RELEASE NOTES FOR APRIL 2021 UPDATE

Chen Xue[1]

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In this release, we extend the sample period for factors and testing portfolios data through the end of 2020. We also expand testing portfolios from 185 to 187 anomalies, which are grouped into six categories: momentum (41), value-growth (32), investment (29), profitability (45), intangibles (30), and frictions (10). The sample period is from January 1967 to December 2020.

Factor Construction

We have changed the construction of the market factor (MKT). We used to construct MKT as the value-weighted market index return from CRSP minus the 1-month Treasury bill rate. However, in recent years, the CRSP market index has included a growing number of non-common stock securities such as ETFs. To avoid potential problems with those securities (e.g., double counting stocks via ETFs), we now construct MKT as the value-weighted portfolio return of all NYSE, Amex, and Nasdaq common stocks with a CRSP share code of 10 or 11 minus the 1-month Treasury bill rate. In any case, the new construction produces mostly minor changes to the market factor. From January 1967 to December 2020, the old and new versions of MKT have a correlation of 0.999 and their average returns differ by only 0.026% per month.

Factor Performance

As shown in Table A, all our factors continue to generate significant premiums in the extended sample period. However, the non-market factors have relatively weak performance in recent years.

[1] Associate Professor of Finance, Lindner College of Business, University of Cincinnati, 2338 Lindner Hall, 2906 Woodside Dr, Cincinnati, OH 45221. Tel: (513) 556-7078. E-mail: xuecx@ucmail.uc.edu.

Table A: Monthly Factor Performance					
	MKT	ME	I/A	ROE	EG
	Full Sample, 1/1967-12/2020				
Mean (%)	0.58	0.27	0.33	0.51	0.80
[*t*]	[3.18]	[2.22]	[4.10]	[4.96]	[9.69]
	Mean during recent periods (%)				
Last 12 months	2.07	0.14	-1.06	-1.09	0.42
Last 60 months	1.29	-0.06	-0.39	-0.01	0.55
Last 120 months	1.15	-0.09	-0.17	0.20	0.43

Anomaly Selection

The anomalies are a subset of the 452 anomalies in Hou, Xue, and Zhang (2020).[2] We first include the 158 anomalies that are significant ($|t|$ greater than or equal to 1.96) in their original sample from January 1967 to December 2016. We then add anomalies that have become significant in three separate extensions, including 11 anomalies for the period through December 2018 (Hou, Mo, Xue, and Zhang 2021), one more through December 2019 (R&D capital-to-assets, Rca), and two more through December 2020 (supplier industry momentum with 12-month holding period, Sim12, and quarterly taxable income-to-book income with 6-month holding period, Tbiq6).[3]

The 11 anomalies from the December 2018 extension are prior 11-month returns with 12-month holding period (R11_12), 52-week high with 12-month holding period (52w12), segment momentum with 12-month holding period (Sm12), asset turnover (Ato), capital turnover (Cto), quarterly O-score with 1-month holding period (Oq1), quarterly taxable income-to-book income with 12-month holding period (Tbiq12), quarterly sales growth with 1-month holding period (Sgq1), quarterly R&D expense-to-sales with 6- and 12-month holding periods (Rdsq6 and Rdsq12), as well as the nonannual component of year 1-lagged return (R1n).

We include expected growth from the expected growth factor of Hou, Mo, Xue, and Zhang (2021), with 1-, 6-, and 12-month holding periods.

[2] Hou, Kewei, Chen Xue, and Lu Zhang, 2020, Replicating anomalies, *Review of Financial Studies* 33, 2019-2133.
[3] Hou, Kewei, Haitao Mo, Chen Xue, and Lu Zhang, 2021, An augmented q-factor model with expected growth, *Review of Finance* 25, 1-41.

We include 12 anomalies that, albeit insignificant, are prominent in the empirical asset pricing literature, including standardized unexpected earnings (Sue6, 6-month holding period), long-term reversal (Rev1, 1-month holding period), dividend yield (Dp), payout yield (Op), total accruals (Ta), operating profits-to-equity (Ope), market equity (Me), idiosyncratic volatility per the Fama-French 3-factor model (Ivff1, 1-month holding period), idiosyncratic volatility per the Hou-Xue-Zhang *q*-factor model (Ivq1, 1-month holding period), total volatility (Tv1, 1-month holding period), market beta (β1, 1-month holding period), and short-term reversal (Srev).

Finally, for anomalies that have become insignificant over time since the first release of our data library, we continue their coverage to maintain backward compatibility with prior releases.

The Number of Significant Anomalies

Among the 452 anomalies in Hou, Xue, and Zhang (2020), the number of significant anomalies at the 5% level has declined from 158 to 138 in the latest sample period, as shown in Table B. In particular, the number of significant anomalies in the value-versus-growth category has decreased steadily from 29 to 5. The number of significant anomalies is more stable for other categories.

Table B: Number of Significant Anomalies

	1/1967-12/2016	1/1967-12/2018	1/1967-12/2019	1/1967-12/2020
Momentum (57)	36	39	39	39
Value-Growth (69)	29	15	13	5
Investment (38)	28	26	24	26
Profitability (79)	35	40	38	35
Intangibles (103)	26	27	26	30
Frictions (106)	4	3	2	3
Total (452)	158	150	142	138

Technical Documents

We have updated Technical Documents that accompany our factors and testing portfolios data. The documents detail the construction of our data. As noted, for this release, we have revised the

construction of the market factor. We have also added descriptions for testing portfolios related to two new anomalies (Sim 12 and Tbiq6) that have become significant in the latest sample.

Next Update

We plan to update our data again in April 2022, with the sample extended through December 2021.