308)
The change of rediscount rate	0.3495	0.4841
	(0.3626)	(0.4200)
D	-0.0254	-0.0348
	(0.0156)	(0.0483)
D*The change of rediscount rate	0.2071	-0.9689
	(0.4821)	(0.6542)
R_{t-1}	0.0345	-0.0687
	(0.1403)	(0.2303)
E_t	-1.5842***	-3.2214*
	(0.5936)	(1.7345)
R^2	0.2607	0.2239

Panel B. The change of overnight rate in different market regimes.

Independent Variables	Dependent Variables: Rate of Return	
	Bull Market	Bear Market
Intercept	0.0038	-0.0086
	(0.0110)	(0.0305)
The change of overnight rate	0.1707	-0.0162
	(0.2017)	(0.2582)
D	-0.0244	0.0161
	(0.0157)	(0.0493)
D*The change of overnight rate	-0.3094	0.1055
	(0.3241)	(0.4370)
R_{t-1}	0.1280	-0.0534
	(0.1331)	(0.2430)
E_t	-1.5484**	-3.1072*
	(0.6095)	(1.7916)
R^2	0.2055	0.1395

Panel C. M2 (YoY, Averages of daily figures) in different market regimes.

Independent Variables	Dependent Variables: Rate of Return	
	Bull Market	Bear Market
Intercept	0.0088	-0.0090
	(0.0097)	(0.0231)
M2 (YoY, Averages of daily figures)	3.0382	2.7849
	(1.9145)	(3.8787)
D	-0.0287*	0.0117
	(0.0146)	(0.0401)
D*M2 (YoY, Averages of daily figures)	-4.6683*	-3.9831
	(2.7907)	(7.9610)
R_{t-1}	0.0640	-0.0270
	(0.1362)	(0.2342)
E_t	-1.6162***	-2.7530
	(0.5895)	(1.8051)
R^2	0.2341	0.1582

*Coefficient is statistically significant at 10% level; **coefficient is statistically significant at 5% level; ***coefficient is statistically significant at 1% level. Standard errors are shown in parentheses.

Table 17 Effect of trading volume of domestic corporations and monetary policy on TAIEX futures index returns in different market regimes.

Panel A. The change of rediscount rate in different market regimes.

Independent Variables	Dependent Variables: Rate of Return	
	Bull Market	Bear Market
Intercept	0.0018 (0.0095)	-0.0113 (0.0325)
The change of rediscount rate	0.6662** (0.2688)	0.2016 (0.4754)
D	-0.0250 (0.0177)	0.0259 (0.0493)
D*The change of rediscount rate	-0.3994 (0.5432)	-0.1674 (0.6768)
R_{t-1}	0.0257 (0.1307)	-0.0130 (0.2328)
E_t	-1.8204*** (0.6391)	-3.0899* (1.7768)
R^2	0.2840	0.1725

Panel B. The change of overnight rate in different market regimes.

Independent Variables	Dependent Variables: Rate of Return	
	Bull Market	Bear Market
Intercept	-0.0057 (0.0107)	-0.0064 (0.0361)
The change of overnight rate	0.4697 (0.2822)	0.2861 (0.5617)
D	-0.0090 (0.0170)	-0.0209 (0.0565)
D*The change of overnight rate	-0.7613* (0.3983)	-0.9621 (0.7681)
R_{t-1}	0.0618 (0.1335)	-0.1055 (0.2330)
E_t	-1.4965** (0.6545)	-2.8305 (1.7543)
R^2	0.2110	0.2459

Panel C. M2 (YoY, Averages of daily figures) in different market regimes.

Independent Variables	Dependent Variables: Rate of Return	
	Bull Market	Bear Market
Intercept	0.0040 (0.0094)	-0.0253 (0.0249)
M2 (YoY, Averages of daily figures)	-0.3504 (1.5775)	4.3092 (4.7319)
D	-0.0242 (0.0161)	0.0371 (0.0355)
D*M2 (YoY, Averages of daily figures)	4.8900 (3.3554)	-5.5625 (8.0637)
R_{t-1}	0.0942 (0.1298)	-0.0043 (0.2120)
E_t	-1.5818** (0.6591)	-2.1238 (2.0438)
R^2	0.2147	0.1993

*Coefficient is statistically significant at 10% level; **coefficient is statistically significant at 5% level; ***coefficient is statistically significant at 1% level. Standard errors are shown in parentheses.

Table 18 Effect of trading volume of domestic institutions and monetary policy on TAIEX futures index returns in different market regimes.

Panel A. The change of rediscount rate in different market regimes.

Independent Variables	Dependent Variables: Rate of Return	
	Bull Market	Bear Market
Intercept	0.0076	-0.0115
	(0.0091)	(0.0345)
The change of rediscount rate	0.4019	-0.6021
	(0.3439)	(0.6790)
D	-0.0444***	0.0303
	(0.0147)	(0.0495)
D*The change of rediscount rate	0.2090	1.0304
	(0.4268)	(0.8340)
R_{t-1}	0.0125	0.0513
	(0.1240)	(0.2312)
E_t	-1.3183**	-3.1178*
	(0.5541)	(1.7809)
R^2	0.3424	0.1980

Panel B. The change of overnight rate in different market regimes.

Independent Variables	Dependent Variables: Rate of Return	
	Bull Market	Bear Market
Intercept	0.0085	-0.0121
	(0.0096)	(0.0412)
The change of overnight rate	0.1852	-0.4806
	(0.2865)	(0.5844)
D	-0.0417***	-0.0044
	(0.0150)	(0.0550)
D*The change of overnight rate	-0.2783	0.3208
	(0.3677)	(0.7667)
R_{t-1}	0.1120	-0.0804
	(0.1227)	(0.2238)
E_t	-1.3677**	-2.3307
	(0.5736)	(1.8713)
R^2	0.2744	0.1671

Panel C. M2 (YoY, Averages of daily figures) in different market regimes.

Independent Variables	Dependent Variables: Rate of Return	
	Bull Market	Bear Market
Intercept	0.0118	0.0074
	(0.0086)	(0.0228)
M2 (YoY, Averages of daily figures)	1.6728	-2.9523
	(1.9487)	(3.4311)
D	-0.0455***	-0.0006
	(0.0143)	(0.0317)
D*M2 (YoY, Averages of daily figures)	-2.7466	18.7363**
	(2.6905)	(7.0325)
R_{t-1}	0.0930	-0.1617
	(0.1229)	(0.1824)
E_t	-1.2626**	-4.2086**
	(0.5726)	(1.5875)
R^2	0.2851	0.3656

*Coefficient is statistically significant at 10% level; **coefficient is statistically significant at 5% level; ***coefficient is statistically significant at 1% level. Standard errors are shown in parentheses.

Table 19 Effect of trading volume of domestic dealers and monetary policy on TAIEX futures index returns in different market regimes.

Panel A. The change of rediscount rate in different market regimes.

Independent Variables	Dependent Variables: Rate of Return	
	Bull Market	Bear Market
Intercept	0.0088	-0.0074
	(0.0109)	(0.0306)
The change of rediscount rate	0.3537	0.2365
	(0.3891)	(0.3750)
D	-0.0320**	0.0154
	(0.0154)	(0.0442)
D*The change of rediscount rate	0.1411	-1.1625
	(0.4862)	(0.7537)
R_{t-1}	0.0427	-0.0002
	(0.1387)	(0.2074)
E_t	-1.8399***	-3.8033**
	(0.5950)	(1.6674)
R^2	0.2739	0.2899

Panel B. The change of overnight rate in different market regimes.

Independent Variables	Dependent Variables: Rate of Return	
	Bull Market	Bear Market
Intercept	0.0141	0.0325
	(0.0118)	(0.0300)
The change of overnight rate	-0.2872	1.3457**
	(0.5321)	(0.5890)
D	-0.0351**	-0.0666
	(0.0163)	(0.0496)
D*The change of overnight rate	0.3921	-2.1795***
	(0.5695)	(0.7069)
R_{t-1}	0.1377	-0.0179
	(0.1332)	(0.1924)
E_t	-1.7318***	-2.9545*
	(0.6203)	(1.5443)
R^2	0.2068	0.4613

Panel C. M2 (YoY, Averages of daily figures) in different market regimes.

Independent Variables	Dependent Variables: Rate of Return	
	Bull Market	Bear Market
Intercept	0.0145	-0.0302
	(0.0099)	(0.0215)
M2 (YoY, Averages of daily figures)	1.5478	4.8696
	(1.8372)	(3.5624)
D	-0.0371**	0.0547
	(0.0147)	(0.0355)
D*M2 (YoY, Averages of daily figures)	-0.8460	-8.8946
	(2.8171)	(8.0275)
R_{t-1}	0.1394	0.0539
	(0.1347)	(0.2019)
E_t	-1.7962***	-2.8063
	(0.5936)	(1.6995)
R^2	0.2302	0.2791

*Coefficient is statistically significant at 10% level; **coefficient is statistically significant at 5% level; ***coefficient is statistically significant at 1% level. Standard errors are shown in parentheses.

Table 20 Effect of the trading volume of foreign institutions and monetary policy on TAIEX futures index returns in different market regimes.

Panel A. The change of rediscount rate in different market regimes.

Independent Variables	Dependent Variables: Rate of Return	
	Bull Market	Bear Market
Intercept	0.0055	-0.0113
	(0.0094)	(0.0270)
The change of rediscount rate	0.2738	0.4410
	(0.2822)	(0.4828)
D	-0.0375**	0.0357
	(0.0167)	(0.0496)
D*The change of rediscount rate	0.7080	-0.3812
	(0.4702)	(0.7316)
R_{t-1}	0.1376	0.0316
	(0.1423)	(0.2226)
E_t	-1.5001**	-3.0184
	(0.5737)	(1.8926)
R^2	0.2857	0.2443

Panel B. The change of overnight rate in different market regimes.

Independent Variables	Dependent Variables: Rate of Return	
	Bull Market	Bear Market
Intercept	0.0031	0.0252
	(0.0099)	(0.0292)
The change of overnight rate	0.4576	1.3236**
	(0.4131)	(0.5650)
D	-0.0240	-0.0655
	(0.0168)	(0.0467)
D*The change of overnight rate	-0.4288	-2.2829***
	(0.4711)	(0.7115)
R_{t-1}	0.1556	0.0728
	(0.1466)	(0.1832)
E_t	-1.4805**	-1.7490
	(0.6050)	(1.5470)
R^2	0.1994	0.5086

Panel C. M2 (YoY, Averages of daily figures) in different market regimes.

Independent Variables	Dependent Variables: Rate of Return	
	Bull Market	Bear Market
Intercept	0.0072	-0.0297
	(0.0092)	(0.0231)
M2 (YoY, Averages of daily figures)	0.3072	4.2584
	(1.6452)	(4.0048)
D	-0.0290*	0.0482
	(0.0159)	(0.0351)
D*M2 (YoY, Averages of daily figures)	1.1666	-4.5550
	(2.9074)	(7.0809)
R_{t-1}	0.1952	-0.0231
	(0.1390)	(0.2026)
E_t	-1.4831**	-2.8623
	(0.5950)	(1.7403)
R^2	0.1921	0.2553

*Coefficient is statistically significant at 10% level; **coefficient is statistically significant at 5% level; ***coefficient is statistically significant at 1% level. Standard errors are shown in parentheses.

Table 21 Effect of trading volume of domestic individuals and the unexpected monetary policy on TAIEX futures index returns.

Panel A. The change of rediscount rate

Independent Variables	Dependent Variables: Rate of Return
Intercept	0.0026
	(0.0095)
The change of rediscount rate	0.3280
	(0.2472)
D	-0.0182
	(0.0146)
D*The change of rediscount rate	-0.2419
	(0.4580)
R_{t-1}	-0.0594
	(0.1158)
E_t	-1.8142***
	(0.6051)
R^2	0.1390

Panel B. The change of overnight rate

Independent Variables	Dependent Variables: Rate of Return
Intercept	-0.0067
	(0.0092)
The change of overnight rate	0.4445
	(0.2720)
D	-0.0050
	(0.0144)
D*The change of overnight rate	-0.8264*
	(0.4317)
R_{t-1}	0.0584
	(0.1108)
E_t	-1.9543***
	(0.5772)
R^2	0.1674

Panel C. M2 (YoY, Averages of daily figures)

Independent Variables	Dependent Variables: Rate of Return
Intercept	0.0030
	(0.0094)
M2 (YoY, Averages of daily figures)	3.0348
	(1.9856)
D	-0.0167
	(0.0143)
D*M2 (YoY, Averages of daily figures)	-5.8574*
	(3.4455)
R_{t-1}	-0.0102
	(0.1088)
E_t	-1.8439***
	(0.6016)
R^2	0.1698

*Coefficient is statistically significant at 10% level; **coefficient is statistically significant at 5% level; ***coefficient is statistically significant at 1% level. Standard errors are shown in parentheses.

Table 22 Effect of trading volume of domestic corporations and the unexpected monetary policy on TAIEX futures index returns.

Panel A. The change of rediscount rate

Independent Variables	Dependent Variables: Rate of Return
Intercept	-0.0023
	(0.0095)
The change of rediscount rate	0.3128
	(0.2646)
D	-0.0068
	(0.0151)
D*The change of rediscount rate	-0.1257
	(0.4343)
R_{t-1}	-0.0511
	(0.1162)
E_t	-1.8654***
	(0.6225)
R^2	0.1227

Panel B. The change of overnight rate

Independent Variables	Dependent Variables: Rate of Return
Intercept	-0.0067
	(0.0095)
The change of overnight rate	0.3748
	(0.2613)
D	-0.0049
	(0.0147)
D*The change of overnight rate	-0.7297*
	(0.4310)
R_{t-1}	0.0093
	(0.1076)
E_t	-1.9047***
	(0.6026)
R^2	0.1587

Panel C. M2 (YoY, Averages of daily figures)

Independent Variables	Dependent Variables: Rate of Return
Intercept	-0.0008
	(0.0094)
M2 (YoY, Averages of daily figures)	1.9848
	(1.8127)
D	-0.0057
	(0.0149)
D*M2 (YoY, Averages of daily figures)	-4.5842
	(4.1497)
R_{t-1}	0.0253
	(0.1073)
E_t	-2.0296***
	(0.6275)
R^2	0.1425

*Coefficient is statistically significant at 10% level; **coefficient is statistically significant at 5% level; ***coefficient is statistically significant at 1% level. Standard errors are shown in parentheses.

Table 23 Effect of trading volume of domestic institutions and the unexpected monetary policy on TAIEX futures index returns.

Panel A. The change of rediscount rate

Independent Variables	Dependent Variables: Rate of Return
Intercept	0.0104
	(0.0086)
The change of rediscount rate	0.0927
	(0.3145)
D	-0.0379***
	(0.0138)
D*The change of rediscount rate	0.4105
	(0.4072)
R_{t-1}	-0.0283
	(0.1083)
E_t	-1.6303***
	(0.5744)
R^2	0.2114

Panel B. The change of overnight rate

Independent Variables	Dependent Variables: Rate of Return
Intercept	0.0123
	(0.0085)
The change of overnight rate	-0.2264
	(0.2487)
D	-0.0445***
	(0.0133)
D*The change of overnight rate	0.7104*
	(0.3984)
R_{t-1}	0.0299
	(0.0989)
E_t	-1.5111***
	(0.5512)
R^2	0.2515

Panel C. M2 (YoY, Averages of daily figures)

Independent Variables	Dependent Variables: Rate of Return
Intercept	0.0105
	(0.0088)
M2 (YoY, Averages of daily figures)	0.7399
	(2.1222)
D	-0.0343**
	(0.0140)
D*M2 (YoY, Averages of daily figures)	-0.5969
	(3.3026)
R_{t-1}	0.0286
	(0.1020)
E_t	-1.6408***
	(0.6120)
R^2	0.1850

*Coefficient is statistically significant at 10% level; **coefficient is statistically significant at 5% level; ***coefficient is statistically significant at 1% level. Standard errors are shown in parentheses.

Table 24 Effect of trading volume of domestic dealers and the unexpected monetary policy on TAIEX futures index returns.

Panel A. The change of rediscount rate

Independent Variables	Dependent Variables: Rate of Return
Intercept	-0.0004
	(0.0094)
The change of rediscount rate	0.4694*
	(0.2526)
D	-0.0073
	(0.0144)
D*The change of rediscount rate	-0.5110
	(0.4350)
R_{t-1}	-0.0537
	(0.1131)
E_t	-1.8881***
	(0.6029)
R^2	0.1418

Panel B. The change of overnight rate

Independent Variables	Dependent Variables: Rate of Return
Intercept	-0.0020
	(0.0092)
The change of overnight rate	0.5841**
	(0.2901)
D	-0.0162
	(0.0139)
D*The change of overnight rate	-1.0252**
	(0.4164)
R_{t-1}	0.0556
	(0.1064)
E_t	-2.1811***
	(0.5786)
R^2	0.2025

Panel C. M2 (YoY, Averages of daily figures)

Independent Variables	Dependent Variables: Rate of Return
Intercept	0.0024
	(0.0094)
M2 (YoY, Averages of daily figures)	2.3097
	(1.9014)
D	-0.0104
	(0.0142)
D*M2 (YoY, Averages of daily figures)	-4.9260
	(3.8185)
R_{t-1}	0.0094
	(0.1080)
E_t	-1.8697***
	(0.6091)
R^2	0.1503

*Coefficient is statistically significant at 10% level; **coefficient is statistically significant at 5% level; ***coefficient is statistically significant at 1% level. Standard errors are shown in parentheses.

Table 25 Effect of trading volume of foreign institutions and the unexpected monetary policy on TAIEX futures index returns.

Panel A. The change of rediscount rate

Independent Variables	Dependent Variables: Rate of Return
Intercept	-0.0027
	(0.0092)
The change of rediscount rate	0.0751
	(0.2782)
D	-0.0057
	(0.0143)
D*The change of rediscount rate	0.5211
	(0.4333)
R_{t-1}	-0.0880
	(0.1181)
E_t	-2.0165***
	(0.6053)
R^2	0.1475

Panel B. The change of overnight rate

Independent Variables	Dependent Variables: Rate of Return
Intercept	-0.0061
	(0.0085)
The change of overnight rate	0.7641***
	(0.2620)
D	-0.0072
	(0.0135)
D*The change of overnight rate	-1.4351***
	(0.3877)
R_{t-1}	0.0627
	(0.1016)
E_t	-1.8414***
	(0.5478)
R^2	0.2651

Panel C. M2 (YoY, Averages of daily figures)

Independent Variables	Dependent Variables: Rate of Return
Intercept	-0.0028
	(0.0091)
M2 (YoY, Averages of daily figures)	0.4714
	(1.8393)
D	-0.0033
	(0.0146)
D*M2 (YoY, Averages of daily figures)	2.1128
	(4.0112)
R_{t-1}	0.0366
	(0.1076)
E_t	-1.9780***
	(0.6098)
R^2	0.1359

*Coefficient is statistically significant at 10% level; **coefficient is statistically significant at 5% level; ***coefficient is statistically significant at 1% level. Standard errors are shown in parentheses.

Table 26 Effect of trading volume of domestic individuals and unexpected monetary policy on TAIEX futures index returns in different market regimes.

Panel A. The change of rediscount rate in different market regimes.

Independent Variables	Dependent Variables: Rate of Return	
	Bull Market	Bear Market
Intercept	0.0057	-0.0003
	(0.0110)	(0.0243)
The change of rediscount rate	0.1714	0.3740
	(0.3573)	(0.4713)
D	-0.0237	-0.0097
	(0.0158)	(0.0453)
D*The change of rediscount rate	0.4637	-0.7052
	(0.6021)	(0.9075)
R_{t-1}	0.0736	-0.1050
	(0.1502)	(0.2735)
E_t	-1.3878**	-2.8687
	(0.6102)	(1.7064)
R^2	0.1716	0.1728

Panel B. The change of overnight rate in different market regimes.

Independent Variables	Dependent Variables: Rate of Return	
	Bull Market	Bear Market
Intercept	-0.0070	0.0053
	(0.0135)	(0.0254)
The change of overnight rate	0.3451	0.7337
	(0.4524)	(0.6071)
D	-0.0058	-0.0352
	(0.0188)	(0.0490)
D*The change of overnight rate	-0.2719	-1.4437
	(0.7744)	(0.8731)
R_{t-1}	0.0689	-0.0146
	(0.1416)	(0.2271)
E_t	-1.5982**	-2.6842
	(0.6176)	(1.6098)
R^2	0.1506	0.2386

Panel C. M2 (YoY, Averages of daily figures) in different market regimes.

Independent Variables	Dependent Variables: Rate of Return	
	Bull Market	Bear Market
Intercept	0.0082	-0.0111
	(0.0098)	(0.0235)
M2 (YoY, Averages of daily figures)	2.6992	4.2999
	(1.9293)	(6.3711)
D	-0.0283*	0.0205
	(0.0147)	(0.0404)
D*M2 (YoY, Averages of daily figures)	-4.5609	-12.8849
	(3.3171)	(13.6480)
R_{t-1}	0.0858	-0.0076
	(0.1354)	(0.2284)
E_t	-1.5642**	-2.3974
	(0.6045)	(1.8460)
R^2	0.2249	0.1733

*Coefficient is statistically significant at 10% level; **coefficient is statistically significant at 5% level; ***coefficient is statistically significant at 1% level. Standard errors are shown in parentheses.

Table 27 Effect of trading volume of domestic corporations and unexpected monetary policy on TAIEX futures index returns in different market regimes.

Panel A. The change of rediscount rate in different market regimes.

Independent Variables	Dependent Variables: Rate of Return	
	Bull Market	Bear Market
Intercept	0.0004	-0.0194
	(0.0099)	(0.0248)
The change of rediscount rate	0.5688*	-0.0466
	(0.3263)	(0.5082)
D	-0.0158	0.0270
	(0.0174)	(0.0377)
D*The change of rediscount rate	-0.4114	0.4454
	(0.6303)	(0.7783)
R_{t-1}	0.0389	-0.0915
	(0.1438)	(0.2317)
E_t	-1.5413**	-3.1202*
	(0.6398)	(1.6613)
R^2	0.1674	0.1737

Panel B. The change of overnight rate in different market regimes.

Independent Variables	Dependent Variables: Rate of Return	
	Bull Market	Bear Market
Intercept	-0.0084	-0.0144
	(0.0125)	(0.0275)
The change of overnight rate	0.5054	0.2129
	(0.4203)	(0.5544)
D	-0.0034	0.0060
	(0.0226)	(0.0504)
D*The change of overnight rate	-0.8111	-0.5333
	(0.8695)	(1.0749)
R_{t-1}	0.0665	-0.0394
	(0.1372)	(0.2250)
E_t	-1.5287**	-2.8295*
	(0.6825)	(1.6183)
R^2	0.1782	0.1625

Panel C. M2 (YoY, Averages of daily figures) in different market regimes.

Independent Variables	Dependent Variables: Rate of Return	
	Bull Market	Bear Market
Intercept	0.0056	-0.0367
	(0.0096)	(0.0247)
M2 (YoY, Averages of daily figures)	1.3379	11.0285
	(1.7053)	(6.8201)
D	-0.0272	0.0541
	(0.0162)	(0.0346)
D*M2 (YoY, Averages of daily figures)	0.1874	-23.7195*
	(4.5459)	(12.0404)
R_{t-1}	0.1228	0.0292
	(0.1305)	(0.2005)
E_t	-1.7926**	-1.0842
	(0.6822)	(1.8010)
R^2	0.1901	0.3012

*Coefficient is statistically significant at 10% level; **coefficient is statistically significant at 5% level; ***coefficient is statistically significant at 1% level. Standard errors are shown in parentheses.

Table 28 Effect of trading volume of domestic institutions and unexpected monetary policy on TAIEX futures index returns in different market regimes.
Panel A. The change of rediscount rate in different market regimes.

Independent Variables	Dependent Variables: Rate of Return	
	Bull Market	Bear Market
Intercept	0.0102	0.0031
	(0.0082)	(0.0250)
The change of rediscount rate	0.2667	-0.4030
	(0.3127)	(0.8077)
D	-0.0599***	-0.0088
	(0.0149)	(0.0373)
D*The change of rediscount rate	0.9344*	0.8510
	(0.5039)	(0.9769)
R_{t-1}	0.0900	-0.0510
	(0.1276)	(0.2303)
E_t	-1.2378**	-2.9816
	(0.5322)	(1.7586)
R^2	0.3465	0.1828

Panel B. The change of overnight rate in different market regimes.

Independent Variables	Dependent Variables: Rate of Return	
	Bull Market	Bear Market
Intercept	0.0131	-0.0086
	(0.0116)	(0.0261)
The change of overnight rate	-0.0579	-0.5358
	(0.4735)	(0.4831)
D	-0.0586***	0.0230
	(0.0175)	(0.0394)
D*The change of overnight rate	0.6557	1.9266**
	(0.6539)	(0.9108)
R_{t-1}	0.0375	0.0139
	(0.1254)	(0.1822)
E_t	-1.3630**	-2.2985
	(0.5558)	(1.5096)
R^2	0.3167	0.3062

Panel C. M2 (YoY, Averages of daily figures) in different market regimes.

Independent Variables	Dependent Variables: Rate of Return	
	Bull Market	Bear Market
Intercept	0.0113	0.0076
	(0.0086)	(0.0258)
M2 (YoY, Averages of daily figures)	1.5565	-3.4066
	(1.9990)	(6.8145)
D	-0.0460***	-0.0190
	(0.0145)	(0.0359)
D*M2 (YoY, Averages of daily figures)	-3.0530	11.8627
	(3.0627)	(12.1936)
R_{t-1}	0.1164	-0.0982
	(0.1212)	(0.2101)
E_t	-1.2182**	-3.3502*
	(0.5883)	(1.8426)
R^2	0.2846	0.1651

*Coefficient is statistically significant at 10% level; **coefficient is statistically significant at 5% level; ***coefficient is statistically significant at 1% level. Standard errors are shown in parentheses.

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Table 29 Effect of trading volume of domestic dealers and unexpected monetary policy on TAIEX futures index returns in different market regimes.

Panel A. The change of rediscount rate in different market regimes.

Independent Variables	Dependent Variables: Rate of Return	
	Bull Market	Bear Market
Intercept	0.0106	-0.0205
	(0.0106)	(0.0218)
The change of rediscount rate	0.1940	0.3597
	(0.3764)	(0.4179)
D	-0.0350**	0.0591
	(0.0159)	(0.0352)
D*The change of rediscount rate	0.4305	-1.7322**
	(0.5304)	(0.8168)
R_{t-1}	0.1010	-0.0298
	(0.1483)	(0.1965)
E_t	-1.6649***	-3.4800**
	(0.6023)	(1.4776)
R^2	0.2094	0.3670

Panel B. The change of overnight rate in different market regimes.

Independent Variables	Dependent Variables: Rate of Return	
	Bull Market	Bear Market
Intercept	0.0203	-0.0018
	(0.0138)	(0.0220)
The change of overnight rate	-0.3748	1.0310*
	(0.4895)	(0.5806)
D	-0.0523***	-0.0134
	(0.0181)	(0.0447)
D*The change of overnight rate	0.8871	-1.7777**
	(0.6931)	(0.8465)
R_{t-1}	0.0976	0.0253
	(0.1366)	(0.1844)
E_t	-1.6533***	-3.1262*
	(0.5988)	(1.5189)
R^2	0.2558	0.3326

Panel C. M2 (YoY, Averages of daily figures) in different market regimes.

Independent Variables	Dependent Variables: Rate of Return	
	Bull Market	Bear Market
Intercept	0.0147	-0.0335
	(0.0099)	(0.0216)
M2 (YoY, Averages of daily figures)	1.7662	9.3709
	(1.7984)	(6.3399)
D	-0.0375**	0.0612*
	(0.0148)	(0.0345)
D*M2 (YoY, Averages of daily figures)	-0.7490	-19.8346*
	(3.7475)	(11.2391)
R_{t-1}	0.1473	0.0451
	(0.1354)	(0.1963)
E_t	-1.7065***	-2.2619
	(0.5982)	(1.6900)
R^2	0.2333	0.3158

*Coefficient is statistically significant at 10% level; **coefficient is statistically significant at 5% level; ***coefficient is statistically significant at 1% level. Standard errors are shown in parentheses.

Table 30 Effect of the trading volume of foreign institutions and unexpected monetary policy on TAIEX futures index returns in different market regimes.

Panel A. The change of rediscount rate in different market regimes.

Independent Variables	Dependent Variables: Rate of Return	
	Bull Market	Bear Market
Intercept	0.0093	-0.0231
	(0.0093)	(0.0225)
The change of rediscount rate	-0.0199	-0.0141
	(0.3431)	(0.5080)
D	-0.0398**	0.0432
	(0.0157)	(0.0377)
D*The change of rediscount rate	1.1190**	0.7182
	(0.5121)	(0.8961)
R_{t-1}	0.1096	-0.1497
	(0.1469)	(0.2359)
E_t	-1.3571**	-3.8453**
	(0.5647)	(1.8046)
R^2	0.2565	0.2392

Panel B. The change of overnight rate in different market regimes.

Independent Variables	Dependent Variables: Rate of Return	
	Bull Market	Bear Market
Intercept	0.0025	-0.0007
	(0.0118)	(0.0228)
The change of overnight rate	0.3461	1.1012*
	(0.4121)	(0.5684)
D	-0.0285	-0.0287
	(0.0221)	(0.0400)
D*The change of overnight rate	-0.3298	-2.0940**
	(0.8265)	(0.8453)
R_{t-1}	0.1595	0.0394
	(0.1510)	(0.1773)
E_t	-1.4938**	-1.9798
	(0.6076)	(1.5270)
R^2	0.2113	0.3916

Panel C. M2 (YoY, Averages of daily figures) in different market regimes.

Independent Variables	Dependent Variables: Rate of Return	
	Bull Market	Bear Market
Intercept	0.0073	-0.0296
	(0.0091)	(0.0238)
M2 (YoY, Averages of daily figures)	0.3196	4.4306
	(1.7495)	(5.8083)
D	-0.0297*	0.0502
	(0.0158)	(0.0359)
D*M2 (YoY, Averages of daily figures)	3.5611	-11.3626
	(3.7123)	(13.9126)
R_{t-1}	0.1993	-0.0381
	(0.1375)	(0.2107)
E_t	-1.4305**	-3.1275*
	(0.5994)	(1.6645)
R^2	0.2057	0.2466

*Coefficient is statistically significant at 10% level; **coefficient is statistically significant at 5% level; ***coefficient is statistically significant at 1% level. Standard errors are shown in parentheses.

Table 31 Effect of trading volume of domestic individuals and the unexpected tight and easy monetary policy on TAIEX futures index returns.

Panel A. The change of rediscount rate

Independent Variables	Dependent Variables: Rate of Return
Intercept	0.0153
	(0.0133)
$MP_{tRtight}$	-0.2163
	(0.4552)
MP_{tReasy}	0.7622*
	(0.4024)
D	-0.0229
	(0.0207)
$MP_{tRtight}D$	-0.1574
	(0.8166)
$MP_{tReasy}D$	-0.6847
	(0.5631)
R_{t-1}	0.0317
	(0.1114)
E_t	-1.8996***
	(0.6197)
R^2	0.1764

Panel B. The change of overnight rate

Independent Variables	Dependent Variables: Rate of Return
Intercept	-0.0061
	(0.0127)
$MP_{tOtight}$	0.3654
	(0.3283)
MP_{tOeasy}	-0.1932
	(0.3207)
D	-0.0064
	(0.0204)
$MP_{tOtight}D$	-0.9516
	(0.9621)
$MP_{tOeasy}D$	-0.0689
	(0.4210)
R_{t-1}	0.0281
	(0.1105)
E_t	-1.9465***
	(0.6034)
R^2	0.1707

Panel C. M2 (YoY, Averages of daily figures)

Independent Variables	Dependent Variables: Rate of Return
Intercept	-0.0201
	(0.0158)
$MP_{tMtight}$	-3.3940
	(4.0878)
MP_{tMeasy}	8.6701**
	(3.6729)
D	0.0140
	(0.0229)
$MP_{tMtight}D$	2.7496
	(6.0412)
$MP_{tMeasy}D$	-14.6064**
	(7.2576)
R_{t-1}	0.0228
	(0.1101)
E_t	-1.5700**
	(0.6166)
R^2	0.2053

*Coefficient is statistically significant at 10% level; **coefficient is statistically significant at 5% level; ***coefficient is statistically significant at 1% level. Standard errors are shown in parentheses.

Table 32 Effect of trading volume of domestic corporations and the unexpected tight and easy monetary policy on TAIEX futures index returns.

Panel A. The change of rediscount rate

Independent Variables	Dependent Variables: Rate of Return
Intercept	0.0120
	(0.0127)
$MP_{tRtight}$	-0.2381
	(0.4499)
MP_{tReasy}	0.7852**
	(0.3591)
D	-0.0196
	(0.0217)
$MP_{tRtight}D$	0.1268
	(0.7942)
$MP_{tReasy}D$	-0.8819
	(0.5437)
R_{t-1}	0.0026
	(0.1091)
E_t	-1.8076***
	(0.6280)
R^2	0.1752

Panel B. The change of overnight rate

Independent Variables	Dependent Variables: Rate of Return
Intercept	-0.0013
	(0.0122)
$MP_{tOtight}$	0.2796
	(0.3212)
MP_{tOeasy}	0.5205
	(0.3835)
D	-0.0189
	(0.0209)
$MP_{tOtight}D$	-0.3928
	(0.8859)
$MP_{tOeasy}D$	-1.0684**
	(0.4628)
R_{t-1}	-0.0316
	(0.1093)
E_t	-2.0778***
	(0.6119)
R^2	0.2155

Panel C. M2 (YoY, Averages of daily figures)

Independent Variables	Dependent Variables: Rate of Return
Intercept	-0.0172
	(0.0156)
$MP_{tMtight}$	-1.7351
	(3.3704)
MP_{tMeasy}	6.9137*
	(3.6885)
D	-0.0080
	(0.0243)
$MP_{tMtight}D$	-10.6196
	(8.7993)
$MP_{tMeasy}D$	-1.6876
	(7.3439)
R_{t-1}	0.0467
	(0.1103)
E_t	-1.8931***
	(0.6268)
R^2	0.1797

*Coefficient is statistically significant at 10% level; **coefficient is statistically significant at 5% level; ***coefficient is statistically significant at 1% level. Standard errors are shown in parentheses.

Table 33 Effect of trading volume of domestic institutions and the unexpected tight and easy monetary policy on TAIEX futures index returns.

Panel A. The change of rediscount rate

Independent Variables	Dependent Variables: Rate of Return
Intercept	0.0022
	(0.0130)
$MP_{tRtight}$	0.3497
	(0.4690)
MP_{tReasy}	-0.4936
	(0.6995)
D	-0.0167
	(0.0223)
$MP_{tRtight}D$	-0.4315
	(0.7631)
$MP_{tReasy}D$	0.8704
	(0.7579)
R_{t-1}	0.0234
	(0.1051)
E_t	-1.7007***
	(0.5896)
R^2	0.2090

Panel B. The change of overnight rate

Independent Variables	Dependent Variables: Rate of Return
Intercept	0.0008
	(0.0114)
$MP_{tOtight}$	0.2891
	(0.3203)
MP_{tOeasy}	-0.5102
	(0.3664)
D	-0.0325*
	(0.0189)
$MP_{tOtight}D$	-0.1576
	(0.7329)
$MP_{tOeasy}D$	0.2151
	(0.4359)
R_{t-1}	0.0355
	(0.1021)
E_t	-1.6705***
	(0.5773)
R^2	0.2212

Panel C. M2 (YoY, Averages of daily figures)

Independent Variables	Dependent Variables: Rate of Return
Intercept	0.0012
	(0.0142)
$MP_{tMtight}$	-2.2804
	(4.1238)
MP_{tMeasy}	3.2378
	(3.7627)
D	-0.0399*
	(0.0219)
$MP_{tMtight}D$	-1.4456
	(5.8391)
$MP_{tMeasy}D$	2.5952
	(6.7364)
R_{t-1}	0.0578
	(0.1065)
E_t	-1.6802***
	(0.6178)
R^2	0.2068

*Coefficient is statistically significant at 10% level; **coefficient is statistically significant at 5% level; ***coefficient is statistically significant at 1% level. Standard errors are shown in parentheses.

Table 34 Effect of trading volume of domestic dealers and the unexpected tight and easy monetary policy on TAIEX futures index returns.

Panel A. The change of rediscount rate

Independent Variables	Dependent Variables: Rate of Return
Intercept	0.0103
	(0.0134)
$MP_{tRtight}$	-0.1366
	(0.4959)
MP_{tReasy}	0.4403
	(0.3286)
D	-0.0141
	(0.0219)
$MP_{tRtight}D$	0.0131
	(0.7739)
$MP_{tReasy}D$	-0.1190
	(0.6390)
R_{t-1}	0.0207
	(0.1136)
E_t	-1.9180***
	(0.6405)
R^2	0.1525

Panel B. The change of overnight rate

Independent Variables	Dependent Variables: Rate of Return
Intercept	0.0195
	(0.0136)
$MP_{tOtight}$	-0.3531
	(0.5262)
MP_{tOeasy}	1.4170***
	(0.4854)
D	-0.0494***
	(0.0183)
$MP_{tOtight}D$	0.7686
	(0.6215)
$MP_{tOeasy}D$	-2.0438***
	(0.5303)
R_{t-1}	0.0554
	(0.1006)
E_t	-2.1391***
	(0.5628)
R^2	0.2857

Panel C. M2 (YoY, Averages of daily figures)

Independent Variables	Dependent Variables: Rate of Return
Intercept	-0.0198
	(0.0152)
$MP_{tMtight}$	-3.1171
	(3.4944)
MP_{tMeasy}	8.0949**
	(3.6576)
D	0.0130
	(0.0225)
$MP_{tMtight}D$	1.0122
	(7.0397)
$MP_{tMeasy}D$	-11.0318
	(6.9307)
R_{t-1}	0.0368
	(0.1082)
E_t	-1.7158***
	(0.6107)
R^2	0.1842

*Coefficient is statistically significant at 10% level; **coefficient is statistically significant at 5% level; ***coefficient is statistically significant at 1% level. Standard errors are shown in parentheses.

Table 35 Effect of trading volume of foreign institutions and the unexpected tight and easy monetary policy on TAIEX futures index returns.

Panel A. The change of rediscount rate

Independent Variables	Dependent Variables: Rate of Return
Intercept	0.0129
	(0.0119)
$MP_{tRtight}$	-0.6113
	(0.4573)
MP_{tReasy}	0.7432**
	(0.3574)
D	-0.0339
	(0.0219)
$MP_{tRtight}D$	1.3887*
	(0.7576)
$MP_{tReasy}D$	-0.9235
	(0.5562)
R_{t-1}	0.0132
	(0.1074)
E_t	-1.8091***
	(0.6075)
R^2	0.1958

Panel B. The change of overnight rate

Independent Variables	Dependent Variables: Rate of Return
Intercept	0.0072
	(0.0126)
$MP_{tOtight}$	0.1264
	(0.5134)
MP_{tOeasy}	1.2817***
	(0.4394)
D	-0.0328*
	(0.0185)
$MP_{tOtight}D$	0.1784
	(0.6183)
$MP_{tOeasy}D$	-1.9337***
	(0.4901)
R_{t-1}	0.0366
	(0.0990)
E_t	-1.6469***
	(0.5670)
R^2	0.3009

Panel C. M2 (YoY, Averages of daily figures)

Independent Variables	Dependent Variables: Rate of Return
Intercept	-0.0248*
	(0.0147)
$MP_{tMtight}$	-5.2280
	(3.5502)
MP_{tMeasy}	6.1465*
	(3.5287)
D	0.0127
	(0.0232)
$MP_{tMtight}D$	5.8487
	(7.1764)
$MP_{tMeasy}D$	-0.8362
	(8.1692)
R_{t-1}	0.0725
	(0.1103)
E_t	-1.9378***
	(0.6048)
R^2	0.1736

*Coefficient is statistically significant at 10% level; **coefficient is statistically significant at 5% level; ***coefficient is statistically significant at 1% level. Standard errors are shown in parentheses.

Table 36 Effect of trading volume of domestic individuals and the unexpected tight and easy monetary policy on TAIEX futures index return in different market regimes.

Panel A. The change of rediscount rate in different market regimes.

Independent Variables	Dependent Variables: Rate of Return	
	Bull Market	Bear Market
Intercept	-0.0008	0.0765**
	(0.0153)	(0.0340)
$MP_{tRtight}$	0.3587	-4.1022**
	(0.4493)	(1.5943)
MPt_{Reasy}	-0.7091	1.6238**
	(1.5792)	(0.5919)
D	-0.0041	-0.0071
	(0.0223)	(0.0643)
$MP_{tRtight}D$	-0.5419	1.9128
	(0.8809)	(2.0880)
$MP_{tReasy}D$	1.6722	-1.3777
	(1.6739)	(0.9337)
R_{t-1}	0.0060	0.2577
	(0.1462)	(0.2449)
E_t	-1.2091*	-3.9712**
	(0.6329)	(1.4947)
R^2	0.2471	0.4533

Panel B. The change of overnight rate in different market regimes.

Independent Variables	Dependent Variables: Rate of Return	
	Bull Market	Bear Market
Intercept	0.0018	-0.0373
	(0.0139)	(0.0368)
$MP_{tOtight}$	0.2276	2.3941
	(0.3126)	(2.8590)
MP_{tOeasy}	-0.0156	-0.5099
	(4.0421)	(0.5529)
D	-0.0138	0.0145
	(0.0221)	(0.0632)
$MP_{tOtight}D$	-0.8770	0.2255
	(0.9222)	(15.4433)
$MP_{tOeasy}D$	-0.0504	-0.1558
	(4.0560)	(1.0078)
R_{t-1}	0.1295	-0.0183
	(0.1369)	(0.2392)
E_t	-1.5631**	-2.9493
	(0.6172)	(1.8015)
R^2	0.2109	0.2132

Panel C. M2 (YoY, Averages of daily figures) in different market regimes.

Independent Variables	Dependent Variables: Rate of Return	
	Bull Market	Bear Market
Intercept	-0.0124	-0.0381
	(0.0192)	(0.0339)
$MP_{tMtight}$	-1.9353	-15.2746
	(4.2321)	(18.7482)
MP_{tMeasy}	7.3977*	10.6015
	(4.2017)	(8.6613)
D	-0.0003	0.0336
	(0.0257)	(0.0561)
$MP_{tMtight}D$	2.1288	-0.6875
	(6.0130)	(27.7016)
$MP_{tMeasy}D$	-12.1262	-13.2831
	(7.3429)	(24.2695)
R_{t-1}	0.1171	0.0025
	(0.1413)	(0.2366)
E_t	-1.3565**	-2.0092
	(0.6246)	(1.9887)
R^2	0.2515	0.2318

*Coefficient is statistically significant at 10% level; **coefficient is statistically significant at 5% level; ***coefficient is statistically significant at 1% level. Standard errors are shown in parentheses.

Table 37 Effect of trading volume of domestic corporations and the unexpected tight and easy monetary policy on TAIEX futures index returns in different market regimes.

Panel A. The change of rediscount rate in different market regimes.

Independent Variables	Dependent Variables: Rate of Return	
	Bull Market	Bear Market
Intercept	0.0099	0.0529
	(0.0121)	(0.0382)
$MP_{tRtight}$	0.2598	-3.2945**
	(0.4169)	(1.4527)
MP_{tReasy}	0.9157*	1.1842
	(0.4608)	(0.6990)
D	-0.0189	0.0269
	(0.0252)	(0.0583)
$MP_{tRtight}D$	-0.3733	1.0630
	(0.8485)	(2.0904)
$MP_{tReasy}D$	0.9918	-0.3322
	(2.3466)	(0.9552)
R_{t-1}	0.0248	0.2426
	(0.1369)	(0.2196)
E_t	-1.4691**	-3.1285*
	(0.6633)	(1.5133)
R^2	0.2595	0.3892

Panel B. The change of overnight rate in different market regimes.

Independent Variables	Dependent Variables: Rate of Return	
	Bull Market	Bear Market
Intercept	0.0060	-0.0322
	(0.0121)	(0.0377)
$MP_{tOtight}$	0.1690	2.1794
	(0.2905)	(2.7863)
MP_{tOeasy}	2.2092**	-0.0545
	(0.9470)	(0.6875)
D	-0.0245	0.0065
	(0.0235)	(0.0575)
$MP_{tOtight}D$	-0.3084	0.1232
	(0.8721)	(13.9468)
$MP_{tOeasy}D$	-2.5303**	-0.7422
	(1.0030)	(0.9205)
R_{t-1}	-0.0398	-0.0556
	(0.1416)	(0.2257)
E_t	-1.5959**	-2.7877
	(0.6600)	(1.6524)
R^2	0.2785	0.2691

Panel C. M2 (YoY, Averages of daily figures) in different market regimes.

Independent Variables	Dependent Variables: Rate of Return	
	Bull Market	Bear Market
Intercept	-0.0060	-0.0162
	(0.0185)	(0.0366)
$MP_{tMtight}$	-0.8772	32.2523
	(3.4647)	(31.5904)
MPt_{Measy}	4.2615	6.8189
	(4.3236)	(8.5235)
D	-0.0198	0.0068
	(0.0291)	(0.0557)
$MP_{tMtight}D$	0.0138	-53.9689
	(11.5234)	(34.6213)
$MP_{tMeasy}D$	-1.5801	-3.5022
	(8.1636)	(23.4911)
R_{t-1}	0.1530	0.0464
	(0.1442)	(0.2051)
E_t	-1.7674**	-1.7598
	(0.6934)	(1.9518)
R^2	0.1995	0.3429

*Coefficient is statistically significant at 10% level; **coefficient is statistically significant at 5% level; ***coefficient is statistically significant at 1% level. Standard errors are shown in parentheses.

Table 38 Effect of trading volume of domestic institutions and the unexpected tight and easy monetary policy on TAIEX futures index returns in different market regimes..

Panel A. The change of rediscount rate in different market regimes.

Independent Variables	Dependent Variables: Rate of Return	
	Bull Market	Bear Market
Intercept	0.0091	0.0014
	(0.0128)	(0.0417)
$MP_{tRtight}$	0.3371	-0.4797
	(0.4263)	(1.6720)
MP_{tReasy}	0.1517	-1.0100
	(1.0728)	(1.2511)
D	-0.0552**	0.1086*
	(0.0218)	(0.0608)
$MP_{tRtight}D$	0.6434	-3.6520
	(0.7171)	(2.2319)
$MP_{tReasy}D$	0.4290	2.4820
	(1.1469)	(1.4398)
R_{t-1}	0.0278	0.2105
	(0.1285)	(0.2180)
E_t	-1.2245**	-3.0277*
	(0.5782)	(1.5947)
R^2	0.3649	0.4005

Panel B. The change of overnight rate in different market regimes.

Independent Variables	Dependent Variables: Rate of Return	
	Bull Market	Bear Market
Intercept	0.0056	-0.0359
	(0.0116)	(0.0431)
$MP_{tOtight}$	0.2108	1.9372
	(0.2917)	(2.9735)
MP_{tOeasy}	-1.3317	-0.9187
	(3.0108)	(0.7040)
D	-0.0474**	-0.0109
	(0.0208)	(0.0668)
$MP_{tOtight}D$	0.1328	12.7511
	(0.7024)	(17.9527)
$MP_{tOeasy}D$	1.1033	0.3562
	(3.0218)	(0.9608)
R_{t-1}	0.0961	-0.0471
	(0.1238)	(0.2118)
E_t	-1.3950**	-2.0194
	(0.5728)	(1.8968)
R^2	0.2902	0.2377

Panel C. M2 (YoY, Averages of daily figures) in different market regimes.

Independent Variables	Dependent Variables: Rate of Return	
	Bull Market	Bear Market
Intercept	0.0007	-0.0055
	(0.0148)	(0.0374)
$MP_{tMtight}$	-1.3540	-13.0828
	(3.8366)	(18.9707)
MP_{tMeasy}	4.3567	0.9732
	(3.9469)	(9.0058)
D	-0.0469*	-0.0420
	(0.0240)	(0.0546)
$MP_{tMtight}D$	-2.5983	-2.9631
	(5.4791)	(30.2129)
$MP_{tMeasy}D$	-2.0568	21.7007
	(6.9534)	(17.6547)
R_{t-1}	0.1497	-0.0129
	(0.1304)	(0.2387)
E_t	-1.2322**	-2.9296
	(0.5990)	(1.8556)
R^2	0.3019	0.2571

*Coefficient is statistically significant at 10% level; **coefficient is statistically significant at 5% level; ***coefficient is statistically significant at 1% level. Standard errors are shown in parentheses.

Table 39 Effect of trading volume of domestic dealers and the unexpected tight and easy monetary policy on TAIEX futures index returns in different market regimes..

Panel A. The change of rediscount rate in different market regimes.

Independent Variables	Dependent Variables: Rate of Return	
	Bull Market	Bear Market
Intercept	0.0115	0.0398
	(0.0156)	(0.0343)
$MP_{tRtight}$	0.1711	-3.3745**
	(0.4900)	(1.5662)
MP_{tReasy}	0.4095	0.8183
	(1.7365)	(0.4920)
D	-0.0321	0.0631
	(0.0232)	(0.0616)
$MP_{tRtight}D$	0.2774	0.4599
	(0.7411)	(2.2003)
$MP_{tReasy}D$	0.1360	-0.8844
	(1.8028)	(1.7673)
R_{t-1}	0.0693	0.2818
	(0.1488)	(0.2053)
E_t	-1.5757**	-4.0658**
	(0.6509)	(1.4808)
R^2	0.2579	0.4774

Panel B. The change of overnight rate in different market regimes.

Independent Variables	Dependent Variables: Rate of Return	
	Bull Market	Bear Market
Intercept	0.0283*	0.0074
	(0.0163)	(0.0301)
$MP_{tOtight}$	-0.6076	-0.0233
	(0.5539)	(2.3862)
MP_{tOeasy}	2.8717	1.1969
	(3.9933)	(0.7245)
D	-0.0622***	-0.0753
	(0.0209)	(0.0574)
$MP_{tOtight}D$	1.0599*	29.7390
	(0.6328)	(20.3200)
$MP_{tOeasy}D$	-3.0858	-2.5414**
	(4.0051)	(0.9076)
R_{t-1}	0.1548	0.0727
	(0.1312)	(0.1813)
E_t	-1.7966***	-2.0823
	(0.5987)	(1.6045)
R^2	0.2699	0.4764

Panel C. M2 (YoY, Averages of daily figures) in different market regimes.

Independent Variables	Dependent Variables: Rate of Return	
	Bull Market	Bear Market
Intercept	-0.0034	-0.0108
	(0.0187)	(0.0304)
$MP_{tMtight}$	-1.6762	37.8287
	(3.5553)	(28.6753)
MP_{tMeasy}	6.0244	4.0904
	(4.1242)	(7.8791)
D	-0.0078	0.0024
	(0.0251)	(0.0535)
$MP_{tMtight}D$	7.6993	-60.0403*
	(7.1629)	(31.9594)
$MP_{tMeasy}D$	-9.0507	5.6836
	(6.8926)	(22.2739)
R_{t-1}	0.1568	0.0265
	(0.1368)	(0.1960)
E_t	-1.5782**	-3.0653*
	(0.6041)	(1.7704)
R^2	0.2622	0.3857

*Coefficient is statistically significant at 10% level; **coefficient is statistically significant at 5% level; ***coefficient is statistically significant at 1% level. Standard errors are shown in parentheses.

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Table 40 Effect of trading volume of foreign institutions and the unexpected tight and easy monetary policy on TAIEX futures index returns in different market regimes..

Panel A. The change of rediscount rate in different market regimes.

Independent Variables	Dependent Variables: Rate of Return	
	Bull Market	Bear Market
Intercept	0.0125	0.0459
	(0.0108)	(0.0346)
$MP_{tRtight}$	-0.1180	-2.8397**
	(0.4176)	(1.2899)
MP_{tReasy}	0.5889	1.3325*
	(0.4466)	(0.6856)
D	-0.0180	0.0562
	(0.0236)	(0.0645)
$MP_{tRtight}D$	0.5046	0.1859
	(0.7351)	(2.3039)
$MP_{tReasy}D$	2.5486*	-0.2860
	(1.3680)	(0.9988)
R_{t-1}	0.1165	0.2474
	(0.1372)	(0.2184)
E_t	-1.0931*	-3.1629*
	(0.5793)	(1.5936)
R^2	0.3358	0.4369

Panel B. The change of overnight rate in different market regimes.

Independent Variables	Dependent Variables: Rate of Return	
	Bull Market	Bear Market
Intercept	0.0089	0.0043
	(0.0136)	(0.0347)
$MP_{tOtight}$	0.0499	0.6034
	(0.5143)	(2.5670)
MP_{tOeasy}	1.1891	1.2093
	(0.9734)	(0.7983)
D	-0.0401*	-0.0282
	(0.0210)	(0.0522)
$MP_{tOtight}D$	0.3200	-4.9293
	(0.6197)	(13.1239)
$MP_{tOeasy}D$	-1.4280	-2.1501**
	(1.0222)	(0.9665)
R_{t-1}	0.1222	0.0358
	(0.1508)	(0.1895)
E_t	-1.3543**	-1.9070
	(0.6127)	(1.5694)
R^2	0.2315	0.4674

Panel C. M2 (YoY, Averages of daily figures) in different market regimes.

Independent Variables	Dependent Variables: Rate of Return	
	Bull Market	Bear Market
Intercept	-0.0013	-0.0746**
	(0.0161)	(0.0343)
$MP_{tMtight}$	-1.5563	-25.1673
	(3.4454)	(17.6740)
MP_{tMeasy}	2.5052	14.5798*
	(3.8082)	(8.0311)
D	-0.0317	0.0813
	(0.0252)	(0.0554)
$MP_{tMtight}D$	2.1856	11.5104
	(6.8898)	(27.3117)
$MP_{tMeasy}D$	5.4445	-7.9236
	(8.0325)	(26.6814)
R_{t-1}	0.2097	0.0828
	(0.1427)	(0.2161)
E_t	-1.4123**	-2.2834
	(0.6071)	(1.6741)
R^2	0.2180	0.3667

*Coefficient is statistically significant at 10% level; **coefficient is statistically significant at 5% level; ***coefficient is statistically significant at 1% level. Standard errors are shown in parentheses.

Table 41 Summary statistics of the interaction terms on actual monetary policy.

Types of Investors	The interaction terms		
	Rediscount rate	Overnight rate	M2
Domestic individuals			-
Domestic corporations	--	---	
Domestic institutions			
Domestic dealers		---	
Foreign institutions		---	

+,- represents the coefficient is positive, negative and statistically significant at 10% level; ++,-- represents the coefficient is positive, negative and statistically significant at 5% level; +++,--- represents the coefficient is positive, negative and statistically significant at 1% level.

Table 42 Summary statistics of the interaction terms on actual monetary policy in different regimes.

Types of Investors	Regimes	The interaction terms		
		Rediscount rate	Overnight rate	M2
Domestic individuals	Bull			-
	Bear			
Domestic corporations	Bull		-	
	Bear			
Domestic institutions	Bull			
	Bear			++
Domestic dealers	Bull			
	Bear		---	
Foreign institutions	Bull			
	Bear		---	

+,- represents the coefficient is positive, negative and statistically significant at 10% level; ++,-- represents the coefficient is positive, negative and statistically significant at 5% level; +++,--- represents the coefficient is positive, negative and statistically significant at 1% level.

Table 43 Summary statistics of the interaction terms on unexpected monetary policy.

Types of Investors	The interaction terms		
	Rediscount rate	Overnight rate	M2
Domestic individuals		-	-
Domestic corporations		-	
Domestic institutions		+	
Domestic dealers		--	
Foreign institutions		---	

+,- represents the coefficient is positive, negative and statistically significant at 10% level; ++,-- represents the coefficient is positive, negative and statistically significant at 5% level; +++,--- represents the coefficient is positive, negative and statistically significant at 1% level.

Table 44 Summary statistics of the interaction terms on unexpected monetary policy in different regimes.

Types of Investors	Regimes	The interaction terms		
		Rediscount rate	Overnight rate	M2
Domestic individuals	Bull			
	Bear			
Domestic corporations	Bull			
	Bear			-
Domestic institutions	Bull	+		
	Bear		++	
Domestic dealers	Bull			
	Bear	--	--	-
Foreign institutions	Bull	++		
	Bear		--	

+,- represents the coefficient is positive, negative and statistically significant at 10% level; ++,-- represents the coefficient is positive, negative and statistically significant at 5% level; +++,--- represents the coefficient is positive, negative and statistically significant at 1% level.

Table 45 Summary statistics of the interaction terms on unexpected tight and easy monetary policy.

Types of Investors	The interaction terms					
	Rediscount rate		Overnight rate		M2	
	Tight	Easy	Tight	Easy	Tight	Easy
Domestic individuals						--
Domestic corporations				--		
Domestic institutions						
Domestic dealers				---		
Foreign institutions	+			---		

+,- represents the coefficient is positive, negative and statistically significant at 10% level; ++,-- represents the coefficient is positive, negative and statistically significant at 5% level; +++,--- represents the coefficient is positive, negative and statistically significant at 1% level.

Table 46 Summary statistics of the interaction terms on unexpected tight and easy monetary policy in different regimes.

Types of Investors	Regimes	The interaction terms					
		Rediscount rate		Overnight rate		M2	
		Tight	Easy	Tight	Easy	Tight	Easy
Domestic individuals	Bull						
	Bear						
Domestic corporations	Bull				--		
	Bear						
Domestic institutions	Bull						
	Bear						
Domestic dealers	Bull			+			
	Bear				--		-
Foreign institutions	Bull		+				
	Bear				--		

+,- represents the coefficient is positive, negative and statistically significant at 10% level; ++,-- represents the coefficient is positive, negative and statistically significant at 5% level; +++,--- represents the coefficient is positive, negative and statistically significant at 1% level.