

# Investing in small-cap stocks (and not only): benefits, risks and current trends

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## *1. Introduction*

What if you invested one penny in Stock X in Year Y? A question that nowadays we can see more and more on social networks but also on other platform about investments and finance. People are attracted by cheap bets with large upside potential and thus can be impressed when looking at the cumulative returns that stocks such as Apple, Amazon or Google delivered since they were known by a handful of people. Unfortunately for us, the chance of picking the future blue chips without hindsight, or an incredible talent for investing, is not a child's play. Investors can anyway enjoy potentially interesting performances by small, especially in a portfolio context and by accepting higher risk and maybe worse night of sleep. In this report we analyze the peculiar characteristics of this category of equity, academic research on it and some techniques to exploit this and/or other single characteristics of a stock to try to predict its future return by looking at the past.

## *2. Small-cap stocks*

Small-cap stocks is a term that designates the stock of a public-traded company whose market capitalization is between \$300

million and \$2 billion. Small-cap stocks constitute an interesting opportunity for investors since small-cap companies are often young companies with significant growth potential. Indeed, every major public company went through this phase and if investors would have invested in say Amazon (AMZN) on January 1<sup>st</sup> 2000 and hold it until March 26<sup>th</sup> 2022, they would have had a stunning 4657% return (Yahoo Finance). There are countless examples of small-cap stocks that after a few years delivered very high returns including the already mentioned AMZN, Apple (AAPL), Alphabet (GOOGL), and Netflix (NFLX). However, these constitute the small minority of incredibly innovative and successful companies and there are of course many examples of small-cap stocks that delivered disappointing returns or disappeared.

### *2.1 Hypothesis about their advantages and disadvantages*

It's important for investors to know the advantages and disadvantages of small-cap stocks before they add them to their portfolio's so that they can minimize typical small-cap risks and maximize their returns and diversification benefits.

The first important advantage of small-cap stocks is the already mentioned high growth

potential which is due to their small capitalization and consequently large room for future growth compared to large-caps which translates into higher overall returns.

The second advantage of small-caps consists of the high probability that they are mispriced. Most analysts focus on large-caps since it's easier to find information on them compared to small-caps. Furthermore, there are many more small-cap stocks than large or mega-cap stocks and since most analysts have limited time to assign to each individual stock they can't cover the full small-cap universe. Indeed, data shows that there are about 3 and 10 times more small-caps than large and mega-caps respectively (Stanhope & Meredith, 2015). This mispricing constitutes a significant opportunity for investors as they can leverage this inefficiency and earn great returns.

The main disadvantage of small-cap stocks is that they involve high levels of risk. One of the problems that small-cap companies face is that they have less access to capital and financial resources which makes it difficult for them to obtain funding to scale and expand their business or pursue new opportunities (Maverick, 2022). Furthermore, since small-caps usually don't have vast resources, they aren't industry leaders, they have low borrowing power, and they are more likely to have negative

cash flows, they tend to underperform large-caps during recessions and bear markets (Bowman, 2022). Indeed, unexpected emergencies are a bigger threat for small-caps as the risk of facing a significant setback or going bankrupt is much higher.

Finally, small-caps are also less liquid than large-caps (Maverick, 2022). This might be problematic for investors as they could have difficulties to buy or sell shares quickly at favorable prices.

## *2.2 Comparison of small-caps returns in the US and Europe to the relevant market indexes*

To compare the returns of small-caps and large-caps we explored the Russell 2000, which consists of an index that tracks the 2000 smallest companies included in the Russell 3000 which represents the entire US market, and the S&P 500 which tracks the 500 biggest US companies by market capitalization.

Figure 1 shows the performance of the Russell 2000 and the S&P500 in the last 20 years. Since 2000, the Russell 2000 has delivered a 344.84% return compared to a 225.25% return for the S&P 500. Investors should also note that in the sub-prime crisis period in 2008-2009 and the pandemic in

2020, the Russell 2000 experienced steeper drops than the S&P 500.



Figure 1: Yahoo Finance

Furthermore, annualized risk measured by the standard deviation over the last 10 years is 17.94% (FTSE Russell, 2022) and 13.24% (S&P Dow Jones Indices, 2022) for the Russell 2000 and the S&P 500 respectively.

However, it is interesting to note that in Europe small-caps are also more risky than large caps but haven't delivered higher returns over the long term.

Figure 2 shows the performance of the iShares MSCI Europe Small-Cap ETF (IEUS) which tracks the performance of the MSCI Europe Small Cap index constituted by over 1000 European small-cap companies, and the Euronext 100 which tracks the performance of the 100 biggest European companies by market capitalization. Contrary to the US, in Europe the large-cap index has outperformed the small-cap index in the last 10 years and similarly to the US, the volatility and risk of small-caps are higher than large-caps.



Figure 2: Yahoo Finance

### 2.3 How to select small-cap stocks

Having covered the main advantages and disadvantages as well as the performance and risk of small-caps we further our analysis on how to maximize returns and minimize risks by selecting certain small-cap stocks based on different metrics.

The first set of criteria come from a comparison between the Russell 2000 and the S&P SmallCap 600, both indexes cover small-cap stocks, but the S&P SmallCap 600 has outperformed the Russell 2000 in terms of annualized returns in 3,5-,10-, and 20-year periods as well as having lower annualized volatility in those same periods (Brzenk et al., 2019). A study performed in 2019 found that this difference was due to the fact that, unlike the Russell 2000, the S&P SmallCap 600 utilized profitability, liquidity, and investability criteria to select its securities (Brzenk et al., 2019). Indeed, the S&P SmallCap 600 would only include a security if the sum of the most recent quarter earnings was positive, if the annual trading turnover was at least 100% of shares

outstanding and a minimum of 250,000 shares were traded in the 6 months preceding the evaluation, and at least 10% of the shares were publicly floated compared to only 5% for the Russell 2000 (Brzenk et al., 2019). Figure 3 highlights the differences in returns by both indexes from 1994 to 2018.

YEAR	S&P SMALLCAP 600	RUSSELL 2000	EXCESS RETURN	NUMBER OF MONTHS S&P SMALLCAP 600 OUTPERFORMED RUSSELL 2000
1994	-4.77	-1.82	-2.95	4
1995	29.96	28.45	1.51	6
1996	21.32	16.49	4.83	10
1997	25.58	22.36	3.22	8
1998	-1.31	-2.55	1.24	9
1999	12.40	21.26	-8.85	4
2000	11.80	-3.02	14.82	8
2001	6.54	2.49	4.05	6
2002	-14.63	-20.48	5.85	8
2003	38.79	47.25	-8.46	4
2004	22.65	18.33	4.32	6
2005	7.68	4.55	3.13	7
2006	15.12	18.37	-3.25	5
2007	-0.30	-1.57	1.27	6
2008	-31.07	-33.79	2.71	8
2009	25.57	27.17	-1.60	5
2010	26.31	26.85	-0.55	6
2011	1.02	-4.18	5.19	9
2012	16.33	16.35	-0.02	7
2013	41.31	38.82	2.49	7
2014	5.76	4.89	0.86	6
2015	-1.97	-4.41	2.44	8
2016	26.56	21.31	5.25	7
2017	13.23	14.65	-1.41	4
2018	-8.48	-11.01	2.53	7
<b>Annual Average</b>	<b>10.08</b>	<b>8.28</b>	<b>1.80</b>	-

Figure 3: S&P Dow Jones Indices LLC, FactSet.

In addition, Stanhope and Meredith (2015) found that selecting small-caps based on valuation, quality, and momentum consistently lead to higher returns. They divided small-cap stocks in quintiles and assigned each stock to a quintile based on the yearly return, after back testing this approach, they found that the best quintile outperformed by 65.2% per year for more than 50 years and the majority of stocks that

composed it were undervalued and of high quality measured by financial strength, earnings quality, earnings growth, and momentum. The results are presented in Figure 4.

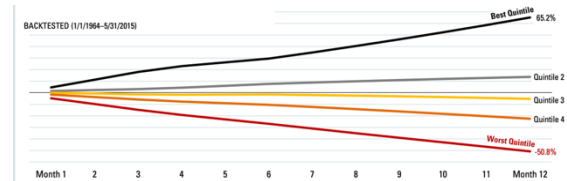


Figure 4: O'Shaughnessy Asset Management

The price-to-earnings ratio (PE ratio) and the price-to-book ratio (PB ratio) are often used to identify undervalued stocks. Indeed, the Russell 2000 Value Index selects small caps with low PB ratios, and it outperforms the Russell 2000 in annualized returns (Stanhope & Meredith, 2015). Having said that, based on the research of Stanhope and Meredith (2015), we recommend investors to use a multi-factor approach to the valuation of small caps instead of a single factor focusing on PE or PB ratio to increase the robustness of the analysis and avoid value traps as well as biases to sectors, cap ranges and specially liquidity as low PB small caps tend to be less liquid which can drastically reduce return prospects as mentioned before. We suggest that investors therefore focus on the combination of PB ratio, sales, cash flows, earnings, and return of capital (ROC) as

highlighted by Stanhope and Meredith (2015).

As mentioned before when assessing the quality of a small cap stock investors should focus on financial strength, earnings quality, earnings growth, and momentum. Financial strength refers to companies that are not heavily levered, are not issuing a lot of equity and debt, and can face their current and non-current liabilities. Investors should select stocks with high cash flow coverage ratios, and high current and quick ratios. Earnings quality measures whether earnings are driven by cash generation or non-cash accruals. Here investors need to expend more effort and should investigate changes in receivables balances, nonrecurring gains, and the net income to cash from operations ratio (Thakur, 2022). Earnings growth simply refers to profitability and the trend in earnings and investors can simply look at the growth in revenue as well as earnings throughout the quarters and years. Lastly, momentum as suggested by Stanhope and Meredith (2015), refers to the recent market trend over the last 3 to 9 months as well as volatility and in this case, they advise investors to select stocks that have not been heavily penalized during that period and have not experienced excessive volatility.

The results that Stanhope and Meredith (2015) obtained by incorporating these

measures into selecting small cap stocks are presented in Figure 5. As expected, the annualized returns of a basket of stocks selected based on the highlighted criteria deliver significant excess returns compared to the overall Small Cap universe.

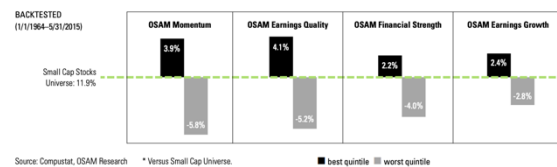


Figure 5: O'Shaughnessy Asset Management

## 2.4 Conclusion on their performance

To conclude on small caps, investors should consider investing into small cap stocks due to their return potential as well as diversification benefits. However, investors need to consider the increase in risk by investing in these securities and select small caps after investigation their value, liquidity, and overall quality to ensure maximal returns while lowering volatility and risk.

## 3. Small stocks and more: the challenges of data-driven investing

Investing in small stocks is only one of the many strategies following a data-driven or

systematic investing approach. These techniques rely on insights resulting from data and scientific research by which more or less complex security-selection and portfolio formation rules are devised and back tested. Apart from these rules, this approach tends to be quite blind as for which securities are picked: it has little or nothing to do with extensive fundamental research and valuation of single instruments, but rather leans on that scientific research and on an usually very high number of portfolio constituents to reduce firm-specific impact on the portfolio return, and maximize this latter according with the insights obtained *ex ante*. The burden of determining the portfolio rebalancing frequency and the threshold used to assign or not a stock to a specific portfolio is fully entrusted to statistical softwares, tests and previous research. Many of these portfolio strategies aim to deliver the so-called alpha, the risk-adjusted abnormal return resulting from regressing the portfolio return over a set of risk factor models widely accepted by the academia and considered capable of detecting all most of the forms of systematic, undiversifiable risk investors price in the securities they invest in. Whenever these models – such as the Fama, French (1993, 2015), Carhart or Hou et al.’s (2021) ones – don’t estimate an intercept significantly different from zero, the value

of the intercept (the alpha) could be considered either a “free lunch” somewhat not already arbitrated away, or the consequence of another undetected source of risk – for example, when an economic reason behind it can be found. Academics usually try to investigate which of the two alternative hypothesis holds, and often carefully question the validity and replicability of the findings of some colleagues of theirs. Indeed, some results claiming notable, attractive abnormal returns may be merely due to a lucky sample selection, or to overlooked transaction costs, or to data-mining at worst. Investors following systematic strategies are exposed also to this kind of statistics-related risks.

Anyway, as academics usually publish their findings on widely publicly available platforms and investments firms started commercializing data-driven approaches more and more, it’s not surprising that over the years an increasing share of investors adopted these strategies, with the consequence that most of these latter lost their profitability. This is what happened also to the size anomaly, that is the one taking a long position on small stocks and a short stake on large ones. After its first discovery in the US by Banz (1981), subsequent empirical research showed its disappearance already in the early 80s (Van



Dijk, 2011), with sporadic comebacks<sup>1</sup>. Fama (1998) shows that, indeed, for many anomalies post-event continuation of pre-event abnormal returns is about as frequent as post-event reversal. Nevertheless, asset managers and other professionals argue that the devil is the detail: systematic strategies that are publicly disclosed and easily replicable are the most likely to have a short life. Sometimes, even small and apparently irrelevant details can reverse the situation and turn a trivial idea in a goose laying golden eggs, they say. In the next paragraph we briefly present a strategy discovered by Hackel, Livnat and Rai in 1994 and based on stock selection by both company size and free-cash-flows.

### *3.1 The free-cash flow anomaly: background*

Hackel, Livnat and Rai (1994,2000) document the existence of an anomaly according to which portfolios with long positions on consistent free-cash-flow-generator US firms outperforms the market in both normal and bad periods. This strategy seems to provide abnormal return

after correcting for risk factors, and apart from small stocks, where also Jokipii et al. (2006) document it as for the Finnish market, results profitable also when the investment universe is extended to bigger stocks. We decided to examine it since we deemed it potentially interesting in the current period of rising interest rates. In Hackel et al.'s (2000) paper, the main conditions for the equity of a company to be eligible are:

- a market capitalization above \$50 million, to avoid noisy results caused by excessive movements of “microcap” stocks
- a positive four-year-average and most recent operating free cash flow
- a positive four-year-average net operating cash flow
- a positive growth in net operating cash flow over the last four years
- the total debt to four-year-average free cash flow ratio is lower than 10
- To further ensure consistent free cash flow generation, free cash flows must have increased over the last four and eight years
- The market capitalization to four-year-average free cash flow ratio

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<sup>1</sup> As of today, actually, nobody thinks anymore that this is a market anomaly but, instead, it is recognized as a full-fledged risk factor alongside with the market risk. Indeed, a size factor is present in almost every asset pricing factor model. The economic rationale behind the (not anymore) abnormal return provided by a small-misus-big portfolio lies in small stocks being generally

less reviewed by equity analysts and thus more opaque than large stocks. Furthermore, they are generally less liquid and small companies are more sensitive to overall market movements. Investing in small cap equity will hardly provide investors with free lunches.

must not be lower than 5, a quite low value used to exclude firms whose data was misreported or belonging to the financial sector, and should be lower than the median value of the multiple itself, in order to select stocks trading at cheaper values of this multiple

Portfolios are rebalanced annually and consist of all the stocks who passed the screening above. In their paper published in 2000, these authors study the period between 1979 and 1996 and report that these portfolios outperformed the market return, regardless of which of the two definitions of free cash flow was used to select securities<sup>2</sup>. Also the net alphas<sup>3</sup> found are positive, and significant after correcting for all but one of the risk factors (the market factor, in this case). The aspect that most questions the reliability of this findings is the use of those risk factors one-by-one, without combining them in a unique regression model in order to exploit their explanatory power altogether.

Thus, although with some simplifications, we wanted to conduct some tests on an analogous strategy.

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<sup>2</sup> Conducting robustness checks and sensitivity analysis is common practice in this area, to further reduce concerns about misleading sample and variable choice

### *3.2 Free cash flow strategies: tests*

Our sample consisted of US-listed stocks over the period between 1990 and 2021. The portfolio formation rules we followed are:

- every year, the initial investment universe consists of the 2000 companies with the highest market capitalization, as of Dec 31<sup>st</sup> of the previous year, among those listed on the NYSE, NASDAQ and AMEX
- due to the recent pandemic, FCF data over then last four years may not be as indicative of the degree of financial solidity a company has today. In this particular context more recent data may have more informational value. To test the outcome of a strategy implementable as of today, we simplified the rules by looking at either the reported free cash flow generated in the previous year, as of Dec 31<sup>st</sup> of each year, or at the one related to the last reported quarter.
- For further tests, the investment universe is further splitted in two equally large subgroups, reconstituted each year, according

which may have fortunately fitted in the main analysis without a real stable link between them and the inferred result, out-of-sample.

<sup>3</sup> With transaction costs assumed flat and equal to 2%

to a cutoff level equal to the median market capitalization observed on Dec 31<sup>st</sup> of the previous year. This split is driven by empirical research suggesting that some alleged anomalies and free lunch in equity investing are more common among smaller instruments.

Portfolios are formed every January 1<sup>st</sup> with the 20% of investment universe that reported the highest FCF, and are kept until Dec 31<sup>st</sup> of the same year. The benchmark portfolios used are the US market portfolio and a portfolio formed with the 1000 smallest stocks of the investment universe. In a first phase we ran the same set of tests for both the versions of the strategy. In a second moment, while implementing the strategy that appeared to have delivered the best results in the first phase, we iterated those tests on portfolios formed with respectively the big best FCF stocks and small best FCF stocks.

As for the first phase, the common results we found are less optimistic than those by Hackel et al. First, equal-weighted portfolios delivered the worst performance over the period. For brevity, the results discussed will regard value-weighted portfolios. Regarding the characteristics of

the stocks in each FCF-based quintiles, we found that the average relative bid-ask spread by quintile increases in average FCF: this means that an apparent outperformance of this strategy with respect to the market may be partially due to higher transaction costs to bear. Quite predictably, firms with high FCF are not financially distressed: this fact is reflected in the book-to-market ratio, decreasing in FCF. In further support to the financial solidity of the stocks in the highest quantile, the average current ratio increases in free cash flow average values<sup>4</sup>.

As for M<sup>2</sup> measures<sup>5</sup>, none of the strategies and benchmark portfolios dominated the others over the whole 30 years. In the most recent period, starting from about 2018, the best FCF stocks seems to have lead.

Cumulative and alpha returns point at the strategy using the previous quarter FCF as key variable as the best one. Besides a small stock portfolio, we compared the cumulative return of the best FCF portfolio to the return of the worst FCF one: Hackel et al. (2000) indeed argue that stocks reporting low or negative FCF are not necessarily more likely to deliver future poor returns: companies could report such cash flows due to high investments in R&D

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<sup>4</sup> The same results apply also for equal weighted portfolios.

<sup>5</sup> This measure allows direct comparisons between the return of a (de)leveraged version of a portfolio

P and a benchmark portfolio with the same level of volatility. Besides being defined in return terms rather than as a scalar, it delivers the same ordinal ranking provided by the Sharpe Ratio.

and innovation and enjoy future new business opportunities for that. In fact, these portfolios still performed better than the equal weighted best FCF rival.

Hackel et al. (1994) and in line with Jokipii et al. (2006), evidence here suggests that larger companies starkly better perform.

	FCF Quintiles				
	1	2	3	4	5
<i>Mean of:</i>					
<b>Current Ratio</b>	1,52	2,027	2,613	3,366	2,478
<b>Company Size (\$ million)</b>	21853,1	5717,44	3083,96	1893,8	6335,99
<b>Book-to-Market Ratio</b>	1,228	0,93	0,782	0,628	0,629
<b>Relative bid-ask spread</b>	0,0022	0,0021	0,0022	0,0024	0,001

Table 1: average characteristics of quintile portfolio based on previous quarter FCF

The alphas estimated through a Fama-French five factor model and a Fama-French three factor model plus a quality factor (Asness et al., 2018) equal a significant 0.4% per month for a portfolio based on the financially strongest firms in terms of FCF. When past year FCF are used, only the former model estimates positive significant alphas.

To investigate whether there is a link between size and profitability of our most profitable FCF strategy, as suggested by the poor performance of an equal weighted portfolio, in the second phase the analysis is repeated on portfolios jointly based on size and financial strength. In contrast with

### 3.3 Free cash flow anomaly: considerations

The tables and figure below sum up the main results from the analysis of the portfolio strategy based on past quarter FCF. Also the cumulative returns from the other strategy are reported to allow comparisons. It is interesting to note that the rise of FCF stocks apparently occurred only in the last decade, while not being so much evident before. It is difficult to find a reason behind this outperformance that could exclude the hypothesis of a free lunch, since achieving higher free cash flow doesn't appear to be a source of risk for a company<sup>6</sup>. Hackel et al. (2000) relate it with

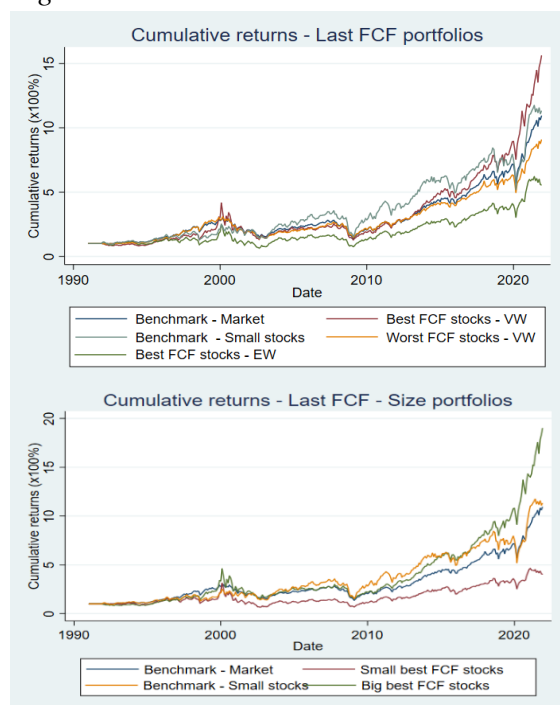
<sup>6</sup> In results unreported for brevity, the return of a "FCF factor" constructed according with Fama, French's (1993) methodology is regressed on several asset pricing model, to further verify

whether this performance can be explained by other widely accepted factors. No regression model delivers a not positive and significant alpha.

excessive overreaction to negative earnings reports which causes investors to temporarily overlook the financial outlook for a FCF-strong company.

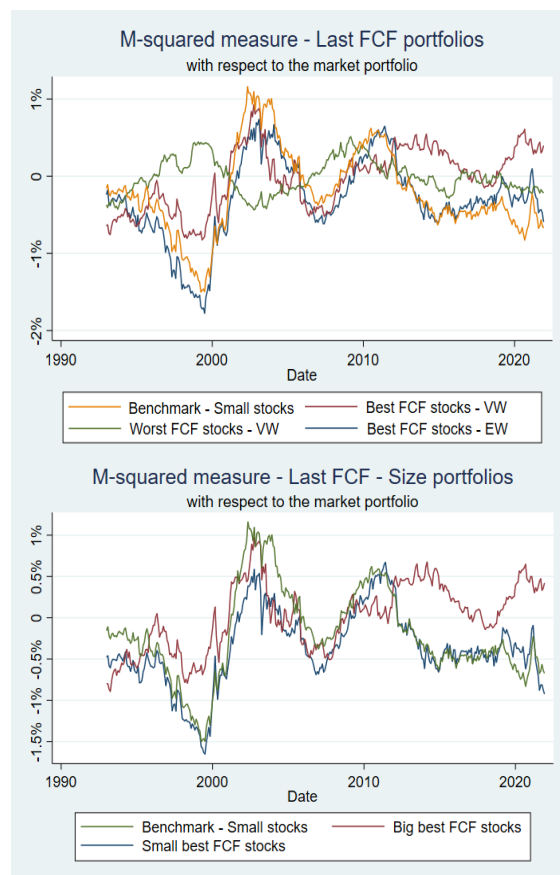
Our strategy is just a simple example of how systematic investing works. Commercialized and undisclosed strategies require much more testing and complexity, and more and more the use of AI and machine learning nowadays. Nevertheless, it is clear how much variable and sample definition can affect the final outcomes. Even in the cases in which such a type of investing techniques worked for a period and after transaction costs, the situation can rapidly change as soon as the methodology or the market and investors' taste do.

Figure 6



Indeed, factors that are positively related with the performance of profitable companies are associated with negative coefficients, interestingly.

Figure 7



	Best FCF Return	Best FCF Return	Small-Best FCF Return	Small-Best FCF Return	Big-Best FCF Return	Big-Best FCF Return
Market	0.987	0.992	0.980	0.914	0.984	0.998
	(0.036)***	(0.041)***	(0.025)***	(0.029)***	(0.040)***	(0.046)***
Size	0.002	0.003	0.009	0.010	0.002	0.003
	(0.001)***	(0.001)***	(0.000)***	(0.000)***	(0.001)***	(0.001)***
Value	-0.565	-0.709	-0.346	-0.568	-0.567	-0.714
	(0.059)***	(0.045)***	(0.041)***	(0.032)***	(0.066)***	(0.050)***
Investment Policy	-0.044		-0.143		-0.046	
	(0.092)		(0.064)**		(0.101)	
Profitability	-0.460		-0.603		-0.463	
	(0.065)***		(0.045)***		(0.072)***	
Quality		-0.204		-0.530		-0.180
		(0.073)***		(0.052)***		(0.080)**
Alpha	0.004	0.004	0.001	0.001	0.005	0.004
	(0.001)***	(0.002)**	(0.001)	(0.001)	(0.002)***	(0.002)**
R <sup>2</sup>	0.83	0.81	0.94	0.93	0.80	0.78
N	372	372	372	372	372	372

Table 2: regression results for the past-quarter-FCF strategy

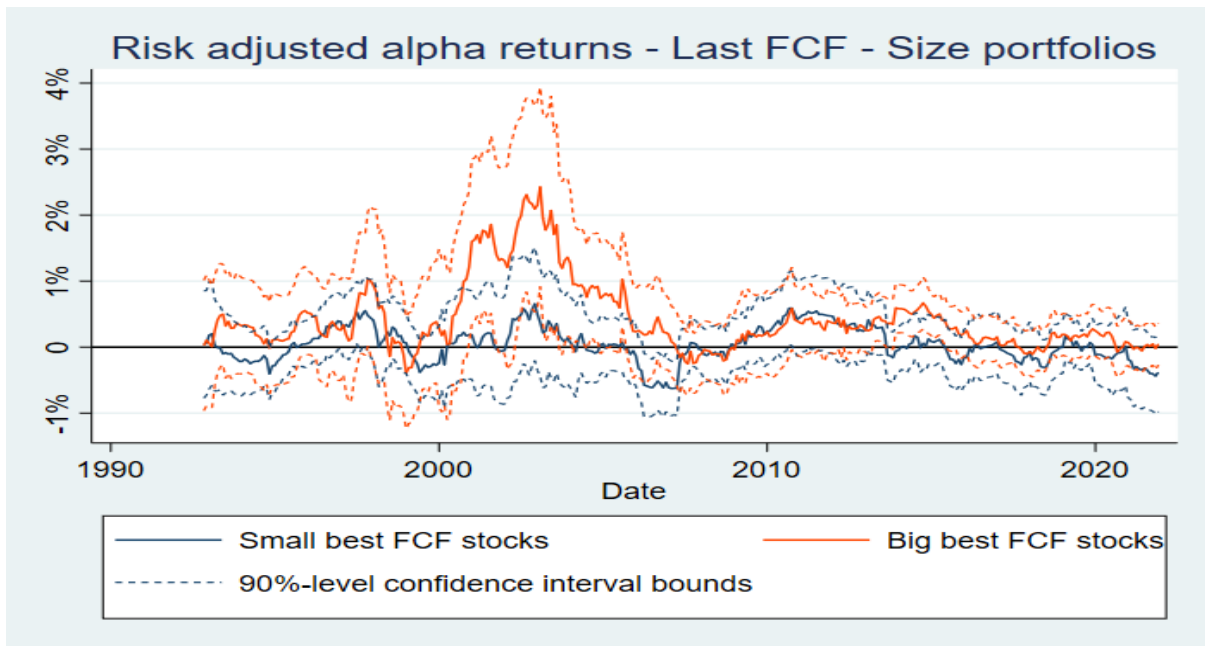


Figure 8

An aerial night view of a city skyline, likely New York City, with a blue overlay. The image shows a dense urban landscape with numerous skyscrapers and buildings, some of which are illuminated. A large body of water is visible in the background, and the sky is a deep blue with some light clouds. The overall tone is dark and moody, with the blue overlay creating a sense of depth and focus.

# Conclusion

Small-cap stocks present an often overlooked opportunity for investors to diversify their portfolios and pursue higher returns. Having said that investors should note that the quality of small companies and their underlying equity varies widely and they should therefore focus on selecting small-cap stocks based on metrics such as liquidity, value, earnings strength, and free cash flow generation. We further explored data-driven investing and more specifically the free cash flow anomaly, and then tested it and concluded that high free cash flow generating equity may have had better days and that the increasing focus of investors on them seems to have lowered the benefits of investing in these stocks.

## References

- Asness, C. S., Frazzini, A., & Pedersen, L. H. (2018). Quality minus junk. *Review of Accounting Studies*, 24(1), 34–112.
- Banz, R. W. (1981). The relationship between return and market value of common stocks. *Journal of Financial Economics*, 9(1), 3–18.
- Bowman, J. (2022, February 28). *Are Small-Cap Stocks Risky?* The Motley Fool. Retrieved April 22, 2022, from <https://www.fool.com/investing/stock-market/types-of-stocks/small-cap-stocks/are-small-cap-stocks-risky/>
- Brzenk, P., Hao, B., & Soe, A. M. (2019, September). *A Tale of Two Small-Cap Benchmarks: 10 Years Later*. S&P Dow Jones Indices. <https://www.spglobal.com/spdji/en/documents/research/research-a-tale-of-two-small-cap-benchmarks-10-years-later.pdf>
- Carhart, M. M. (1997). On Persistence in Mutual Fund Performance. *The Journal of Finance*, 52(1), 57–82.
- Fama, E. F. (1998). Market efficiency, long-term returns, and behavioral. *Journal of Financial Economics*, 49(3), 283–306.
- Fama, E. F., & French, K. R. (1993). Common risk factors in the returns on stocks and bonds. *Journal of Financial Economics*, 33(1), 3–56.
- Fama, E. F., & French, K. R. (2015). A five-factor asset pricing model. *Journal of Financial Economics*, 116(1), 1–22.
- FTSE Russell. (2022, March). *Index Factsheet Russell 2000*. <https://research.ftserussell.com/Analytics/FactSheets/temp/1a69263e-c995-4ec9-b29d-0178096596b7.pdf>
- Hackel, K. S., Livnat, J., & Rai, A. (1994). The Free Cash Flow/Small-Cap



- Anomaly. *Financial Analysts Journal*, 50(5), 33–42.
- Hackel, K. S., Livnat, J., & Rai, A. (2000). A Free Cash Flow Investment Anomaly. *Journal of Accounting, Auditing & Finance*, 15(1), 1–24.
- Hou, K., Mo, H., Xue, C., & Zhang, L. (2020). An Augmented  $q$ -Factor Model with Expected Growth\*. *Review of Finance*, 25(1), 1–41.
- Jokipii, A., & Vähämaa, S. (2006). The Free Cash Flow Anomaly Revisited: Finnish Evidence. *Journal of Business Finance and Accounting*, 33(7–8), 961–978.
- Maverick, J. B. (2022, January 26). *How Small Cap Stocks Differ in Risk vs. Large Cap Stocks*. Investopedia. Retrieved April 22, 2022, from <https://www.investopedia.com/ask/answers/032615/how-do-risks-large-cap-stocks-differ-risks-small-cap-stocks.asp>
- S&P Dow Jones Indices. (2022, March). *Factsheet S&P500*. [https://www.spglobal.com/spdji/en/idsenhancedfactsheet/file.pdf?calcFrequency=M&force\\_download=true&hostIdentifier=48190c8c-42c4-46af-8d1a-0cd5db894797&indexId=340](https://www.spglobal.com/spdji/en/idsenhancedfactsheet/file.pdf?calcFrequency=M&force_download=true&hostIdentifier=48190c8c-42c4-46af-8d1a-0cd5db894797&indexId=340)
- Stanhope, E., & Meredith, C. (2015, July). *Inefficiency Breeds Opportunity in Small Cap Equities*. O’Shaughnessy Asset Management. [https://www.osam.com/pdfs/whitepapers/\\_4\\_Commentary\\_InefficiencyBreedsOpportunitySmallCapEquities.pdf](https://www.osam.com/pdfs/whitepapers/_4_Commentary_InefficiencyBreedsOpportunitySmallCapEquities.pdf)
- Thakur, M. (2022, March 28). *Quality of Earnings*. WallStreetMojo. Retrieved April 22, 2022, from <https://www.wallstreetmojo.com/quality-of-earnings/>
- Van Dijk, M. A. (2011). Is size dead? A review of the size effect in equity returns. *Journal of Banking & Finance*, 35(12), 3263–3274.

