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Firm power in product market and stock returns

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ABSTRACT

We compare the buy-and-hold abnormal returns (BHARs) among the deciles portfolios of firms based on their product market power. We document that the value-weighted portfolios (equally-weighted portfolios) of firms with the strongest product market power generate one-year BHARs ranging from 13.96% (8.85%) to 16.90% (10.63%) higher than the portfolios of the weakest firms. The abnormal returns persist even when we control for industry concentration level (as suggested by Hou and Robinson (2006)), common firm characteristics and alternative industry classifications. The higher returns accrued to the portfolios of firms with the strongest product market power can be attributed to the higher future standardized earnings surprises generated by these firms and their lower idiosyncratic volatility.

1. Introduction

The link between product market competition and firm performance has been a major theme in industrial organization research. Starting with the seminal paper by Bain (1951) and subsequent supporting studies by Collins and Preston (1969), Demsetz (1973) and Mann (1966) this strand of literature establishes convincing evidence of higher profitability among firms in highly concentrated industries. Collins and Preston (1969), specifically, look into the concentration levels of 417 four-digit SIC industries over the period 1958–1963, and they show that firms in highly concentrated industries and the largest firms in these industries enjoy higher price-cost margins than all other firms.

Extending the literature on market structure and firm profitability, Melicher, Rush, and Winn (1976) examine a sample of 500 manufacturing firms over the 1967–1975 period and show that portfolios of firms in highly concentrated industries do not generate superior or excess returns after adjusting for firm risk. Sullivan (1978) examines a sample of 1409 firms in 1972 and documents that a powerful firm (based upon its share of the sales in 4-digit SIC codes in 1972) and/or a firm in a concentrated industry incurs lower cost of capital than a non-powerful firm and/or a firm in a competitive industry. In addition, since these powerful firms experience lower systematic risk (estimated using data from 1963–1972), the expected returns on these powerful firms are lower than non-powerful firms.

Hou and Robinson (2006) propose that product market structure impact the magnitude and the risk of firm cash flows and consequently their stock returns through two channels: innovation and barriers-to-entry. First, firms in more concentrated industries tend to engage in less innovation, and thus the average returns accrued to these firms tend to be lower. Second, firms in high barriers-to-entry industries (highly concentrated industries) are exposed to lower levels of distress risk (since the barriers mitigate potential competition), and as a result they earn lower average returns. While shedding more lights on how firm returns are affected by the competitiveness of the product market, the findings by Hou and Robinson (2006) do not show how the power of a firm (relative to others) or the position of a firm in the product market affect its stock returns.

In this study, we fill the above gap by examining the relationship between firms' relative power in their product market and stock returns. Specifically, we compare the returns of the portfolios of the strongest firms in terms of product market power with those of the portfolios of the weakest firms, and predict higher excess returns for the portfolios of the strongest firms. We define a firm's power in the product market as the proportion of industry sales that it generates. Hou and Robinson (2006) focus on inter-industry effects (i.e., the concentration degrees of the different product markets) on firm stock returns. They compare and contrast the returns accrued to firms in highly concentrated industries versus firms in less concentrated industries. We, on the other hand, explore the intra-industry variation effects on firm returns. Within each indus-

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try (irrespective of concentration levels), we compare and contrast the returns accrued to the most powerful firms versus the weakest ones.

We predict higher excess returns accruing to the portfolios of firms with the most product market power as opposed to the portfolios of firms with the least product market power for the following two reasons. First, based upon the literature of industrial organization, in an oligopoly under Bertrand competition, the relative power of a firm or the relative position of a firm in a product market enables the firm to demand higher prices and thus maximize its profit by exploiting consumer surplus. Collins and Preston (1969) suggest that the largest firms in each industry enjoy both wider profit margins and more stable customer base. The largest firms derive their cost advantages from their experience, access to scarce resources and scale economies, which in turn consolidates the industry's barrier to entry. The stable customer base is a product of the large firms' established reputation, extensive distribution systems and product differentiation. The ability to exercise such market power enhances the firm's profit as well as reduces the volatility in the firm's earnings.

Second, Gaspar and Massa (2006) show how a firm with market power is able to pass on a bigger proportion of any idiosyncratic cost shocks to its consumers and minimize fluctuations in its cash flows. Firms with less market power, on the other hand, are more susceptible to cost shocks and cash flow fluctuations. If idiosyncratic risk is priced, then the effect of market power (on firm idiosyncratic risk) should manifest in firm excess returns. Given the tantamount evidence of higher excess returns attributable to firms with lower stock price volatility (see Ang, Hodrick, Xing, & Zhang, 2006; Bali & Cakici 2008; Baker, Bradley, & Wurgler, 2011; Frazzini, Asness, & Pedersen 2014; Garcia-Feijoo, Kochard, Sullivan, & Wang, 2015), we expect the most powerful firms in terms of product market should earn superior or excess returns. The combined results of higher profitability and lower idiosyncratic risks suggest higher excess returns attributable to the most powerful firms in the product markets (unlike the weakest firms).

There is a wide literature on the ability of dominant firms to extract benefits from rival firms. Hahn (1984) finds that, in the energy industry, information asymmetry causes regulators to misallocate emissions allowance to dominant firms, who then have monopoly power on the excess emission permits. Sartzetakis (1997) and Hintermann (2011) find that such market power enables the dominant firms to manipulate the permit market to raise rival firms' marginal costs and to diminish competition. Dormady (2014) conducts a series of experiments to demonstrate that the dominant firm is able to inflate the price of energy (i.e., electricity) without raising the price of emissions allowances. The overall outcome is that the dominant firm reaps the most benefits, either through raising the rival firms' marginal costs (and thus excluding them from the competition) or through inflating the price in the product market itself.

To test that firms with greater product-market power generates higher excess stock returns, we measure a firm's product market power as the proportion of industry sales generated by the firm in a given year. We employ three alternative industry classification schemes: (i) two-digit SIC codes, (ii) four-digit SIC codes and (iii) Fama-French 48-sector classifications. Regardless of how we define an industry and after controlling for other firm characteristics, the outperformance of the portfolios of the strongest firms is consistently and highly significant. We find that a one-year long position in the value-weighted portfolios (equally-weighted portfolios) of firms with the strongest product market power generates a one-year BHARs ranging from 13.96% (8.85%) to 16.90% (10.63%) above the BHARs of the portfolios of the weakest firms. The results persist in shorter time windows, i.e., in the 6- and 9-month windows following portfolio formation.

As robustness checks, we examine whether the product market power impact varies across industries that differ in competitiveness structures. We first sort firms into quintile portfolios based on industry concentration and within each quintile we further sort the firms into another set of quintile portfolios based on product market power. Regardless of industry's concentration level, the portfolio of the most powerful firms (in every industry) consistently outperforms the portfolio of the weakest firms based on product market power alone. Thus, product market power by itself is a contributing factor to firm stock returns in addition to industry competitiveness structure as documented by Hou and Robinson (2006).

It is likely that product market power is a manifestation of other firm characteristics. As such, the higher returns accrued to the portfolio of firms with the most product market power that we document might be driven by other firm characteristics rather than product market power itself. To account for this possibility, we first regress product market power of firm on other firm characteristics and obtain the residuals from the regression, which capture the part of product market power uncorrelated with firm characteristics. We refer to the residuals as excess product market power. We then sort the firms into portfolios based upon their excess product market power measure and still find evidence of higher returns accruing to the portfolio of firms with the most rather than less excess product market power measure.

Our findings should assist investment managers who consider firms' product market strength as part of their fundamental analyses to investments. Successful fund managers, i.e., the likes of Lynch (1989, 1994) and Warren Buffet (see Hagstrom, 2002) have long prophesized the importance of selecting portfolio companies that hold a sustainable competitive advantage over their rivals. Nonetheless, there is little empirical evidence to support that thesis. To the best of our knowledge, we are the first to establish that the strength of a firm within its industry — based on the proportion of industry sales that it generates — directly impacts shareholder wealth. Building a portfolio comprising of firms that dominate their respective product market yields significant abnormal positive returns to investors.

We are not advocating for reduced competition and more monopoly power. Indeed, it is the existence of competition within an industry or sector that allows us to rank the firms based on product market power. We are also not advocating that leaders in product market power is the mainstay. On the contrary, our investment strategy requires an annual rebalancing of the portfolios based on product market power (i.e., the leader of the previous year may get downgraded in the current year) and we are calculating returns in the short-run. However, our investment strategy represents an alternative way to build and manage investment portfolios based on the core business philosophy of strength in product market. The coexistence of alternative investment strategies like ours (besides value-, growth- and momentum strategies amongst others) is necessary in the quest to minimize market anomalies and contribute toward market efficiency.

2. Data and methodology

Our sample period extends from 1980 to 2012. Since we also examine the subsequent three-year earnings surprises and idiosyncratic risk of the sample firms after they are included in the portfolios, we stop the sample period in 2012 to ensure that all the sample firms have three years' worth of data.

We obtain accounting data from COMPUSTAT and stock trading data from CRSP. We present the sample distribution by year in Panel A of Table 1. The number of firms increases gradually over the years until 2000. We present the sample distribution by the Fama-French

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Table 1
Sample distribution.

Year	N	Percent	Fama-French 48-sector	N	Percent
1980	3933	2.21	AERO	798	0.45
1981	4192	2.36	AGRIC	530	0.3
1982	4292	2.42	AUTOS	2448	1.38
1983	4515	2.54	BANKS	16,881	9.5
1984	4681	2.63	BEER	550	0.31
1985	4625	2.6	BLDMT	3400	1.91
1986	4887	2.75	BOOKS	1263	0.71
1987	5047	2.84	BOXES	480	0.27
1988	5023	2.83	BUSSV	16,690	9.39
1989	4997	2.81	CHEM	3012	1.7
1990	5020	2.83	CHIPS	9491	5.34
1991	5016	2.82	CLTHS	2202	1.24
1992	5355	3.01	CNSTR	2064	1.16
1993	6337	3.57	COAL	280	0.16
1994	6723	3.78	COMPS	6465	3.64
1995	6991	3.93	DRUGS	8493	4.78
1996	7364	4.14	ELCEQ	2549	1.43
1997	7188	4.05	FABPR	619	0.35
1998	6857	3.86	FIN	9088	5.12
1999	6646	3.74	FOOD	2632	1.48
2000	6496	3.66	FUN	2488	1.4
2001	6084	3.42	GOLD	1628	0.92
2002	5727	3.22	GUNS	292	0.16
2003	5515	3.1	HLTH	2719	1.53
2004	5433	3.06	HSHLD	3010	1.69
2005	5350	3.01	INSUR	5351	3.01
2006	5165	2.91	LABEQ	3492	1.97
2007	5081	2.86	MACH	5586	3.14
2008	4856	2.73	MEALS	3086	1.74
2009	4652	2.62	MEDEQ	5042	2.84
2010	4556	2.56	MINES	1139	0.64
2011	4558	2.57	OIL	8128	4.57
2012	4508	2.54	PAPER	2317	1.3
			PERSV	1670	0.94
			RLEST	1987	1.12
			RTAIL	7826	4.4
			RUBBR	1563	0.88
			SHIPS	314	0.18
			SMOKE	206	0.12
			SODA	374	0.21
			STEEL	2350	1.32
			TELCM	5212	2.93
			TOYS	1301	0.73
			TRANS	4275	2.41
			TXTLS	1002	0.56
			UTIL	5633	3.17
			WHLSL	6041	3.4
			OTHER	3703	2.08

This table reports the sample distribution by year in Panel A and by Fama-French 48-sector classification in Panel B.

48-industry classification codes[1] in Panel B of Table 1. Banks and business services dominate the sample with 9.50% and 9.39% of the sampled firms, respectively. The two smallest sectors are tobacco products and coal, which represent 0.12% and 0.16%, respectively.

We measure product market power of firm (i) as the ratio of its sales to the total sales of its respective industry (f) at the end of each calendar year (t) as follows:

$$\text{Product market power}_{i,f,t} = \frac{\text{Sales}_{i,f,t}}{\sum_{i}^{n} \text{Sales}_{i,f,t}} \quad (1)$$

To ensure that our measure of product market power is not sensitive to how we define an industry, we consider three alternative industry classification schemes, including the four-digit SIC codes, two-digit SIC codes and Fama-French 48-sector classification codes. At the end of each calendar year, we sort the firms into decile portfolios based on their product market power (i.e., the ratio of a firm's sales to its industry sales) and calculate the one-year buy-and-hold return of the firms from January through December of the following year. We apply two schemes to weigh the stocks in the portfolios, i.e., value-weighted using market values of equity in December of year t and equally-weighted, and we present both sets of results separately. We subtract from the buy-and-hold return of each firm the corresponding CRSP value-weighted/equally-weighted portfolio buy-and-hold return to isolate market impacts and extract the excess return purely driven by the firm.

In Table 2, we report the product market power (i.e., firm sales as a proportion of the industry total sales) of an average firm in each of the decile portfolios. In Panel A, when we use 4-digit SIC codes for industry classification, the average firm in the smallest decile accounts for 0.001% of the industry sales while the average firm in the largest decile accounts for 48.163%. In Panel B, under the 2-digit SIC code classification, the average firm in the smallest decile accounts for 0.001% of the industry sales while the average firm in the largest decile accounts for 9.500%. In Panel C, using Fama-French 48-sector classification, the average firm in the smallest decile accounts for 0.001% of the industry sales while the

[1] http://mba.tuck.dartmouth.edu/pages/faculty/ken.french/Data_Library/det_48_ind_port.html.

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Table 2
Sales proportion of deciles portfolios of product market power.

Deciles	Average number of firms in the portfolio in a year	Average industry sales proportion generated by a firm in the portfolio in a year	Median industry sales proportion generated by a firm in the portfolio in a year	Standard deviation of industry sales proportion generated by a firm in the portfolio in a year
Panel A—Market shares based upon 4-digit SIC codes				
1	200.14	0.001%	0.003%	1.994%
2	156.95	0.038%	0.028%	0.032%
3	112.51	0.115%	0.094%	0.071%
4	82.64	0.269%	0.228%	0.145%
5	65.14	0.572%	0.501%	0.273%
6	51.56	1.159%	1.035%	0.492%
7	38.92	2.397%	2.180%	0.942%
8	31.04	5.236%	4.943%	1.865%
9	20.34	12.872%	12.121%	4.700%
10	11.03	48.163%	40.743%	24.627%
Panel B—Market shares based upon 2-digit SIC codes				
1	390.80	0.001%	0.001%	0.023%
2	434.46	0.004%	0.004%	0.002%
3	393.11	0.012%	0.010%	0.006%
4	347.96	0.026%	0.022%	0.013%
5	298.17	0.055%	0.049%	0.025%
6	254.61	0.112%	0.103%	0.043%
7	217.21	0.229%	0.217%	0.075%
8	176.57	0.499%	0.471%	0.169%
9	150.81	1.300%	1.202%	0.500%
10	104.45	9.500%	5.182%	12.561%
Panel C—Market shares based upon Fama-French 48-sector codes				
1	368.48	0.001%	0.001%	0.013%
2	415.91	0.004%	0.004%	0.002%
3	369.00	0.011%	0.010%	0.006%
4	328.36	0.023%	0.020%	0.011%
5	287.99	0.045%	0.040%	0.019%
6	258.89	0.085%	0.077%	0.033%
7	227.59	0.163%	0.152%	0.057%
8	201.54	0.345%	0.322%	0.123%
9	173.86	0.914%	0.841%	0.373%
10	142.78	6.565%	3.661%	8.183%

This table reports the summary statistics of the sales generated by an average firm as a proportion of the industry total sales, where industry is defined by 2-digit SIC codes (in Panel A), 4-digit SIC codes (in Panel B) and Fama-French 48-sector codes (in Panel C), alternatively. We first group the universe of sample firms in Compustat from 1980–2012 into industries. Then in each industry, we form deciles portfolios of firms based upon their sales as a proportion of the total industry sales.

average firm in the largest decile accounts for 6.565%. The proportion of sales of individual firms is consistent under both the 2-digit SIC code and Fama-French 48-sector classifications. However, since the 4-digit SIC code classification spreads firms out into more industries (which leads to fewer firms per each industry-power decile-year observation), the sales proportion of individual firms is much higher than that under the 2-digit SIC code classification and the Fama-French 48-sector classification.

3. Results

3.1. Stock returns to decile portfolios based upon product market power

We compare the value-weighted (in Panel A of Table 3) and equally-weighted (in Panel B) portfolios' buy and hold abnormal returns (BHARs) in the year following the formation of the portfolio (i.e., $t+1$), and present our findings in Table 3. The firms are ranked based on their product market power. BHAR is the difference in the buy and hold returns of the sampled portfolio and that of the corresponding CRSP portfolio.

Using the four-digit SIC codes to classify firms into industries, the value-weighted (equally-weighted) BHAR of the lowest ranked decile portfolio is −14.617% (−7.507%). The returns increase monotonously as we move up the rankings, i.e., the product market power of the portfolio firms increases. The value-weighted (equally-weighted) BHAR of the highest ranked decile portfolio is −0.659% (1.343%). The difference in the BHARs of the value-weighted (equally-weighted) deciles portfolio with the most product market power and the one with the least product market power is 13.958% (8.85%); both the t-statistics and the Wilcoxon z-statistics are significant at the 1% level.

Using the two-digit SIC and the Fama-French 48 sector classification codes leads to even bigger differences. At the two-digit SIC level, the difference between the highest and lowest ranked decile portfolios are 15.527% using value-weighted portfolios and 9.464% using equally-weighted portfolios. The respective values are 16.902% and 10.627% using the Fama-French 48-sector classification. The evidence suggests an overwhelming advantage to the most powerful firms in generating excess stock returns based on their proportion of industry sales.

3.2. Stock returns to quintiles portfolios based upon industry concentration level and product market power

Hou and Robinson (2006) document that firms in more concentrated industries tend to experience lower returns than firms in less concentrated industries since they are exposed to lower distress risk and are engaged in little innovation. Thus, we test whether our results hold regardless of the competitive nature of an industry. First, we sort the industries into five groups based on their Hefindahl Index. The industry Herfindahl index is calculated as the sum of the squared ratios of individual firm sales to total industry sale in the industry. Within each quintile of industry Herfindahl index, we

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Table 3
Buy-and-hold abnormal returns for deciles portfolios based upon product market power.

Deciles portfolios	Panel A—Value-weighted deciles portfolios			Panel B—Equally-weighted deciles portfolios		
	Industry classification based on 4-digit SIC codes	Industry classification based on 2-digit SIC codes	Industry classification based on Fama-French 48 sector codes	Industry classification based on 4-digit SIC codes	Industry classification based on 2-digit SIC codes	Industry classification based on Fama-French 48 sector codes
Q1	−14.617%	−16.290%	−17.374%	−7.507%	−8.049%	−9.263%
Q2	−7.404%	−11.345%	−13.627%	−2.071%	−3.114%	−3.324%
Q3	−2.642%	−7.404%	−9.098%	−0.212%	−0.921%	−0.919%
Q4	−1.554%	−4.381%	−5.245%	0.059%	−0.011%	0.436%
Q5	−2.406%	−2.536%	−4.411%	−0.206%	−0.084%	0.469%
Q6	−0.816%	−1.668%	−0.681%	0.527%	1.353%	1.152%
Q7	−0.202%	−1.258%	−1.436%	0.741%	1.549%	1.258%
Q8	−0.498%	0.173%	−0.880%	1.435%	1.719%	1.229%
Q9	−0.380%	0.225%	−0.066%	1.281%	1.513%	2.563%
Q10	−0.659%	−0.763%	−0.472%	1.343%	1.414%	1.364%
Q10 minus Q1	13.958%	15.527%	16.902%	8.850%	9.464%	10.627%
t-stat	3.9***	3.5***	4.16***	2.22**	2.02**	2.5**
Wilcoxon-stat	4.68***	4.77***	4.63***	2.64***	3.31***	3.24***

We compare and contrast the buy and hold abnormal returns accrued to the deciles value-weighted portfolios (in Panel A) and equally-weighted portfolios of firms (in Panel B) ranked by their sales as a proportion of the industry sales. Industry is defined by either 4-digit SIC codes, 2-digit SIC codes or Fama-French 48-sector codes, alternatively. In January of each year, for each industry, we rank all the firms in the industry into deciles based upon their sales in the preceding fiscal year as a proportion of the industry sales. We then calculate the following 12-month buy-and-hold abnormal returns (BHARs) for the firms in each deciles in each industry. The BHAR is the difference between the 12-month buy-and-hold returns of the firm and the 12-month buy-and-hold returns of the CRSP value-weighted index or equally-weighted index. Individual firm BHARs are then value-weighted (based upon firm market capitalization in the portfolio formation year) or equally-weighted for each decile portfolios.
* Indicate the significance levels at 10%, respectively.
** Indicates the significance level of 5%, respectively.
*** Indicates the significance level of 1%, respectively.

Table 4
12-month buy-and-hold abnormal returns for value-weighted portfolios formed based upon industry concentration and product market power.

Industry concentration quintiles	Market power quintiles							
	Q1	Q2	Q3	Q4	Q5	Q5 minus Q1	t-stat	Wilcoxon-stat
Panel A—Industry classification based upon 4-digit SIC codes								
Q1	−4.457%	−0.928%	−0.572%	−1.043%	−0.661%	3.796%	1.06	1.24
Q2	−11.743%	−2.901%	−2.445%	0.929%	−1.142%	10.601%	2.48**	3.73***
Q3	−13.223%	−2.260%	−0.983%	0.231%	1.500%	14.723%	4.01***	4.12***
Q4	−14.430%	−3.713%	−1.259%	0.488%	0.341%	14.771%	3.27***	4.21***
Q5	−10.040%	−3.220%	−2.865%	0.020%	−1.519%	8.521%	1.84*	2.82***
Panel B—Industry classification based upon 2-digit SIC codes								
Q1	−8.398%	1.929%	3.622%	2.204%	1.179%	9.577%	1.89*	3.05***
Q2	−12.028%	−6.138%	−4.496%	−2.140%	−1.285%	10.743%	2.13**	3.62***
Q3	−17.482%	−7.524%	−3.780%	−2.671%	−1.853%	15.629%	2.84***	4.36***
Q4	−15.989%	−6.070%	−2.174%	0.512%	−0.616%	15.373%	3.93***	4.77***
Q5	−13.967%	−12.410%	−6.318%	−1.151%	1.298%	15.265%	3.19***	3.53***
Panel C—Industry classification based upon Fama-French 48 sector codes								
Q1	−8.498%	0.956%	1.587%	2.469%	0.373%	8.871%	2.47**	2.92***
Q2	−10.313%	−7.017%	−3.382%	−4.129%	−1.059%	9.254%	2.46**	3.49***
Q3	−15.453%	−8.707%	−3.909%	−4.375%	−2.045%	13.408%	2.89***	4.08***
Q4	−14.948%	−3.660%	−0.970%	0.100%	1.513%	16.461%	4.23***	4.44***
Q5	−15.043%	−7.429%	−7.466%	−1.531%	−0.050%	14.993%	3.35***	4.21***

We compare and contrast the buy and hold abnormal returns accrued to the quintiles value-weighted portfolios of firms ranked by their sales as a proportion of the industry sales. Industry is defined by either 4-digit SIC codes (in Panel A), 2-digit SIC codes (in Panel B) or Fama-French 48-sector codes (in Panel C), alternatively. In January of each year, we sort industries into 5 groups based upon the industry Herfindahl index. The industry Herfindahl index is calculated as the sum of the squared ratios of individual firm sales to total industry sale in the industry. Within each quintile of industry Herfindahl index, we sort firms into quintiles based upon the ratio of firm sales to total industry sales (e.g. product market power). We then compare and contrast the BHARs of the portfolio of firms with the largest and the one with the lowest product market power in each quintile of industry Herfindahl index. The BHAR is the difference between the 12-month buy-and-hold returns of the firm and the 12-month buy-and-hold returns of the CRSP value-weighted index. Individual firm BHARs are then value-weighted (based upon firm market capitalization in the portfolio formation year) for each quintile portfolio.
* Indicate the significance levels at 10%, respectively.
** Indicate the significance levels at 5%, respectively.
*** Indicate the significance levels at 1%, respectively.

sort the firms into quintiles based upon their ratio of sales to total industry sales (i.e., their measure of product market power). We then compare and contrast the BHARs of the portfolio of firms with the largest and the one with the lowest product market power in each quintile of industry-Herfindahl index. We report our findings in Table 4.

In Panel A of Table 4, we use the four-digit SIC codes to classify the industries. Among the least concentrated industries (i.e., the lowest quintile of industry-Herfindahl index), the returns accrued to the portfolio of the most powerful firms (i.e., the firms with the highest proportion of industry sales) are higher than those of the portfolio of the weakest firms though the difference in the returns is not statistically significant. As the industry concentration level

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Table 5
Buy-and-hold abnormal returns of various windows for value-weighted portfolios formed based upon industry concentration and product market power as per Fama-French 48-sector classification.

Industry concentration quintiles	Market power quintiles							
	Q1	Q2	Q3	Q4	Q5	Q5 minus Q1	t-stat	Wilcoxon-stat
Panel A—BHAR 3 months								
Q1	0.098%	0.717%	0.658%	0.021%	−0.680%	−0.098%	−0.51	−0.64
Q2	−0.302%	0.732%	0.297%	0.126%	−0.799%	0.302%	−0.25	0.35
Q3	−1.323%	−0.491%	−0.699%	−0.654%	−0.769%	1.323%	0.34	−0.91
Q4	0.343%	0.998%	0.336%	1.622%	0.253%	−0.343%	−0.04	0.96
Q5	0.502%	1.004%	−0.724%	0.301%	−0.489%	−0.502%	−0.64	−0.1
Panel B—BHAR 6 months								
Q1	−1.900%	1.576%	0.392%	0.273%	−0.506%	1.393%	0.65	1.14
Q2	−2.643%	−0.420%	−0.649%	−1.381%	−0.928%	1.715%	0.54	1.03
Q3	−6.288%	−3.144%	−2.055%	−1.974%	−1.820%	4.468%	1.75*	1.85*
Q4	−2.492%	2.762%	1.248%	2.131%	1.961%	4.452%	2.43**	2.76***
Q5	−5.168%	−0.498%	−2.656%	0.090%	−0.358%	4.810%	1.94*	1.97**
Panel C—BHAR 9 months								
Q1	−4.142%	1.857%	1.902%	1.726%	0.049%	4.191%	2.46**	1.9*
Q2	−7.356%	−4.457%	−3.209%	−3.443%	−1.642%	5.714%	2.34**	2.56***
Q3	−10.111%	−4.272%	−2.448%	−2.525%	−1.232%	8.879%	2.69***	3.08***
Q4	−6.432%	−0.011%	0.160%	1.292%	1.490%	7.922%	2.26**	3.18***
Q5	−8.567%	−3.220%	−4.176%	−1.105%	−0.289%	8.278%	2.6***	3.23***

We compare and contrast the buy and hold abnormal returns accrued to the quintiles value-weighted portfolios of firms ranked by their sales as a proportion of the industry sales. Industry is defined by Fama-French 48-sector codes. In January of each year, we sort industries into 5 groups based upon the industry Herfindahl index. The industry Herfindahl index is calculated as the sum of the squared ratios of individual firm sales to total industry sale in the industry. Within each quintile of industry Herfindahl index, we sort firms into quintiles based upon the ratio of firm sales to total industry sales (e.g. product market power). We then compare and contrast the BHARs of the portfolio of firms with the largest and the one with the lowest product market power in each quintile of industry Herfindahl index. The BHAR is the difference between the 3, 6 or 9-month buy-and-hold returns of the firm, alternatively, and the respective 3, 6 or 9-month buy-and-hold returns of the CRSP value-weighted index. Individual firm BHARs are then value-weighted (based upon firm market capitalization in the portfolio formation year) for each quintile portfolio.

* Indicate the significance levels at 10%, respectively.
** Indicate the significance levels at 5%, respectively.
*** Indicate the significance levels at 1%, respectively.

increases, the differences in the BHARs between the portfolio of the most powerful firms and the portfolio of the weakest firms get larger and are statistically significant at the 1% level. In Panels B and C, using the two-digit SIC codes and the Fama-French 48-sector codes as alternative industry classification schemes, the differences in the returns between the portfolio of the most powerful firms and the portfolio of the weakest firms range between 9.577% and 16.461%, and are consistently significant at the 1% level. Thus, the results in Table 4 confirm that firms with more product market power generate higher returns regardless of whether their industry is highly or less concentrated.

In Table 5, we repeat the aforementioned analyses on BHARs in the three-, six- and nine months following the portfolio formation month as robustness checks. We focus on the BHARs within the 12 months following the portfolio formation month instead of looking beyond the 12 months windows (e.g. 24-month BHARs or 36-month BHARs) to lessen the impact of serial correlation on the BHARs since the portfolios are formed at the beginning of every year. The results show that the three-month BHARs between the portfolio of firms with the most product market power and the portfolio of firms with the least product market power are not statistically significant. However, the portfolio of firms with the most product market power accrue significantly higher BHARs in the extended six- and nine months' windows following the portfolio formation month.

3.3. Stock returns to deciles portfolios based upon product market power in control for firm characteristics

While we document solid evidence in Tables 3–5 that the most powerful firms (in terms of product market share) generate significantly higher excess returns than the weakest firms, it is possible that such returns are driven by certain firm characteristics beyond market power. To account for this possibility, we first examine the differences in other firm characteristics between the value-weighted portfolios of the most powerful and weakest firms in Table 6. The results in all three panels (based upon the three alternative industry classification schemes) of Table 6 show that the most powerful firms' portfolio is bigger in size, more indebted and more profitable (as measured by ROA) than the weakest firms' portfolio. Coincidentally, the most powerful firms' portfolio has lower market-to-book ratio and lower capital expenditure than the weakest firms' portfolio. Thus, the most powerful firms' portfolio is systematically different from the weakest firms' portfolio.

Given the above differences in firm characteristics between the two portfolios in Table 6, it is conceivable that the higher returns to the most powerful firms' portfolio in Table 3 is attributable to those characteristics. To isolate the effect of product market power from firm characteristics, we estimate the following regression cross-sectionally with all firm observations in each year-industry combination.

$$\begin{aligned}\text{Product market power}_{i,t} &= \alpha_i + \beta_1 \text{Ln(market capitalization)}_{i,t} \\ &+ \beta_2 \text{Market to book ratio}_{i,t} + \beta_3 \text{Debt to asset ratio}_{i,t} \\ &+ \beta_4 \text{Return on asset ratio}_{i,t} \\ &+ \beta_5 \text{Capital expenditure to asset ratio}_{i,t} + \varepsilon_{i,t} \end{aligned} \quad (2)$$

We use the residuals from the above regression as a proxy for the part of product market power that is uncorrelated with firm characteristics, and refer to the residuals as the firm's excess product market power. We report the results from the estimations of the above regression under the three alternative industry classification schemes in Panel A of Table 7. The average adjusted R-squared statistics range from 0.497 to 0.855, suggesting that a significant portion of firms' product market power can be explained by these firm characteristics.

In Panel B of Table 7, we sort the firms into decile portfolios based on their excess product market power measure obtained

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Table 6
Characteristics of deciles portfolios based upon product market power.

Deciles of firm sales proportion in the industry	Market cap.	Market-to-book ratio	Debt	ROA	Capital expenditure to asset ratio
Panel A—Industry classification based upon 4-digit SIC codes					
1	891.650	11.559	0.414	−0.255	0.085
2	863.430	4.767	0.586	−0.052	0.061
3	1169.090	4.281	0.592	−0.006	0.057
4	2144.560	4.807	0.576	0.022	0.064
5	5146.630	4.293	0.577	0.040	0.062
6	8065.900	3.246	0.588	0.053	0.064
7	13,706.700	3.128	0.595	0.055	0.067
8	34,995.690	5.447	0.597	0.065	0.067
9	54,270.790	3.048	0.571	0.070	0.070
10	55,192.040	4.339	0.596	0.073	0.063
10 minus 1	54,300.390	−7.220	0.182	0.328	−0.023
t-stat	7.45***	−2.87***	11.33***	18.72***	−2**
Wilcoxon-stat	6.98***	−2.78***	6.64***	6.98***	−1.86*
Panel B—Industry classification based upon 2-digit SIC codes					
1	909.820	11.436	0.328	−0.345	0.081
2	724.760	7.858	0.446	−0.097	0.064
3	677.460	6.600	0.440	−0.016	0.069
4	871.360	6.571	0.451	0.032	0.067
5	1445.160	7.958	0.493	0.051	0.066
6	2295.770	5.124	0.523	0.114	0.066
7	4421.540	3.812	0.543	0.063	0.062
8	8065.440	8.152	0.560	0.063	0.066
9	17,615.990	3.567	0.583	0.068	0.063
10	63,064.800	3.478	0.609	0.064	0.067
10 minus 1	62,154.980	−7.958	0.281	0.409	−0.014
t-stat	7.39***	−3.2***	18.91***	21.71***	−1.45
Wilcoxon-stat	6.98***	−3.46***	6.96***	6.98***	−0.24
Panel C—Industry classification based upon Fama-French 48 sector codes					
1	906.100	11.612	0.347	−0.323	0.095
2	715.090	10.362	0.456	−0.090	0.083
3	654.530	10.527	0.469	0.021	0.076
4	940.160	6.742	0.476	0.043	0.081
5	1338.330	5.831	0.499	0.140	0.072
6	2217.640	6.032	0.521	0.054	0.064
7	3808.220	3.474	0.548	0.052	0.064
8	7130.370	2.633	0.558	0.059	0.068
9	13,218.800	6.050	0.593	0.061	0.064
10	59,892.950	3.588	0.601	0.066	0.065
10 minus 1	58,986.850	−8.024	0.255	0.389	−0.030
t-stat	7.33***	−3.24***	16.06***	18.11***	−2.85***
Wilcoxon-stat	6.98***	−3.48***	6.76***	6.98***	−2.51**

We compare and contrast the characteristics the deciles value-weighted portfolios of firms ranked by their sales as a proportion of the industry sales. Industry is defined by 2-digit SIC codes (in Panel A), 4-digit SIC codes (in Panel B) and Fama-French 48-sector codes (in Panel C), alternatively. In January of each year, for each industry, we rank all the firms in the industry into deciles based upon their sales in the preceding fiscal year as a proportion of the industry sales. We then calculate value-weighted characteristics of these portfolios. The characteristics include market capitalization, market-to-book ratio, debt-to-asset ratio return on assets, and capital expenditure to asset ratio; all of which are obtained for the preceding fiscal year.

* Indicate the significance levels at 10%, respectively.
** Indicate the significance levels at 5%, respectively.
*** Indicate the significance levels at 1%, respectively.

from Panel A. We compare and contrast the BHARs in the following year of both the value-weighted and equally-weighted portfolios of firms. Regardless of the industry classification schemes, the BHARs of the portfolios of firms with the highest excess product market power are consistently positive and significant at the 1%, ranging from 7.708% to 15.369%. In Panels C through D, we perform double sorts of firms into quintile portfolios based upon both industry concentration level and the power of the firms in each industry concentration quintile. Consistent with the results in Table 4, we find that firms with more product market power generate higher returns regardless of whether their industry is highly or less concentrated.

The results in Tables 3–7 suggest that product market power is an important determinant of firm returns. Higher product market power is associated with higher firm returns. This relationship holds even after controlling for the competitiveness structure of the industry and firm characteristics including size, market-to-book ratio, leverage, profitability and capital expenditure.

3.4. Earnings surprises of firms with stronger product market power

To the extent that investors believe that higher market power will translate into future earnings growth, we test the relationship between the earnings growth and the firm's current market power of the firm. More specifically, we calculate standardized surprise earnings in year $t+1$ for each of the decile portfolios sorted on product market power. We expect to find that the subsequent standardized surprise earnings of the firms in the highest decile of product market power is consistently higher than those in the lowest decile.

Following Jegadeesh and Livnat (2006), we first calculate each firm's unexpected earnings as the residuals from the following regression of current year's income before extraordinary items on the previous year's figure.

$$E_{i,t+1} = \delta_{i,t+1} + \beta_{i,t}E_{i,t} + \varepsilon_{i,t+1} \quad (3)$$

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Table 7
Buy-and-hold excess returns for deciles portfolios based upon excess firm market power.

Panel A—Regressions to derive firms' excess market power (Dependent variable = Firm sales as a proportion of industry total sales)

	Regressions by year & 4-digit SIC codes		Regressions by year & 2-digit SIC codes		Regressions by year & Fama-French 48 sector codes	
	Number of year-4-digic SIC code combinations	Mean parameter estimates	Number of year-2-digic SIC code combinations	Mean parameter estimates	Number of year-Fama-French 48 sector code combinations	Mean parameter estimates
Ln (market capitalization)	13,675	0.102	2279	0.030	1584	0.021
Market-to-book ratio	13,675	−0.036	2279	−0.005	1584	−0.009
Debt-to-asset ratio	13,675	0.398	2279	0.083	1584	0.031
Return on asset	13,675	1.492	2279	0.152	1584	0.064
Capital expenditure-to-asset	13,675	−1.628	2279	−0.045	1584	0.051
Adjusted R-squared	12,339	0.855	2185	0.564	1584	0.497

Panel B—Buy-and-hold abnormal returns for deciles portfolios based upon excess firm market power

Deciles portfolios	Value-weighted deciles portfolios			Equally-weighted deciles portfolios		
	Market power based upon 4-digit SIC codes	Market power based upon 2-digit SIC codes	Market power based upon Fama-French 48 sector codes	Market power based upon 4-digit SIC codes	Market power based upon 2-digit SIC codes	Market power based upon Fama-French 48 sector codes
Q1	−16.883%	−20.174%	−19.212%	−11.287%	−13.325%	−12.701%
Q2	−11.753%	−16.335%	−16.407%	−8.193%	−8.640%	−8.565%
Q3	−8.766%	−12.499%	−12.723%	−7.470%	−7.253%	−7.424%
Q4	−8.436%	−10.342%	−10.563%	−6.294%	−6.849%	−6.515%
Q5	−7.419%	−10.045%	−9.911%	−6.077%	−6.252%	−5.848%
Q6	−5.943%	−8.183%	−7.667%	−5.340%	−4.827%	−5.492%
Q7	−5.910%	−7.559%	−7.821%	−4.980%	−4.231%	−4.831%
Q8	−5.238%	−6.063%	−6.612%	−4.402%	−3.770%	−4.365%
Q9	−5.094%	−4.692%	−5.553%	−4.304%	−3.471%	−3.128%
Q10	−4.789%	−4.805%	−4.615%	−3.579%	−3.559%	−3.402%
Q10 minus Q1	12.094%	15.369%	14.597%	7.708%	9.766%	9.299%
t-stat	5.7***	6.49***	6.55***	3.77***	4.55***	4.3***
Wilcoxon-stat	5.26***	5.57***	5.44***	3.48***	4.42***	4.45***

Market power quintiles	Industry concentration				
	Q1	Q2	Q3	Q4	Q5
Panel C—Buy-and-hold abnormal returns for quintiles portfolios based upon industry concentration and excess firm market Power (industry classification based upon 4-digit SIC codes)					
Q1	−8.101%	−15.292%	−18.402%	−17.140%	−14.933%
Q2	−6.485%	−8.676%	−12.578%	−10.179%	−10.144%
Q3	−4.919%	−6.240%	−9.832%	−8.120%	−9.906%
Q4	−4.248%	−5.394%	−6.959%	−7.036%	−7.053%
Q5	−5.465%	−5.035%	−4.579%	−4.369%	−5.172%
Q5 minus Q1	2.636%	10.257%	13.823%	12.771%	9.761%
t-stat	1.02	4.11***	6.1***	6.05***	3.44***
Wilcoxon-stat	1.4	3.78***	5.26***	5.26***	3.19***
Panel D—Buy-and-hold abnormal returns for quintiles portfolios based upon industry concentration and excess firm market Power (industry classification based upon 2-digit SIC codes)					
Q1	−16.258%	−15.408%	−20.552%	−17.641%	−14.595%
Q2	−8.333%	−10.363%	−12.504%	−12.665%	−13.723%
Q3	−4.484%	−10.257%	−11.046%	−8.661%	−11.036%
Q4	−3.443%	−8.548%	−8.858%	−7.002%	−6.915%
Q5	−2.570%	−5.547%	−6.027%	−5.139%	−3.715%
Q5 minus Q1	13.688%	9.861%	14.525%	12.502%	10.880%
t-stat	3.96***	3.82***	5.33***	4.54***	3.5***
Wilcoxon-stat	5***	3.57***	4.78***	4.08***	3.59***
Panel E—Buy-and-hold abnormal returns for quintiles portfolios based upon industry concentration and excess firm market power (industry classification based upon Fama-French 48 sector codes)					
Q1	−9.268%	−15.289%	−20.703%	−16.803%	−16.756%
Q2	−5.471%	−13.387%	−14.163%	−9.499%	−10.828%
Q3	−5.443%	−10.121%	−12.024%	−6.259%	−13.027%
Q4	−3.632%	−10.693%	−9.325%	−6.138%	−8.440%
Q5	−3.624%	−6.505%	−6.538%	−3.020%	−4.099%
Q5 minus Q1	5.644%	8.784%	14.165%	13.783%	12.657%
t-stat	2.54**	2.74***	5.73***	4.02***	4.46***
Wilcoxon-stat	2.45**	2.65***	4.87***	5.36***	4.27***

In Panel A, we estimate the following regression cross-sectionally with all firm observations in each year-industry combination.
Product market power$_{i,t}$ $= \alpha_i + \beta_1$Ln(market capitalization)$_{i,t} + \beta_2$ Market-to-book ratio$_{i,t} + \beta_3$ Debt-to-asset ratio$_{i,t} + \beta_4$ Return on asset ratio$_{i,t} +$ β_5 Capital expenditure to asset ratio$_{i,t} + \varepsilon_{i,t}$
We obtain the residuals from the estimated regressions, which capture the part of product market power that is uncorrelated with firm characteristics (e.g. excess product market power). In Panel B of Table 6, we sort firms into deciles portfolios based upon the excess product market power measure obtained from Panel A. We compare and contrast the BHARs in the following year of both the value-weighted and equally-weighted portfolios of firms. In Panels C through D, we perform double sorts of firms into quintiles portfolios based upon both industry concentration level and the power of the firms in each industry concentration quintiles. Industry is defined by either 4-digit SIC codes2-digit SIC codes (in Panel B) or Fama-French 48-sector codes (in Panel C), alternatively. In January of each year, we sort industries into 5 groups based upon the industry Herfindahl index. The industry Herfindahl index is calculated as the sum of the squared ratios of individual firm sales to total industry sale in the industry. Within each quintile of industry Herfindahl index, we sort firms into quintiles based upon the ratio of firm sales to total industry sales (e.g. product market power). We then compare and contrast the BHARs of the portfolio of firms with the largest and the one with the lowest product market power in each quintile of industry Herfindahl index. The BHAR is the difference between the 12-month buy-and-hold returns of the firm and the 12-month buy-and-hold returns of the CRSP value-weighted index. Individual firm BHARs are then value-weighted (based upon firm market capitalization in the portfolio formation year) for each quintile portfolios.
* Indicate the significance levels at 10%, respectively.
** Indicate the significance levels at 5%, respectively.
*** Indicate the significance levels at 1%, respectively.

We use the data of the preceding 10 years (rolling windows) to estimate the above regression for each firm in each year ($t+1$). We obtain the residuals from the regressions (i.e. unexpected earnings) and calculate the standard deviation of the residuals for every firm in each year. We divide the firm's unexpected earnings by the standard deviation of the residuals to obtain the standardized surprise earnings (SUE) as follows:

$$SUE_{i,t+1} = \frac{\varepsilon_{i,t+1}}{STD(\varepsilon)_{i,t+1}} \quad (4)$$

Table 8
Standardized Surprise Earnings (SUE) of deciles portfolios of product market power.

	Industry classification based upon 4-digit SIC codes		Industry classification based upon Fama-French 48 sector codes	
	SUE in the following year	Average SUE in the following 3 years	SUE in the following year	Average SUE in the following 3 years
Panel A—Value-weighted deciles portfolios				
Q1	−4.479%	−5.200%	−4.085%	−4.117%
Q2	−6.155%	−7.208%	−6.595%	−6.834%
Q3	−3.088%	−4.141%	−6.284%	−8.093%
Q4	−2.241%	−2.031%	−3.673%	−5.213%
Q5	6.704%	6.744%	−4.804%	−4.508%
Q6	23.404%	9.486%	−3.915%	−5.869%
Q7	28.864%	30.549%	4.139%	0.126%
Q8	69.673%	64.942%	3.785%	9.416%
Q9	129.513%	122.498%	25.772%	15.055%
Q10	121.720%	99.359%	134.531%	119.395%
Q10 minus Q1	126.199%	104.559%	138.616%	123.512%
t-stat	5.02***	7.34***	6.68***	10.54***
Wilcoxon-stat	4.28***	5.31***	5.94***	6.96***
Panel B—Equally-weighted deciles portfolios				
Q1	−4.811%	−4.851%	−4.793%	−4.846%
Q2	−4.465%	−4.607%	−4.800%	−4.839%
Q3	−4.140%	−4.162%	−4.726%	−4.750%
Q4	−3.625%	−3.712%	−4.348%	−4.520%
Q5	−3.198%	−2.933%	−4.205%	−4.221%
Q6	−0.469%	−1.315%	−3.503%	−3.771%
Q7	1.249%	1.382%	−2.477%	−2.698%
Q8	6.557%	6.229%	−0.666%	0.052%
Q9	10.473%	11.094%	6.202%	5.080%
Q10	15.476%	14.901%	32.067%	32.230%
Q10 minus Q1	20.287%	19.752%	36.860%	37.076%
t-stat	6.33***	12.67***	6.06***	12.54***
Wilcoxon-stat	5.14***	6.9***	4.95***	6.98***

We compare and contrast the standardized unexpected earnings (SUE) accrued to the deciles value-weighted portfolios (in Panel A) and equally-weighted portfolios (in Panel B) of firms ranked by their sales as a proportion of the industry sales. Industry is defined by 2-digit SIC codes, 4-digit SIC codes and Fama-French 48-sector codes, alternatively. In January of each year, for each industry, we rank all the firms in the industry into deciles portfolios based upon their sales in the preceding fiscal year as a proportion of the industry sales. We then calculate standardized unexpected earnings (SUE) for the firms in each decile in each industry and value-weight the firm's SUE in the portfolio. Following Jegadeesh and Livnat (2006), we calculate the firm's unexpected earnings as the residuals from the regressions of the firm's income before extraordinary items on the previous year income before extraordinary items. The regression is performed annually with the preceding 10 years of annual data. We then standardize the firm's unexpected earnings by the standard deviation of the residuals. We report SUE in the one year following the portfolio formation year and the average SUE in the 3 years following the portfolio formation year.
*Indicate the significance levels at 10%, respectively.
**Indicate the significance levels at 5%, respectively.
*** Indicate the significance levels at 1%, respectively.

In Table 8, we report the mean SUE of each of the value-weighted (in Panel A) and equally-weighted (in Panel B) decile portfolios ranked on product market power in the one- and three years' post-portfolio formation, respectively. Consistent with our prediction, the portfolios of the firms with the most market power are associated with the highest standardized surprise earnings contrary to the portfolios of the firms with the least market power. Based on the four-digit SIC codes of industry classification, the mean difference in SUE in the one year following the portfolio formation year between the most powerful and the less powerful value-weighted (equally-weighted) decile portfolios is 126.20% (20.29%) and is statistically significant at the 1% level. Looking at the average SUE in the three years following the year of the portfolio formation, the difference is 104.56% on the value-weighted portfolios and 19.75% on the equally-weighted portfolios. Results based on Fama-French 48-sector classification are qualitatively the same.

As a robustness check, we control for industry concentration level and compare the mean SUEs of portfolios formed using both industry concentration level and product market power. In Table 9, we first partition the sample into quintiles based upon industry competitiveness structure (i.e., using the industry Herfindahl index) before further dividing each into quintiles using firm product market power. Irrespective of the industry concentration level, the mean SUEs (in the one- and three years following the year of the portfolio formation) of the portfolios of firms with the highest product market power are consistently and significantly higher than the mean SUEs of the portfolios of firms ranked lowest on product market power. Consequently, firms with the most product market power have better future earnings prospect, which contributes to their stock return outperformance over firms with the least product market power.

3.5. Idiosyncratic risk of firms with stronger product market power

Gaspar and Massa (2006) show how a firm with market power is able to pass on a bigger proportion of idiosyncratic cost shocks to its consumers and minimize fluctuations in its cash flows. Conversely, firms with less market power are more susceptible to cost shocks and cash flow fluctuations. Therefore, we expect the most powerful firms in terms of product market to exhibit lower idiosyncratic risk as opposed to firms with the weakest product market power.

We estimate idiosyncratic risk as the standard deviation of the residuals from the Fama-French three-factor model regressions using daily stock returns of the firms up to three years after the portfolio formation. We compare and contrast the idiosyncratic risk of the portfolios of firms with the strongest product market power vs. the portfolios of firms with the weakest product market power and present our findings in Tables 10 and 11.

In Table 10, we classify the firms into deciles, with Q1 representing the decile of the firms' weakest in product market power and Q10 consisting of the strongest firms in product market power. We compare the idiosyncratic risks between Q1 and Q10. The difference in risks is statistically significant at the 1% level, with lower

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Table 9
Standardized Surprise Earnings (SUE) of quintiles portfolios of industry concentration and firm market power.

Industry concentration quintiles	Market share quintiles							
	Q1	Q2	Q3	Q4	Q5	Q5 minus Q1	t-stat	Wilcoxon-stat
Panel A – Value-weighted quintiles portfolios – SUE in the following year								
Q1	−2.374%	2.928%	22.517%	70.639%	198.875%	201.249%	5.13***	4.85***
Q2	−4.989%	−8.299%	10.634%	83.723%	172.914%	177.903%	4.5***	4.01***
Q3	−5.910%	−7.554%	8.581%	11.837%	83.062%	88.972%	2.79***	2.77***
Q4	−6.150%	−4.693%	0.460%	13.290%	83.519%	89.669%	5.1***	4.53***
Q5	−11.590%	−8.687%	0.325%	−14.654%	105.170%	116.760%	3.47***	3.03***
Panel B – Value-weighted quintiles portfolios – Average SUE in the following 3 years								
Q1	−2.577%	2.746%	11.142%	71.830%	196.844%	199.421%	12.17***	6.55***
Q2	−5.742%	−8.344%	12.399%	62.370%	172.782%	178.524%	7.76***	5.71***
Q3	−6.326%	−7.521%	1.466%	10.457%	61.174%	67.500%	4.45***	4.13***
Q4	−4.150%	−3.519%	0.524%	9.213%	79.282%	83.432%	6.69***	6.46***
Q5	−18.246%	−9.341%	−1.014%	10.752%	78.937%	97.183%	4.73***	4.12***
Panel C – Equally-weighted quintiles portfolios – SUE in the following year								
Q1	−4.473%	−4.514%	1.487%	17.719%	106.541%	111.014%	7.13***	6.09***
Q2	−2.749%	−4.620%	−5.780%	13.738%	81.518%	84.267%	3.29***	3.78***
Q3	−6.737%	−6.728%	−5.844%	−14.690%	84.004%	90.741%	3.11***	3.59***
Q4	−4.383%	−4.002%	−2.769%	5.248%	146.006%	150.389%	3.95***	2.95***
Q5	−3.531%	−4.652%	−2.596%	2.944%	168.486%	172.017%	3.87***	4.35***
Panel D – Equally-weighted quintiles portfolios – Average SUE in the following 3 years								
Q1	−4.613%	−3.208%	0.312%	14.852%	95.977%	100.590%	10.94***	6.55***
Q2	−3.889%	−5.707%	−6.262%	9.853%	64.620%	68.509%	4.91***	5.17***
Q3	−5.574%	−8.741%	−6.298%	−0.806%	71.841%	77.415%	5.79***	5.28***
Q4	−7.285%	−3.843%	−3.783%	4.010%	115.480%	122.765%	4.63***	4.51***
Q5	−3.509%	−4.233%	−2.780%	1.194%	147.086%	150.595%	5.93***	5.04***

We compare and contrast the standardized unexpected earnings (SUE) accrued to quintiles portfolios formed by both industry concentration level and sales as a proportion of industry sales at the same time. Industry is defined by 4-digit SIC codes. In January of each year, we sort industries into 5 groups based upon the industry Herfindahl index. The industry Herfindahl index is calculated as the sum of the squared ratios of individual firm sales to total industry sale in the industry. Within each quintile of industry Herfindahl index, we sort firms into quintiles based upon the ratio of firm sales to total industry sales (e.g. product market power). We then calculate standardized unexpected earnings (SUE) for the firms in each quintile in each industry and value-weight the firm's SUE in the portfolio. Following Jegadeesh and Livnat (2006), we calculate the firm's unexpected earnings as the residuals from the regressions of the firm's income before extraordinary items on the previous year income before extraordinary items. The regression is performed annually with the preceding 10 years of annual data. We then standardize the firm's unexpected earnings by the standard deviation of the residuals. We report SUE in the one year following the portfolio formation year and the average SUE in the 3 years following the portfolio formation year.
*Indicate the significance levels at 10%, respectively.
**Indicate the significance levels at 5%, respectively.
*** Indicate the significance levels at 1%, respectively.

risk for Q10 and higher risk for Q1. The differences range between 8.56% and 12.23% in the year following portfolio formation; and they range between 9.25% and 14.32% in the three years following portfolio formation.

In Table 11, we first classify the firms into quintiles based on industry concentration. Within each quintile of industry concentration, we reclassify the firms into another set of quintiles based on product market power. We compare and contrast the idiosyncratic risks between the top and bottom quintiles of product market powers. The idiosyncratic risks of the firms in the highest market power quintiles (i.e., Q5) are significantly lower than the risks of the lowest market power quintiles (i.e., Q1). For instance, the differences range between 3.88% and 11.42% in the year following portfolio formation, and they are statistically significant at the 1% level.

The results in both Tables 10 and 11 suggest that the portfolios of firms with the strongest product market power have significantly lower idiosyncratic risk than the portfolios of firms with

Table 10
Idiosyncratic risk of deciles portfolios of product market power.

	Industry classification based upon 4-digit SIC codes		Industry classification based upon Fama-French 48 sector codes	
	Idiosyncratic risk in the following year	Average idiosyncratic risk in the following 3 years	Idiosyncratic risk in the following year	Average idiosyncratic risk in the following 3 years
Panel A—Value-weighted deciles portfolios				
Q1	14.056%	15.661%	15.641%	17.731%
Q2	10.162%	10.746%	12.151%	14.702%
Q3	9.140%	9.468%	10.991%	11.756%
Q4	8.426%	8.694%	10.139%	10.407%
Q5	7.252%	7.620%	9.254%	9.654%
Q6	6.819%	6.965%	8.397%	8.724%
Q7	6.553%	6.543%	7.576%	12.948%
Q8	5.895%	5.900%	6.821%	6.931%
Q9	6.130%	6.203%	6.180%	6.164%
Q10	5.497%	6.050%	5.558%	5.647%
Q10 minus Q1	−8.559%	−9.611%	−10.083%	−12.084%
t-stat	−14.85***	−9.79***	−15.39***	−11.29***
Wilcoxon-stat	−6.91***	−6.49***	−6.66***	−6.89***

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Table 10 (*Continued*)

	Industry classification based upon 4-digit SIC codes		Industry classification based upon Fama-French 48 sector codes	
	Idiosyncratic risk in the following year	Average idiosyncratic risk in the following 3 years	Idiosyncratic risk in the following year	Average idiosyncratic risk in the following 3 years
Panel B—Equally-weighted deciles portfolios				
Q1	17.612%	19.115%	19.594%	22.131%
Q2	14.725%	16.325%	15.282%	18.610%
Q3	12.972%	14.520%	13.259%	15.197%
Q4	11.991%	13.330%	12.387%	13.427%
Q5	11.039%	13.160%	11.279%	12.572%
Q6	10.610%	12.601%	10.596%	11.202%
Q7	10.245%	11.223%	9.515%	26.389%
Q8	9.707%	10.203%	9.015%	9.709%
Q9	8.915%	9.715%	8.393%	8.592%
Q10	8.204%	9.870%	7.362%	7.815%
Q10 minus Q1	−9.408%	−9.245%	−12.232%	−14.316%
t-stat	−12.19***	−12.31***	−13.66***	−10.85***
Wilcoxon-stat	−6.86***	−6.39***	−6.84***	−6.82***

We compare and contrast the idiosyncratic risk accrued to the deciles value-weighted portfolios (in Panel A) and equally-weighted portfolios (in Panel B) of firms ranked by their sales as a proportion of the industry sales. Industry is defined by 4-digit SIC codes and Fama-French 48-sector codes, alternatively. In January of each year, for each industry, we rank all the firms in the industry into deciles portfolios based upon their sales in the preceding fiscal year as a proportion of the industry sales. We then calculate idiosyncratic risk for the firms in each decile in each industry and value-weight (or equally-weight) the firm's idiosyncratic risk in the portfolio. We calculate the firm's idiosyncratic risk as the standard deviation of residuals from the Fama-French 3-factor model regressions of the firm's daily returns in the years following the portfolio formation years. We report idiosyncratic risk in the one year following the portfolio formation year and the average idiosyncratic risk in the 3 years following the portfolio formation year.
*Indicate the significance levels at 10%, respectively.
**Indicate the significance levels at 5%, respectively.
*** Indicate the significance levels at 1%, respectively.

Table 11
Idiosyncratic risks of quintiles portfolios of industry concentration and firm market power.

Industry concentration quintiles	Market share quintiles							
	Q1	Q2	Q3	Q4	Q5	Q5 minus Q1	t-stat	Wilcoxon-stat
Panel A – Value-weighted quintiles portfolios – Idiosyncratic risk in the following year								
Q1	8.997%	7.264%	5.929%	5.262%	5.117%	−3.880%	−6.98***	−5.92***
Q2	13.345%	9.577%	7.489%	6.434%	6.588%	−6.757%	−6.01***	−6.01***
Q3	13.856%	10.562%	8.386%	7.353%	5.750%	−8.106%	−17.74***	−6.98***
Q4	14.054%	10.892%	9.176%	7.807%	5.722%	−8.332%	−11.77***	−6.85***
Q5	13.885%	11.483%	9.217%	7.724%	5.392%	−8.493%	−9.57***	−6.5***
Panel B – Value-weighted quintiles portfolios – Average idiosyncratic risk in the following 3 years								
Q1	9.552%	7.253%	5.947%	5.178%	5.186%	−4.366%	−6.27***	−5.86***
Q2	15.127%	9.869%	7.890%	6.471%	6.926%	−8.201%	−5.93***	−5.63***
Q3	15.008%	11.397%	8.359%	7.489%	5.803%	−9.205%	−13.16***	−6.98***
Q4	14.988%	11.181%	10.398%	7.707%	7.128%	−7.860%	−4.84***	−6.44***
Q5	14.535%	12.916%	9.811%	7.806%	5.431%	−9.104%	−9.95***	−6.67***
Panel C – Equally-weighted quintiles portfolios – Idiosyncratic risk in the following year								
Q1	11.911%	9.613%	7.701%	6.977%	6.887%	−5.024%	−7.46***	−5.75***
Q2	19.153%	12.705%	10.573%	9.251%	9.291%	−9.862%	−4.96***	−5.89***
Q3	17.942%	13.551%	11.468%	9.796%	8.039%	−9.903%	−14.78***	−6.96***
Q4	18.273%	13.790%	12.144%	11.668%	8.430%	−9.843%	−11.85***	−6.87***
Q5	20.223%	14.659%	12.838%	11.316%	8.800%	−11.423%	−9.1***	−6.91***
Panel D – Equally-weighted quintiles portfolios – Average idiosyncratic risk in the following 3 years								
Q1	13.160%	10.689%	7.841%	6.939%	7.348%	−5.812%	−6***	−5.23***
Q2	20.321%	14.374%	14.387%	9.488%	9.449%	−10.872%	−6.49***	−5.69***
Q3	19.434%	15.147%	12.484%	10.761%	8.629%	−10.805%	−11.08***	−6.63***
Q4	21.526%	14.707%	14.446%	11.756%	38.535%	17.009%	−6.57***	−6.44***
Q5	20.919%	16.950%	15.412%	13.337%	10.084%	−10.835%	−9.43***	−6.41***

We compare and contrast the idiosyncratic risk of the quintiles portfolios formed by both industry concentration level and sales as a proportion of industry sales at the same time. Industry is defined by 4-digit SIC codes. In January of each year, we sort industries into 5 groups based upon the industry Herfindahl index. The industry Herfindahl index is calculated as the sum of the squared ratios of individual firm sales to total industry sale in the industry. Within each quintile of industry Herfindahl index, we sort firms into quintiles based upon the ratio of firm sales to total industry sales (e.g. product market power). In January of each year, for each industry, we rank all the firms in the industry into deciles portfolios based upon their sales in the preceding fiscal year as a proportion of the industry sales. We then calculate idiosyncratic risk for the firms in each decile in each industry and value-weight (or equally-weight) the firm's idiosyncratic risk in the portfolio. We calculate the firm's idiosyncratic risk as the standard deviation of residuals from the Fama-French 3-factor model regressions of the firm's daily returns in the years following the portfolio formation years. We report idiosyncratic risk in the one year following the portfolio formation year and the average idiosyncratic risk in the 3 years following the portfolio formation year.
*Indicate the significance levels at 10%, respectively.
**Indicate the significance levels at 5%, respectively.
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the weakest product market power. The results are consistent with the findings by Gaspar and Massa (2006), who suggest that market power smooths out idiosyncratic risk and mitigates information uncertainty about a firm.

While the capital asset pricing model suggests investors are only rewarded for bearing systematic/non-diversifiable risk while diversifiable/idiosyncratic risk can be eliminated by holding a well-diversified portfolio at no extra cost, the empirical evidence on the relationship between idiosyncratic risk and expected returns is at best mixed. Malkiel and Xu (2002) document a positive relationship between idiosyncratic risk and returns. Boehme, Danielsen, Kumar, and Sorescu (2009) show that such positive relation is more pronounced among stocks with low levels of investor recognition and limited short selling. Conversely, Ang et al. (2006), Ang, Hodrick, Xing, and Zhang, (2009) find evidence that lagged idiosyncratic volatility is negatively related to future returns. Numerous other studies examine the anomaly of higher returns accruing to low-volatility stocks including Blitz and Vliet (2007), Baker et al. (2011), and Frazzini et al. (2014). Our study shows that firms with the strongest product market power enjoy higher subsequent returns and at the same time lower idiosyncratic risk.

4. Conclusion

In this paper, we study the profitability of investing in portfolios of firms with the strongest product market power in their respective industries. We define dominant firms as those that control the highest proportion of sales in their respective industries based on the two- and four-digit SIC codes as well as the Fama-French 48 sector classification codes, alternatively. We find that the difference in buy and hold abnormal stock returns between the portfolios of the dominant and weak firms ranges between 8.85% and 16.90% depending on the measure used. The differences are statistically significant at the 1% level. The abnormal returns persist after controlling for industry concentration level (as in Hou & Robinson, 2006), firm characteristics and industry classification methods. The firms in the dominant product market power decile exhibit superior standardized earnings surprises post-portfolio formation years, as well as lower idiosyncratic risk.

Our results corroborate previously documented evidence of higher profitability and lower idiosyncratic volatility among firms that are exposed to less competition and has more market power. The differences in stock returns between the firms that generate most of their industry sales and those that generate too little are too big to ignore. Our study suggests that there is a definite advantage to dominant firms regarding their ability to reward their shareholders through increases in stock prices. Our findings are limited to investment portfolio construction and management. We provide compelling evidence that firms that dominate their industry sales add to investors' wealth in the stock market. Our paper, though, neither attempts to explain why firms should maintain a lead in industry sales and nor explores the fundamentals that lead some firms to become market leaders and generate a lot of wealth. It further ignores the intricacies of industry composition bar industry concentration level.

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