Factor Performance 2010-2019: A Lost Decade?

David Blitz

Head of Quantitative Research at Robeco in the Netherlands

d.c.blitz@robeco.com

Abstract

The factors in the widely used Fama-French model experienced a negative average return over the 2010-2019 period. Perhaps surprisingly, such a lost decade is not unprecedented in history, as factor performance in the 2010s is, in fact, remarkably similar to factor performance in the 1990s. By contrast, many other factors did deliver a positive premium over the past decade. These factors include low risk, price momentum, earnings momentum, analyst revisions, seasonals, and short-term reversal. Thus, there appears to be a clear dichotomy in recent factor performance: while generally accepted factors struggled, various factors that are considered to be inferior or redundant remained effective.

Keywords: factor investing, factor premiums, smart beta, value, momentum, quality, low risk, low volatility, asset pricing, market efficiency, Fama-French model

JEL Classification: G11, G12, G14

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1. Introduction

This paper reviews the performance of academic factor portfolios. We find that the factors in the widely used 5-factor model of Fama and French (2015) failed to deliver over the most recent 2010-2019 decade, with an average return below zero. As it turns out, this is not unprecedented in history, but in fact remarkably similar to the performance of these factors over the 1990-1999 decade. Extending the analysis we find that many factors which are not endorsed by Fama-French did deliver a positive premium over the 2010-2019 decade. These factors include low-risk, price momentum, earnings momentum, analyst revisions, seasonals, and short-term reversal. In sum, there appears to be a clear dichotomy in recent factor performance: while generally accepted factors experienced a lost decade, various factors that are considered to be inferior or redundant remained effective.

2. Performance of the Fama-French factors

The asset pricing literature is heavily influenced by the work of professors Eugene Fama and Kenneth French. In Fama and French (1993) they proposed a 3-factor model, which extends the classic Capital Asset Pricing Model with size (SMB), and value (HML) factors. Fama and French (2015) augment their widely used 3-factor model with profitability (RMW) and investment (CMA) factors, resulting in a 5-factor model which has since become the new academic standard. Return series for these factors are publicly available in the Kenneth French data library.[1]

Figure 1 compares the performance of the Fama-French factors pre- versus post-2010. Over the most recent 2010-2019 decade, the return on each of the Fama-French factors fell well short of its long-term average. The size and value factors even experienced a negative decade, with the return of the value factor being particularly poor. Arnott, Harvey, Kalesnik, and Linnainmaa (2020) and Fama and French (2020) address the mounting concern that the value premium might have disappeared permanently. They conclude that although the recent performance of the value factor is bad indeed, it is still well within the range of variation that can be expected statistically.

INSERT FIGURE 1 HERE

It is not just the size and value factors which have had a hard time though. Over the past decade, the premium on the investment factor also failed to materialize, with a return close to zero. Only the profitability factor generated a positive return, but the magnitude of this premium is only about half its pre-2010 level. This weak performance of the two newly added factors is particularly striking, since they were introduced in the Fama and French (2015) study that uses data until the end of 2013. In other words, the most recent decade is effectively still partially (40%) an in-sample period for these two new factors. Despite this head start, the two new factors did not have a strong decade. This complements evidence from Linnainmaa and Roberts (2018) and Wahal (2019), who find poor out-of-sample performance for the profitability and investment factors over the pre-1963 period that precedes the sample of Fama and French (2015).

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[1] http://mba.tuck.dartmouth.edu/pages/faculty/ken.french/data_library.html.

Combined, the four Fama-French factors generated an average premium of -0.28% over the 2010-2019 period, which compares to 3.95% over the 1963-2009 period. In unreported tests we find that this is not due to an increase in correlations between the factors, as the post-2010 correlations are in fact very similar to the pre-2010 correlations (close to zero on average). One might think that such a collective failure of these widely accepted factors must be unique in history, but an inspection of the performance by decade figures in Table 1 shows that it is not. In fact, the 2010-2019 decade looks remarkably familiar to the 1990-1999 decade, because also during that decade (i) the size premium was negative, (ii), the value premium was negative, (iii) the investment premium was close to zero, and (iv) the profitability premium was positive but well below its long-term average. As a result, the four factors combined also failed to deliver a positive return over that decade.

INSERT TABLE 1 HERE

This is not where the similarities between the 2010-2019 and 1990-1999 decades end, because these also just so happen to be the only two decades with double-digit excess returns for the market factor. Conversely, the two decades during which the market premium failed to materialize, the 2000-2009 and 1970-1979 decades, were also the two decades during which factor premiums were highest. Thus, there appears to be an inverse relation between long-term market returns and factor premiums. Of course we cannot rule out being fooled by randomness here, as these inferences are based on just six independent decade observations, but the results are intriguing nonetheless.

The availability of just six independent decades also means it is hard to reliably asses the probability of a negative average performance of the Fama-French factors over a period of one decade. The calendar decades suggest a 1 in 5 probability based on pre-2010 data, which increases to 2 out of 6 when the most recent decade is included. Based on rolling 10-year average returns of the Fama-French factors, however, this probability is just 1.6%. Thus, although calendar decades (xyz0 to xyz9) are a natural choice for independent 10-year observations, they appear to exaggerate the likelihood of an entirely lost decade for the Fama-French factors.

3. Performance of other factors in the Kenneth French data library

The Kenneth French data library also tracks the performance of a number of factors that are not included in the Fama-French 5-factor model. Some of these are constructed using the same kind of 2x3 sorts that are used for the value, profitability, and investment factors. This means that value-weighted top 30% minus bottom 30% portfolios are created within the large-cap and small-cap segments of the universe separately, and next a fifty-fifty average of these two long-short portfolios is taken. For other factors only value-weighted quantile portfolios based on the full universe are available. For these factors we create top 30% minus bottom 30% portfolios by taking the average of the top three deciles minus the average of the bottom three deciles. Since factor premiums tend to be stronger in the small-cap space than in the large-cap space, not giving a weight of 50% to the small-cap part of the universe should generally lead to more conservative estimates for factor premiums.

The factors for which 2x3 sorts are available are three alternative value metrics (earnings-to-price, cash-flow-to-price, and dividend yield), momentum (12-1 month), and short-term reversal (1 month). The other factors are an alternative investment factor (net share issuance), accruals (change in operating working capital to book), and three low-risk factors (60-month market beta, 60-day variance, and 60-day residual variance). We make the risk factors beta neutral by levering up the long low-risk leg and levering down the short high-risk leg to market betas of exactly 1. For simplicity we do this using the full-sample data, following Blitz, van Vliet, and Baltussen (2020), rather than dynamically as in Frazzini and Pedersen (2014).

The performance of these factors is reported in Figure 2 and Table 2. The three alternative value metrics all have a negative return over the last decade, similar to the HML value factor. The alternative investment factor, net share issuance, also ends up in negative territory. The accruals factor fared better, with a return of 3.5% over the 2010-2019 period, which is even slightly higher than its return over the pre-2010 period. Fama and French (2016) find that their 5-factor model has difficulties explaining the performance of accruals portfolios, and the 2010-2019 period illustrates that the accruals factor can indeed do well when the Fama-French factors struggle.

INSERT FIGURE 2 HERE

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We next turn to the momentum factor, which is often used to augment the Fama-French factor models, turning e.g. the 5-factor model into a 6-factor model. Momentum had a huge negative return of -82% in 2009, causing the 2000-2009 period to be a lost decade for the momentum factor. This even led to the factor being existentially questioned, with e.g. Bhattacharya, Li, and Sonaer (2017) observing that "momentum profits have become insignificant since the late 1990s", based on data until 2012. Over the 2010-2019 period we observe an average premium of about 3.5% for the momentum factor, which, although below its long-term average, is well within positive territory. Thus, it seems premature to discard the momentum factor. Interestingly, the momentum factor also did well over the other decade that was tough for the Fama-French factors, 1990-1999. This was, in fact, the best decade for momentum.

The short-term reversal factor had a realized return of about 3.5% over the last decade, which, similar to the momentum factor, is below its long-term average but well above zero. Most notable in Figure 2 and Table 2, however, are the three low-risk factors, which exhibit premiums of about 6-10% over the 2010-2019 period. This makes it the second-best decade ever for low risk, with only the 1980-1989 decade being stronger. Fama and French (2016) argue that the low-risk anomaly is subsumed by their 5-factor model, but the most recent decade shows that the low-risk factor can shine when the Fama-French factors fail to deliver.

In sum, the factors in the Kenneth French data library that are closely related to the factors in the 5-factor model struggled just as much as the factors in that model, while all the other, fundamentally different factors in the Kenneth French data library had decent positive returns, and, in the case of the low-risk factor, even a great return. As before, the similarities with previous decades are striking. The lost decade of 2010-2019 is like a mirror image of the 2000-2009 period, during which the Fama-French factors had exceptionally strong performance and left most other

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factors in their wake, and like a repeat of the 1990-1999 period, during which the Fama-French factors also failed to deliver while other factors held their ground.

4. International performance of the Fama-French-Carhart factors

The Kenneth French data library also offers data for the international versions of the 5-factor model, plus the momentum factor. This data is available with a shorter history, from July 1990 onwards. Figure 3 depicts the performance for the Global-ex-US factors over 2010-2019 versus 1990-2009, and Table 3 reports the performance by decade of these factors. The Global-ex-US results are in many ways similar to the US results. For the size factor we observe a much weaker long-term performance, but performance over the 2010-2019 decade was still marginally positive. The value factor had a negative return over the last decade, just like in the US. The investment factor was close to zero, also just like in the US.

INSERT FIGURE 3 HERE

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For the US we observed that the profitability factor was the only factor in the 5-factor model (apart from the market) that remained effective post-2010, albeit with a drop in performance of about 50% compared to pre-2010. For Global-ex-US we also find that profitability is the only Fama-French factor that remained effective post-2010. We even find no performance decay at all in Global-ex-US, as pre-2010 and post-2010 performance of the profitability factor is virtually identical. Combined, the international versions of the Fama-French factors experienced a drop in performance of about two-thirds over the last decade, but did manage to stay in positive territory.

The final similarity between the Global-ex-US and US results is the momentum factor. In the US this factor remained effective post-2010, and we observe the same for Global-ex-US. In fact, just like for the profitability factor, we observe no decay in performance at all for the Global-ex-US momentum factor, compared to its pre-2010 performance.

5. Performance of the Hou-Xue-Zhang factors

One of the main contenders to the Fama-French 5-factor model is the 4-factor model of Hou, Xue, and Zhang (2015), also known as the q-factor model. This model consists of market and size factors similar (but not identical) to those in the Fama-French model, an investment factor, and a return-on-equity factor. Data for the HXZ factors are also publicly available.[2] The performance of these factors is reported in Figure 4 and Table 4.

INSERT FIGURE 4 HERE

INSERT TABLE 4 HERE

The HXZ size factor shows a negative return over the past decade, similar to the Fama-French size factor, SMB. This is not surprising, since the two series are very similar, with a correlation of

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[2] http://global-q.org/index.html.

0.97. The HXZ investment factor has a return close to zero over the past decade, similar to the Fama-French investment factor, CMA. This is again not surprising, because also these two series are very highly correlated, with a correlation of 0.91. Only the HXZ return-on-equity factor showed a positive return, although at about 3% the magnitude of this return is less than half its pre-2010 level. This is also consistent with the previous findings, since the HXZ return-on-equity factor is correlated with the Fama-French profitability (RMW) and momentum (WML) factors, with correlations of 0.67 and 0.49 respectively. For these factors we also observed that returns post-2010 are positive, but below the pre-2010 levels. The correlation of the HXZ return-on-equity factor and momentum has been documented by Novy-Marx (2015), who finds that the factor captures momentum in firm fundamentals by relying entirely on the most recent recently announced quarterly earnings, which tend to be high after positive earnings surprises.

Next to the q-factors, the HXZ data library contains value-weighted decile portfolios for about fifty individual factors from the Hou, Xue, and Zhang (2019) paper. Since most of these factors were first documented well before 2010, the past decade also constitutes an out-of-sample period for them. Following the same approach as before, we turned these into factor return series by taking the average of the top three deciles minus the average of the bottom three deciles. We combined closely related factors into composite factors by averaging their returns, which brings down the number of factors to 13. For instance, the HXZ data library contains five separate seasonal factors, which we combined into one composite seasonal factor. The performance of these factors is reported in Figure 5 and Table 5.

INSERT FIGURE 5 HERE

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Consistent with our findings in the previous sections, the size and value composite factors exhibit a negative premium over the most recent decade. Remarkably, however, the other 11 composite factors all exhibit positive returns over the 2010-2019 decade: payout yield, profitability, accruals, investment, intangibles, price momentum, analyst revisions, earnings momentum, seasonals, short-term reversal, and low-risk. For profitability, price momentum, short-term reversal, and low-risk this is consistent with our earlier results for the Kenneth French versions of these factors. For the other factors it is an additional insight. The main take-away is that whereas the Fama-French factors experienced a lost decade, many factors which are not endorsed by Fama-French actually had a decent, or in some cases even a very good recent decade.

6. Summary and implications

The factors in the widely used 5-factor model of Fama and French (2015) experienced a lost decade, with a negative return on average, and each individual factor falling well short of its long-term average return. As it turns out, this is not unprecedented in history, but in fact remarkably similar to the performance of these factors over the 1990-1999 decade. Expanding the analysis we find that many factors which are not endorsed by Fama-French did deliver a positive premium over the 2010-2019 decade. These factors include low-risk, price momentum, earnings momentum, analyst revisions, seasonals, and short-term reversal. In sum, there appears to be a clear dichotomy: while generally accepted factors experienced a lost decade, many factors that

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are considered to be inferior or redundant were actually the ones that delivered. Altogether, the 2010-2019 decade is like a mirror image of the 2000-2009 decade, during which the Fama-French factors had an exceptionally strong performance and left most other factors in their wake.

Only time will tell if the Fama-French factors are again able to a comeback in the decade(s) to come. In the meantime, their weak recent performance will have implications for asset pricing research. For one, the 5-factor model will generally have a hard time explaining strong CAPM alphas over the 2010-2019 period, because positive loadings on the Fama-French factors will not help to explain returns if the Fama-French factors themselves have no premium to begin with. Our findings also question the classic ambition of the asset pricing literature to reduce the entire 'factor zoo', i.e. the hundreds of alleged factors, to just a handful of factors that should explain the entire cross-section of stock returns. Although the Fama-French factors still have a strong long-term performance, they have by now experienced two lost decades during which various other factors were able to deliver. Thus, it seems that more factors are needed for an accurate and comprehensive description of the cross-section of stock returns.

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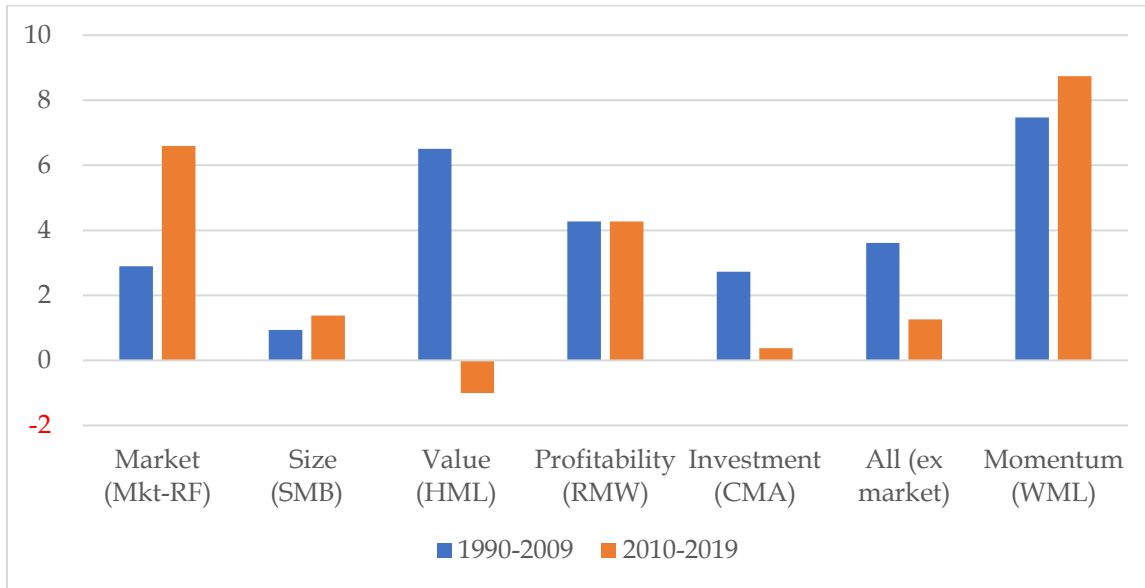
Figure 1: Performance of the Fama-French factors
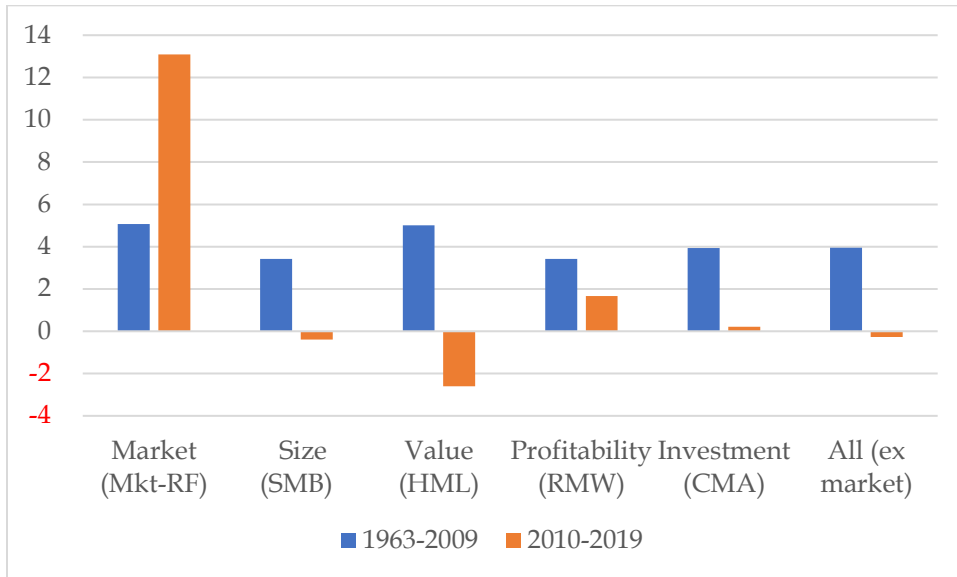
Figure 2: Performance of the other factors available in the Kenneth French data library
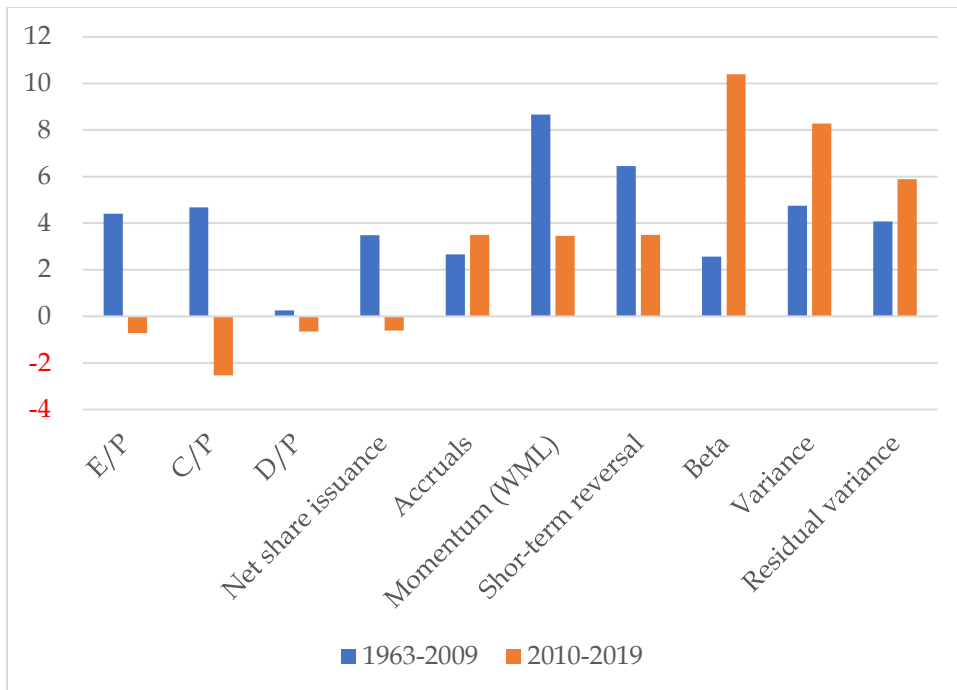
Figure 3: Performance of the Fama-French-Carhart factors in Global-ex-US

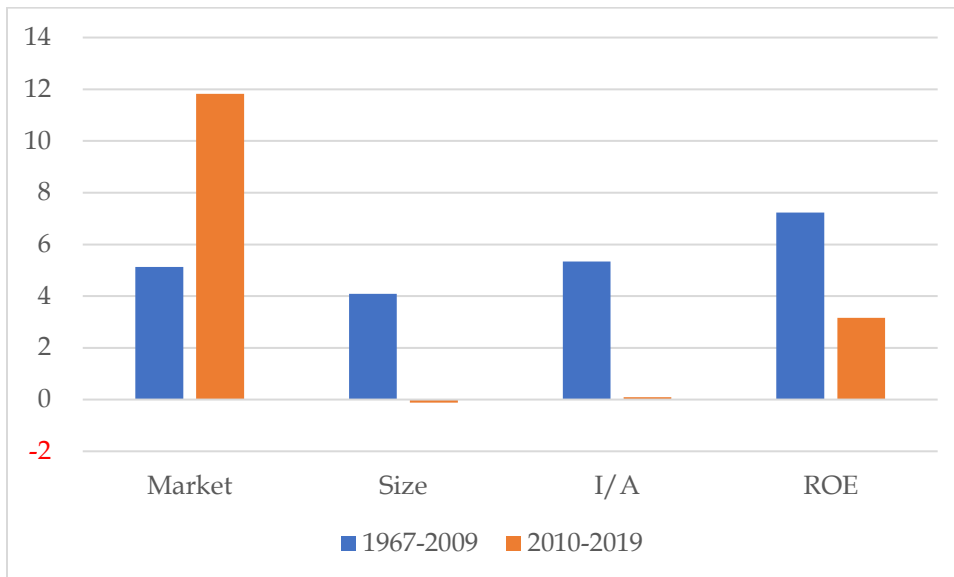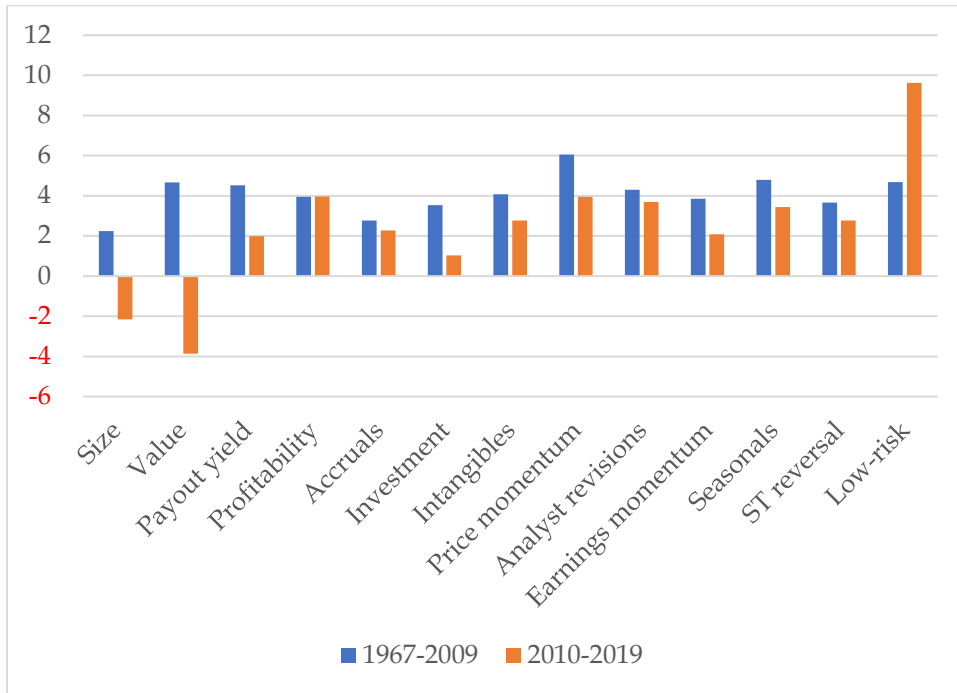**Figure 4: Performance of the Hou-Xue-Zhang factors**

Figure 5: Performance of the other factors available in the Hou-Xue-Zhang data library

Table 1: Performance of the Fama-French factors

	Market (Mkt-RF)	Size (SMB)	Value (HML)	Profitability (RMW)	Investment (CMA)	All (ex market)
1963-1969	4.49	9.49	2.39	1.28	-0.58	3.15
1970-1979	1.18	4.86	8.10	-0.51	6.25	4.67
1980-1989	8.51	-0.31	6.05	4.83	5.74	4.08
1990-1999	12.76	-2.11	-0.13	2.22	-0.04	-0.02
2000-2009	-1.77	7.27	7.74	8.54	6.76	7.58
2010-2019	13.10	-0.39	-2.60	1.67	0.22	-0.28

Table 2: Performance of the other factors available in the Kenneth French data library

	E/P	C/P	D/P	Net share issuance	Accruals	Momentum (WML)	Short-term reversal	Beta	Variance	Residual variance
1963-1969	1.10	1.32	-5.84	0.24	5.81	10.62	7.59	-4.19	-1.80	-3.19
1970-1979	6.50	8.95	2.90	3.75	3.29	9.97	13.28	0.27	0.87	0.60
1980-1989	6.02	6.21	2.68	4.22	3.39	8.94	6.29	13.19	14.28	12.83
1990-1999	-0.53	-1.74	-2.53	0.44	2.93	13.49	1.40	-1.44	3.20	5.38
2000-2009	7.78	7.46	1.91	7.61	-1.02	1.00	4.13	2.66	4.86	2.19
2010-2019	-0.72	-2.54	-0.66	-0.61	3.50	3.45	3.50	10.40	8.28	5.88

Table 3: Performance of the Fama-French-Carhart factors in Global-ex-US

	Market (Mkt-RF)	Size (SMB)	Value (HML)	Profitability (RMW)	Investment (CMA)	All (ex market)	Momentum (WML)
1990-1999	4.35	-1.84	0.04	6.42	-1.69	0.73	10.67
2000-2009	1.52	3.57	12.64	2.22	6.93	6.34	4.55
2010-2019	6.60	1.38	-1.01	4.28	0.37	1.26	8.74

Table 4: Performance of the Hou-Xue-Zhang factors

	Market	Size	I/A	ROE
1967-1979	2.04	7.65	6.09	5.81
1980-1989	8.09	0.16	7.62	9.67
1990-1999	12.34	-1.02	2.16	9.22
2000-2009	-1.04	8.47	5.25	4.66
2010-2019	11.82	-0.12	0.09	3.16

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Table 5: Performance of the other factors available in the Hou-Xue-Zhang data library

	Size	Value	Payout yield	Profitability	Accruals	Investment	Intangibles
1967-1979	7.05	7.50	8.99	0.68	3.65	4.58	3.42
1980-1989	-3.11	4.37	6.65	4.68	3.56	4.85	5.06
1990-1999	-2.54	-2.47	-1.59	6.14	1.05	-0.41	3.81
2000-2009	6.16	8.96	5.19	5.26	2.52	4.80	4.58
2010-2019	-2.15	-3.86	1.99	3.96	2.28	1.03	2.77

	Price momentum	Analyst revisions	Earnings momentum	Seasonals	Short-term reversal	Low-risk
1967-1979	9.37	8.02	4.34	5.64	6.60	-0.30
1980-1989	5.74	7.21	4.93	2.22	4.46	13.61
1990-1999	10.05	7.27	5.09	9.19	-2.65	2.44
2000-2009	-1.92	-2.87	1.16	1.90	5.34	4.48
2010-2019	3.96	3.69	2.09	3.43	2.77	9.63

Size: ME; **Value**: BM, Rev_12, EP, CP, EM, SP, OCP; **Payout yield**: OP, NOP; **Profitability**: OPE, OPA, COP; **Accruals**: OA, TA, DA, POA; **Investment**: IA, dPIA, NOA, dNOA, IG, NSI, CEI; **Intangibles**: OCA, ADM, RDM, RER; **Price momentum**: R6_6, R11_1; **Analyst revisions**: RE_1, RE_6; **Earnings momentum**: Abr_1, Abr_6, ROE_1, ROE_6, dROE_1, dROE_6, SUE_1, SUE_6; **Seasonals**: r1a, r5a, r10a, r15a, r20a; **Short-term reversal**: SRev; **Volatility**: IVFF_1, TV_1, beta_1.

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