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Industry Concentration, Excess Returns and Innovation in Australia

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Abstract

This paper examines market concentration and stock returns on the Australian Securities Exchange. We find that dominant companies operating in concentrated industries in Australia are able to generate significant risk-adjusted excess stock returns and excess profits on sales (monopoly rents). Our results for Australian data are opposite to that found by Hou and Robinson (2006) for United States market data. Hou and Robinson reason that U.S. firms which operate in concentrated industries are insulated from competitive pressures, have lower levels of innovation (Arrow (1962)) and therefore experience lower profitability and stock returns. The high stock returns of dominant companies in Australia is consistent with Schumpeter's (1942) theory of innovation where monopoly excess profits are necessary to fund corporate innovation. We hypothesize that the apparent contradiction of our results compared with Hou and Robinson (2006) for the United States market is resolved by an examination of the differences in size and competition in U.S. and Australian industries and the consequent differential ability of dominant companies in the two countries to generate monopoly rents.

1 Introduction

We find companies operating in highly concentrated industries in Australia generate significantly higher risk-adjusted stock returns than those operating in less concentrated industries. The spread between the most concentrated quintile and the most competitive quintile is 0.49% per month corresponding to the economic magnitude of approximately 5.8% per annum. We also show that dominant stocks in highly concentrated industries in Australia generate excess gross margin on sales (monopoly economic rents) and have a higher market volatility than stocks in less concentrated industries. Moreover, the ability of companies in highly concentrated (monopoly) industries to generate excess concentration stock returns and monopoly economic rents is a persistent feature of the returns of Australian stocks in concentrated industries over the data period of 1993 to 2007.

We hypothesize that higher realized stock returns observed over the period 1993 to 2007 are generated by companies with monopoly rents investing in product and process innovation. The economic outcome of investment in innovation is uncertain and increases the riskiness of future corporate free cash flow. To compensate for this increased risk, the Australian market requires higher stock returns. Schumpeter (1942) considered the role of market environment in innovation, he theorized that companies in concentrated industries with market power are able to use monopolistic excess profits to fund and promote innovation. In fact, Schumpeter reasons that monopoly excess profits are a necessary pre-condition for industry innovation. Schumpeter's theory of monopoly profits and innovation have been controversial in mainstream economic debate. Both theoretical and empirical studies have produced conflicting results and evidence in support of, and against, Schumpeter's theory. These studies are detailed in a comprehensive survey by Gilbert (2006).

An efficient Australian stock market will expect that dominant companies in concentrated industries can extract monopoly rents and this expectation will be reflected in an increased

stock price and a decreased book-to-market ratio. The decreased book-to-market ratio for higher risk, higher return dominant stocks explains why the multi-factor regression (table 5) of Australian companies returns a *negative* coefficient for stock return (dependent variable) and the book-to-market ratio (independent variable). This is *opposite* to the positive book-to-market ratio coefficient found by Fama and French (1992) and Hou and Robinson (2006) on United States market data.

We also find interesting evidence regarding the interaction between the company size (market capitalization), concentration and stock returns. The multi-factor regression (table 5) of Australian companies returns a *positive* coefficient for stock return and company size. Again, this is *opposite* to the negative size coefficient² found by Fama and French (1992) and Hou and Robinson (2006) on United States market data. The Fama and French result is consistent with an efficient market that compensates investors with additional stock return for the liquidity risk acquired when holding smaller stocks. We believe that the anomalous Australian result is due to the fact that, generally, concentrated dominant stocks are large stocks. When we observe Australian large stock returns, we are also observing the concentration returns on large stocks³ and this is obscuring lower returns due to lower liquidity risk. Further, when we examine smaller dominant companies in concentrated industries, these have higher average stock returns than large dominant companies. This is consistent with smaller dominant stocks having higher returns due to concentration *and* higher returns due to liquidity risk. The higher returns on smaller dominant companies is also consistent with empirical studies that show small and medium-sized companies are more *efficient* than large companies at innovation (Aghion et al. (2005), Nooteboom and Vossen (1995), Archibugi et al. (1995), literature survey Simon and Shallone (2013)).

² Fama and French (1992) actually find a positive coefficient between return and the SMB (Small Minus Big) factor return; this is equivalent to a negative coefficient between size (market capitalization) and return.

³ We have tested size and concentration for collinearity and conclude that this is not a problem in the regression.

Hou and Robinson (2006) consider an empirical study of industry concentration and average stock returns in the United States. Their work shows that firms operating in highly concentrated industries earn significantly *lower* risk-adjusted returns than firms in less concentrated (i.e. more competitive) industries. Indeed, their results show that the magnitude of the excess concentration return differential between high and low concentration industries is approximately -4% per annum. Gaspar and Massa (2006) show that U.S. firms in competitive industries have higher stock market volatility and therefore the investors require higher returns from these stocks as compensation for higher risk. Peress (2010) shows that when stock returns are risk adjusted the excess returns of firms in competitive industries are still significantly positive and are therefore are not fully explained by increased stock volatility. Once again, our results for the Australian market are *opposite* to that found by Hou and Robinson (2006), Gaspar and Massa (2006) and Peress (2010) for the United States data.

Hou and Robinson (2006)⁴ reason that U.S. companies operating in highly concentrated industries are not motivated to invest in innovation and, as a result, experience significantly *lower* risk-adjusted returns (-4% per annum) than firms in less concentrated industries. This relationship between monopoly and innovation was proposed by Arrow (1962) who argued that, *in a perfectly competitive market*, innovation is simply another profitable investment and *large* monopolists, because of their size and technological inertia (capital investment in current technologies), are inefficient at implementing innovation and will receive a lower investment return from innovation than *smaller* and more nimble competitors. Therefore *large* stocks in concentrated industries (monopolists) are not motivated to invest in innovation and new industry technologies and innovation are driven by *smaller* competitors.

We believe that the results of Hou and Robinson (2006), Gaspar and Massa (2006) and Per-

⁴ Hou and Robinson (2006) cite Schumpeter's 1912 German language publication 'Theorie der wirtschaftlichen Entwicklung' (Schumpeter (1912)). However, most readers will be familiar with the English language translation (with important amendments from the 1912 publication) Schumpeter (1934) and Schumpeter (1942) where Schumpeter argues that monopoly economic rents are *necessary* to fund innovation.

ess (2010) where highly concentrated industries generate *lower* risk-adjusted stock returns reflect the fact that the United States economy, because of its size and rigorous regulatory environment, is an efficient market for goods and services and dominant stocks in concentrated industries cannot generate the same magnitude monopoly economic rents as dominant stocks in Australia. Boulhol (2005) compares the ability of companies to generate monopoly rents between the two countries using observed Price-Cost Margins (PCM) (Lerner (1934)) in the period 1970 to 2003 and finds that Australian companies extract greater monopoly profits (PCM 0.131) than companies in the United States (PCM 0.111). The United States also has a long history of national competition policy (known as anti-trust policy in the U.S.) with the landmark Sherman Antitrust Act enacted in 1890. The Global Competitive Review (Schwab (2012)) ranked the United States as the 5th (of 144) most competitive national economy in 2011-2012, by contrast the Australian economy was ranked 20th.

It is important to emphasize that we *do not* assert that the Australian economy is more innovative than the United States economy. Indeed, an objective measure of innovation, the number of patents filed per million people (2008-2009 average; Schwab (2012)), is higher in the United States (137.9 patents per million) than in Australia (83.4 patents per million).

The paper is structured as follows. Section 2 reviews risk factors affecting stock returns and provides some preview for the results of this study. In Section 3 we provide review on concentration measures (our proxy for competition), as well as the descriptive statistics of the data. This is followed by our research design in measuring concentration. Section 4 relates industry concentration to the cross-section of average stock returns. Further, we study the relationship between cross-sectional size and book-to-market factor premia and concentration premium in Section 5. Section 6 concludes the paper.

2 Risk factors and stock returns

Several empirical studies for the U.S. stock market and internationally have documented a significant relation between security returns and priced risk factors. In early studies, Banz (1981) and Rosenberg et al. (1985) find a strong negative relation between the average return and the firm size, that is, small firms outperform large firms. Stattman (1980) documents that firms with high book-to-market ratio (B/M) outperform those with low B/M . Bhandari (1988) reports that firms with greater leverage outperform other firms with different capital structures. Ball (1978), Basu (1983), and Keim (1988) report a positive relation of stock returns to earnings-to-price ratio (E/P). Other firm attributes, such as dividend yield, exhibit a significant correlation with average stock returns as reported in Litzenberger and Ramaswamy (1979). Fama and French (1992) proposed the three-factor model, which is, in addition to the market factor from the CAPM (see Sharpe (1964), Lintner (1965) and Black (1972)), incorporates two factors that capture the return premium of small firms over big firms (SMB), and the return spread between high book-to-market (B/M) and low B/M (HML). Fama and French (1992, 1993, 1996) further confirm their findings regarding the strong negative effect of size (SMB), and document an even more powerful positive B/M effect (HML) for the U.S. stock market.

The cross-section of Australian stock returns is less well documented. Halliwell et al. (1999) use the Fama and French (1993) approach with Australian data for the period 1981 to 1991, and also report a premium for small size and high book-to-market stocks. However, the authors find that the role of the B/M factor may not be as robust as suggested in the literature and concede that their results might be biased.⁵ Other Australian studies show a size effect which is opposite to that observed on the U.S. market. For example, Faff (2001, 2004) examines the three-factor model over the period 1991 to 1999 and documents

⁵ Due to missing market and accounting data, and given the final sample is likely, on average, to contain larger companies with a high market capitalization.

a significantly negative, rather than the expected positive, premium for small stocks. He argues that the reason the results are different from those of Halliwell et al. (1999) is likely due to a different sample period. Gaunt (2004) partly confirms the results documented in Halliwell et al. (1999) using data from 1993 to 2001. He finds a strong small firm effect, but no evidence of a large firm premium across the remaining size quintiles. Furthermore, Gaunt (2004) finds little evidence of a B/M effect in explaining equity returns. More recent studies by Gharghori et al. (2006, 2007, 2009a) find strong evidence of a B/M effect. Furthermore, Gharghori et al. (2009b) analyze the three-factor model on a smaller sample⁶, and reveal that the model fails to explain the returns of the portfolio sorts and thus, is less satisfactory in pricing assets in Australia.

This study provides the first 'out-of-sample' evidence relative to the U.S. market regarding the link between concentration and expected returns. Given the difference between the Australian and U.S. market in terms of market structure and industry concentration, we find significant evidence that companies operating in highly concentrated industries in Australia generate higher risk-adjusted returns than those operating in less concentrated industries. The spread between the most concentrated quintile and the most competitive quintile is approximately 5.8% per annum. Furthermore, we show that concentration is a proxy for the gross margin (profits on sales) in the Australian economy. Companies operating in highly concentrated industries have higher gross sales margins which supports the intuition that excess concentration returns are due to monopolistic pricing of goods and services. Finally, we find that the average stock returns are positively related to the size of the company and negatively related to the book-to-market ratio. In addition, we find interesting evidence regarding the interaction between the size premium and concentration. Smaller dominant companies in concentrated industries have higher average stock returns than large dominant

⁶ They split the sample into firms with positive and negative earnings or cash flows. They document that around 40% of the sample covering time period from 1992 to 2004 are firms with negative earnings or cash flows. Therefore, the positive and negative groups have roughly the same number of firms.

companies.

3 Data and measures of industry concentration

3.1 Concentration measure

The *Herfindahl Index* is applied to measure concentration of companies in an industry. It relates the size of the company to the size of the industry which the company belongs and is a proxy for competitiveness. For industry j the Herfindahl index is computed as:

$$H_j = \sum_{i=1}^I s_{ij}^2, \quad (1)$$

where s_{ij} denotes the market share of company i in the industry j . We calculate s_{ij} based on net sales, total assets, or book value of equity, respectively. This leads to three different types of the index denoted respectively as H(Sales), H(Assets) and H(Equity). It is clear that small values of H_j indicate that the market is shared by many competing companies, whereas higher values imply that several large firms operate in the industry j . Following the approach by Hou and Robinson (2006), we calculate the concentration measure every calendar year t for each industry j , and then average them over the past three years, i.e. t , $t - 1$ and $t - 2$.

3.2 Data

We use historical Australian Stock Exchange (ASX) data from the Centre for Research in Finance (CRIF) at the Australian School of Business *Share Price & Price Relative* (i.e. (SPPR) database), which contains historical records of share prices and calculated price relatives of all Australian listed companies with fully paid shares. The SPPR covers the period from December 1973 to December 2008. For each company, the share price, the number of

shares outstanding and the price relatives are provided on a monthly basis, together with company code, industry classification code, and trading information. Industry classification is based on the current (as of December 2008) Standard & Poors Global Industry Classification System (GICS) which has replaced the complete ASX Industry Classifications at the end of 2002.⁷ We consider 25 major industries classified into 11 GICS industry sectors summarized in Table 1.

Accounting information is sourced from the *Aspect Huntley* (ASPECT) database. It includes raw and aggregate data items from financial reports, annual reports, interim half yearly reports and quarterly cash flow statements. The data is collected directly from company financial statements and the notes include data on earnings, sales, book equity, market equity and total assets. The coverage of annual data goes back to 1989, and interim and preliminary final data is from 1996.

The accounting information used in the analysis include: B/M (the ratio of book value of equity (total assets minus total liabilities) reported in the balance sheets to the market value of the company (share price times the number of shares outstanding)), E/A (earnings before interest divided by assets), E/S (earnings divided by sales), V/A (market value of the firm divided by total assets), D/B (dividends divided by book equity), $R\&D/A$ (ratio of $R\&D$ expenditure to total assets), leverage (ratio of book liabilities (total assets minus book equity) to total market value of a firm), and beta (post-ranking β as in Fama and French (1992)). The calculation of post-ranking betas is explained in Appendix A. To be able to compute post-ranking β s we have to compute pre-ranking betas first, which requires monthly return

⁷ GICS introduced with a purpose to standardize industry definitions and to make the Australian stock market consistent with a common global standard, became increasingly popular among all major groups of market participants as well as financial academics. For example, Brands et al. (2006) examine the role of GICS industry classifications in the design of a portfolio and document that GICS classifications reflects better the industry composition of the ASX and has an important impact on the stockholdings of Australian institutional investment managers. The most recent study by Dou et al. (2012) examines the out-of-sample stock returns predictability in Australia using GICS when predicting sector returns.

data for at least 36 months out of the 60 preceding July of year t .

In order to obtain comprehensive coverage of financial reporting data we merge equity data from SPPR with accounting data from ASPECT for the period from 1991 to 2007 since not enough accounting data is available prior to 1991. The average number of monthly observation (firms) amounts to approximately 200 in early years (1993-1994), and increases to almost 700 at the end of the sample period (2007). The total number of observation (firms) per year increases from approximately 2000 to almost 8000 during the period from 1993 to 2007. To guarantee that accounting information is available prior to equity data and thus, is reflected in the stock prices, we match SPPR stock return data of July of year t to June of year $t + 1$ with the ASPECT accounting information of year $t - 1$, as in Fama and French (1992) and Hou and Robinson (2006). We use a firm's market equity at the end of December of year $t - 1$ to compute B/M and leverage for year $t - 1$, and we use its market equity for June of year t to measure its size. Therefore, to be included in the return tests for July of year t , a firm must have a stock price for December of year $t - 1$ and June of year t . Since the Herfindahl index is averaged over the past three years to enhance robustness, the final data sample covers the period from 1993 to 2007.

3.3 Summary statistics and characteristics of concentration-sorted portfolios

Panel A of Table 2 reports the summary statistics of industry concentration measures computed based on net sales, total assets, or book value of equity⁸ for the 25 industries listed in Table 1. We group industries into quintile portfolios based on $H(\text{Sales})$. Industry characteristics include newlist (delist) computed as the average number of newly listed (de-listed) firms per year in each quintile, the size of the company, its total assets and net sales, as well as the accounting ratios E/A , E/S , V/A , D/B , $R\&D$, $R\&D/A$, leverage, B/M and beta

⁸ Note however, that the data used to compute $H(\text{Sales}/\text{Assets}/\text{Equity})$ might not fully overlap. For example, total assets might not be available for some firms which report sales and vice versa. Excluding these data clearly produces a smaller sample for which all concentration measures become highly correlated.

(post-ranking beta as in Fama and French (1992)) as defined above.

Each of these characteristics is calculated at the firm level, and then averaged within each concentration quintile. The results are reported in Panel B of Table 2. We observe that the number of new-listings and de-listings is the highest for the second least concentrated quintile, corresponding to 21.6 and 22.1 respectively, and it drops to 4.8 and 8.2 for the most concentrated industries, respectively, indicating higher barriers to entry and lower pressure to exit the market. The average size and total assets increase towards more concentrated quintiles. Profitability measured through E/A and E/S varies across quintiles. On average, earnings are negative, which leads to the negative values for E/A and E/S ⁹. The E/A appears to be lower (-10.5%) for the most concentrated (Q5) quintile than for the most competitive (Q1) quintile with a value of -1.1% . This indicates that highly concentrated industries have larger asset bases and lower unit profitability. V/A is larger than one indicating that firms earn on average a rate of return higher than that justified by the cost of its assets. Such a return could not persist in the absence of long-run barriers to entry. V/A increases slightly when concentration increases. While the smaller E/A ratio for the more concentrated industries indicates lower current profitability, an increase in V/A points out that concentrated industries expect higher profitability in the future. Dividend payout given by the ratio of dividend to book equity is nearly constant across quintiles Q2, Q3 and Q4. It increases slightly for the most competitive (Q1) and the most concentrated (Q5) quintiles. Fama and French (2000) and Hou and Robinson (2006) relate dividend policy to expected profitability, showing that firms in more concentrated industries are more profitable. $R\&D$ expenditure increases from AUD 1.40 M for the most competitive quintile to AUD 1.72 M for the most concentrated quintile indicating that firms in the highly concentrated industries get more involved in risky innovations¹⁰. Scaling by the total assets leads to the similar pattern: $R\&D/A$ increases with increasing concentration. B/M decreases with increasing

⁹ Gharghori et al. (2009b) found that approx. 40% of Australian companies in the sample covering period from 1992 to 2004 have negative earnings or cash flows.

¹⁰ Note that this does not control for firm size.

concentration, that is, for more concentrated industries the market is valuing equity relatively expensively compared to the book value. Since less risky investments are (all else equal) likely to have higher market value given that the associated companies have similar book values (and therefore, lower book to market ratio), the more concentrated industries appear to be less risky than the more competitive ones. The average betas decrease slightly with increasing concentration. Finally, leverage is higher for the industries falling into extreme quintiles (Q1 and Q5) rather than for the middle-concentrated industries in Q3. Comparing the extreme quintiles, leverage appears to be slightly higher for the most competitive (Q1) quintile compared to the most concentrated quintile (Q5).

3.4 Regression of $H(\text{Sales})$ on industry average characteristics

In the following, we apply regressions as in Fama and MacBeth (1973) of the cross-section of $H(\text{Sales})$ on industry average characteristics. Therefore, we estimate coefficients of the following regression equation:

$$H(\text{Sales})_{jt} = \gamma_t + \sum_{n=1}^N \delta_{nt} X_{jt} + \varepsilon_{jt}, \quad (2)$$

where X_{jt} represents the j^{th} industry average characteristic in year t . The cross-sectional regressions are run every year from 1993 to 2007, and the means of annual regression coefficients together with the time-series t -statistics are reported in Table 3. Panel A reports the results for the estimates from the simple regression (i.e. where there is only one regressor besides the intercept), Panel B reports the results of multivariate regression of $H(\text{Sales})$ on a combination of industry characteristics.

Viewed collectively, the regression estimates from Table 3 and the descriptive statistics from Table 2 show that size and total assets are positively correlated with industry concentration (albeit with insignificant t -statistics). Sales are significantly negatively correlated with industry concentration, even after controlling for other variable in the regression. E/A , as well

as V/A and D/B appear to be positively (but insignificantly) correlated with industry concentration. The effect of B/M on concentration is negative, but remains insignificant even after controlling for other variables. Further, $R\&D/A$ is significantly and positively related to concentration, which indicates that firms in more concentrated industries tend to engage in risky innovations. On the other side, beta has a negative and significant effect on concentration, indicating that more concentrated industries are less risky than more competitive ones. Depending on the control variables, the effect of beta remains negative and statistically significant, or disappears (e.g. when controlling for size). Finally, leverage has significantly negative t -statistics indicating that the usage of debt to supplement investment decreases with concentration.

4 Cross-section of stock returns

4.1 Concentration and average cross-sectional stock returns

In Table 4 we report the cross-section of average stock returns based on H(Sales) index. Average monthly returns of the quintile portfolios are calculated, as well as the difference between the most and least concentrated quintile Q5-Q1; t -statistics and standard errors (i.e. standard deviation divided by the square root of the sample size) for the average returns in each concentration quintile are reported below the corresponding average return. Quintile returns are measured by either equally weighting the firm returns in each concentration quintile (firm level returns), or by first forming industry portfolios (i.e. averaging the returns within each industry), and then by equally weighting industry returns in each concentration quintile (industry level returns). The first row in Panel A shows that firms in the least concentrated industries (Q1) have an average return of 0.87% per month. This increases to 1.36% for Q5. The spread between Q5 and Q1 is 0.49% per month (with a significant t -statistic of 2.61), which corresponds to approximately 5.8% per annum. For the average return calculated on the industry level we observe nearly a double increase from 0.95% for

Q1 to 1.99% for Q5. The spread accounts to 1.04% and is statistically significant with a t -statistic of 2.55. Here, the reported standard errors can be considered as a proxy for risk, and therefore, one would expect that increasing returns will lead to increase in standard errors, which is a standard argument on risk-return tradeoff. This is exactly what we observe from the table. We conclude that although companies operating in concentrated industries tend to have monopolistic structure, the cash flows seem to be more risky for those companies, which leads to higher average returns, compared to less concentrated industries.

In Panel B (B1, B2 and B3) we perform the same calculations on the firm and industry level for the *adjusted* returns obtained by subtracting the return on a characteristics-based benchmark (constructed as in Daniel and Titman (1997) and Hou and Robinson (2006) using size, book-to-market and momentum as benchmark portfolio characteristics) from the individual firm's return, and then averaging within a given concentration quintile. Subtracting the return on a characteristics-based benchmark allows to adjust individual returns for risk factors such as size, book-to-market, and momentum. Therefore, every month a triple sort is performed on all firms in our sample: first firms are grouped into size quintiles/quartiles/tertiles¹¹, and then within each size quintile/quartile/tertile into book-to-market quintiles/quartiles/tertiles. Within each of these 25/16/9 portfolios we sort firms again into quintiles/quartiles/tertiles based on the 12-month performance (12-month average return is build ignoring the most recent month). We subtract from each individual stock's return the benchmark return calculated by averaging individual return within each of these 125/64/27 portfolios. The results are reported in Panel B1, B2 and B3 for the number of portfolio corresponding to $5 \times 5 \times 5$, $4 \times 4 \times 4$ and $3 \times 3 \times 3$, respectively.

Similarly to Panel A, we observe an increase in the adjusted average stock return with an increase in concentration; and standard errors used as a proxy for risk, increase with increasing returns. The spread in the average *adjusted* returns calculated on the firm (industry)

¹¹ Different number of portfolios for construction of a characteristics-based benchmark is used as a robustness check.

level between Q5 and Q1 decreases compared to the spread in the *raw* returns to 0.16 (0.77), 0.18 (0.96), 0.12 (0.81). While the spread Q5-Q1 remains significant on the industry level, it becomes insignificant on the firm level. Together, it suggests that on the industry level the average return premium associated with industry concentration is independent from those of size, book-to-market, and momentum. However, it is affected by these risk factors on the firm level.

4.2 Fama-MacBeth cross-sectional regressions

Table 5 presents the results from regressing monthly average stock returns on the concentration measure and other characteristics. Individual company returns are regressed on $H(\text{Sales})$ of the respective industry, and the firm level characteristics $\ln(\text{Size})$, $\ln(B/M)$, momentum, beta, and leverage. Cross-sectional regressions are estimated monthly and time-series average estimates are reported together with the t -statistics. We observe similar results in that there is a positive and highly significant relationship between concentration and average stock returns. This indicates that on average the more concentrated industries earn higher average returns, which confirms the earlier results for the quintile portfolios. Furthermore, we find that average stock returns are positively related to firm size, and negatively related to the book-to-market ratio (with significantly t -statistics in both cases). Finally, momentum and leverage have only insignificant impact on average stock returns.¹²

The adjusted R_{adj}^2 reported in the last column increases from 0.054 for the simple regression to 0.1141 when controlling for $\ln(\text{Size})$, $\ln(B/M)$, leverage, beta and momentum. Viewed collectively, we conclude that concentrated industries are dominated by large companies with

¹² Because firms in the same industry are subject to common shocks, their return on assets (dependent variable) and other characteristics (regressors) might exhibit positive within-industry correlation. In order to remove the influence of the industry on the dependent variable (return) as well as to eliminate within-industry correlations among independent variables, we have estimated the model with industry fixed effects (FE), methodology adopted from Gormley and Matsa (2013). The results are similar to those reported in Table 5 and are available from authors upon request.

high market values (and therefore, the low B/M ratios). Firms in these industries exhibit higher returns than those in more competitive sectors.

4.3 Government regulations and market power

In this section we are interested in the effect of government regulations and market power on concentration and average cross-sectional stock returns. In particular, we are interested in whether higher stock returns are observed for the companies with a higher market capitalization, which is defined as a size of the company divided by the size of the industry in which this company operates. Market capitalization as a measure of monopoly power can be controlled for in the Fama-MacBeth regressions when regressing the average firm return on concentration measure and other characteristics. Furthermore, as an additional measure for the market power we introduce a gross margin defined as earnings before interest divided by sales (operating revenue) expressed in percentages. Table 6 summarizes the results from Fama-MacBeth regression of firm level returns on $H(\text{Sales})$ and firm characteristics, controlling for the market power (gross margin and a dummy D which takes value of one for two largest companies based on their market capitalization, and zero otherwise). As before, cross-sectional regressions are estimated monthly and time-series average estimates are reported together with the t -statistic. We observe that the effects of market capitalization, the dummy variable and the gross margins are positive, with market capitalization and dummy effect being statistically significant. Furthermore, the effect of concentration remains positive and significant even after controlling for the market capitalization. The effect disappears in a last regression when adding gross margin to the regression. Thus concentration is a proxy for the gross margin (profits on sales) in the Australian economy and this supports the intuition that excess concentration returns are due to monopolistic pricing of goods and services.

5 Size premium and industry concentration

Given the findings of the previous sections, it is then important to explore the interaction between size and concentration, as well as book-to-market and concentration.

Panel A of Table 7 presents estimates from Fama-MacBeth cross-sectional regressions of firm level returns on firm characteristics $\ln(Size)$, $\ln(B/M)$, and characteristics of the respective industry: momentum, beta, leverage, as well as the concentration measure $H(Sales)$ and the interaction term $H(Sales) \times \ln(Size)$. We observe that the regression coefficients on the usual firm and industry characteristics remain the same in magnitude and significance as those reported in Panel B of Table 5. The coefficient on the interaction term is negative and statistically significant indicating that with increasing industry concentration the average stock return decreases for the large-size companies. For the small-size companies increasing concentration indicates higher expected stock returns.

This effect can also be observed from the results reported in Panel B of Table 7 which shows average stock returns of the quintile portfolios. The returns are sorted according to different levels of concentration and size as following: in June of each year, industries are sorted into quintiles according to their $H(Sales)$ value. Further, size quintiles are constructed for each industry¹³. Finally, we calculate the average value-weighted (Panel B) and equally-weighted (Panel C) stock-returns within the double-sorted quintile.

Overall (across all $H(Sales)$ quintiles) we observe that the average monthly return increases with the increasing size of the company: small companies earn on average 1.28% monthly return whereas large companies earn 2.08% monthly return across all concentration quintiles. Further, we observe differences in stock returns depending on the market structure: with increasing size, concentration tends to decrease the average stock returns. While increasing concentration indicates ultimately lower average stock returns for the Q5 (large) companies

¹³ We address the fact that the variations in average stock returns according to size and B/M arise from the within-industry variations rather than cross-industry variations, see Cohen et al. (2003) and Hou and Robinson (2006).

(1.96% for Q1 drops to 1.57% for Q5), it leads to an increase in average returns for the Q1 (small) companies (0.32% for Q1 increases to 2.55% for Q5). The spread in returns associated with size is on average 0.79% and largest among the most competitive industries. Overall, this suggests that firms of a similar size differ from each other with respect to the structure of the industry they operate in. In particular, small companies operating in highly concentrated industries earn higher average stock return compared to small companies operating in highly competitive industry.

6 Conclusion

This study is an examination of the economic determinants of cross-sectional stock returns of the Australian equity market. Motivated by the study of Hou and Robinson (2006), we address the issue of competition on the Australian stock market by measuring industry concentration and examining its relation to stock returns. Australia is a relatively small open-economy where concentrated industries are dominated by the large companies with a high market power. In contrast to the Hou and Robinson (2006) results on United States stocks, we find significant evidence that companies operating in highly concentrated industries generate higher risk-adjusted stock returns. The spread between the most concentrated quintile and the most competitive quintile is 0.49% per month corresponding to the economic magnitude of approximately 5.8% per annum. We also show that stocks in highly concentrated industries in Australia generate excess gross margin on sales (monopoly rents) and have a higher market volatility than stocks in less concentrated industries.

We hypothesize that higher realized stock returns observed over the period 1993 to 2007 are generated by companies with monopoly rents investing these rents in ‘Schumpeterian’ product and process innovation. The economic outcome of investment in innovation is uncertain and increases the riskiness of future corporate free cash flow. To compensate for this increased risk, the Australian market requires higher stock returns.

A Appendix: Calculating Post-Ranking β s

We follow Fama and French (1992) to estimate β s for the stocks in our sample by computing full-period β s for portfolios sorted by size and pre-ranking betas, and then assigning these portfolios β s to the stocks in those portfolios. Therefore, the procedure of assigning market β s to stocks comprises the following two steps:

- (1) Computing market capitalization.
- (2) Computing pre-ranking β .

A.1 Computing Market Capitalization

In June of each year, market value of equity is calculated as SPPR stock prices times the number of shares outstanding. We sort stocks in our sample into 5 portfolios by determining break points as the quintile ranges of size. We form portfolios based on size because of the evidence documented in Chan and Chen (1988) and Fama and French (1992) that size produces a wide spread of average returns and β s.

A.2 Computing Pre-ranking β s

Further, to allow for variation in β s, we divide each size quintile into 5 portfolios based on pre-ranking β s. The pre-ranking β s are computed as the sum of the coefficients of regressions of individual monthly stock returns $r_{i,t}$ on contemporaneous ($r_{m,t}$) and lagged ($r_{m,t-1}$) market returns over the past three years. Therefore, estimating coefficients from the regression

$$r_{i,t} = \alpha_i + \beta_i r_{m,t} + \beta_i^* r_{m,t-1} + u_t \quad (\text{A.1})$$

leads to the pre-ranking beta for stock i : $\hat{\beta}_i + \hat{\beta}_i^*$. The use of both the current and the lagged market return as regressors in the estimation of pre-ranking betas represents an adjustment for the non-synchronous trading, see Dimson (1979) and Fama and French (1992). Note that

for its calculation we require monthly returns for at least 36 months preceding July of year t .

A.3 Computing Post-ranking β s

In June of each year t , stocks are sorted into 25 portfolios according to their size and pre-ranking β . After assigning firms to the size- β portfolios in June of year t , stocks remain in the respective portfolio from July of year t until June of the next year $t + 1$. The portfolio return in any given month is computed as the equally-weighted average of the returns on the stocks in that portfolio in the respective month. As a result, we obtain 25 time-series portfolio returns from the first post-sorting month until end of the sample.

We then estimate post-ranking β s for each of the 25 portfolios using the full sample of these post-ranking returns. Analogously to pre-ranking betas, post-ranking β s are obtained from regressing portfolio returns on market returns over the complete sample period. For the cross-sectional regressions in a given month stocks are assigned the beta of the portfolio they belong to in the respective month.

References

- Aghion, P., Bloom, N., Blundell, R., Griffith, R., Howitt, P., 2005. Competition and innovation: An inverted-u relationship. *The Quarterly Journal of Economics* 120, 701–728.
- Archibugi, D., Evangelista, R., Simonetti, R., 1995. Concentration, firm size and innovation: evidence from innovation costs. *Technovation* 15, 153–163.
- Arrow, K., 1962. Economic Welfare and the Allocation of Resources for Inventions; In R. R. Nelson (ed.), *The Rate and Direction of Inventive Activity: Economic and Social Factors*. Princeton University Press. Princeton.
- Ball, R., 1978. Anomalies in relationships between securities' yields and yield-surrogates. *Journal of Financial Economics* 6, 103 – 126.
- Banz, R., 1981. The relationship between return and market value of common stocks. *Journal of Financial Economics* 9, 3 – 18.

- Basu, S., 1983. The relationship between earnings yield, market value and returns for nyse common stocks: Further evidence. *Journal of Financial Economics* 12, 129 – 156.
- Bhandari, L., 1988. Debt/equity ratio and expected common stock returns: Empirical evidence. *The Journal of Finance* 43, 507 – 528.
- Black, F., 1972. Capital market equilibrium with restricted borrowing. *The Journal of Business* 45(3), 445–455.
- Boulhol, H., 2005. Why haven't cost price margins decreased with globalization? Unpublished - Centre d'Economie de la Sorbonne.
- Brands, S., Gallagher, D., Looi, A., 2006. Active investment manager portfolios and preferences for stock characteristics. *Accounting and Finance* 49(2), 169–190.
- Chan, K., Chen, N., 1988. An unconditional asset-pricing test and the role of firm size as an instrumental variable for risk. *Journal of Finance* 43, 309–325.
- Cohen, R., Polk, C. K., Vuolteenaho, T., 2003. The value spread. *Journal of Finance* 58, 609 – 641.
- Daniel, K. D., Titman, S., 1997. Evidence on the characteristics of cross sectional variation in stock returns. *Journal of Finance* 52(1), 1035–1058.
- Dimson, E., 1979. Risk measurement when shares are subject to infrequent trading. *Journal of Financial Economics* 7(2), 197–226.
- Dou, Y., Gallagher, D. R., Schneider, D., Walter, T., 2012. Out-of-sample stock return predictability in australia. *Australian journal of management*, 37(3), 461–479.
- Faff, R., 2001. An examination of the fama and french three-factor model using commercially available factors. *Australian Journal of Management* 26, 117.
- Faff, R., 2004. A simple test of the fama and french model using daily data: Australian evidence. *Applied Financial Economics* 14(2), 83 – 92.
- Fama, E., French, K., 1992. The cross-section of expected stock returns. *Journal of Finance* 47, 427–465.
- Fama, E., French, K., 1993. Common risk factors in the returns on stocks and bonds. *Journal of Financial Economics* 33, 3 – 56.
- Fama, E., French, K., 1996. Multifactor explanations of asset pricing anomalies. *Journal of Finance* 51, 55–84.

- Fama, E., French, K., 2000. Forecasting profitability and earnings. *Journal of Business* 73, 161–175.
- Fama, E., MacBeth, J., 1973. Risk, returns, and equilibrium: Empirical tests. *Journal of Political Economy* 81, 607 – 636.
- Gaspar, J., Massa, M., 2006. Idiosyncratic volatility and product market competition. *Journal of Business* 79, 3125–3152.
- Gaunt, C., 2004. Size and book-to-market effects and the fama and french three factor asset pricing model: evidence from the australian stock market. *Accounting and Finance* 44, 126.
- Gharghori, P., Chan, H., Faff, R., 2006. Factors or characteristics? that is the question. *Pacific Accounting Review* 18, 21–46.
- Gharghori, P., Chan, H., Faff, R., 2007. Are the fama-french factors proxying default risk? *Australian Journal of Management* 32, 223–249.
- Gharghori, P., Chan, H., Faff, R., 2009a. Default risk and equity returns: Australian evidence. *Pacific-Basin Finance Journal* 17(5), 580–593.
- Gharghori, P., Lee, R., Veeraraghavan, M., 2009b. Anomalies and stock returns: Australian evidence. *Accounting and Finance* 49, 555–576.
- Gilbert, R., 2006. Looking for Mr. Schumpeter: Where Are We in the Competition-Innovation Debate? In Adam B. Jaffe, Josh Lerner and Scott Stern (eds), *Innovation Policy and the Economy* Volume 6. MIT Press, Cambridge, Mass.
- Gormley, T., Matsa, D., 2013. Common errors: How to (and not to) control for unobserved heterogeneity. AFA 2013 San Diego Meetings Paper. Available at SSRN: <http://ssrn.com/abstract=2023868> or <http://dx.doi.org/10.2139/ssrn.2023868>.
- Halliwel, J., Heaney, J., Sawicki, J., 1999. Size and book to market effects in australian share markets: a time series analysis. *Accounting Research Journal* 12, 122 – 137.
- Hou, K., Robinson, D., 2006. Industry concentration and average stock returns. *Journal of Finance* 61, 1927 – 1956.
- Keim, D., 1988. Stock market regularities: A synthesis of the evidence and explanations. In: Dimson, E., ed: Cambridge University Press.
- Lerner, A. P., 1934. The concept of monopoly and the measurement of monopoly power. *The Review of Economic Studies* 1, 157–175.

- Lintner, J., 1965. The valuation of risk assets and the selection of risky investments in stocks portfolios and capital budgets. *Review of Economics and Statistics* 47, 13 – 37.
- Litzenberger, R., Ramaswamy, K., 1979. The effect of personal taxes and dividends on capital asset prices : Theory and empirical evidence. *Journal of Financial Economics* 7, 163 – 195.
- Nooteboom, B., Vossen, R., 1995. Firm Size and Efficiency in R & D Spending. *Studies in Industrial Organization* 20, 69–86.
- Peress, J., 2010. Product market competition, insider trading and stock market efficiency. *Journal of Finance* 65, 1–43.
- Rosenberg, B., Reid, K., Lanstein, R., 1985. Persuasive evidence of market inefficiency. *Journal of Portfolio Management* 11, 9 – 17.
- Schumpeter, J., 1912. *Theorie der wirtschaftlichen Entwicklung*. Duncker & Humblot, Leipzig.
- Schumpeter, J., 1934. *The Theory of Economic Development* (German 1st ed. 1912). Harvard University Press, Cambridge, MA.
- Schumpeter, J., 1942. *Capitalism, Socialism and Democracy*. Harper, New York.
- Schwab, K., 2012. *The Global Competitiveness Report*. World Economic Forum.
- Sharpe, W., 1964. Capital asset prices: a theory of market equilibrium under conditions of risk. *Journal of Finance* 19, 425 – 442.
- Simon, M., Shallone, C., 2013. Effects of firm size and market structures in technological innovation: A review of literature. *Journal of Sustainable Development Studies* 2, 170–181.
- Stattman, D., 1980. Book values and stock returns. *The Chicago MBA: A Journal of Selected Papers* 4, 25 – 45.

GICS Sector	Industry
Energy	Energy
Materials	Materials, Metals and Mining
Industrials	Capital Goods, Commercial Services and Supplies, Transportation
Consumer Discretionary	Automobile and Components, Consumer Durables & Apparel, Consumer Services, Media, Retailing
Consumer Staple	Food and Staples Retailing, Food Beverage and Tobacco
Health Care	Healthcare Equipment and Services, Pharmaceuticals and Biotechnology and Life Sciences
Financials	Banks, Diversified Financials, Insurance, Real Estate (excl. REITs), Real Estate Investment Trusts
Information Technology	Software and Services, Technology Hardware and Equipment
Telecommunications	Telecommunication Services
Utilities	Utilities
Other	Miscellaneous Industrials

Table 1. Standard & Poors GICS classifications.

Panel A: Summary of Industry Concentration Measures													Spearman-Pearson Correlation			
	mean	median	s.d.	max	min	20%	40%	60%	80%	H(Sales)	H(Assets)	H(Equity)				
H(Sales)	0.349	0.291	0.231	0.900	0.092	0.150	0.222	0.359	0.550	1.000	0.677	0.626				
H(Assets)	0.277	0.218	0.172	0.718	0.082	0.140	0.184	0.265	0.432	0.714	1.000	0.958				
H(Equity)	0.267	0.208	0.178	0.759	0.075	0.128	0.173	0.248	0.409	0.660	0.906	1.000				
Panel B: Mean Characteristics of H(Sales) Sorted Quintile Portfolios																
Rank	H(Sales)	New-list	De-list	Size	Assets	Sales	E/A	E/S	V/A	D/B	R&D	R&D/A	Lev.	B/M	Beta	
Q1(Low)	0.113	6.04	9.20	491.5	543.1	544.9	-0.011	-1.880	1.904	0.0057	1.399	0.013	0.378	0.943	1.245	
Q2	0.181	21.60	22.11	729.0	774.1	595.2	-0.038	-7.468	1.861	0.0047	1.855	0.007	0.322	0.924	1.281	
Q3	0.278	10.16	22.15	1214.5	1092.8	773.9	-0.016	-693.179	2.184	0.0047	1.517	0.009	0.277	0.799	1.262	
Q4	0.411	5.35	7.32	1094.0	1296.3	846.2	-0.065	22.684	2.276	0.0052	1.344	0.021	0.301	0.773	1.240	
Q5(High)	0.555	4.82	8.19	1182.6	1849.0	834.7	-0.105	-14.675	2.135	0.0059	1.721	0.039	0.348	0.804	1.228	

Table 2. Summary statistics of industry concentration measures. $H(\text{Sales}/\text{Asset}/\text{Equity})$ is the Herfindahl index calculated as the sum of squared sales/total assets/book equity-based market shares of all firms in each industry in a given year and then averaging over the past three years. Last three columns represent the Pearson correlation (above the main diagonal) and the Spearman correlation (below the main diagonal). Panel B represents mean industry characteristics within $H(\text{Sales})$ -sorted quintile portfolios. Q1(low) corresponds to the 20% of industries with the lowest concentration whereas Q5(high) corresponds to the 20% of industries with the highest concentration.

$\ln(Size)$	$\ln(Assets)$	$\ln(Sales)$	E/A	E/S	V/A	D/B	$R\&D/A$	$Leverage$	$\ln(B/M)$	$beta$
Panel A: Simple Regression										
0.016 (1.420)	0.012 (1.336)	-0.014 (-2.261)	0.102 (0.766)	-0.027 (-0.886)	0.042 (1.262)	1.763 (0.354)	1.001 (3.522)	-0.347 (-2.621)	-0.070 (-1.0968)	-0.069 (-1.105)
Panel B: Multiple Regression										
0.027 (1.651)			0.211 (0.843)				1.245 (1.705)	-0.138 (-0.589)	-0.024 (-0.273)	0.062 (0.390)
	0.039 (2.172)		0.209 (0.838)				1.281 (1.796)	-0.228 (-0.996)	-0.035 (-0.420)	0.135 (0.815)
		-0.057 (-2.991)	0.362 (1.576)				0.643 (0.890)	0.067 (0.284)	-0.069 (-0.747)	-0.498 (-2.857)
0.026 (1.708)				-0.014 (-0.704)			0.795 (1.280)	-0.106 (-0.518)	-0.057 (-0.690)	0.046 (0.322)
0.012 (0.012)				0.025 (0.494)		1.302 (1.589)	0.264 (1.421)		-0.082 (-0.405)	
0.036 (2.008)			0.200 (0.737)			7.745 (1.375)	1.615 (2.700)	-0.220 (-0.962)	0.044 (0.555)	0.172 (1.019)

Table 3. Fama-MacBeth regression of H(Sales) on industry average characteristics. Cross-sectional regressions are estimated every year and averaged over the past three years afterwards. Panel A reports the results for the estimates from the simple regression, Panel B reports the results of multivariate regression of H(Sales) on a combination of industry characteristics; t -statistics appear below the coefficient estimates.

Firm Level Returns							Industry Level Returns					
Quintile							Quintile					
	Q1	Q2	Q3	Q4	Q5	Q5 - Q1	Panel A: Raw Returns					
Avg.Return	0.871	0.737	1.574	1.581	1.360	0.489	0.952	0.698	1.220	1.307	1.990	1.038
<i>t</i> -stats	(10.19)	(8.451)	(14.15)	(12.12)	(8.175)	(2.615)	(5.346)	(3.262)	(5.917)	(6.308)	(5.453)	(2.555)
Std.Err.	0.085	0.087	0.111	0.130	0.166	0.185	0.178	0.214	0.206	0.207	0.365	0.377
Panel B1: Adjusted Returns: 5 × 5 × 5 portfolios benchmark												
adj. Avg.Return	-0.063	-0.068	0.079	0.134	0.096	0.159	-0.096	-0.016	0.053	0.016	0.669	0.766
adj. <i>t</i> -stats	(-0.869)	(-0.945)	(0.831)	(1.189)	(0.681)	(1.004)	(-0.903)	(-0.123)	(0.382)	(0.109)	(2.674)	(2.814)
Std.Err.	0.073	0.072	0.095	0.113	0.141	0.157	0.106	0.131	0.141	0.151	0.250	0.245
Panel B2: Adjusted Returns: 4 × 4 × 4 portfolios benchmark												
adj. Avg.Return	-0.103	-0.086	0.192	0.121	0.077	0.181	-0.139	-0.008	0.253	-0.115	0.816	0.955
adj. <i>t</i> -stats	(-1.301)	(-1.081)	(1.841)	(0.968)	(0.508)	(1.051)	(-1.069)	(-0.051)	(1.541)	(-0.698)	(2.823)	(3.013)
Std.Err.	0.079	0.080	0.104	0.124	0.153	0.171	0.130	0.158	0.164	0.165	0.289	0.287
Panel B3: Adjusted Returns: 3 × 3 × 3 portfolios benchmark												
adj. Avg.Return	-0.065	-0.125	0.197	0.140	0.053	0.118	-0.036	-0.078	0.172	-0.039	0.774	0.811
adj. <i>t</i> -stats	(-0.780)	(-1.473)	(1.796)	(1.075)	(0.334)	(0.657)	(-0.270)	(-0.475)	(0.990)	(-0.216)	(2.498)	(2.394)
Std.Err.	0.083	0.085	0.110	0.131	0.160	0.179	0.137	0.165	0.174	0.180	0.310	0.306

Table 4. Industry Concentration and the cross-section of average stock returns: we report the cross-section of average stock returns (in percent) based on H(Sales) index. We calculate average monthly returns of the quintile portfolios, as well as the difference between the most concentrated quintile Q5 and the least concentrated quintile Q1; *t*-statistics and standard errors are reported below the average returns. Firm level returns are the average returns across firms within the same concentration quintile. Industry level returns are calculated by first, averaging the returns within each industry, and then, across industries within the same concentration quintile. Adjusted returns are calculated by subtracting the return on a characteristics-based benchmark constructed as in Daniel and Titman (1997) and Hou and Robinson (2006).

$H(Sales)$	$\ln(Size)$	$\ln(B/M)$	Momentum	$Beta$	$Leverage$	$R^2_{adj.}$
0.034 (3.900)						0.0542
	0.002 (2.856)	-0.016 (-13.109)	5.776 (0.372)			0.1071
0.008 (2.324)	0.002 (2.872)	-0.016 (-13.396)	3.158 (0.198)			0.1076
				-0.004 (-0.986)		0.0786
					-0.038 (-8.698)	0.0444
	0.003 (5.141)	-0.016 (-13.203)	-9.070 (-0.435)	0.013 (4.147)	-0.003 (-0.692)	0.1135
0.008 (2.231)	0.003 (5.171)	-0.016 (-13.383)	-11.054 (-0.511)	0.013 (4.111)	-0.003 (-0.648)	0.1141

Table 5. Fama-MacBeth regression of firm level cross-sectional returns on $H(Sales)$ and firm level characteristics. Individual company returns are regressed on $H(Sales)$ of the respective industry and the firm level characteristics $\ln(Size)$, $\ln(B/M)$, momentum, beta, and leverage. Cross-sectional regressions are estimated monthly and time-series average estimates are reported together with the t -statistics. Last column reports the adjusted $R^2_{adj.}$

$H(\text{Sales})$	Market cap	$\ln(B/M)$	Momentum	Beta	Leverage	D	Gross margin
0.031 (3.226)	0.019 (3.442)					0.017 (6.776) 0.008 (3.821) 0.003 (1.491)	
0.031 (3.382) 0.030 (3.188) 0.010 (3.020) 0.010 (2.839) 0.010 (2.731)	0.014 (2.109) 0.001 (0.277) 0.002 (0.590)	-0.017 (-15.063) -0.018 (-15.644) -0.018 (-15.669)	-1.829 (-0.751) -7.253 (-1.479) -7.629 (-1.434)	0.002 (0.611) 0.002 (0.617)	-0.002 (-0.462) -0.002 (-0.441)	0.001 (0.795)	0.002 (1.865) 0.001 (1.613) 0.001 (1.584) 0.001 (0.882)
0.035 (3.643) 0.031 (3.184) 0.004 (0.958)		-0.017 (-15.222)	-8.384 (-1.316)	0.003 (0.836)	-0.003 (-0.821)	0.008 (4.151) 0.002 (0.970)	

Table 6. Fama-MacBeth regression of firm level returns on $H(\text{Sales})$ and firm characteristics, controlling for a market power. Individual company returns are regressed on $H(\text{Sales})$ of the respective industry in which this company operates and the firm level characteristics $\ln(\text{Size})$, market capitalization, momentum, beta, and leverage, as well as a dummy D for the two largest companies based on their market power, as well as the gross margin. Cross-sectional regressions are estimated monthly and time-series average estimates are reported together with the t -statistics.

Panel A: Fama-MacBeth Cross-Sectional Regression						
$\ln(Size)$	$\ln(B/M)$	Momentum	$Beta$	$Leverage$	$H(Sales)$	$H(Sales) \times \ln(Size)$
0.004 (4.798)	-0.015 (-13.461)	1.043 (0.086)	0.014 (4.677)	-0.002 (-0.608)	0.068 (2.370)	-0.003 (-2.115)
H(Sales) Quantiles	Q1(small)	Q2	Size Quintiles		Q5(large)	Q5(large)-Q1(small)
Panel B: Value-Weighted Average Returns of H(Sales) and Size Sorted Portfolios						
Q1(low)	0.318 (0.741)	1.407 (4.789)	1.687 (5.580)	2.290 (7.058)	1.958 (6.648)	1.64 (3.15)
Q2	0.613 (1.696)	1.059 (3.263)	1.801 (4.973)	1.510 (4.462)	1.960 (5.673)	1.35 (2.70)
Q3	1.489 (4.006)	1.925 (5.328)	1.540 (5.738)	2.247 (7.308)	2.175 (6.655)	0.69 (1.39)
Q4	1.669 (3.413)	2.283 (5.153)	2.535 (6.047)	2.420 (5.950)	2.352 (6.594)	0.68 (1.13)
Q5(high)	2.549 (4.796)	2.304 (4.570)	2.030 (4.237)	1.311 (2.859)	1.567 (3.560)	0.98 (1.42)
All	1.285 (4.608)	1.702 (6.945)	1.883 (7.558)	2.076 (7.827)	2.079 (7.656)	0.79 (2.04)
Panel C: Equally-Weighted Average Returns of H(Sales) and Size Sorted Portfolios						
Q1(low)	-0.609 (-1.545)	0.824 (2.380)	1.208 (3.695)	1.591 (5.054)	1.437 (4.655)	2.05 (4.09)
Q2	-0.924 (-2.004)	0.431 (1.044)	1.115 (2.693)	1.377 (3.852)	1.611 (4.557)	2.53 (4.36)
Q3	0.084 (0.173)	1.119 (2.472)	1.446 (4.055)	2.165 (6.402)	2.063 (5.859)	1.98 (3.30)
Q4	0.148 (0.303)	1.392 (3.142)	1.872 (4.618)	1.915 (4.414)	2.042 (5.697)	1.89 (3.13)
Q5(high)	0.583 (1.105)	1.684 (3.146)	1.824 (3.554)	1.541 (3.299)	1.295 (3.101)	0.71 (1.06)
All	-0.372 (-0.978)	0.853 (2.498)	1.337 (4.286)	1.716 (5.829)	1.704 (6.041)	2.08 (4.39)

Table 7. Size and industry concentration. Panel A reports the Fama-MacBeth regression of the firm level cross-sectional returns on the firm level characteristics $\ln(Size)$, $\ln(B/M)$, the industry characteristics which the firm belongs to: momentum, beta, leverage, as well as the concentration measure $H(Sales)$ and the interaction term $H(Sales) \times \ln(Size)$. Cross-sectional regressions are estimated monthly and time-series average estimates are reported together with the time-series t -statistics. Panel B and C report average value-weighted (Panel B) and equally-weighted (Panel C) returns in each $H(Sales)$ and size double-sorted quintile portfolio, their t -statistics as well as the difference in returns between quintiles Q5 (the most concentrated) and Q1 (the most competitive).