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The Impact of Capital Market Opening on the A/H Premium: From the Perspective of ETF Connect

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Abstract. Seng China A/H Premium Index, taking into account variables measuring exchange rate, market sentiment, and the A/H risk-free spread. The empirical results show that the ETF Connect initially increased the A/H premium, due to market adjustment and external factors like the Federal rate hikes. With several subsequent expansions as well as improvement, the ETF Connect then significantly reduced the premium, suggesting improved market efficiency and integration. In this work, we conclude that ETF Connect has the potential to further narrow the A/H share premium, especially in the post-pandemic and rate-cutting environment, thereby promoting value investing in the A-share market. This study contributes to the literature by providing a macro perspective on the correlation between the ETF Connect and the A/H premium, highlighting the importance of capital market integration in reducing price discrepancies and fostering a more efficient investment landscape.

Keywords: ETF Connect, A/H share Premium, Capital Market Integration, China's Capital Markets.

1. Introduction

The A/H stock price premium in China is a special and interesting phenomenon. International stocks tend to outperform domestic stocks in the eleven-nation stock markets except in China where it is exactly the opposite [1]. For dual-listed Chinese stocks, prices in A shares are mostly higher than those in H shares, some of them at a very significant level [2].

China has long maintained high A/H stock premiums, and relevant policies to promote exchanges between the two capital markets have been successively introduced. The Shanghai-Hong Kong Stock Connect, announced on April 10, 2014, allows investors to access both markets. This is China's first controllable and expandable capital control liberalization channel, and stocks are traded in each other's market within the agreed range. The total transaction amount in the past nine years has reached 149.1 trillion yuan. In 2022, this connectivity began to include ETFs (exchange-traded funds).

The ETF Connect was issued on July 4, 2022. Mainland and Hong Kong investors can trade ETFs in each other's market (secondary market only) through local securities companies or brokers

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within the scope, which is another strengthened link between the A and H financial markets.

The ETF Connect initially admitted 87 qualified ETFs, including 4 Hong Kong and 83 mainland ETFs. Expansions to the ETF link have generally occurred every six months, adding more qualified choices. The first major expansion was on January 16, 2023, when 15 Northbound ETFs were added and one was removed. More recently, on July 22, 2024, 6 southbound ETFs and 85 northbound ETFs were added, totaling 91 more included, which is the largest expansion ever. The latest profile (2024.7) is a total of 241 ETFs worth 2.5 trillion yuan. As the expansion goes on, the ETF Connect will be improved and more attractive.

2. Literature review

In the study of A/H premium, previous research has formulated four hypotheses regarding the existence of price differences among listed companies in different regions. These hypotheses include the liquidity hypothesis [3], the demand elasticity hypothesis [4], the risk preference hypothesis [5], and the information asymmetry hypothesis [6]. Scholars have proposed four corresponding corporate micro indicators: the daily turnover rate of the A/H stock market [7], outstanding shares [8], EPS [9], and total equity [10]. Other scholars have used the incident as a starting point to examine the Shanghai-Hong Kong Connect and the inclusion of the RMB in the SDR [11,12]. In addition, some researchers have analyzed the issue from the market perspective, such as investor sentiment [13], market segmentation [14], and government actions [15].

Regarding the study of ETF Connect, the previous literature mostly focuses on the benefits of this initiative for specific industries and capital financial markets. Controversial discussions have arisen regarding the effects of targeting corporate stock prices. From one perspective, the "index benefit" of ETFs leads to optimistic deviation, which further reduces pricing efficiency [16], while some people argue that ETFs facilitate the transmission of characteristic information between Tier I and Tier II markets, thereby improving the market efficiency of related indices and promoting pricing effectiveness [17].

From the above information, it is clear that there is a correlation between the ETF Connect and A/H share price differentials. However, there is a lack of research in this area, which makes it necessary to conduct a more comprehensive study on the influence of ETFs on the premium of A/H stocks in China. In addition, most articles primarily examine A/H premiums from a micro perspective, focusing on the industry or individual companies. This paper argues that it is crucial to consider the overall market impact of companies listed in both Mainland China and Hong Kong. Therefore, this research aims to examine the correlation between the ETF Connect and the A/H premium by adopting a macro perspective and selecting appropriate macro variables.

3. Theoretical analysis

The ETF Connect enriches and perfects the relationship of capital markets between Mainland China and Hong Kong. It is assumed that ETF Connect will improve the pricing efficiency of related companies' stocks and strongly reduce the A/H premium level through the following three aspects:

First, asymmetric information has a crucial role in explaining the price disparities between A and H shares. The ETF Connect decreases the expenses for both domestic and international investors to obtain information from the other market. This facilitates the influx of international investment into ETF trading, enabling institutional investors to incorporate current information into their pricing models. Their comprehension of ETF component equities encompasses a greater number of

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companies, enhancing the transparency of information and thereby reducing information asymmetry and narrowing price premiums.

Second, the extent to which the premium is influenced is greatly determined by the elasticity of demand. China's capital market is somewhat less accessible compared to international markets, resulting in limited trading options and a low demand elasticity for investors. Companies can engage in unrestricted pricing discrimination. The ETF link enhances trading alternatives for domestic investors, leading to increased demand flexibility and decreased occurrence of discriminatory pricing in A-shares.

Third, the A-share market is predominantly controlled by ordinary investors, many of whom lack sensible investment mindsets. Overseas markets, on the other hand, are mostly influenced by institutional actors that possess superior decision-making abilities. As more institutional investors participate in the stock market, a higher percentage of institutional investors in the A stock can expected. This will aid in mitigating irrational investment behaviors among mainland investors, reducing the disparity in investment behavior between the two regions' investors and guiding the A-share market towards a focus on value investing.

4. Empirical methodology

4.1. Sample selection

The issue date of the ETF Connect policy is July 1, 2022, so the event window is chosen from June 24, 2022, to August 4, 2022, ten days before the event and one month after it, to investigate whether the opening of the ETF Connect has a significant impact on A/H premium under the premise of capital flow restriction relaxation and market linkage strengthening. The estimation window is from July 1, 2021, to June 24, 2022, 250 days before the event window. All data in this paper are from the iFind and Wind database.

4.2. Variable selection

In this paper, the Hang Seng A/H Share Premium Index (HSAHP) is adopted as the measurement standard. A-share trades at a premium to H-share if $HSAHP_t > 100$ and A-share trades at a discount if $HSAHP_t < 100$.

For dependent variables, there are three aspects of control variables in this model.

(1) Exchange Rate (EXR)

Exchange rate expectations can reflect the current development trend of China's economy, thus affecting the investment of China's domestic residents. According to Chen and Liu, changes in the exchange rate of the RMB against the US dollar will, to a certain extent, affect the changes in the prices of A/H stocks [12]. Since Hong Kong adopts a linked exchange rate system closely related to the US dollar, this paper uses the central parity rate of the RMB forward foreign exchange rate (RMB against the US dollar) when constructing exchange rate-related indicators.

(2) Market Sentiment (SEN)

Shiller has mentioned in Irrational Exuberance that sentiment differences have a systematic effect on overall market prices [18]. Since the main body of investors in the two markets of Mainland China and Hong Kong are different, the stock prices in each market will also deviate due to their sentiment differences. This paper refers to Lu, who found that the sentiment indicator is almost the same as the fluctuation pattern of the broad market index, and creatively proposes the Heng Sang Index/Shanghai Composite Index as an indicator to measure market sentiment [19].

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(3) The A/H risk-free spread (DI)

This paper adopts the issue rate of domestic Negotiable Certificates of Deposit (NCDs) as the CNY risk-free rate and the Hong Kong 10-year treasury bond yield as the HKD risk-free rate. The 10-year treasury bond rate is commonly to be regarded as a risk-free interest rate, while the choice of NCDs issue rate is a novelty in this research. It is a derivative as well as an improvement to the Shanghai Inter-bank Offered Rate (Shibor). It has higher liquidity and can be easily priced, providing a more timely reflection of market changes. The issue rate of NCDs minus HK 10-year treasury bond yield demonstrates the A/H risk-free yield.

4.3. Model construction

The time series model considered is the following:

$$HSAHP_t = \alpha_i + \beta HSAHP_{t-1} + \gamma X_t + \epsilon_t \quad (1)$$

where $HSAHP_t$ is the daily Hang Seng China A/H Premium Index. The lag premium term $HSAHP_{t-1}$ is concluded to control for the auto-correlation [20]. γ is a k-dimensional vector of coefficients associated with the explanatory variables X_t above. It is often assumed that the error term ϵ_t fits the independent and identically distributed hypothesis and has no auto-correlation in different time series observations. Various tests including error term analysis, outlier tests, and the Durbin-Watson test are conducted after the model construction.

4.4. Data description

There are a small number of missing values in the data set, and the missing situation is visualized in Figure 1. 228 out of 250 are full samples. These missing values are mostly considered as missing completely at random (MCAR), so they are each completed concerning the numbers before and after it due to the characteristics of time series data. No outliers are observed after drawing the box plot, so each sample is used to train the model.

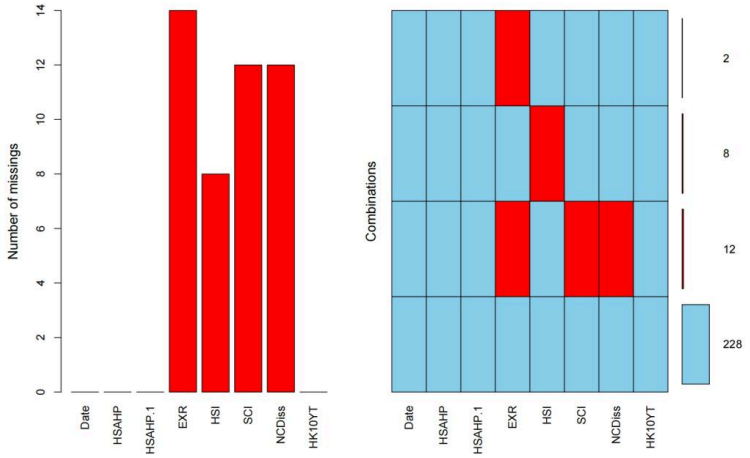

Figure 1. Missing value plot

The statistical properties of the variables in the estimation window are shown in Table 1:

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Table 1. Data description

Variable	Description	Range	Average
HSAHP	Hang Seng China AH Premium Index	134.86 - 151.71	142.00
HSAHP-1	the lag premium term	134.86 - 151.71	141.99
EXR	USD & RMD forward exchange rate (central parity rate)	6.33 - 6.80	6.47
SEN	Hang Seng Index (HSI) / Shanghai Composite Index (SCI)	6.01 - 8.05	6.91
DI	NCDs issue rate (NCDiss) - HK 10y treasury bond yield (HK10YT)	-1.42 - 1.59	0.55

4.5. Regression results

Table 2. Regression results

Coefficient	Estimate	Std.Error	t-value	p-value	
Intercept	50.7546	8.1789	6.206	2.31e-09	***
HSAHP-1	0.6955	0.0362	19.188	<2e-16	***
EXR	1.4491	0.8387	1.728	0.0853	.
SEN	-2.5207	0.3213	-7.884	1.34e-13	***
DI	0.9982	0.1588	6.285	1.49e-09	***

From Table 2, all the variables are significant at 0.05 level except the observable related to the exchange rate (EXR) which is significant at 0.1 level. The R^2, adjusted R^2 of the model is 0.888 and 0.887. The coefficients of this model serve as evidence of previous literature on how different variables affect the A/H premium. The depreciation of RMB will lead to an increase in the A/H premium [12]. The more optimistic A-share investors are compared to H-share investors, the higher the A/H premium will be [21]. The difference in A/H risk-free interest rate has a positive effect on A/H premium. A larger spread leads to a higher premium [22].

4.6. Model diagnostics

4.6.1. Assumption test

As the model uses a linear regression model to estimate the relationship between A/H premium and the other variables, looking for any evidence that Gauss-Markov assumptions do not hold is imperative.

(1) Linearity assumption: First check the scatter plot of the residuals versus the fitted value. Figure 2 indicates that there is no systematic relationship between residuals and predicted values, proving that the assumption of linearity appears to be reasonable.

(2) Normal distribution Assumption: Figure 3 shows that most of the observations fall close to the straight line, with the only exception of observations #69, #98, and #193. Therefore, the normality assumption can be proved.

(3) Homoscedasticity assumption: The breach-Pagan Test is conducted, and it turns out to have a p-value of 0.22 which is above the significance level, failing to reject the null hypothesis H_0 : The error terms have constant variance.

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(4) No auto-correlation assumption: In time series data, the covariance of error terms in different observations should be zero ($\mathrm{cov}(\varepsilon_t, \varepsilon_s) = 0, \quad \text{for } t \neq s$) . Durbin-Watson Test is conducted, and the test statistics d is 1.72. It shows a slight positive auto-correlation, but is within the range to be considered as no auto-correlation.

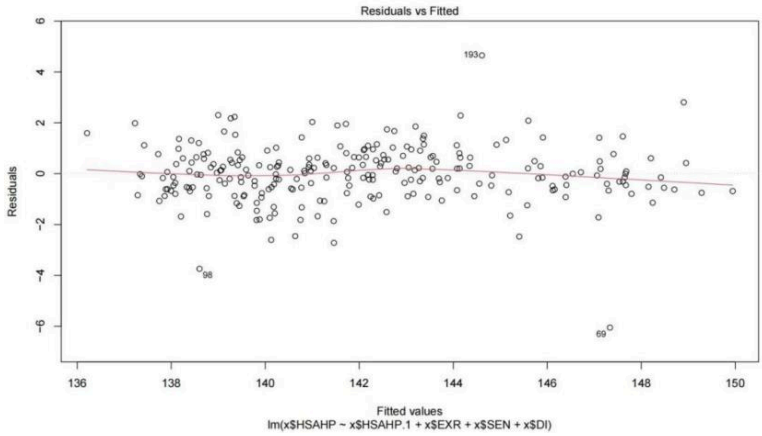

Figure 2. Residual plot

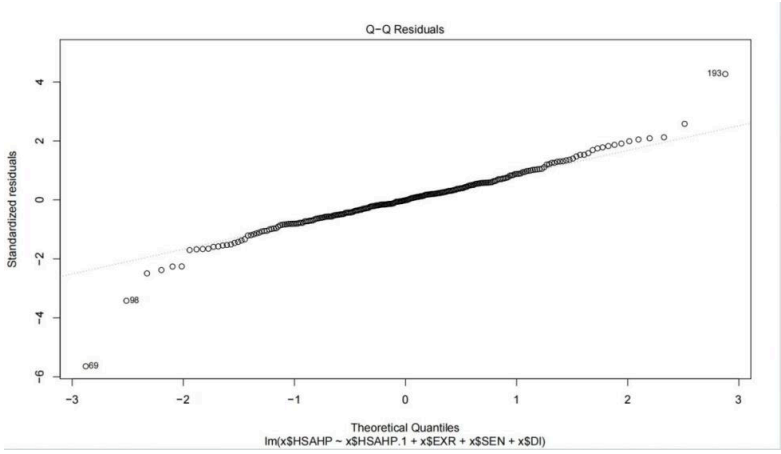

Figure 3. Q-Q plot

4.6.2. Outlier test

Cook's distance and hat value are calculated to find out high influence and high leverage outliers in this model. From Figure 4, #69 and #193 have relatively high cook distances, and from Figure 5, #69, #70, and #31 have high hat values. #69 and #193 are also the outliers on the Q-Q plot.

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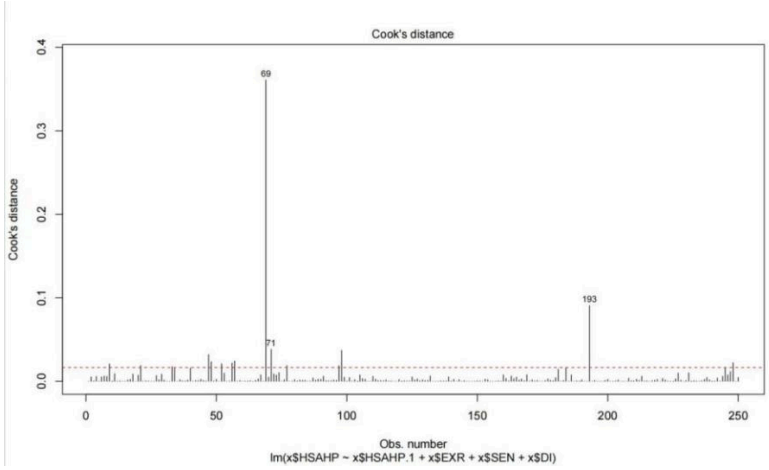

Figure 4. Cook's distance plot

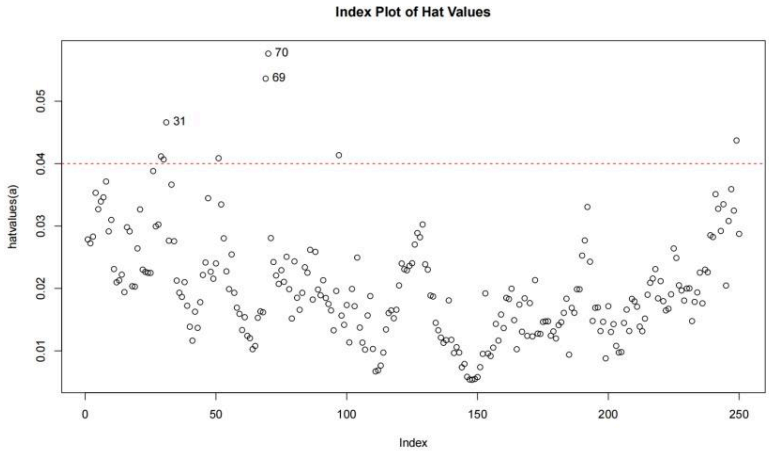

Figure 5. Hat value plot

There is a sharp drop (over 5%) on $HSAHP_t$ from March 16 (#70) to March 17 (#69), 2022, so #69 has the largest difference between $HSAHP_{69}$ and its lag term $HSAHP_{70}$, which can affect the model greatly. #193 is also the case. $HSAHP_t$ of #193 (2022.9.20) increases by 3.8% compared to #194 (2022.9.17), while in most other samples, very little difference is observed between the current and previous HSAHP. This is why these two samples can strongly influence the model.

5. Empirical results

5.1. Result 1 and explanation

After fitting the event window data to the model, the residuals are analyzed to see the impact of ETF connect on the A/H premium, and Figure 6 shows the situation. If the average error term $A\epsilon_t$ and the cumulative error terms $CA\epsilon_t$ are both significantly negative, it means that the launch of ETF connect has observably narrowed the A/H premium. If $A\epsilon_t$ and $CA\epsilon_t$ are significantly positive, it means that the introduction of ETF connect has conversely increased the A/H premium.

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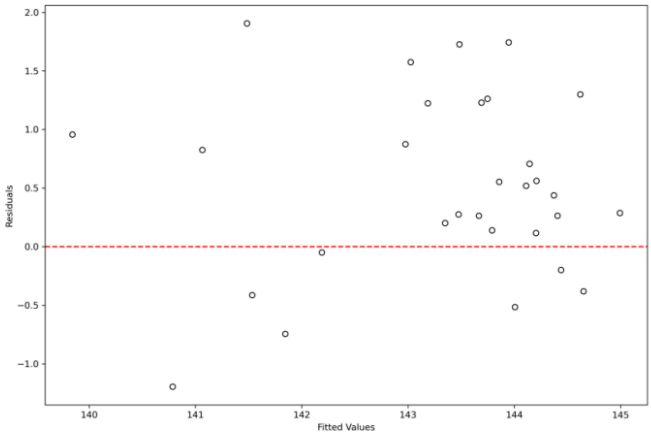

Figure 6. Residual plot of event window 1

The average error term $A\epsilon_t$ of this event window is 0.51429, and $CA\epsilon_t$ is 15.429, with the p-value of 0.00106, which significantly proves that the launch of ETF connect has a significant positive effect on the A/H premium. The empirical analysis seems to have reached an opposite conclusion to the analysis.

Based on the result, the research delves into the problem and comes up with 3 reasons for the opposite result.

(1) Investors need more time to react.

As the trading regulations, fee structure, and features of ETFs are all different between A/H markets, investors need to spend time making preparations before actual trading actions. It is common for a new capital market policy to have a slow reaction after the initial launch. Back when the Shanghai-Hong Kong Connect was first announced, the trading volume and its growth speed also remained low in the first few months. But that didn't stop it from becoming one of the most influential policies between these two places.

(2) The Federal rate hikes

The Federal Reserve's successive and aggressive rate hikes in the second half of 2022 are a major contributor. The additional increase in interest rates changes people's risk appetite and asset allocation strategies. They are more willing to save than to invest, and thus less likely to acquire new financial assets, which hampers cross-border capital flows and increases the A/H premium. However, as demonstrated in Figure 7, the rate hikes slowed down in 2023, injecting more vitality into the market and allowing ETF Connect to reach its full capacity.

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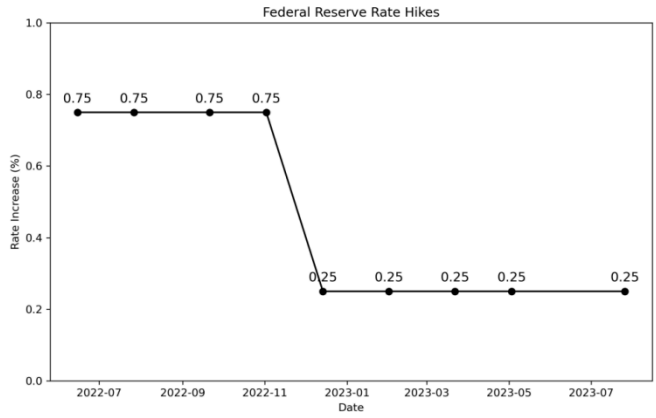

Figure 7. Rate hikes from 2022 to 2023

(3) Imperfect policy

The ETF mechanism itself was imperfect. When ETF Connect was released, the requirements for ETFs to be included in the Connect were quite high, which excluded many high-quality ETFs. Besides, some products were already available to investors as part of certain new derivative products, so the policy didn't sound very attractive. After its semi-annual expansions, investors have access to an increasingly diverse range of products, making the policy more attractive.

5.2. Further research

To further examine how an improved ETF connected with less macro shock affects the A/H premium after it is put to good use, this research then focuses on the first two expansions that happened to it and conducts new empirical tests.

For the first expansion on January 16, 2023, 15 ETFs are included in ETF Connect. The event window is chosen 10 days before the event and 1 month after the event (1.6~2.16), which is the same method as the original event window. For the second expansion of 34 ETFs on July 17, 2023, the event window is 7.7~8.17.

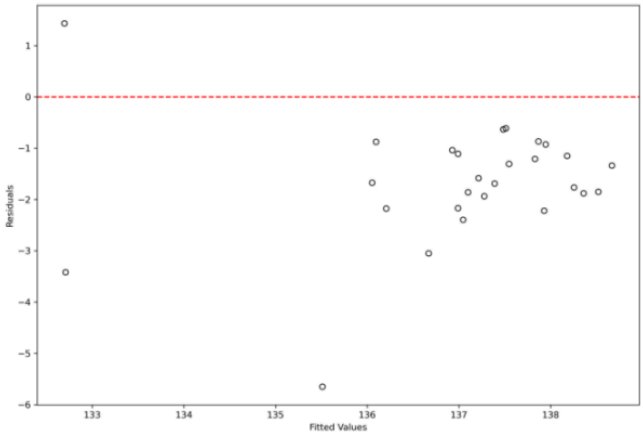

Figure 8. Residual plot of event window 2

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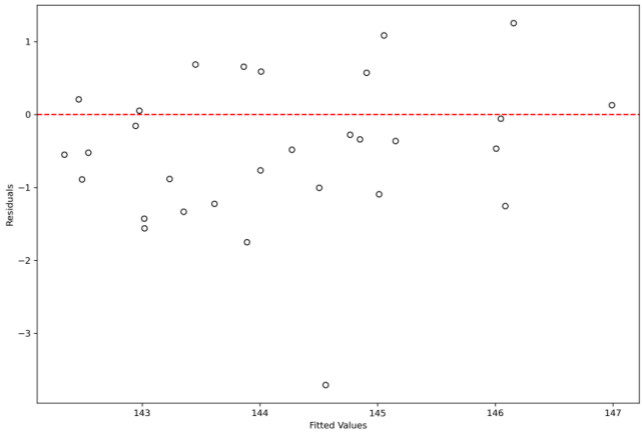

Figure 9. Residual plot of event window 3

From Figure 8, the average error term $A\epsilon_{t1}$ of expansion 1 is -1.66587, and the cumulative error term $CA\epsilon_{t1}$ is -44.9785, with the p-value of 1.162e-07. And from Figure 9, that of expansion 2 is -0.4962 and -14.8844, with a p-value of 0.011. At this point, the empirical analysis can reach the conclusion that with the expansion of ETFs, the flourishing ETF connection significantly reduces the A/H premium.

6. Conclusion

This paper studies the impact of ETF Connect on A/H premium, and according to the research: the ETF Connect policy has significantly reduced the A/H premium.

The average error term means that the implementation of ETF connect has reduced the A/H premium level by 1.2%. As there is a significant lag term whose coefficient is 0.6955, the overall degree of reduction is higher than 1.2% in the long run, since the reduction in the current premium level will surely affect that of the next period, causing a superimposing effect. Under the assumption of perpetual existence, the ETF connect can lead to a reduction of the A/H premium level of more than 4%, which is a considerable amount.

In the past few years, the pandemic and the Federal's rate hikes significantly widened the spread. It can be legitimately concluded that in the current and future post-pandemic period, as well as the Fed's rate-cutting cycle, the ETF Connect will have an even more outstanding effect.

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