10-2021

FAANG stocks

Roger LOH
Singapore Management University, rogerloh@smu.edu.sg

FAANG Stocks*

Roger K. Loh†

October 2021

Abstract

A portfolio of FAANG stocks does not show remarkable outperformance after the acronym was coined. Monthly returns attenuate by more than half after controlling for common factor exposures using traditional or modern asset-pricing models. Alphas in the post-acronym period are not always statistically significant. Pre-acronym alphas are in contrast strong and robust. FAANG-sector stocks comove more with a FAANG portfolio in the post-acronym period. But sorting stocks on their FAANG beta does not earn a reliable return spread. These results might be consistent with investors over-extrapolating the success of hot investing themes, and abnormal profits become less remarkable after popularization.

Keywords: FANG stocks; FAANG stocks; Extrapolative beliefs; Comovement
JEL Classification Codes: G12, G14

*I thank Weikai Li and Chishen Wei for helpful comments.

†Associate Professor of Finance, Singapore Management University, Lee Kong Chian School of Business, 50 Stamford Road, Singapore 178899. Tel: (65) 6828-0243. Email: rogerloh@smu.edu.sg. Website: www.mysmu.edu/faculty/rogerloh/.

1. Introduction

In February 2013, Mad Money host Jim Cramer used the "FANG" acronym to describe Facebook, Amazon, Netflix, and Google as being totally dominant in their markets.[1] Apple was added to this set in October 2017 and the term was recoined "FAANG".[2] These companies became part of a popular investing theme and the key touted attributes of this theme are Big Tech and market outperformance.

In this paper, I quantify the abnormal performance of a portfolio of FANG/FAANG stocks after the coining of the FANG acronym in 2013 (with Apple added in October 2017 as the additional FAANG). Although these companies have been continually depicted as market beaters by the media, how impressive really is their abnormal return (i.e. alpha) after controlling for known factors that drive individual stock returns? I will use both traditional asset-pricing models and many recently introduced multi-factor models to ascertain whether and how much these stocks outperformed if one had jumped on investing in these stocks immediately after this acronym was coined. This analysis is particularly relevant as the recent decade has seen the outperformance of growth stocks (see, e.g. Lev and Srivastava (2019), Israel, Laursen, and Richardson (2020), and Arnott, Harvey, Kalesnika, and Linnainmaa (2021)), when it is value stocks that typically outperform (e.g., Graham and Dodd (1934) and Fama and French (1992)). Since these companies are growth-oriented, we can assess whether their outperformance, if indeed that they outperform, is robust when benchmarked against factor models that can account for the value/growth style.

I also examine the performance of these stocks prior to the coining of the acronym. This can inform us whether their outperformance, which presumably led to the media labelling, is robust to controls for common factor exposures. Studies like Greenwood and Shleifer (2014) and Da, Huang, and Jin (2021) document that investors might have extrapolative beliefs and their expectations about future returns are positively related to recent past returns. If

[1] See CNBC article: Does Your Portfolio Have FANGs?
[2] See CNBC article: Move over 'FANG' stocks, now there's 'FAAANG'.

naive investors indeed chase recently hot investing themes and these past returns are not related to future performance, the outperformance of recently successful themes could decline after popularization. On the other hand, the fact that the FANG theme still generates so much buzz almost a decade after 2013 might indicate that their outperformance continues unabated. Overall, the answers to these questions would be of great interest to investors, market commentators, and academics. To the best of my knowledge, there is surprisingly no existing academic study that carefully examines these questions and I aim to fill this gap.

Here are the main results of this study. If one were to hold a portfolio of FAANG stocks from February 2013 to August 2021, which I call the post-acronym period, the value-weighted average raw return of this portfolio is an impressive 2.553% per month. Note that these returns are "implementable" in the sense that the portfolio holds all four FANG stocks from February 2013 when the FANG term was first coined, and adds Apple only in October 2017 when it gets included in the modified FAANG acronym.[3] However, a simple control for market returns by estimating the Capital Asset-Pricing Model (CAPM) results in an alpha of only 1.154%—less than half of the raw monthly return performance of 2.553%. Factor models that account for the value/growth factor further attenuate the stock return performance—the Fama and French (1993) three-factor alpha is 0.704% per month, the Carhart (1997) four-factor alpha is 0.619% per month, and the Fama and French (2018) six-factor alpha is 0.658% per month. Two of these three alphas are still statistically significant but barely so, with t-statistics all three alphas being less than 2. For other factor models, where the factors returns are only available up to December 2020, the alpha is 0.733% for the investment-motivated Hou, Xue, and Zhang (2014) q-4 model, 0.401% for the Hou, Mo, Xue, and Zhang (2020a) q-5 model, and 0.841% for the Daniel, Hirshleifer, and Sun (2019) (DHS) behavioral model. The q-5 alpha is not statistically different from zero and the other two alphas are significant only at the 10% level. Together, these results show that the magnitude of FAANG stock outperformance is not remarkable post-2013 as it can mostly be explained

[3]Similar results are obtained if the portfolio starts only in March 2013.

by factor models and is not always statistically different from zero.

When the return of each FAANG stock is equally weighted instead of weighted according to their market cap, FAANG stock portfolio performance in the post-acronym period is stronger. The caveat is that this weighting method requires active trading to maintain equal weights every month and will incur higher trading costs. Hence the higher reported returns are less attainable by investors. While equal-weighted portfolios show greater robustness of FAANG stock outperformance in the post-2013 period, we still see the average returns attenuate by more than half after controlling for the asset-pricing factors that drive monthly stock returns.

I make two modifications to the post-acronym portfolios to examine the robustness of these post-acronym results. First, note that the above less remarkable post-acronym results include the effects of the Covid-19 pandemic which provided an unexpected boost to the fortunes of large technology firms. This implies that when limiting the post-acronym period to exclude the Covid-19 period, their alphas could weaken. And I find that indeed this is the case—alphas which were barely significant are now statistically insignificant. Second, one might argue that the FAANG stocks became so large in the post-acronym period so that they exert an out-sized influence on the factors, and this could make it easier for the factors to explain the returns of the FAANG portfolio. To test this, I reconstruct the market, size, value/growth, and momentum factors by excluding the FAANG portfolio constituents. These "ex-FAANG" factors continue to attenuate the FAANG portfolio performance by more than half.

Next, I examine the pre-acronym period, i.e. before the FANG acronym was coined. This portfolio begins in June 2002, which is the first full month where at least three FAANG stocks are available (i.e. Amazon, Apple, and Netflix are in the portfolio at the start, and Google enters in 2004 and Facebook in 2012 after their IPOs), and the portfolio ends in January 2013. The raw average value-weighted monthly return in this period is an impressive 2.769%. The CAPM alpha, which controls for covariation with market returns, is still sizable

at 2.065% per month. Other factor models confirm the economic and statistical robustness of this outperformance of about two percent per month. The Fama and French (1993) three-factor model gives an alpha of 1.941% per month, and so does the Carhart (1997) four-factor model (alpha of 1.935%) and the Fama and French (2018) six-factor model (alpha of 2.529%). The Hou et al. (2014) q-4 model gives an alpha of 2.349%, the Hou et al. (2020a) q-5 model gives an alpha of 1.929%, and the Daniel et al. (2019) behavioral model gives an alpha of 2.274%. In equal-weighted portfolios, all the alphas are above 2.4% per month and statistically significant. Overall, in the pre-acronym period, i.e. prior to the coining of the acronym, FAANG stocks showed robust outperformance which is statistically significant no matter which asset-pricing model is used to benchmark their returns.

Are these results surprising? On the one hand they are because there is a lot of market commentary on the extraordinary stock-market success of the FAANG companies even in the post-acronym period. To the average reader of such investing anecdotes, the outperformance of the FAANG stocks must almost be a moot point. So it is indeed a surprise to see that controlling for the usual factors that drive stock returns can make a sizable dent on FAANG stock outperformance in the post-acronym period. This suggests that investors should not take all media-touted success as robust evidence of *true* outperformance of the mentioned firms unless there is evidence that the outperformance survives after controlling for known factor exposures. If a portfolio's so-called outperformance can be explained by factor models, this means its returns can mostly be replicated by using style-mimicking portfolios (e.g., using relevant ETFs) without directly holding the stocks in question. The fact that investors do not focus on abnormal returns that control for all available factors is consistent with the findings of Barber, Huang, and Odean (2016) and Berk and van Binsbergen (2016).

On the other hand, these results are not surprising as they could be consistent with the tendency for investor to overextrapolate, as described in various studies such as De Long, Shleifer, Summers, and Waldmann (1990), Greenwood and Shleifer (2014), and Da et al. (2021). This makes it likely that an investing theme is celebrated based on its past success

and its performance might mean revert post-popularization. Ben-David, Franzoni, Kim, and Moussawi (2021) describe a parallel occurrence in ETF markets where specialized ETFs perform very poorly after launch. This is consistent with ETF sponsors launching thematic products to cater to retail demand for hot themes (e.e., trade war, vegan products, work-from-home, or vaccines) and the performance of stocks identified by these themes decline after the hype.

Another way to view these results is that stocks with the same style as the FAANG stocks performed and comoved more like FAANG stocks in the post-acronym period. This is why controlling for factor exposures drastically reduced the outperformance of the portfolio post-2013. This can be viewed as either 1) the coining of the acronym itself caused a spillover to the returns of same-style stocks, or 2) the coining of the acronym was coincidentally accompanied by the outperformance of same-style stocks. It is obviously difficult to distinguish between these two explanations since it might be far fetched to expect the mere act of coining an acronym to cause a spillover to the entire set of growth stocks. However, instead of focusing on the entire group of same-style stocks, I test for evidence of post-acronym spillover to two smaller subsets. The first group is the FAANG stocks themselves. I show that there is increased comovement of a FAANG stock with a portfolio of FAANGs (where the stock itself is excluded) in the post-acronym period compared to the pre-acronym period. There is similar evidence of increased comovement when I look at stocks in the same sectors as the FAANG stocks. This is consistent with investors viewing and trading the FAANGs and related stocks as a theme, with increased comovement within the habitat as a consequence (see, e.g. Peng and Xiong (2006), Greenwood (2008), Green and Hwang (2009), Boyer (2011), and Huberman and Regev (2001)).

Finally, I examine if there is a return spread to a stock's covariance with FAANGs. I compute for every stock its FAANG beta, estimated using its prior month's daily returns regressed against the daily returns of a value-weighted FAANG portfolio, controlling for daily market returns. Sorting stocks into FAANG beta quintiles and holding stocks for one month,

I find no reliable spread between the extreme FAANG beta quintiles. Hence, investors do not treat covariation with FAANG stocks as a type of risk that deserves compensation.

The rest of the paper is organized as follows. Section 2 describes the data used, Section 3 reports the main results, Section 4 reports the comovement results, and Section 5 concludes.

2. Data and summary statistics

2.1. FAANG stock data

I obtain monthly stock returns of the FAANG stocks using the Center for Research in Security Prices (CRSP) files from 2002 to 2020.[4] The CRSP file I use is the annually updated file with data up to the end of 2020. To get monthly 2021 data on the FAANG stocks, I use Bloomberg from January 2021 to August 2021.[5] Note that each of the FAANG companies has only one listed ordinary class of shares except for Google which has two listed classes since April 2014. For the purposes of this study, Google's two classes are combined (i.e., their returns are averaged using the lagged market cap of each class as weights). The returns examined in this study are total returns, which are returns where any dividends received are reinvested.[6]

2.2. Portfolio and time period definitions

The portfolio composition and time-period labels are defined in this section. Post-acronym is defined as the period starting February 2013 and after. In the post-acronym period, the value-weighted FAANG portfolio is defined as a calendar-time portfolio with Facebook,

[4]The identifiers, i.e. CRSP permanent numbers (tickers), for the FAANG stocks are: Facebook 13407 (FB), Amazon 84788 (AMZN), Apple 14593 (AAPL), Netflix 89393 (NFLX); Google 14542 and 90319 (GOOG and GOOGL).

[5]I end the sample in August 2021 since at the time of writing the Fama-French factors returns are available only up to this month and we need the factors as controls.

[6]The market cap variable in Bloomberg that is similar to the market cap measure in CRSP (shrout×prc) is "CURRENT_MARKET_CAP_SHARE_CLASS", and return measure in Bloomberg that is similar to the holding-period return measure in CRSP (ret) is the percentage change in "TOT_RETURN_INDEX_GROSS_DVDS"

Amazon, Netflix, and Google all entering the portfolio in February 2013 and Apple entering in October 2017. The prior month-end market cap is used as weights for this portfolio. Note that although the FAANG acronym refers to all five stocks, Apple enters only in October 2017 as it was added to the acronym only at that time and not at the start in February 2013. This portfolio is hence implementable by someone who takes positions in these stocks only at the time when the stocks are grouped. The results are similar if I start the post-acronym period only in March 2013.

[Insert Figure 1 here]

To visualize the FAANG portfolio composition, Figure 1 plots the monthly weights of each constituent stock in the FAANG portfolio during the post-acronym period. For easy reference, the colors of the bars are chosen to match the main color in each company's logo. All four FANG companies enter the portfolio from February 2013 and we see that at the start, Google has the largest weight, followed by Amazon, Facebook, and Netflix. Apple is added in October 2017 and takes over from Google as the largest component of the portfolio for the subsequent periods. The company with the smallest weight through all periods is Netflix.

The bottom chart in Figure 1 shows the FAANG stock portfolio composition in the pre-acronym period, which is defined as the period from June 2002 to January 2013. The IPO dates of these companies are, chronologically, Apple in December 1980, Amazon in May 1997, Netflix in May 2002, Google in August 2004, and Facebook in May 2012. I start the pre-acronym portfolio in June 2002 since this is the first full month where there are at least three available companies. We can see that Netflix is the smallest stock and Amazon is the largest stock in the initial years. Google and Facebook are added to the portfolio at the month-end of their IPO. Google's share in the portfolio increases steadily after its IPO in 2004. Facebook is only a small part of the pre-acronym portfolio as it was listed for less than a year before the FANG acronym was coined. Apple's share in the portfolio is larger at the end of the pre-acronym period than it is at the beginning.

2.3. Other data

In some parts of this study, e.g., in the tests involving comovement of other stocks with the FAANG portfolio, I use data from the entire U.S. stock market. The CRSP ordinary share universe is used (shrcd of 10 and 11) for both the monthly file and the daily file. Stocks must have a computable book-to-market ratio matched from the CRSP-Compustat merged file, with the annual Compustat information from the fiscal period ending in the last calendar year matched to CRSP observations for the 12-month period starting July of the current year. The monthly returns of the stocks are adjusted for delisting following Shumway (1997).

I also require factor model returns to estimate alphas. Monthly asset-pricing model factors returns are obtained from Ken French's website, which at the time of the writing, had data up to August 2021. The obtained factors are as follows. The market excess returns (Mkt) where the market is defined as the CRSP NYSE/Nasdaq/Amex value-weighted index, and the risk-free rate is the the one-month Treasury Bill rate; and the returns from long-short factor portfolios consisting of small-minus-big stocks (SMB, the size factor), high-minus-low book-to-market ratio stocks (HML, the value factor), up-minus-down price momentum stocks (UMD, the momentum factor), robust-minus-weak profitability stocks (RMW, the profitablity factor), and conservative-minus-aggressive investment stocks (CMA, the investment factor). Other asset-pricing models have also been introduced in recent years. I obtain the investment-based q-factor returns up to December 2020 (which are posted by the authors of Hou et al. (2014) and Hou et al. (2020a)). These q factors are the returns on a size portfolio (R_{ME}), the returns on an investments-to-assets portfolio (R_{IA}), the returns on a return-on-equity portfolio (R_{ROE}), and the returns on an expected growth portfolio (R_{Eg}). Hou et al. (2014) and Hou et al. (2020a) contend that the q-model does a better job than other asset-pricing models in explaining the returns of numerous stock anomalies. In Hou, Mo, Xue, and Zhang (2021), it is shown that the q-5 model can do a good job of explaining the returns of one spectacular firm—Berkshire Hathaway. It would be interesting to see if this model can also be successful in explaining the returns of another set of spectacular

firms—the FAANG stocks.

Another modern asset-pricing model is the Daniel et al. (2019) DHS behavioral model where FIN is a financing factor that exploits managers' financing decisions made in response to persistent long-term mispricing, and PEAD is an earnings surprise factor that captures investor inattention and short-term underreaction to news. DHS proposes that together with the market factor, this parsimnious model can explain a broad range of anomalies. I obtain the monthly returns of these two factors from the authors' website and the data are available up to December 2020.[7]

3. Results

This section documents the main results of the paper, which is to examine the performance of the portfolio of FAANG stocks if one were to follow investing according to the acronym as popularized.

3.1. Post-acronym period

Table 1 reports the performance of the FAANG portfolio in the post-acronym period from February 2013 to August 2021. The average raw returns of the portfolio, as well as the abnormal returns of the portfolios measured using factor models that include the Fama and French-related factors, are reported.

[Insert Table 1 here]

Panel A shows the value-weighted results. Value-weighted returns are the most investible as they weigh each stock according to their market cap and this minimizes trading costs since no rebalancing is needed after portfolio formation. Column 1 shows that the raw return of

[7]There is another recent behavioral (or mispricing-based) model by Stambaugh and Yuan (2017). However, the factor return data provided by these authors are only available up to 2016 and this represents too little of the post-acronym 2013–2021 period to be useful for this study.

the FAANG portfolio is an impressive 2.553% per month in this period. However, the stock market in general also performed very well in this period. When the CAPM is estimated by regressing the portfolio's excess return (i.e., in excess of the one-month Treasury Bill rate), the Intercept, which represents the CAPM alpha, is only 1.154% per month. The FAANG portfolio has a market beta exposure of 1.044. Accounting for this exposure reduces the average monthly performance of the portfolio by more than half.

Columns 3 to 5 report the coefficient estimates when asset-pricing models that rely on the Fama-French factors are used. Column 3 shows the Fama and French (1993) three-factor model coeffcients. Of particular interest is coefficient on the HML factor which will reveal the exposure of the FAANG portfolio to the value factor. We see a robust negative coefficient of -0.527 ($t = 4.19$)—a negative exposure to value means a growth orientation. A negative coefficient on size is also evident, which is obviously expected as the FAANG component stocks are extremely large companies. The market beta is now 1.220 after the factor controls, and this shows that the portfolio's systematic risk is 22% higher than the market's. Once all these factor exposures are accounted for, the estimated intercept is 0.704 with a t-statistic of 1.80 (significant at the 10% level). This Fama and French (1993) three-factor alpha's magnitude is a drastic reduction from the magnitude of average raw return of 2.553%. We can see that a simple adjustment for the market, size, and value can account for more than two-thirds of the performance of the value-weighted FAANG portfolio, and the resulting alpha is barely different from zero.

Model 4 reports the Carhart (1997) four-factor model estimates where the only difference is the addition of a momentum factor. Jegadeesh and Titman (1993) show that positive price momentum stocks outperform and negative price momentum stocks underperform. Carhart (1997) adds a price momentum factor to the Fama and French (1993) three-factor model and shows that it can explain almost all of the persistence in mutual fund performance. If the FAANGs are persistently stalwart all these post-acronym years, perhaps a momentum factor can capture part of their outperformance. Indeed we see from column 4 that the

coefficient on UMD (the momentum factor) is positive and significant. Together the Carhart four factors explain a little bit more of the abnormal performance of the FAANG portfolio so that its intercept is now 0.619% and no longer reliably different from zero with $t = 1.61$. The reported adjusted R-Squared for this model shows that 63.3% of the variation of the returns of the portfolio can be explained by these four simple factors. Hence the majority of the level and variation of the FAANG stock portfolio's returns can be explained by the Carhart (1997) model.

In column 5, I estimate the latest Fama-French model, which is the Fama and French (2018) six-factor model. We see that in this expanded model, only the market, size, momentum, and the investment factor have statistically significant coefficient estimates. The negative coefficient on the investment factor CMA (conservative-minus-aggressive) shows that these firms make aggressive investments. The value factor HML still has a negative coefficient but it is no longer statistically significant. Altogether, controlling for these six exposures results in an intercept of 0.658% which is statistically significant at the 10% level ($t = 1.75$).

Panel B of the table then examines the portfolio performance when the returns are equal-weighted. We see that the results are similar that the return performance attenuates by a large amount when the factors exposures are controlled for. The raw return is 2.968% and this attenuates to between 1.088% (Carhart) and 1.192% (FF6) using the Fama and French-related asset-pricing models—about a 60% drop in basis points when compared to the average raw monthly return. The equal-weighted portfolio's alphas are however, still statistically significant. In terms of the coefficients on the factors, they are similar to those in Panel A, except that the momentum exposures are not always statistically significant.

Overall, the message from this table is that controlling for factor exposures reduces the magnitude of FAANG stock outperformance by more than half and the resulting alphas in some cases are not reliably different from zero. The FAANG portfolio also has significant exposures to the market portfolio, large sized firms, high growth firms, high momentum firms,

and high investment firms. Controlling for these exposures dents the FAANG portfolio's outperformance in the post-acronym period, which implies that large size, high growth, high momentum, or high investment firms also performed relatively well during this period.

In Table 2, I repeat this analysis using the q-factors and the DHS factors. For this analysis, due to the availability of the factors only up till the end of 2020, the post-acronym period ends in December 2020 instead of in August 2021.

[Insert Table 2 here]

We see from column 1 of Panel A that the raw average monthly value-weighted return of the portfolio is 2.530% which is very similar to the average when the sample has eight more months of data (2.553% in column 1 of Panel A in Table 1. In column 2, we see the effects of controlling for the q-4 factors. The coefficient of the size factor (R_{ME}) is negative and significant, naturally indicating that this is a large-stock oriented portfolio. The coefficient on R_{IA} is negative and significant, with the sign corresponding to the CMA factor's coefficient earlier, indicating that the FAANG firms have aggressive investment policies. The coefficient on R_{ROE} is statistically insignificant, showing that this portfolio has no exposure to a return on equity factor. Controlling for these exposures gives an intercept of 0.733%, with a t-statistic of 1.71. This shows the investment-based model of Hou et al. (2014) is also able to account for most of the returns of the value-weighted FAANG portfolio in the post-acronym period.

In column 3, The q-5 model shows even starker results. The coefficient on the expected growth factor (R_{Eg}) positive and significant. This factor is built to identify firms with high expected growth and such firms according to Hou et al. (2020a) earn higher expected returns. This fits the profile of the FAANG stocks and helps to intuitively explain their higher than average returns. And indeed, we see that the coefficient on R_{Eg} is positive, large, and statistically significant. Once these five factors including the expected growth factor are accounted for, the alpha is only 0.401% and it is not statistically different from zero ($t = 0.92$).

In column 4, the DHS model shows the impact of controlling for the financing factor and the earnings surprise factor of Daniel et al. (2019). We see that the alpha is 0.841% ($t = 1.83$). The financing factor has not much bite in explaining the returns of the FAANG portfolio, but the PEAD factor has a large loading. This could be capturing the earnings momentum enjoyed by the FAANG firms over this period.

Next, we examine Panel B, the equal-weighted portfolio results. The tests show a similar attenuation of the performance of the FAANG stocks when factor exposures are accounted for. From a raw equal-weighted average return of about 3% in column 1, the q-5 model alpha in column 3 is 0.969% and is barely statistically significant ($t = 1.82$). Hence, about two-thirds of the magnitude of the FAANG portfolio's equal-weighted return can be explained by the investment-based asset pricing models. The adjusted R-Squared of the regressions in this table range between 44% to 62%, again showing that about half of the variation in the returns of the FAANG portfolio can be explained by the asset-pricing models examined in this table.

Therefore, the analysis in Table 2 further supports the the view that exposures to both traditional and modern asset-pricing factors can account for the majority of the level of FAANG stock performance as well as the variation of their performance in the post-acronym period.

The results here have the following important implications for investors. First, it shows that the outperformance of the FAANG stocks, despite being strenuously marketed in the popular press, is really not that remarkable once the usual factors that drive stock returns are controlled for. Even the simple CAPM reduces the average returns to half its raw magnitude. Controlling for the various asset-pricing models, we see the alpha attenuate even further and in some cases, the abnormal performance is no longer reliably different from zero. Investors should be aware that press-touted performance does not usually come with factor adjustments and hence such outperformance should not be believed unless verified by estimating the appropriate alphas. Barber et al. (2016) and Berk and van Binsbergen

(2016) document that investors mostly do not consider multifactor-adjusted returns when evaluating mutual funds. But investors should care about returns that are appropriately benchmarked because factor returns can now be easily obtained by holding factor-based ETFs.

Secondly, these results show that growth and tech stock outperformance in this decade (e.g. Lev and Srivastava (2019), Arnott et al. (2021), and Israel et al. (2020)) is really not concentrated in the celebrity names like FAANGs but is instead across the board. Otherwise, FAANG stock outperformance would not be so severely attenuated when the growth-related factors are controlled for.

Finally, Ben-David et al. (2021) show that when specialized ETFs launch, their subsequent performance is often very poor. This could due to an overextrapolation bias by investors. If investors jump on hot themes after these themes are popularized, and the themes themselves have no predictive power for future outperformance, then outperformance of an investing theme could mean revert after popularization. The post-acronym results of only moderate outperformance is consistent with this story, although it would need to be accompanied by robust pre-acronym performance to complete the story.

3.2. Pre-acronym period

I now examine the pre-acronym performance of the FAANG stocks. Since the acronym did not exist in this period, this is a hypothetical portfolio that is not implementable since no one could ex ante hold these exact stocks at these timings except by chance. The objective is only to confirm if the stock-market performance of these set of stocks were indeed remarkable, which presumably led to them being crowned into this acronym, and whether those remarkable returns can survive factor adjustment. The pre-acronym period is from June 2002 to January 2013. Starting from June 2002 is for the purpose of having at least three stocks in the portfolio (i.e., Apple, Amazon, and Netflix). Table 3 reports the returns of the FAANG portfolio for this pre-acronym period, controlling for the Fama and French-related

factors.

[Insert Table 3 here]

Panel A of the table reports that the raw monthly returns of the value-weighted FAANG portfolio is 2.769% with a t-statistic of 3.48 (see column 1). In columns 2 to 5, I control for the factor exposures in the CAPM, the Fama and French (1993) three-factor model, the Carhart (1997) four-factor model, and the Fama and French (2018) six-factor model. I find that the alphas do attenuate but they are still sizable at between 1.94% to 2.5%, and are all statistically significant with t-statistics greater than 3. Similar results are obtained for Panel B which focuses on equal-weighted portfolios. There the average raw returns are above 3% and the alphas are between 2.4% and 3.1% with t-statistics closer to 4.

These presented results show that FAANG stock outperformance prior to February 2013 is strong and robust. Controlling for the known factors that drive stock returns does not severely dent this abnormal performance.

Next, Table 4 describes the same exercise using the q-model factors and the DHS-model factors. These results paint a similar picture. The investment-based models and the behavioral model does not explain the strong performance of the FAANG portfolio in the pre-acronym period. All the t-statistics of the alphas are above 3 and their magnitudes almost all above 2% per month.

[Insert Table 4 here]

Squaring up these results with those in the post-acronym period, we see that while FAANG stock outperformance is statistically and economically robust in the pre-acronym period, it is less robust in the post-acronym period.

Figure 2 summarizes the alphas from Table 1 to Table 4 with heat-map colors indicating the statistical significance of the alphas. The top chart plots how the value-weighted returns of the FAANG portfolio change when different asset-pricing models are used to estimate its

abnormal returns with the plot divided into pre- and post-acronym panels. The pre-acronym period returns show only moderate performance attenuation when comparing alphas to the raw monthly return. The heat-map colors depicting the t-statistics show that the alphas are all statistically significant. The post-acronym period in contrast shows a stark attenuation of the alphas with orange to red bar colors revealing that these smaller magnitude alphas are not all statistically different from zero.

[Insert Figure 2 here]

The bottom chart describes the equal-weighted portfolio's returns and alphas and we see largely the same trend. The post-acronym period alphas attenuate after controlling for the factors that have been shown to explain monthly stock returns, while the pre-acronym alphas remain statistically resilient whichever factor model is used for benchmark adjustment.

In sum, the results in this section reveals that there is an attenuation in the portfolio's abnormal stock-market performance that coincides with the coining of this popular acronym. This can be consistent with an investor extrapolation bias where successful investing themes tend to get popularized. But if the past success of these themes is not predictive of future performance, this will coincide with less remarkable outperformance post-popularization. Note that this does not mean that the very act of popularization causes the less remarkable performance, but that the labelling itself is related to a representativeness bias where investors expect past trends to continue (see, e.g., Barberis et al. (1998), Greenwood and Shleifer (2014), and Da et al. (2021)).

3.3. Excluding the impact of Covid-19

The post-acronym results are up to August 2021 or December 2020, depending on the available asset-pricing factors. Hence this period includes the impact of Covid-19. This unexpected pandemic helped to boost the stock prices of technology firms, which benefited from forced consumer digitalization. For example, it is well documented that online retailers

like Amazon benefited from the explosion in e-commerce and streaming service providers like Netflix benefited from lockdown-induced subscriber growth. If Big Tech firms like the FAANG companies benefited more from this Covid-19 induced boost compared to the market or to other related stocks, their post-acronym stock market performance could also have seen an unexpected boost. In other words, would the post-acronym outperformance of the FAANG portfolio be even weaker without the Covid-19 boost?

[Insert Table 5 here]

Panel A of Table 5 examines the post-acronym value-weighted portfolio's alphas, focusing on the Fama and French-related factors, when the post-acronym period ends in December 2019—effectively excluding the period affected by the Covid-19 pandemic. We see that the results are similar to those in Table 1, except that all the multi-factor alphas are statistically insignificant. This means that without the unexpected boost provided by the Covid-19 pandemic, post-2013 FAANG stock outperformance is even weaker. Panel B reports equal-weighted results, where the message of weaker outperformance is similar even though the multi-factor alphas remain statistically significant.

3.4. Excluding the FAANG constituents from the factors

The factor models used are off-the-shelf factors made available by the authors of the factor-model papers. But the FAANG stocks in recent years have very large market cap and might be very dominant in the index. Hence there is a concern that factors themselves are contaminated by the FAANG, so it might be easier for the factors to explain the returns of the FAANG portfolio. From the perspective of performance benchmarking in the mutual fund industry, removing a portfolio's stocks from the benchmark is not a required step. However, it might be useful to gauge whether the factors' success in explaining the FAANG portfolio's returns is mechanical to the presence of the FAANGs themselves inside the factors.

[Insert Table 6 here]

I use the CRSP universe of stocks to construct ex-FAANG versions of the four factors in the Carhart (1997) model. The FAANG portfolio constituents are excluded from this construction for the periods that they are in the FAANG portfolio. I then re-estimate the alphas for the post-acronym period and Table 6 reports the results. The sample ends in December 2020 since the CRSP universe I rely on for the construction is up to this date. We see that the average raw value-weighted return for this period is 2.530%. The regular Fama and French (1993) three-factor alpha is 0.638% and is not statistically significant in column 2. When we use the ex-FAANG version of the Fama and French (1993) model, the alpha is indeed larger at 0.942% and it is now significant at the ten percent level. Hence removing the FAANG stocks themselves from the factors do indeed improve the alphas by about 30 bps. Similar evidence is seen in the Carhart (1997) ex-FAANG model and in the equal-weighted portfolios. While the alphas are expectedly stronger, we do not see a dramatic change. The magnitude of attenuation is still large, the ex-FAANG alphas remain less than half of the magnitude of the raw monthly returns.

4. Comovement

4.1. FAANG-Beta changes in post-acronym period

The previous section established the main results of the paper—that a FAANG portfolio's outperformance is not very remarkable in the post-acronym period. While the raw performance of the portfolio is still impressive, the performance of similar-style stocks allows any factor control for same-style performance to dent the outperformance of the FAANG stocks.

However, why did same-style stocks also outperform the market during this period? Can we say that the coining of an acronym concerning only 4-5 stocks led to spillovers in the performance to an entire class of stocks, i.e. growth/tech stocks? While claiming such causality might be far fetched, I perform some tests in this section that examines comovement spillover onto a smaller subset of stocks. These tests are not intended to establish any

causality but merely to investigate for potential spillover in movement and performance to other related stocks and not just to the style identified by the asset-pricing factors. Studies have shown that when stocks are grouped together in a theme or a certain style, and even if their fundamentals do not justify the groupings, these stocks tend to comove more with each other. For example, Boyer (2011) shows that innocuous classifications of stocks at the edge of value/growth leads them to comove more with the category that they join compared to the category that they leave. Greenwood and Shleifer (2014) provides similar evidence using the constituents of the Nikkei 225 index and Da and Shive (2018) reports the increased comovement of ETF constituents after grouping.

Table 7 reports the results of this investigation, which aims to test two things: 1) whether the coining of the acronym results in FAANG stocks comoving more with each other, and 2) whether FAANG-sector stocks comoved more with a FAANG portfolio in the post-acronym period compared to the pre-acronym period.

The test is set up as follows. A large panel regression of all CRSP stock-month observations (June 2002 to December 2020) is estimated where the dependent variable is a stock's FAANG beta. The FAANG beta is estimated each month from a regression of a stock's daily returns (at least 10 observations) on the daily returns of a value-weighted FAANG portfolio and that on a value-weighted market portfolio.[8] Hence, this FAANG beta measures the covariance of a stock to the FAANG portfolio after its covariance with the market portfolio is controlled for. To avoid mechanical comovement, when the FAANG beta is estimated for a FAANG stock, the stock itself is excluded from computation of the returns of value-weighted FAANG portfolio.

The following independent variables are defined. $FAANGstock$ as a dummy variable

[8]Unlike the FAANG portfolio used in the earlier tables where in the post-acronym period Apple enters the portfolio only in October 2017, this FAANG portfolio has all FAANG stocks in the portfolio from the first full month that they are listed. This is because this analysis aims to examine the comovement of stocks relative to the FAANG stocks before and after the coining of the acronym. For this comparison to be possible, all constituents need to be in the FAANG portfolio in both the pre and post-acronym periods. Whereas for the calendar-time FAANG portfolio in the post-acronym period, Apple only enters when it is named into the modified acronym so that the 2013–2021 portfolio is implementable.

which equals one when the stock is a FAANG stock and zero otherwise. *PostAcronym* is a dummy variable which equals one when the month is February 2013 and after, except for Apple where *PostAcronym* equals one from October 2017 and after, and zero otherwise. The following control variables are added: BM is the stock's book-to-market ratio, $Size$ is its lag-month market cap, and $PriceMomentum$ is its month $t-12$ to $t-2$ buy-and-hold return. $FAANGsector$ is a dummy variable indicating that the stock is in groups 7 (Entertainment), 35 (Computer Hardware), or 36 (Computer Software) of the Fama and French (1997) 49-industry groups. These are the industry groups that the FAANG stocks belong to. The estimations include either industry fixed effects (49-industry groups definition) or DGTW-group fixed effects. Daniel, Grinblatt, Titman, and Wermers (1997) DGTW sorts are based on size quintiles, then the book-to-market ratio quintiles within each size group, and momentum quintiles are defined within each book-to-market ratio group for a total of 125 DGTW groups. The standard errors are clustered by industry (49-industry groups definition).

[Insert Table 7 here]

We see from the regressions that the FAANG beta is 0.521 higher for a FAANG stock since the $FAANGstock$ dummy yields a significant coefficient of about this magnitude. Compared to the average FAANG beta which is close to zero (-0.032), this is a sizable coefficient.[9] In the post-acronym period, stocks in general had less covariance with the FAANG portfolio with the magnitude of their FAANG beta being smaller by 0.094.

We next focus on the coefficient of interest for the first test—the interaction term $FAANGstock \times PostAcronym$ that helps us to identify whether there is any increased comovement of a FAANG stock with the FAANG portfolio after the coining of the FANG acronym. We see that this is indeed the case. The FAANG beta increases by between 0.22 to 0.35 in the post-acronym period for a FAANG stock, depending on the specification. This

[9]The average FAANG beta is close to zero because it is estimated while controlling for market returns, so that the market exposure has been removed from this measure.

shows that when grouped into a common theme by the acronym, FAANG stocks start to comove more with each other. This is consistent with the grouping being associated with spillover effects in that it is accompanied by changes in the price movements of the stocks relative to each other.

The second test involves stocks in same sectors as the FAANG stocks. In order to add a $FAANGsector$ dummy to the regression, I need to remove industry fixed effects so as to avoid colinearity as the $FAANGsector$ dummy is simply a linear combination of the three industries. In place of industry fixed effects, DGTW-group fixed effects are included. The positive coefficient for $FAANGsector$ shows that there is indeed a positive association between a stock's FAANG beta and it belonging to a FAANG sector. The coefficient for $FAANGsector \times PostAcronym$ identifies whether there is any increased comovement of FAANG sector stocks with a FAANG portfolio in the post-acronym period. We see that indeed the FAANG beta is higher by 0.105 ($t = 2.96$) in model 4. Overall, the coining of the acronym is related to a significant increase in the comovement of the daily returns of FAANG sector stocks with the daily returns of a FAANG portfolio.

These results are consistent with Da and Shive (2018) and Boyer (2011)—that the grouping of stocks into a theme or grouping can result in an increase in their covariation. Or that trading in a certain habitat increases comovement within that habitat (e.g., Green and Hwang (2009)).

4.2. Calendar-time portfolios sorted by FAANG Beta

A key result is that the coining of the FANG and FAANG acronyms are associated with related stocks in these themes exhibiting increased comovement. Huberman and Regev (2001) show that excitement about a stock can spill over to its peers. I examine if using the covariance with a FAANG portfolio can allow one to identify other outperforming stocks in both the pre- and post-acronym periods.

[Insert Table 8 here]

Table 8 reports the results for the post-acronym period. Stocks are sorted each month based their prior month FAANG beta. This is estimated by regressing for that month the stock's daily returns (at least 10 observations) on the daily returns of a value-weighted FAANG portfolio and the value-weighted market portfolio. As in the earlier table, controlling for market returns in the estimation of the FAANG beta ensures that the FAANG exposures obtained are not proxying for exposures to the market portfolio. As we would like this portfolio to be implementable by someone who intends to pursue a pseudo-FAANG strategy in the post-acronym period, the FAANG portfolio used for the estimation of beta is one that holds the four FANG stocks from February 2013 and adds Apple only in October 2017. Stocks are then sorted into quintiles each month based on their FAANG beta, using NYSE breakpoints.[10] Stocks are held for one month within each portfolio and their returns are value-weighted (Panel A) or equal-weighted (Panel B). FAANG stocks themselves are excluded from the quintile portfolios, as are observations whose prior month-end stock price is less than one dollar.

Panel A shows the value-weighted portfolio raw returns, the alphas from the Fama and French (2018) six-factor model, and the alphas from the Hou et al. (2020a) q-5 model. The average FAANG betas are also reported in the last column, which shows that the sorting does produce a large spread in the average FAANG betas, with the lowest FAANG beta portfolio having an average (value-weighted) FAANG beta of -0.995 and the highest FAANG beta quintile having an average FAANG beta of 0.668, a spread of 1.664. However, the raw return spread of the high-minus-low portfolio is not significant. The CAPM alpha return spread however, is significant at the ten percent level. But the other alpha spreads are not significant. In Panel B, for the equal-weighted return spreads, none of the high-minus-low portfolio return spreads is statistically significant. Other factor models used in the earlier tests are also used to examine these return spreads and those alternative factor controls yield

[10]Hou, Xue, and Zhang (2020b) suggest that using NYSE breakpoints help to improve the implementability and tradability of extreme portfolios when sorting on any measure. The results here are similar when universal breakpoints are used.

similar insignificant (unreported) results. Hence, this table shows that in the post-acronym period, if one used a strategy of finding pseudo FAANGs by relying on a stock's FAANG beta, this trading strategy cannot reliably produce future outperformance.

Is this any different in the pre-acronym period, i.e. prior to February 2013? Table 9 examines this and we see from the last column that there is also a spread in the mean values of the FAANG beta in the pre-acronym period but this spread is only 1.024, unlike the post-acronym spread of 1.664. This shows that post-acronym, the magnitude of covariance with the FAANG portfolio is higher. But just like in Table 8 I do not find any reliable spread in the high-minus-low returns of the portfolios regardless of the asset-pricing model used to benchmark their returns. Only one of the portfolios produced a statistically significant spread, which is the Panel B equal-weighted portfolio having a positive six-factor alpha which is significant at the ten percent level. But overall, there is also no strong evidence that FAANG betas can be used in the pre-acronym period to identify outperforming stocks.

[Insert Table 9 here]

The results in both these tables indicate that exposure to the FAANG stocks is not viewed as a risk exposure where investors demand compensation for. Buying high FAANG beta stocks and selling low FAANG beta stocks does not lead to a reliable return spread in either the pre- or post-acronym period.

5. Conclusion

This paper has a simple objective—to quantify the magnitude and the statistical significance of a FAANG portfolio for an investor who follows this investment strategy since the coining of the FANG acronym in 2013. If an investor bought all four FANG stocks in February 2013 according to their market cap at that time, and held this portfolio up to August 2021, adding Apple into the portfolio when it was included in a modified FAANG acronym in October 2017, what would be the returns of this portfolio? I find that its abnormal returns, i.e.,

returns after controlling for the traditional or modern asset-pricing factors that are known to be related to stock returns, are not very remarkable. Not all the alphas from a value-weighted portfolio are statistically significant, and the magnitude of the returns attenuate by about two-thirds after controlling for factor returns.

These results show that media-touted abnormal performance might not survive, or at least be considerably dented, by very standard asset-pricing controls which account for the performance from reasonable benchmarks. In a related literature, e.g., Lev and Srivastava (2019), the abnormal performance of growth stocks over value in the last decade has been well documented. This paper shows that the FAANG stock "outperformance" is just another dimension of the success of growth stocks over this period. The FAANG stocks themselves, when the underlying growth-related factors driving their returns are controlled for, show a sizable attenuation of their outperformance in the post-acronym period.

Prior to the coining of the FANG acronym, however, FAANG stocks did perform well and those pre-acronym returns are robust to all forms of factor controls. That the abnormal returns of an investing attenuates after popularization is consistent with an over-extrapolation bias by investors. Investors are more likely to celebrate the past investing success of a set of companies. But if these past outperformance is not a good predictor of future abnormal returns, more muted alphas could follow post-popularization. This is consistent with the findings of Ben-David et al. (2021) who show that specialty ETFs, very likely formed to cater to hot-theme focused investors, perform poorly after launched.

Finally, I examine the spillover effects of the coining of the acronym on trading and stock-price comovement. I show that the stock-price comovement of the FAANG stocks vis-a-vis each other increased in the post-acronym period. If investors are more likely to group these stocks together, they will also trade them together, leading to comovement increase. FAANG sector stocks also comove more with the FAANG stocks in the post-acronymn period. These results show that there are spillover effects on the trading and movement of related stocks as a result of the coining of the acronym. However, sorting stocks based on the FAANG betas

does not yield a reliable return spread.

Some caveats are in order for the interpretation of these results. Since the paper focus on returns, it does not make any statement on the dollar profits earned by investors. As Berk and van Binsbergen (2015) show, in the setting of mutual funds, dollar profits can be more important than percentage returns in identifying fund manager skill. Hence despite the small percentage-based outperformance documented, a fund manager or a retail investor could have derived larger abnormal dollar profits from the FAANG strategy in the post-acronym period given the much larger post-acronym market cap, even if the percentage abnormal profits are less reliable statistically. Second, while the paper documents a lukewarm percentage outperformance of these firms in the post-2013 period than is implied by anecdotal evidence, this is not a statement about the technological contributions of these companies. The fact that controlling for the return performance of the style dents the stock-return performance of the FAANGs might also be consistent with technological spillovers from these firms to similar companies.

References

Arnott, Robert D., Campbell R. Harvey, Vitali Kalesnika, and Juhani T. Linnainmaa, 2021, Reports of Value's death may be greatly exaggerated, *Financial Analysts Journal* 77, 44–67.

Barber, Brad M., Xing Huang, and Terrance Odean, 2016, Which factors matter to investors? Evidence from mutual fund flows, *Review of Financial Studies* 29, 2600–2642.

Barberis, Nicholas, Andrei Shleifer, and Robert Vishny, 1998, A model of investor sentiment, *Journal of Financial Economics* 49, 307–343, Reprinted in Richard Thaler, ed., Advances in Behavioral Finance Vol. II, Princeton University Press and Russell Sage Foundation, 2005.

Ben-David, Itzhak, Francesco A. Franzoni, Byungwook Kim, and Rabih Moussawi, 2021, Competition for attention in the ETF space, Working paper, Ohio State University.

Berk, Jonathan B., and Jules H. van Binsbergen, 2015, Measuring skill in the mutual fund industry, *Journal of Financial Economics* 118, 1–20.

Berk, Jonathan B., and Jules H. van Binsbergen, 2016, Assessing asset pricing models using revealed preference, *Journal of Financial Economics* 119, 1–23.

Boyer, Brian H., 2011, Style-related comovement: Fundamentals or labels?, *Journal of Finance* 66, 307–332.

Carhart, Mark M., 1997, On persistence in mutual fund performance, *Journal of Finance* 52, 57–82.

Da, Zhi, Xing Huang, and Lawrence J. Jin, 2021, Extrapolative beliefs in the cross-section: What can we learn from the crowds?, *Journal of Financial Economics* 140, 175–196.

Da, Zhi, and Sophie Shive, 2018, Exchange traded funds and asset return correlations, *European Financial Management* 24, 136–168.

Daniel, Kent, Mark Grinblatt, Sheridan Titman, and Russ Wermers, 1997, Measuring mutual fund performance with characteristic-based benchmarks, *Journal of Finance* 52, 1035–1058.

Daniel, Kent, David Hirshleifer, and Lin Sun, 2019, Short- and long-horizon behavioral factors, *Review of Financial Studies* 33, 1673–1736.

De Long, J. Bradford, Andrei Shleifer, Lawrence H. Summers, and Robert J. Waldmann, 1990, Noise trader risk in financial markets, *Journal of Political Economy* 98, 703–738.

Fama, Eugene F., and Kenneth R. French, 1992, The cross-section of expected stock returns, *Journal of Finance* 47, 427–465.

Fama, Eugene F., and Kenneth R. French, 1993, Common risk factors in the returns on stocks and bonds, *Journal of Financial Economics* 33, 3–56.

Fama, Eugene F., and Kenneth R. French, 1997, Industry costs of equity, *Journal of Financial Economics* 43, 153–193.

Fama, Eugene F., and Kenneth R. French, 2018, Choosing factors, *Journal of Financial Economics* 128, 234–252.

Graham, Benjamin, and David L. Dodd, 1934, *Security analysis* (1st ed., McGraw-Hill).

Green, T. Clifton, and Byoung-Hyoun Hwang, 2009, Price-based return comovement, *Journal of Financial Economics* 93, 37–50.

Greenwood, Robin, 2008, Excess comovement of stock returns: Evidence from cross-sectional variation in Nikkei 225 weights, *Review of Financial Studies* 21, 1153–1186.

Greenwood, Robin, and Andrei Shleifer, 2014, Expectations of returns and expected returns, *Review of Financial Studies* 27, 714–746.

Hou, Kewei, Haitao Mo, Chen Xue, and Lu Zhang, 2020a, An augmented q-factor model with expected growth, *Review of Finance* 25, 1–41.

Hou, Kewei, Haitao Mo, Chen Xue, and Lu Zhang, 2021, The economics of security analysis, Working paper, Ohio State University.

Hou, Kewei, Chen Xue, and Lu Zhang, 2014, Digesting anomalies: An investment approach, *Review of Financial Studies* 28, 650–705.

Hou, Kewei, Chen Xue, and Lu Zhang, 2020b, Replicating anomalies, *Review of Financial Studies* 33, 2019–2133.

Huberman, Gur, and Tomer Regev, 2001, Contagious speculation and a cure for cancer: A nonevent that made stock prices soar, *Journal of Finance* 56, 387–396.

Israel, Ronen, Kristoffer Laursen, and Scott Richardson, 2020, Is (systematic) value investing dead?, *Journal of Portfolio Management: Quantitative Special Issue 2021* 21, 1–25.

Jegadeesh, Narasimhan, and Sheridan Titman, 1993, Returns to buying winners and selling losers: implications for stock market efficiency, *Journal of Finance* 48, 65–91.

Lev, Baruch, and Anup Srivastava, 2019, Explaining the recent failure of value investing, Working paper, New York University.

Peng, Lin, and Wei Xiong, 2006, Investor attention, overconfidence and category learning, *Journal of Financial Economics* 80, 563–602.

Shumway, Tyler, 1997, The delisting bias in CRSP data, *Journal of Finance* 52, 327–340.

Stambaugh, Robert F., and Yu Yuan, 2017, Mispricing factors, *Review of Financial Studies* 30, 1270–1315.

Table 1: FAANG portfolio alphas since Feb 2013: Fama-French factors

A portfolio of FAANG stocks (Facebook, Amazon, Netflix, and Google; with Apple added only in October 2017) is held from February 2013 to August 2021, the period after the acronym was coined. The returns of the stocks are averaged each month with value weights (the lag month market cap) in Panel A or equal weights in Panel B. The Intercept in model 1 is the average raw portfolio monthly return. The Intercept in models 2 to 5 are the alphas estimated by a time-series regression of the portfolio excess returns (excess of the risk-free rate which is the one-month T-Bill rate) on the various asset-pricing factor returns. Model 2 is the CAPM with the excess market return (Mkt) as a single factor, model 3 is the Fama and French (1993) three-factor model, model 4 is the Carhart (1997) four-factor model, and model 5 is the Fama and French (2018) six-factor model. The factors are returns from long-short portfolios consisting of small-minus-big stocks (SMB), high-minus-low book-to-market ratio stocks (HML), up-minus-down price momentum stocks (UMD), robust-minus-weak profitability stocks (RMW), and conservative-minus-aggressive investment stocks (CMA). Estimated coefficients are reported with t-statistics in parentheses and *, **, and *** indicates statistical significance at the 10%, 5%, and 1% levels respectively.

	Coefficient Estimates of Factor Models				
Factors	Raw (1)	CAPM (2)	FF3 (3)	Carhart (4)	FF6 (5)
	Panel A: Value-Weighted Portfolio				
Intercept (%)	2.553***	1.154**	0.704*	0.619	0.658*
	(4.33)	(2.59)	(1.80)	(1.61)	(1.75)
Mkt		1.044***	1.220***	1.299***	1.238***
		(9.86)	(12.39)	(12.77)	(11.79)
SMB			-0.408***	-0.374**	-0.428**
			(-2.71)	(-2.53)	(-2.45)
HML			-0.527***	-0.366**	-0.161
			(-4.19)	(-2.60)	(-1.02)
UMD				0.297**	0.275**
				(2.38)	(2.24)
RMW					-0.097
					(-0.39)
CMA					-0.688***
					(-2.64)
# Months	103	103	103	103	103
Adj R-Sq	NA	0.485	0.616	0.633	0.652
	Panel B: Equal-Weighted Portfolio				
Intercept (%)	2.968***	1.610***	1.168**	1.088**	1.192***
	(4.66)	(3.07)	(2.40)	(2.25)	(2.63)
Mkt		1.012***	1.179***	1.253***	1.181***
		(8.12)	(9.65)	(9.81)	(9.34)
SMB			-0.362*	-0.330*	-0.551**
			(-1.94)	(-1.78)	(-2.62)
HML			-0.542***	-0.390**	-0.003
			(-3.48)	(-2.21)	(-0.02)
UMD				0.280*	0.219
				(1.79)	(1.48)
RMW					-0.489
					(-1.64)
CMA					-1.132***
					(-3.61)
# Months	103	103	103	103	103
Adj R-Sq	NA	0.389	0.493	0.504	0.567

Table 2: FAANG portfolio alphas since Feb 2013: q and behavioral factors

A portfolio of FAANG stocks (Facebook, Amazon, Netflix, and Google; with Apple added only in October 2017) is held from February 2013 to December 2020, the period after the acronym was coined. The returns of the stocks are averaged each month with value weights (the lag month market cap) in Panel A or equal weights in Panel B. The Intercept in model 1 is the average raw portfolio monthly return. The Intercept in models 2 to 4 are the alphas estimated by a time-series regression of the portfolio excess returns (excess of the risk-free rate which is the one-month T-Bill rate) on the various asset-pricing factor returns. Model 2 is the Hou et al. (2014) q-factor model the excess market return (Mkt), a size factor (R_{ME}), an investments-to-assets factor (R_{IA}), and a return-on-equity factor (R_{ROE}). Model 3 adds an expected growth factor (R_{Eg}). Model 4 is the Daniel et al. (2019) (DHS) behavioral model where FIN is financing factor and PEAD is the earnings surprise factor. Estimated coefficients are reported with t-statistics in parentheses and *, **, and *** indicates statistical significance at the 10%, 5%, and 1% levels respectively.

	Coefficient Estimates of Factor Models			
Factors	Raw	q-4	q-5	DHS
	(1)	(2)	(3)	(4)
Panel A: Value-Weighted Portfolio				
Intercept (%)	2.530***	0.733*	0.401	0.841*
	(4.04)	(1.71)	(0.92)	(1.83)
Mkt		1.137***	1.238***	1.087***
		(9.84)	(10.37)	(9.96)
R_{ME}		-0.569***	-0.446**	
		(-3.16)	(-2.45)	
R_{IA}		-0.966***	-0.703**	
		(-3.83)	(-2.63)	
R_{ROE}		0.034	-0.327	
		(0.18)	(-1.39)	
R_{Eg}			0.710**	
			(2.49)	
FIN				-0.218
				(-1.46)
PEAD				0.688***
				(3.16)
# Months	95	95	95	95
Adj R-Sq	NA	0.596	0.619	0.541
Panel B: Equal-Weighted Portfolio				
Intercept (%)	2.974***	1.218**	0.969*	1.476***
	(4.36)	(2.38)	(1.82)	(2.67)
Mkt		1.040***	1.116***	0.985***
		(7.57)	(7.70)	(7.53)
R_{ME}		-0.646***	-0.554**	
		(-3.02)	(-2.51)	
R_{IA}		-1.298***	-1.101***	
		(-4.33)	(-3.39)	
R_{ROE}		-0.213	-0.484*	
		(-0.94)	(-1.70)	
R_{Eg}			0.532	
			(1.54)	
FIN				-0.500***
				(-2.78)
PEAD				0.466*
				(1.78)
# Months	95	95	95	95
Adj R-Sq	NA	0.519	0.526	0.443

Table 3: FAANG portfolio alphas pre-acronym: Fama-French factors

A portfolio of FAANG stocks (Facebook, Amazon, Apple, Netflix, and Google) is held from June 2002 to January 2013, the period before the acronym was coined. The returns of the stocks are averaged each month with value weights (the lag month market cap) in Panel A or equal weights in Panel B. The Intercept in model 1 is the average raw portfolio monthly return. The Intercept in models 2 to 5 are the alphas estimated by a time-series regression of the portfolio excess returns (excess of the risk-free rate which is the one-month T-Bill rate) on the various asset-pricing factor returns. Model 2 is the CAPM with the excess market return (Mkt) as a single factor, model 3 is the Fama and French (1993) three-factor model, model 4 is the Carhart (1997) four-factor model, and model 5 is the Fama and French (2018) six-factor model. The factors are returns from long-short portfolios consisting of small-minus-big stocks (SMB), high-minus-low book-to-market ratio stocks (HML), up-minus-down price momentum stocks (UMD), robust-minus-weak profitability stocks (RMW), and conservative-minus-aggressive investment stocks (CMA). Estimated coefficients are reported with t-statistics in parentheses and *, **, and *** indicates statistical significance at the 10%, 5%, and 1% levels respectively.

Factors	Coefficient Estimates of Factor Models				
	Raw	CAPM	FF3	Carhart	FF6
	(1)	(2)	(3)	(4)	(5)
	Panel A: Value-Weighted Portfolio				
Intercept (%)	2.769***	2.065***	1.941***	1.935***	2.529***
	(3.48)	(3.31)	(3.40)	(3.38)	(4.33)
Mkt		1.227***	1.349***	1.387***	1.180***
		(9.07)	(9.76)	(9.19)	(7.13)
SMB			0.418	0.400	0.383
			(1.58)	(1.50)	(1.47)
HML			-1.291***	-1.260***	-0.966***
			(-5.30)	(-5.06)	(-3.78)
UMD				0.078	0.145
				(0.64)	(1.18)
RMW					-0.916**
					(-2.53)
CMA					-1.365***
					(-3.11)
# Months	128	128	128	128	128
Adj R-Sq	NA	0.390	0.495	0.493	0.529
	Panel B: Equal-Weighted Portfolio				
Intercept (%)	3.317***	2.615***	2.419***	2.411***	3.141***
	(4.03)	(3.95)	(3.95)	(3.93)	(5.06)
Mkt		1.223***	1.258***	1.312***	1.019***
		(8.51)	(8.49)	(8.12)	(5.79)
SMB			0.769***	0.745**	0.659**
			(2.72)	(2.61)	(2.38)
HML			-1.235***	-1.192***	-0.896***
			(-4.73)	(-4.47)	(-3.30)
UMD				0.110	0.218*
				(0.84)	(1.67)
RMW					-1.325***
					(-3.45)
CMA					-1.161**
					(-2.49)
# Months	128	128	128	128	128
Adj R-Sq	NA	0.360	0.460	0.458	0.503

Table 4: FAANG portfolio alphas pre-acronym: q and behavioral Factors

A portfolio of FAANG stocks (Facebook, Amazon, Apple, Netflix, and Google) is held from June 2002 to January 2013. The returns of the stocks are averaged each month with value weights (the lag month market cap) in Panel A or equal weights in Panel B. The Intercept in model 1 is the average raw portfolio monthly return. The Intercept in models 2 to 4 are the alphas estimated by a time-series regression of the portfolio excess returns (excess of the risk-free rate which is the one-month T-Bill rate) on the various asset-pricing factor returns. Model 2 is the Hou et al. (2014) q-factor model the excess market return (Mkt), a size factor (R_{ME}), an investments-to-assets factor (R_{IA}), and a return-on-equity factor (R_{ROE}). Model 3 adds an expected growth factor (R_{Eg}). Model 4 is the Daniel et al. (2019) (DHS) behavioral model where FIN is financing factor and PEAD is the earnings surprise factor. Estimated coefficients are reported with t-statistics in parentheses and *, **, and *** indicates statistical significance at the 10%, 5%, and 1% levels respectively.

Factors	Coefficient Estimates of Factor Models			
	Raw	q-4	q-5	DHS
	(1)	(2)	(3)	(4)
Panel A: Value-Weighted Portfolio				
Intercept (%)	2.769***	2.349***	1.929***	2.274***
	(3.48)	(3.77)	(3.05)	(3.86)
Mkt		1.160***	1.321***	1.003***
		(6.49)	(7.10)	(6.18)
R_{ME}		0.114	0.329	
		(0.42)	(1.19)	
R_{IA}		-1.372***	-1.368***	
		(-3.20)	(-3.25)	
R_{ROE}		-0.269	-0.420	
		(-0.91)	(-1.42)	
R_{Eg}			1.230**	
			(2.53)	
FIN				-0.892***
				(-3.80)
PEAD				0.725**
				(2.28)
# Months	128	128	128	128
Adj R-Sq	NA	0.423	0.447	0.482
Panel B: Equal-Weighted Portfolio				
Intercept (%)	3.317***	2.738***	2.718***	2.870***
	(4.03)	(4.09)	(3.91)	(4.54)
Mkt		1.075***	1.083***	0.961***
		(5.61)	(5.29)	(5.51)
R_{ME}		0.503*	0.513*	
		(1.74)	(1.68)	
R_{IA}		-1.060**	-1.060**	
		(-2.30)	(-2.29)	
R_{ROE}		-0.186	-0.194	
		(-0.59)	(-0.59)	
R_{Eg}			0.058	
			(0.11)	
FIN				-0.945***
				(-3.75)
PEAD				0.591*
				(1.73)
# Months	128	128	128	128
Adj R-Sq	NA	0.382	0.377	0.442

Table 5: FAANG portfolio since Feb 2013 excluding Covid-19 period

A portfolio of FAANG stocks (Facebook, Amazon, Netflix, and Google; with Apple added only in October 2017) is held since February 2013 (the post-acronym period) but excluding the Covid-19 pandemic, i.e. ending month is December 2019. The returns of the stocks are averaged each month with value weights (the lag month market cap) in Panel A or equal weights in Panel B. The Intercept in model 1 is the average raw portfolio monthly return. The Intercept in models 2 to 5 are the alphas estimated by a time-series regression of the portfolio excess returns (excess of the risk-free rate which is the one-month T-Bill rate) on the various asset-pricing factor returns. Model 2 is the CAPM with the excess market return (Mkt) as a single factor, model 3 is the Fama and French (1993) three-factor model, model 4 is the Carhart (1997) four-factor model, and model 5 is the Fama and French (2018) six-factor model. The factors are returns from long-short portfolios consisting of small-minus-big stocks (SMB), high-minus-low book-to-market ratio stocks (HML), up-minus-down price momentum stocks (UMD), robust-minus-weak profitability stocks (RMW), and conservative-minus-aggressive investment stocks (CMA). Estimated coefficients are reported with t-statistics in parentheses and *, **, and *** indicates statistical significance at the 10%, 5%, and 1% levels respectively.

	Coefficient Estimates of Factor Models				
Factors	Raw (1)	CAPM (2)	FF3 (3)	Carhart (4)	FF6 (5)
	Panel A: Value-Weighted Portfolio				
Intercept (%)	2.253***	1.034**	0.695	0.589	0.660
	(3.69)	(2.08)	(1.54)	(1.31)	(1.58)
Mkt		1.068***	1.171***	1.253***	1.104***
		(7.49)	(8.71)	(8.92)	(8.09)
SMB			-0.385**	-0.380**	-0.500**
			(-2.04)	(-2.04)	(-2.53)
HML			-0.680***	-0.473**	-0.014
			(-3.76)	(-2.21)	(-0.06)
UMD				0.285*	0.194
				(1.77)	(1.28)
RMW					-0.271
					(-0.85)
CMA					-1.292***
					(-3.59)
# Months	83	83	83	83	83
Adj R-Sq	NA	0.402	0.522	0.534	0.601
	Panel B: Equal-Weighted Portfolio				
Intercept (%)	2.795***	1.525**	1.166**	1.064*	1.203**
	(3.94)	(2.48)	(2.03)	(1.84)	(2.35)
Mkt		1.115***	1.215***	1.294***	1.087***
		(6.33)	(7.11)	(7.18)	(6.51)
SMB			-0.364	-0.359	-0.653***
			(-1.52)	(-1.50)	(-2.70)
HML			-0.780***	-0.583**	0.065
			(-3.40)	(-2.13)	(0.23)
UMD				0.272	0.116
				(1.31)	(0.63)
RMW					-0.792**
					(-2.04)
CMA					-1.783***
					(-4.05)
# Months	83	83	83	83	83
Adj R-Sq	NA	0.323	0.426	0.431	0.556

Table 6: FAANG portfolio since Feb 2013 excluding FAANG stocks from factors
A portfolio of FAANG stocks (Facebook, Amazon, Netflix, and Google; with Apple added only in October 2017) is held since February 2013 (the post-acronym period). The returns of the stocks are value weighted (Panel A) or equal-weighted (Panel B) each month. The Intercept in column 1 is the average raw portfolio monthly return and other intercepts are factor-model alphas. Factors with an exFAANG suffix are self-constructed from a CRSP universe that excludes the FAANG stocks when they are in the FAANG portfolio. Factor models are described in the legend of Table 1. Estimated coefficients are reported with t-statistics in parentheses and *, **, and *** indicates statistical significance at the 10%, 5%, and 1% levels respectively.

Factors	Coeffient Estimates of Factor Model				
	Raw	FF3	FF3-exFAANG	Carhart	Carhart-exFAANG
	(1)	(2)	(3)	(4)	(5)
	Panel A: Value-Weighted Portfolio				
Intercept (%)	2.530***	0.638	0.942*	0.591	0.888*
	(4.04)	(1.50)	(1.93)	(1.41)	(1.83)
Mkt		1.227***		1.295***	
		(11.69)		(12.01)	
Mkt-exFAANG			1.104***		1.182***
			(8.88)		(9.07)
SMB		-0.430**		-0.371**	
		(-2.54)		(-2.21)	
SMB-exFAANG			-0.242		-0.195
			(-1.21)		(-0.98)
HML		-0.557***		-0.387**	
		(-3.74)		(-2.32)	
HML-exFAANG			-0.611***		-0.432**
			(-3.43)		(-2.14)
UMD				0.295**	
				(2.13)	
UMD-exFAANG					0.297*
					(1.80)
# Months	95	95	95	95	95
Adj R-Sq	NA	0.604	0.472	0.619	0.485
	Panel B: Equal-Weighted Portfolio				
Intercept (%)	2.974***	1.096**	1.404**	1.051**	1.348**
	(4.36)	(2.07)	(2.42)	(2.00)	(2.34)
Mkt		1.194***		1.258***	
		(9.16)		(9.30)	
Mkt-exFAANG			1.068***		1.149***
			(7.25)		(7.40)
SMB		-0.391*		-0.336	
		(-1.86)		(-1.59)	
SMB-exFAANG			-0.195		-0.147
			(-0.82)		(-0.62)
HML		-0.605***		-0.444**	
		(-3.27)		(-2.12)	
HML-exFAANG			-0.646***		-0.461*
			(-3.06)		(-1.92)
UMD				0.279	
				(1.60)	
UMD-exFAANG					0.305
					(1.55)
# Months	95	95	95	95	95
Adj R-Sq	NA	0.485	0.375	0.494	0.385

Table 7: Stock comovement with a FAANG portfolio

This table reports estimates from a large panel regression of all CRSP stock-month observations (June 2002 to December 2020) where the dependent variable is a stock's FAANG Beta, estimated each month from a regression of a stock's daily returns (at least 10 observations) on the daily returns of a value-weighted portfolio of FAANG stocks and the daily returns of a value-weighted market portfolio. When estimating a FAANG beta of a FAANG stock (Facebook, Amazon, Apple, Netflix, or Google), the stock itself is excluded from the FAANG portfolio's daily returns. Otherwise, all five stocks are in the FAANG portfolio for the estimation of a stock's FAANG beta. $FAANGstock$ is a dummy variable which equals one when the stock is a FAANG stock and zero otherwise. $PostAcronym$ is a dummy variable which equals one when the date is February 2013 and after, except for Apple where $PostAcronym$ equals one from October 2017 and after. BM is the stock's book-to-market ratio, $Size$ is its lag-month market cap, and $PriceMomentum$ is its month $t-12$ to $t-2$ buy-and-hold return. $FAANGsector$ is a dummy indicating that the stock is in groups 7 (Entertainment), 35 (Computer Hardware), or 36 (Computer Software) of the Fama and French (1997) 49-industry groups. The estimations include either industry (49-group definition) fixed effects or DGTW-group (based on size-BM-momentum Daniel et al. (1997) sorts) fixed effects as indicated. Reported coefficients have t-statistics shown in parentheses based on standard errors clustered by industry (49-group definition) and *, **, and *** indicate statistical significance at the 10%, 5%, and 1% levels respectively.

Explanatory Variable	Dependent Variable: FAANG Beta			
	(1)	(2)	(3)	(4)
FAANGstock	0.521***	0.473***	0.532***	0.492***
	(15.12)	(18.86)	(12.87)	(12.59)
PostAcronym	-0.094***	-0.092***	-0.089***	-0.089***
	(-4.49)	(-4.83)	(-4.67)	(-4.94)
FAANGstock×PostAcronym	0.350***	0.248***	0.336***	0.224***
	(9.31)	(6.24)	(6.39)	(4.11)
FAANGsector		0.040***		0.038***
		(5.54)		(5.42)
FAANGsector×PostAcronym		0.102***		0.105***
		(2.76)		(2.96)
Log(BM)			-0.026***	-0.013***
			(-6.21)	(-2.87)
Log(Size)			-0.008**	-0.007**
			(-2.53)	(-2.07)
PriceMomentum			0.054***	0.042***
			(8.56)	(6.49)
# Observations	859,630	859,604	831,037	831,037
Adj R-Squared	0.00495	0.00510	0.00667	0.00595
Fixed Effects	Industry	DGTW	Industry	DGTW

Table 8: Post-acronym return spread of FAANG beta portfolios

The average returns of stocks in FAANG beta quintiles are reported for the post-acronym period defined as February 2013 to December 2020. A stock's FAANG beta is estimated by regressing its prior month daily stock returns (at least 10 observations) on the daily returns of a value-weighted portfolio of FAANG stocks (Facebook, Amazon, Netflix, and Google, with Apple added in October 2017) and the daily returns of a value-weighted market portfolio. Stocks are sorted each month using NYSE breakpoints and held for one month in the portfolio. Stocks with lagged prices of less than one dollar are removed. FAANG stocks themselves are excluded from the quintile portfolios. Reported returns and averages are based on value weights (lag month market cap) in Panel A, or equal weights in Panel B. The Intercept in model 1 is the average raw portfolio monthly return. The Intercept in models 2 to 4 are the alphas estimated by time-series regressions of the portfolio excess returns (excess of the risk-free rate which is the one-month T-Bill rate) on the various asset-pricing factor returns. The CAPM alphas are reported in model 2, Fama and French (2018) six-factor model alphas in model 3, and Hou et al. (2020a) q-5 factor model alphas in model 4. Returns are shown in percent with t-statistics in parentheses and *, **, and *** indicates statistical significance at the 10%, 5%, and 1% levels respectively.

Portfolio	Raw Return (%)	Alpha (%)			Avg FAANG Beta
		CAPM	FF6	q-5	
	(1)	(2)	(3)	(4)	(5)
Panel A: Value-Weighted Portfolios					
Low FAANG Beta	0.985*	-0.483	0.057	0.204	-0.995
	(1.73)	(-1.65)	(0.25)	(0.86)	
2	0.918*	-0.451**	-0.179	-0.066	-0.443
	(1.86)	(-2.51)	(-1.10)	(-0.40)	
3	0.996**	-0.254**	-0.089	-0.048	-0.163
	(2.31)	(-2.41)	(-0.87)	(-0.45)	
4	1.163***	-0.007	0.078	0.096	0.105
	(2.89)	(-0.07)	(0.76)	(0.88)	
High FAANG Beta	1.489***	0.190	0.150	0.176	0.668
	(3.25)	(1.34)	(1.10)	(1.18)	
High–Low	0.505	0.673*	0.094	-0.028	1.664
	(1.38)	(1.78)	(0.30)	(-0.09)	
Panel B: Equal-Weighted Portfolios					
Low FAANG Beta	1.021	-0.860**	-0.258	0.154	-1.333
	(1.40)	(-2.36)	(-1.08)	(0.71)	
2	1.209**	-0.355	0.123	0.280**	-0.451
	(2.10)	(-1.51)	(1.14)	(2.42)	
3	1.150**	-0.325	0.096	0.218**	-0.164
	(2.15)	(-1.60)	(1.13)	(2.31)	
4	1.241**	-0.161	0.228**	0.387***	0.113
	(2.41)	(-0.77)	(2.34)	(4.21)	
High FAANG Beta	1.132*	-0.418	-0.049	0.188	0.966
	(1.93)	(-1.54)	(-0.32)	(1.23)	
High–Low	0.110	0.442	0.209	0.034	2.299
	(0.37)	(1.56)	(0.77)	(0.13)	

Table 9: Pre-acronym return spread of FAANG beta portfolios

The average returns of stocks in FAANG beta quintiles are reported for the pre-acronym period defined as June 2002 to January 2013. A stock's FAANG beta is estimated by regressing its prior month daily stock returns on the daily returns of a value-weighted portfolio of FAANG stocks (Facebook, Amazon, Apple, Netflix, and Google when available) and the daily returns of a value-weighted market portfolio. Stocks are sorted each month using NYSE breakpoints and held for one month in the portfolio. Stocks with lagged prices of less than one dollar are removed. FAANG stocks themselves are excluded from the quintile portfolios. Reported returns and averages are based on value weights (lag month market cap) in Panel A, or equal weights in Panel B. The Intercept in model 1 is the average raw portfolio monthly return. The Intercept in models 2 to 4 are the alphas estimated by time-series regressions of the portfolio excess returns (excess of the risk-free rate which is the one-month T-Bill rate) on the various asset-pricing factor returns. The CAPM alphas are reported in model 2, Fama and French (2018) six-factor model alphas in model 3, and Hou et al. (2020a) q-5 factor model alphas in model 4. Returns are shown in percent with t-statistics in parentheses and *, **, and *** indicates statistical significance at the 10%, 5%, and 1% levels respectively.

Portfolio	Raw Return (%)	Alpha (%)			Avg FAANG Beta
		CAPM	FF6	q-5	
	(1)	(2)	(3)	(4)	(5)
Panel A: Value-Weighted Portfolios					
Low FAANG Beta	0.746	-0.087	-0.101	0.233	-0.523
	(1.44)	(-0.43)	(-0.49)	(1.13)	
2	0.575	-0.110	0.059	0.114	-0.192
	(1.47)	(-1.02)	(0.52)	(1.03)	
3	0.749*	0.072	0.203**	0.199**	-0.027
	(1.97)	(0.84)	(2.22)	(2.19)	
4	0.716*	0.008	0.202**	0.068	0.143
	(1.79)	(0.10)	(2.25)	(0.78)	
High FAANG Beta	0.792	-0.053	0.173	0.018	0.502
	(1.54)	(-0.30)	(0.99)	(0.10)	
High–Low	0.046	0.035	0.274	-0.215	1.024
	(0.15)	(0.11)	(0.84)	(-0.65)	
Panel B: Equal-Weighted Portfolios					
Low FAANG Beta	0.926	-0.006	0.033	0.211	-0.734
	(1.55)	(-0.03)	(0.20)	(1.35)	
2	1.072**	0.259	0.318***	0.395***	-0.197
	(2.19)	(1.58)	(3.51)	(4.29)	
3	1.008**	0.233	0.257***	0.339***	-0.026
	(2.19)	(1.60)	(3.16)	(3.93)	
4	1.102**	0.307*	0.396***	0.392***	0.148
	(2.31)	(1.96)	(4.90)	(4.39)	
High FAANG Beta	1.106*	0.210	0.316***	0.307***	0.702
	(1.96)	(0.94)	(2.70)	(2.64)	
High–Low	0.179	0.217	0.283*	0.096	1.436
	(1.21)	(1.47)	(1.79)	(0.62)	

Figure 1: FAANG portfolio market-cap share

The share of market cap of a portfolio of FAANG stocks (Facebook, Amazon, Apple, Netflix, and Google) is plotted in the post-acronym period (top chart, February 2013 to August 2021) and in the pre-acronym period (bottom chart, June 2002 to January 2013). Post-acronym, Facebook, Amazon, Netflix, and Google all enter at the start, but Apple enters only in October 2017 when the FANG acronym was re-coined as FAANG. Pre-acronym, stocks enter whenever possible with newly IPO stocks entering the portfolio immediately after their IPO month, i.e., Google enters in September 2004 and Facebook enters June 2012, while Apple, Amazon, and Netflix which are already listed enter at the start. Bars represent the value-weight of the stocks within the portfolio (the lag-month market cap). The market cap is the ordinary share market cap computed from CRSP for the period up to 2020 (note that for Google the market cap is combined for the periods where there are two classes of shares) and from Bloomberg for the months after 2020.

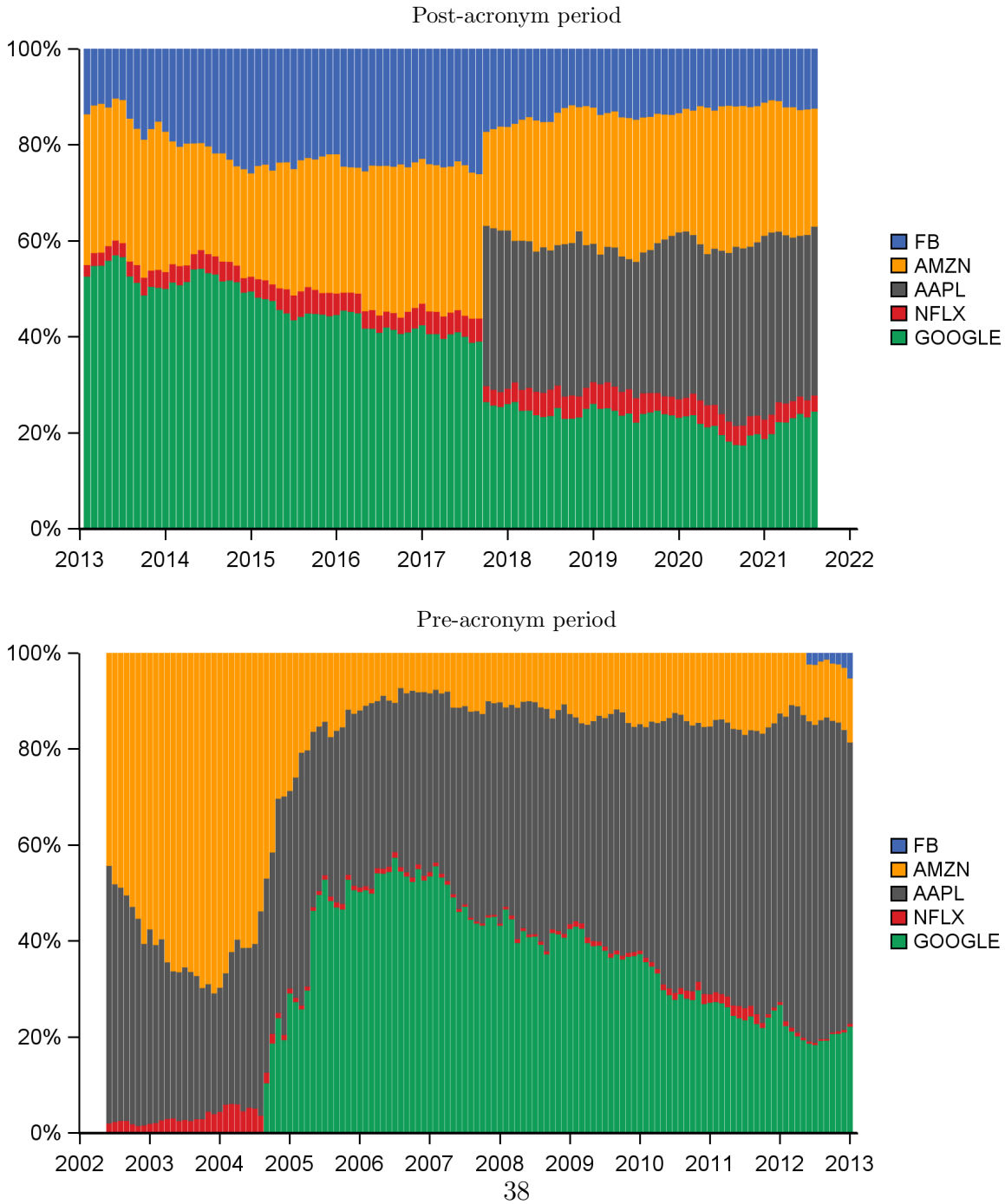

Figure 2: FAANG portfolio monthly alphas

The pre-acronym June 2002 to January 2013 portfolio of FAANG stocks contains Facebook, Amazon, Apple, Netflix, and Google. A post-acronym February 2013 to August 2021 portfolio of FAANG stocks contains Facebook, Amazon, Netflix, and Google, but Apple is added only in October 2017. The returns of the stocks are averaged each month with value weights (the lag month market cap) in the top chart or equal weights in the bottom chart. The bars plot their monthly average returns with the heat map color representing the statistical significance (greener colors representing greater statistical significance compared to a null of zero). The returns plotted are the raw return, the CAPM alpha, the Fama and French (1993) three-factor alpha (FF3), the Carhart (1997) four-factor alpha (Carhart), the Fama and French (2018) six-factor alpha (FF6), the Hou et al. (2014) q-4 model alpha, the Hou et al. (2020a) q-5 model alpha, and the Daniel et al. (2019) model alpha (DHS). For the last three models, the post-acronym period ends in December 2020 instead of August 2021 because of factor data availability. The alphas are estimated by a time-series regression of the monthly portfolio excess returns (excess of the risk-free rate which is the one-month T-Bill rate) on the relevant asset-pricing factor returns.