Firms' Degree of Internationalisation and the Cross-section of Stock Returns: Evidence from Multinational Listed Companies in the U.K.

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Abstract: This paper proposes two main opposing channels through which firms' degree of internationalisation affects stock returns. In particular, firms that operate internationally benefit from risk reduction via diversification channel and also encounter higher risk exposure due to various risk factors in international markets. Using a sample of 566 multinational publicly listed companies in the London Stock Exchange during 1999 and 2010, this paper empirically tests whether firms' degree of internationalisation is a new asset pricing factor in addition to the standard risk factors such as beta, size, book-to-market, leverage, momentum, and product market competition. The results show that firms' degree of internationalisation is positively and significantly related to the cross-section of stock returns in all Fama and MacBeth regressions, even after accounting for beta, size, book-to-market, leverage, and momentum. In addition, the effect of internationalisation on stock return becomes statistically insignificant after controlling for product market competition, indicating that the interaction term between competition and internationalisation plays a role in explaining stock returns. Overall, the empirical findings indicate that firms or industries with higher degree of internationalisation earn, on average, higher risk-adjusted returns. The results of this paper suggest that although multinational firms can benefit from cash flow diversification by going international, firms with higher degree of internationalisation are risky than firms with lower degree of internationalisation due to higher political, foreign exchange, and distress risks faced by multinational companies in international markets.

Key words: Degree of Internationalisation; Stock returns; International Markets; Multinational Companies; Asset pricing; London Stock Exchange.

1. Introduction:

Prior research into the determinant of stock return report many stock market anomalies that are contradictory with the perditions of rational asset pricing theories. For instance, in the US stock markets, Basu (1977) detects the effect of earning-to-price (E/P) ratio on average stock returns. Banz (1982) documents size effect. Rosenberg, Reid, and Lanstein (1985) observe the existence of value effect (Book-to-Market ratio). Fama and French (1992) show that size and book-to-market ratio predict the cross-section of stock returns. Fama and French (1993) find that the three-factor model including size (SMB), value (HML), and excess returns on market portfolios can predict the time-series variation in stock returns. Black (1993), Kothari, Shanken, and Sloan (1995), and Shumway (1997) document that Fama and French models of 1992-3 may suffer from data snooping and survivorship bias. Conversely, Barber and Lyon (1997) conclude that Fama and French three-factor model is valid and the results are conducted using biasfree data. Jegadeesh and Titman (1993) and Lakonishok, Shileifer, and Vishny (1994) report the existence of momentum and value stock strategies in the US.

Many empirical asset pricing studies in the UK stock market remain ambiguous to document the effects of different stock market anomalies as in the US stock markets. For instance, Miles and Timmermann (1996), Strong and Xu (1997), Malin and Veeraraghavan (2004), and others find no evidence of small size effect on the cross-section of stock returns. Conversely, Charitou and Constantinidi (2003), and Leledakis, Davidson, and Smith (2004) find that firms with small size earn higher returns in the UK stock market. Momentum related studies in the UK are also controversial. For instance, Liu, Strong, and Xu (1999) indicate that momentum effect plays a vital role in the UK stock exchange. However, Hon and Tonks (2003) reveal that momentum effect is not a general feature of the UK stock market. Finally, Muradoglu and Wittington (2001) find that leverage is negatively related to stock returns.

However, Sivaprasad and Muradoglu (2009) show that leverage is positively related to stock returns in the Utility sector and negatively related to stock returns in Consumers Goods and Industrial Sectors.

Recent asset pricing studies in the US, UK, and Australia stock markets show that not only the standard risk factors such as beta, size, book-to-market, leverage, and momentum explain stock returns but also industry market structure. For instance, Hou and Robinson (2006) demonstrate that the US firms in highly competitive industries earn on average higher stock returns than firms in highly concentrated industries. The authors argue that firms in highly competitive industries face higher innovation risk and distress risk and therefore earn higher stock returns. Hashem (2010) further prove that industry market structure affects stock returns in the UK stock market and find that there is a negative relationship between industry concentration and stock returns. Finally, Gallagher and Ignatieve (2010) find that the Australian firms in highly competitive industries earn on average lower stock returns than firms operating in highly concentrated industries.

In addition to the above risk factors and stock market anomalies, this paper argues that there are many reasons why firms' degree of internationalisation may have an impact on stock returns. For instance, firms that operate internationally generate cash flows not only through their domestic product markets but also through international product markets. In addition, firms' production decisions are based upon the equilibrium of both local and international markets. Since multinational companies' production decisions are based on a particular domestic market structure, and also affected by various risk sources in international markets, risk sources in international markets may affect the riskiness of these firms' cash flows and consequently influence firms' equilibrium rate of returns. Although firms with higher degree of internationalization face many sources of political and foreign exchange

risks in international markets, they are also able to capture the benefits of their cash flows diversification and face lower risk. For example, firms with multinational bases have the opportunity to capture the benefits of operating in international markets via reacting against any destructive moves by their domestic competitors and reducing the risk of competitive pressures induced by their domestic competitors (Hamel and Prahalad, 1985; and Kim et al, 1993).

Prior studies on multinational companies (MNCs) specify ***two main competing channels*** through which firms' degrees of internationalization may influence firms' systematic risk and therefore affect stock returns. ***The first channel*** through which the firms' degree of internationalisation may affect stock returns is through the theory of *diversification*. I denote this channel as *international diversification channel for stock returns*. Shapiro (1978) states that because multinational companies operate in various international markets, they are better able to diversify their cash flows relative to firms with less international exposure. Hence, MNCs' returns will be less correlated with the domestic market returns, leading to a lower systematic risk and consequently lower stock returns. Subsequent studies into the relationship between MNCs and systematic risk document inconclusive results. For instance, Mikhail and Shawkey (1979) note that multinational companies (MNCs) face higher risks and earn higher risk-adjusted returns. Fatemi (1984) indicates that the MNCs do not earn abnormal returns unless they operate in the highly competitive foreign market. In contrast, Michel and Shaked (1986) finds that MNCs face less systematic risk and consequently earn lower risk-adjusted returns. I illustrate the international diversification channel for stock returns as follows:

Higher degree of internationalisation ⟶ better ability for firms to diversify their cash flows ⟶ Less correlation with domestic market returns ⟶lower systematic risk ⟶ lower stock returns.

The second channel through which firms' degree of internationalization may influence stock returns is through the exposure to various risk sources in international markets, where these multinational companies MNCs operate. I call this channel as *international market risk channel for stock returns*. In fact, as companies expand internationally; they mainly face various risk factors in international markets such as foreign exchange risk, political risk, and competitive pressure risk. In particular, higher degree of firms internationalization leads to a higher exposure to foreign exchange fluctuations and therefore to a higher variability of foreign returns in domestic currency. Prior studies indicate that multinational firms are also highly exposed to foreign exchange risk than domestic firms (e.g. Black, 1990; and Dumas and Solnik, 1995). Moreover, firms that operate internationally encounter higher political risk in the host country such as specific governmental regulations including tax payments, subsidiary policies (Burgman, 1996). In addition, multinational companies encounter higher competitive risk through the competitive pressures by domestic companies in international markets, as those domestic companies in international markets are more familiar with local businesses and operational environment. Finally, higher degree of firms' internationalization might introduce difficulties in monitoring foreign operations and controlling managers in international markets, leading to a higher risk exposure for firms' cash flows and hence to a higher stock returns (Lee and Kwok, 1988). I illustrate the international market risk channel for stock returns as follows:

Higher degree of internationalisation ⟶ higher exposure to international market risk factors ⟶ Higher foreign exchange risk, political risk, and competitive pressure risk ⟶ higher stock returns.

Prior opposing channels show that while higher degree of internationalization for firms may reduce the firms risks through the channel of cash flow diversification, it also leads to a higher political and foreign exchange risk, as well as competitive risk in international

markets, and to an increase in the volatility of the firms' cash flows. Therefore, whether and to what extent firms' degree of internationalization affects stock returns is an open empirical question to be further addressed in this paper. Based upon the aforementioned argument, I hypothesize the following hypotheses:

H0: There no relationship between firms' degree of internationalization and stock returns in the London Stock Exchange market between 1999 and 2010.

H1: There is either negative or positive relationship between firms' degree of internationalization and stock returns in the London Stock Exchange market between 1999 and 2010 even after accounting for beta, size, book-to-market, momentum, and industry market competition.

This paper intends to address to the following research questions. What determine the cross-section of stock returns for the listed multinational companies in the UK stock market during 1999 and 2010? Can firms' degree of internationalization be a new risk factor in addition to other risk factors and stock market anomalies in explaining the cross-section of stock returns for multinational companies? Will the results of firms' internationalization remain significant in explaining stock returns after accounting for beta, size, book-to-market, leverage, momentum, and market competition? Will the results of firm' degree of internationalization remain robust to firm and industry level regressions in explaining stock returns after accounting for various risk factors and stock market anomalies?

Using a sample of 566 multinational listed companies in the London Stock Exchange between 1999 and 2010, this paper finds that firms' degree of internationalisation is positively and significantly related to the cross-section of stock returns. In addition, the positive relationship between degree of internationalisation and stock returns remains significantly negative, even after accounting for beta, size, book-to-market, leverage,

momentum, and product market competition. However, beta is never statistically significant in explaining the cross-section of stock returns. Moreover, firm size, book-to-market, and leverage are negatively related to the cross-section of stock returns, while momentum is positively related to the cross-section of stock returns. Furthermore, product market competition is negatively and significantly related to stock returns. The above results are robust to firm and industry level regressions. Overall, the empirical findings of this paper indicate that firms or industries with higher degree of internationalisation earn, on average, higher risk-adjusted returns than companies with lower degree of internationalisation. An explanation is that firms or industries with higher degree of internationalisation face higher political, foreign exchange, and international competitive risks in international markets than firms or industries with lower degree of internationalisation. Therefore, investors in firms or industries with higher degree of internationalisation require positive returns premiums for the greater risks involved in those firms and/or industries.

The incremental contributions of this paper are three-fold. First, given that prior literature examines whether multinational companies influence firms systematic risk and documents inconclusive findings, it is important to test directly whether firm internationalization leads to higher or lower stock returns. This paper is one of the first to link firms' degree of internationalization with stock returns in the context of UK during 1999 to 2010. Second, extant asset pricing studies in the UK and US have not considered firms' degree of internationalization as a potential risk factor that explains stock returns. This paper is one of the first to empirically examine whether firms' degree of internationalization predicts the cross-section of stock returns in addition to other risk factors and stock market anomalies. Third, this paper also contributes to the current empirical debate on whether firms operating internationally will reduce their risk through cash flow diversification or encounter higher risk through various risk factors in international markets.

The paper proceeds as follows. Section 2 explains the data, sample, and the measures for both firms' degree of internationalisation and product market competition. Section 3 reports summary statistics and presents firm level characteristics across firms' degree of internationalisation sorted portfolio quintiles, and shows the results of Fama-MacBeth two-step procedure to explain the relationship between degree of internationalisation and firm level characteristics. Section 4 carries out Fama-MacBeth cross-sectional regression to examine the relationship between degree of internationalisation and stock returns at firm and industry level. Section 4 also shows how degree of internationalisation interacts with product market competition to explain stock returns. Section 5 concludes and suggests some recommendation for further research.

2. Data and Measures:

2.1. Data

The sample used in this paper is unbalanced panel consisting of 566 multinational UK-publicly listed companies in the London Stock Exchange (LSE) during 1999 and 2010. I collect data on monthly share returns, and accounting information from Thomson Reuters *'DataStream'*. I also use the most detailed level 6 industry classification code consisting of 76 industries to calculate the measure of product market competition.

Consistent with prior studies, I exclude de-listed companies, financial companies (banks, investment trusts, insurance companies, and properties companies); companies with negative book-to-market-ratio; companies without foreign sales; and companies without positive foreign sales. To ensure that accounting data are available prior to equity data, and thus are reflected in stock prices; I collect data on market value of equity, book-to-market ratio, leverage, total assets, and net sales at the fiscal year ending in *t*-1. I then match stock returns data from July of year *t* to June of year *t*+1 with accounting information for fiscal year ending in *t*-1, as in Fama and French (1992), Hou and Robinson (2006), Gallagher and Ignatieve (2010), and Hashem (2011). In addition, for each company to be included in the sample in a given year, I require a company to have monthly share return data during the previous 3-5 years to allow the estimation of market beta and calculation of post-ranking beta.

For each company in each year, I collect information on the following accounting and financial variables: (1) *SIZE* is firm size measured as the annual market value of equities; (2) *B/M* is book-to-market equity ratio calculated as the book value of the common equity divided by the market value of common equity; (3) *LEV* is leverage defined as total (short- and long-term) debt as a percentage of total equity; (4) *ASSETS* is the book value of total

assets; (5) *SALES* is net sales revenue defined as total sales minus returns and other deductions; (6) *R&D* is research and development expense; (7) *R&D/A* is the ratio of R&D and total assets; (8) *FSTS* is foreign sales as a percentage of net sales or revenue; (9) *OPM* is operating profit margin defined as the ratio of operating income to net sales. Operating income represents the difference between sales and total operating expenses (10) POSTBETA is the post ranking beta as in Fama and French (1992).

To calculate the post ranking beta, I group the stocks in each year into 100 size-beta portfolios. I then calculate the post ranking average monthly returns for each of the 100 size beta portfolios over the next 12 months during year t and t+1. I next regress the post-ranking average monthly returns of 100 size-beta portfolios on market returns over the 12-month period. Finally, I assign a post-ranking beta for each stock in each size-beta portfolio in a given year, so that each stock in the same size-beta portfolio will have the same post-ranking beta within the 12-month period.

2.2. Measures:

This paper examines the effect of internationalisation on stock returns and further tests the joint effect of product market competition and internationalisation in explaining stock returns. Therefore, I use the following measures for internationalisation and product market competition:

Degree of Internationalisation DOI: consistent with prior studies (e.g. Singh and Nejadmalayeri, 2004; Zhang and Yang 2009, among others), I utilize foreign sales as a percentage of net sales FSTS to measure firm's degree of internationalisation (DOI henceforth). This measure represents the extent to which a firm is related to its operational activities in international markets for generating revenues. The measure of foreign sales excludes export sales, excise taxes, windfall profit taxes, value Added taxes, and general and services taxes. Higher percentage of foreign sales to net sales indicates that a firm extensively

engages in cross boarder operations to generate revenues (higher degree of internationalisation), while lower percentage of foreign sales to net sales refers that a firm depends on domestic market operations to generate revenues (lower degree of internationalisation).

Competition: to compute product market competition (PMC), I use Lerner Index (Li_{it}) represented by operating profit margin as a measure of price cost margin as in Aghoin *et al* (2002a, 2005). Operating profit margin is the ratio of operating income to net sales or revenues. My measure of product market competition (MPC_{jt}) is the average Lerner Index across firms within the industry as follows:

$$PMC_{jt} = 1 - \frac{1}{N}\sum_{i=1}^{N} Li_{it}$$

Li_{it} represents the Lerner Index of firm i in industry j for year t, and N is the number of firms in industry j. The product market competition measure (PMC) ranges between (0) to (1). A value of (1) indicates perfect competition, while a value of (0) indicates perfect monopoly.

3. Degree of Internationalisation DOI and Firm characteristics:

3.1. Firm Average Characteristics and Degree of Internationalisation Quintiles:

Panel A in Table 1 displays descriptive statistics for the unbalanced panel from 1999-2010. As shown in Panel A, an average firm in the sample has DOI with a mean (median) of 33.9% (20.6%). The average industry degree of internationalisation Ind.DOI is similar to firm DOI but with higher median (28.2%). The results indicate that the sample of the UK multinational listed firms during 1999 and 2010 have low degree of internationalisation. Although firm DOI and industry DOI have same mean values, the former has higher standard deviation. In addition, the spread in DOI is larger than Ind.DOI. For instance, DOI ranges between 0 (indicating low degree of internationalisation) and 1427.6% (indicating high degree of internationalisation). The lowest DOI deciles (lowest 10%) has an average DOI of 0, while the highest DOI deciles (top 90%) has an average of 88.8%. Regarding product market competition measure PMC, The lowest PMC deciles (lowest 10%) has an average PMC of 0.806, while the highest PMC deciles (top 90%) has an average of 0.945, indicating that the sample of the UK multinational listed companies face high competition during 1999 and 2010.

Panel B in Table 1 reports average firm- and industry-level returns as well as firm average characteristics across DOI sorted quintiles portfolios constructed based on firms' DOI values. I calculate industry returns at industry level and other characteristics at the firm level, and then average them within each DOI quintile portfolio. Quintile 1 refers to the 20% of the firms with the lowest DOI ratios, while quintile 5 corresponds to the highest 20% of the firms with the highest DOI ratios.

A quick inspection of Panel B in Table 1 uncovers many remarkable findings. First, the mean returns for both firm and industry levels increase from Q1 to Q5, suggesting that firms in high internationalisation quintiles earn, on average, higher returns than those in low

internationalisation quintiles. The average firm-level returns for quintiles 1 and 2 are 0.735% and 0.864%, while the average firm-level returns for quintiles 3, 4 and 5 are 0.465%, 0.667% and 0.885%, respectively. The spread in the average firm-level returns between the highest and lowest DOI quintiles is approximately 0.15% per month, or 1.8% per annum. The average industry-level returns for quintiles 1 and 2 are 0.714% and 0.426%, while the average industry-level returns for quintiles 3, 4 and 5 are 0.533%, 0.708% and 0.901%, respectively. The spread between the highest and the lowest DOI quintiles based on the average industry-level returns is approximately 0.188% per month, or 2.253% per annum. The results favour the assumption that firms with higher degree of internationalisation earn, on average, higher returns than firms with low degree of internationalisation.

Second, the results show that firms with higher degree of internationalisation have, on average, higher size, total assets and net sales than firms with lower degree of internationalisation. For instance, the average firm size for quintiles 4 and 5 are £2169.31 and £4334.03 million, while the average firm size for quintiles 1, 2, and 3 are £243.59, £980.01, and £1268.5 million, respectively. The average total assets for quintiles 4 and 5 are £2354.686 and £4173.933 million, whereas the average total assets for quintiles 1 and 2 are merely £311.335 and £1071.29 million, respectively. The average net sales for quintiles 4 and 5 are £1968.665 and £3487.435 million, while the average net sales for quintiles 1 and 2 are £306.9 and £1203.157 million, respectively.

Third, the average R&D expenditure increases from £1.38 million for the least DOI quintile to reach a value of £112.93 million in quintile 5 for the highest DOI quintile. Scaling R&D by total assets leads to opposite pattern. For instance, R&D/A increases from 0.025 for quintile 1 to 0.046 for quintile 2, and then decreases for subsequent quintiles to 0.036, 0.032, and 0.031 for quintile 3,4, and 5 respectively. The findings seem to advocate that firms with higher degree of internationalisation spend less on innovations. The results

also show that the average PMC slightly decreases across DOI quintiles. For instance, the average PMC measure for the least DOI quintile is 0.8952 and decreases to reach 0.8506 for quintile 5, suggesting that firms with higher degree of internationalisation have slightly less competitive market structure than those with low degree of internationalisation.

Finally, firms in the highest DOI quintile have lower book-to-market equity ratios than those in the lowest DOI quintile, but the average leverage ratio seems to be flat across various DOI quintiles. There is strong evidence that firms in highest DOI quintiles are more risky than those in lowest DOI quintile, because the average post-ranking beta rises from 0.65 for quintile 1 to 1.01 for quintile 5, indicating that higher degree of internationalisation leads to a higher risk.

Table1. Panel A: Summary Statistics of Firm Degree of Internationalisation Measure

	Mean	*Median*	*SD*	*Max*	*Min*	*p10*	*p25*	*p75*	*p90*
Firms Degree of Internationalisation DOI	33.908	20.630	45.843	1427.580	0	0	0	61.43	88.83
Industry Degree of Internationalisation Ind.DOI	33.908	28.252	27.638	325.440	0	5.343	16.002	45.840	71.023
Product Market Competition PMC	0.884	0.908	0.073	0.977	0.434	0.806	0.865	0.929	0.945

Table 1. Panel B: Characteristics of Firm Degree of Internationalisation Sorted Portfolios Quintiles

Rank	*DOI*	*Fir Ret*	*Ind. Ret*	*Size*	*Assets*	*Sales*	*R&D*	*R&D/A*	*PMC*	*Lev.*	*B/M*	*Post.Beta*
Low	0.00	0.00735	0.00714	243.59	311335	306900.90	1381.46	0.025	0.8952	3.00	0.83	0.65
Q2	5.26	0.00864	0.00426	980.01	1071290	1203157	7539.42	0.046	0.9066	3.04	0.61	0.69
Q3	19.24	0.00465	0.00533	1268.05	1302068	1603532	22573.28	0.036	0.8978	3.35	0.61	0.83
Q4	49.87	0.00667	0.00708	2168.31	2354686	1968665	61190.96	0.032	0.8954	3.50	0.57	1.00
High	87.62	0.00885	0.00901	4334.03	4173933	3487435	112934.40	0.031	0.8506	3.78	0.62	1.01

Panel A reports summary statistics for firms degree of internationalisation DOI, industry degree of internationalisation Ind.DOI, and product market competition PMC. I calculate DOI and Ind.DOI based on foreign sales as % of net sales FSTS for DOI and based on industry average FSTS for Ind.DOI. I also compute PMC based on operating profit margin OPM as a proxy for Lerner Index. The PMC_{jt} is the average Lerner Index across firms within the industry deducted from 1 as in Aghoin *et al* (2002a, 2005). Panel B displays the characteristics of DOI sorted quintile portfolios. Quintile 1 refers to the bottom 20% of companies with the lowest DOI ratios, while quintile 5 corresponds to the top 20% of companies with the highest DOI ratios. SIZE is the annual market value of equity in million British Pound, calculated as share price multiplied by the number of ordinary shares in issue; B/M is book-to-market equity ratio calculated as the balance sheet value of the common equity divided by the market value of common equity; LEV is the percentage of total debt to common equity; ASSETS is the book value of total assets in thousand British Pound; SALES is net sales or revenue in thousand British Pound, defined as total sales minus returns and other deductions; R&D is research and development expenses in thousand British Pound; R&D/A is the ratio of R&D and total assets; PBETA is the post-ranking beta as in Fama and French (1992).

3.2. Regressions of Degree of Internationalisation DOI on Firm Level Characteristics

To examine the relationship between firms' degree of internationalisation DOI and firm level characteristics without quintile limits, I apply Fama-MacBeth (1973) two-step procedure. In the first step, I estimate the following cross-section regression for each single year from 1999 to 2010:

$$DOI_{i,t} = \alpha_t + \sum_{k=1}^{K} \beta_{k,t} X_{k,i,t} + \varepsilon_{i,t}$$

where DOI_{it} is the measure of degree of internationalisation based on the ratio of foreign sales to net sales for firm i in year t, $X_{k,i,t}$ denotes firm level characteristics, including the logarithm of average firm size Ln(Size), the logarithm of total assets Ln(Assets), the logarithm of net sales Ln(Sales), product market competition measure PMC for the industry j a firm belongs to, leverage (LEV), the logarithm of book-to-market equity ratio Ln(B.M) and post-ranking beta Post.Beta. In the second step, I calculate the time-series average of test statistics as well as the time-series average of the cross-sectional coefficients estimate. Table 2 contains estimation results from the Fama-MacBeth two-step procedure. The results in Panel A are based on bivariate regressions of DOI on each of the 7 firm level characteristics, while the results in Panel B are based on multiple regressions of DOI after controlling for various characteristic variables. I report t-statistics in *italic* under the time-series average coefficient estimates of the annual cross-section regressions.

As shown in Table 2, firm size, total assets, and net sales are positively related to DOI, as the coefficient estimates for Ln(Size), Ln(Assets) and Ln(Sales) are individually significant at the 1% level, with or without other characteristic variables. When I account for all 7 variables in one regression, Ln(Assets) remains significantly positive, while Ln(Sales) becomes significantly negative at the 1% level, and Ln(Size) becomes statistically insignificant. The results suggest that firms with higher degree of internationalisation have large firm size, higher book value of

assets and large net sales than those with lower degree of internationalisation, which is consistent with the reported findings in the previous section.

In addition, depending on the control variables, the coefficient estimates for LEV are significantly positive at the 1 to 10% levels in all regressions except in the third and fifth rows in Panel B. The coefficient estimates for Ln(B/M) are significantly negative at the 1% level in all regressions. Therefore, the firm degree of internationalisation DOI is positively related to leverage but negatively related to book-to-market equity, indicating that firms with higher DOI have higher market value of equity and use more debt than those with lower DOI. Moreover, the effect of industry structure is negative. The coefficient estimates for PMC are significantly negative at the 1% level in single and multiple regressions but statistically insignificant in all the last row of Panel B when I control for all firm characteristics. The results suggest that as the degree of competition increases, firms' degree of internationalisation decrease. Finally, the coefficient estimates for Post.Beta are significantly positive at the 1% level in simple and multiple regressions, indicating that firms with higher DOI appear to be risky than those with lower DOI. The findings are in line with those obtained under the quintile analysis in the previous section.

Table 2. Fama and MacBeth Regressions of DOI on Firm Characteristics

Panel A: Simple Regressions

Ln(Size)	***Ln(Assets)***	***Ln(Sales)***	***PMC***	***Lev.***	***Ln(B/M)***	***PostBeta***
0.0528	0.0564	0.0386	-1.3848	0.0341	-0.0794	0.0783
*23.83**	*15.63**	*15.66**	*-11.06**	*4.38**	*-5.78**	*4.29**

Panel B: Multiple Regressions

Ln(Size)	***Ln(Assets)***	***Ln(Sales)***	***PMC***	***Lev.***	***Ln(B/M)***	***PostBeta***
			-1.1654	0.0190	-0.0728	0.0762
			*-7.98**	*3.24**	*-5.65**	*4.61**
0.0369			-0.9261	0.0134	-0.0328	0.0565
*11.82**			*-6.86**	*2.16****	*-2.07****	*3.14**
	0.0408		-0.9156	0.0067	-0.0548	0.0556
	*14.54**		*-6.29**	*1.1*	*-3.99**	*3.13**
		0.0272	-1.1521	0.0123	-0.0550	0.0635
		*8.67**	*-8.01**	*1.94****	*-3.85*	*3.58**
-0.0104	0.1651	-0.119249	-0.2583	0.0012	-0.0839	0.0537
-0.49	*3.3**	*-3.77**	*-0.98*	*0.2*	*-2.98***	*3.64**

Table 2 reports Fama and MacBeth cross-section regression of DOI on firm level characteristics. The variables are defined in Table 1. Panel A reports the results from univariate regression of DOI on each firm characteristic. Panel B reports the results from the multiple regressions of DOI on multiple firm characteristics in which multiple industry characteristics are included as independent variables concurrently. The time series test statistics are reported in *italics* under the time-series averages of the yearly cross-sectional coefficients for the simple and multiple regressions. *, **, and *** denote statistically significant at the 1%, 5% and 10% level, respectively.

4. Degree of Internationalisation and the Cross-section of Stock Returns

4.1. Empirical Results Based on Firm Level Regressions

To empirically examine the relationship between firm degree of internationalisation and the cross-section of stock returns, I adopt Fama-MacBeth regressions of monthly individual stock returns on DOI (based on the ratio of foreign sales to net sales) and other firm level characteristics. In particular, I estimate the following cross-section regression each month over a period of 12 years from 1999 to 2010:

$$R_i = \gamma_0 + \gamma_1 DOI_i + \gamma_2 Post.Beta_i + \gamma_3 Ln(Size)_i + \gamma_4 Ln(B/M)_i + \gamma_5 Leverage_i + \gamma_6 Momentum_i + \gamma_7 PMCi + u_i$$

Where the subscript i denotes firm-level data and the number of companies is 566; $Momentum_i$ is the past one-year return for each firm; firms within the same DataStream level-6 industry have the same *PMC*. Table 3 presents estimation results from Fama-MacBeth regressions of firm-level returns. The results in Panel A are based on bivariate regressions of stock returns on individual firm level characteristics (simple correlations), while the results in Panel B are based on multiple regressions of stock returns on DOI after controlling for various characteristic variables (conditional correlations). I report t-statistics in *italic* under the time-series average coefficient estimates of the annual cross-section regressions.

As shown in Panel A of Table 3, the time-series average coefficient of DOI is positive and statistically significant at the 10% level, indicating that firms with higher degree of internationalisation earn higher risk-adjusted returns. The relationship between DOI and stock returns remains significantly positive after accounting for various risk factors and stock market anomalies as shown in Panel B of Table 3. For instance, rows (1 to 4) in Panel B show that the time-series average coefficients estimates of DOI are positive and statistically significant at the 5%-10% levels after accounting for post ranking beta, size, book-to-market ratio, leverage, and momentum concurrently. The results suggest that firms with higher degree of

internationalisation earn, on average, higher risk-adjusted returns than those firms with low degree of internationalisation. The results mimic my findings in Section 3.1 in that the mean value of stock returns increases from the least DOI quintile to the highest DOI quintile. An explanation is that investors in firms with higher degree of internationalisation require positive return premium for the greater political, foreign exchange, and competitive risks involved in international markets. Interestingly, the last row in Panel B shows that when I account for product market competition PMC in addition to other risk factors, the time-series average coefficient estimate of DOI decreases dramatically in significance and magnitude to reach 0.00275, suggesting that the effect of product market competition absorbs the effect of DOI on stock returns. The results also raise an interesting question as to how the product market competition interacts with firms' degree of internationalisation to explain stock returns. A further explanation on how does the interaction term between firm degree of internationalisation DOI and product market competition PMC explains stock returns is shown in Table 5.

In addition, the results indicate that post-ranking beta is not related to the cross-section of stock returns in all single and multiple regressions. There is also an evidence of size effect, as the average coefficient estimates for Ln(Size) are significantly negative at the 1% when controlling for DOI and other firm characteristics. The results suggest that firms with larger size earn lower stock returns. The results are consistent with Hussain, Toms, and Diacon (2002), Charitou and Constantinidi, (2003), and Leledakis, Davidson and Smith (2004) that show the existence of size premium in the UK stock market.

Moreover, there is strong evidence of growth effect, as the average coefficient estimates for Ln(B/M) are all significantly negative at the 1% level, suggesting that stocks with lower book-to-market ratio earn higher abnormal returns. The results are also consistent with Malin and Veeraraghavan (2004), and Hashem (2010), which document a significant growth effect in

the UK stock market, but are in contrast to Hou and Robinson (2006), which finds a strong value effect for the US stocks.

Furthermore, there is a negative (positive) relationship between leverage (momentum) and stock returns. The results indicate that highly levered firms earn lower stock returns, while firms with larger stock returns in previous period continue to experience positive returns in current period. The results are consistent with Muradoglu and Whittington (2001), and Sivaprasad and Muradoglu (2009) with regard to the leverage effect in the UK stock market, and in line with Liu, Strong, and Xu (1999), and Hon and Tonks (2003) regarding the momentum effect in the UK stock market.

Finally, the product market competition measure is negatively and significantly related to the cross-section of individual stock returns, as the average coefficient estimate for PMC is statistically significant and negative. The results suggest that firms with higher product market competition earn, on average, lower risk-adjusted returns than firms with lower product market competition. An explanation is that firms with lower product market competition extensively engage in innovation and face higher distress risk and therefore earn higher stock returns. The results are consistent with Gallagher and Ignatieve (2010), which shows that highly competitive industries earn lower stock returns in the Australian stock market, but in contrast to Hou and Robinson (2006) and Hashem (2010) in both the US and UK markets respectively, which report a negative relationship between industry concentration and stock returns.

Table 3. Fama-Macbeth Cross-Sectional Regressions of Firm-Level Returns

Panel A: Simple Regressions

DOI	***PostBeta***	***Ln(Size)***	***Ln(B/M)***	***Leverage***	***Momentum***	***PMC***
0.00435	-0.002852	-0.000922	-0.007684	-0.001627	0.029669	-0.041655
*1.86***	*-0.78*	*-1.5*	*-5.18**	*-3.27**	*3.09**	*-3.06**

Panel B: Multiple Regressions

DOI	***PostBeta***	***Ln(Size)***	***Ln(B/M)***	***Leverage***	***Momentum***	***PMC***
0.00631	-0.002737	-0.000944				
*2.75**	*-0.75*	*-1.74****				
0.00582	-0.002295	-0.002440	-0.009596			
*2.55***	*-0.64*	*-4.05**	*-6.68**			
0.00448	-0.002032	-0.001800	-0.010197	-0.001925		
*1.76****	*-0.56*	*-2.8**	*-6.85**	*-4.25**		
0.00431	-0.002627	-0.000203		-0.001560	0.019698	
*1.66****	*-0.7*	*-0.34*		*-3.61**	*2.08***	
0.00275	-0.001698	-0.002026	-0.010441	-0.002046	0.016394	-0.038928
1.09	*-0.46*	*-3.12**	*-6.98**	*-4.36**	*1.76****	*-2.78**

Table 3 presents Fama and MacBeth cross-section regression of firm level returns on DOI and firm level characteristics. Particularly, individual companies' returns are regressed on DOI, and individual companies' characteristics including post-ranking beta based on the methodology of Fama and French (1992), Ln(Size), Ln(B/M), Leverage, past 12 months returns (Momentum), and product market competition PMC. The numbers in *italics* are the time-series of the test statistics, while all other numbers represent the time-series average of the cross-sectional coefficients. *, **, and *** denote statistically significant at the 1%, 5% and 10% level, respectively.

4.1. Empirical Results Based on Industry Level Regressions

To further investigate the relationship between degree of internationalisation and stock return, I implement Fama-MacBeth regressions of monthly industry-level returns on industry degree of internationalisation Ind.DOI and other industry level characteristics. The cross-section regression is as follows:

$$R_j = \phi_0 + \phi_1 Ind.DOI_j + \phi_2 Ind.Beta_j + \phi_3 Ind.(Size) + \phi_4 Ind.Ln(B/M)_j + \phi_5 Ind.Leverage_j + \phi_6 Ind.Momentum_j + \phi_7 PMC_j + u_j$$

Where the subscript j denotes industry-level data and the number of industries is 76; $Ind.DOI_j$ is the industry degree of internationalisation (based on the ratio of industry foreign sales to industry net sales); $Ind.Beta_j$ is the post-ranking industry beta; $Ind.(Size)_j$ is the logarithm of the market value of equity for industry j; $Ind.Ln(B/M)_j$ is the logarithm of industry book-to-market equity ratio; $Ind.Leverage_j$ is the industry leverage ratio; $Ind.Momentum_j$ is the past one-year return for industry j; and PMC_j is the product market competition for the industry j. The results in Panel A of Table 4 are based on bivariate regressions of industry average returns on individual industry level characteristics (simple correlations), while the results in Panel B are based on multiple regressions of industry average returns on industry In.DOI after controlling for various industry characteristic variables (conditional correlations). I report t-statistics in *italic* under the time-series average coefficient estimates of the annual cross-section regressions.

As shown in Table 4, in line with firm level results, the time-series averages of the cross-sectional coefficients of Ind.DOI are positive and statistically significant at the 5-10% level with or without accounting for other industry characteristics (Panel A and rows 1 to 4 in Panel B). Interestingly, when I account for product market competition (PMC) in addition to other industry characteristics (last row in Panel B), the time-series average coefficient estimate of industry degree of internationalisation Ind.DOI drops in significance and magnitude and becomes statistically insignificant. All taken together, the results suggest that industries with higher

degree of internationalisation earn, on average, higher risk-adjusted returns than those with lower degree of internationalisation. However, introducing product market structure into the regression absorbs the effect of industry DOI on stock returns, leading to further illustrate how product market competition (PMC) interacts with industry degree of internationalisation (Ind.DOI) to explain stock returns. Detailed explanation on how degree of internationalisation interacts with product market competition is shown in Table 5.

The results indicate that industry average returns are significantly related with industry average size, industry book-to-market equity, industry leverage, and product market competitions, which is consistent with firm level results reported in Table 3. The results also show that both momentum and industry beta are not priced for the cross-section of industry average returns. The results suggest the industries with higher degree of internationalisation, smaller size, higher earnings potential, lower level of debts and uncompetitive market structure earn, on average, higher risk-adjusted returns. The results are consistent with prior studies in the UK stock market. For instance, Hussain, Toms, and Diacon (2002), Charitou and Constantinidi, (2003), and Leledakis, Davidson and Smith (2004) report the existence of small firm size. Malin and Veeraraghavan (2004) also document the growth effect indicating that stocks with low book-to-market ratio earn higher returns. In addition, Muradoglu and Whittington (2001); and Sivaprasad and Muradoglu (2009) find a negative relationship between leverage and stock returns. Finally, Gallagher and Ignatieve (2010) show that the Australian firms in highly competitive industries earn higher stock returns. Conversely, Hou and Robinson (2006) and Hashem (2010) in the US and UK respectively stock markets show that highly concentrated industries earn higher stock returns.

Table 4. Fama-Macbeth Cross-Sectional Regressions of Firm-Level Returns

Table 3. Panel A: Simple Regressions

Ind.DOI	*Ind. Beta*	*Ind.(Size)*	*Ind. (B/M)*	*Ind. Leverage*	*Ind. Momentum*	*PMC*
0.00883	-0.001949	-0.000945	-0.00562	-0.001417	0.03331	-0.041655
*2.28***	*-0.45*	*-1.51*	*-2.67**	*-1.96****	*1.85****	*-3.06**

Table 3. Panel B: Multiple Regressions

Ind.DOI	*Ind. Beta*	*Ind.(Size)*	*Ind. (B/M)*	*Ind. Leverage*	*Ind. Momentum*	*PMC*
0.00833	-0.0019213	-0.001097				
*2.25***	*-0.45*	*-1.79****				
0.00772	-0.0018635	-0.002145	-0.007303			
*2.13***	*-0.44*	*-3.01**	*-3.46**			
0.00726	-0.001808	-0.001963	-0.007681	-0.0011884		
*1.95****	*-0.42*	*-2.69**	*-3.57**	*-1.52*		
0.00833	-0.0013347	-0.001101		-0.0012847	0.0235177	
*2.14***	*-0.31*	*-1.66****		*-1.72****	*1.41*	
0.00194	-0.000317	-0.002820	-0.008455	-0.0014922	0.0170786	-0.0498327
0.5	*-0.08*	*-3.85**	*-4.01**	*-1.95****	*1.04*	*-3.8**

Table 4 presents Fama and MacBeth cross-section regression of industry level returns on industry degree of internationalisation Ind.DOI, and industry average characteristics. Particularly, industry average returns are regressed on Ind.DOI, PMC, and industry average values of: post-ranking beta based on the methodology of Fama and French (1992), Ln(Size), Ln(B/M), Leverage, and past 12 months returns (Momentum). The numbers in *italics* are the time-series of the test statistics, while all other numbers represent the time-series average of the cross-sectional coefficients. *, **, and *** denote statistically significant at the 1%, 5% and 10% level, respectively.

4.2. Product Market Competition and Firm Degree of Internationalisation

Based on the empirical findings in the last row of Panel B in both Tables 3 and 4 which show that the coefficient of DOI drops in significance and magnitude when controlling for product market competition and other firm characteristics, this section intends to empirically analyse the interaction between product market competition and firm degree of internationalisation.

Because multinational firms are better able to capture the benefits of internationalisation via reducing the risk of competitive pressures induced by their rivals in domestic markets, a potential incentive for firms to internationalise rises when firms face higher competitive pressures by their domestic rivals. Hamel and Prahalad (1985); and Kim et al (1993) indicate that firms with multinational bases have the opportunity to capture the benefits of operating in international markets via reacting against any destructive moves by their domestic competitors and reducing the risk of competitive pressures induced by their domestic competitors**.** As a result, it would be also essential to study how firms' degree of internationalisation interacts with product market competition in explaining stock returns.

To empirically examine how product market competition interacts with firms' degree of internationalisation to explain stock returns, Panel A of Table 5 presents estimation results for Fama-MacBeth regressions of monthly individual stock returns on DOI, Post.Beta, Ln(Size), Ln(B/M), Leverage, Momentum, PMC, and the interaction term between product market competition and firms' degree of internationalisation PMC X DOI. The results in Panel A of Table 5 show that the coefficients on firm level characteristics remain similar in significance and magnitude compared with those reported in Table 3. The only exception is that the coefficient of PMC drops in significant and magnitude and becomes statistically insignificant. Since the coefficient of DOI is positive and statistically significant, and the coefficient of PMC is negative and statistically insignificant, a negative coefficient on the interaction term PMC X DOI

indicates that with increasing DOI, average stock returns decrease for highly competitive industries. However, the increase in DOI will lead to a higher stock returns for less competitive industries (industries with lower product market competition). The results also suggest that with decreasing DOI, the average stock returns decrease for highly competitive firms and increase for less competitive firms.

Panel B of Table 5 reports the value weighted average of stock returns across both product market competition and degree of internationalisation quintiles. In particular, in each year, I group the stocks independently into quintiles according to DOI values (degree of internationalisation quintiles) and PMC (product market competition quintiles). Afterwards, within each of the internationalisation-competition quintiles, I calculate the average value weighted of monthly stock returns.

As shown in Panel B of Table 5, the monthly average returns for individual companies decrease with increasing product market competition across all internationalisation quintiles of DOI. For instance, the monthly average returns for firms with highly competitive market structure is (0.383%), while firms with less competitive market structure earn (1.108%) monthly average returns across all DOI quintiles. The results also seem to suggest differences on average stock returns depending firms degree of internationalisation. For instance, when firm degree of internationalisation increases, the increase in product market competition leads to a decrease in average stock returns. While the increase in the degree of internationalisation indicates higher average returns for firms with higher product market competition (0. 529% for Q1 rises to 0.801% for Q5), it also leads to an increase in monthly average returns for the firms with less competitive market structure (1.023% for Q1 rises to 1.327% for Q5). The spread in monthly returns associated with product market competition is on average (0.725%) and is the largest among the firms with the highest degree of internationalisation. Overall, the results suggest that firms with similar product market competition diverge with respect to their degree of

internationalisation. Particularly, companies with higher product market competition and with higher degree of internationalisation earn on average higher returns compared to companies with higher product market competition and lower degree of internationalisation. On the other hand, companies that operate in less competitive market earn on average higher stock returns when they have a higher degree of internationalisation compared to companies that operate in less competitive market and have a lower degree of internationalisation.

In conclusion, firms with highly competitive pressure earn lower stock returns compared with firms with less competitive pressures. Regardless to firms' product market competition, firms that have higher degree of internationalisation encounter many sources of risks in international markets, leading to a higher risk exposures and consequently to a higher stock returns. If firms with higher competitive market structures choose to escape competition by having higher degree of internationalisation, firms operating in higher competitive market structure earn higher returns due to the risks involved in operating internationally. Similarly, if firms with less competitive market structure choose to exploit the benefit of internationalisation and diversify their cash flow sources, firms with higher degree of internationalisation will face higher risk in international markets and earn higher returns.

Table 5. Panel A: Fama-MacBeth Cross-Sectional Regression

DOI	*PostBeta*	*Ln(Size)*	*Ln(B/M)*	*Leverage*	*Momentum*	*PMC*	*DOI X PMC*
0.0004254	-0.001649	-0.002055	-0.010465	-0.00195	0.0169568	-0.019	-0.0004545
*1.76***	*-0.45*	*-3.2**	*-6.97**	*-4.11**	*1.81****	*-0.97*	*-1.66****

Table 5. Panel B: Value-Weighted Average Returns of DOI and PMC Sorted Portfolios

DOI Quintiles	**PMC Quintiles**					
	Q1 (Low)	***Q2***	***Q3***	***Q4***	***Q5 (High)***	***All***
Q1 (Low)	0.01023	0.00966	0.00319	0.00925	0.00529	0.00735
	*6.86**	*4.87**	*1.73****	*4.99**	*3.17**	*9.32**
Q2	0.00306	0.00913	0.01528	0.01774	-0.00198	0.00864
	0.33	*0.85*	*2.91**	*2.08***	*-0.29*	*2.54***
Q3	0.00939	0.00770	0.00094	0.00393	0.00347	0.00465
	*2.75**	*2.89**	*0.34*	*1.45*	*1.21*	*3.61**
Q4	0.01048	0.00919	0.01066	0.00241	-0.00069	0.00667
	*3.82**	*4.53**	*3.83**	*0.95*	*-0.21*	*5.63**
Q5 (High)	0.01327	0.00695	0.00808	0.00043	0.00801	0.00885
	*6.81**	*2.55**	*3.48**	*0.12*	*2.04***	*7.46**
All	0.01108	0.00868	0.00559	0.00573	0.00383	0.00723
	*10.57**	*7.56**	*4.87**	*4.64**	*3.09**	*9.50**

Panel A shows the results from monthly Fama and MacBeth cross-sectional regressions of individual stock returns on DOI, Post.Beta, Ln(Size), Ln(B/M), Leverage, Momentum, PMC, and the interaction term between PMC X DOI. Panels B reports the value weighted average of stock returns across both PMC and DOI sorted portfolio quintiles with their t-statistics. In each year, stocks are grouped independently into quintiles according to DOI values (degree of internationalisation quintiles) and PMC (product market competition quintiles). Afterwards, within each of the internationalisation-competition quintiles, I calculate the average value weighted of monthly stock returns. The row (column) entitles All reports average returns of product market competition quintiles (degree of internationalisation quintiles) across competition quintiles (internationalisation quintiles). Numbers in italics are t-statistics. *, **, and *** denote statistically significant at the 1%, 5% and 10% level, respectively.

5. Conclusion

In this paper, I empirically examine the relationship between degree of internationalisation and the cross-section of stock returns using 566 multinational listed companies in the London stock exchange during 1999 and 2010. I test whether firms' degree of internationalisation is a priced risk factor in addition to conventional risk factors and stock market anomalies such as beta, size, book-to-market, leverage, momentum, and product market competition. I find that firms' degree of internationalisation is positively and significantly related to the cross-section of stock returns. The positive relationship between firms' degree of internationalisation remains significantly positive after accounting for beta, size, book-to-market, leverage, momentum, and product market competition. The results are also robust to firm and industry level regressions. The findings indicate that firms with higher degree of internationalisation earn, on average, higher risk-adjusted returns than firms with lower degree of internationalisation. The results also suggest that firms with high product market competition earn higher average returns when they have higher degree of internationalisation. Similarly, firms with lower product market competition earn, on average, higher stock returns if they have higher degree of internationalisation. The results imply that if firms with higher competitive market structure choose to escape competition by internationalisation, they will have higher risk exposures to different sources of risks in international market that lead to a higher stock returns. In addition, if firms with less competitive market structure choose to benefit from internationalisation through cash flow diversification, they will also face higher risks in international market and consequently earn higher risk-adjusted returns. An explanation is that investors in firms with high degree of internationalisation require positive return premium for greater political, foreign exchange, and distress risks associated with international markets.

In addition, I find that there is size effect in the UK stock market. Smaller firms or industries tend to earn, on average, higher stock returns. Moreover, there is a strong evidence of growth effect in the UK market. Firms or industries with lower book-to-market ratio earn higher

stock returns. I also document a negative relationship between leverage and industry-firm level returns. Highly levered firms or industries earn lower stock returns. In addition, I report that firms with larger returns in previous year continue to have positive returns in the current year, while momentum effect disappears at industry level regression. Furthermore, I find that firms or industries with higher product market competition earn lower stock returns. One explanation is that firms with higher product market competition may reduce the risk of competitive pressures through the benefit of international cash flow diversification and therefore earn lower stock returns in domestic market. Finally, I document that market risk as measured by post-ranking beta for firms and industries are not priced in the cross-section of stock returns.

While this paper provides empirical evidence on the impact of firms' degree of internationalisation on the cross-section of stock return, several extensions should be considered for further research. First, further research should test whether degree of internationalisation explains the time-series variation in stock returns and whether the impact of DOI on time-series of stock returns is subsumed by other risk factors and risk premiums. Second, further research should use another proxy for firms' degree of internationalisation such as foreign assets to total assets, foreign sales, and export sales. Third, the sample used of this study includes listed multinational companies in the UK stock market. Further, research should utilize extensive data set that covers large number of multinational listed firms under different institutional settings.

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