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Is the Fama French Five Factor model still working?

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Content

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Abstract

Many different asset pricing models have been developed over the years, in order to understand how the risk of an investment should affect the expected return. None of the models developed seem to be completely exempt from criticism, but many economists prefer the Fama French Five factor model. The aim of this paper is to verify if the five factors of the model are still relevant and significant nowadays, in order to explain the expected return of an investment. At the beginning of the study, a lot of focus has been addressed to the validity of the value factor. Contrary to the initial expectations, our results show that this factor is still relevant to explain the average expected return. On the contrary there are other factors which may need further analysis and of which validity is questionable.

KEYWORDS: Asset pricing, stock returns, Fama-French 5 factor model, factors, risk, momentum factor, beta.

1. Introduction

Economists and scholars have always dedicated a lot of attention to the asset pricing topic, in order to explain the relationship between risk and return. The first model developed was CAPM by Sharpe (1964) and Lintner (1965). After this model, many other versions of CAPM were presented in order to improve the existing one. In 1993, Fama & French, introduced a new model that could explain the average return behavior better than CAPM. They decided to include two new factors other than the market factor, which were the size factor (measured with book value of equity) and the value factor (measured with the book to market ratio). Despite this, after the introduction of the three factor model a lot of criticism followed. For this reason, in the subsequent years Fama & French, decided to add two other factors to their previous model: the investment factor and the profitability factor. Moreover, in 1997 Carhart, added another explanatory variable to the factors presented in the Fama French three factor model: the momentum factor. In order to construct this new factor he considered the investment in past winners and the selling of past losers. The purpose of this paper is to analyze if Fama French five factor model still explains average returns in a satisfactory way. For our analysis, two different portfolios will be used: one portfolio sorted on size and on book to market values and another portfolio sorted on size and on momentum factor values. The independent variables will be the five different factors of the Fama French model and only at a later stage of our analysis, also the momentum factor will be added as a sixth independent variable. The choice to subsequently add this other factor was made in order to analyze if the results obtained were the same, also after the inclusion of this new variable.

2. Literature Review

During the years, many asset pricing models have been developed in order to analyse and to explain the returns for risk bearing assets. Financiers and economists have dedicated a lot of attention to this topic over the years, trying to identify a model that could explain asset returns in the best possible way. This is useful when investors have to make decisions regarding the investments to be done, and what return to expect when they invest in company's assets.

Sharpe (1964), Litner (1965) and Black (1972), were among the first to develop some theories regarding asset pricing. They supported the theory that expected returns on securities were a positive linear function of the market βs and that this was the only explanatory variable needed to explain returns behaviour. The model evaluated what the expected return should be, given a specific function of the market risk. The basis of the CAPM model took origin from the model of portfolio theory of Markowitz (1952), which allowed to assess the future performance of portfolios of risky assets. One of the model implications was that market portfolio is efficient.

Sharpe-Litner relation assumed unrestricted free borrowing and lending, which is a scenario which does not reflect reality. For this reason in 1972 a new version of the CAPM was proposed by Black, based on the assumption that borrowing and lending is not risk free and allowing unlimited short selling. Another problem was represented by the fact that it was very difficult to test the validity of the CAPM, when using individual securities returns, because of the difficulty to estimate the betas for individual assets. In order to solve these problems, some analysis started to be done on portfolios' returns rather than on individual securities. For this reason, Blume (1970) and Black (1972), took into consideration portfolios in order to estimate their betas.

The relationship between return and beta was also empirically confirmed by Fama and MacBeth (1973), their study was conducted on different portfolios including different stocks listed on New York stock exchange. From their findings, they indicated that beta was the only important factor in order to explain variation in expected returns.

Both of the CAPM versions of Lintner and Black, consider the beta as a factor sufficient enough to explain the variation in expected returns. Since1980, CAPM model started to be questioned by many economists, leaving space to the development of more accurate asset pricing models (Fama & French, 2004). Over the years, CAPM model, was constantly criticized from different point of views. From a theoretical point of view, the model is based on very restrictive assumptions which in most of the cases do not represent reality. CAPM model was very criticized also from an empirical point of view because according to many economists there were other relevant factors needed to explain average returns. Richard Roll (1977), criticized the fact that CAPM model was very difficult to test empirically because in the model there are not good proxies for the variables.

Different versions of CAPM, were developed during the years, Merton (1973) studied an intertemporal version of CAPM, he believed that for the assumptions to be realistic the model needed to have an intertemporal nature in order to catch results that could not have been recorded in the static model. Ross (1976a, 1976b) focused on the arbitrage model of the capital asset pricing model, which is based on the low of one price, according to which two identical assets need to have the same price in every market, but APT theory does not give any indications on the relevant factors to consider. Breeden (1979), instead, proposed a consumption based version of the CAPM.

Friend & Blume (1970), argued that CAPM model underestimates the cost of equity for low beta stocks and overestimates the cost of equity for high beta stocks, these claims were based on empirical observations based on the fact that the relation between beta and average return was flatter than what Sharpe Litner presented with their model. According to Basu (1977), the possibility to earn excess average return is not possible in an efficient market. The efficiency market hypothesis is questioned by many, some of them for instance believe that price-earnings (P/E) ratios could reflect the future performance of a security. In fact, in his study, he claims that investors are biased by the values of P/E. What he found from his analysis, was that portfolios with low P/E tend to have on average higher returns than the ones estimated with CAPM during the period 1957-1971. The result was explained by the author as a proof of market inefficiency.

According to Banz (1981), CAPM model was not complete because the "size effect" (market capitalization) was neglected. From his analysis, by adding market size as an independent variable in the cross-sectional regression, he found that small stocks present higher average returns relative to big firms. A "value effect" in US stock market was studied by Rosenberg, Reid and Lanstein (1985), according to their analysis stocks with high Book-to-market equity on average performed better than the stocks with low Book-to-market equity. The same results were also found by Stattman (1980). Another contradiction is presented by Bhandari (1988), he claimed a positive relationship between leverage and average returns. Moreover, other than the anomalies linked to size and value factors, there are also other elements as the momentum effect which lead to further inconsistency of CAPM model. The anomalies could be attributed to two different causes: the first one is related to market inefficiency while the second one is associated to the inaccuracy of the model.

In 1992 Fama & French, tested different variables such as: beta, size, leverage and book-to-market ratio in order to understand which variables are really relevant in order to anticipate future stock returns. They concluded that the effects of leverage and E/P could be easily summarized by two other variables: size factor and value factor. For this reason, they decided to add these factors to the existing CAPM model. They proved that value stocks (the stocks with high book to market values) outperform the market contrary to growth stocks. The validity of the Fama French three factors model was also tested by other scholars and with samples considering not only US stocks.

In 1997, Carhart added to the model the momentum factor. Fama & French (1993), claim that cross section average returns are negatively related to firm size (market capitalization) and positively related to the value factor (book-to-market ratio). In their 2006 paper, Fama & French, decided to add to their previous model two other factors in order to best explain the average stock returns. Their analysis was conducted taking into consideration only American stocks.

2.1 International studies

Some years later, the Fama French five Factor model was analyzed also in other countries. Fama and French (2017), conducted their study taking into consideration four different zones (North America, Asia, Europe and Japan) with a total of 23 developed markets. All of the five factors were relevant when explaining average returns for North American stocks, considering a period from 1990 to 2015. In the other zones instead, the investment factor was found to be not significant when considering the same period. The choice of the period is very important when testing the significance of the factors. In fact, the HML factor is considered to be redundant for explaining average returns, when examining a time period going from 1963 to 2013, while this is not the case when taking into consideration the period 1990-2015. What they found from their analysis was also that, contrary to the developed markets, the factor that best describes equity return is the profitability factor. Moreover, contrary to the expectations, the market factor results insignificant in many countries in general.

The five factor model was also tested for the Chinese stock market by Guo, Zhang, W., Zhang, Y. and Zhang, H (2017). They found significance when testing the size, value and profitability factors. Regarding, instead, the investment factor it was not recognized as very relevant for predicting average stock returns because its effect it is captured by the other factors. Their analysis was conducted over a period from July 1995 to June 2014. Moreover, from their analysis, it was evident that the Fama French five factor model performed much better than three factor model.

Huynn (2017) tried to observe the Fama French five factor model in Australia. With his research, he empirically proved that the investment and profitability factors are relevant when explaining the average stock returns for the Australian market. Despite this, when executing the Gibbons, Ross and Shanken's GRS test, both the Fama French three factor model and the Fama French five factor model do not perform well.

3. Theory

3.1 CAPM

CAPM model is built on the portfolio theory developed by Markowitz (1959).
The model is based on different assumptions: the investors are risk averse and they tend to choose portfolios which given an expected return, minimize the variance and given a specific variance, maximize the returns. The planning horizon is a single period and regarding the market structure, all information is considered to be publicly available, there are no taxes and transaction costs (Bodie et al, 2014). The CAPM add to these assumptions, the fact that borrowing and lending should be risk free. Furthermore, if the expected return on assets is not linked to market returns, it will be equal to the risk free rate. Sharp-Lintner equation for calculating expected return given a certain amount of risk is the following:

$$E(R_i) = R_f + \left[E(R_M) - R_f\right]\beta_{iM}, i = 1, \dots, N.$$

Where the market beta it is defined as the ratio between the covariance of its return with the market return divided by the variance of the market return.

$$\beta_{iM} = \frac{cov\,(R_i, R_m)}{(\sigma^2 R_M)}$$

The expected return is defined as the sum between the risk free rate and the product between the market premium and the asset's market beta. Investors expect to be compensated for the risk they cover with the investment. The model assumes that there is a linear relation between the expected return and the beta and that no other variables are needed to predict expected returns. CAPM equation is not free of downsides, some of these are the unrealistic assumptions on which the model is built. Despite this, CAPM equation continue to be adopted in many occasions. (Fama & French, 1992).

3.2 Fama & French three factor model

As we previously stated, Fama & French focused their attention on what factors could explain in the best possible way the cross-section of US average stock returns. They added two important risk factors to CAPM model: size (market equity) and value (book-to-market ratio). The return on stocks were calculated for the period from 1963 to 1990. The time-series regression approach adopted was the one of Black, Jensen and Scholes (1972) and the model could be represented by this equation:

$$E(R_i) = R_f + \beta_i\big(E(R_m) - R_f\big) + s_i\, SMB + h_i\, HML$$

In the formula, SMB is the size factor and it stands for "small minus big", while HML is the value factor and it indicates "high minus low" book-to-market ratio. The SMB factor implies that on average investing on small stocks generates an additional return and the same it is true when investing in stocks with a high book-to-market factor. The result of their analysis was that these two factors could explain the cross-section of average returns on NYSE, Amex and NASDAQ stocks for the period under observation. In order to conduct their study, the stocks were sorted considering their size (price time shares) and book-to-market values in order to form six different portfolios. They separated NYSE stocks present on CRSP, using the median NYSE size, in order to divide them into two groups: small and big. The same was done for the book-to-market values, which instead, were separated into three different groups, using the bottom 30% for low value, the middle 40% for medium value and the top 30% for high book-to-market stocks. The book-to-market equity factor is defined as the ratio between the book value of equity at the end of the fiscal year divided by the market value of equity. By the intersection of these two factors, six different portfolios were created, in order to analyze the real effects that these factors have on stock returns. The same analysis was also conducted by Fama & French to calculate value-weighted monthly returns, by using 25 portfolios, given by the intersection of five different size groups and five book-to-market groups.

3.3 Carhart four factor model

In 1997 Carhart developed a four factor model. He based his study on what was previously found by Fama & French, with their three factor model and he also took into consideration the momentum factor from Jegadeesh & Titman's paper (1993). The momentum factor indicates that good stocks tend to continue performing well in the following periods, meaning that if the price is rising it keeps rising and if it is declining it keeps declining. According to Jegadeesh & Titman's paper by selling stocks which performed poorly and by buying stocks which performed well, significant returns can be generated in the short term. Furthermore Carhart, instead of using stocks for the analysis, he used regression mutual funds for his regressions. The regression for the four factor model can be represented with the following equation:

$$r_i - r_f = \alpha + \beta_1(r_m - r_f) + \beta_{2i}(SMB) + \beta_{3i}(HML) + \beta_{4i}(MOM) + \varepsilon_i$$

The equation is very similar to the one previously described for the Fama French Three Factor model, with the difference that there is a new factor represented by the variable MOM which shows the return on the momentum factor. The factor is calculated by winners stocks (top 30% percentile) minus loser stocks (bottom 30% percentile).

3.4 Fama & French five factor model

Fama & French with their paper in 2006, added to their previous model two other factors. They based their analysis starting from the dividend discount model with Modigliani valuation formula (1961). They thought that by adding two other factors to their model: investment and profitability, they could better describe the average stocks return.

$$M_t = \sum_{t=1}^{\infty} E(D_{t+\tau})/(1+r)^{\tau}$$

The share price is represented by M_t, according to the equation if two stocks have the same expected dividends $E(D_{t+\tau})$ we will expect from the stock with the lower price a higher expected return. After some changes to the formula, they arrived to the following equation:

$$\frac{M_t}{B_t} = \frac{\sum_{t=1}^{\infty} E(Y_{t+\tau} - dB_{t+\tau})/(1+r)^{\tau}}{B_t}$$

From this equation they concluded that low value of the book to market factor leads to lower expected returns. Moreover, higher expected earnings should result in higher expected returns and the same should be true when the expected growth in book equity is high. They considered the expected change in total book equity to current book equity as a measure of investment. For this reasons, they arrived at the conclusion that the three factor model could be improved by adding the investment and profitability factors. The new model can be summarized with the following equation:

$$E(R_i) = R_f + \beta_i\big(E(R_m) - R_f\big) + s_i\, SMB_t + h_i\, HML_t + r_i\, RMW_t + c_i\, CMA_t$$

RMW represents the profitability factor and it stands for robust minus weak profitability, on the other hand, CMA is the investment factor and it is the difference between conservative (low investment stocks) and aggressive (high investment stocks). By holding everything constant, they observed a positive relationship between expected profitability and expected stock return but a negative relationship between expected investment and expected stock return.

Despite the fact that the results of their study confirmed the relationship previously described, the addition of the two new factors in their model never improved the explanation of stock return provided by size and book to market factor. Several criticism followed, according to Novy-Marx (2009), the measure of profitability selected by Fama & French was not adequate in order to predict stock average return. In their analysis, instead of choosing current earnings as Fama & French, they adopted gross profit information in order to predict average return and they succeeded in explaining the relationship.

Another criticism came from Aharoni et al. (2013), in their paper they were able to find a statistically significant relationship between expected investment and average stock return, contrary to Fama & French.

Despite all of the critiques, the Fama French Five factor model performed better than CAPM and their three factor model, explaining 70%-94% of variation in average stock returns for the years going from July 1963 to December 2013. Another important aspect is that Fama & French in their paper after having introduced the investment and profitability factor, define the HML factor as redundant in order to describe the average stock return. One of the main objective of this thesis is to examine if this condition still holds over time or if other circumstances occur in the last periods.

4. Research Methodology

In order to understand if the five factors of the Fama French model are still working and if they are still relevant to explain expected asset returns, we conducted our analysis on an extended time frame taking into consideration the most recent period. We decided to test our analysis, considering different set of portfolios. First of all considering the different portfolios analyzing the five factors of Fama & French, and then observing the results by including also the momentum factor.

4.1 Portfolios construction

As we previously observed, the five Fama French factors are the following: The market factor $(Rm - Rf)$, the size factor (SMB), the value factor (HML), the profitability factor (RMW) and the investment factor (CMA).

In order to construct the factors, there is the need first of all to create six different value-weight portfolios formed on size and book to market, six different value-weight portfolios formed on size and investment and six different portfolios formed on size and operating profitability. All of the portfolios include: NYSE, AMEX and NASDAQ stocks and consider monthly returns from July 1963 to June 2020.

The size and book-to-market portfolios are generated by intersecting two portfolios sorted on size (their market equity) and three portfolios considering the book-to-market value. The two size portfolios are divided taking into consideration as the threshold value the median NYSE market equity. The two thresholds, considered instead for dividing the three book-to-market portfolios are the 30th and 70th NYSE percentiles.

SIZE / B/M	Small	Big
Value	Value Small	Value Big
Neutral	Neutral Small	Neutral Big
Growth	Growth Small	Growth Big

The size and investment portfolios is constructed in a very similar way to the one we have just described. The portfolios are formed by crossing two portfolios formed on size (market equity) and three portfolios sorted on the investment value. The latter is calculated by subtracting the change in total assets from the end of the year t to the end of year t+1, divided by the total assets in year t. As before, the size threshold it is the median, while for the investment the threshold are defined by the 30th and 70th NYSE percentiles.

SIZE / **INV**	**Small**	**Big**
Small	Small Small	Small Big
Neutral	Neutral Small	Neutral Big
High	High Small	High Big

The size and operating profitability portfolios are constructed by intersecting the two size portfolios (sorted on market equity) and the three portfolios divided according to the profitability values. The operating profitability for each stock it is calculated by subtracting the cost of goods sold, interest expenses and selling and general expenses to the annual revenues and dividing this amount by book equity. Also in this case, the breakpoints for operating profitability are the 30th and 70th percentiles.

SIZE / **PROFITABILITY**	**Small**	**Big**
Small	Small Small	Small Big
Neutral	Neutral Small	Neutral Big
High	High Small	High Big

4.2 Factors construction

Once having constructed all the different portfolios, it is possible to calculate the five factors for the Fama French model. The size factor, it is calculated by considering the difference between the average returns of all the big and small portfolios, considering a monthly basis. For all of the six combinations of portfolios previously described, we can calculate the difference between the average return of small and big stocks, by taking into consideration the different factors.

Excess return on the market

As we previously observed, the excess return on the market is the difference between the return on the market and the risk free rate. The stocks taken into examination are all stocks of American companies, listed on NYSE, NASDAQ or AMEX.

SMB factor

SMB factor by taking into consideration the different sorts on B/M value:

$$SMB\ (B/M) = \ 1/3\ (Small\ value + Small\ neutral + Small\ growth) - \ 1/3\ (Big\ value + Big\ neutral + Big\ growth)$$

SMB factor by taking into consideration the different sorts on investment value:

$$SMB(I) = \ 1/3\ (Small\ conservative + Small\ neutral + Small\ aggressive) - \ 1/3\ (Big\ conservative + Big\ neutral + Big\ aggressive)$$

SMB factor by taking into consideration the different sorts on operating profitability:

$$SMB(P) = \ 1/3\ (Small\ robust + Small\ neutral + Small\ weak) - \ 1/3\ (Big\ robust + big\ neutral + Big\ weak)$$

The final SMB factor is then calculated by making an average of the factors we just took into consideration.

$$SMB = \frac{1}{3} * SMB\left(\frac{B}{M}\right) + \frac{1}{3} * SMB(I) + \frac{1}{3} * \ SMB(P)$$

HML factor

HML factor is calculated by subtracting the average returns of the two value portfolios minus the average returns of the two growth portfolios.

$$HML = \frac{1}{2}\ (Small\ value + Big\ value) - \frac{1}{2}\ (Small\ growth + Big\ growth)$$

Profitability factor

The profitability factor is constructed exactly as the HML factor, but this time subtracting the return of the two robust profitability portfolios with the returns of the two weak profitability portfolios

$$RMW = \frac{1}{2}\ (Small\ robust + Big\ robust) - \frac{1}{2}\ (Small\ weak + Big\ weak)$$

Investment factor

The investment factor is defined as the difference between the average return of the two conservative portfolios and the two aggressive investment portfolios.

$$CMA = \frac{1}{2}\ (Small\ conservative + Big\ conservative) - \frac{1}{2}\ (Small\ aggressive + Big\ aggressive)$$

Momentum factor

The momentum factor is calculated as the difference between the average returns of the two antecedent high portfolios returns and the two low antecedent portfolio returns. The formula can be identified as:

$$MOM = \frac{1}{2}\ (Small\ high + Big\ high) - \frac{1}{2}(Small\ low + Big\ low)$$

5. Data collection

For our analysis the data have been directly collected from Kenneth French data library (Kenneth R. French-Data Library, 2015). We observe monthly average returns in the US stock market, taking into consideration a total of 683 observations going from July 1963 to May 2020. In order to provide an accurate vision of the significance of the factors, the dataset was splitted into three different subperiods, in order to observe the behavior of the factors in each single period. The first period under observation goes from July 1963 to July 1982, the second period goes from August 1982 to August 2002 and the last timeframe goes from September 2002 to May 2020. The stocks under observations are American stocks listed on NYSE, NASDAQ and AMEX for which we have all of the required information in order to construct the factors (available market equity, positive book equity data).
Two different sets of six portfolios have been selected for our analysis: the first six portfolios sorted on size and on book-to-market ratio and the other six portfolios instead, were sorted according to their size values and momentum values.

The regressions were built using as the dependent variable the difference between the average return on each of the portfolios minus the risk free rate. The independent variables, instead, were composed by the different factors to be analyzed (Kenneth R. French Data Library).

From the summary statistic in table 1, we can observe that the highest average return is the one of the momentum factor, immediately followed by the market factor return. The values of the average monthly returns have a wide range from 21% to 65%. The highest volatile factor is the market factor, with a standard deviation value of 4.45.

Table 1 *Summary statistics for the factors (including momentum factor) for the period July 1963 - May 2020*

Explanatory variables	Obs.	Mean	Standard Deviation	Min	Max
$(\boldsymbol{R_M}) - \boldsymbol{R_f}$	683	0.5338507	4.44761	-23.24	16.1
SMB	683	0.214041	3.02123	-14.91	18.32
HML	683	0.2568814	2.87556	-14.12	12.87
RMW	683	0.2556955	2.15319	-18.34	13.33
CMA	683	0.26041	1.99557	-6.86	9.56
MOM	683	0.65490498	4.1895	-34.39	18.36

In order to assess if multicollinearity could be an issue for our analysis, we can observe from table 2, the existing correlation among the factors.

Table 2 *Correlation matrix of the factors*

	$(\boldsymbol{R_M}) - \boldsymbol{R_f}$	SMB	HML	RMW	CMA	MOM
$(\boldsymbol{R_M}) - \boldsymbol{R_f}$	1.0000					
SMB	0.2882	1.0000				
HML	-0.2175	-0.0378	1.0000			
RMW	-0.2121	-0.3368	0.0695	1.0000		
CMA	-0.3806	-0.1034	0.6820	-0.0331	1.0000	
MOM	-0.1524	-0.0473	-0.2058	0.1040	-0.0261	1.0000

The highest correlation value is represented by the correlation between the value factor (HML) and the investment factor (CMA). Moreover, the correlation between the two has an absolute value of 0.6820, which is quite high. For this reason, there is the chance that our model could be affected by multicollinearity, but in any case not a severe one.

6. Empirical Results

6.1 Six size book to market portfolios

All of the portfolios have been examined for the three different periods. In order to define the relevance of each factor, we focus on the significance of the factors, determined considering a 95% confidence interval. In order to establish if the factors are significant or not we look at the p-values provided in the following tables, which summarize our analysis. We started the analysis by focusing on the average returns of the portfolios sorted on size values and book to market values. The first portfolio under observation is the one with small size values and low book to market ratios. We can observe from table 3 that the only insignificant factor is the investment factor for the period from 1963 to 1982, the same result we obtain when looking at the big size medium book to market portfolio. The second portfolio with small size and medium book to market values, shows the insignificance of the investment factor in the first and last period under observation. Also when considering the portfolios with small size and high book to market components the investment factor is insignificant in the first two periods. When observing the big size and low book to market portfolio, the investment factor results insignificant for the second and third periods. Regarding the profitability factor, we find insignificance mainly in the last period, when considering the small size medium book to market portfolio and the big size low book to market portfolio.

Table 3 *3x2 Size – B/M Portfolios*

3x2 Size- B/M portfolio									
Small Size- low B/M									
	First period (1963-1982)			**Second period (1982-2002)**			**Third period (2002-2020)**		
	Coef.	t-value	P-value	Coef.	t-value	P-value	Coef.	t-value	P-value
Mkt-Rf	1.063	75.34	0.000	1.060	75.43	0.000	1.046	78.89	0.000
SMB	1.032	54.94	0.000	0.985	54.34	0.000	0.991	43.40	0.000
HML	-0.451	-13.87	0.000	-0.269	-9.64	0.000	-0.350	-16.36	0.000
RMW	-0.100	-2.18	0.030	-0.180	-7.80	0.000	-0.312	-10.21	0.000
CMA	-0.007	-0.16	**0.875****	0.141	-93.69	0.000	-0.179	-4.79	0.000
Small Size- medium B/M									
	First period (1963-1982)			**Second period (1982-2002)**			**Third period (2002-2020)**		
	Coef.	t-value	P-value	Coef.	t-value	P-value	Coef.	t-value	P-value
Mkt-Rf	0.963	92.02	0.000	0.985	84.51	0.000	0.968	85.02	0.000
SMB	0.819	58.80	0.000	0.867	57.62	0.000	0.853	43.50	0.000
HML	0.215	8.93	0.000	0.251	10.84	0.000	0.132	7.19	0.000
RMW	-0.075	-2.20	0.029	0.129	6.72	0.000	0.004	0.15	**0.883****
CMA	-0.057	-1.74	**0.083****	0.098	3.07	0.002	0.007	0.21	**0.834****

Small Size- high B/M									
	First period (1963-1982)			**Second period (1982-2002)**			**Third period (2002-2020)**		
	Coef.	t-value	P-value	Coef.	t-value	P-value	Coef.	t-value	P-value
Mkt-Rf	1.014	93.74	0.000	0.999	95.55	0.000	0.987	96.39	0.000
SMB	0.860	59.80	0.000	0.882	65.45	0.000	0.915	51.95	0.000
HML	0.553	22.20	0.000	0.553	26.64	0.000	0.523	31.01	0.000
RMW	0.091	2.57	0.011	0.058	3.35	0.001	0.046	1.93	**0.055****
CMA	0.061	1.82	**0.070****	0.045	1.57	**0.117****	0.123	4.31	0.000
Big Size- low B/M									
	First period (1963-1982)			**Second period (1982-2002)**			**Third period (2002-2020)**		
	Coef.	t-value	P-value	Coef.	t-value	P-value	Coef.	t-value	P-value
Mkt-Rf	0.985	77.26	0.000	0.996	91.97	0.000	0.989	122.38	0.000
SMB	-0.105	-6.17	0.000	-0.118	-8.43	0.000	-0.113	-8.13	0.000
HML	-0.198	-6.74	0.000	-0.329	-15.28	0.000	-0.252	-19.31	0.000
RMW	0.207	4.97	0.000	0.204	11.44	0.000	0.065	3.47	0.001
CMA	-0.090	-2.27	0.024	0.016	0.54	**0.590****	-0.009	-0.42	**0.677****
Big Size- medium B/M									
	First period (1963-1982)			**Second period (1982-2002)**			**Third period (2002-2020)**		
	Coef.	t-value	P-value	Coef.	t-value	P-value	Coef.	t-value	P-value
Mkt-Rf	0.978	46.83	0.000	1.053	46.75	0.000	1.021	75.61	0.000
SMB	-0.123	-4.44	0.000	-0.063	-2.18	0.030	0.265	10.88	0.000
HML	0.157	3.27	0.001	0.377	8.43	0.000	-0.085	-4.27	0.000
RMW	-0.183	-2.69	0.008	0.192	5.20	0.000	0.180	6.81	0.000
CMA	0.112	1.73	**0.086****	0.153	2.48	0.014	0.1889	5.01	0.000
Big Size- high B/M									
	First period (1963-1982)			**Second period (1982-2002)**			**Third period (2002-2020)**		
	Coef.	t-value	P-value	Coef.	t-value	P-value	Coef.	t-value	P-value
Mkt-Rf	1.034	62.94	0.000	1.058	55.44	0.000	1.049	59.59	0.000
SMB	0.067	3.05	0.003	-0.014	-0.59	**0.557****	-0.034	-1.10	**0.271****
HML	0.799	21.12	0.000	0.849	22.40	0.000	0.866	30.41	0.000
RMW	0.150	0.28	**0.780****	-0.034	-1.08	**0.280****	-0.292	-7.20	0.000
CMA	-0.159	-3.11	0.002	-0.171	-3.28	0.001	-0304	-6.12	0.000

***** insignificant factors when considering a 95% confidence interval***

After having analyzed the regressions with the five Fama French factors, another factor has been added to the regression: the momentum factor. The factor was added to the analysis in order to see if the significance of some of the factors changed by adding this component. From table 4, we can observe that in most of the portfolios the momentum factor was found to be not even significant. Also in this case, the investment factor is insignificant in many cases, when considering the small size portfolios. The profitability factor is found insignificant for small size medium book to market portfolio and for small size high book to market portfolios, when considering the years from 2002 to 2020. Even when considering the three different big portfolios, the investment factor is not relevant in many occasions.

Table 4 *3x2 Size – B/M Portfolios with momentum factor*

3x2 Size- B/M portfolio with MOM factor									
Small Size- low B/M									
	First period (1963-1982)			**Second period (1982-2002)**			**Third period (2002-2020)**		
	Coef.	t-value	P-value	Coef.	t-value	P-value	Coef.	t-value	P-value
Mkt-Rf	1.063	75.30	0.000	1.062	77.40	0.000	1.033	76.28	0.000
SMB	1.033	54.79	0.000	0.987	55.79	0.000	0.998	44.40	0.000
HML	-0.448	-13.75	0.000	-0.302	-10.51	0.000	-0.370	-16.92	0.000
RMW	-0.104	-2.24	0.026	-0.178	-7.89	0.000	-0.295	-9.71	0.000
CMA	-0.008	-0.18	**0.858****	-0.094	-2.37	0.018	-0.184	-5.02	0.000
MOM	0.012	0.86	**0.393****	-0.046	-3.59	0.000	-0.038	-3.13	0.002
Small Size- medium B/M									
	First period (1963-1982)			**Second period (1982-2002)**			**Third period (2002-2020)**		
	Coef.	t-value	P-value	Coef.	t-value	P-value	Coef.	t-value	P-value
Mkt-Rf	0.962	96.76	0.000	0.986	84.37	0.000	0.969	81.36	0.000
SMB	0.813	61.24	0.000	0.867	57.55	0.000	0.853	43.18	0.000
HML	0.206	8.96	0.000	0.246	10.05	0.000	0.134	6.97	0.000
RMW	-0.061	-1.88	0.062	0.129	6.73	0.000	0.003	0.10	**0.924****
CMA	-0.053	-1.70	**0.090****	0.105	3.12	0.002	0.007	0.22	**0.825****
MOM	-0.051	-4.98	0.000	-0.007	-0.67	**0.504****	0.003	0.28	**0.780****
Small Size- high B/M									
	First period (1963-1982)			**Second period (1982-2002)**			**Third period (2002-2020)**		
	Coef.	t-value	P-value	Coef.	t-value	P-value	Coef.	t-value	P-value
Mkt-Rf	1.014	94.01	0.000	0.999	96.00	0.000	0.987	95.87	0.000
SMB	0.859	59.65	0.000	0.882	65.79	0.000	0.915	51.82	0.000
HML	0.550	22.07	0.000	0.540	24.79	0.000	0.526	31.91	0.000
RMW	0.095	2.70	0.008	0.058	3.42	0.001	0.046	1.93	**0.055****
CMA	0.063	1.87	**0.063****	0.063	2.09	**0.038****	0.124	4.30	0.000
MOM	-0.017	-1.55	**0.124****	-0.018	-1.81	**0.071****	0.001	0.17	**0.866****
Big Size- low B/M									
	First period (1963-1982)			**Second period (1982-2002)**			**Third period (2002-2020)**		
	Coef.	t-value	P-value	Coef.	t-value	P-value	Coef.	t-value	P-value
Mkt-Rf	0.985	78.16	0.000	0.996	91.79	0.000	0.992	117.64	0.000
SMB	-0.108	-6.43	0.000	-0.118	-8.44	0.000	-0.114	-8.20	0.000
HML	-0.204	-7.00	0.000	-0.323	-14.22	0.000	-0.248	-18.25	0.000
RMW	0.216	5.22	0.000	0.202	11.44	0.000	0.061	3.22	0.001
CMA	-0.088	-2.23	0.026	0.008	0.24	**0.809****	-0.008	-0.37	**0.712****
MOM	-0.032	-2.51	**0.013****	0.008	0.80	**0.422****	0.008	1.11	**0.268****
Big Size- medium B/M									
	First period (1963-1982)			**Second period (1982-2002)**			**Third period (2002-2020)**		
	Coef.	t-value	P-value	Coef.	t-value	P-value	Coef.	t-value	P-value
Mkt-Rf	0.979	47.15	0.000	1.057	48.97	0.000	1.047	49.16	0.000
SMB	-0.119	-4.29	0.000	-0.059	-2.13	0.034	-0.139	-4.48	0.000
HML	-0.165	3.44	0.001	0.309	6.83	0.000	0.309	6.89	0.000
RMW	-0.195	-2.86	0.005	0.197	5.56	0.000	0.139	3.22	0.002
CMA	0.109	1.69	**0.093****	0.251	4.01	0.000	0.129	2.00	0.047
MOM	0.042	1.99	0.048	-0.095	-4.72	0.000	0.003	0.20	**0.845****
Big Size- high B/M									
	First period (1963-1982)			**Second period (1982-2002)**			**Third period (2002-2020)**		
	Coef.	t-value	P-value	Coef.	t-value	P-value	Coef.	t-value	P-value
Mkt-Rf	1.034	62.80	0.000	1.059	55.47	0.000	1.033	57.44	0.000
SMB	0.066	3.01	0.003	-0.014	-0.55	**0.580****	-0.024	-0.82	**0.414****
HML	0.798	20.99	0.000	0.835	20.88	0.000	0.840	28.96	0.000
RMW	0.016	0.29	**0.770****	-0.033	-1.05	**0.295****	-0.270	-6.68	0.000
CMA	-0.159	-3.10	0.002	-0.150	-2.72	0.007	-0.310	-6.39	0.000
MOM	-0.003	-0.18	**0.858****	-0.020	-1.14	**0.257****	-0.051	-3.19	0.002

***** insignificant factors when considering a 95% confidence interval***

6.2 Size momentum portfolios

The other six portfolios, under observation for our analysis, are formed by the intersection of two portfolios formed on size and three portfolios based on momentum values (prior returns). Firstly, we regress the average returns with the Fama French five factors and then we focus on which factors seem relevant and are significant and which not. From table 5, when taking into consideration the first period, from 1963 to 1982, the investment and profitability factors are basically always insignificant except when looking at the small size portfolio with low value momentum. In the second period, the investment factor is insignificant when dealing with small size, big size and medium momentum value portfolios. Also the profitability factor is insignificant in most of the portfolios in the second timeframe. In the period from 2002 to 2020, we can observe that the investment factor is not relevant with small size, low momentum portfolios and with big size, low and medium momentum value. As we previously examined with the other six portfolios sorted on size and book to market, also in this case, the majority of insignificant factors is composed by investment and profitability factors.

Table 5 *3x2 Size – momentum Portfolios*

3x2 Size- momentum portfolio									
Small Size- low MOM									
	First period (1963-1982)			**Second period (1982-2002)**			**Third period (2002-2020)**		
	Coef.	t-value	P-value	Coef.	t-value	P-value	Coef.	t-value	P-value
Mkt-Rf	1.006	29.83	0.000	1.020	20.16	0.000	1.301	23.89	0.000
SMB	1.021	22.72	0.000	0.870	13.45	0.000	0.900	9.59	0.000
HML	0.226	2.84	0.005	0.577	5.82	0.000	0.264	2.99	0.003
RMW	-0.262	-2.33	0.021	-0.147	-1.78	**0.076****	-0.408	-3.25	0.001
CMA	-0.250	-2.32	0.021	-0.834	-6.12	0.018	-0.079	0.52	**0.605****
Small Size- medium MOM									
	First period (1963-1982)			**Second period (1982-2002)**			**Third period (2002-2020)**		
	Coef.	t-value	P-value	Coef.	t-value	P-value	Coef.	t-value	P-value
Mkt-Rf	0.939	70.49	0.000	0.949	50.75	0.000	0.969	60.72	0.000
SMB	0.781	44.02	0.000	0.752	31.20	0.000	0.831	30.22	0.000
HML	0.185	6.02	0.000	0.315	8.48	0.000	0.239	9.25	0.000
RMW	-0.016	-0.36	**0.722****	0.277	9.03	0.000	0.059	1.61	**0.109****
CMA	-0.602	1.45	**0.148****	-0.039	-0.77	**0.441****	-0.140	-3.12	0.002
Small Size- high MOM									
	First period (1963-1982)			**Second period (1982-2002)**			**Third period (2002-2020)**		
	Coef.	t-value	P-value	Coef.	t-value	P-value	Coef.	t-value	P-value
Mkt-Rf	1.049	36.23	0.000	1.059	40.63	0.000	0.983	36.35	0.000
SMB	0.845	21.94	0.000	0.952	28.35	0.000	0.977	20.96	0.000
HML	-0.051	-0.76	0.449	-0.130	-2.52	0.012	-0.092	-2.11	0.036
RMW	-0.005	-0.05	**0.960****	-0.031	-0.74	0.462	0.017	0.27	**0.787****
CMA	0.044	0.49	**0.623****	0.172	2.42	0.016	-0.162	-2.12	0.035

Big Size- low MOM									
	First period (1963-1982)			**Second period (1982-2002)**			**Third period (2002-2020)**		
	Coef.	t-value	P-value	Coef.	t-value	P-value	Coef.	t-value	P-value
Mkt-Rf	1.088	23.81	0.000	0.985	17.69	0.000	1.266	23.33	0.000
SMB	0.050	0.82	**0.411****	-0.033	-0.46	**0.645****	-0.134	-1.43	**0.155****
HML	-0.031	-0.30	**0.767****	0.484	4.38	0.000	0.475	5.42	0.000
RMW	-0.228	-1.53	**0.127****	0.078	0.85	**0.397****	-0.302	-2.41	0.017
CMA	0.059	0.41	**0682****	-0.701	-4.61	0.000	-0.165	-1.08	**0.281****
Big Size- medium MOM									
	First period (1963-1982)			**Second period (1982-2002)**			**Third period (2002-2020)**		
	Coef.	t-value	P-value	Coef.	t-value	P-value	Coef.	t-value	P-value
Mkt-Rf	0.984	59.08	0.000	0.989	46.29	0.000	0.973	65.34	0.000
SMB	-0.087	-3.91	0.000	-0.130	-4.72	0.000	-0.075	-2.94	0.004
HML	0.031	0.81	0.420	0.154	3.64	0.000	0.102	4.23	0.000
RMW	0.030	0.56	**0.576****	0.244	6.94	0.000	0.123	3.58	0.000
CMA	0.052	1.00	**0.320****	0.066	1.12	**0.263****	0.024	0.57	**0.571****
Big Size- high MOM									
	First period (1963-1982)			**Second period (1982-2002)**			**Third period (2002-2020)**		
	Coef.	t-value	P-value	Coef.	t-value	P-value	Coef.	t-value	P-value
Mkt-Rf	1.021	27.97	0.000	1.039	35.84	0.000	0.937	29.66	0.000
SMB	0.026	0.53	**0.594****	-0.035	-0.94	**0.350****	0.148	2.73	0.007
HML	-0.123	-1.47	**0.144****	-0.239	-4.15	0.000	-0.182	-3.56	0.000
RMW	0.070	0.59	**0.556****	0.058	1.22	**0.224****	0.170	2.34	0.020
CMA	-0.071	-0.63	**0.532****	-0.351	4.43	0.000	-0.185	-2.08	0.039

***** insignificant factors when considering a 95% confidence interval***

As we did before, also in this case, in order to observe if the significance of the factors change by adding a new factor that may be relevant to explain average returns, we include the momentum factor. When examining the small size low momentum portfolios, we can see that for the second period the profitability and the momentum factors are insignificant. Regarding the last term, the investment factor is found insignificant. When considering the portfolios with small size and medium momentum values, the investment factor is insignificant for both the first and second period. The value factor is insignificant when observing the first two periods for the big size medium momentum value portfolios and for all of the periods when observing the big size high momentum portfolios.

Table 6 *3x2 Size – momentum Portfolios with momentum factor*

3x2 Size- momentum portfolio with MOM factor									
Small Size- low MOM									
	First period (1963-1982)			**Second period (1982-2002)**			**Third period (2002-2020)**		
	Coef.	t-value	P-value	Coef.	t-value	P-value	Coef.	t-value	P-value
Mkt-Rf	0.993	64.78	0.000	1.027	20.27	0.000	1.082	54.19	0.000
SMB	0.983	48.04	0.000	0.896	13.43	0.000	1.022	30.86	0.000
HML	0.135	3.82	0.000	0.589	5.94	0.000	-0.080	-2.49	0.014
RMW	-0.120	-2.38	0.018	-0.131	-1.58	**0.115****	-0.104	-2.32	0.022
CMA	-0.206	-4.31	0.000	-0.821	-6.02	0.000	-0.009	-0.16	**0.869****
MOM	-0.474	-30.13	0.000	0.070	1.54	**0.126****	-0.678	-38.37	0.000

Small Size- medium MOM									
	First period (1963-1982)			**Second period (1982-2002)**			**Third period (2002-2020)**		
	Coef.	t-value	P-value	Coef.	t-value	P-value	Coef.	t-value	P-value
Mkt-Rf	0.939	78.14	0.000	0.954	57.57	0.000	0.944	60.89	0.000
SMB	0.771	48.07	0.000	0.757	35.45	0.000	0.845	32.89	0.000
HML	0.168	6.07	0.000	0.225	6.49	0.000	0.199	7.95	0.000
RMW	0.009	0.22	**0.826****	0.284	10.42	0.000	0.095	2.72	0.007
CMA	0.673	1.80	**0.074****	0.089	1.86	**0.064****	-0.151	-3.60	0.000
MOM	-0.089	-7.24	0.000	-0.125	-8.09	0.000	-0.079	-5.76	0.000
Small Size- high MOM									
	First period (1963-1982)			**Second period (1982-2002)**			**Third period (2002-2020)**		
	Coef.	t-value	P-value	Coef.	t-value	P-value	Coef.	t-value	P-value
Mkt-Rf	1.052	74.88	0.000	1.046	59.90	0.000	1.081	71.74	0.000
SMB	0.887	47.27	0.000	0.940	41.78	0.000	0.922	36.88	0.000
HML	0.020	0.62	**0.535****	0.068	1.86	**0.064****	0.062	2.55	0.011
RMW	-0.110	-2.39	0.018	-0.045	-1.58	**0.116****	-0.120	-3.54	0.000
CMA	0.014	0.31	**0.753****	-0.113	-2.23	0.027	-0.122	-3.00	0.003
MOM	0..389	26.94	**0.000****	0.277	17.02	0.000	0.304	22.80	0.000
Big Size- low MOM									
	First period (1963-1982)			**Second period (1982-2002)**			**Third period (2002-2020)**		
	Coef.	t-value	P-value	Coef.	t-value	P-value	Coef.	t-value	P-value
Mkt-Rf	1.083	58.05	0.000	1.017	45.01	0.000	1.051	47.42	0.000
SMB	-0.018	-0.72	**0.472****	-0.003	-0.09	**0.930****	-0.014	-0.39	**0.697****
HML	-0.148	-3.42	0.001	-0.038	-0.80	**0.424****	0.139	3.89	0.000
RMW	-0.055	-0.90	0.371	0.114	3.07	0.002	-0.004	-0.08	**0.935****
CMA	0.109	1.87	**0.062****	0.047	0.73	**0.468****	-0.252	-4.21	0.000
MOM	-0.640	-33.39	0.000	-0.728	-34.56	0.000	-0.664	-33.83	0.000
Big Size- medium MOM									
	First period (1963-1982)			**Second period (1982-2002)**			**Third period (2002-2020)**		
	Coef.	t-value	P-value	Coef.	t-value	P-value	Coef.	t-value	P-value
Mkt-Rf	0.983	64.52	0.000	0.995	52.23	0.000	0.950	65.56	0.000
SMB	-0.098	-4.80	0.000	-0.124	-5.05	0.000	-0.062	-2.59	0.010
HML	0.120	0.34	**0.734****	0.054	1.37	**0.174****	0.065	2.78	0.006
RMW	0.059	1.18	**0.241****	0.251	8.00	0.000	0.156	4.79	0.000
CMA	0.060	1.26	**0.208****	0.209	3.80	0.000	0.014	0.37	**0.715****
MOM	-0.104	-6.66	0.000	-0.140	-7.87	0.000	-0.073	-5.69	0.000
Big Size- high MOM									
	First period (1963-1982)			**Second period (1982-2002)**			**Third period (2002-2020)**		
	Coef.	t-value	P-value	Coef.	t-value	P-value	Coef.	t-value	P-value
Mkt-Rf	1.024	60.79	0.000	1.023	66.81	0.000	1.051	58.98	0.000
SMB	0.079	3.50	0.001	-0.050	-2.52	0.012	0.085	2.87	0.005
HML	-0.033	-0.84	**0.400****	0.014	0.42	**0.674****	-0.003	-0.10	**0.922****
RMW	-0.064	-1.17	**0.245****	0.041	1.61	**0.109****	0.011	0.29	**0.775****
CMA	-0.110	-2.10	0.037	-0.011	-0.26	**0.795****	-0.139	-2.88	0.004
MOM	0.497	28.70	0.000	0.353	24.68	0.000	0.354	22.41	0.000

***** insignificant factors when considering a 95% confidence interval***

7. Conclusion

This thesis analyzed the significance of the factors of the Fama French five factor model, in the most recent periods. To conduct our study we chose different value-weighted portfolios and we divided the dataset into three different subsamples according to the period. As stated at the beginning of the paper, what was initially expected from the analysis was the non-significance of the value factor. Contrary to the initial expectations, from the results of our regressions (see Appendix), we can easily observe that the value component in almost all of the scenarios is significant and relevant in order to explain the expected average return.

Contrary to our predictions, our findings indicate that the two new factors added in the Fama French Five factor model are considered to be insignificant when taking into consideration a 95% confidence interval. Specifically, the investment (CMA) and the profitability factors (RMW). However, in order to examine if the results of the analysis were accurate, we also decided to add the momentum factor to investigate if different results were obtained. What we found is that even when adding the momentum factor, the profitability and the investment factors keep to be insignificant. For this reason, it is evident that the validity of the profitability and investment factors may be questioned in most of the cases, leaving room to further research regarding the statistical significance of these risk factors.

Despite this, we should also take into consideration the variability of the results that could be obtained, because of the different possible combinations of portfolios chosen for the study. Another suggestion for further analysis could be the study of other relevant new factors that could improve the existing asset pricing models.

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9. Appendix

Six Size- Book to market portfolios

Small size low book to market first period (1963/07 – 1982/07)

```
. reg RiRf MktRF SMB HML RMW CMA
```

Source	SS	df	MS	Number of obs	=	229
				F(5, 223)	=	3772.53
Model	11393.6142	5	2278.72284	Prob > F	=	0.0000
Residual	134.698924	223	.604031049	R-squared	=	0.9883
				Adj R-squared	=	0.9881
Total	11528.3131	228	50.5627768	Root MSE	=	.77719

RiRf	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
MktRF	1.063198	.0141126	75.34	0.000	1.035387	1.091009
SMB	1.032031	.0187853	54.94	0.000	.9950115	1.06905
HML	-.450517	.0324834	-13.87	0.000	-.5145307	-.3865033
RMW	-.1003564	.0460489	-2.18	0.030	-.1911031	-.0096097
CMA	-.0068982	.0439638	-0.16	0.875	-.0935358	.0797394
_cons	-.032306	.0549136	-0.59	0.557	-.1405219	.0759099

Small size low book to market second period (1982/08 – 2002/08)

```
reg RiRf MktRF SMB HML RMW CMA
```

Source	SS	df	MS	Number of obs	=	241
				F(5, 235)	=	3784.07
Model	12110.3252	5	2422.06504	Prob > F	=	0.0000
Residual	150.416295	235	.640069343	R-squared	=	0.9877
				Adj R-squared	=	0.9875
Total	12260.7415	240	51.0864229	Root MSE	=	.80004

RiRf	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
MktRF	1.060388	.0140571	75.43	0.000	1.032694	1.088082
SMB	.9848317	.0181219	54.34	0.000	.9491295	1.020534
HML	-.26905	.0279234	-9.64	0.000	-.3240621	-.2140378
RMW	-.1802885	.0231043	-7.80	0.000	-.2258066	-.1347704
CMA	-.1414914	.0383817	-3.69	0.000	-.2171077	-.0658751
_cons	-.1708958	.0563436	-3.03	0.003	-.2818989	-.0598927

Small size low book to market third period (2002/09 – 2020/05)

```
reg RiRf SMB MktRF HML RMW CMA
```

Source	SS	df	MS	Number of obs	=	213
				F(5, 207)	=	3126.36
Model	7644.98887	5	1528.99777	Prob > F	=	0.0000
Residual	101.236618	207	.489065786	R-squared	=	0.9869
				Adj R-squared	=	0.9866
Total	7746.22549	212	36.5387995	Root MSE	=	.69933

RiRf	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
SMB	.9914378	.0228463	43.40	0.000	.9463965	1.036479
MktRF	1.045931	.0132578	78.89	0.000	1.019794	1.072069
HML	-.3507987	.0214417	-16.36	0.000	-.3930708	-.3085267
RMW	-.3123294	.0305876	-10.21	0.000	-.3726326	-.2520262
CMA	-.1788693	.0373277	-4.79	0.000	-.2524604	-.1052781
_cons	-.0330516	.0501592	-0.66	0.511	-.13194	.0658367

Small size, medium book to market first period (1963/07 – 1982/07)

```
. reg RiRf MktRF SMB HML RMW CMA
```

Source	SS	df	MS	Number of obs	=	229
				F(5, 223)	=	4658.36
Model	7731.90883	5	1546.38177	Prob > F	=	0.0000
Residual	74.0266867	223	.331958236	R-squared	=	0.9905
				Adj R-squared	=	0.9903
Total	7805.93552	228	34.2365593	Root MSE	=	.57616

RiRf	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
MktRF	.9627464	.0104621	92.02	0.000	.9421292	.9833636
SMB	.8188276	.0139261	58.80	0.000	.791384	.8462712
HML	.2150511	.024081	8.93	0.000	.1675957	.2625064
RMW	-.0749396	.0341375	-2.20	0.029	-.1422129	-.0076663
CMA	-.0568156	.0325917	-1.74	0.083	-.1210427	.0074115
_cons	.0441223	.0407091	1.08	0.280	-.0361015	.1243461

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Small size, medium book to market second period (1982/08 – 2002/08)

```
. reg RiRf MktRF SMB HML RMW CMA
```

Source	SS	df	MS	Number of obs	=	241
				F(5, 235)	=	2665.10
Model	5869.28662	5	1173.85732	Prob > F	=	0.0000
Residual	103.506969	235	.440455187	R-squared	=	0.9827
				Adj R-squared	=	0.9823
Total	5972.79359	240	24.8866399	Root MSE	=	.66367

RiRf	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
MktRF	.9854601	.011661	84.51	0.000	.9624868	1.008434
SMB	.866256	.0150329	57.62	0.000	.8366396	.8958724
HML	.251116	.0231636	10.84	0.000	.2054812	.2967508
RMW	.1288415	.019166	6.72	0.000	.0910824	.1666005
CMA	.0977495	.0318392	3.07	0.002	.0350228	.1604762
_cons	.0231984	.0467393	0.50	0.620	-.0688831	.11528

Small size, medium book to market third period (2002/09 – 2020/05)

```
reg RiRf MktRF SMB HML CMA RMW
```

Source	SS	df	MS	Number of obs	=	213
				F(5, 207)	=	3575.66
Model	6443.59169	5	1288.71834	Prob > F	=	0.0000
Residual	74.6057491	207	.360414247	R-squared	=	0.9886
				Adj R-squared	=	0.9883
Total	6518.19744	212	30.7462143	Root MSE	=	.60035

RiRf	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
MktRF	.9676181	.0113812	85.02	0.000	.9451802	.9900561
SMB	.8531836	.0196126	43.50	0.000	.8145177	.8918496
HML	.1323295	.0184067	7.19	0.000	.0960409	.1686181
CMA	.0067318	.0320441	0.21	0.834	-.0564429	.0699065
RMW	.0038738	.0262581	0.15	0.883	-.0478938	.0556413
_cons	.0458085	.0430594	1.06	0.289	-.0390826	.1306997

Small size, high book to market first period (1963/07 – 1982/07)

```
. reg RiRf MktRF SMB HML RMW CMA
```

Source	SS	df	MS	Number of obs	=	229
				F(5, 223)	=	4670.46
Model	8284.29961	5	1656.85992	Prob > F	=	0.0000
Residual	79.1098577	223	.354752725	R-squared	=	0.9905
				Adj R-squared	=	0.9903
Total	8363.40947	228	36.6816205	Root MSE	=	.59561

RiRf	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
MktRF	1.013784	.0108153	93.74	0.000	.9924702	1.035097
SMB	.8608346	.0143963	59.80	0.000	.8324644	.8892048
HML	.5526502	.024894	22.20	0.000	.5035925	.6017078
RMW	.0905784	.0352901	2.57	0.011	.0210337	.1601231
CMA	.0613696	.0336921	1.82	0.070	-.0050261	.1277652
_cons	.0473405	.0420836	1.12	0.262	-.035592	.1302729

Small size, high book to market second period (1982/08 – 2002/08)

```
. reg RiRf MktRF SMB HML RMW CMA
```

Source	SS	df	MS	Number of obs	=	241
				F(5, 235)	=	3146.71
Model	5563.27468	5	1112.65494	Prob > F	=	0.0000
Residual	83.0943084	235	.353592802	R-squared	=	0.9853
				Adj R-squared	=	0.9850
Total	5646.36899	240	23.5265374	Root MSE	=	.59464

RiRf	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
MktRF	.998297	.0104481	95.55	0.000	.9777132	1.018881
SMB	.8815514	.0134692	65.45	0.000	.8550155	.9080872
HML	.5529141	.0207542	26.64	0.000	.512026	.5938023
RMW	.0575311	.0171724	3.35	0.001	.0236995	.0913627
CMA	.0448554	.0285274	1.57	0.117	-.0113468	.1010577
_cons	.08902	.0418777	2.13	0.035	.0065163	.1715236

Small size, high book to market third period (2002/09 – 2020/05)

```
. reg RiRf MktRF SMB HML RMW CMA
```

Source	SS	df	MS	Number of obs	=	214
				F(5, 208)	=	5547.72
Model	8087.34035	5	1617.46807	Prob > F	=	0.0000
Residual	60.6435081	208	.291555328	R-squared	=	0.9926
				Adj R-squared	=	0.9924
Total	8147.98386	213	38.2534453	Root MSE	=	.53996

RiRf	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
MktRF	.9865309	.0102352	96.39	0.000	.9663529	1.006709
SMB	.9145695	.0176062	51.95	0.000	.87986	.949279
HML	.5257578	.0164256	32.01	0.000	.4933759	.5581398
RMW	.0456046	.0236137	1.93	0.055	-.0009482	.0921574
CMA	.1234311	.0286326	4.31	0.000	.0669837	.1798784
_cons	-.0205837	.0385921	-0.53	0.594	-.0966654	.0554981

Big size, low book to market first period (1963/07 – 1982/07)

```
. reg RiRf MktRF SMB HML RMW CMA
```

Source	SS	df	MS	Number of obs	=	229
				F(5, 223)	=	1932.30
Model	4761.01005	5	952.20201	Prob > F	=	0.0000
Residual	109.89031	223	.492781661	R-squared	=	0.9774
				Adj R-squared	=	0.9769
Total	4870.90036	228	21.3635981	Root MSE	=	.70198

RiRf	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
MktRF	.9848823	.0127469	77.26	0.000	.9597626	1.010002
SMB	-.104702	.0169674	-6.17	0.000	-.138139	-.0712651
HML	-.1977326	.0293399	-6.74	0.000	-.2555516	-.1399136
RMW	.2067396	.0415927	4.97	0.000	.1247746	.2887046
CMA	-.0902822	.0397093	-2.27	0.024	-.1685357	-.0120286
_cons	.0680167	.0495995	1.37	0.172	-.029727	.1657604

Big size, low book to market second period (1982/08 – 2002/08)

```
reg RiRf MktRF SMB HML RMW CMA
```

Source	SS	df	MS	Number of obs	=	241
				F(5, 235)	=	3069.84
Model	5835.12359	5	1167.02472	Prob > F	=	0.0000
Residual	89.3371538	235	.380158101	R-squared	=	0.9849
				Adj R-squared	=	0.9846
Total	5924.46075	240	24.6852531	Root MSE	=	.61657

RiRf	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
MktRF	.9963461	.0108334	91.97	0.000	.9750031	1.017689
SMB	-.1177404	.013966	-8.43	0.000	-.1452551	-.0902258
HML	-.3288659	.0215197	-15.28	0.000	-.3712621	-.2864697
RMW	.2037709	.0178058	11.44	0.000	.1686915	.2388504
CMA	.0159751	.0295797	0.54	0.590	-.0423001	.0742503
_cons	.0722185	.0434223	1.66	0.098	-.0133283	.1577653

Big size , low book to market third period (2002/09 – 2020/05)

```
reg RiRf MktRF SMB HML RMW CMA
```

Source	SS	df	MS	Number of obs	=	213
				F(5, 207)	=	3768.56
Model	3427.0084	5	685.40168	Prob > F	=	0.0000
Residual	37.6478463	207	.181873653	R-squared	=	0.9891
				Adj R-squared	=	0.9889
Total	3464.65625	212	16.3427182	Root MSE	=	.42647

RiRf	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
MktRF	.9894055	.0080849	122.38	0.000	.9734663	1.005345
SMB	-.1132559	.0139321	-8.13	0.000	-.140723	-.0857888
HML	-.2524421	.0130755	-19.31	0.000	-.2782204	-.2266638
RMW	.0647828	.0186529	3.47	0.001	.0280087	.1015568
CMA	-.0095109	.0227631	-0.42	0.677	-.0543882	.0353664
_cons	.0656699	.030588	2.15	0.033	.0053658	.1259739

Big size, neutral book to market first period (1963/07 – 1982/07)

```
reg RiRf MktRF SMB HML RMW CMA
```

Source	SS	df	MS	Number of obs	=	229
				F(5, 223)	=	550.79
Model	3647.06328	5	729.412657	Prob > F	=	0.0000
Residual	295.320411	223	1.32430678	R-squared	=	0.9251
				Adj R-squared	=	0.9234
Total	3942.3837	228	17.2911566	Root MSE	=	1.1508

RiRf	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
MktRF	.9786403	.0208964	46.83	0.000	.9374607	1.01982
SMB	-.1233625	.0278152	-4.44	0.000	-.1781768	-.0685482
HML	.1574433	.0480979	3.27	0.001	.0626587	.252228
RMW	-.1832947	.0681842	-2.69	0.008	-.3176626	-.0489268
CMA	.1123575	.0650968	1.73	0.086	-.0159261	.2406411
_cons	-.0185696	.0813101	-0.23	0.820	-.1788041	.1416648

Big size, neutral book to market second period (1982/08 – 2002/08)

```
reg RiRf MktRF SMB HML RMW CMA
```

Source	SS	df	MS	Number of obs	=	241
				F(5, 235)	=	508.40
Model	4179.03531	5	835.807063	Prob > F	=	0.0000
Residual	386.341776	235	1.64400756	R-squared	=	0.9154
				Adj R-squared	=	0.9136
Total	4565.37709	240	19.0224045	Root MSE	=	1.2822

RiRf	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
MktRF	1.053142	.0225287	46.75	0.000	1.008758	1.097525
SMB	-.0633634	.0290431	-2.18	0.030	-.1205815	-.0061453
HML	.3770712	.0447514	8.43	0.000	.288906	.4652364
RMW	.1923719	.0370281	5.20	0.000	.1194223	.2653214
CMA	.1527733	.0615125	2.48	0.014	.031587	.2739596
_cons	-.2978482	.090299	-3.30	0.001	-.4757472	-.1199491

Big size , neutral book to market third period (2002/09 – 2020/05)

```
reg RiRf MktRF HML SMB RMW CMA
```

Source	SS	df	MS	Number of obs	=	454
				F(5, 448)	=	1312.21
Model	8211.35984	5	1642.27197	Prob > F	=	0.0000
Residual	560.684088	448	1.25152698	R-squared	=	0.9361
				Adj R-squared	=	0.9354
Total	8772.04393	453	19.3643354	Root MSE	=	1.1187

RiRf	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
MktRF	1.021042	.0135045	75.61	0.000	.9945022	1.047582
HML	.2646908	.0243275	10.88	0.000	.2168806	.312501
SMB	-.0851923	.0199482	-4.27	0.000	-.124396	-.0459886
RMW	.179882	.0264087	6.81	0.000	.1279817	.2317823
CMA	.1885403	.0376019	5.01	0.000	.1146422	.2624384
_cons	-.1882263	.0557341	-3.38	0.001	-.2977591	-.0786936

Big size, high book to market first period (1963/07 – 1982/07)

```
reg RiRf MktRF SMB HML RMW CMA
```

Source	SS	df	MS	Number of obs	=	229
				F(5, 223)	=	1165.55
Model	4773.8431	5	954.76862	Prob > F	=	0.0000
Residual	182.672076	223	.819157291	R-squared	=	0.9631
				Adj R-squared	=	0.9623
Total	4956.51518	228	21.7391016	Root MSE	=	.90507

RiRf	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
MktRF	1.034354	.0164346	62.94	0.000	1.001967	1.066741
SMB	.0666408	.0218762	3.05	0.003	.0235303	.1097513
HML	.799042	.0378282	21.12	0.000	.7244955	.8735885
RMW	.014988	.0536257	0.28	0.780	-.0906901	.1206661
CMA	-.1591162	.0511975	-3.11	0.002	-.2600091	-.0582234
_cons	-.0112194	.063949	-0.18	0.861	-.137241	.1148023

Big size, high book to market second period (1982/08 – 2002/08)

```
reg RiRf MktRF SMB HML RMW CMA
```

Source	SS	df	MS	Number of obs	=	241
				F(5, 235)	=	763.80
Model	4507.02763	5	901.405525	Prob > F	=	0.0000
Residual	277.337241	235	1.18015847	R-squared	=	0.9420
				Adj R-squared	=	0.9408
Total	4784.36487	240	19.9348536	Root MSE	=	1.0864

RiRf	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
MktRF	1.058223	.0190877	55.44	0.000	1.020618	1.095827
SMB	-.0144737	.0246071	-0.59	0.557	-.0629525	.0340051
HML	.8492292	.0379162	22.40	0.000	.7745301	.9239283
RMW	-.033944	.0313726	-1.08	0.280	-.0957514	.0278635
CMA	-.1709005	.0521172	-3.28	0.001	-.2735772	-.0682238
_cons	-.187692	.076507	-2.45	0.015	-.3384193	-.0369648

Big size , high book to market third period (2002/09 – 2020/05)

```
reg RiRf MktRF SMB HML RMW CMA
```

Source	SS	df	MS	Number of obs	=	213
				F(5, 207)	=	1593.57
Model	6870.75045	5	1374.15009	Prob > F	=	0.0000
Residual	178.498048	207	.862309411	R-squared	=	0.9747
				Adj R-squared	=	0.9741
Total	7049.2485	212	33.2511722	Root MSE	=	.92861

RiRf	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
MktRF	1.049108	.0176043	59.59	0.000	1.014401	1.083815
SMB	-.0335137	.0303364	-1.10	0.271	-.0933217	.0262944
HML	.8657215	.0284712	30.41	0.000	.8095907	.9218523
RMW	-.2924711	.0406157	-7.20	0.000	-.3725444	-.2123977
CMA	-.3035642	.0495654	-6.12	0.000	-.4012819	-.2058464
_cons	.0446943	.0666037	0.67	0.503	-.0866142	.1760029

Six Size- Book to market portfolios with the inclusion of the Momentum factor

Small size, low book to market first period (1963/07 – 1982/07)

```
reg RiRf MktRF SMB HML RMW CMA MOM
```

Source	SS	df	MS	Number of obs	=	229
				F(6, 222)	=	3140.12
Model	11394.057	6	1899.0095	Prob > F	=	0.0000
Residual	134.256092	222	.604757171	R-squared	=	0.9884
				Adj R-squared	=	0.9880
Total	11528.3131	228	50.5627768	Root MSE	=	.77766

RiRf	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
MktRF	1.063287	.0141214	75.30	0.000	1.035458	1.091116
SMB	1.033351	.0188597	54.79	0.000	.9961836	1.070518
HML	-.4482595	.0326098	-13.75	0.000	-.5125239	-.3839951
RMW	-.1037182	.0462438	-2.24	0.026	-.1948511	-.0125852
CMA	-.0078764	.044005	-0.18	0.858	-.0945974	.0788447
MOM	.0124118	.0145046	0.86	0.393	-.0161725	.040996
_cons	-.0451931	.0569731	-0.79	0.428	-.1574704	.0670841

Small size, low book to market second period (1982/08 – 2002/08)

```
. reg RiRf MktRF SMB HML RMW CMA MOM
```

Source	SS	df	MS	Number of obs	=	241
				F(6, 234)	=	3315.31
Model	12118.188	6	2019.69799	Prob > F	=	0.0000
Residual	142.553529	234	.609203115	R-squared	=	0.9884
				Adj R-squared	=	0.9881
Total	12260.7415	240	51.0864229	Root MSE	=	.78051

RiRf	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
MktRF	1.062433	.0137258	77.40	0.000	1.035391	1.089475
SMB	.9867641	.0176878	55.79	0.000	.9519165	1.021612
HML	-.3019955	.0287439	-10.51	0.000	-.3586254	-.2453656
RMW	-.178001	.0225494	-7.89	0.000	-.2224267	-.1335753
CMA	-.0942264	.0396889	-2.37	0.018	-.1724195	-.0160332
MOM	-.0459837	.0127996	-3.59	0.000	-.0712009	-.0207665
_cons	-.1359254	.0558235	-2.43	0.016	-.2459063	-.0259445

Small size, low book to market third period (2002/09 – 2020/05)

```
. reg RiRf MktRF SMB HML RMW CMA MOM
```

Source	SS	df	MS	Number of obs	=	213
				F(6, 206)	=	2717.51
Model	7649.57986	6	1274.92998	Prob > F	=	0.0000
Residual	96.6456275	206	.469153531	R-squared	=	0.9875
				Adj R-squared	=	0.9872
Total	7746.22549	212	36.5387995	Root MSE	=	.68495

RiRf	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
MktRF	1.033796	.0135522	76.28	0.000	1.007077	1.060515
SMB	.9981778	.0224799	44.40	0.000	.9538576	1.042498
HML	-.3698169	.0218629	-16.92	0.000	-.4129207	-.3267131
RMW	-.2954747	.0304391	-9.71	0.000	-.3554869	-.2354626
CMA	-.1837623	.0365933	-5.02	0.000	-.2559078	-.1116169
MOM	-.0375421	.0120012	-3.13	0.002	-.061203	-.0138813
_cons	-.029948	.0491375	-0.61	0.543	-.1268248	.0669288

Small size, medium book to market first period (1963/07 – 1982/07)

```
. reg RiRf MktRF SMB HML RMW CMA MOM
```

Source	SS	df	MS	Number of obs	=	229
				F(6, 222)	=	4299.87
Model	7739.3392	6	1289.88987	Prob > F	=	0.0000
Residual	66.5963235	222	.299983439	R-squared	=	0.9915
				Adj R-squared	=	0.9912
Total	7805.93552	228	34.2365593	Root MSE	=	.54771

RiRf	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
MktRF	.9623821	.0099457	96.76	0.000	.9427819	.9819822
SMB	.8134217	.0132829	61.24	0.000	.787245	.8395985
HML	.2058039	.0229671	8.96	0.000	.1605424	.2510653
RMW	-.0611688	.0325695	-1.88	0.062	-.1253538	.0030161
CMA	-.052809	.0309928	-1.70	0.090	-.1138867	.0082687
MOM	-.0508416	.0102156	-4.98	0.000	-.0709735	-.0307097
_cons	.0969111	.0401262	2.42	0.017	.0178341	.175988

Small size, medium book to market second period (1982/08 – 2002/08)

```
. reg RiRf MktRF SMB HML RMW CMA MOM
```

Source	SS	df	MS	Number of obs	=	241
				F(6, 234)	=	2215.78
Model	5869.48471	6	978.247451	Prob > F	=	0.0000
Residual	103.308881	234	.441490945	R-squared	=	0.9827
				Adj R-squared	=	0.9823
Total	5972.79359	240	24.8866399	Root MSE	=	.66445

RiRf	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
MktRF	.9857847	.0116847	84.37	0.000	.962764	1.008805
SMB	.8665628	.0150575	57.55	0.000	.8368972	.8962283
HML	.2458868	.0244695	10.05	0.000	.197678	.2940955
RMW	.1292045	.0191962	6.73	0.000	.0913852	.1670239
CMA	.1052516	.0337869	3.12	0.002	.0386862	.171817
MOM	-.0072987	.0108962	-0.67	0.504	-.028766	.0141686
_cons	.0287491	.0475223	0.60	0.546	-.0648771	.1223752

Small size, medium book to market third period (2002/09 – 2020/05)

```
. reg RiRf MktRF SMB HML RMW CMA MOM
```

Source	SS	df	MS	Number of obs	=	213
				F(6, 206)	=	2966.46
Model	6443.6199	6	1073.93665	Prob > F	=	0.0000
Residual	74.5775345	206	.362026866	R-squared	=	0.9886
				Adj R-squared	=	0.9882
Total	6518.19744	212	30.7462143	Root MSE	=	.60169

RiRf	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
MktRF	.9685695	.0119048	81.36	0.000	.9450986	.9920404
SMB	.8526552	.0197473	43.18	0.000	.8137225	.891588
HML	.1338204	.0192053	6.97	0.000	.0959563	.1716846
RMW	.0025525	.026739	0.10	0.924	-.0501647	.0552696
CMA	.0071154	.0321451	0.22	0.825	-.0562602	.0704909
MOM	.0029431	.0105423	0.28	0.780	-.0178416	.0237278
_cons	.0455652	.0431644	1.06	0.292	-.0395354	.1306659

Small size, high book to market first period (1963/07 – 1982/07)

```
. reg RiRf MktRF SMB HML RMW CMA MOM
```

Source	SS	df	MS	Number of obs	=	229
				F(6, 222)	=	3916.69
Model	8285.14169	6	1380.85695	Prob > F	=	0.0000
Residual	78.2677795	222	.352557565	R-squared	=	0.9906
				Adj R-squared	=	0.9904
Total	8363.40947	228	36.6816205	Root MSE	=	.59377

RiRf	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
MktRF	1.013661	.0107821	94.01	0.000	.9924125	1.034909
SMB	.8590147	.0143999	59.65	0.000	.8306367	.8873927
HML	.5495371	.0248985	22.07	0.000	.5004695	.5986048
RMW	.0952142	.0353084	2.70	0.008	.0256318	.1647967
CMA	.0627184	.033599	1.87	0.063	-.0034955	.1289322
MOM	-.0171155	.0110746	-1.55	0.124	-.0389404	.0047093
_cons	.0651115	.0435005	1.50	0.136	-.0206152	.1508382

Small size, high book to market second period (1982/08 – 2002/08)

```
. reg RiRf MktRF SMB HML RMW CMA MOM
```

Source	SS	df	MS	Number of obs	=	241
				F(6, 234)	=	2648.26
Model	5564.42371	6	927.403952	Prob > F	=	0.0000
Residual	81.9452754	234	.350193485	R-squared	=	0.9855
				Adj R-squared	=	0.9851
Total	5646.36899	240	23.5265374	Root MSE	=	.59177

RiRf	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
MktRF	.9990788	.0104067	96.00	0.000	.9785761	1.019582
SMB	.8822901	.0134105	65.79	0.000	.8558693	.9087109
HML	.5403198	.0217931	24.79	0.000	.4973841	.5832556
RMW	.0584056	.0170965	3.42	0.001	.0247228	.0920883
CMA	.0629238	.0300913	2.09	0.038	.0036392	.1222084
MOM	-.0175785	.0097044	-1.81	0.071	-.0366977	.0015407
_cons	.1023884	.0423243	2.42	0.016	.0190029	.1857738

Small size, high book to market third period (2002/09 – 2020/05)

```
. reg RiRf MktRF SMB HML RMW CMA MOM
```

Source	SS	df	MS	Number of obs	=	214
				F(6, 207)	=	4601.51
Model	8087.34867	6	1347.89145	Prob > F	=	0.0000
Residual	60.6351878	207	.292923612	R-squared	=	0.9926
				Adj R-squared	=	0.9923
Total	8147.98386	213	38.2534453	Root MSE	=	.54122

RiRf	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
MktRF	.9866688	.0102918	95.87	0.000	.9663787	1.006959
SMB	.9145952	.0176481	51.82	0.000	.8798021	.9493883
HML	.5256638	.0164735	31.91	0.000	.4931863	.5581412
RMW	.045806	.0236992	1.93	0.055	-.0009166	.0925287
CMA	.1236198	.0287216	4.30	0.000	.0669955	.1802442
MOM	.0013644	.0080953	0.17	0.866	-.0145955	.0173242
_cons	-.0207791	.0386999	-0.54	0.592	-.0970756	.0555174

Big size, low book to market first period (1963/07 – 1982/07)

```
. reg RiRf MktRF SMB HML RMW CMA MOM
```

Source	SS	df	MS	Number of obs	=	229
				F(6, 222)	=	1649.69
Model	4764.04986	6	794.00831	Prob > F	=	0.0000
Residual	106.850501	222	.481308561	R-squared	=	0.9781
				Adj R-squared	=	0.9775
Total	4870.90036	228	21.3635981	Root MSE	=	.69376

RiRf	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
MktRF	.9846493	.012598	78.16	0.000	.9598224	1.009476
SMB	-.1081597	.0168251	-6.43	0.000	-.141317	-.0750025
HML	-.2036473	.0290917	-7.00	0.000	-.2609786	-.1463159
RMW	.2155476	.0412548	5.22	0.000	.1342464	.2968487
CMA	-.0877195	.0392576	-2.23	0.026	-.1650847	-.0103543
MOM	-.032519	.0129398	-2.51	0.013	-.0580195	-.0070186
_cons	.1017812	.0508266	2.00	0.046	.0016169	.2019455

Big size, low book to market second period (1982/08 – 2002/08)

```
. reg RiRf MktRF SMB HML RMW CMA MOM
```

Source	SS	df	MS	Number of obs	=	241
				F(6, 234)	=	2554.48
Model	5835.37031	6	972.561718	Prob > F	=	0.0000
Residual	89.0904372	234	.380728364	R-squared	=	0.9850
				Adj R-squared	=	0.9846
Total	5924.46075	240	24.6852531	Root MSE	=	.61703

RiRf	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
MktRF	.9959838	.0108509	91.79	0.000	.9746059	1.017362
SMB	-.1180827	.013983	-8.44	0.000	-.1456314	-.0905341
HML	-.32303	.0227234	-14.22	0.000	-.3677985	-.2782615
RMW	.2033657	.0178263	11.41	0.000	.1682452	.2384863
CMA	.0076027	.0313758	0.24	0.809	-.0542125	.0694179
MOM	.0081455	.0101187	0.80	0.422	-.0117899	.0280808
_cons	.0660239	.044131	1.50	0.136	-.020921	.1529687

Big size, low book to market third period (2002/09 – 2020/05)

```
. reg RiRf MktRF SMB HML RMW CMA MOM
```

Source	SS	df	MS	Number of obs	=	213
				F(6, 206)	=	3144.19
Model	3427.23221	6	571.205368	Prob > F	=	0.0000
Residual	37.424039	206	.181670092	R-squared	=	0.9892
				Adj R-squared	=	0.9889
Total	3464.65625	212	16.3427182	Root MSE	=	.42623

RiRf	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
MktRF	.992085	.0084332	117.64	0.000	.9754584	1.008711
SMB	-.114744	.0139887	-8.20	0.000	-.1423235	-.0871645
HML	-.2482431	.0136048	-18.25	0.000	-.2750656	-.2214205
RMW	.0610614	.0189416	3.22	0.001	.0237172	.0984056
CMA	-.0084306	.0227712	-0.37	0.712	-.0533251	.0364639
MOM	.008289	.0074681	1.11	0.268	-.0064346	.0230126
_cons	.0649846	.0305772	2.13	0.035	.0047003	.1252689

Big size, medium book to market first period (1963/07 – 1982/07)

```
. reg RiRf MktRF SMB HML RMW CMA MOM
```

Source	SS	df	MS	Number of obs	=	229
				F(6, 222)	=	465.71
Model	3652.22069	6	608.703448	Prob > F	=	0.0000
Residual	290.163005	222	1.30704056	R-squared	=	0.9264
				Adj R-squared	=	0.9244
Total	3942.3837	228	17.2911566	Root MSE	=	1.1433

RiRf	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
MktRF	.9789438	.0207603	47.15	0.000	.9380314	1.019856
SMB	-.1188587	.0277261	-4.29	0.000	-.1734988	-.0642186
HML	.1651474	.0479405	3.44	0.001	.0706707	.2596241
RMW	-.1947675	.0679841	-2.86	0.005	-.3287442	-.0607908
CMA	.1090195	.0646929	1.69	0.093	-.0184712	.2365102
MOM	.0423575	.0213235	1.99	0.048	.0003351	.0843799
_cons	-.0625493	.0837575	-0.75	0.456	-.2276109	.1025122

Big size, medium book to market second period (1982/08 – 2002/08)

```
. reg RiRf MktRF SMB HML RMW CMA MOM
```

Source	SS	df	MS	Number of obs	=	241
				F(6, 234)	=	465.79
Model	4212.65489	6	702.109148	Prob > F	=	0.0000
Residual	352.7222	234	1.50735983	R-squared	=	0.9227
				Adj R-squared	=	0.9208
Total	4565.37709	240	19.0224045	Root MSE	=	1.2277

RiRf	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
MktRF	1.05737	.0215907	48.97	0.000	1.014833	1.099907
SMB	-.0593675	.0278228	-2.13	0.034	-.1141826	-.0045523
HML	.3089465	.045214	6.83	0.000	.2198679	.3980251
RMW	.1971018	.03547	5.56	0.000	.1272204	.2669833
CMA	.2505079	.0624304	4.01	0.000	.1275104	.3735054
MOM	-.095085	.0201337	-4.72	0.000	-.1347516	-.0554185
_cons	-.2255362	.0878101	-2.57	0.011	-.3985357	-.0525368

Big size, medium book to market third period (2002/09 – 2020/05)

```
. reg RiRf MktRF SMB HML RMW CMA MOM
```

Source	SS	df	MS	Number of obs	=	214
				F(6, 207)	=	490.60
Model	3733.01941	6	622.169902	Prob > F	=	0.0000
Residual	262.514374	207	1.26818538	R-squared	=	0.9343
				Adj R-squared	=	0.9324
Total	3995.53379	213	18.7583746	Root MSE	=	1.1261

RiRf	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
MktRF	1.047128	.0212991	49.16	0.000	1.005137	1.089119
SMB	-.1385891	.0309233	-4.48	0.000	-.1995542	-.0776241
HML	.3094317	.0449397	6.89	0.000	.2208335	.3980299
RMW	.1389917	.0432116	3.22	0.002	.0538004	.224183
CMA	.1288408	.0643996	2.00	0.047	.0018776	.2558041
MOM	.0033717	.0172058	0.20	0.845	-.0305494	.0372928
_cons	-.3155622	.0837672	-3.77	0.000	-.4807085	-.1504159

Big size, high book to market first period (1963/07 – 1982/07)

```
. reg RiRf MktRF SMB HML RMW CMA MOM
```

Source	SS	df	MS	Number of obs	=	229
				F(6, 222)	=	967.08
Model	4773.86966	6	795.644944	Prob > F	=	0.0000
Residual	182.645512	222	.822727532	R-squared	=	0.9632
				Adj R-squared	=	0.9622
Total	4956.51518	228	21.7391016	Root MSE	=	.90704

RiRf	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
MktRF	1.034332	.0164709	62.80	0.000	1.001873	1.066791
SMB	.0663176	.0219975	3.01	0.003	.022967	.1096682
HML	.7984891	.0380352	20.99	0.000	.7235328	.8734454
RMW	.0158114	.0539375	0.29	0.770	-.0904836	.1221064
CMA	-.1588767	.0513263	-3.10	0.002	-.2600258	-.0577276
MOM	-.0030399	.0169177	-0.18	0.858	-.0363798	.0303
_cons	-.0080631	.0664519	-0.12	0.904	-.1390202	.1228941

Big size, high book to market second period (1982/08 – 2002/08)

```
. reg RiRf MktRF SMB HML RMW CMA MOM
```

Source	SS	df	MS	Number of obs	=	241
				F(6, 234)	=	637.50
Model	4508.54947	6	751.424912	Prob > F	=	0.0000
Residual	275.815397	234	1.17869828	R-squared	=	0.9424
				Adj R-squared	=	0.9409
Total	4784.36487	240	19.9348536	Root MSE	=	1.0857

RiRf	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
MktRF	1.059122	.0190923	55.47	0.000	1.021508	1.096737
SMB	-.0136235	.0246033	-0.55	0.580	-.0620958	.0348488
HML	.834735	.0399821	20.88	0.000	.755964	.913506
RMW	-.0329376	.0313657	-1.05	0.295	-.0947328	.0288576
CMA	-.1501065	.0552063	-2.72	0.007	-.2588715	-.0413416
MOM	-.0202302	.017804	-1.14	0.257	-.0553068	.0148464
_cons	-.172307	.0776493	-2.22	0.027	-.325288	-.019326

Big size, high book to market third period (2002/09 – 2020/05)

```
. reg RiRf MktRF SMB HML RMW CMA MOM
```

Source	SS	df	MS	Number of obs	=	213
				F(6, 206)	=	1388.49
Model	6879.14758	6	1146.5246	Prob > F	=	0.0000
Residual	170.100918	206	.82573261	R-squared	=	0.9759
				Adj R-squared	=	0.9752
Total	7049.2485	212	33.2511722	Root MSE	=	.9087

RiRf	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
MktRF	1.032695	.0179793	57.44	0.000	.9972484	1.068142
SMB	-.0243984	.0298234	-0.82	0.414	-.0831966	.0343998
HML	.840001	.0290049	28.96	0.000	.7828165	.8971854
RMW	-.2696764	.0403826	-6.68	0.000	-.3492926	-.1900603
CMA	-.3101817	.0485472	-6.39	0.000	-.4058947	-.2144686
MOM	-.0507728	.0159216	-3.19	0.002	-.0821629	-.0193827
_cons	.0488917	.0651891	0.75	0.454	-.0796317	.1774151

Six Size - Momentum portfolios

Small size, low momentum first period (1963/07 – 1982/07)

```
. reg RiRf MktRF SMB HML RMW CMA
```

Source	SS	df	MS	Number of obs	=	230
				F(5, 224)	=	558.27
Model	10102.1302	5	2020.42604	Prob > F	=	0.0000
Residual	810.679446	224	3.61910467	R-squared	=	0.9257
				Adj R-squared	=	0.9241
Total	10912.8096	229	47.6541906	Root MSE	=	1.9024

RiRf	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
MktRF	1.005893	.0337189	29.83	0.000	.9394458	1.072339
SMB	1.021483	.0449639	22.72	0.000	.9328763	1.110089
HML	.2259591	.0794293	2.84	0.005	.0694349	.3824833
RMW	-.2618215	.1122004	-2.33	0.021	-.4829249	-.0407181
CMA	-.2497836	.1074865	-2.32	0.021	-.4615977	-.0379695
_cons	-.6523778	.1338214	-4.87	0.000	-.9160878	-.3886678

Small size, low momentum second period (1982/08 – 2002/08)

```
. reg RiRf MktRF SMB HML RMW CMA
```

Source	SS	df	MS	Number of obs	=	240
				F(5, 234)	=	219.55
Model	8838.42618	5	1767.68524	Prob > F	=	0.0000
Residual	1883.99882	234	8.051277	R-squared	=	0.8243
				Adj R-squared	=	0.8205
Total	10722.425	239	44.8637029	Root MSE	=	2.8375

RiRf	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
MktRF	1.019842	.0505858	20.16	0.000	.9201805	1.119504
SMB	.8697338	.06467	13.45	0.000	.7423239	.9971437
HML	.5768457	.099106	5.82	0.000	.3815916	.7720998
RMW	-.1467006	.0823088	-1.78	0.076	-.3088616	.0154603
CMA	-.834345	.1363024	-6.12	0.000	-1.102882	-.5658084
_cons	-.6680695	.199903	-3.34	0.001	-1.061909	-.2742299

Small size, low momentum third period (2002/09 – 2020/05)

```
. reg RiRf MktRF SMB HML RMW CMA
```

Source	SS	df	MS	Number of obs	=	213
				F(5, 207)	=	285.47
Model	11778.2873	5	2355.65746	Prob > F	=	0.0000
Residual	1708.11249	207	8.25175115	R-squared	=	0.8733
				Adj R-squared	=	0.8703
Total	13486.3998	212	63.6150932	Root MSE	=	2.8726

RiRf	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
MktRF	1.300834	.0544579	23.89	0.000	1.193471	1.408197
SMB	.8999337	.0938439	9.59	0.000	.7149213	1.084946
HML	.2635261	.0880741	2.99	0.003	.0898889	.4371632
RMW	-.408347	.125642	-3.25	0.001	-.6560491	-.160645
CMA	.0795116	.1533276	0.52	0.605	-.2227723	.3817955
_cons	-.0125195	.2060345	-0.06	0.952	-.4187144	.3936755

Small size, neutral momentum first period (1963/07 – 1982/07)

```
. reg RiRf MktRF SMB HML RMW CMA
```

Source	SS	df	MS	Number of obs	=	229
				F(5, 223)	=	2626.01
Model	7072.21466	5	1414.44293	Prob > F	=	0.0000
Residual	120.113867	223	.538627206	R-squared	=	0.9833
				Adj R-squared	=	0.9829
Total	7192.32852	228	31.5453005	Root MSE	=	.73391

RiRf	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
MktRF	.9394043	.0133266	70.49	0.000	.9131421	.9656666
SMB	.7807982	.0177391	44.02	0.000	.7458404	.8157559
HML	.1846814	.0306744	6.02	0.000	.1242326	.2451302
RMW	-.0155167	.0434844	-0.36	0.722	-.1012097	.0701763
CMA	.0602707	.0415154	1.45	0.148	-.021542	.1420835
_cons	-.0392187	.0518554	-0.76	0.450	-.141408	.0629707

Small size, neutral momentum second period (1982/08 – 2002/08)

```
. reg RiRf MktRF SMB HML RMW CMA
```

Source	SS	df	MS	Number of obs	=	241
				F(5, 235)	=	868.52
Model	4913.76236	5	982.752472	Prob > F	=	0.0000
Residual	265.907649	235	1.13152191	R-squared	=	0.9487
				Adj R-squared	=	0.9476
Total	5179.67001	240	21.5819584	Root MSE	=	1.0637

RiRf	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
MktRF	.948543	.0186902	50.75	0.000	.9117212	.9853649
SMB	.7518409	.0240948	31.20	0.000	.7043716	.7993103
HML	.3148626	.0371267	8.48	0.000	.2417189	.3880063
RMW	.2773499	.0307193	9.03	0.000	.2168294	.3378703
CMA	-.0393655	.051032	-0.77	0.441	-.1399041	.0611732
_cons	-.114133	.0749139	-1.52	0.129	-.2617217	.0334557

Small size, neutral momentum third period (2002/09 – 2020/05)

```
. reg RiRf MktRF SMB HML RMW CMA
```

Source	SS	df	MS	Number of obs	=	213
				F(5, 207)	=	1833.80
Model	6498.75315	5	1299.75063	Prob > F	=	0.0000
Residual	146.71667	207	.708776182	R-squared	=	0.9779
				Adj R-squared	=	0.9774
Total	6645.46982	212	31.3465558	Root MSE	=	.84189

RiRf	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
MktRF	.9690886	.0159603	60.72	0.000	.937623	1.000554
SMB	.831131	.0275035	30.22	0.000	.7769081	.8853539
HML	.2386921	.0258125	9.25	0.000	.1878031	.2895812
RMW	.0592706	.0368228	1.61	0.109	-.0133251	.1318663
CMA	-.1404067	.0449368	-3.12	0.002	-.2289991	-.0518143
_cons	.08882	.0603839	1.47	0.143	-.0302263	.2078664

Small size, high momentum first period (1963/07 – 1982/07)

```
. reg RiRf MktRF SMB HML RMW CMA
```

Source	SS	df	MS	Number of obs	=	229
				F(5, 223)	=	703.32
Model	8941.31036	5	1788.26207	Prob > F	=	0.0000
Residual	566.997218	223	2.54258842	R-squared	=	0.9404
				Adj R-squared	=	0.9390
Total	9508.30757	228	41.7031034	Root MSE	=	1.5945

RiRf	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
MktRF	1.048969	.0289544	36.23	0.000	.9919093	1.106028
SMB	.8454269	.0385413	21.94	0.000	.7694752	.9213786
HML	-.0505158	.0666454	-0.76	0.449	-.1818511	.0808196
RMW	-.004695	.0944774	-0.05	0.960	-.1908777	.1814876
CMA	.0443889	.0901993	0.49	0.623	-.1333632	.2221411
_cons	.5515789	.1126648	4.90	0.000	.3295551	.7736027

Small size, high momentum second period (1982/08 – 2002/08)

```
. reg RiRf MktRF SMB HML RMW CMA
```

Source	SS	df	MS	Number of obs	=	241
				F(5, 235)	=	816.49
Model	8977.10673	5	1795.42135	Prob > F	=	0.0000
Residual	516.752833	235	2.19894823	R-squared	=	0.9456
				Adj R-squared	=	0.9444
Total	9493.85957	240	39.5577482	Root MSE	=	1.4829

RiRf	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
MktRF	1.058682	.026055	40.63	0.000	1.00735	1.110013
SMB	.9521005	.0335891	28.35	0.000	.8859263	1.018275
HML	-.1304583	.0517562	-2.52	0.012	-.2324236	-.0284929
RMW	-.0315228	.042824	-0.74	0.462	-.1158909	.0528452
CMA	.1724373	.0711408	2.42	0.016	.0322821	.3125925
_cons	.6018016	.1044332	5.76	0.000	.3960567	.8075466

Small size, high momentum third period (2002/09 – 2020/05)

```
. reg RiRf MktRF SMB HML RMW CMA
```

Source	SS	df	MS	Number of obs	=	213
				F(5, 207)	=	648.27
Model	6598.13339	5	1319.62668	Prob > F	=	0.0000
Residual	421.374434	207	2.03562528	R-squared	=	0.9400
				Adj R-squared	=	0.9385
Total	7019.50783	212	33.110886	Root MSE	=	1.4268

RiRf	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
MktRF	.9830996	.0270481	36.35	0.000	.9297746	1.036425
SMB	.9768407	.0466103	20.96	0.000	.8849489	1.068732
HML	-.0921348	.0437445	-2.11	0.036	-.1783767	-.0058928
RMW	.0168458	.0624038	0.27	0.787	-.1061826	.1398742
CMA	-.1617052	.0761546	-2.12	0.035	-.3118432	-.0115671
_cons	.0252997	.102333	0.25	0.805	-.1764489	.2270482

Big size, low momentum first period (1963/07 – 1982/07)

```
reg RiRf MktRF SMB HML RMW CMA
```

Source	SS	df	MS	Number of obs	=	229
				F(5, 223)	=	167.95
Model	5320.18147	5	1064.03629	Prob > F	=	0.0000
Residual	1412.78869	223	6.3353753	R-squared	=	0.7902
				Adj R-squared	=	0.7855
Total	6732.97016	228	29.5305709	Root MSE	=	2.517

RiRf	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
MktRF	1.088102	.0457049	23.81	0.000	.9980334	1.178171
SMB	.0501107	.0608379	0.82	0.411	-.0697801	.1700014
HML	-.0311762	.1052006	-0.30	0.767	-.2384907	.1761383
RMW	-.2282151	.1491337	-1.53	0.127	-.5221069	.0656766
CMA	.0585102	.1423808	0.41	0.682	-.2220738	.3390942
_cons	-.3714347	.1778428	-2.09	0.038	-.7219022	-.0209673

Big size, low momentum second period (1982/08 – 2002/08)

```
reg RiRf MktRF SMB HML RMW CMA
```

Source	SS	df	MS	Number of obs	=	241
				F(5, 235)	=	108.95
Model	5463.86281	5	1092.77256	Prob > F	=	0.0000
Residual	2357.08987	235	10.0301697	R-squared	=	0.6986
				Adj R-squared	=	0.6922
Total	7820.95269	240	32.5873029	Root MSE	=	3.167

RiRf	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
MktRF	.9845398	.0556465	17.69	0.000	.8749101	1.09417
SMB	-.0331392	.0717373	-0.46	0.645	-.1744697	.1081913
HML	.4837391	.1105373	4.38	0.000	.2659684	.7015097
RMW	.0776343	.0914606	0.85	0.397	-.1025532	.2578219
CMA	-.7008541	.1519376	-4.61	0.000	-1.000188	-.4015202
_cons	-.1150043	.2230413	-0.52	0.607	-.5544202	.3244117

Big size, low momentum third period (2002/09 – 2020/05)

```
reg RiRf MktRF SMB HML RMW CMA
```

Source	SS	df	MS	Number of obs	=	213
				F(5, 207)	=	185.58
Model	7596.27194	5	1519.25439	Prob > F	=	0.0000
Residual	1694.56704	207	8.18631423	R-squared	=	0.8176
				Adj R-squared	=	0.8132
Total	9290.83898	212	43.8247122	Root MSE	=	2.8612

RiRf	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
MktRF	1.265713	.0542415	23.33	0.000	1.158776	1.372649
SMB	-.1335619	.0934711	-1.43	0.155	-.3178393	.0507155
HML	.4753537	.0877241	5.42	0.000	.3024064	.648301
RMW	-.3021363	.1251429	-2.41	0.017	-.5488543	-.0554184
CMA	-.1652349	.1527184	-1.08	0.281	-.4663178	.135848
_cons	-.127195	.2052159	-0.62	0.536	-.5317762	.2773862

Big size, neutral momentum first period (1963/07 – 1982/07)

```
reg RiRf MktRF SMB HML RMW CMA
```

Source	SS	df	MS	Number of obs	=	229
				F(5, 223)	=	943.96
Model	3971.68499	5	794.336997	Prob > F	=	0.0000
Residual	187.65387	223	.841497173	R-squared	=	0.9549
				Adj R-squared	=	0.9539
Total	4159.33886	228	18.2427143	Root MSE	=	.91733

RiRf	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
MktRF	.9840785	.0166572	59.08	0.000	.9512528	1.016904
SMB	-.0865851	.0221725	-3.91	0.000	-.1302795	-.0428907
HML	.03096	.0383406	0.81	0.420	-.0445962	.1065161
RMW	.0304104	.0543521	0.56	0.576	-.076699	.1375198
CMA	.051746	.051891	1.00	0.320	-.0505134	.1540053
_cons	-.136107	.0648151	-2.10	0.037	-.2638356	-.0083785

Big size, neutral momentum second period (1982/08 – 2002/08)

```
. reg RiRf MktRF SMB HML RMW CMA
```

Source	SS	df	MS	Number of obs	=	241
				F(5, 235)	=	555.71
Model	4108.22449	5	821.644898	Prob > F	=	0.0000
Residual	347.459973	235	1.47855308	R-squared	=	0.9220
				Adj R-squared	=	0.9204
Total	4455.68446	240	18.5653519	Root MSE	=	1.216

RiRf	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
MktRF	.9890709	.021365	46.29	0.000	.9469796	1.031162
SMB	-.130006	.0275429	-4.72	0.000	-.1842685	-.0757434
HML	.1546567	.0424398	3.64	0.000	.0710456	.2382678
RMW	.2435768	.0351155	6.94	0.000	.1743955	.3127582
CMA	.065456	.0583351	1.12	0.263	-.0494704	.1803825
_cons	-.3003755	.0856347	-3.51	0.001	-.4690852	-.1316658

Big size, neutral momentum third period (2002/09 – 2020/05)

```
. reg RiRf MktRF SMB HML RMW CMA
```

Source	SS	df	MS	Number of obs	=	213
				F(5, 207)	=	1167.28
Model	3606.85844	5	721.371688	Prob > F	=	0.0000
Residual	127.925044	207	.61799538	R-squared	=	0.9657
				Adj R-squared	=	0.9649
Total	3734.78348	212	17.6169032	Root MSE	=	.78613

RiRf	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
MktRF	.9737326	.0149032	65.34	0.000	.944351	1.003114
SMB	-.0754496	.0256818	-2.94	0.004	-.126081	-.0248181
HML	.101985	.0241028	4.23	0.000	.0544665	.1495034
RMW	.1230203	.0343838	3.58	0.000	.0552329	.1908078
CMA	.0238284	.0419604	0.57	0.571	-.0588962	.106553
_cons	.0637933	.0563845	1.13	0.259	-.0473681	.1749547

Big size, high momentum first period (1963/07 – 1982/07)

```
. reg RiRf MktRF SMB HML RMW CMA
```

Source	SS	df	MS	Number of obs	=	229
				F(5, 223)	=	252.26
Model	5094.63488	5	1018.92698	Prob > F	=	0.0000
Residual	900.748519	223	4.03923103	R-squared	=	0.8498
				Adj R-squared	=	0.8464
Total	5995.3834	228	26.2955412	Root MSE	=	2.0098

RiRf	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
MktRF	1.020926	.0364944	27.97	0.000	.9490083	1.092844
SMB	.0259421	.0485777	0.53	0.594	-.069788	.1216723
HML	-.1231491	.0840004	-1.47	0.144	-.2886853	.0423871
RMW	.0702342	.1190801	0.59	0.556	-.164432	.3049004
CMA	-.0711065	.113688	-0.63	0.532	-.2951467	.1529338
_cons	.4856102	.1420036	3.42	0.001	.2057695	.7654509

Big size, high momentum second period (1982/08 – 2002/08)

```
. reg RiRf MktRF SMB HML RMW CMA
```

Source	SS	df	MS	Number of obs	=	241
				F(5, 235)	=	377.40
Model	5136.26612	5	1027.25322	Prob > F	=	0.0000
Residual	639.658981	235	2.72195311	R-squared	=	0.8893
				Adj R-squared	=	0.8869
Total	5775.9251	240	24.0663546	Root MSE	=	1.6498

RiRf	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
MktRF	1.039031	.0289884	35.84	0.000	.9819212	1.096142
SMB	-.0349941	.0373707	-0.94	0.350	-.1086186	.0386303
HML	-.2390617	.0575831	-4.15	0.000	-.3525068	-.1256167
RMW	.0580747	.0476453	1.22	0.224	-.0357918	.1519413
CMA	.3508624	.0791501	4.43	0.000	.194928	.5067968
_cons	.1382076	.1161907	1.19	0.235	-.090701	.3671161

Big size, high momentum third period (2002/09 – 2020/05)

```
. reg RiRf MktRF SMB HML RMW CMA
```

Source	SS	df	MS	Number of obs	=	213
				F(5, 207)	=	245.42
Model	3403.81011	5	680.762023	Prob > F	=	0.0000
Residual	574.200769	207	2.77391676	R-squared	=	0.8557
				Adj R-squared	=	0.8522
Total	3978.01088	212	18.7642023	Root MSE	=	1.6655

RiRf	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
MktRF	.936546	.0315743	29.66	0.000	.8742975	.9987946
SMB	.1483521	.0544101	2.73	0.007	.041083	.2556212
HML	-.1819143	.0510648	-3.56	0.000	-.2825881	-.0812406
RMW	.1701894	.0728465	2.34	0.020	.0265733	.3138055
CMA	-.1846424	.0888984	-2.08	0.039	-.3599047	-.00938
_cons	.0012349	.1194575	0.01	0.992	-.2342744	.2367443

Six Size - Momentum portfolios with the inclusion of the Momentum factor:

Small size, low momentum first period (1963/07 – 1982/07)

```
. reg RiRf MktRF SMB HML RMW CMA MOM
```

Source	SS	df	MS	Number of obs	=	229
				F(6, 222)	=	2496.03
Model	10670.3957	6	1778.39928	Prob > F	=	0.0000
Residual	158.173161	222	.712491718	R-squared	=	0.9854
				Adj R-squared	=	0.9850
Total	10828.5688	228	47.493723	Root MSE	=	.84409

RiRf	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
MktRF	.9929064	.0153277	64.78	0.000	.9626999	1.023113
SMB	.983344	.0204708	48.04	0.000	.9430021	1.023686
HML	.1350649	.0353955	3.82	0.000	.0653107	.204819
RMW	-.11959	.0501941	-2.38	0.018	-.2185079	-.0206722
CMA	-.2057385	.0477641	-4.31	0.000	-.2998676	-.1116094
MOM	-.4742781	.0157436	-30.13	0.000	-.5053041	-.443252
_cons	-.176064	.0618399	-2.85	0.005	-.2979324	-.0541955

Small size, low momentum second period (1982/08 – 2002/08)

```
. reg RiRf MktRF SMB HML RMW CMA MOM
```

Source	SS	df	MS	Number of obs	=	240
				F(6, 233)	=	184.42
Model	8857.30957	6	1476.21826	Prob > F	=	0.0000
Residual	1865.11543	233	8.00478723	R-squared	=	0.8261
				Adj R-squared	=	0.8216
Total	10722.425	239	44.8637029	Root MSE	=	2.8293

RiRf	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
MktRF	1.027034	.0506564	20.27	0.000	.9272308	1.126837
SMB	.8960885	.066727	13.43	0.000	.764623	1.027554
HML	.5885003	.0991104	5.94	0.000	.3932333	.7837674
RMW	-.1309427	.0827096	-1.58	0.115	-.2938969	.0320116
CMA	-.8206079	.1362023	-6.02	0.000	-1.088953	-.5522625
MOM	.0695071	.0452548	1.54	0.126	-.0196537	.1586679
_cons	-.7586329	.2078635	-3.65	0.000	-1.168165	-.3491008

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Small size, low momentum third period (2002/09 – 2020/05)

```
. reg RiRf MktRF SMB HML RMW CMA MOM
```

Source	SS	df	MS	Number of obs	=	213
				F(6, 206)	=	2174.61
Model	13276.782	6	2212.797	Prob > F	=	0.0000
Residual	209.617779	206	1.01756204	R-squared	=	0.9845
				Adj R-squared	=	0.9840
Total	13486.3998	212	63.6150932	Root MSE	=	1.0087

RiRf	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
MktRF	1.081586	.0199587	54.19	0.000	1.042237	1.120936
SMB	1.021702	.0331068	30.86	0.000	.9564298	1.086973
HML	-.0800658	.0321982	-2.49	0.014	-.143546	-.0165856
RMW	-.1038418	.0448286	-2.32	0.022	-.1922234	-.0154602
CMA	-.0088894	.0538921	-0.16	0.869	-.1151401	.0973613
MOM	-.6782556	.0176745	-38.37	0.000	-.7131016	-.6434096
_cons	.0435521	.0723662	0.60	0.548	-.0991213	.1862254

Small size, neutral momentum first period (1963/07 – 1982/07)

```
. reg RiRf MktRF SMB HML RMW CMA MOM
```

Source	SS	df	MS	Number of obs	=	229
				F(6, 222)	=	2701.27
Model	7095.14439	6	1182.52407	Prob > F	=	0.0000
Residual	97.1841314	222	.437766357	R-squared	=	0.9865
				Adj R-squared	=	0.9861
Total	7192.32852	228	31.5453005	Root MSE	=	.66164

RiRf	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
MktRF	.9387643	.0120146	78.14	0.000	.9150871	.9624416
SMB	.7713017	.016046	48.07	0.000	.7396798	.8029236
HML	.168437	.0277446	6.07	0.000	.1137604	.2231136
RMW	.0086742	.0393445	0.22	0.826	-.0688623	.0862107
CMA	.067309	.0374398	1.80	0.074	-.0064738	.1410919
MOM	-.0893128	.0123406	-7.24	0.000	-.1136325	-.0649932
_cons	.0535147	.048473	1.10	0.271	-.0420115	.1490409

Small size, neutral momentum second period (1982/08 – 2002/08)

```
. reg RiRf MktRF SMB HML RMW CMA MOM
```

Source	SS	df	MS	Number of obs	=	241
				F(6, 234)	=	933.02
Model	4971.84892	6	828.641487	Prob > F	=	0.0000
Residual	207.821089	234	.888124311	R-squared	=	0.9599
				Adj R-squared	=	0.9588
Total	5179.67001	240	21.5819584	Root MSE	=	.9424

RiRf	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
MktRF	.9541016	.0165727	57.57	0.000	.9214508	.9867524
SMB	.7570933	.0213564	35.45	0.000	.7150178	.7991688
HML	.2253166	.0347058	6.49	0.000	.1569409	.2936923
RMW	.2835672	.0272264	10.42	0.000	.229927	.3372074
CMA	.089101	.0479208	1.86	0.064	-.0053104	.1835125
MOM	-.1249839	.0154544	-8.09	0.000	-.1554315	-.0945363
_cons	-.0190831	.067402	-0.28	0.777	-.1518755	.1137092

Small size, neutral momentum third period (2002/09 – 2020/05)

```
. reg RiRf MktRF SMB HML RMW CMA MOM
```

Source	SS	df	MS	Number of obs	=	213
				F(6, 206)	=	1771.39
Model	6519.11516	6	1086.51919	Prob > F	=	0.0000
Residual	126.354663	206	.613372149	R-squared	=	0.9810
				Adj R-squared	=	0.9804
Total	6645.46982	212	31.3465558	Root MSE	=	.78318

RiRf	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
MktRF	.9435312	.0154958	60.89	0.000	.9129804	.9740819
SMB	.8453253	.0257039	32.89	0.000	.7946489	.8960018
HML	.19864	.0249984	7.95	0.000	.1493544	.2479256
RMW	.0947665	.0348046	2.72	0.007	.0261476	.1633853
CMA	-.1507115	.0418414	-3.60	0.000	-.2332038	-.0682192
MOM	-.0790635	.0137223	-5.76	0.000	-.1061177	-.0520093
_cons	.0953562	.0561846	1.70	0.091	-.0154143	.2061268

Small size, high momentum first period (1963/07 – 1982/07)

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reg RiRf MktRF SMB HML RMW CMA MOM
```

Source	SS	df	MS	Number of obs	=	229
				F(6, 222)	=	2611.42
Model	9375.47108	6	1562.57851	Prob > F	=	0.0000
Residual	132.836493	222	.59836258	R-squared	=	0.9860
				Adj R-squared	=	0.9857
Total	9508.30757	228	41.7031034	Root MSE	=	.77354

RiRf	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
MktRF	1.051753	.0140466	74.88	0.000	1.024072	1.079435
SMB	.8867494	.0187598	47.27	0.000	.8497794	.9237194
HML	.0201698	.032437	0.62	0.535	-.043754	.0840935
RMW	-.1099587	.0459986	-2.39	0.018	-.2006085	-.0193089
CMA	.0137626	.0437718	0.31	0.753	-.0724988	.1000239
MOM	.388633	.0144277	26.94	0.000	.3602002	.4170657
_cons	.1480619	.0566711	2.61	0.010	.0363798	.259744

Small size, high momentum second period (1982/08 – 2002/08)

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. reg RiRf MktRF SMB HML RMW CMA MOM
```

Source	SS	df	MS	Number of obs	=	241
				F(6, 234)	=	1564.76
Model	9262.98986	6	1543.83164	Prob > F	=	0.0000
Residual	230.869708	234	.986622683	R-squared	=	0.9757
				Adj R-squared	=	0.9751
Total	9493.85957	240	39.5577482	Root MSE	=	.99329

RiRf	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
MktRF	1.04635	.0174676	59.90	0.000	1.011936	1.080764
SMB	.9404482	.0225096	41.78	0.000	.8961009	.9847956
HML	.0681982	.0365797	1.86	0.064	-.0038694	.1402659
RMW	-.0453158	.0286965	-1.58	0.116	-.1018523	.0112207
CMA	-.1125637	.0505083	-2.23	0.027	-.2120729	-.0130545
MOM	.2772748	.0162889	17.02	0.000	.2451831	.3093664
_cons	.3909349	.0710414	5.50	0.000	.2509724	.5308974

Small size, high momentum third period (2002/09 – 2020/05)

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reg RiRf MktRF SMB HML RMW CMA MOM
```

Source	SS	df	MS	Number of obs	=	213
				F(6, 206)	=	1980.81
Model	6899.91178	6	1149.9853	Prob > F	=	0.0000
Residual	119.596051	206	.580563353	R-squared	=	0.9830
				Adj R-squared	=	0.9825
Total	7019.50783	212	33.110886	Root MSE	=	.76195

RiRf	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
MktRF	1.08149	.0150757	71.74	0.000	1.051767	1.111212
SMB	.9221959	.025007	36.88	0.000	.8728934	.9714984
HML	.0620563	.0243207	2.55	0.011	.014107	.1100057
RMW	-.1198047	.033861	-3.54	0.000	-.1865631	-.0530462
CMA	-.1220341	.040707	-3.00	0.003	-.2022899	-.0417784
MOM	.3043756	.0133503	22.80	0.000	.2780549	.3306963
_cons	.0001369	.0546613	0.00	0.998	-.1076305	.1079042

Big size, low momentum first period (1963/07 – 1982/07)

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. reg RiRf MktRF SMB HML RMW CMA MOM
```

Source	SS	df	MS	Number of obs	=	229
				F(6, 222)	=	1024.97
Model	6498.38841	6	1083.06473	Prob > F	=	0.0000
Residual	234.581759	222	1.05667459	R-squared	=	0.9652
				Adj R-squared	=	0.9642
Total	6732.97016	228	29.5305709	Root MSE	=	1.0279

RiRf	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
MktRF	1.083514	.0186663	58.05	0.000	1.046729	1.1203
SMB	-.017962	.0249296	-0.72	0.472	-.067091	.031167
HML	-.1476199	.0431051	-3.42	0.001	-.2325674	-.0626724
RMW	-.0548092	.061127	-0.90	0.371	-.1752727	.0656543
CMA	.1089625	.0581678	1.87	0.062	-.0056692	.2235942
MOM	-.640214	.0191728	-33.39	0.000	-.677998	-.6024301
_cons	.2932985	.0753095	3.89	0.000	.1448855	.4417115

Big size, low momentum second period (1982/08 – 2002/08)

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. reg RiRf MktRF SMB HML RMW CMA MOM
```

Source	SS	df	MS	Number of obs	=	241
				F(6, 234)	=	750.75
Model	7434.73347	6	1239.12224	Prob > F	=	0.0000
Residual	386.219221	234	1.65050949	R-squared	=	0.9506
				Adj R-squared	=	0.9494
Total	7820.95269	240	32.5873029	Root MSE	=	1.2847

RiRf	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
MktRF	1.016918	.0225926	45.01	0.000	.9724073	1.061429
SMB	-.0025445	.0291139	-0.09	0.930	-.0599034	.0548145
HML	-.0378609	.0473123	-0.80	0.424	-.1310734	.0553515
RMW	.1138497	.0371161	3.07	0.002	.0407253	.1869741
CMA	.0474552	.0653276	0.73	0.468	-.0812502	.1761606
MOM	-.7280231	.0210681	-34.56	0.000	-.7695305	-.6865157
_cons	.4386553	.0918851	4.77	0.000	.2576276	.6196831

Big size, low momentum third period (2002/09 – 2020/05)

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reg RiRf MktRF SMB HML RMW CMA MOM
```

Source	SS	df	MS	Number of obs	=	213
				F(6, 206)	=	1199.51
Model	9032.30891	6	1505.38482	Prob > F	=	0.0000
Residual	258.530072	206	1.25500035	R-squared	=	0.9722
				Adj R-squared	=	0.9714
Total	9290.83898	212	43.8247122	Root MSE	=	1.1203

RiRf	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
MktRF	1.051083	.0221653	47.42	0.000	1.007383	1.094783
SMB	-.0143588	.0367671	-0.39	0.697	-.0868468	.0581292
HML	.1389985	.035758	3.89	0.000	.0685	.209497
RMW	-.0040446	.0497847	-0.08	0.935	-.1021975	.0941084
CMA	-.251774	.0598503	-4.21	0.000	-.3697716	-.1337763
MOM	-.6639702	.0196285	-33.83	0.000	-.7026688	-.6252716
_cons	-.0723044	.0803669	-0.90	0.369	-.2307516	.0861427

Big size, neutral momentum first period (1963/07 – 1982/07)

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. reg RiRf MktRF SMB HML RMW CMA
```

Source	SS	df	MS	Number of obs	=	229
				F(5, 223)	=	943.96
Model	3971.68499	5	794.336997	Prob > F	=	0.0000
Residual	187.65387	223	.841497173	R-squared	=	0.9549
				Adj R-squared	=	0.9539
Total	4159.33886	228	18.2427143	Root MSE	=	.91733

RiRf	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
MktRF	.9840785	.0166572	59.08	0.000	.9512528	1.016904
SMB	-.0865851	.0221725	-3.91	0.000	-.1302795	-.0428907
HML	.03096	.0383406	0.81	0.420	-.0445962	.1065161
RMW	.0304104	.0543521	0.56	0.576	-.076699	.1375198
CMA	.051746	.051891	1.00	0.320	-.0505134	.1540053
_cons	-.136107	.0648151	-2.10	0.037	-.2638356	-.0083785

Big size, neutral momentum second period (1982/08 – 2002/08)

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. reg RiRf MktRF SMB HML RMW CMA MOM
```

Source	SS	df	MS	Number of obs	=	241
				F(6, 234)	=	593.45
Model	4180.92699	6	696.821166	Prob > F	=	0.0000
Residual	274.757468	234	1.17417721	R-squared	=	0.9383
				Adj R-squared	=	0.9368
Total	4455.68446	240	18.5653519	Root MSE	=	1.0836

RiRf	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
MktRF	.9952896	.0190557	52.23	0.000	.9577471	1.032832
SMB	-.1241298	.0245561	-5.05	0.000	-.1725091	-.0757506
HML	.0544762	.0399054	1.37	0.174	-.0241436	.133096
RMW	.2505325	.0313055	8.00	0.000	.1888559	.3122091
CMA	.2091792	.0551004	3.80	0.000	.100623	.3177354
MOM	-.1398269	.0177698	-7.87	0.000	-.1748362	-.1048177
_cons	-.1940375	.0775002	-2.50	0.013	-.3467248	-.0413501

Big size, neutral momentum third period (2002/09 – 2020/05)

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. reg RiRf MktRF SMB HML RMW CMA MOM
```

Source	SS	df	MS	Number of obs	=	213
				F(6, 206)	=	1125.77
Model	3624.25186	6	604.041976	Prob > F	=	0.0000
Residual	110.531625	206	.536561288	R-squared	=	0.9704
				Adj R-squared	=	0.9695
Total	3734.78348	212	17.6169032	Root MSE	=	.7325

RiRf	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
MktRF	.9501115	.0144931	65.56	0.000	.9215376	.9786854
SMB	-.0623307	.0240407	-2.59	0.010	-.109728	-.0149333
HML	.0649674	.0233809	2.78	0.006	.0188709	.1110639
RMW	.1558268	.0325525	4.79	0.000	.0916481	.2200055
CMA	.0143043	.039134	0.37	0.715	-.0628501	.0914588
MOM	-.0730732	.0128344	-5.69	0.000	-.0983768	-.0477696
_cons	.0698343	.0525491	1.33	0.185	-.0337687	.1734372

Big size, high momentum first period (1963/07 – 1982/07)

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. reg RiRf MktRF SMB HML RMW CMA MOM
```

Source	SS	df	MS	Number of obs	=	229
				F(6, 222)	=	1123.02
Model	5804.15523	6	967.359205	Prob > F	=	0.0000
Residual	191.228169	222	.861388148	R-squared	=	0.9681
				Adj R-squared	=	0.9672
Total	5995.3834	228	26.2955412	Root MSE	=	.92811

RiRf	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
MktRF	1.024486	.0168534	60.79	0.000	.9912733	1.0577
SMB	.0787677	.0225084	3.50	0.001	.0344103	.1231252
HML	-.0327867	.0389186	-0.84	0.400	-.109484	.0439105
RMW	-.0643319	.0551902	-1.17	0.245	-.1730956	.0444319
CMA	-.1102583	.0525184	-2.10	0.037	-.2137567	-.00676
MOM	.4968174	.0173107	28.70	0.000	.4627032	.5309317
_cons	-.0302345	.0679953	-0.44	0.657	-.1642333	.1037642

Big size, high momentum second period (1982/08 – 2002/08)

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reg RiRf MktRF SMB HML RMW CMA
```

Source	SS	df	MS	Number of obs	=	241
				F(5, 235)	=	377.40
Model	5136.26612	5	1027.25322	Prob > F	=	0.0000
Residual	639.658981	235	2.72195311	R-squared	=	0.8893
				Adj R-squared	=	0.8869
Total	5775.9251	240	24.0663546	Root MSE	=	1.6498

RiRf	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
MktRF	1.039031	.0289884	35.84	0.000	.9819212	1.096142
SMB	-.0349941	.0373707	-0.94	0.350	-.1086186	.0386303
HML	-.2390617	.0575831	-4.15	0.000	-.3525068	-.1256167
RMW	.0580747	.0476453	1.22	0.224	-.0357918	.1519413
CMA	.3508624	.0791501	4.43	0.000	.194928	.5067968
_cons	.1382076	.1161907	1.19	0.235	-.090701	.3671161

Big size, high momentum third period (2002/09 – 2020/05)

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. reg RiRf MktRF SMB HML RMW CMA MOM
```

Source	SS	df	MS	Number of obs	=	213
				F(6, 206)	=	783.26
Model	3810.96251	6	635.160418	Prob > F	=	0.0000
Residual	167.048375	206	.810914444	R-squared	=	0.9580
				Adj R-squared	=	0.9568
Total	3978.01088	212	18.7642023	Root MSE	=	.90051

RiRf	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
MktRF	1.05083	.0178172	58.98	0.000	1.015703	1.085958
SMB	.0848799	.0295546	2.87	0.005	.0266117	.1431481
HML	-.0028151	.0287434	-0.10	0.922	-.0594841	.0538539
RMW	.0114643	.0400186	0.29	0.775	-.0674343	.0903628
CMA	-.1385628	.0481096	-2.88	0.004	-.2334132	-.0437125
MOM	.3535447	.015778	22.41	0.000	.3224375	.3846518
_cons	-.0279927	.0646015	-0.43	0.665	-.1553576	.0993723