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ORIGINAL ARTICLE

Exploring the real wealth creation in U.K. stocks

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Abstract
This study uses the approach of Bessembinder (J Fin Econ 129:440–457, 2018) to examine the real wealth creation of U.K. individual stocks between January 1975 and December 2024. The study finds that across the whole sample period, real wealth creation is highly concentrated and only 3.1% of stocks generate the aggregate net wealth created. Splitting the sample into two subperiods according to the Big Bang in October 1986, we find that in the pre Big Bang period real wealth creation by U.K. stocks is a lot less concentrated and the majority of stocks provide a higher buy and hold real return than U.K. Treasury Bills. Forming a Wealth trading study, which selects the stocks with the highest real wealth creation, that there are some performance benefits but only when equal weights are used.

Keywords Real wealth creation · Individual stocks · Skewness

JEL classification G11 · G12

Introduction

The equity premium plays a central role in many issues in Finance such as the cost of equity capital estimation. Long-term estimates of the equity premium across different markets is provided by (Dimson, et al., 2002) and the subsequent Global Investment Returns Yearbooks. The evidence suggests that the equity premium is reliably positive. The equity premium puzzle of Mehra and Prescott (1985) highlights the magnitude of the equity premium can only be reconciled with consumption-based asset pricing models if risk aversion is higher than what economists think is reasonable[1].

A recent study by Bessembinder (2018) examines whether individual U.S. stock returns outperform U.S. Treasury Bill returns over different return horizons. Bessembinder finds that only a minority of U.S. stocks provide a higher buy and hold (BAH) return than Treasury Bills during their lifetime. There is a large positive skewness[2] in individual stock BAH returns, implying that a small proportion of stocks have performed exceptionally well. Bessembinder proposes a measure of wealth creation for U.S. stocks. Bessembinder finds that aggregate wealth creation in the U.S. stock markets is highly concentrated and around 4% of companies generate all the positive aggregate net wealth creation. Bessembinder, Chen, Choi and Wei (2023) find similar results in global markets.

In this study, we use the approach of Bessembinder (2018), and explore the wealth creation of U.K. stocks between January 1975 and December 2024. Our main focus is on wealth creation adjusted for inflation (real), and the corresponding real BAH returns on individual stocks as this highlights the purchasing power for investors from the individual stocks. Given the concentration of net wealth documented in Bessembinder (2018), and Bessembinder et al. (2023), we examine whether wealth creation is concentrated in different subperiods. The first break used is the deregulation in U.K. financial markets that took place with the Big Bang in October 1986. Second, we focus on recent events such as the Brexit vote in June 2016, and Covid-19

[1] See Cochrane(2005) Chap. 21 for an excellent review of the equity premium puzzle. Benartzi and Thaler(1995) provide a behavioral explanation.

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[2] Fama and French (2018b) find that skewness of the U.S. market index increases with horizon. Levy (2022) provides a theoretical explanation.

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that hit in March 2020. Given that the companies that generate the largest wealth creation are large companies, we examine whether wealth creation is concentrated in smaller stocks, and the stocks on the Alternative Investment Market (AIM). We also evaluate the performance of Wealth trading strategies, which selects stocks with the highest real wealth creation.

There are four main findings in our study. First, we find in the whole sample period that real wealth creation by U.K. individual stocks is highly concentrated and only 3.1% of stocks generate all the aggregate real net wealth creation. The majority of stocks provide a lower lifetime real BAH return than U.K. Treasury Bills. Second, we find that the real wealth creation by individual stocks is a lot less concentrated in the pre Big Bang subperiod, and the majority of stocks provide a higher real BAH return than the corresponding U.K. Treasury Bills in this subperiod. Third, we find that the aggregate wealth creation is highly concentrated among small stocks, and in recent post Brexit vote and post Covid subperiods. Fourth, we find some performance benefits for a Wealth trading strategy but only when equal weights are used in forming the portfolio.

There are three main contributions from our study. First, our study complements the recent studies of Bessembinder (2018), and Bessembinder et al. (2023) among others by focusing on the U.K. market. Harvey (2017) and Hou, et al., 2020) highlight the importance of replication studies in Finance. Second, our study extends the empirical evidence in Bessembinder, and Bessembinder et al. by focusing on the performance of Wealth trading strategies. Third, we extend the evidence in Bessembinder et al. for U.K. stock returns by looking at a much longer sample period, and including all U.K. stocks.

The paper is organized as follows. Section II describes the data used in our study. Section III presents the research method. Section IV reports the empirical results. The final section concludes.

Data

Our focus in this study is on the U.K. stock markets. We use the monthly dataset provided by the London Share Price Database (LSPD) run by the London Business School. Our sample period is between January 1975 and December 2024. We start from January 1975, as LSPD include all stocks on the London Stock Exchange, and smaller stock markets like the Unlisted Securities Market and the Alternative Investment Market (AIM).

We collect the monthly stock returns, and market values for each stock from LSPD. We exclude closed-end funds[3], foreign companies, and secondary shares. We use the monthly return for the one-month U.K. Treasury Bill (T. Bill) as the risk-free asset, which we collect from LSPD and LSEG Datastream. We use a value weighted portfolio of all U.K. stocks as the market index. The inflation index used is the Retail Price Index, which we collect from LSPD.

We evaluate the performance of the Wealth strategies using three linear factor models. The models include:

1. (1) CAPM – this model is a one-factor model. The factor is the excess return on the U.K. market index.
2. (2) Fama and French (1993) (FF3) – this model is a three-factor model. The model includes the Market, and the excess returns of zero-cost portfolios of the size (SMB), and value (HML) effects in U.K. stock returns.
3. (3) Fama and French (2018a) (FF6) – this model is a six-factor model. The model includes the FF3 factors, and the excess return of the zero-cost portfolios of profitability (RMW), investment (CMA), and momentum (MOM) effect in U.K. stock returns.

Details on how the factors are formed are included in the Appendix.

Research method

We estimate the BAH returns and wealth creation of U.K. stocks following Bessembinder (2018). The BAH returns are estimated over different sample periods, and the lifetime of the stock over the whole sample period[4]. The BAH returns are adjusted for inflation. To calculate the wealth creation, we assume a horizon point T of each stock. For each month in the sample from t=1 to T-1, we calculate the future value of real BAH return of the Treasury Bill to time T. For months t=1 to T-1, we multiply the future value of the Treasury Bill by the lagged one-month market value of the stocks, and by the excess returns of the stock. For t=T, we multiply the lagged one-month market value by the excess returns of the stock. The wealth creation is given by the sum of the monthly values. The wealth creation is adjusted for inflation.

As well as estimating the real wealth creation of all U.K. stocks, we also estimate the real wealth creation of market segments such as companies in the Small Stock index, and in the AIM. We also evaluate the performance of Wealth trading strategies, which selects the stocks which generate the largest real wealth creation during an estimation window. Our initial tests use a monthly portfolio formation. At the

[3] Closed-end funds are commonly known as investment trusts.

[4] The longest sample period we use is January 1975 and December 2024.

start of each month between July 1985 and December 2024, we rank all stocks by their aggregate wealth creation during the previous 120 months. We require stocks to have continuous return observations during the estimation window.

We form both a value weighted (VW) portfolio, and an equal weighted (EW) portfolio of the 100[5] stocks with the highest aggregate wealth creation, and calculate the monthly return for both portfolios. We correct for the delisting bias of Shumway (1997) following the approach of Dimson, Nagel and Quigley(2003) by assigning a −100% return on the death date of firm, where LSPD denotes as valueless. We correct for missing returns, for example due to temporary suspension, to zero as in Liu and Strong (2008). We also consider Wealth trading strategies where the portfolios are formed annually at the start of each year.

We evaluate the performance of the Wealth trading strategies using a number of performance measures. The first measure used is the Sharpe (1966) measure, which is given by the average excess returns divided by the standard deviation of excess returns. We test for significant differences in the Sharpe performance of the Wealth strategies to the Sharpe performance of the market index using the z-test of Ledoit and Wolf (2008, 2011, 2018). We correct the z-test for heteroskedasticity and serial correlation using the automatic lag selection (with prewhitening) of Newey and West (1987). The second group of measures uses the terminal value of £1 invested in the Wealth strategies at the start of January 1985 and what it grows to at the end of December 2024. We also compute the geometric mean of the Wealth strategies and the market index.

The final measure used is based on the stochastic discount factor[6] approach. Harrison and Kreps (1979), Hansen and Richard (1987), and Ross (1978) show that if the law-of-one price (LOP) holds in financial markets, then a stochastic discount factor (m_{t+1}) exists such that:

$$p_{it} = E_t\left(m_{t+1}X_{it+1}\right) \text{ for } i = 1,\ldots,N \quad (1)$$

where p_{it} is the cost of asset i at time t, X_{it+1} is the payoff of asset i at time t+1, E_t is the conditional expectation based on the information set of investors at time t, and N is the number of primitive assets. When the payoffs are gross returns (1+return), then:

$$1 = E_t\left(m_{t+1}R_{it+1}\right) \text{ for } i = 1,\ldots,N \quad (2)$$

where R_{it+1} is the gross return of asset i at time t+1. When the payoffs are excess returns, then:

$$0 = E_t\left(m_{t+1}r_{it+1}\right) \text{ for } i = 1,\ldots,N \quad (3)$$

where r_{it+1} is the excess return of asset i at time t+1. When there is no conditioning information, then $0=E(m_{t+1}r_{it+1})$.

In this study, we use linear factor models such as the CAPM and multifactor models to evaluate the performance of the Wealth trading strategies. The stochastic discount factor of such models is given by:

$$m_{t+1} = a + b_K{}'f_{Kt+1} \quad (4)$$

where f_{Kt+1} is a (K,1) vector of the factor values at time t+1, b_K is a (K,1) vector of slope coefficients relative to the K factors, and K is the number of factors in the model. The individual slope coefficients are linked to the factor premiums, and will be significantly different from zero if the factor plays an important role in pricing assets given the other factors in the model (Cochrane (2005)).

Glosten and Jagannathan (1994) and Chen and Knez (1996) develop the stochastic discount factor approach to evaluate fund performance[7], that can be applied to any trading strategy. The performance of the Wealth trading strategy is given by:

$$a_p = E\left(m_{t+1}r_{pt+1}\right) \quad (5)$$

where r_{pt+1} is the excess return of the Wealth portfolio at time t+1. If $\alpha_p=0$, the Wealth strategy delivers zero performance. If $\alpha_p>0$ ($\alpha_p<0$), the Wealth strategy provides superior (inferior) performance.

We estimate the parameters in the linear factor models and the performance of the Wealth strategy using Generalized Method of Moments (GMM) (Hansen (1982)) following the joint approach of Farnsworth, Ferson, Jackson and Todd (2002). We estimate the parameters in the factor model such that it correctly prices the gross return on the one-month U.K. Treasury Bill, and the excess returns of the factors in the model (Chretien and Kammoun (2024)). Pricing the gross return of the Treasury Bills enforces the restriction that $E(m_{t+1})$ to be just below 1 (Dahlquist and Soderlind (1999), Cochrane (2005)). We correct the *t*-statistic of α_p for heteroskedasticity and serial correlation using the automatic lag selection (with prewhitening) of Newey and West (1987).

[5] We also consider strategies that select the largest 50 stocks.

[6] See Cochrane (2005), and Ferson (2019) for textbook treatment on the stochastic discount factor approach to asset pricing.

[7] See Ferson (2010, 2013) for a review of the stochastic discount factor approach to fund performance.

Empirical results

We begin our empirical analysis by reporting summary statistics of the individual stock returns, and real wealth creation across the whole sample period. Panel A reports summary statistics of real BAH returns (%) over monthly, annual, decade[8], and lifetime horizons. The summary statistics include the cross-sectional mean, median, standard deviation (Std Dev), skewness, and the proportion of positive (Prop > 0) values across stocks, T. Bill, and the market. The BAH return of the T. Bill and market index are matched to each of the time periods of the corresponding stocks. The final row for each horizon includes the number of stock observations (N) and the proportion of times where the real BAH returns of the stocks are higher than the T. Bill return (Prop > T. Bill), and market return (Prop > Market). Panel B includes the proportion of stocks with positive real wealth creation, the aggregate net and gross wealth creation[9], and the proportion of companies which generate the aggregate net wealth. The wealth creation is in £000s. The panel also includes the top 10 companies with the largest real wealth creation, and reports the corresponding wealth creation, real BAH return, and the cumulative proportion of net and gross aggregate wealth captured by the top 10 stocks. Figure 1 plots the cumulative proportion of aggregate net wealth captured by individual stocks. The straight line is the cumulative proportion capture by the top 1% of stocks.

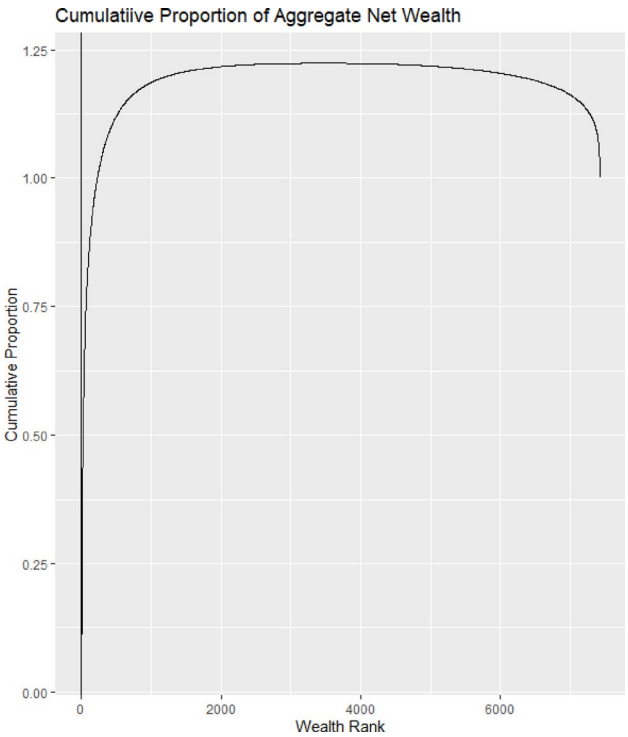

Fig. 1 The figure shows the cumulative proportion of aggregate net wealth of U.K. stocks between January 1975 and December 2024. The straight line is the cumulative proportion captured by the top 1% of stocks

Panel A of Table 1 shows that the average monthly real return of U.K. stocks is 0.98% with a volatility of 20.864%. There is a large positive skewness in the real monthly returns of U.K. stocks. This positive skewness explains why there is a large difference in the mean and median monthly real returns. Only a minority of the monthly real stock returns are positive with a proportion of 0.468. The summary statistics of the monthly real returns of the T. Bill and market index are very different from the individual stocks. The market has a volatility of 4.897% and has a small positive skewness. As in Bessembinder (2018), only a minority of the monthly real returns of individual stocks are higher than the corresponding real returns of both the T. Bill and the market index at around 45%.

Moving to the annual and decade horizons provides a similar picture to the monthly horizon. The annual BAH real returns of the individual stocks are highly skewed to the right. The mean BAH annual real return of stocks is 11.954%, with a median BAH real return of 1.157%. In contrast, the market index has an annual mean BAH real return of 7.923%, a median BAH return of 9.195%, a substantially lower volatility of 17.412%, and a small positive skewness. The individual stocks only earn a higher annual BAH real return than T. Bill in 50.1% of cases, and 44.6% of cases for the market index.

During the decade horizon, individual stocks earned a mean BAH real return of 95.998% but a median BAH real return of only 1.808%. There is a huge volatility in the real decade BAH returns, and the decade BAH returns are skewed to the right. The skewness is lower than in the case for monthly and annual horizons. Bessembinder (2018) also finds that the skewness of BAH returns drops between the annual and decade horizons. Even at the decade horizon, only 50.8% of decade BAH real returns on stocks are positive, and stocks can only earn higher BAH returns than T. Bill in 48.7% of cases and 36.7% of cases than the market index.

The mean lifetime real BAH returns is 620.428%, and the median lifetime real BAH return is −13.934%. There is a massive volatility of the lifetime real BAH returns across stocks and a large positive skewness. Only 46% of stocks generate a positive real BAH lifetime return, and the majority of stocks underperform Treasury Bills. The skewness of the real BAH returns of the market index increases with the horizon. This pattern is consistent with Fama and French

[8] The annual and decade horizons are non-overlapping. There are 50 annual horizons, and five decade horizons. The BAH returns for a horizon are then combined into one sample for that horizon.

[9] Gross wealth only includes stocks with positive real wealth creation.

Table 1 Summary statistics of BAH returns and wealth creation

Summary Statistics	Mean	Median	Std Dev	Skewness	Prop>0
Panel A					
Monthly (%)					
Stock	0.98	−0.339	20.864	24.698	0.468
Market	0.72	1.044	4.897	0.695	0.593
T. Bill	0.071	0.1	0.609	−1.272	0.577
	N	Prop>Market	Prop>T. Bill		
Stock	944,410	0.458	0.456		
Annual (%)					
Stock	11.954	1.157	93.847	23.789	0.513
Market	7.923	9.195	17.412	1.107	0.727
T. Bill	0.89	0.987	3.993	−0.688	0.619
	N	Prop>Market	Prop>T. Bill		
Stock	87,783	0.446	0.501		
Decade (%)					
Stock	95.998	1.808	431.573	13.825	0.508
Market	66.495	31.398	97.624	2.323	0.865
T. Bill	7.347	1.892	23.13	1.225	0.58
	N	Prop>Market	Prop>T. Bill		
Stock	14,145	0.367	0.487		
Lifetime					
Stock	620.428	−13.934	5625.345	30.898	0.46
Market	283.566	50.457	638.781	3.496	0.862
T. Bill	15.537	3.868	39.962	1.433	0.596
	N	Prop>Market	Prop>T. Bill		
Stock	7518	0.31	0.445		

Panel B	Net Wealth	Gross Wealth	Prop (Wealth)>0	Prop comp
Wealth Concentration (£ thousands)	305,119,778.5	373,291,582.3	0.465	0.031
Name	Wealth	BAH Returns	Prop Gross	Prop Net
Shell	15,900,953	107.929	0.043	0.052
BP	12,804,684	44.819	0.077	0.094
HSBC	11,274,133	6.945	0.107	0.131
British American Tobacco	11,217,049	338.067	0.137	0.168
AstraZeneca	10,856,673	16.608	0.166	0.203
Rio Tinto	8,490,119	142.337	0.189	0.231
GlaxoSmithKline	7,575,929	117.108	0.209	0.256
SmithKline Beecham	7,036,614	65.636	0.228	0.279
Unilever	6,704,183	106.243	0.246	0.301
SABMiller	6,316,910	6.906	0.263	0.322

The table reports summary statistics of real BAH returns (%) and aggregate wealth creation (£ thousands) between January 1975 and December 2024 by U.K. stocks

Panel A reports summary statistics of the real BAH returns of stocks, U.K. one-month Treasury Bill (T. Bill), and the U.K. equity market (Mkt) index for monthly, annual, decade, and lifetime horizons

The summary statistics includes the cross-sectional mean, median, standard deviation (Std Dev), skewness, and the proportion of positive (Prop>0) values

The BAH return of the T. Bill and market are matched to each of the time periods of the corresponding stocks

For each horizon the panel also includes the number of stock observations (N) and the proportion of times where the real BAH return of stocks are higher than the T. Bill (Prop>T. Bill), and market (Prop>Mkt) BAH returns

Panel B reports the aggregate net wealth, aggregate gross wealth, the proportion of stocks with positive wealth creation (Prop(Wealth)>0), and the proportion of stocks required to generate the aggregate net wealth

The remaining rows report the Wealth, and the real BAH returns of the ten companies with the largest wealth creation, and the cumulative proportion of both gross (Prop Gross) and net wealth (Prop Net) captured by the ten stocks

(2018b) and Levy (2022). The results are consistent with Bessembinder (2018), and Bessembinder et al. (2023).

Panel B of Table 1 shows that U.K. stocks generated an aggregate wealth in excess of £305 billion. However only a minority of stocks actually generate positive wealth creation (46.5%). As in the U.S. (Bessembinder 2018; 2023), the wealth creation is highly concentrated in U.K. stocks. Only 3.1% of companies are required to generate all the aggregate net wealth creation. The top three companies with the highest wealth creation are Shell (£15.9 billion), BP (£12.8 billion), and HSBC (£11.2 billion). The top 10 stocks account for a substantial proportion of aggregate wealth creation. Figure 1 highlights how quickly the aggregate net wealth is captured.

The findings in Table 1 are consistent with Bessembinder (2018) and Bessembinder et al. (2023) in that a minority of stocks earn a higher lifetime real BAH returns than T. Bills, and aggregate wealth is highly concentrated. We next explore the real wealth creation in two subperiods. In October 1986, there was substantial deregulation in U.K. financial markets known as the Big Bang[10]. We split the sample period into pre Big Bang (January 1975 to October 1986), and post Big Bang (November 1986 to December 2024). Table 2 reports the summary statistics of the lifetime real BAH returns and wealth creation in the pre Big Bang subperiod (panel A), and the post Big Bang subperiod (panel B).

Table 2 shows that the patterns in real wealth creation by U.K. stocks is very different between the two subperiods. Real wealth creation is a lot less concentrated in the first subperiod, and the relative performance of individual stocks is a lot better. The mean real BAH return in panel A of Table 2 is 469.699% and the corresponding median BAH return is positive at 157.094%. Over 78% of individual stocks are able to generate positive real BAH returns during the pre Big Bang subperiod. The individual stock BAH returns do have a positive skewness but it is a lot less than the overall sample period. The individual stocks also perform a lot better relative to the T. Bill and market index. There is around 76% of individual stocks which have a higher real BAH return than the corresponding T. Bill returns, and 50.8% of stocks have higher real BAH return than the market index.

In contrast to the overall sample period, the vast majority of companies now generate positive real wealth creation in the pre Big Bang subperiod (78.8%). The aggregate real wealth creation is a lot less concentrated with the proportion of companies that generate all the net aggregate wealth is now 28%. The aggregate net wealth created is £66.3 billion. BP and Shell generate the largest real wealth creation in the pre Big Bang subperiod. The top 10 companies still generate a substantial share of the real wealth creation. There are some companies like Marks and Spencer that appear among the top 10 companies with the largest real wealth creation in the pre Big Bang period that are not in the top 10 stocks across the whole sample period.

The relative performance of individual stocks is a lot weaker in the post Big Bang subperiod as reflected in panel B of Table 2. The mean real BAH return across stocks is 93.522% with a median BAH return of −44.041%. There is a substantial positive skewness in the individual stock real BAH returns, and only 37.5% of stocks are able to generate positive real BAH returns. There is also a much smaller proportion of stocks that are able to generate a higher real BAH return than the T. Bill and the market index in the post Big Bang subperiod with only 34.5% and 26.8% of stocks with a higher real BAH return than the T. Bill and the market index respectively.

Panel B of Table 2 also shows that the aggregate real wealth creation is a lot more concentrated in the post Big Bang subperiod. There are only 36.2% of U.K. stocks that generate positive wealth creation. It only requires 1.5% of companies to generate all the aggregate net real wealth creation. The aggregate net wealth created is £206.2 billion. The top 10 companies generate a cumulative proportion of net wealth creation of 0.389. HSBC, Shell and AstraZeneca are the three largest wealth creators in the post Big Bang subperiod. A number of companies that were largest wealth creators in the pre Big Bang subperiod remain so in the post Big Bang superiod but there are some companies that drop out.

Table 2 shows that the aggregate net wealth created is a lot less concentrated in the pre Big Bang subperiod. The relative performance of stocks is also a lot better. We also ran the tests by splitting the sample around the Global Financial Crises (GFC). We find that the aggregate wealth creation is highly concentrated in both subperiods. We next examine the aggregate wealth creation in two recent periods[11], including the post Brexit vote in June 2016 (July 2016 to December 2024), and the Covid period (March 2020 to December 2024). Table 3 reports the empirical results for the post Brexit vote subperiod (panel A), and the post Covid subperiod (panel B).

Table 3 shows that aggregate wealth creation is highly concentrated in both the post Brexit vote, and Covid periods. The relative performance of individual stocks are poor in both periods. The mean real BAH return is −0.077% in the Brexit period, and 3.734% in the Covid period. There is a large negative median real BAH returns in both periods, and substantial positive skewness in real BAH returns across stocks. There are only 34.3% of stocks with a positive real BAH return in the Brexit period and 31.2% of stocks in

[10] We thank the reviewer for suggesting this split.

[11] We thank the reviewer for suggesting looking at some more recent periods.

Table 2 Summary statistics of BAH returns and wealth creation: pre and post big Bang

Pre-Bang	Mean	Median	Std Dev	Skewness	Prop > 0
Panel A					
Lifetime BAH Returns (%)					
Stock	469.699	157.094	1252.746	16.81	0.784
Market	237.413	150.434	211.395	0.619	0.972
T. Bill	5.376	10.131	14.482	−0.031	0.656
	N	Prop > Market	Prop > T. Bill		
Stock	2984	0.508	0.764		
Wealth Concentration (£ thousands)	Net Wealth	Gross Wealth	Prop (Wealth) > 0	Prop comp	
	66,387,626	69,101,157	0.788	0.28	
Name	Wealth	BAH Returns	Prop Gross	Prop Net	
BP	4,179,441	7.646	0.06	0.063	
Shell	3,528,644	9.115	0.112	0.116	
Imperial Chemical Industries	1,979,131	5.335	0.14	0.146	
British American Tobacco	1,845,746	7.792	0.167	0.174	
GlaxoSmithKline	1,659,513	16.115	0.191	0.199	
Marks & Spencer	1,409,330	6.817	0.211	0.22	
telent	1,301,639	5.268	0.23	0.24	
BTR	1,089,959	61.893	0.246	0.256	
Unilever	879,306.3	4.973	0.259	0.269	
Imperial Group	876,519.3	9.268	0.271	0.282	
Post Big Bang	Mean	Median	Std Dev	Skewness	Prop > 0
Panel B					
Lifetime BAH Returns (%)					
Stock	93.522	−44.041	806.108	19.869	0.375
Market	74.318	32.624	108.266	1.955	0.836
T. Bill	14.467	5.736	34.233	0.981	0.67
Prop > 0	N	Prop > Market	Prop > T. Bill		
Stock	6164	0.268	0.345		
Wealth Concentration (£ thousands)	Net Wealth	Gross Wealth	Prop (Wealth) > 0	Prop comp	
	206,269,628.2	2285,589,936.5	0.362	0.015	
Name	Wealth	BAH Returns	Prop Gross	Prop Net	
HSBC	11,274,133	6.945	0.039	0.055	
Shell	11,076,256	9.769	0.078	0.108	
AstraZeneca	10,856,673	16.608	0.116	0.161	
British American Tobacco	8,693,140	37.565	0.147	0.203	
Rio Tinto	7,742,983	27.874	0.174	0.241	
BP	7,089,927	4.3	0.199	0.275	
SABMiller	6,316,910	6.906	0.221	0.306	

Table 2 (continued)

Post Big Bang	Mean	Median	Std Dev	Skewness	Prop>0
Panel B					
BHP Billiton	5,948,377	14.065	0.242	0.335	
Diageo	5,763,579	11.524	0.262	0.362	
Unilever	5,503,848	16.955	0.281	0.389	

The table reports summary statistics of the real BAH returns (%) and the real wealth creation (£ thousands) of U.K. stocks in two subperiods based on the Big Bang in October 1986

The pre Big Bang results are in panel A, and post Big Bang in panel B

The pre Big Bang subperiod is January 1975 and October 1986, and the post Big Bang subperiod is November 1986 and December 2024

The first rows of each panel report summary statistics of the real BAH returns of stocks, U.K. one-month Treasury Bill (T. Bill), and the U.K. equity market (Mkt) index

The summary statistics includes the cross-sectional mean, median, standard deviation (Std Dev), skewness, and the proportion of positive (Prop>0) values

The BAH return of the T. Bill and market are matched to each of the time periods of the corresponding stocks

The next rows in each panel include the number of stock observations (N) and the proportion of times where the real BAH return of stocks are higher than the T. Bill (Prop>T. Bill), and market (Prop>Mkt) BAH returns

The next rows of each panel reports the aggregate net wealth, aggregate gross wealth, the proportion of stocks with positive wealth creation (Prop(Wealth)>0), and the proportion of stocks required to generate the aggregate net wealth

The remaining rows of each panel report the Wealth, and the real BAH returns of the ten companies with the largest wealth creation, and the cumulative proportion of both gross (Prop Gross) and net wealth (Prop Net) captured by the ten stocks

the Covid period. Most stocks continue to underperform the market index and T. Bill in terms of lower real BAH returns.

The aggregate net wealth created is £71.1 billion in the Brexit period, and £40.1 billion in the Covid period. Again only a minority of stocks in both subperiods have positive wealth creation. There are 2.5% of stocks that generate all the net wealth created in the Brexit period, and 1.8% of stocks in the Covid period. The top four companies in both periods are HSBC, Shell, AstraZeneca, and Rio Tinto. The cumulative proportion of the aggregate net wealth by the top 10 companies exceeds 0.5 in both periods.

Table 3 suggests that the aggregate wealth creation is highly concentrated in the recent periods. We next explore the aggregate wealth creation of companies in the Small stock index[12], and for the AIM. The sample period is between December 1991 and December 2024 for small stocks, and for AIM stocks is between June 1995 and December 2024. Table 4 reports the results for the Small stock index (panel A), and the AIM (panel B).

Panel A of Table 4 shows that aggregate wealth creation is even highly concentrated among small stocks. The mean real BAH returns among small stocks is 68.192%, and there is a large negative median real BAH returns of −51.464%. As with other samples of stocks, there is a large positive skewness in the real BAH returns of small stocks. There are only 35.1% of small stocks that generate positive real BAH returns, and only around 1/3 of small stocks generate a higher real BAH returns than T. Bill. The aggregate net wealth creation of small stocks is £24.9 billion. Only 37.9% of small stocks generate a positive wealth creation, and 3.2% of small stocks capture the aggregate net wealth of small stocks. Homeserve and Plus500 have generated the highest wealth creation among small stocks.

Panel B of Table 4 shows that AIM stocks have performed poorly. The mean real BAH return is −2.19%, and there is a massive negative median real BAH return of −79.817%. Only 22.3% of AIM stocks have generated positive real BAH returns, and only 23.4% of AIM stocks provide a higher BAH return than T. Bill. This is the lowest proportion of stocks that outperform the T. Bill. The aggregate net wealth creation of AIM stocks is negative £2.6 billion. Only 27.8% of AIM stocks generate a positive wealth creation. First Quantum Minerals, Western Coal, and Plus 500 are the three stocks with the largest wealth creation among AIM stocks.

Tables 1, 2, 3 and 4 show that with the exception of the pre Big Bang period, the aggregate wealth creation of U.K. stocks is highly concentrated. An interesting question is why has aggregate wealth become a lot more concentrated in the U.K. Autor, Dorn, Katz, Patterson, and Reenen

[12] The Small stock index is created by LSPD. It has changed names through the years due to changing sponsors but the index is the same.

Table 3 Summary of BAH returns and wealth creation: brexit and Covid

Brexit	Mean	Median	Std Dev	Skewness	Prop > 0
Panel A					
BAH Returns (%)					
Stock	−0.077	−39.059	198.831	16.86	0.343
Market	10.511	14.012	8.492	−0.592	0.846
T. Bill	−17.089	−22.681	8.778	0.715	0.028
	N	Prop > Market	Prop > T. Bill		
Stock	1932	0.297	0.398		
Wealth Concentration (£ thousands)	Net Wealth	Gross Wealth	Prop (Wealth) > 0	Prop comp	
	71,115,855	93,521,481	0.413	0.025	
Name	Wealth	BAH Returns	Prop Gross	Prop Net	
HSBC	6,992,244	0.772	0.075	0.098	
AstraZeneca	6,402,013	1.028	0.143	0.188	
Rio Tinto	4,703,719	1.678	0.194	0.254	
Shell	4,361,900	0.241	0.24	0.316	
BHP Billiton	3,194,198	1.863	0.274	0.361	
Glencore International	2,958,373	1.17	0.306	0.402	
Reed Elsevier	2,873,706	1.134	0.337	0.443	
London Stock Exchange	2,331,510	2.296	0.362	0.476	
Anglo American	2,301,446	2.193	0.386	0.508	
3i Group	2,083,395	4.724	0.408	0.537	
Covid	Mean	Median	Std Dev	Skewness	Prop > 0
Panel B					
BAH Returns (%)					
Stock	3.734	−36.701	780.965	38.363	0.312
Market	4.302	6.106	5.601	−0.342	0.801
T. Bill	−14.657	−17.2	5.575	1.881	0.041
	N	Prop > Market	Prop > T. Bill		
Stock	1540	0.296	0.388		
Wealth Concentration (£ thousands)	Net Wealth	Gross Wealth	Prop (Wealth) > 0	Prop comp	
	40,172,447	56,612,150	0.384	0.018	
Name	Wealth	BAH Returns	Prop Gross	Prop Net	
HSBC	4,383,763	0.428	0.077	0.109	
Shell	4,035,170	0.339	0.149	0.21	
AstraZeneca	3,551,682	0.268	0.211	0.298	
Rio Tinto	2,532,958	0.489	0.256	0.361	
Reed Elsevier	2,235,653	0.613	0.296	0.417	
Glencore International	2,120,715	0.693	0.333	0.469	
Rolls-Royce	2,084,364	0.988	0.37	0.521	

Table 3 (continued)

Covid	Mean	Median	Std Dev	Skewness	Prop>0
Panel B					
BHP Billiton	1,822,336	0.693	0.402	0.567	
3i Group	1,692,768	2.069	0.432	0.609	
Royal Bank of Scotland	1,559,286	1.021	0.46	0.648	

The table reports summary statistics of the real BAH returns (%) and the real wealth creation (£ thousands) of U.K. stocks in the post Brexit vote period (panel A), and post Covid period (panel B)

The post Brexit vote subperiod is July 2016 and December 2024, and the post Covid subperiod is March 2020 and December 2024

The first rows of each panel report summary statistics of the real BAH returns of stocks, U.K. one-month Treasury Bill (T. Bill), and the U.K. equity market (Mkt) index

The summary statistics includes the cross-sectional mean, median, standard deviation (Std Dev), skewness, and the proportion of positive (Prop>0) values

The BAH return of the T. Bill and market are matched to each of the time periods of the corresponding stocks

The next rows in each panel include the number of stock observations (N) and the proportion of times where the real BAH return of stocks are higher than the T. Bill (Prop>T. Bill), and market (Prop>Mkt) BAH returns

The next rows of each panel reports the aggregate net wealth, aggregate gross wealth, the proportion of stocks with positive wealth creation (Prop(Wealth)>0), and the proportion of stocks required to generate the aggregate net wealth

The remaining rows of each panel report the Wealth, and the real BAH returns of the ten companies with the largest wealth creation, and the cumulative proportion of both gross (Prop Gross) and net wealth (Prop Net) captured by the ten stocks

(2020) document the rise of superstar firms in the U.S. and in Europe as an explanation for the fall in labor share in GDP. Industries have become a lot more concentrated. These superstar firms are able to reap much larger rewards from markets than in earlier periods. They document a large concentration in sales across a range of industries. Autor et al. point out it could be due to technological change that has led to a "winners take all" environment.

The final issue we examine is the performance of the Wealth trading strategies. Our first set of tests look at monthly portfolio formation including the 100 stocks[13] with the highest wealth creation during the prior estimation rolling window of 120 months. Panel A of Table 5 reports the performance results between January 1985 and December 2024 of the Wealth trading strategies. The first rows in panel A include the annualized mean, standard deviation (Std Dev), and Sharpe performance of the EW and VW Wealth strategies, and the market index. The z-tests examine whether the differences are statistically significant between the Wealth strategies and the market index. The next rows report the terminal value of investing £1 in the Wealth strategies and market index and the corresponding annualized geometric means. The final rows are the annualized alphas and *t*-statistics (*t*-alpha) of the Wealth strategies relative to the three factor models.

Panel A of Table 5 shows that the VW Wealth strategy has very similar performance to the market index in terms of annualized mean, volatility, and Sharpe measures. The VW Wealth strategy has a marginally lower terminal wealth and geometric mean than the market. The annualized alphas of the VW Wealth strategy are small and statistically insignificant. The VW Wealth strategy is very highly correlated with the market index at 0.974. The EW Wealth strategy performs better than the VW Wealth strategy. The EW Wealth strategy has a higher annualized Sharpe measure that the market index, although the difference is not statistically significant. This performance is driven by a higher annualized mean excess return. The EW Wealth strategy does have a higher terminal wealth and geometric mean than the market index. The annualized alpha of the EW strategy relative to the FF3 is significantly positive at the 10% level. The EW Wealth strategy is also very highly correlated with the market index at 0.952, but the different weighting scheme to value weights seems to provide some performance benefits. The difference in performance between the VW and EW strategies likely stems from the fact that using value weights mirrors the market index more than the use of equal weights.

We repeat the performance tests, but this time use an annual portfolio formation for the Wealth strategies. Panel

[13] We also run the tests using the top 50 stocks and find similar results.

Table 4 Summary statistics of BAH returns and wealth creation: small stocks and AIM

Small Stocks	Mean	Median	Std Dev	Skewness	Prop > 0
Panel A					
BAH Returns (%)					
Stock	68.192	−51.464	584.506	17.934	0.351
Market	53.683	28.73	73.025	1.814	0.817
T. Bill	3.995	2.786	21.595	0.41	0.608
Prop > 0	N	Prop > Market	Prop > T. Bill		
Stock	5137	0.265	0.34		
Wealth Concentration (£ thousands)	Net Wealth	Gross Wealth	Prop (Wealth) > 0	Prop comp	
	24,916,553	51,553,533	0.379	0.032	
Name	Wealth	BAH Returns	Prop Gross	Prop Net	
Homeserve	336,127.6	176.772	0.007	0.013	
Plus500	333,106.5	44.451	0.013	0.027	
Hutchison China Meditech	287,871.9	24.356	0.019	0.038	
Ferrexpo	266,446.6	16.38	0.024	0.049	
Psion	263,960.5	20.444	0.029	0.06	
Croda International	238,955.2	13.939	0.033	0.069	
Cairn Energy	238,096.4	33.363	0.038	0.079	
Sibir Energy	231,596.6	5.665	0.043	0.088	
Playtech	230,775.2	4.59	0.047	0.097	
Greggs	221,472.2	55.074	0.051	0.106	
AIM	Mean	Median	Std Dev	Skewness	Prop > 0
Panel B					
BAH Returns (%)					
Stock	−2.19	−79.817	287.019	10.122	0.223
Market	21.273	15.795	31.676	1.01	0.735
T. Bill	−6.603	−2.914	14.675	−0.364	0.457
Prop > 0	N	Prop > Market	Prop > T. Bill		
Stock	3015	0.199	0.234		
Wealth Concentration (£ thousands)	Net Wealth	Gross Wealth	Prop (Wealth) > 0		
	−2,648,144	10,302,048	0.278		
Name	Wealth	BAH Returns	Prop Gross		
First Quantum Minerals	256,718.4	17.854	0.025		
Western Coal Corporation	205,528.1	3.269	0.045		
Plus500	187,640.4	18.241	0.063		
Abcam	179,380.3	19.722	0.08		
New Europe Property Investmt	174,648.8	1.907	0.097		
Dart Group	161,372.1	12.7	0.113		
Songbird Estates	158,437.3	0.071	0.128		

Table 4 (continued)

AIM	Mean	Median	Std Dev	Skewness	Prop>0
Panel B					
Izodia	13,3073	15.348	0.141		
Yamana Gold	131,814.7	2.671	0.154		
ASOS	125,789.6	52.628	0.166		

The table reports summary statistics of the real BAH returns (%) and the real wealth creation (£ thousands) of U.K. stocks in the Small stock index (panel A), and in the AIM (panel B)

The sample period for small stocks in December 1991 and December 2024, and for AIM stocks is June 1995 and December 2024

The first rows of each panel report summary statistics of the real BAH returns of stocks, U.K. one-month Treasury Bill (T. Bill), and the U.K. equity market (Mkt) index

The summary statistics includes the cross-sectional mean, median, standard deviation (Std Dev), skewness, and the proportion of positive (Prop>0) values

The BAH return of the T. Bill and market are matched to each of the time periods of the corresponding stocks

The next rows in each panel include the number of stock observations (N) and the proportion of times where the real BAH return of stocks are higher than the T. Bill (Prop>T. Bill), and market (Prop>Mkt) BAH returns

The next rows of each panel reports the aggregate net wealth, aggregate gross wealth, the proportion of stocks with positive wealth creation (Prop(Wealth)>0), and the proportion of stocks required to generate the aggregate net wealth

The remaining rows of each panel report the Wealth, and the real BAH returns of the ten companies with the largest wealth creation, and the cumulative proportion of both gross (Prop Gross) and net wealth (Prop Net) captured by the ten stocks

B of Table 5 reports the corresponding performance tests of the EW and VW Wealth strategies. The performance results using the annual portfolio formation are very similar to panel A of Table 5. There are some performance benefits in using the EW Wealth strategy in that it has the highest Sharpe measure, terminal wealth, and geometric mean. The annualized alphas of the EW Wealth strategy are all above 1%, and is significantly positive relative to the FF6 model.

Table 5 suggests that there are some performance benefits in the Wealth trading strategy when using equal weights. Levy (2024) and Levy and Roll (2024) argue that for investors with long horizons, the best strategy in selecting mutual funds is choosing the fund with the largest monthly Sharpe ratio. This is because over long horizons, fund returns converge to a lognormal distribution[14]. Using the stochastic dominance rules for lognormal returns, Levy (2024) shows that First Order or Second Order stochastic dominance at long horizons only occurs when it also holds in the monthly period, implying investors with long horizons would pick the fund with the highest monthly Sharpe ratio. Furthermore some authors (Latane (1959) and Markowitz (1976)) advocate selecting the strategy with the highest geometric mean for investors with indefinite long investment horizons.

Conclusions

We use the approach of Bessembinder (2018) and Bessembinder et al. (2023) to examine the real wealth creation of individual U.K. stocks between January 1975 and December 2024. We also examine the performance of Wealth trading strategies. There are four main findings in our study.

First, we find that aggregate real wealth creation is highly concentrated across the whole sample period. The aggregate net wealth created by U.K. stocks is around £305 billion. It only requires 3.1% of stocks to generate the aggregate net real wealth creation. There are only 46.5% of stocks with positive real wealth creation. We also find that the distribution of real lifetime BAH returns are highly positively skewed and only a minority of stocks earn a higher real BAH return than U.K. Treasury Bills. These results are consistent with Bessembinder (2018) and Bessembinder et al. (2023).

Second, when we split the sample period into two subperiods based on the Big Bang in October 1986 the real wealth creation of individual stocks is a lot less concentrated and the relative performance of individual stocks is a lot better in the pre Big Bang subperiod. In the pre Big Bang subperiod, it requires 28% of companies to generate the aggregate net real wealth creation, and 78.8% of stocks have positive

[14] Fama and French(2018b) show that the same pattern holds in market returns.

Table 5 Performance of wealth trading strategy

Monthly	Mean (%)	Std Dev (%)	Sharpe	
Panel A				
Mkt	4.997	14.757	1.173	
EW	6.132	16.094	1.32	
VW	4.77	14.367	1.15	
z-test	EW	VW		
Sharpe	0.86	−0.1		
Std Dev	4.11[1]	−1.11		
Mean	1.49	−0.38		
	Terminal Value	Geometric Mean (%		
Mkt	31.571	9.014		
EW	45.639	10.023		
VW	29.499	8.829		
SDF	EW alpha (%)	*t*-alpha	VW alpha (%)	*t*-alpha
CAPM	0.942	1.21	0.029	0.06
FF3	1.07	1.73[2]	0.201	0.46
FF6	1.162	1.57	−0.585	−1.16
Annual	Mean (%)	Std Dev (%)	Sharpe	
Panel B				
EW	6.417	16.662	1.334	
VW	4.994	14.569	1.188	
z-test	EW	VW		
Sharpe	0.94	0.12		
Std Dev	5.51[1]	−1.02		
vMean	1.74[2]	−0.01		
	Terminal Value	Geometric Mean (%)		
EW	49.236	10.232		
VW	31.892	9.042		
SDF	EW alpha (%)	*t*-alpha	VW alpha (%)	*t*-alpha
CAPM	1.05	0.74	0.18	0.36

Table 5 (continued)

Annual	Mean (%)	Std Dev (%)	Sharpe	
Panel B				
FF3	1.033	1.43	0.262	0.67
FF6	1.875	2.4[1]	–0.306	–0.67

[1] Significant at 5%

[2] Significant at 10%

The table reports the performance of the EW and VW Wealth trading strategies between January 1985 and December 2024

Panel A refers to the monthly portfolio revision and panel B to an annual portfolio revision

The strategies include the top 100 stocks with the highest real wealth creation during a rolling 120 month estimation window

The first rows in each panel include the annualized mean, standard deviation (Std Dev), and Sharpe performance of the EW and VW Wealth strategies, and the market index

The z-tests examine whether the differences are statistically significant between the Wealth strategies and the market index

The next rows report the terminal value of investing £1 in the Wealth strategies and market index and the corresponding annualized geometric means

The final rows are the annualized alphas and *t*-statistics (t-alpha) of the Wealth strategies relative to the three factor models

The test statistics are corrected for heteroskedasticity and serial correlation using the automatic lag selection (with prewhitening) of Newey and West (1987)

real wealth creation. The vast majority of individual stocks provide a higher real BAH returns than Treasury Bills. The relative performance of individual stocks is a lot weaker in the post Big Bang subperiod, which is similar to the overall period.

Third, we find that aggregate wealth creation is highly concentrated in the post Brexit vote and post Covid subperiods. It only requires 2.5% and 1.8% of stocks to generate the aggregate net wealth created in these subperiods. Likewise, looking at small stocks, aggregate net wealth is again highly concentrated with only 3.2% of small stocks generating all the aggregate net wealth. Stocks on AIM includes the poorest performance, and generates negative net aggregate wealth and the smallest proportion of stocks which provide a higher real BAH returns than T. Bills.

Fourth, we find some performance benefits for the Wealth trading strategy but only when using equal weights. The EW Wealth strategy has a higher Sharpe measure, terminal wealth, and geometric mean than both the VW Wealth strategy and market index. The EW Wealth strategy using an annual portfolio formation also delivers significant positive alpha relative to the FF6 model.

Our study suggests aggregate net wealth creation is highly concentrated in U.K. stock returns, except for the pre Big Bang subperiod. There are some performance benefits using the EW Wealth strategy. Our Wealth strategies have followed a passive approach. Evaluating the performance of the Wealth strategy using optimal portfolio rules such as Markowitz (1952) optimization or Michaud optimization (Michaud and Michaud (2008)) is worthy of more research. Our performance tests have used monthly returns. It would be of interest to examine the performance of the Wealth strategy over longer horizons such as in Levy (2022), Bessembinder, Cooper and Zhang (2023), and Levy (2024). We leave these issues to future research.

Appendix

All of the data is collected from LSPD and LSEG Worldscope. The accounting data comes from Worldscope, and all the remaining data come from LSPD.

In forming the factors, the following corrections are made. Foreign companies, investment trusts, and secondary shares are excluded. The delisting bias of Shumway (1997) is corrected following the approach of Dimson, et al., (2003). Where a company dies valueless according to LSPD, then we allocate a -100% return on the death event month. When calculating the portfolio returns used to form the factors, we allocate missing values, for things such as temporary suspension, to 0 as in Liu and Strong (2008). The

prior month-end market values are used to calculate value weights in the portfolios used to form the factors.

We form the market index following a similar approach to Dimson and Marsh (2001). At the start of January each year between 1975 and 2024, all stocks on LSPD that are alive are allocated to the market index. We then calculate the value weighted monthly returns during the next 12 months. We calculate the excess returns on the market index using the monthly returns of the one-month U.K. Treasury Bill.

We form the HML factor following a similar approach to Fama and French (2012). At the start of July each year between 1983 and 2024, all stocks are ranked on the basis of their market value and BM ratio. We allocate stocks into two size groups (Small and Big), where Big stocks are the top 90% by market value and small stocks are bottom 10% by market value. We also allocate stocks to three BM groups (Growth, Neutral, Value) using the BM breakpoints of 30% and 70% percentiles of the BM ratios of the Big stocks. We create 6 portfolios at the intersection of the independent 2×3 sorts (SG, SN, SV, BG, BN, and BV), and then calculate value-weighted monthly returns during the next 12 months.

The HML factor is calculated as the average of the HML_S and HML_B portfolios, where HML_S=SV-SG and HML_B=BV-BG. The BM ratio is calculated using the book value of equity at the fiscal year-end (WC03501) during the previous calendar year and the year-end market value. Size is measured by the market value at the end of June. We exclude companies with negative book values. From the 6 portfolios, we also calculate a SMB_{HML} factor as the average return of 3 Small stock portfolios minus the average return of 3 Big stock portfolios.

The RMW and CMA factors are formed as follows. At the start of July each year between 1983 and 2024, all stocks are ranked on the basis of their market value and either their gross profitability (GP) or investment growth (Inv). All stocks are then grouped into two size groups (Small and Big), three GP groups (Weak, Neutral, Robust), and three Inv groups (Conservative, Neutral, Aggressive). The GP and Inv groups are sorted by 30% and 70% percentiles of the GP and Inv measures of Big companies. Six size/GP (size/Inv) portfolios are formed at the intersection of the 2*3 sorts as SW, SN, SR, BW, BN, and BR (SC, SN, SA, BC, BN, and BA), and value weighted monthly returns on each portfolio is calculated over the next 12 months.

The RMW factor is then calculated as the average returns of RMW_S and RMW_B portfolios, where RMW_S = SR – SW, and RMW_B = BR – BW. The CMA factor is calculated as the average return of the CMA_S and CMA_B portfolios, where CMA_S = SC – SA, and CMA_B = BC – BA. We exclude companies with zero total assets. The GP of a company is calculated as the difference between sales revenue (WC01001) and the cost of goods sold (WC01051) divided by the total assets (WC02999) from the prior fiscal year t-1. Inv is defined as the annual change in total assets in years t-1 and t-2 divided by lagged total assets at t-2. From the 6 portfolios in each sort, we calculate SMB_{RMW}, and SMB_{CMA} factors, and the final SMB factor is the average return of the SMB_{HML}, SMB_{RMW}, and SMB_{CMA} factors.

The MOM factor is formed as follows. At the start of each month between July 1983 and December 2024, all stocks are ranked on the basis of their market value and cumulative buy and hold returns from months t-12 to t-2. All stocks are grouped into two size groups (Small and Big), and three momentum groups (Losers, Neutral, Winners) using breakpoints are 30% and 60% of the past returns of Big stocks. Six portfolios are formed at the intersection of the 2*3 sorts (SL, SN, SW, BL, BN, BW), and value weighted return is calculated over the next month for each portfolio. The MOM factor is calculated as the average returns of the MOM_S and MOM_B portfolios, where MOM_S = SW – SL, and MOM_B = BW – BL. Companies with incomplete returns during for the prior year are excluded. We then the extract the sample period January 1985 and December 2024 to run the performance tests.

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