The 6th International Conference on Economic Management and Green Development (ICEMGD 2022)
DOI: 10.54254/2754-1169/3/2022800

Implication of Momentum Crash in Covid-19

Haoyu Zhou[1,a,*]

[1]*Beijing Normal University - Hong Kong Baptist University United International College, China*
a. lncs@springer.com
**corresponding author*

Abstract: This article seeks to investigate momentum strategy from January 2001 to June 2021 and establishes three types of consequences of momentum collapse triggered by covid-19. I demonstrate the validity of three types of implication, which are narrowing the window of positive return for momentum strategies, widening the average return gap between past winners and losers, and diminishing profit in the WML portfolio (winner minus loser) over time. Finally, I do further research in both the covid-19 and normal periods, and find that past winners and losers are more vulnerable to momentum crashes, as evidenced by a big reversal of return.

Keywords: Momentum Crash, Momentum Strategy, Covid-19

1. Introduction

One of the most prevalent characteristics of today's financial sector is momentum strategy. The principle of market efficiency, which states that stock prices will efficiently represent market information specified by Fama, lies at the heart of the momentum approach[1]. Bondt and Thaler claim that momentum is caused by market overreaction[2]. Moment strategy, according to Jegadeesh and Titman, is ascribed as influence of delayed pricing response and other firm-specific information [3]. Chan observed that post-formation return drift should be attributed to market underreaction theory since it is compatible with a market slowly responding to news in earlier price movement. [4]. Contrary to these classic literatures assuming that investors are rational, Bodie, Kane, and Marcus argue that investor irrationality and arbitrage constraints are to blame for the prevalence and persistence of stock mispricing, generating anomalies for efficient market theory[5].

Bondt and Thaler are the first to show that the future return of a past loser will eventually equal that of a past winner, resulting in a considerable abnormal return[2]. However, this phenomenon only happens in January. Jegadeesh also shows future return is predictable, caused by inefficient market or systematic changes [3]. Jegadeesh and Titman go on to show that a momentum strategy may be used by investors to generate a profit over a 3- to 12-month holding period by purchasing the winners and selling the losers[3]. According to Chan, a stock’s past 6 months return might have predictive power for future returns[4]. Such power can persist for six months throughout the time period from 1993 to 2001, which is similar with Jegadeesh and Titman's[3]. In comparison to other momentum methods, Thejll observe that building a portfolio based on the past 6 months return and keeping it for the next 3 months period produces the greatest profit[6].

In various nations and locations, the momentum strategy has been proven to exist. In the United Kingdom, Liu et al. document a momentum effect [7]. G-7 countries, according to Bacmannn et al.,

DOI: 10.54254/2754-1169/3/2022800

have a momentum. Similarly, evidence of the presence of momentum can be seen in Europe , Spain, and Australia[8-11]. However, a momentum crash occurs leading to a negative return of momentum strategy occurs during the recovery phase after a significant drop, as found by Daniel and Moskowitz [12].

My study, extending the analysis of Jegadeesh and Titman's, tries to address two key issues[3]. First, determining if the momentum approach is still viable over the long term from 2001 to 2021, despite two major financial market risks. Second, investigating the implications of a momentum crash occurring when the stock market had a severe drop and then rebounded due to the disease, covid -19. The following sections make up the remainder of this paper's content: Section 2 focuses on portfolio construction and discusses data and technique. Section 3 examines the validity of the momentum approach from 2001 to 2021 in order to determine the consequences of the momentum collapse. Section 4 specifies the technique for proving the implication stated in the preceding section. Section 5 delves deeper into the findings offered in 12 industries and the market. This report concludes with speculation on observations, then suggests topics for research in future.

2. Sample and Methodology

All stocks on the NYSE, Amex, and NASDAQ are taken into account. Using data from the CRSP, I construct monthly results. The sample period for testing the momentum strategy is from Jan 2001 to June 2021. Following Chan's methods, I calculated the past 6-month return as $Ret_{p6} = \sum_{j=0}^{6} \frac{p_j - p_{j-1}}{p_{j-1}}$, where p_j is announced as the stock price p at month j[4]. The past 3-month return is computed as $Ret_{p3} = \sum_{j=0}^{3} \frac{p_j - p_{j-1}}{p_{j-1}}$.

To compute future returns, I use the portfolio sorting approach. All equities are evaluated and grouped into 10 portfolios and rebalance 10 portfolios at each month based on the past 6 month or past 3 month return. Portfolio 10 is top decile portfolio, representing 10% of the highest performing enterprises in the past 6 or 3 months. Portfolio 1 which is lowest decile portfolio, having 10% of the poorest performers. Dougwaggle et al. show firms with more market equity are positively connected with higher levels of momentum and higher rank[13]. Brennan et al., show that market equity and the speed with which prices adjust to new information are strongly correlated[14]. In rating firms, I use a value-weighted technique using market equity as value, which is calculated by multiplying the number of outstanding stocks and corresponding stock prices, to control associated bias at each time portfolio construction. In addition, to eliminate relevant bias, I excluded all financial organizations from my sample.

3. Examine validity of momentum strategy

3.1. Examine momentum strategy from 2001 to 2021

Chan shows that the future return drift is economically significant and lasts at least six months. Jegadeesh and Titman consistently report that the anomalous return persists for 3 to 12 months [3]. My findings also show that the anomalous return could last for 6 to 12 months from January 2001 to June 2021. Table I Panel I show the negative WML return (-20%) of portfolio ranked without value-weighted, occurs at future 12 months, representing return of past loser outperforms past winner by 20%. Such occurrence time for negative WML return is also reported in Table I Panel II, whose portfolio is ranked with value-weighted based on market equity. As a result, regardless of whether value weighting is used in portfolio formation, return of the past loser is larger than that of the past winner in the future 12 months.

DOI: 10.54254/2754-1169/3/2022800

Past 6-month return of past winners in Table I Panel I and Table I Panel II is 185% and 106%. Such 79% divergence indicates that the size of firms has an influence on portfolio construction. Furthermore, the difference of return over a future 36-month timeframe is 39% also support this assumption

3.2. Identify implication of momentum crashes

By comparing the results in Table I Panel II and Table I Panel III, I want to see if there is a powerful momentum crash impacting the success of momentum strategy from 2001 to 2021. Daniel and Moskowitz reveal a momentum crash occurs when the market has a sudden drop following a period of market recovering or when the market experiences a period of high volatility following a panic condition[12]. Between 2001 and 2021, there are two notable drops. One happens from July 2007 to February 2009, when the financial crisis began, and the other begins in January 2020, when the covid-19 pandemic spread. They both point to a prominent momentum crash. From February 2009 to August 2011, the precipitous drop and recovery degree of the Financial Crisis were roughly 50% and 65%, as measured by the S&P500 index. According to Do et al., the start and end points of the financial crisis should be 2007 July and 2011 August, respectively[15]. As a result, the time period spanning 2007 July to 2011 August, as well as the time period spanning 2020 January to 2021 June, are removed from the sample time horizon referred as the normal period in Table I Panel III.

The pattern of past winners return outnumbering past losers return in Table I Panel III will continue for the future 12 months. It is 6 months longer than the trend in Table I Panel II. Then WML portfolio return in past 6 months (141%) in Panel III is 12% lower than in Panel II. This shows a momentum crash caused not only shortens the window of opportunity for momentum strategies to generate positive returns by 3 months, but also increases the difference in return between winners and losers in the average over the entire time sample. Furthermore, when comparing the future 6, 12, 24, and 36-month of the WML portfolio return in Table I Panels II and Table I Panel III, a decrement of 6%, 12.5%, 13.5%, and 11.7% is created, respectively, due to two large momentum crashes. Finally, I propose three types of momentum crash implications for momentum strategy: (1) dwindling the profitable time period of WML portfolio, (2) increasing the average return discrepancy between winner and loser, and (3) shrinking profit generated by buying winner and selling loser strategy in the future several months.

4. Verify validity of three implication

Section 4 confirms three types of momentum crash implications using the discussion in section 3.2, by comparing result between covid-19 and normal periods.

Every crisis has a winner and a loser. The covid-19, as the most severe crisis in recent years, struck certain businesses badly, such as Air transportation and Mining. All industries, save Finance and Insurance, had a negative percent change in industry real gross production in 2020 Q2 according to US Bureau of Economic Analysis data (second quarter).

Momentum crashes that precede negative returns can be observed since they occur in panic situations. It results in a quick market decline followed by market recoveries or significant market volatility, as Daniel and Moskowitz have observed[12]. According to Jegadeesh et al., during the recovery phase of the market collapse, such as 1932 July of the Great Depression, negative returns of -40% of a 6-month portfolio were reported, following a 43% rebound degree of the index [3]. Daniel and Moskowitz add to this theory by observing that while the market index rose by 82% and 32% in the first two months of 1932 and the first three months of 2009, the return of the bottom decile increased by 232% and 163%, respectively[12]. Similarly, a 66% increase occurs in March 2020, following a 20% drop in the S&P500 index during the preceding three months, completing the trigger criteria for

DOI: 10.54254/2754-1169/3/2022800

a momentum crash. According to my prior data, I believe momentum strategy is still viable throughout the Covid-19 period. However, a momentum crash will reduce both lucrative time periods and WML portfolio profits by increasing the average return gap between past winners and losers. Further analysis is performed in Table II and Table III to see if these three types of implications of momentum crash caused by epidemic spreading are still prominent during the covid-19 timeframe.

Table II Panel I presents a value-weighted portfolio for equities from 2020 Jan to 2021 June. The identical method established in Section 2 is duplicated in Table II Panel II, as Moskowitz and Grinblatt provide evidence supporting strong industrial momentum [16]. SIC code is used to categorize industry. Also, I add two more sectors to my analytic scope: Air transportation and Health services, in addition to the 10 initial industries to increase the size of my sample. Table III has the same tests, with the exception of the time period from 2007 July to 2011 August and from 2020 January to 2021 June, which includes two seeming plummets and recoveries that result in the current momentum crash. Instead of using past 6-month return as the standard for assigning stocks, I utilize past 3-month returns to prevent the influence of a limited sample size based on a very short time period (18 months) from Covid-19 outbroken,

4.1. First implication

First, I test the hypothesis that momentum crashes will reduce the time it takes for a momentum strategy to deliver a positive return. When comparing the data in Table II Panel I and Table III Panel I, the first time a negative return of the WML portfolio shows in the covid-19 period is in the future 12 months, as seen in Table II Panel I. Simultaneously, the WML portfolio's return in Table III Panel I remains positive. To help comprehend the reasoning, Table III Panel I illustrates a 48 percent increase in past losers from the past three months to the future twelve months, but Table II Panel I shows a 170% increase in past loser return. Meanwhile, the return of past winners in Table II shows a major reversal of 69% in future three months and a recovery of 24%, 27%, and 14 % in future six, nine, and twelve months, respectively. Table III, on the other hand, shows a very slight reversal of past winners, with 45%, -1%, 6%, and 5% in future 3, 6, 9, and 12 months. During the covid-19 era, aggressive performance of the lowest decile and top decile portfolios shows.

Result of case studies in Table III Panel II, show that the return of the WML portfolio for all industries is positive beyond the future 12 months. But in Table II Panel II, the past winner of 8 industries outperforms the past loser continuing until the future 12 months (Agriculture&Forestry&Fishing, Air transportation, Manufacturing, Transport, Utility, Retail trade, Public administrate and Healthy service). In these 8 industries, Outperformance in two sectors (Agriculture&Forestry& Fishing, and Air transportation) is expected to end around the future six months. And the positive return on the WML portfolio of Healthy services industry is expected to end in the future three months. Past losers return in most industries in Table II Panel II get a huge increase above 100% in the future 12 months with the exception of Utility (85%). And increment in both Healthy service (327%) and Mining (352%) exceed 300%. Because of the substantial degree increase, the loser's return is virtually approaching that of the winner in future months, with the exception of Air transportation. Although the negative return for the WML portfolio of this exception does not materialize in the future 12 months, there is still some specific evidence that the winner's return will eventually catch up to the loser's return in the next 15 months or longer.

In conclusion, past winners outperform past losers in the covid-19 era is likewise temporary. Such performance linked with momentum crash is more transient than performance without that.

DOI: 10.54254/2754-1169/3/2022800

4.2. Second implication

I test the validity of my second proposition, that a momentum crash will accentuate the difference in average return between winners and losers. According to Waldkirch, small businesses are more likely to close as a result of pandemic spread than large businesses[17]. Hassan et al. represents firms with past epidemic experience such as SARS and H1N1, are related with less unfavorable implications, being equal to senior companies incur less loss than younger companies [18-24]. As a result, one may expect the average return of the winner holding above advantages to prevent the virus impact to be significantly higher than that of the loser in the Covid-19. I use the past 3 month return of the WML portfolio as a reference to measure average discrepancy throughout each sample time in Table II and Table III. The WML portfolio's past three-month return in the eight industries in Table II Panel II is higher past three-month return in Table III Panel III (Mining, Manufacturing, Utility, Services, Wholesale trade, Retail trade, Public administrate and Healthy service).

In this situation, I believe the meaning of a momentum crash is less substantial; there is one rationale for this, since there are interesting reactions of various industries to the epidemic. The most common concern about the emergence of covid -19 is "social distance," which has been linked to reduced needs by both Hassan et al. and Waldkirch[17,18]. According to Waldkirch[17], labor shortages, disturbances in the supply chain, particularly multinational supply chains, create dramatically declining sales quantities. Original materials, particularly sale exporting, are mainly responsible for the return reduction. Unfortunately, industries that rely on multinational corporations to provide services or produce goods, such as transportation, as well as labor-intensive industries such as construction, would be constantly vulnerable to global governments' lockdown policies and the resulting unstable economic situation.

As a result, being exposed to the pandemic will reduce the distinction of return reduction across enterprises belonging to the same industry that contains the aforementioned characteristics.

4.3. Third implication

I will prove the third assumption that momentum crash will decrease WML portfolio return in future several months. WML portfolio through future three and six months in Table II Panel I is larger about 2.6% (34.4%-31.8%) and 0.7% (33.1%-32.4%) than that in Table III Panel I. Then negative return difference occurs, -16% (9.8%-26.2%) and -54% (-33.7%-21.1%) in future 9 months and 12 months. Next, I consider situation in each industry. For most industries, the trend of past winners outperforming past losers will terminate over the future12 months in the covid-19 timeframe. It is consistent with the findings in Section 3.2. As a result, in Tables II and III, I will use the return of the WML portfolio over the future three, six, and nine months as an index demonstrating the capacity of the momentum approach to produce a profit.

I look at the profitability of momentum strategies in several industries during the next few months. To begin, Table III Panel II shows that WML return of five industries (Agriculture& Forestry& Fishing, Construction, Transportation, Utility, and Air transportation) are greater than those in Table II Panel II for future three-month returns. The number of industries with a greater future 6-month return in Table III rises to 6 (with the addition of Service to the preceding manual) and reaches 9 for future 9 month returns (adding Retail trade, Wholesale and Healthy service into the previous manual). As a result, such a tendency is increasing as holding time passes. So, it is possible to get a higher return in the very beginning of future months of a certain industry in covid-19 period than that in the normal period.

For one particular business, Mining, the covid-19 period delivers higher return than the normal period in all subsequent months, contradicting my earlier premise. As a result, one interpretation may be that strong recovery from pandemic affection in the coming 12 months will be large enough to

DOI: 10.54254/2754-1169/3/2022800

offset the effect of the dramatic drop in the first two months of 2020. According to data collected by the United States Bureau of Economic Analysis, price indexes for gross output percent change from the previous period for the Mining industry in 2020 Q3 (third quarter), Q4 and 2021 Q1, Q2 are positive, as 98.5 percent, 41.3 percent, 80.6 percent, and 19.7 percent, respectively. However, 2020 Q1 and Q2 experience decrements of -34.3 percent and -61.7 percent. In keeping with earlier observations, the S&P Metals & Mining Select Industry Index drops by half from 1485 to 735 from 2020 January 2 to 2020 May 18, then climbs by 231.4 percent to a new high of 2436 on June 1, 2021.

Finally, I believe that a momentum crash will drastically reduce the return on a portfolio constructed by buying winners and selling losers only in the long run. In the short run, such an assumption may be reversed, implying that the return of the WML portfolio might yield a higher return during the crisis time. Contrary to the preceding premise, such an effect is not efficient over all time horizons.

5. Further evidence for previous propositions

I continue my investigation for determining how the past winners return and losers return change for all 12 industries. Future 3-month return of stocks in portfolio 10 is approximately half of the return in the past 3-month period in the Covid-19 timeframe. Table II Panel II demonstrates that 9 industries fulfill this notion with a 10% range skew. The future 3-month return of the past winner in the other three industries (Manufacturing, Utility, and Healthy service) approaches around 30% of the past 3-month return.

In section 3.1, it is stated for past losers in all 12 industries that during the covid-19 period, a significant increase above 100 percent over the future 12 months is reflected in 11 industries and the market, except Utility. Among the 11 industries, two (Mining and Healthy service) are witnessing increases in excess of 300 percent, which is compounded by a pronounced momentum crash. The rapid recovery of these two industries may have contributed to this phenomenon. According to the U.S. Bureau of Economic Analysis, change from the previous period of real GDP in 2020 Q3 of the Healthy service is 67.4 percent, and the development scenario of mining is mentioned in Section 4.3.

The return of past losers in four industries (Mining, Construction, Transportation, and Healthy service) increase a relatively high level, nearly 70% from past 3 month to future 12 month in Table III Panel III. Such significant increment of return should only be caused by momentum crash. One explanation for that is, from 2001 to 2021, fewer noticeable momentum collapses, such as SARS H1N1 and Ebola, were noticed instead of covid-19 and Financial crisis. Because of their high labor intensity, Mining and Construction may be harmed. The approach of keeping borders closed to avoid pandemic transmission will also restrict cross-border travel. And tackling serious public health issues will put a lot of pressure on the Healthy service industry. These disadvantages for four industries will result in a sharp drop in the stock market over a short period of time, which is a required trigger for a momentum collapse. Momentum crash could result in a significant increase in past losers return , which is consistent with previous analysis.

Such observational data might be used to support the shortening window of implication caused by momentum crash, because return of past winner and past loser experience big reversal, allowing them to draw near to each other.

6. Conclusion

My findings demonstrate statistically significant momentum from 2001 to 2021, and they provide a detailed understanding of the implications of momentum crashes for momentum strategy. To forecast future returns, I employ the portfolio sorting method. I present additional evidence showing the loser benefits significantly more in the covid -19 period than in the usual period, while the winner suffers an almost 50% negative reversal in the following several months. Both of the aforementioned

DOI: 10.54254/2754-1169/3/2022800

characteristics are related to the "short life" of momentum strategies that produce positive returns. As a result, it is obvious that future returns are predictable based on previous returns in many businesses, whether in a normal or crisis era. These findings should be considered robust because they are consistent with one another when comparing the covid-19 era to the regular time period using 13 instances analysis.

The main constraint of my research is the small sample size, which is limited by the short time span of 18 months beginning with the emergence of covid-19. The pandemic is affecting several industries, with no evidence of covid-19 elimination. Future research on this topic could confirm my findings based on a larger sample size over a longer time span.

References

[1] *Eugene F. Fama., 1969. "Efficient Capital Markets: A Review of Theory and Empirical Work," Journal of Finance, Volume 25, Issue 2, Papers and Proceedings of the Twenty-Eighth Annual Meeting of the American Finance Association New York, N.Y. December, 28-30, 1969 (May, 1970), pp. 383-417.*

[2] *Thaler, Richard and Werner F.M. De Bondt., 1985. "Does the Stock Market Overreact?" Journal of Finance, vol. 40, no. 3 Uuly):793-805.*

[3] *Jegadeesh, N. and Titman, S., 1993. "Returns to buying winners and selling losers: implications for stock market efficiency." The Journal of Finance 48, 65–91.*

[4] *Chan,L., Jegadeesh.N.,Lakonoshok, J., 1996, "Momentum strategies." Journal of Finance 51, 1681-1713.*

[5] *Bodie, Z., Kane, A. and Marcus, A.J., 2017. "Investments." UK: McGraw-Hill.*

[6] *Tobias Thejll, 2018."Returns to Buying Winners and Selling Losers." Bachelor's Thesis in Finance.*

[7] *Liu, W., Strong, N., Xu, X., 1999. "The profitability of momentum investing". Journal of Business Finance and Accounting 26, 1043–1091.*

[8] *Bacmann J., Dubois M., Isakov D., 2001. "Industries, business cycle and profitability of momentum strategies: an international perspective." EFMA 2001 Lugano Meetings. Available at SSRN: http://ssrn.com/abstract=264657 or DOI: 10.2139/ssrn.264657.*

[9] *Nijman T., Swinkels L., Verbeek M., 2002. "Do countries or industries explain momentum in Europe?" ERIM Report Series Reference No. ERS-2002-91-F&A. Available at SSRN: http://ssrn.com/abstract=301533 or DOI: 10.2139/ssrn.301533.*

[10] *Forner C., Marhuenda J., 2003. "Contrarian and momentum strategies in the Spanish stock Market." European Financial Management 9,67–88.*

[11] *Jenni L. Bettman., Thomas R.B. Maher, Stephen J. Sault, 2007. "Momentum profits in the Australian equity market: A matched firm approach." Pacific-Basin Finance Journal 17 (2009) 565–579.*

[12] *Daniel, Kent D., and Tobias J. Moskowitz. "Momentum crashes." Swiss Finance Institute Research Paper 13-61 (2013): 14-6.*

[13] *Dougwaggle, Pankaj Agrrawal, and Don Johnson, 2001. "Interaction between value line's timeliness and safety ranks." Journal of Investing, Vol. 10 (1), Spring 2001. Available at SSRN: https://ssrn.com/abstract=2639040.*

[14] *Michael J. Brennan, Jegadeesh, N and Bhaskaran Swaminathan,1993. "Investment Analysis and the Adjustment of Stock Prices to Common Information." The Review of Financial Studies, Winter, 1993, Vol. 6, No. 4 (Winter, 1993), pp.799-824.*

[15] *A. Do., R. Powell1., A. Singh and J. Yong.,2018. "When did the Global Financial Crisis start and end?" The proceedings of 3rd Business Doctoral and Emerging Scholars.*

[16] *Tobias J. Moskowitz and Mark Grinblatt., 1999. "Do Industries Explain Momentum?" The Journal of Finance, Aug., 1999, Vol. 54, No. 4, Papers and Proceedings, Fifty-Ninth Annual Meeting, American Finance Association, New York, New York, January 4-6, 1999 (Aug., 1999), pp. 1249-1290.*

[17] *Andreas Waldkirch., 2021. "Firms around the World during the COVID-19 Pandemic." Journal of Economic Integration, March 2021, Vol. 36, No. 1 (March 2021), pp. 3-19.*

[18] *Tarek A. Hassan, Stephan Hollander, Laurence van Lent and Ahmed Tahoun, 2020. "Firm-Level Exposure to Epidemic Diseases: Covid-19, SARS, and H1N1." Available at: www.firmlevelrisk.com.*

[19] *Affleck-Graves, John, and Richard R. Mendenhall. 1992. "The relationship between the Value Line enigma and post-earnings-announcement drift." Journal of Financial Economics 31, 75-96.*

[20] *Anthony J. Richards.,1997. "Winner-Loser Reversals in National Stock Market Indices: Can They be Explained?" The Journal of Finance, Dec., 1997, Vol. 52, No. 5 (Dec., 1997), pp. 2129-2144.*

[21] *Eugene F. Fama and Kenneth R. French, 1992. "The Cross-Section of Expected Stock Returns." The Journal of Finance, June,1992, Vol 48, NO. 2.*

DOI: 10.54254/2754-1169/3/2022800

[22] *Jegadeesh, N. and Titman, S., 2001. "Profitability of Momentum Strategies: An Evaluation of Alternative Explanations." The Journal of Finance, Vol. 56, No. 2, pp. 699-720.*
[23] *Narasimhan Jegadeesh.,1990. "Evidence of Predictable Behavior of Security Returns." The Journal of Finance, Jul., 1990, Vol. 45, No. 3, Papers and Proceedings, Forty-ninth Annual Meeting, American Finance Association, Atlanta, Georgia, December 28-30, 1989 (Jul., 1990), pp. 881-898.*
[24] *Nusret Cakici and Adam Zaremba., 2021. "Who should be afraid of infections? Pandemic exposure and the cross-section of stock returns." J. Int. Financ. Markets Inst. Money 72 (2021) 101333.*

Appendix

Table I illustrates the performance of ten portfolios comprised of stocks in CPRP traded on the NYSE, Amex, and NASDAQ. Ten portfolios are created and rated in ascending order based on the past six months' returns. Portfolio 10 (winner) has the best performing stocks during the portfolio creation period, while Portfolio 1(loser) contains the worst performing stocks. The WML (winner minus loser) displays the return of a portfolio comprised of a longing winner (portfolio 10) and a shorting loser (portfolio 1). After each portfolio construction, future 6,12,24,36-month returns are computed (omitting all financial companies). Panel I shows the past 6 months and future 6 months, 12 months, 24 months, and 36 months return of a 1-10 portfolio WML portfolio evaluated without value weight based on market equity for the market from January 2001 to June 2021. Panel II shows the past six months and future six, twelve, twenty-four, and thirty-six-month returns of the 1-10 portfolio and the WML portfolio sorted by value weighted market equity from January 2001 to June 2021 for the market. Panel III illustrates the past six months and future six, twelve, twenty-four, and thirty-six months return of the 1-10 portfolio and the WML portfolio with value-weighted based on market equity from 2001 January to 2007 July, as well as another period from 2011 August to 2020 January (deleting period of financial crisis and covid-19) for the market.

Table II illustrates the performance of ten portfolios comprised of stocks in CPRP traded on the NYSE, Amex, and NASDAQ. Ten portfolios are created and rated in ascending order based on the past three months' returns. Portfolio 10 (winner) has the best performing stocks, while Portfolio 1 (loser) contains the worst performing stocks. The WML (winner minus loser) displays the return of a portfolio comprised of a longing winner (portfolio 10) and a shorting loser (portfolio 1). After each portfolio construction, future 3,6,9,12-month returns are computed. All portfolio is value weighted ranked on the market equity at the end of each month. Panel I represents the market's past three months, as well as future three, six, nine, and twelve-month returns of 1-10 and WML portfolios (omitting all financial companies). Panel II applies the aforesaid measure in 12 industries, classified by SIC code.

Table III illustrates the performance of ten portfolios comprised of stocks in CPRP traded on the NYSE, Amex, and NASDAQ. Ten portfolios are created and rated in ascending order based on the past three months' returns. Portfolio 10 (winner) has the best performing stocks, while Portfolio 1 (loser) contains the worst performing stocks. The WML (winner minus loser) displays the return of a portfolio comprised of a longing winner (portfolio 10) and a shorting loser (portfolio 1). After each portfolio construction, future 3,6,9,12-month returns are computed. All portfolio is value weighted ranked on the market equity at the end of each month. Panel I represents the market's past three months, as well as future three, six, nine, and twelve-month returns of 1-10 and WML portfolios (omitting all financial companies). Panel II applies the aforesaid measure in 12 industries, classified by SIC code.

DOI: 10.54254/2754-1169/3/2022800

Table 1. Return of portfolio ranked by prior six-month return.

portfolio	1	2	3	4	5	6	7	8	9	10	WML
Panel I											
Past 6-month return	-0.491	-0.266	-0.158	-0.079	-0.010	0.056	0.128	0.221	0.376	1.859	2.350
Future 6-month return	0.297	0.099	0.078	0.078	0.087	0.086	0.100	0.114	0.149	0.443	0.149
Future 12-month return	0.690	0.250	0.187	0.169	0.154	0.157	0.161	0.174	0.213	0.484	-0.206
Future 24-month return	1.132	0.482	0.367	0.310	0.287	0.290	0.285	0.294	0.337	0.636	-0.494
Future 36-month return	1.304	0.589	0.503	0.440	0.404	0.399	0.394	0.416	0.471	0.739	-0.565
Panel II											
Past 6-month return	-0.471	-0.259	-0.155	-0.077	-0.010	0.056	0.128	0.219	0.364	1.062	1.534
Future 6-month return	0.053	0.021	0.033	0.027	0.044	0.048	0.060	0.079	0.092	0.175	0.121
Future 12-month return	0.228	0.087	0.064	0.073	0.084	0.116	0.101	0.126	0.127	0.191	-0.037
Future 24-month return	0.442	0.199	0.153	0.161	0.155	0.231	0.185	0.216	0.200	0.283	-0.159
Future 36-month return	0.550	0.281	0.257	0.209	0.241	0.314	0.261	0.306	0.272	0.373	-0.177
Panel III											
Past 6-month return	-0.483	-0.267	-0.161	-0.082	-0.015	0.050	0.121	0.209	0.349	0.931	1.145
Future 6-month return	0.007	-0.014	0.023	0.032	0.053	0.053	0.063	0.075	0.098	0.192	0.185
Future 12-month return	0.147	0.053	0.072	0.094	0.107	0.105	0.104	0.104	0.127	0.235	0.088
Future 24-month return	0.394	0.181	0.164	0.223	0.206	0.203	0.225	0.196	0.229	0.370	-0.024

DOI: 10.54254/2754-1169/3/2022800

Table 1. (continued).

Future 36-month return	0.504	0.329	0.244	0.314	0.278	0.267	0.316	0.297	0.299	0.444	-0.059

Table 2: Return of portfolio ranked by prior three-month return in covid-19 period.

Portfolio	1	2	3	4	5	6	7	8	9	10	WML
Panel I											
Past 3-month return	-0.328	-0.140	-0.061	0.003	0.061	0.118	0.186	0.272	0.420	1.079	1.407
Future 3-month return	0.046	0.065	0.059	0.094	0.156	0.105	0.120	0.167	0.224	0.390	0.344
Future 6-month return	0.290	0.245	0.169	0.191	0.277	0.193	0.233	0.367	0.362	0.622	0.331
Future 9-month return	0.794	0.487	0.377	0.352	0.469	0.312	0.328	0.540	0.450	0.892	0.098
Future 12-month return	1.373	0.903	0.634	0.643	0.765	0.449	0.509	0.614	0.815	1.037	-0.337
Panel II Agriculture & Forestry & Fishing (SIC:01-09)											
Past 3-month return	-0.169	-0.076	-0.031	0.002	0.047	0.085	0.139	0.236	0.363	0.409	0.578
Future 3-month return	0.091	0.029	0.001	0.104	0.043	0.107	0.146	0.168	0.191	0.202	0.111
Future 6-month return	0.268	0.056	0.101	0.124	0.143	0.347	0.250	0.415	0.247	0.445	0.177

DOI: 10.54254/2754-1169/3/2022800

Table 2: (continued).

Future 9-month return	0.945	0.104	0.247	0.142	0.222	0.679	0.536	0.283	0.292	0.344	-0.601
Future 12-month return	1.351	0.282	0.285	0.159	0.341	0.415	0.824	0.207	0.162	0.864	-0.451
Mining (SIC:10-14)											
Past 3-month return	-0.300	-0.146	-0.050	0.036	0.111	0.207	0.300	0.431	0.686	3.808	4.108
Future 3-month return	0.271	0.223	0.155	0.154	0.298	0.220	0.256	0.284	0.789	1.543	1.271
Future 6-month return	0.772	0.555	0.430	0.441	0.625	0.764	0.626	0.575	1.284	2.837	2.064
Future 9-month return	2.287	1.777	0.886	0.903	1.010	1.091	1.025	0.843	1.212	6.393	4.105
Future 12-month return	3.228	1.472	1.668	1.463	1.228	1.344	1.470	1.465	1.521	7.491	4.262

DOI: 10.54254/2754-1169/3/2022800

Table 2: (continued).

Construction (SIC:15-17)											
Past 3-month return	-0.147	-0.024	0.024	0.087	0.130	0.185	0.236	0.291	0.383	0.614	0.761
Future 3-month return	0.105	0.200	0.134	0.237	0.188	0.189	0.255	0.243	0.303	0.345	0.240
Future 6-month return	0.435	0.516	0.348	0.554	0.431	0.423	0.420	0.423	0.545	0.521	0.086
Future 9-month return	0.673	0.873	0.677	0.773	0.650	0.596	0.549	0.588	0.949	0.926	0.253
Future 12-month return	1.335	1.478	1.197	1.212	1.084	0.946	1.046	1.082	0.092	1.526	0.191
Manufacturing (SIC:20-39)											
Past 3-month return	-0.312	-0.112	-0.040	0.019	0.071	0.120	0.178	0.257	0.371	1.913	2.226
Future 3-month return	-0.018	0.067	0.084	0.095	0.103	0.156	0.158	0.152	0.185	0.733	0.751
Future 6-month return	0.094	0.170	0.217	0.223	0.228	0.285	0.322	0.288	0.307	1.026	0.932
Future 9-month return	0.597	0.381	0.400	0.377	0.392	0.504	0.516	0.389	0.393	1.176	0.579
Future 12-month return	1.674	0.657	0.511	0.577	0.523	0.732	0.621	0.602	0.523	1.426	-0.249

DOI: 10.54254/2754-1169/3/2022800

Table 2: (continued).

Transportation (SIC:40-42 & 44-45)											
Past 3-month return	-0.218	-0.090	-0.029	0.032	0.076	0.136	0.189	0.258	0.368	0.618	0.835
Future 3-month return	0.058	0.105	0.010	0.110	0.142	0.139	0.228	0.157	0.286	0.250	0.192
Future 6-month return	0.226	0.261	0.226	0.285	0.358	0.266	0.369	0.343	0.441	0.337	0.112
Future 9-month return	0.501	0.515	0.451	0.544	0.495	0.516	0.382	0.552	0.634	0.570	0.069
Future 12-month return	0.796	0.964	0.950	0.839	0.642	0.828	0.783	0.656	1.097	0.634	-0.162
Public Utilities (SIC:43&46-49)											
Past 3-month return	-0.284	-0.105	-0.051	-0.014	0.024	0.063	0.110	0.170	0.275	0.612	0.896
Future 3-month return	0.035	0.044	0.044	0.065	0.053	0.059	0.079	0.190	0.149	0.185	0.150
Future 6-month return	0.217	0.129	0.121	0.099	0.151	0.118	0.075	0.181	0.362	0.311	0.094
Future 9-month return	0.497	0.278	0.314	0.120	0.332	0.125	0.108	0.298	0.380	0.596	0.099
Future 12-month return	0.576	0.386	0.556	0.124	0.227	0.207	0.214	0.327	0.605	0.526	-0.050

DOI: 10.54254/2754-1169/3/2022800

Table 2: (continued).

Wholesale Trade (SIC:50-51)											
Past 3-month return	-0.195	-0.081	-0.011	0.042	0.082	0.129	0.190	0.262	0.384	1.026	1.221
Future 3-month return	0.127	0.100	0.166	0.120	0.105	0.140	0.152	0.142	0.230	0.465	0.338
Future 6-month return	0.345	0.321	0.294	0.302	0.208	0.294	0.299	0.241	0.418	0.696	0350
Future 9-month return	0.628	0.534	0.490	0.677	0.374	0.500	0.436	0.477	0.503	0.830	0.202
Future 12-month return	1.187	0.869	0.540	1.092	0.637	0.632	0.582	0.649	0.824	1.365	0.178
Retail Trade (SIC:52-59)											
Past 3-month return	-0.228	-0.094	-0.017	0.046	0.102	0.173	0.245	0.350	0.520	1.502	1.179
Future 3-month return	0.109	0.097	0.158	0.160	0.153	0.119	0.250	0.249	0.372	0.762	0.653
Future 6-month return	0.816	0.338	0.397	0.351	0.282	0.228	0.413	0.476	0.769	1.383	0.568
Future 9-month return	1.647	0.644	0.715	0.549	476	0.438	1.170	0.617	0.911	1.804	0.157
Future 12-month return	2.770	1.355	1.355	1.132	0.809	0.658	1.700	0.637	0.914	1.999	-0.771
Services (SIC:70-89)											

DOI: 10.54254/2754-1169/3/2022800

Table 2: (continued).

Past 3-month return	-0.259	-0.123	-0.052	0.005	0.067	0..122	0.190	0.273	0.409	1.309	1.567
Future 3-month return	0.286	0.052	0.093	0.085	0.116	0.135	0.128	0.160	0.180	0.774	0.488
Future 6-month return	0.608	0.208	0.0.246	0.205	0.187	0.225	0.222	0.293	0.291	0.846	0.238
Future 9-month return	0.981	0.418	0.436	0.442	.423	0.411	0.349	0.430	0.522	1.027	0.046
Future 12-month return	1.126	0.748	0.698	0.819	0.686	0.601	0.490	0.654	0.818	1.325	0.199
Public Administration (SIC:91-99)											
Past 3-month return	-0.378	-0.191	-0.101	-0.032	0.034	0.107	0.159	0.302	0.498	2.691	3.070
Future 3-month return	0.032	0.098	0.041	0.129	0.099	0.132	0.211	0.249	0.261	1.354	1.322
Future 6-month return	0.249	0.241	0.279	0.266	0.245	0.377	0.372	0.441	0.431	1.886	1.636
Future 9-month return	0.998	0.511	0.522	0.643	0.456	0.726	0.672	0.560	0.638	1.578	0.580
Future 12-month return	2.557	0.690	0.856	0.807	0.820	0.914	0.731	0.566	0.749	1.869	-0.688

DOI: 10.54254/2754-1169/3/2022800

Table 3. Return of portfolio ranked by prior three-month return in normal period

Port-folio	1	2	3	4	5	6	7	8	9	10	WML
Panel I											
Past 3-month return	-0.377	-0.195	-0.115	-0.060	0.013	0.031	0.179	0.137	0.233	0.678	1.026
Future 3-month return	-0.094	-0.047	-0.012	0.000	0.010	0.023	0.040	0.058	0.092	0.224	0.318
Future 6-month return	-0.048	-0.020	0.036	0.021	0.048	0.047	0.064	0.074	0.101	0.276	0.324
Future 9-month return	0.042	0.003	0.056	0.049	0.067	0.061	0.087	0.097	0.121	0304	0.262
Future 12-month return	0.109	0.028	0.082	0.073	0.084	0.089	0.105	0.124	0.147	0.320	0.211
Panel II Agriculture & Forestry & Fishing (SIC:01-09)											
Past 3-month return	-0.257	-0.105	-0.043	-0.015	0.027	0.059	0.111	0.157	0.296	3.582	3.839
Future 3-month return	-0.079	-0.011	-0.013	0.022	0.039	0.031	0.083	0.056	0.124	1.414	1.494
Future 6-month return	-0.017	0.007	0.031	0.077	0.055	0.056	0.116	0.102	0.187	1.634	1.651
Future 9-month return	0.000	0.050	0.064	0.114	0.090	0.095	0.178	0.107	0.258	1.734	1.734

DOI: 10.54254/2754-1169/3/2022800

Table 3: (continued).

Future 12-month return	0.043	0.075	0.087	0.153	0.179	0.145	0.204	0.177	0.276	1.847	1.804
Mining (SIC:10-14)											
Past 3-month return	-0.399	-0.213	-0.137	-0.081	-0.032	0.015	0.066	0.129	0.227	1.399	1.798
Future 3-month return	-0.1223	-0.058	-0.051	-0.002	-0.005	0.039	0.033	0.051	0.233	0.604	0.727
Future 6-month return	0.085	-0.041	-0.047	-0.007	-0.006	0.068	0.027	0.071	0.783	0.514	0.429
Future 9-month return	0.175	-0.016	-0.011	0.028	0.037	0.062	0.051	0.077	0.184	0.630	0.454
Future 12-month return	0.269	0.078	0.034	0.065	0.063	0.081	0.062	0.065	0.194	0.765	0.496
Construction (SIC:15-17)											
Past 3-month return	-0.290	-0.148	-0.086	-0.037	0.003	0.044	0.093	0.148	0.221	0.735	1.025
Future 3-month return	-0.058	-0.021	-0.005	0.019	0.037	0.081	0.064	0.096	0.071	0.235	0.294
Future 6-month return	0.067	0.015	-0.047	0.053	0.077	0.141	0.086	0.134	0.114	0.275	0.208
Future 9-month return	0.117	0.069	0.088	0.102	0.108	0.178	0.130	0.192	0.188	0.385	0.267

DOI: 10.54254/2754-1169/3/2022800

Table 3: (continued).

Future 12-month return	0.278	0.107	0.152	0.154	0.165	0.194	0.169	0.228	0.205	0.435	0.158
Manufacturing (SIC:20-39)											
Past 3-month return	-0.367	-0.185	-0.110	-0.057	-0.012	-0.031	0.079	0.137	0.229	0.640	1.007
Future 3-month return	-0.088	-0.021	-0.015	0.003	0.021	0.028	0.038	0.067	0.084	0.334	0.422
Future 6-month return	-0.059	-0.005	0.006	0.024	0.047	0.043	0.066	0.092	0.108	.0390	0.449
Future 9-month return	0.001	0.037	0.033	0.055	0.060	0.067	0.093	0.122	0.125	0.403	0.401
Future 12-month return	0.087	0.068	0.057	0.079	0.085	0.089	0.104	0.133	0.146	0.417	0.330
Transportation (SIC:40-42 & 44-45)											
Past 3-month return	-0.309	-0.152	-0.086	-0.037	0.001	0.038	0.082	0.134	0.211	1.523	1.832
Future 3-month return	0.066	0.021	-0.009	0.005	0.018	0.032	0.042	.0.47	0.078	0.536	0.470
Future 6-month return	0.134	-0.003	0.016	0.075	0.044	0.059	0.057	0.067	0.093	0.540	0.407
Future 9-month return	0.253	0.046	0.042	0.104	0.061	0.090	0.073	0.099	0.130	.0595	0.343

DOI: 10.54254/2754-1169/3/2022800

Table 3: (continued).

Future 12-month return	0.382	0.173	0.068	0.106	0.083	0.116	0.102	0.151	0.175	0.733	0.352
Public Utilities (SIC:43&46-49)											
Past 3-month return	-0.316	-0.149	-0.082	-0.038	-0.003	0.026	0.060	0.101	0.172	0.563	0.879
Future 3-month return	-0.121	-0.040	0.012	0.006	0.016	0.020	0.048	0.043	0.068	0.220	0.341
Future 6-month return	-0.081	-0.027	0.007	0.016	0.032	0.058	0.067	0.075	0.099	0.255	0.336
Future 9-month return	0.030	-0.018	0.023	0.025	0.054	0.104	0.078	0.102	0.140	0.313	0.283
Future 12-month return	0.107	0.008	0.050	0.047	0.078	0.137	0.100	0.151	0.168	0.355	0.247
Wholesale Trade (SIC:50-51)											
Past 3-month return	-0.330	-0.164	-0.094	-0.046	-0.005	0.033	0.079	0.133	0.217	0.550	0.880
Future 3-month return	-0.054	-0.037	-0.008	0.022	0.015	0.034	0.043	0.061	0.097	0.184	0.238
Future 6-month return	-0.041	-0.011	0.029	0.051	0.041	0.059	0.070	0.084	0.123	0.202	0.243
Future 9-month return	0.022	0.025	0.054	0.077	0.064	0.097	0.089	0.093	0.166	0.228	0.206

DOI: 10.54254/2754-1169/3/2022800

Table 3: (continued).

Future 12-month return	0.050	0.053	0.083	0.109	0.108	0.119	0.110	0.124	0.181	0.275	0.224
Wholesale Trade (SIC:50-51)											
Past 3-month return	-0.331	-0.165	-0.100	-0.049	-0.006	0.037	0.082	0.138	0.220	0.541	0.872
Future 3-month return	-0.078	-0.037	0.002	0.007	0.011	0.026	0.034	0.064	0.084	0.180	0.258
Future 6-month return	-0.085	-0.011	0.020	0.031	0.035	0.050	0.052	0.072	0.095	0.216	0.302
Future 9-month return	-0.054	0.010	0.048	0.054	0.061	0.066	0.068	0.088	0.117	0.239	0.294
Future 12-month return	-0.036	0.040	0.061	0.065	0.078	0.079	0.085	0.107	0.131	0.256	0.292
Services (SIC:70-89)											
Past 3-month return	-0.377	-0.198	-0.102	-0.061	-0.012	0.036	0.088	0.153	0.254	0.778	10156
Future 3-month return	-0.073	0.024	-0.003	0.006	0.021	0.054	0.056	0.070	0.104	0.259	0.332
Future 6-month return	-0.020	0.016	0.030	0.041	0.050	0.097	0.077	0.092	0.130	0.336	0.365
Future 9-month return	0.019	0.073	0.052	0.078	0.081	0.146	0.108	0.140	0.166	0.417	0.398

DOI: 10.54254/2754-1169/3/2022800

Table 3: (continued).

Future 12-month return	0.063	0.106	0.068	0.109	0.116	0.174	0.173	0.162	0.199	0.495	0.432
Public Administration (SIC:91-99)											
Past 3-month return	-0.253	-0.238	-0.104	-0.107	-0.023	0.037	0.076	0.143	0.256	0.760	1.013
Future 3-month return	-0.067	-0.073	-0.003	-0.003	0.017	0.022	0.042	0.082	0.135	0.169	0.236
Future 6-month return	-0.057	-0.064	0.008	0.013	0.059	0.047	0.081	0.109	0.196	0.189	0.245
Future 9-month return	-0.058	-0.031	0.119	0.075	0.103	0.046	0.142	0.146	0.210	0.227	0.285
Future 12-month return	-0.033	0.027	0.122	0.092	0.169	0.075	0.158	0.161	0.261	0.273	0.306
Air Transportation (SIC:45)											
Past 3-month return	-0.302	-0.163	-0.095	-0.046	-0.002	0.039	0.093	0.158	0.261	1.945	2.247
Future 3-month return	-0.020	-0.022	-0.024	-0.019	0.025	0.015	0.032	0.063	0.113	0.916	0.936
Future 6-month return	0.058	-0.024	0.011	-0.004	0.042	0.076	0.070	0.094	0.163	1.024	0.936
Future 9-month return	0.094	0.082	0.056	0.031	0.069	0.081	0.115	0.117	0.225	1.095	1.001

DOI: 10.54254/2754-1169/3/2022800

Table 3: (continued).

Future 12-month return	0.194	0.104	0.166	0.098	0.084	0.103	0.081	0.175	0.267	1.323	1.129
Healthy Services(SIC:80)											
Past 3-month return	-0.346	-0.177	-0.102	-0.047	-0.002	0.042	0.093	0.154	0.259	1.071	1.416
Future 3-month return	-0.082	-0.032	-0.012	0.011	0.011	0.038	0.053	0.075	0.102	0.278	0.359
Future 6-month return	0.161	0.005	0.040	0.026	0.046	0.092	0.080	0.103	0.130	0.325	0.165
Future 9-month return	0.072	0.033	0.124	0.084	0.119	0.109	0.159	0.125	0.173	0.396	0.324
Future 12-month return	0.316	0.073	0.146	0.105	0.172	0.141	0.130	0.167	0.197	0.487	0.171