Research Article

Market Timing Ability of Mutual Fund Manager: Evidence from the Five-Factor Model

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ABSTRACT

In this study, we examine the mutual fund performance in Thai mutual fund industry by using three different capital asset pricing models—three-factor model, four-factor model, and five-factor model and show that the high performing portfolio generates better risk adjusted return than the market. Our results support one source of higher return derived from an ability to time future market return of high performing portfolio managers. Furthermore, our finding demonstrates the superior ability of four-factor capital asset pricing model to five-factor capital asset pricing model.

Keywords: Market Timing, Mutual Fund, Thai Mutual Fund, Five-Factor Model
JEL: G11, G12, G21, G23

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บทคัดย่อ

งานวิจัยนี้ศึกษาผลการดำเนินงานของกองทุนรวมในอุตสาหกรรมกองทุนรวมไทย โดยใช้แบบจำลองการกำหนดราคาหลักทรัพย์ที่แตกต่างกัน 3 แบบจำลอง ได้แก่ แบบจำลอง 3 ปัจจัย แบบจำลอง 4 ปัจจัย และแบบจำลอง 5 ปัจจัย และแสดงให้เห็นว่า กลุ่มหลักทรัพย์ลงทุนที่มีผลการดำเนินงานสูงสร้างผลตอบแทนที่ปรับด้วยความเสี่ยงได้ดีกว่าตลาด ซึ่งผลการศึกษานี้สนับสนุนงานวิจัยที่ผ่านมาในประเด็นว่า ผลตอบแทนที่สูงขึ้นมาจากความสามารถในการจับจังหวะเวลาการลงทุนของผลตอบแทนในอนาคตของผู้จัดการกองทุนในกลุ่มหลักทรัพย์ลงทุนที่มีผลการดำเนินงานสูง นอกจากนี้ การศึกษานี้ยังแสดงให้เห็นถึงความสามารถของแบบจำลองการกำหนดราคาหลักทรัพย์แบบ 4 ปัจจัยที่เหนือกว่าแบบจำลองการกำหนดราคาหลักทรัพย์แบบ 5 ปัจจัย

คำสำคัญ : การจับจังหวะเวลาการลงทุน กองทุนรวม กองทุนรวมไทย แบบจำลอง 5 ปัจจัย

1. INTRODUCTION

Originally, Treynor and Mazuy (1968) established a market timing model to gauge mutual fund manager ability to forecast the future market return. Their model was developed based on the traditional capital asset pricing model (CAPM) pioneered by Sharpe (1964). Since then, the market timing ability of mutual fund managers is largely grounded on CAPM. However, Fama and French (1993) established three-factor asset pricing model and hence, it was used as a standard model to value financial asset as well as to measure risk adjusted return of mutual fund. Further, Carhart (1997) enhanced the standard three-factor asset pricing model by adding the one-year momentum factor developed by Jegadeesh & Titman (1993), called a four-factor asset pricing model, and demonstrated that the four-factor model can better explain the mutual fund risk adjusted return than standard three-factor model.

More recently, Fama and French (2015) added two more factors to explain stock return, namely profitability and investment. On the one hand, prior studies suggest that this five-factor model help to explain the stock return (Fama & French, 2017; Foye, 2018; Roy & Shijin, 2018; and Zaremba & Czapkiewicz, 2017). On the other hand, several researches critique the explanatory power of these two extra factors—profitability (Artmann, Finter, & Kempf, 2012; Ball, Gerakos, Linnainmaa, & Nikolaev, 2016; and Novy-Marx, 2013) and investment (Elliot, Docherty, Easton, & Lee, 2018; and Nyberg & Pöyry, 2014). Consequently, the ability of the five-factor model in explaining stock return remains mixed.

Although numerous studies examine the mutual fund performance, few studies evaluate it by using the five-factor model. Leite and Cortez (2020) provide evidence that profitability and investment are the important risk factors for European and Global funds. Cuthbertson et al. (2022) further support the result of Leite and Cortez (2020) and find that the significant role of both profitability and investment in U.S. mutual fund. However, Božović (2022) only documents the significant role of investment in U.S. emerging market funds, but not for profitability. Accordingly, the result remains mixed in emerging market study. Chen et al. (2022) demonstrate that the five-factor model can explain the return of Chinese mutual fund while Sha and Gao (2019) claim that despite the five-factor model successfully prices asset in developed and international contexts, it fails to explain the Chinese mutual fund return.

In this study, we aim to explore the role of the five-factor model in explaining Thai mutual fund performance for several reasons. First, Thailand mutual fund industry demonstrates an impressive growth. The total net asset (TNA) expands from about 0.367 trillion Baht in 2000 to more than 5.368 trillion Baht by 2021[1]. Second, although prior studies in Thai mutual fund industry document a superior market timing ability of high-performing fund manager (Wattanatorn & Nathaphan, 2019, 2020; Wattanatorn, Padungsaksawasdi, Chunhachinda, & Nathaphan, 2020; and Wattanatorn & Tansupswatdikul, 2019), none

[1] TNA of mutual fund industry in Thailand are obtained from Associate of Investment management (AIMC) (https://ns3.aimc.or.th/web/)

of prior study explores the role of the five-factor model in mutual fund industry in Thai market, and thus this study aims to fill this gap.

The remaining of this study organizes as follows. Section 2 provides the literature review. Section 3 discusses detail of data and methodology used in this study. Section 4 exhibits empirical results. Conclusion is in the last section.

2. LITERATURE REVIEW

2.1 Three-Factor Model

Fama and French (1993) is one of the most widely used asset pricing model finance literature. The size premium and the value premium are formulated following Fama and French (1992) methodology. To construct size mimic portfolio, the stocks are classified into big and small by the median of all stock market capitalization. All stocks that are larger than the median of market capitalize are allocated to big (B) size portfolio while the remaining are allocated to small (S) size portfolio. Then, to formulate value mimic portfolio, stocks are classified into three different values of book-to-market value (BTMV). The highest 30 percentile of BTMV stocks are allocated to High BTMV portfolio while the bottom 30 percentile of BTMV stocks are allocated to low BTMV portfolio. The remaining stocks are allocated to medium BTMV portfolio. After the double sorting procedure, six portfolios are created as follow:

BTMV / Market Capitalization	High (H)	Medium	Low (L)
Big (B)	BH	BM	BL
Small (S)	SH	SM	SL

Then, we form the small-minus-big mimic portfolio return (SMB) and high-minus-low BTMV mimic portfolio return (HML) as follows.

$$SMB = \frac{(SL + SM + SH)}{3} - \frac{(BL + BM + BH)}{3} \quad (1)$$

$$HML = \frac{(SH + BH)}{2} - \frac{(SL + BL)}{2} \quad (2)$$

2.2 Four-Factor Model

To formulate momentum factor (MOM) is to follow Jegadeesh and Titman (1993). First, stocks are classified into the winner and loser portfolios based on their prior return—last 2- and 12-months performance. The highest 30 percentile of past return stocks are allocated to winner portfolio while the bottom 30 percentile of past return stocks are allocated to loser portfolio. Similar to the size and value risk premium factors, we create six intersection portfolios as follow:

Portfolio / Market Capitalization	Winner (W)	Loser (L)
Big (B)	BW	BL
Small (S)	SW	SL

Then, the MOM strategy is formulated as follows.

$$MOM = \frac{(SW+BW)}{2} - \frac{(SL+BL)}{2} \tag{3}$$

2.3 Five-Factor Model

Fama and French (2015) further develop profitability and investment factors by forming three profitability and investment mimic portfolios. The highest 30 percentile operating profit ratio stocks are allocated to robust profitability portfolio while the bottom 30 percentile operating profit ratio stock are allocated to weak profitability portfolio. The remaining stocks are allocated to medium profitability portfolio. To formulate profitability factor—RMW (robust minus weak), Fama and French (2015) further formulate six intersection portfolios between size and profitability as follow:

Profitability / Market Capitalization	Robust (R)	Medium	Weak (W)
Big (B)	BR	BMP	BW
Small (S)	SR	SMP	SW

$$RMW = \frac{1}{2}(SR+BR) - \frac{1}{2}(SW+BW) \tag{4}$$

Based on the same analogue, the highest 30 percentile investment growth ratio stocks are allocated to aggressive investment portfolio while the bottom 30 percentile investment growth ratio stock are allocated to conservative portfolio. The remaining stocks are allocated to medium investment growth portfolio. To formulate investment factor—CMA (conservative minus aggressive), six intersection portfolios between size and profitability are constructed as follow:

Investment growth / Market Capitalization	Aggressive (A)	Medium	Conservative (C)
Big (B)	BA	BMI	BC
Small (S)	SA	SMI	SC

$$CMA = \frac{1}{2}(SC + BC) - \frac{1}{2}(SA + BA) \quad (5)$$

2.4 Mutual Fund Performance: Market Timing

The market timing ability is an ability of fund managers to time the market return that they will adjust their portfolios beta according to their view on future market return. More specifically, if fund managers having market timing ability believe that the future market return will be higher, they will increase their portfolio beta. Once the market return increases, their portfolios will gain larger than the market does. On the other hand, if they expects that the future market return will decline, they will decrease their portfolio beta. As a consequence, their portfolios will be less sensitive to market movement. However, prior studies in mutual fund manager market timing ability remain inconclusive. Many researchers fail to document the market timing ability of fund managers (Ferson & Mo, 2016; Graham & Harvey, 1997; Henriksson & Merton, 1981; Romacho & Cortez, 2006; and Treynor & Mazuy, 1966). On the other hand, some studies support the market timing ability of mutual fund managers in U.S. (Busse, 2001; and Jiang, Yao, & Yu, 2007). Furthermore, many studies document strong evidence of market timing ability of mutual fund manager in Thai market (Wattanatorn & Nathaphan, 2019, 2020; Wattanatorn et al., 2020; and Wattanatorn & Tansupswatdikul, 2019). However, none of research provides an evidence based on the five-factor model. Therefore, to uncover the unexplored area of study. We propose three different models to test our research query as follow:

Baseline Regression

1) Three-factor model

$$r_{p,t+1} = \alpha_p + \beta_m MKT_{t+1} + \beta_{p,smb} SMB_{t+1} + \beta_{p,hml} HML_{t+1} + v_{t+1} \quad (6)$$

2) Four-factor model

$$r_{p,t+1} = \alpha_p + \beta_m MKT_{t+1} + \beta_{p,smb} SMB_{t+1} + \beta_{p,hml} HML_{t+1} + \beta_{p,mom} MOM_{t+1} + v_{t+1} \quad (7)$$

3) Five-factor model

$$r_{p,t+1} = \alpha_p + \beta_m MKT_{t+1} + \beta_{p,smb} SMB_{t+1} + \beta_{p,hml} HML_{t+1} + \beta_{p,RMW} RMW_{t+1} + \beta_{p,CMA} CMA_{t+1} + v_{t+1} \quad (8)$$

Market Timing Model

1) Three-factor model

$$r_{p,t+1} = \alpha_p + \beta_m MKT_{t+1} + \beta_{p,smb} SMB_{t+1} + \beta_{p,hml} HML_{t+1} + \beta_{mkt} MKT^2_{t+1} + v_{t+1} \quad (9)$$

2) Four-factor model

$$r_{p,t+1} = \alpha_p + \beta_m MKT_{t+1} + \beta_{p,smb} SMB_{t+1} + \beta_{p,hml} HML_{t+1} + \beta_{p,mom} MOM_{t+1} + \beta_{mkt} MKT^2_{t+1} + v_{t+1} \quad (10)$$

3) Five-factor model

$$r_{p,t+1} = \alpha_p + \beta_m MKT_{t+1} + \beta_{p,smb} SMB_{t+1} + \beta_{p,hml} HML_{t+1} + \beta_{p,RMW} RMW_{t+1} + \beta_{p,CMA} CMA_{t+1} + \beta_{mkt} MKT^2_{t+1} + v_{t+1} \quad (11)$$

where $r_{p,t+1}$ and MKT_{t+1} are returns of portfolio p and excess market return in month $t+1$, respectively. β_p and β_{mkt} represent systematic risk and market timing ability, respectively. $v_{p,t+1}$ is an error term of portfolio p in month $t+1$.

3. DATA AND METHODOLOGY

Stock price, market capitalization, Book value to market value ratio (BTMV), and net asset value (NAV) are gathered from Thomson Reuter Datastream database. The one-month government bond is obtained from Thai bond market association (ThaiBMA). Due to the availability of one-month government bond, our sample period starts from July 2001 to December 2014. The profitability factor—RWA (Robust minus weak factor) and investment factor—CMA (Conservative minus aggressive) are obtained from CMRI Factor library[2].

[2] https://www.set.or.th/th/education-research/research/database/factor-library/overview

We further classify mutual fund in our sample based on fund objective. We include only domestic equity funds as we intend explore the ability to forecast the market return. As the consequence, we exclude other types of funds namely funds of funds, index funds, international funds, bond funds, money market funds, and term funds. To alleviate the survivorship bias, we include all funds that have information at least 24 months and all new registered funds once it becomes available. Also, if funds are liquidated in a particular year, we remove them from our sample.

Table 1: Descriptive Statistics: The Descriptive Statistics Displays the Variables Used in our Analysis. Rm is the Market Exceed Return. SMB, HML, MOM, RMW, and CMA are Size, Value, Momentum, Profitability, and Investment Mimic Portfolio Return Respectively. MKT is Market Timing Factor. Full Represents the Average Return of Full Sample. Panel A Shows the Descriptive Statistics For Independent Variables Used in our analysis, and Panel B is the Time-Series Average of Ten-Portfolio Returns and the Full Sample Return

Panel A: Explanatory variables						
	Mean	**S.D.**	**Min**	**Median**	**Max**	**skewness**
Rm	1.542	6.498	−17.397	1.943	15.769	−0.790
SMB	0.372	4.349	−12.235	0.047	14.197	−0.150
HML	0.677	3.453	−8.676	0.892	12.018	0.058
RMW	0.123	3.448	−7.585	0.072	11.105	0.719
CMA	0.409	3.252	−9.771	0.687	8.422	−0.397
MOM	1.206	4.928	−14.567	1.501	13.350	−0.772
MKT	3.348	3.919	0.000	1.943	15.769	1.353
Panel B: Portfolio return						
Full	−0.456	5.722	−18.970	0.333	9.202	−1.545
P1	−6.233	8.738	−35.536	−4.677	8.393	−1.858
P2	−3.350	7.370	−33.197	−2.205	9.039	−2.673
P3	−2.333	6.142	−22.819	−1.636	10.826	−2.652
P4	−1.868	5.120	−16.207	−1.282	9.501	−2.995
P5	−0.958	4.870	−13.330	−0.686	8.785	−1.693
P6	−0.386	5.099	−21.057	0.067	9.801	−2.095
P7	0.210	5.031	−16.835	0.144	11.779	−0.826
P8	1.202	5.375	−17.193	1.614	13.422	−0.578
P9	2.483	6.699	−15.608	2.698	21.226	−0.034

Table 1: Descriptive Statistics: The Descriptive Statistics Displays the Variables Used in our Analysis. Rm is the Market Exceed Return. SMB, HML, MOM, RMW, and CMA are Size, Value, Momentum, Profitability, and Investment Mimic Portfolio Return Respectively. MKT is Market Timing Factor. Full Represents the Average Return of Full Sample. Panel A Shows the Descriptive Statistics For Independent Variables Used in our analysis, and Panel B is the Time-Series Average of Ten-Portfolio Returns and the Full Sample Return (Cont.)

Panel B: Portfolio return (Cont.)						
	Mean	**S.D.**	**Min**	**Median**	**Max**	**skewness**
P10	6.678	9.520	–14.917	6.451	39.959	0.422
P11	12.910	8.539	–3.461	11.937	44.853	1.013

Table 1 shows a descriptive statistic for all variables used in this study. In Panel A, we find that, during sample period, all the risk factors exhibit positive risk premium. This supports that the investors require higher return to compensate higher risk. In Panel B, we classify portfolio into decile based on 12-month performance and rebalance it on monthly basis. The result clearly shows that the return ranging from P1 to P10 is monotonically increasing. Further, we find that on average, the market return is superior to the mutual funds return. However, if investors allocate their investment into the top performing portfolio (P10) it can outperform the market return.

Table 2: Results for Correlation Metrix of Research Variables

	Rm	**SMB**	**HML**	**RMW**	**CMA**	**MOM**	**MKT**
Rm	1						
SMB	–0.3117	1					
HML	0.3042	–0.0413	1				
RMW	–0.1941	–0.2444	–0.3453	1			
CMA	–0.1787	0.173	0.1413	–0.3308	1		
MOM	–0.0824	0.1677	–0.0765	0.0269	0.2173	1	
MKT	0.8371	–0.3101	0.2291	–0.1062	–0.1867	–0.1039	1

The result in Table 2 reports a correlation matrix of explanatory variables used in this analysis. We find the correlation among the explanatory variables is low. Therefore, the multicollinearity issue is out of concern.

4. RESULT AND DISCUSSION

4.1 Based Line Regression

In this section, we perform the regression analysis based on empirical model in section 2.4. Table 3 reports the results. In Panel A, the results are based on the three-factor model. In line with prior literature, we find that, on average, the mutual funds have inferior risk adjusted return. Our results, in general, suggest that the mutual funds generate a negative of 2.123% per month. Furthermore, market risk premium, size risk premium, and value risk premium are all positively significant. Then, we perform the test at the portfolio level. As in section 3, though the bottom performing portfolios generate the negative risk adjusted return, the high performing portfolios (P9 and P10) clearly outperform. Like the total return, we find that the risk adjusted return demonstrates a monotonically increasing pattern. Lastly, we perform the zero-investment strategy by taking a long positive in P10 and a short position in P1. The zero-investment strategy yields 4.18% per month. According to Panel B, we perform the test based on four-factor model. The results remain unchanged.

At the aggregate level, the mutual fund portfolio yields a negative risk adjusted return as in Panel A. Also, P9 and P10 give a positive risk adjusted return to their investors. In addition, the zero-investment policy also works well with this model. Panel C demonstrates the results grounded on the five-factor model. In general, we find most of the results remain unchanged. This finding is consistent with the prior study of mutual fund performance in Thailand (Wattanatorn & Nathaphan, 2019, 2020; Wattanatorn et al., 2020; and Wattanatorn & Tansupswatdikul, 2019). However, profitability and investment are insignificant at aggregate level. Furthermore, at portfolio level, we find insignificance of profitability factor while we find an increasing pattern in CMA for most of the portfolios. Our finding is consistent with Božović (2022) and Leite & Cortez (2020) who document an insignificance of profitability but investment. Considering the Adjusted R-Squared, we find that although the five-factor model yields the Adjusted R-Squared higher than the three-factor model does, our results support that the four-factor model gives the highest one in all portfolios.

4.2 Market Timing Ability

Table 4 reports the result of the market timing model. Panel A provides an evidence based on the three-factor model. Like the prior finding, there is no market timing at the aggregate level. However, at the portfolio level, we find that the high-performance portfolios (P9 and P10) demonstrate a positive and significant market timing ability. Also, the risk adjusted returns for P9 and P10 are all positive and significant. In addition to Panel A, Panel B give the results based on the four-factor model which yields a very similar to Panel A. Lastly, in Panel C, we perform the same test with the five-factor model. The results show that despite CMA is insignificant at aggregate level, it is significant for most of the portfolios at portfolio level. However, unlike CMA, RMW is insignificant at all portfolios. Further, we find that other

results remain unchanged. However, we observe that the Adjusted R-Squared are all lower than that of Panel B. This finding is consistent with section 4.1 that the four-factor model perform better than the other two models in explaining mutual fund return. In sum, we provide the evidence that is in line with prior studies to show that only high performing mutual fund managers exhibit market timing ability (Wattanatorn & Nathaphan, 2019, 2020; Wattanatorn et al., 2020; Wattanatorn & Tansupswatdikul, 2019).

5. CONCLUSION

In this study, we aim to explore the mutual fund performance based on three different models—three-factor model, four-factor model, and five-factor model. The results clearly show that three-factor and four-factor models can explain the mutual funds return well while the five-factor model plays the important role of profitability and investment at aggregate level. However, we find that at the portfolio level, the investment factor can explain the mutual fund return. On the other hand, the profitability is lacked of explanatory power for mutual fund, particularly in Thai market. Besides, we find that the high-performing portfolio outperform the market and the bottom performance portfolio. Also, the zero-investment strategy work well in Thai mutual fund industry. Furthermore, our result also supports the ability to time market return for the top performing mutual fund portfolio.

Table 3: Baseline Regression. We Perform the Regression According to Eq. (6) Eq. (7), and Eq. (8) for Panel A, Panel B and Panel C respectively. Rm is the Market Excess Return. SMB, HML, MOM, RMW, and CMA are Size, Value, Momentum, Profitability, and Investment Mimic Portfolio Return Respectively. The T-Statistic Was Calculated from Newey and West (1985) and Was Reported in the Parenthesis. *, **, *** Represent the Significant Level at 10%, 5%, and 1% Respectively

Panel A: Three-factor model												
	Full	**P1**	**P2**	**P3**	**P4**	**P5**	**P6**	**P7**	**P8**	**P9**	**P10**	**P11**
Rm	0.866***	1.157***	0.971***	0.820***	0.677***	0.690***	0.728***	0.730***	0.744***	0.935***	1.210***	0.0527
	(13.87)	(7.69)	(7.39)	(7.19)	(5.39)	(12.04)	(10.82)	(16.20)	(11.49)	(16.72)	(13.83)	(0.23)
SMB	0.590***	0.595***	0.369***	0.314***	0.352***	0.405***	0.440***	0.465***	0.663***	0.965***	1.328***	0.733***
	(12.37)	(5.55)	(3.13)	(5.06)	(7.47)	(11.12)	(9.52)	(7.62)	(10.66)	(15.74)	(19.75)	(5.60)
HML	0.166***	0.167	0.160	0.141	0.197*	0.182***	0.167**	0.176**	0.197**	0.0653	0.204*	0.0374
	(3.11)	(1.15)	(1.11)	(0.95)	(1.94)	(3.20)	(2.56)	(2.58)	(2.50)	(0.75)	(1.83)	(0.16)
a	−2.123***	−8.351***	−5.093***	−3.810***	−3.176***	−2.297***	−1.786***	−1.208***	−0.326**	0.638***	4.180***	12.53***
	(−10.36)	(−15.47)	(−10.74)	(−9.44)	(−11.66)	(−12.04)	(−10.92)	(−9.68)	(−2.36)	(3.27)	(14.40)	(23.55)
Adj-R2	92.30%	68.50%	69.20%	71.30%	73.10%	83.00%	83.00%	86.40%	83.60%	82.80%	73.30%	13.10%

Table 3: Baseline Regression. We Perform the Regression According to Eq. (6) Eq. (7), and Eq. (8) for Panel A, Panel B and Panel C respectively. Rm is the Market Excess Return. SMB, HML, MOM, RMW, and CMA are Size, Value, Momentum, Profitability, and Investment Mimic Portfolio Return Respectively. The T-Statistic Was Calculated from Newey and West (1985) and Was Reported in the Parenthesis. *, **, *** Represent the Significant Level at 10%, 5%, and 1% Respectively (Cont.)

Panel B: Four-factor model												
	Full	**P1**	**P2**	**P3**	**P4**	**P5**	**P6**	**P7**	**P8**	**P9**	**P10**	**P11**
m	0.866***	1.153***	0.967***	0.818***	0.675***	0.689***	0.728***	0.730***	0.745***	0.937***	1.214***	0.0602
	(13.43)	(7.47)	(7.32)	(6.93)	(5.21)	(11.50)	(10.44)	(16.68)	(12.95)	(24.65)	(13.84)	(0.25)
SMB	0.599***	0.670***	0.433**	0.363***	0.382***	0.422***	0.450***	0.461***	0.640***	0.921***	1.253***	0.583***
	(11.05)	(4.63)	(2.56)	(3.55)	(5.47)	(8.30)	(9.02)	(8.99)	(18.33)	(20.23)	(16.64)	(3.05)
HML	0.159***	0.114	0.115	0.107	0.176**	0.171***	0.160***	0.179***	0.213***	0.0964**	0.257***	0.143
	(3.48)	(1.44)	(1.23)	(1.09)	(2.51)	(4.43)	(2.89)	(2.75)	(4.31)	(2.30)	(3.81)	(1.64)
MOM	−0.0550	−0.423***	−0.356***	−0.278***	−0.170***	−0.0927***	−0.0573	0.0256	0.131***	0.249***	0.421***	0.845***
	(−1.61)	(−4.09)	(−6.43)	(−5.67)	(−3.15)	(−3.01)	(−1.13)	(0.72)	(3.06)	(11.69)	(11.19)	(7.35)
a	−2.055***	−7.827***	−4.651***	−3.465***	−2.966***	−2.182***	−1.715***	−1.239***	−0.488***	0.329**	3.658***	11.49***
	(−10.70)	(−19.55)	(−11.33)	(−8.66)	(−10.23)	(−10.98)	(−9.93)	(−9.65)	(−3.91)	(2.05)	(10.32)	(34.35)
Adj-R2	92.50%	74.00%	74.70%	76.10%	75.70%	83.80%	83.30%	86.80%	85.00%	86.10%	77.90%	36.00%

Table 3: Baseline Regression. We Perform the Regression According to Eq. (6) Eq. (7), and Eq. (8) for Panel A, Panel B and Panel C respectively. Rm is the Market Excess Return. SMB, HML, MOM, RMW, and CMA are Size, Value, Momentum, Profitability, and Investment Mimic Portfolio Return Respectively. The T-Statistic Was Calculated from Newey and West (1985) and Was Reported in the Parenthesis. *, **, *** Represent the Significant Level at 10%, 5%, and 1% Respectively (Cont.)

Panel C: Five-factor model												
	Full	**P1**	**P2**	**P3**	**P4**	**P5**	**P6**	**P7**	**P8**	**P9**	**P10**	**P11**
Rm	0.865***	1.117***	0.949***	0.814***	0.646***	0.682***	0.733***	0.740***	0.763***	0.962***	1.248***	0.131
	(36.96)	(15.61)	(15.80)	(16.96)	(17.15)	(23.22)	(23.64)	(27.43)	(24.38)	(23.83)	(17.52)	(1.14)
SMB	0.588***	0.553***	0.360***	0.341***	0.362***	0.414***	0.442***	0.454***	0.655***	0.983***	1.315***	0.762***
	(17.67)	(5.44)	(4.21)	(5.01)	(6.76)	(9.92)	(10.03)	(11.84)	(14.73)	(17.15)	(12.99)	(4.64)
HML	0.164***	0.130	0.155	0.177**	0.220***	0.195***	0.167***	0.159***	0.181***	0.0782	0.175	0.0452
	(4.02)	(1.04)	(1.49)	(2.11)	(3.35)	(3.82)	(3.10)	(3.38)	(3.31)	(1.11)	(1.41)	(0.22)
RMW	−0.00711	−0.224*	−0.0873	0.0535	−0.0611	−0.00211	0.0175	0.000120	0.0334	0.123	0.0756	0.300
	(−0.16)	(−1.66)	(−0.77)	(0.59)	(−0.86)	(−0.04)	(0.30)	(0.00)	(0.57)	(1.62)	(0.56)	(1.38)
CMA	−0.000468	−0.156	−0.122	−0.124	−0.243***	−0.0836	0.0273	0.103**	0.157***	0.130*	0.305**	0.461**
	(−0.01)	(−1.17)	(−1.09)	(−1.39)	(−3.47)	(−1.54)	(0.47)	(2.06)	(2.70)	(1.74)	(2.31)	(2.15)
a	−2.119***	−8.157***	−4.992***	−3.790***	−3.041***	−2.261***	−1.807***	−1.250***	−0.409**	0.513**	4.011***	12.17***
	(−15.37)	(−19.37)	(−14.12)	(−13.42)	(−13.71)	(−13.08)	(−9.90)	(−7.87)	(−2.22)	(2.16)	(9.57)	(17.90)
Adj-R2	92.30%	69.20%	69.50%	71.90%	75.10%	83.30%	83.00%	86.40%	84.40%	83.30%	74.20%	15.80%

Table 4: Market Timing Ability of Mutual Funds: We Perform the Regression According to Eq. (9) Eq. (10), and Eq. (11) for Panel A, Panel B and Panel C Respectively. Rm is the Market Excess Return. SMB, HML, MOM, RMW, and CMA are Size, Value, Momentum, Profitability, and Investment Mimic Portfolio Return Respectively. MKT is Market Timing Factor. The t-Statistic Was Calculated from Newey and West (1985) and Was Reported in the Parenthesis. *, **, *** represent the Significant Level at 10%, 5%, and 1% Respectively

Panel A: Three-Factor Model												
	Full	**P1**	**P2**	**P3**	**P4**	**P5**	**P6**	**P7**	**P8**	**P9**	**P10**	**P11**
Rm	1.019***	1.521***	1.342***	1.093***	0.960***	0.826***	0.923***	0.776***	0.814***	0.862***	1.070***	−0.451***
	(18.37)	(23.63)	(12.43)	(11.07)	(6.52)	(10.18)	(19.23)	(19.51)	(10.41)	(7.44)	(11.16)	(−4.69)
SMB	0.570***	0.549***	0.322***	0.279***	0.316***	0.388***	0.415***	0.459***	0.654***	0.974***	1.346***	0.797***
	(13.91)	(4.91)	(3.06)	(5.60)	(6.89)	(12.30)	(10.83)	(7.51)	(10.74)	(15.43)	(21.49)	(5.82)
HML	0.159***	0.152	0.145	0.130	0.186*	0.177***	0.159**	0.174***	0.194***	0.0683	0.210*	0.0580
	(2.89)	(0.95)	(0.93)	(0.82)	(1.68)	(2.94)	(2.31)	(2.64)	(2.64)	(0.75)	(1.74)	(0.22)
MKT	−0.307***	−0.734***	−0.749***	−0.550***	−0.571***	−0.273**	−0.393***	−0.0926*	−0.102	0.147*	0.282**	1.016***
	(−6.93)	(−3.88)	(−5.50)	(−5.15)	(−4.10)	(−2.59)	(−7.01)	(−1.74)	(−1.10)	(1.93)	(2.11)	(2.68)
a	−1.318***	−6.428***	−3.132***	−2.368***	−1.681***	−1.581***	−0.756***	−0.965***	0.0414	0.252	3.442***	9.870***
	(−5.68)	(−7.43)	(−5.05)	(−6.49)	(−6.07)	(−8.14)	(−4.79)	(−5.96)	(0.13)	(0.68)	(4.85)	(9.51)
Adj-R2	93.60%	71.60%	73.70%	74.90%	78.60%	84.40%	85.60%	86.50%	83.90%	83.10%	83.70%	19.30%

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Panel B: Four-Factor Model												
	Full	**P1**	**P2**	**P3**	**P4**	**P5**	**P6**	**P7**	**P8**	**P9**	**P10**	**P11**
Rm	1.024***	1.556***	1.371***	1.116***	0.974***	0.833***	0.929***	0.774***	0.804***	0.843***	1.037***	−0.519***
	(16.76)	(17.38)	(11.12)	(9.47)	(5.92)	(9.01)	(18.97)	(20.35)	(11.36)	(8.69)	(16.07)	(−6.43)
SMB	0.581***	0.624***	0.386**	0.329***	0.347***	0.405***	0.427***	0.455***	0.633***	0.932***	1.274***	0.650***
	(11.78)	(4.40)	(2.51)	(3.73)	(5.33)	(8.71)	(10.06)	(8.74)	(18.57)	(21.94)	(16.90)	(3.48)
HML	0.151***	0.0942	0.0955	0.0922	0.161**	0.164***	0.150***	0.177***	0.210***	0.101**	0.265***	0.171**
	(3.41)	(1.21)	(1.05)	(0.95)	(2.27)	(4.40)	(2.74)	(2.81)	(4.63)	(2.26)	(3.97)	(2.09)
MKT	−0.319***	−0.811***	−0.814***	−0.601***	−0.603***	−0.290**	−0.405***	−0.0887	−0.119*	0.191**	0.356***	1.167***
	(−6.97)	(−6.32)	(−5.98)	(−5.85)	(−3.55)	(−2.26)	(−7.29)	(−1.55)	(−1.81)	(2.31)	(4.70)	(4.42)
MOM	−0.0653*	−0.450***	−0.383***	−0.297***	−0.189***	−0.102**	−0.0703	0.0227	0.127***	0.256***	0.433***	0.883***
	(−1.78)	(−4.42)	(−5.19)	(−4.88)	(−3.02)	(−2.53)	(−1.39)	(0.62)	(2.97)	(11.33)	(9.93)	(7.40)
a	−1.207***	−5.669***	−2.485***	−1.866***	−1.362***	−1.409***	−0.638***	−1.004***	−0.173	−0.180	2.711***	8.381***
	(−7.40)	(−10.04)	(−5.81)	(−10.10)	(−4.08)	(−5.03)	(−3.14)	(−5.30)	(−0.46)	(−0.40)	(3.32)	(10.11)
Adj−R2	93.90%	77.80%	80.00%	80.30%	81.80%	85.40%	86.00%	86.90%	87.20%	86.50%	88.65%	44.20%

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Panel C: Five-factor model												
	Full	**P1**	**P2**	**P3**	**P4**	**P5**	**P6**	**P7**	**P8**	**P9**	**P10**	**P11**
Rm	1.020***	1.479***	1.326***	1.100***	0.940***	0.822***	0.931***	0.783***	0.830***	0.890***	1.099***	−0.380***
	(18.30)	(18.39)	(12.11)	(11.74)	(7.14)	(10.69)	(19.62)	(21.11)	(10.83)	(7.84)	(12.97)	(−3.85)
SMB	0.573***	0.519***	0.324***	0.314***	0.334***	0.400***	0.423***	0.450***	0.649***	0.990***	1.329***	0.810***
	(13.80)	(4.37)	(2.78)	(5.81)	(10.56)	(10.50)	(10.64)	(7.04)	(9.94)	(14.04)	(17.62)	(5.51)
HML	0.163***	0.128	0.153	0.175	0.218**	0.194***	0.166**	0.159**	0.180***	0.0786	0.176	0.0481
	(2.73)	(0.73)	(0.96)	(1.12)	(2.21)	(3.10)	(2.19)	(2.37)	(2.61)	(0.70)	(1.41)	(0.18)
	−0.309***	−0.723***	−0.753***	−0.571***	−0.586***	−0.281***	−0.396***	−0.0856	−0.134*	0.143*	0.297***	1.021***
	(−7.00)	(−3.94)	(−5.53)	(−5.30)	(−4.37)	(−2.85)	(−6.98)	(−1.63)	(−1.84)	(1.99)	(2.94)	(2.85)
RMW	0.00931	−0.186**	−0.0473	0.0838	−0.0300	0.0128	0.0385	0.00467	0.0405	0.116	0.0598	0.245
	(0.34)	(−2.19)	(−0.48)	(1.09)	(−0.60)	(0.15)	(0.99)	(0.17)	(0.77)	(1.34)	(0.32)	(0.98)
CMA	−0.00550	−0.167**	−0.134**	−0.133**	−0.252***	−0.0882	0.0208	0.102***	0.154**	0.133**	0.310**	0.478***
	(−0.20)	(−2.25)	(−2.10)	(−2.32)	(−3.69)	(−1.25)	(0.44)	(2.69)	(2.04)	(1.98)	(2.48)	(2.80)
a	−1.317***	−6.280***	−3.039***	−2.309***	−1.522***	−1.532***	−0.779***	−1.028***	−0.0619	0.142	3.240***	9.520***
	(−5.62)	(−7.15)	(−4.83)	(−6.08)	(−5.60)	(−7.36)	(−4.44)	(−6.92)	(−0.20)	(0.37)	(3.99)	(8.19)
Adj-R2	93.60%	72.20%	74.00%	75.70%	80.80%	84.70%	85.60%	86.60%	86.20%	83.50%	82.22%	22.10%

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