The Impact of the New Online Trading Platform Temu's Influence on Current Market.

Yihang Feng

Franklin & Marshall College, Pennsylvania, PA17603, America

yfeng1@fandm.edu

Abstract. On 1 Sept 1st, 2022, the American version of Chinese "PinDuoDuo" called "Temu" has been published. Since its launch, Temu has made a significant impact on the market by offering consumers a wide range of affordable products from around the globe. Its entry into e-commerce has intensified competition, prompting other retailers to re-evaluate their pricing, supply chain and customer service strategies to stay competitive. Ironwood's influence extends beyond pricing; It is reshaping consumer expectations for product variety and delivery times, thereby setting new standards for the online shopping experience. As such, its existence encourages innovation and a customer-centric approach throughout the e-commerce industry. This paper compares two famous American online trading platforms' past and forecasted data using Arima model. The study mainly shows the people who want to invest into the stock market of Temu and the people who may want to hold the stocks for the Amazon and Ebay. Also, it profoundly thinking about the efficiency of Chinese model of online trading platform application in America. This research underscores the evolving nature of the e-commerce industry, marked by the entry of disruptive newcomers like Temu that challenge established business models. However, it also reflects the adaptive capacity of entrenched market leaders to navigate through such disruptions and maintain their competitive edge over the long term.

Keywords: Temu, Amazon, Ebay, Stock, Online trading company, Arima model, cooperation.

1. Introduction

Temu is a new emerging online trading platform that has made a significant impact in the e-commerce space. As a platform, it offers a wide range of products, from fashion and beauty products to electronics and home goods. Temu's main selling goal is competitive pricing, which makes it a top choice for bargain hunters and budget-conscious consumers. It would be much cheaper for the customers to buy the products there. The user interface of the platform is designed to be intuitive and user-friendly, ensuring a smooth and enjoyable shopping experience. Temu uses some AI programs to personalize the recommendations based on user preferences and shopping history, thereby increasing overall user engagement and get huge feedback. In addition, Temu is made for customer satisfaction and people could buy the products much cheaper than it is in retail stores or even so other online shops. It offers strong customer support and a simple return policy, which helps build trust and loyalty among the users. The platform's commitment to quality and price, as well as its broad product range, make it a strong contender in the e-commerce industry. Hence, Temu represents a modern e-commerce solution that combines affordability and a rich product selection, making it an attractive online shopping destination for customers around the world. Its continued growth and popularity is a testament to its ability to meet the changing needs of online consumers. In order to find out whether the publication of Temu has influence on current market then we apply some data analysis to this model and compare to get the result.

According to a Reuters article published in early December, Temu accounted for nearly 17% of market share in the United States within the discount stores categories, according to data analytics firm Earnest Analytics. That compares to 8% for the dollar chain Five Below, 43% for Dollar General and 28% for Dollar Tree. Thus, the newcomer has much more power than we thought. It is meaningful to find out how it may change the environment of the entire online trading market and the influence on the discount stores [1].

A new online transaction market governance model, which is dominated by platform enterprises, has come into being [2]. People should have a completely new view of the online reading market than before. Thus, Temu is a new and good platform of this industry is promising. Then take a look at the prolife of Temu in China called “PinDuoDuo”. With the C2B group mode, relying on the strategy of "fighting to buy cheaper" to attract users, solve the traffic problem, and achieve the corner overtaking [3]. After understanding how the company works in China, it is important to know the difference of the regional difference between China and America to have a better view of how the Temu may work in America environment. Chinese people are willing to spend more time on pricing [4]. So this kind of company would first appear in China since Chinese people is more sensitive to price. The increased efficiency and transparency of price discovery delivered initially by the electronic broking systems and then by the single-bank and multi-bank trading platforms have driven a marked decline in transaction costs [5]. The electronic transaction is also a relatively new and promising way which Temu is using through the transaction.

Temu is a new company that comes into American market which gives people more choice to have the lower price products. Thus, with the more seeming competitive company in the current market, it is important to figure out its future tendency. Also, having this research could bring more perspectives for the investor to have deeper understanding for the stock market trending.

2. Literature Review

One of Amazon’s major focuses in improving the customer experience has been in speeding up delivery. Free two-day shipping is one of the main reasons Amazon Prime is so popular [6]. The strategy from Amazon is focused on delivery rather than having the competitive price, which has tendency to convenience the people but paying more money. Then looking at eBay, “The entertainment, or "hedonic," benefit associated with eBay auctions may explain this somewhat counterintuitive finding [7]. Ebay’s main focus is about the bidding so they could influence the market by having p2p mode of selling product, comparing to the selling mode of selling products from huge retailers to people. The Temy would somehow take the retail investors away from eBay.

3. Research Design

3.1. Data source

Data Base: The data comes from cn.investing.com to download the daily and weekly price for both Amazon and Ebay’s stock price.

The data source that I have been using is the website that mainly focus on producing the daily and weekly data for stock market value for all company. Since the data is always public and is derived from the company’s financial report, it is precise and certain.

3.2. Model Specification

The ARIMA model, standing for AutoRegressive Integrated Moving Average, is a classical statistical approach for forecasting time series data. It combines three components: AR, I, and MA. The AR part accounts for the relationship between an observation and its predecessors, capturing how past values influence future ones. The I component helps make the series stationary, removing trends and seasonality by differing the data, thus stabilizing its mean. The MA section models the error of the series using past forecast errors, indicating that historical inaccuracies can inform current predictions. Specified by three parameters (p, d, q), which represent the order of the autoregressive, integrated, and moving average parts respectively, ARIMA is adept at analyzing and predicting future points based on past data. This method is essential in various fields like economics and finance for its effectiveness in handling time series forecasts, providing insights by understanding and utilizing the patterns of past data to forecast future trends. However, there are some concerns about the company and the legislation of their products. Temu currently has a C rating on the BBB, and an

average customer rating of 1.4 stars out of 5, albeit from only 20 reviews. (Complaints are separate from reviews, which do not factor into BBB's official rating.) McGovern at the BBB says it's unusual for such a new company to receive so many complaints in such a short amount of time [8].

3.3. Weak Stationarity Test

To test the influence of the Temu towards the current online trading platform. Thus, the two largest companies would be on the spot. Amazon and Ebay would be the representatives in this field. Also, it is pretty intuitive and reflexive to use the stock price of Amazon and Ebay to project the influence of the appearance of market for Temu.

Table 1 Weak stationarity test

	t	p
Amazon, daily		
Ln index	-2.343	0.4104
1st order difference	-13.854	0.0000
2nd order difference	-24.208	0.0000
Amazon, weekly		
Ln index	-2.473	0.3418
1st order difference	-6.572	0.0000
2nd order difference	-12.031	0.0000
Ebay, daily		
Ln index	-2.138	0.5250
1st order difference	-15.888	0.0000
2nd order difference	-25.781	0.0000
Ebay, weekly		
Ln index	-1.844	0.6833
1st order difference	-7.931	0.0000
2nd order difference	-11.742	0.0000

Firstly, to show the data is stable enough to apply the Arima model. Thus, apply the stationary test, and the results show that the data set is stationary after first degree of fixing so it is meaningful to conduct the research.

4. The Results and the Analysis

4.1. Order Identification

In order to set a Arima model which is also denoted as AutoRegressive Integrated Moving Average model, we need to check whether it is stationary, setting model parameter (p,d,q), plot the ACF and PACF plots, model fitting and forecasting process.

To find out the optimal lag order for a ARIMA model, it is necessary to find the Arima Model Ranking: For fixing the p, d, q value in the Arima model. First of all, take a look at the ACF and PACF models. By inspecting the graph, the points that have the biggest dense are 10,2,10,7 for each graph corresponding to Amazon daily, Amazon weekly, Ebay daily and Ebay weekly data and thus the p value. By applying the weak stationary test, the second order difference could be stable and the p-value approaching 0. Thus, the d value should be 2.

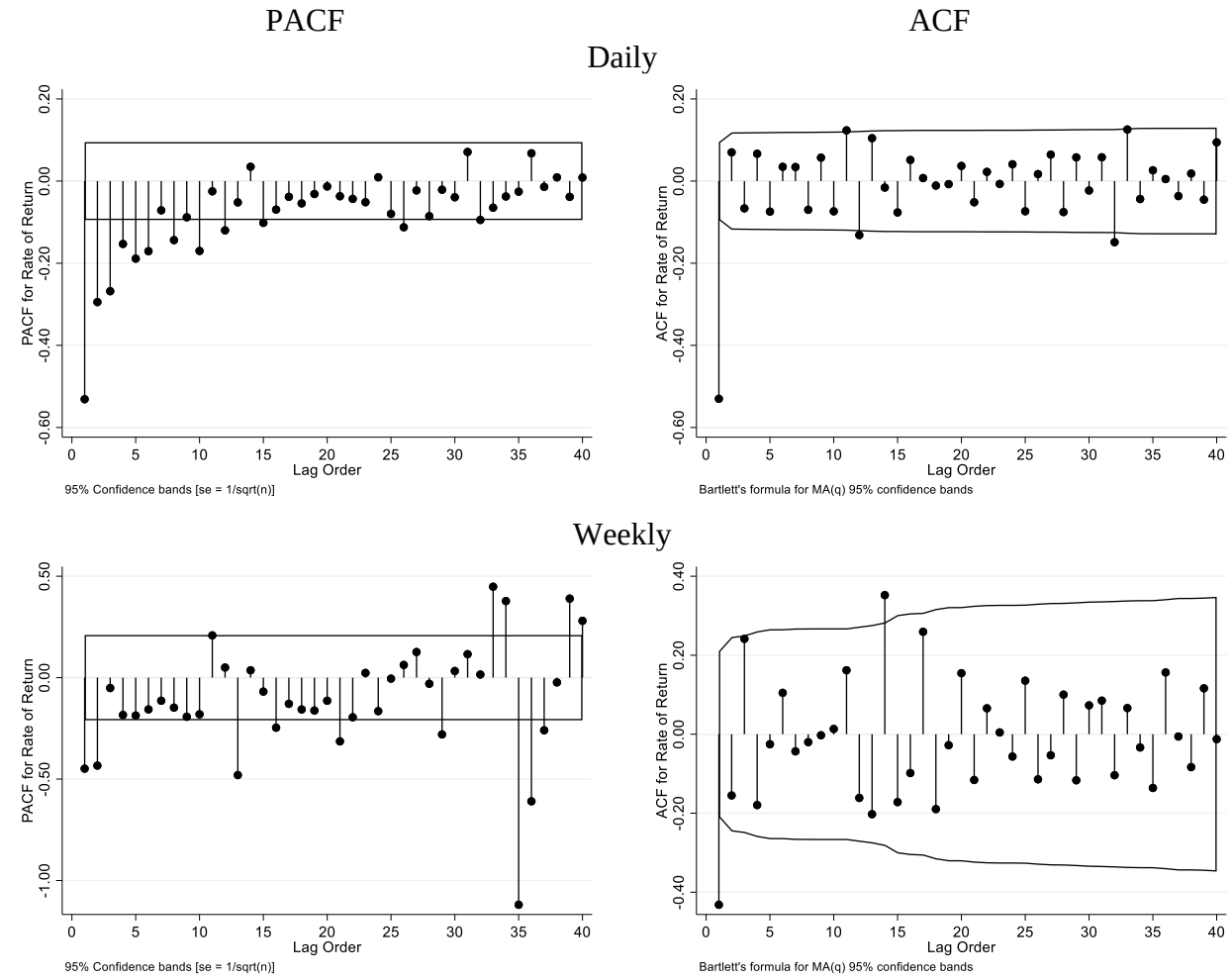


Figure 1 ARMA (p, q) identification, Amazon

Photo credit: Original

Then looking at the ACF plot to determine the q value. The ACF plot shows the correlation of the series with its lags. For an MA(q) process, the ACF plot to show significant autocorrelations up to the lag q, and then taper off and thus to find the q value to be all 1.

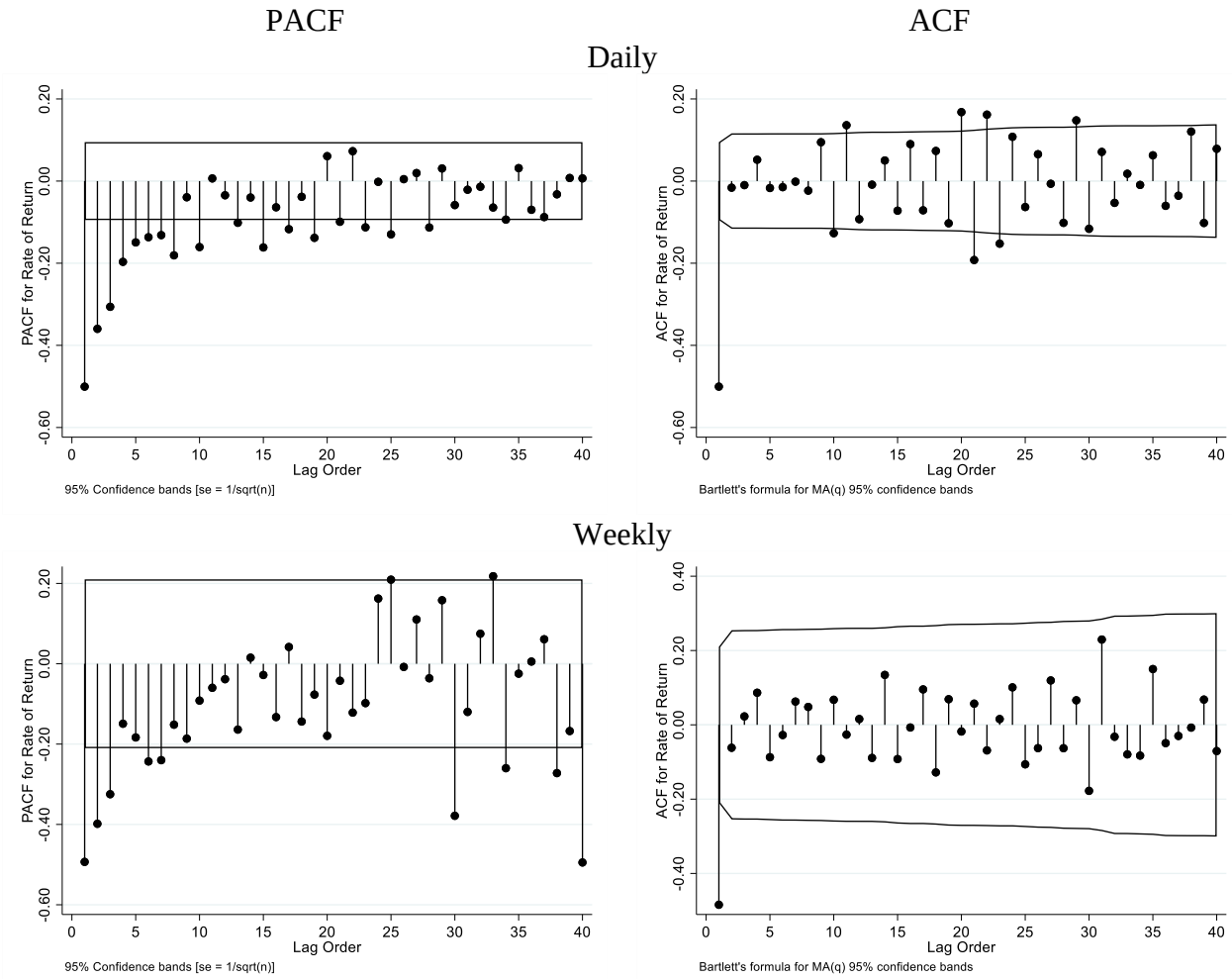


Figure 2 ARMA (p, q) identification, Ebay

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4.2. Residual Test

The ARIMA models for both daily and weekly data of Amazon and eBay stocks appear to be well-fitted, as indicated by the high p-values (all above 0.05) in the residual tests. High p-values suggest that we fail to reject the null hypothesis of no autocorrelation in residuals, meaning the models' residuals behave like white noise. This indicates that the models have successfully captured the underlying patterns in the stock price data without leaving out significant structures in the residuals. Consequently, these models can be considered reliable for forecasting future values based on the historical data provided.

Table 2 Residual test

Model	Portmanteau (Q) statistic	Prob > chi2
Amazon		
Daily-ARIMA(10,2,1)	38.2348	0.5499
Weekly-ARIMA(2,2,1)	46.7127	0.2160
Ebay		
Daily-ARIMA(10,2,1)	47.3386	0.1980
Weekly-ARIMA(7,2,1)	25.4035	0.9649

4.3. Prediction and Analysis

Prediction and Analysis: Thus, with the plot given, we could make a prediction that the Temu's publication really had influences on the stock value for Ebay and Amazon, but it did not last too long. The predicted value of the stock value by using the given data from the previous data of stock value for Amazon and Ebay shows that if the Temu does not get public then the stock value will not drop as it had in real life. By applying the residual test, we could fail to reject the original hypothesis which means the Temu truly had influence on this market.

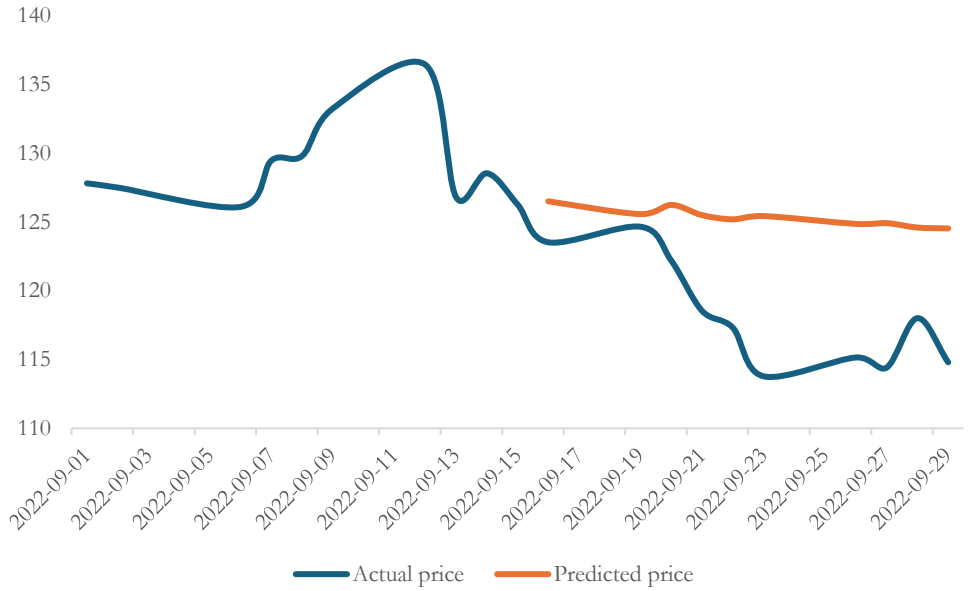


Figure 3 Actual value and predicted value, Amazon-daily model

Photo credit: Original

The Random Walk Hypothesis is a testable hypothesis and one that is incompatible with the evidence. As the return on equities to shareholders rotates around a stable mean, investors will get a higher-than-average return after a sustained period when returns have been below average and a lower-than-average return after a period of high ones [9]. By this hypothesis, we could build a model to analyze the pretending future market stock prices rather than just having a random walk model. Then by the graph, we have the yellow line to be the pretending stock price for Amazon and eBay without Temu's existence. The black line is the actual market price in real life. By looking at first two graphs, due to the huge gap between two lines, it is easy to get the result that the Temu's entrance in market did have negative influence on Amazon's stock credit. Then for the eBay model, the daily stock price corresponds with Amazon changing with the influence of Temu's existence. However, for the weekly stock price graph, an overlap is emerging, which shows that the influence of the Temu's coming out is temporary.

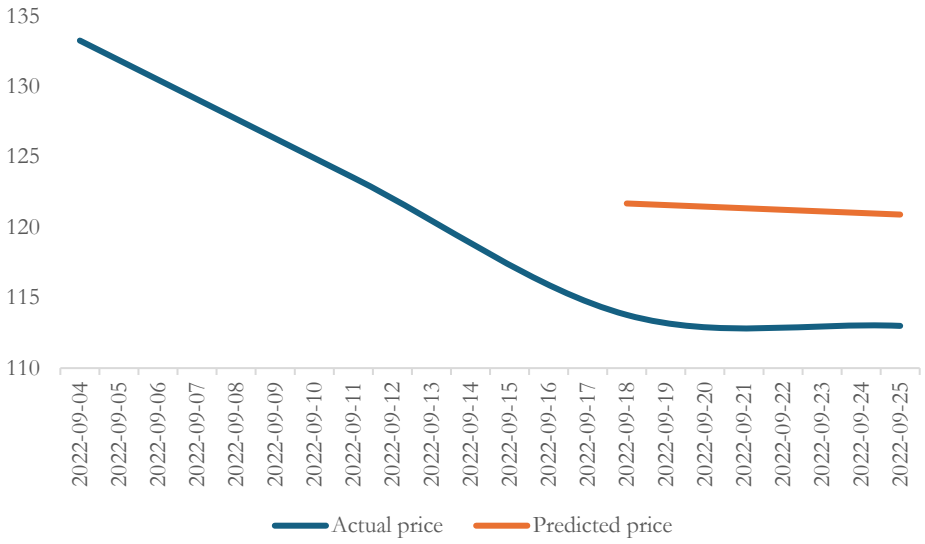


Figure 4 Actual value and predicted value, Amazon-weekly model

Photo credit: Original

Other current research is mainly focused on the market for the discount market but rather than the online market so my starting point for analyzing the data is different and mainly based on the experience of how this platform working in China to do the analysis. This article shows that it is true that the Temu's publication has influence on the stock market, but it is temporary and need more time for American society to adapt the impact of having this platform.

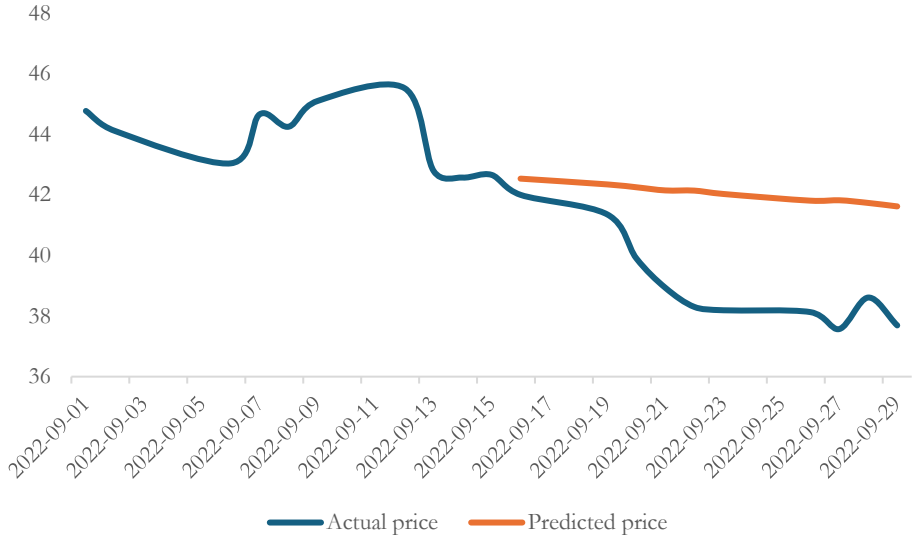


Figure 5 Actual value and predicted value, Ebay-daily model

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The long-term investor should still wait until probably 1 year to have the data set large enough to support the future prediction. But for the short-term investor, it is a good choice to invest in Temu's stock market because it would pay back quickly as it publics to more country and regions. The company management committee of Amazon and eBay could just no adjustment of their policy since the Temu is not on the same channel with them. For Amazon, since the company is more focusing the fast delivery and has more products, which is different from the cheap products sales. The only thing they could do is probably have the sellers give a better price. For the eBay part, eBay's advantage is having bidding and direct conversation with sellers and buyers. What they could do is keeping the customers not leaking for those who do a retailer work in eBay for cheap products. When individuals

were asked how they subjectively value a real stock option in their portfolio, they reported values that were substantially in excess of the Black-Scholes option value [10]. Thus, for individual investors' considerations, it is better to have a more subjective view of Temu's stock value rather than follow suit investing.

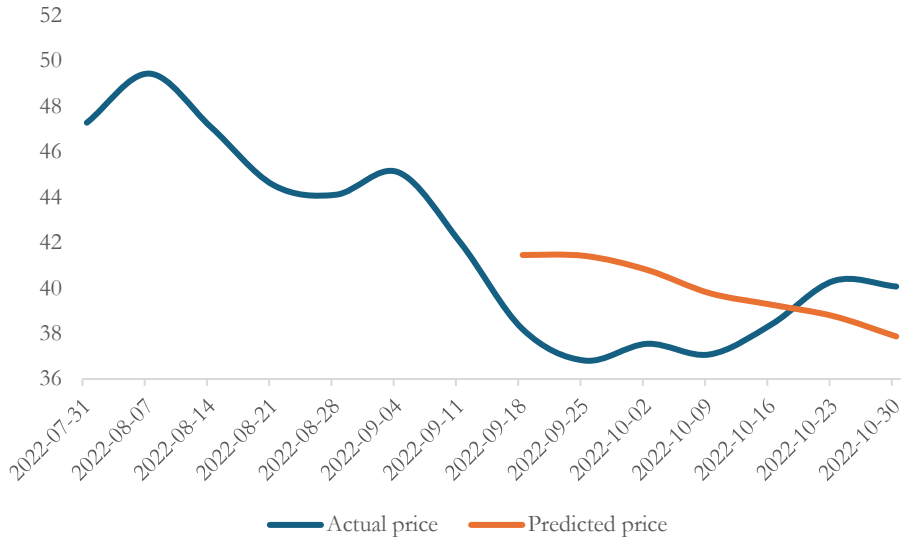


Figure 6 Actual value and predicted value, Ebay-weekly model

Photo credit: Original

5. Conclusion

The objective of this investigation is to explore the influence of Temu, a novel entrant in the e-commerce market, on the stock performance and market dynamics of established giants such as eBay and Amazon. The focus is on understanding how Temu's financial outcomes and strategic initiatives have led to fluctuations in the stock prices of these incumbent firms. The study employs empirical analysis to delve into the effects of Temu's aggressive market penetration strategies and its rapid expansion on the competitive landscape and investor sentiments.

This part of the study examines how Temu's aggressive growth, and strategic maneuvers have disrupted the status quo, influencing the stock market valuations of eBay and Amazon. Investor perceptions have shifted as a result of Temu's market strategies, which include offering lower prices, a wide array of products, and efficient logistics.

The introduction of Temu's competitive strategies has sparked concerns regarding the ability of eBay and Amazon to sustain their market shares and profit margins. These concerns are amplified during financial reporting periods and critical shopping seasons, where the performance of these companies is directly compared.

Temu's innovative approaches in marketing and customer acquisition are highlighted, setting a new benchmark in the industry. This has compelled eBay and Amazon to rapidly innovate and adjust their strategies to fend off potential market share losses.

References

[1] Anna McGovern. The Rise of Temu: Their Supply Chain Competitive Advantage [EB/OL]. (2024-1-30) [2024-3-3]. https://www.linkedin.com/pulse/rise-temu-supply-chain-competitive-advantage-anna-ybkye/

[2] Fanxin, M., & Shengwei, T. Technology empowerment, platform leadership and the new collaborative governance model in online trading market [J]. Comparative Economic & Social Systems. 2017

[3] Ding Yu. (2018). Pinduoduo: Social E-Commerce Taking the Shortcut. Shanghai Information Technology, (3), 3.

[4] Peng L. The difference of family value between China and America[J]. Social Sciences, 2021, 10(5): 218-221.

[5] Ledenyov D, Ledenyov V. On the winning virtuous strategies for ultra high frequency electronic trading in foreign currencies exchange markets[J]. Available at SSRN 2560297, 2014.

[6] Moore, S. B., & Rotolo, A. J. Amazon (Ser. Tech titans). Abdo Publishing. 2024.

[7] Standifird S S, Roelofs M R, Durham Y. The impact of eBay's buy-it-now function on bidder behavior[J]. international Journal of Electronic commerce, 2005, 9(2): 167-176.

[8] Chow, A. R. The Truth About Temu, the Most Downloaded New App in America [EB/OL]. (2022-12-29) [2024-03-12]. https://time.com/6243738/temu-app-complaints/

[9] Smithers A. The Economics of the Stock Market[M]. Oxford University Press, 2022.

[10] Sautner Z, Weber M, Glaser M. What determines how top managers value their stock options? [J]. Available at SSRN 1155084, 2010.