Internationalization and the Cross-section of Stock Returns: Evidence from Multinational Corporations Publicly Listed in the U.K.

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Abstract

The link between internationalization and firm performance is a key issue in international business research. This paper thus proposes two main opposing channels through which the degree of internationalization affects stock returns for multinational corporations (MNCs). In particular, MNCs can benefit from risk reduction through international diversification, yet may be exposed to more risk factors in international markets. Using a sample of 566 MNCs publicly listed on the London Stock Exchange (LSE) during 1999 and 2015, this paper finds that the degree of internationalization positively and significantly correlates to the cross-section of stock returns in all Fama-MacBeth regressions, even after accounting for beta, size, book-to-market, leverage, momentum, and product market competition. In addition, the interaction term between product market competition and internationalization is significantly negative. The results indicate that firms or industries with a higher degree of internationalization earn, on average, higher risk-adjusted returns, but only in less competitive industries.

Key words: internationalization; stock returns; multinational corporations; asset pricing; London Stock Exchange

JEL classifications: G11; G12; L11

1. Introduction

Research into the link between performance and the degree of internationalization (DOI) has reported inconsistent and contradictory results over the last four decades. Errunza and Senbet (1984) and Sullivan (1994) find a positive

linear relationship between a firm's performance and its degree of internationalization (DOI), while Morck and Yeung (1991) and Tallman and Li (1996) present that the relationship does not exist. Hitt et al. (1997) provide evidence that the relationship is inverted U-shaped, while Denis et al. (2002) show that it can be negative. Ruigrok and Wagner (2003) notes that the relationship is U-shaped. However, Contractor et al. (2003) state that the relationship is context dependent and exhibits different shapes in multiple stages. These conflicting results in the literature reinforce the need for more theoretical and empirical analyses in this area.

Building upon the finance literature on asset pricing and stock market anomalies, this paper argues that there are many reasons DOI may be an important risk factor in determining the cross-section of stock returns. For instance, firms operating internationally often make production decisions based on the equilibrium outcome of local and international market forces. Firms also generate cash flows through both domestic and international product markets, implying that the production decisions of multinational corporations (MNCs) are affected by various risk sources, which in turn may affect the riskiness of cash flows and equilibrium rate of returns. Although MNCs with higher DOI face many sources of political and foreign exchange risks, they are able to capture the benefits of cash flow diversification leading to lower risk exposure. For example, MNCs have the capacity to react against destructive moves by competitors and reduce the risk of competitive pressure (Kim et al., 1993).

Using a sample of 566 MNCs publicly listed on LSE between 1999 and 2015, this paper finds that DOI is positively and significantly related to the cross-section of stock returns. In addition, the positive relationship between internationalization and stock returns remains statistically significant, even after accounting for beta, size, book-to-market, leverage, momentum, and product market competition. However, beta is never statistically significant. Firm size, book-to-market, and leverage have a negative effect, while momentum has a positive effect on stock returns. Furthermore, product market competition is negatively and significantly related to stock returns. The interaction term between product market competition and internationalization is significantly negative. 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 DOI earn, on average, higher risk-adjusted returns than companies with lower DOI, but only in less competitive industries. One explanation is that firms in less competitive industries with higher DOI face higher political, foreign exchange, and international competitive risks when operating overseas.

The incremental contributions of this paper are four-fold. First, given that prior literature is inconclusive on whether MNCs are riskier than domestic firms, it is important to test directly whether firm internationalization leads to higher or lower stock returns. Second, extant asset pricing studies have not considered firms' DOI as a potential risk factor that explains stock returns. This paper is one of the first to empirically examine whether internationalization predicts stock returns in a similar

fashion as other well-known risk factors and stock market anomalies. Third, this paper 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. Fourth, this paper is one of the first to examine how DOI interacts with product market competition to explain the cross-section of stock returns.

The paper proceeds as follows. Section 2 discusses two competing channels through which internationalization may affect stock returns. Section 3 explains the data, sample, and measures for internationalization and product market competition, among others. Section 4 reports summary statistics and presents firm-level characteristics across portfolio quintiles sorted by the degree of internationalization. Section 5 carries out Fama-MacBeth cross-sectional regression to examine the relationship between internationalization and stock returns at the firm and industry levels. Section 5 shows how internationalization interacts with product market competition to explain stock returns. Section 6 concludes with recommendations for further research.

2. Theoretical Analysis

One of the most important issues in investment is estimating the risk-return relationship, which posits that risky investments should be rewarded with higher returns compared to risk-free investments. It is with the development of rational assets pricing theories that economists have become capable of measuring the risk-return trade-off. In this regard, rational theories of asset pricing can explain stock returns by identifying the source of risk factors supported by theoretical assumptions - for example, the celebrated Capital Asset Pricing Model (CAPM) proposed by Sharpe (1964), Intertemporal Capital Asset Pricing Model (ICAPM) by Merton (1973), and Arbitrage Pricing Theory (APT) by Ross (1976). In addition, Berk (1995) advances theoretical assumptions to justify the ability of market capitalisation in explaining expected stock returns. Holmström and Tirole (2001) develop a liquidity asset pricing model (LAPM) based on corporations' desire to hoard liquidity.

Research into the determinant of stock returns reports many stock market anomalies that are contradictory with the predictions of rational asset pricing theories. For instance, in the U.S. stock markets, Basu (1977) detects the effect of the earning-to-price (E/P) ratio on average stock returns. Banz (1982) documents size effect. Rosenberg et al. (1985) observe the existence of the value effect (book-to-market ratio). Fama and French (1992) show that size and the 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. Kothari et al. (1995) and Shumway (1997) document that the three-factor model may suffer from data snooping and survivorship bias. Conversely, Barber and Lyon (1997) note that the three-factor model is valid using bias-free data. Jegadeesh

and Titman (1993) and Lakonishok et al. (1994) report the existence of momentum and value stock strategies in the U.S. Hou and Robinson (2006) find that U.S. firms in highly competitive industries earn on average higher stock returns than firms in highly concentrated industries. Fama and French (2015) introduce a new five-factor model that captures profitability and investment patterns, in addition to traditional size and value characteristics. Hou et al. (2015) also present that asset returns exhibit strong profitability and investment effects.

In contrast to the widely documented stock market anomalies in the U.S., many empirical studies on the U.K. market have obtained ambiguous results. For instance, while Miles and Timmermann (1996), Strong and Xu (1997), and Malin and Veeraraghavan (2004) find no evidence of the size effect in asset returns, Charitou and Constantinidi (2003) and Leledakis et al. (2004) note that small firms on average earn higher returns. While Liu et al. (1999) find that the momentum effect plays a vital role, Hon and Tonks (2003) reveal that momentum is not a general feature of the U.K. market. While Muradoglu and Wittington (2001) state that leverage is negatively related to stock returns, Sivaprasad and Muradoglu (2009) show that leverage is positively related to stock returns in the utility sector and negatively related to stock returns in consumer goods and industrial sectors. Gregory et al. (2013) offer that the Fama-French three-factor model has only limited applicability in the U.K. market. Hashem and Su (2015) find that there exists a negative relationship between industry concentration and stock returns in the U.K.

Prior studies on MNCs specify two main competing channels through which DOI may influence firms' systematic risk and therefore affect stock returns. The first channel through which DOI may affect stock returns is through the theory of diversification. We denote this as the international diversification channel for stock returns. Shapiro (1978) states that because MNCs operate in both domestic and foreign markets, they are better able to diversify cash flows relative to firms with less international exposure. Hence, MNCs' returns are less correlated with domestic market returns, leading to 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 MNCs face higher risks and earn higher risk-adjusted returns. Fatemi (1984) indicates that MNCs do not earn abnormal returns unless they operate in a highly competitive foreign market. In contrast, Michel and Shaked (1986) find that MNCs face less systematic risk and consequently earn lower risk-adjusted returns. Thus, this paper proposes the following hypothesis.

Hypothesis 1:   A higher degree of internationalization for an MNC is associated with lower systematic risk, which leads to lower expected stock returns.

The second channel through which DOI may influence stock returns is through exposure to various risk sources in international markets where MNCs operate. We call this the international market risk channel for stock returns. In fact, as companies expand internationally, they face various risk factors such as foreign exchange risk, political risk, and competitive risk from local businesses. Dumas and Solnik (1995) show that MNCs are more exposed to foreign exchange risk than

domestic firms. In particular, higher DOI leads to higher exposure to foreign exchange fluctuations and therefore higher variability of foreign returns in domestic currency. Burgman (1996) presents that firms operating internationally encounter political risks in the host country such as tightened regulations, tax payments, restrictions on foreign remittance, war, confiscation and military coups. Moreover, MNCs encounter higher risk through competitive pressures exerted by domestic companies in host countries, as those domestic companies are more familiar with local businesses and operational environment. Finally, Lee and Kwok (1988) argue that higher DOI may introduce difficulties in monitoring foreign operations and controlling managers in international markets, leading to higher risk exposure for cash flows and hence to higher required returns by equity investors. Thus, this paper proposes the following alternative for Hypothesis 1.

Hypothesis 1A: A higher degree of internationalization for an MNC is associated with higher exposure to international market risk factors, which leads to higher stock returns.

The aforementioned two opposing channels show that while greater DOI may reduce firm risks through the channel of cash flow diversification, it may also lead to higher political, foreign exchange, and local competitive risks that increase the volatility of MNCs' cash flow. Therefore, whether and to what extent DOI affects stock returns is an open empirical question to be further studied in this paper.

In addition to proposing DOI as a new risk factor for asset pricing, this paper argues that product market competition (PMC) may impact the relationship between DOI and stock returns. It is well-known that firms operating internationally generate cash flows not only through their domestic product markets, but also through international product markets. Thus, the process of internationalization is influenced by specific factors that may depend on the level of industry competition. In highly competitive industries, internationalization through marketing products and services globally or through foreign direct investments may be the last resort for a firm to survive, indicating that a higher level of internationalization is no longer associated with a higher level of risk, and so the relationship between DOI and stock returns can be flat or even negative. However, in less competitive industries, international markets may increase the riskiness of cash flows and consequently increase the equilibrium rate of returns for MNCs, as risks of operating internationally outweigh the diversification benefits. In particular, although MNCs in less competitive industries have more domestic market power, it can be significantly eroded when operating internationally. Additional sources of political and foreign exchange risks that accompany higher DOI reduce the benefits of cash flows diversification. Therefore, this paper proposes the following hypothesis.

Hypothesis 2: The relationship between DOI and stock returns depends on product market competition. In highly competitive industries, DOI is negatively related to the cross-section of stock returns, while in less competitive industries DOI is positively related to the cross-section of stock returns.

3. Data and Variables

3.1 Data

The sample used in this paper is unbalanced panel consisting of 566 MNCs publicly listed on the London Stock Exchange (LSE) during 1999 and 2015.   We collect data on monthly share returns and accounting information from Thomson Reuters Eikon and Datastream.   We also use the most detailed level 6 industry classification code consisting of 76 industries to calculate the proxy for product market competition.

Consistent with prior studies, we exclude the following firms from our sample: (1) de-listed companies; (2) financial companies, including banks, investment trusts, insurance companies, and property companies; (3) companies with negative a book-to-market-ratio; and (4) companies without positive foreign sales.   To ensure that accounting information is available prior to equity data and thus reflected in stock prices, we follow Fama and French (1992) and collect data on the market value of equity, book-to-market ratio, leverage, total assets, and net sales at the fiscal year ending in t-1.   We 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 (see also Hou and Robinson, 2006).   In addition, for each company included in the sample within a given year, we require it to have monthly share return data during the previous 3-5 years so that we can estimate its market beta and calculate its post-ranking beta.

For each company in each year, we collect information on the following accunting 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 book value of equity; (4) ASSETS is the book value of total assets; (5) SALES is net sales revenue defined as total sales minus customer returns and other deductions; (6) R&D is research and development expense; (7) R&D/A is the ratio of R&D expenses 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 (the difference between sales and total operating expenses) to net sales; and (10) POSTBETA is the post ranking beta constructed using the Fama and French (1992) methodology.

To calculate the post ranking beta, we group stocks in each year into 100 size-beta portfolios.   We then calculate the post ranking average monthly returns for each of the 100 size beta portfolios over the next 12 months during years t and t+1.   We next regress the post-ranking average monthly returns of 100 size-beta portfolios on market returns over the 12-month period.   Finally, we 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.

3.2 Key Variables

This paper examines the effect of internationalization on stock returns and tests the joint effect of product market competition and internationalization in explaining stock returns. We construct measures for internationalization and product market competition as follows.

Degree of Internationalization (DOI): Consistent with prior studies (e.g. Singh and Nejadmalayeri, 2004, among others), we utilize foreign sales as a percentage of net sales (FSTS) to measure DOI. This measure represents the extent to which a firm is related to its operational activities in international markets for generating revenues. A higher percentage of foreign sales to net sales indicates that a firm extensively engages in cross border operations to generate revenues (higher DOI), while a lower percentage of foreign sales to net sales means that a firm depends on domestic market operations to generate revenues (lower DOI).

Product Market Competition (PMC): Following Aghion et al. (2005), we use the Lerner Index represented by operating profit margin as a measure of price cost margin. Operating profit margin is the ratio of operating income to net sales or revenues. Our measure of PMC_{jt} is the average Lerner Index across firms within the industry as follows:

$$PMC_{jt} = 1 - \frac{1}{N}\sum_{i=1}^{N} LI_{ijt}$$

where L_{iijt} represents the Lerner Index of firm *i* in industry *j* for year *t*, and *N* is the number of firms in industry *j*. PMC ranges between 0 and 1. A PMC value of 1 indicates perfect competition, while a value of 0 indicates complete monopoly.

4. Degree of Internationalization and Firm Characteristics

4.1 Firm Average Characteristics and DOI Quintiles

Table 1 contains descriptive statistics for the unbalanced panel from 1999-2015. As shown in the panel, an average firm in the sample has DOI with a mean (median) of 33.9% (20.6%). The average industry DOI (Ind.DOI) is similar to firm DOI, but with a higher median (28.2%). The results indicate that the sample of publicly listed U.K. MNCs during 1999 and 2015 has low DOI. Although firm DOI and industry DOI have the same mean values, the former has a higher standard deviation. In addition, the spread in firm DOI is larger than Ind.DOI. For instance, DOI ranges between 0 (indicating low DOI) and 1427.6% (indicating high DOI). The lowest DOI decile (lowest 10%) has an average DOI of 0, while the highest DOI decile (top 90%) has an average of 88.8%. Regarding product market competition measure PMC, the lowest PMC decile (lowest 10%) has an average PMC of 0.806, while the highest PMC decile (top 90%) has an average of 0.945, indicating that the sample U.K. MNCs face great competition during 1999 and 2015.

Table 1. Summary Statistics of Firms' Degree of Internationalization Measure

No.	Mean	Median	SD	Max	Min
Firms' Degree of Internationalization DOI	33.908	20.630	45.843	100.00	0.236
Industry Degree of Internationalization	33.908	28.252	27.638	78.58	0.266
Product Market Competition PMC	0.884	0.908	0.073	0.977	0.434
	P10	**P25**	**P75**	**P90**	
Firms' Degree of Internationalization DOI	4.885	14.68	61.43	88.83	
Industry Degree of Internationalization	5.343	16.002	45.840	71.023	
Product Market Competition PMC	0.806	0.865	0.929	0.945	

Table 2 reports average firm- and industry-level returns as well as firm average characteristics across DOI sorted quintile portfolios constructed based on firms' DOI values. We calculate industry returns at the 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 firms with the lowest DOI ratios, while quintile 5 corresponds to the highest 20% of firms with the highest DOI ratios.

Table 2. Characteristics of Firms' Degree of Internationalization Sorted Portfolio Quintiles

Rank	DOI	Fir Ret	Ind. Ret	Size	Assets	Sales
Low	0.08	0.00735	0.00714	243.59	311335	306900.90
Q2	5.26	0.00864	0.00426	980.01	1071290	1203157
Q3	19.24	0.00465	0.00533	1268.05	1302068	1603532
Q4	49.87	0.00667	0.00708	2168.31	2354686	1968665
High	87.62	0.00885	0.00901	4334.03	4173933	3487435
Rank	**R&D**	**R&D/A**	**PMC**	**Lev.**	**B/M**	**Post.Beta**
Low	1381.46	0.025	0.8952	3.00	0.83	0.65
Q2	7539.42	0.046	0.9066	3.04	0.61	0.69
Q3	22573.28	0.036	0.8978	3.35	0.61	0.83
Q4	61190.96	0.032	0.8954	3.50	0.57	1.00
High	112934.40	0.031	0.8506	3.78	0.62	1.01

A quick inspection of Table 2 uncovers a number of interesting findings. First, the mean returns for both firm and industry levels increase from Q1 to Q5, suggesting that firms in high internationalization quintiles earn, on average, higher returns than those in low internationalization 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 favor the assumption that firms with higher DOI earn, on average, higher returns than firms with low DOI.

Second, the results show that firms with higher DOI have, on average, greater

size, total assets and net sales. 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 an 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 quintiles 3, 4, and 5 respectively. The findings seem to advocate that firms with higher DOI spend less on innovations. The results also show that the average PMC decreases slightly 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 DOI have a slightly less competitive market structure.

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 the highest DOI quintiles are riskier than those in the 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 DOI leads to a higher risk.

4.2 Regressions of Degree of Internationalization on Firm-level Characteristics

To examine the relationship between DOI and firm-level characteristics without quintile limits, we apply the Fama-MacBeth two-step procedure. In the first step, we estimate the following cross-section regression for each single year from 1999 to 2015:

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

where DOI_{it} is 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, the logarithm of total assets, the logarithm of net sales, the product market competition to which industry j a firm belongs, leverage, the logarithm of book-to-market equity ratio, and post-ranking beta. In the second step, we calculate the time-series average of test statistics as well as the time-series average of cross-sectional coefficient estimates.

Table 3 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 on all characteristic variables. We report *t*-statistics in italics

under the time-series average coefficient estimates of the annual cross-section regressions.

Table 3. Fama and MacBeth Regressions of DOI on Firm Characteristics

Ln(Size)	Ln(Assets)	Ln(Sales)	PMC	Lev.	Ln(B/M)	PostBeta
Panel A: Simple Regressions						
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						
			-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*

As shown in Table 3, 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 we 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) turns statistically insignificant. The results suggest that firms with higher DOI are larger, have higher book value of assets, and have higher net sales than those with lower DOI, which are consistent with the reported findings in the previous section.

Depending on control variables, the coefficient estimates for LEV are significantly positive at the 10% to 1% 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, there is strong evidence that DOI is positively related to leverage, but negatively related to book-to-market ratio, indicating that firms with higher DOI, on average, have a 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 all single and multiple regressions except in the last row of Panel B where it becomes statistically insignificant after controlling for all firm characteristics. The results suggest that as the degree of competition increases, firms tend not to internationalize. Finally, the coefficient estimates for Post.Beta are significantly positive at the 1% level in all regressions, indicating that firms with higher DOI appear to be riskier. The findings are in line with those obtained under the quintile analysis in the previous section.

5. Degree of Internationalization and the Cross-section of Stock Returns

5.1 Empirical Results Based on Firm-level Regressions

To empirically examine the relationship between DOI and the cross-section of stock returns, we adopt Fama-MacBeth regressions of monthly individual stock returns on DOI (based on the ratio of foreign sales to net sales) and other firm characteristics. In particular, we estimate the following cross-section regression each month over a period of 17 years from 1999 to 2015:

$$R_i = \gamma_0 + \gamma_1 DOI_i + \gamma_2 Post.Beta_i + \gamma_3 Ln(Size)_i + \gamma_4 Ln(B/M)_i \\ + \gamma_5 Leverage_i + \gamma_6 Momentum_i + \gamma_7 PMCi + u_i \qquad (2)$$

where subscript i denotes firm-level data, the number of companies is 566; $Momentum_i$ is the past one-year return for each firm; and firms within the same DataStream level-6 industry have the same PMC.

Table 4 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). We report *t*-statistics in italics under the time-series average coefficient estimates of the annual cross-section regressions.

Table 4. 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**

As shown in Panel A of Table 4, the time-series average coefficient of DOI is positive and statistically significant at the 10% level, indicating that firms with higher DOI earn higher risk-adjusted returns, which is consistent with Hypothesis 1A (international market risk channel). 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 4. For instance, rows 1 to 4

in Panel B show that the time-series average coefficient estimates of DOI are positive and statistically significant at the 10% to 5% levels after accounting for post-ranking beta, size, book-to-market ratio, leverage, and momentum concurrently. The results suggest that firms with higher DOI earn, on average, higher risk-adjusted returns than those firms with lower DOI.   The results mimic our findings in Section 5.1 in that the mean value of stock returns increases from the lowest DOI quintile to the highest DOI quintile.   An explanation is that investors in firms with higher DOI require a positive return premium for the greater political, foreign exchange, and competitive risk exposures from operating in international markets.   Interestingly, the last row in Panel B shows that when we 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, suggesting that the effect of PMC absorbs the effect of DOI on stock returns.   The results raise an interesting question as to whether PMC interacts with DOI to explain stock returns.

The results in Table 4 indicate that post-ranking beta is not related to the cross-section of stock returns in all single and multiple regressions.   Although beta is unimportant, there is evidence of the size effect, as the average coefficient estimates for Ln(Size) are significantly negative at 1% even after controlling for DOI and other firm characteristics.   The results suggest that larger firms earn lower stock returns and are consistent with Charitou and Constantinidi (2003) and Leledakis et al. (2004), showing the existence of the size premium in the U.K. stock market.

There is strong evidence of the growth effect, as the average coefficient estimates for Ln(B/M) are all significantly negative at the 1% level, suggesting that stocks with a lower book-to-market ratio earn higher abnormal returns.   The results are consistent with Malin and Veeraraghavan (2004), who document a significant growth effect in the U.K. stock market, but are in contrast to Hou and Robinson (2006), who find a strong value effect for U.S. stocks.

Stock returns are negatively related to leverage, but positively related to momentum.   The results indicate that highly leveraged firms earn lower stock returns, while firms with larger stock returns in previous periods continue to experience positive returns in the current period.   The results are consistent with Liu et al. (1999), Muradoglu and Whittington (2001), Hon and Tonks (2003), and Sivaprasad and Muradoglu (2009) with regard to the leverage and momentum effects in the U.K. stock market.

Product market competition is negatively 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 in more competitive industries earn, on average, lower risk-adjusted returns than firms in less competitive industries.   An explanation is that firms with lower PMC may have spent more on innovation.   Because innovation is risky, these firms face higher distress risk and thus command higher expected stock returns.   Our results are consistent with Gallagher et al. (2015), who show that highly competitive industries earn lower stock returns in the Australia stock market, but run contrast to Hou and

Robinson (2006), who report a negative relationship between industry concentration and stock returns in the U.S.

5.2 Empirical Results Based on Industry-level Regressions

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

$$R_j = \emptyset_0 + \emptyset_1 Ind.DOI_j + \emptyset_2 Ind.Beta_j + \emptyset_3 Ind.(Size) + \\ \emptyset_4 Ind.Ln(B/M)_j + \emptyset_5 Ind.Leverage_j + \qquad (3) \\ \emptyset_6 Ind.Momentum_j + \emptyset_7 PMC_j + u_j$$

Here, subscript j denotes industry-level data; the number of industries is 76; $Ind.DOI_j$ is the industry DOI (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 industry j.

The results in Panel A of Table 5 are based on bivariate regressions of industry average returns on industry-level characteristics (simple correlations), while the results in Panel B are based on multiple regressions of industry average returns on In.DOI after controlling for various industry characteristic variables (conditional correlations). We report *t*-statistics in italics under the time-series average coefficient estimates of the annual cross-section regressions.

Table 5. Fama-macbeth Cross-sectional Regressions of Industry-level Returns

Panel A: Simple Regressions						
Ind.DOI	**Ind. Beta**	**Ind.(Size)**	**Ind. (B/M)**	**Ind. Leverage**	**Ind. Momentun**	**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. Momentun**	**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*

As shown in Table 5 and 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 10% or 5% level with or without accounting for other industry characteristics (Panel A and rows 1 to 4 in Panel B). When we account for product market competition in addition to other industry characteristics (last row in Panel B), the time-series average coefficient estimate of Ind.DOI drops in significance and magnitude and becomes statistically insignificant. All taken together, the results suggest that industries with higher DOI earn, on average, higher risk-adjusted returns than those with lower DOI, indicating that Hypothesis 1A cannot be rejected. However, introducing product market structure into the regression absorbs the effect of industry DOI on stock returns. The results are consistent with firm-level regressions in Section 5.1 and suggest that PMC may interact with Ind.DOI to explain stock returns.

Industry average returns are significantly related with average industry size, book-to-market equity, leverage, and PMC, which are consistent with results from firm-level regressions reported in Table 4. However, there is no evidence that either momentum or beta is priced for the cross-section of industry average returns. The results suggest the industries exhibiting higher DOI, smaller size, higher earnings potential, lower level of debt, and less competitive market structure earn, on average, higher risk-adjusted returns. The results are consistent with prior studies in the U.K. stock market. For instance, Charitou and Constantinidi (2003) and Leledakis et al. (2004) report the existence of a small firm effect. Malin and Veeraraghavan (2004) document the growth effect, i.e., stocks with a lower book-to-market ratio earn higher returns. Muradoglu and Whittington (2001) and Sivaprasad and Muradoglu (2009) find a negative relationship between leverage and stock returns. Gallagher et al. (2015) show that Australian firms in highly competitive industries earn higher stock returns. Conversely, Hou and Robinson (2006) and Hashem and Su (2015) show that highly concentrated industries earn higher stock returns in the U.S. and U.K., respectively.

5.3 Product Market Competition and Degree of Internationalization

Based on the empirical findings in the last row of Panel B in Tables 4 and 5, which show that the coefficient estimates for DOI drop in significance and magnitude after controlling for product market competition and other firm characteristics, this section intends to empirically analyze the interaction between PMC and DOI. Panel A of Table 6 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 of DOI and PMC. The results show that the coefficients on firm-level characteristics remain similar in significance and magnitude compared with those reported in Table 5. The only exception is that the coefficient of PMC drops in significance and magnitude and turns 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 indicates that with increasing DOI, average stock returns decrease for highly competitive industries. However, the increase in DOI will lead to 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. Thus, Hypothesis 2 cannot be rejected.

Table 6. Panel A: Fama-macBeth Cross-sectional Regression

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

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

		PMC Quintiles			
Q1 (Low)	Q2	Q3	Q4	Q5 (High)	All
0.01023	0.00966	0.00319	0.00925	0.00529	0.00735
6.86*	4.87*	1.73***	4.99*	3.17*	9.32*
0.00306	0.00913	0.01528	0.01774	-0.00198	0.00864
0.33	0.85	2.91*	2.08**	-0.29	2.54**
0.00939	0.00770	0.00094	0.00393	0.00347	0.00465
2.75*	2.89*	0.34	1.45	1.21	3.61*
0.01048	0.00919	0.01066	0.00241	-0.00069	0.00667
3.82*	4.53*	3.83*	0.95	-0.21	5.63*
0.01327	0.00695	0.00808	0.00043	0.00801	0.00885
6.81*	2.55*	3.48*	0.12	2.04**	7.46*
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 B of Table 6 reports the value weighted average of stock returns across both PMC and DOI quintiles. In each year, we group the stocks independently into quintiles according to DOI and PMC values. Afterwards, within each of the internationalization-competition quintiles, we calculate the average value weighted monthly stock returns. As shown in the table, average monthly returns for individual companies decrease with increasing PMC across all internationalization quintiles. For instance, the monthly average returns for firms with a less competitive market structure is 1.108%, while firms with a highly competitive market structure earn 0.383% monthly average returns across all DOI quintiles. The results also suggest that differences in average stock returns depend on firms' DOI. For instance, when PMC is high (e.g., at PMC quintile 5), an increase in DOI is accompanied by higher average returns (0.529% for Q1, rising to 0.801% for Q5). For firms with a less competitive market structure (e.g., PMC quintile 1), the average monthly stock returns increase from 1.023% for DOI Q1 to 1.327% for DOI Q5. The spread in monthly returns associated with PMC is on average 0.725% and the largest among firms with the highest DOI. Overall, the results suggest that firms with similar PMC diverge with respect to their DOI. In particular, companies with lower PMC and higher DOI earn on average the highest returns compared to companies with higher PMC and lower DOI. The above results substantiate our finding that Hypothesis 2 cannot be rejected.

In summary, firms in highly competitive industries earn lower stock returns

compared with firms in less competitive industries.   Regardless of PMC, firms with higher DOI may have encountered many sources of risks in international markets, leading to higher risk exposures and consequently to higher required returns.   If firms with a less competitive market structure choose to exploit the benefit of internationalization and diversify their cash flow sources, then they may face higher risk in international markets and command higher stock returns.

6. Conclusions

In this paper we empirically examine the relationship between internationalization and the cross-section of stock returns using 566 multinational listed companies on the London Stock Exchange during 1999 and 2015.   We test whether DOI is a new risk factor in addition to beta, size, book-to-market, leverage, momentum, and product market competition.   We find that DOI is positively related to the cross-section of stock returns.   The positive relationship remains significant even after accounting for beta, size, book-to-market, leverage, momentum, and product market competition.   The results are robust to firm- and industry-level regressions.   The findings indicate that firms with higher DOI earn, on average, higher risk-adjusted returns than firms with lower DOI.   We also find that firms with high PMC earn higher average returns when they have higher DOI. Interestingly, firms with lower PMC earn, on average, higher stock returns if they have higher DOI.   The results imply that irrespective of the degree of domestic market competition, firms choosing to increase their internationalization may have been exposed to greater political, foreign exchange, and distress risks associated with operating in international markets, leading to higher required risk premium.

We also find a significant size effect in the U.K. stock market.   Smaller firms or industries tend to earn, on average, higher stock returns.   There is strong evidence of growth effect.   In particular, firms or industries with a lower book-to-market ratio earn higher stock returns.   We also document a negative relationship between leverage and returns.   Highly leveraged firms or industries earn lower stock returns.   There is evidence of the momentum effect - firms with larger returns in the previous year continue to have positive returns in the current year.   However, the momentum effect disappears under industry-level regression. Furthermore, we find that firms or industries with higher product market competition earn lower stock returns.   One explanation is that firms in highly competitive industries may seek to reduce the risk of competitive pressures through the benefit of international cash flow diversification and therefore earn lower stock returns in the domestic market.   Finally, we document that market risk as measured by post-ranking beta is not priced into the cross-section of firm- and industry-level stock returns.

While this paper is one of the first to provide empirical evidence on the impact of internationalization on the cross-section of stock returns, several extensions are possible for further research.   First, future research can test whether DOI explains the time-series variation in stock returns and whether the impact of DOI on the

time-series of stock returns is subsumed by other risk factors and risk premiums. Second, future research can try to construct other proxies for DOI such as foreign assets to total assets, foreign sales, and the number of foreign subsidiaries. Third, this study utilizes MNCs publicly listed in the U.K. stock market. Future research can use a more extensive dataset that covers a large number of MNCs under different institutional settings.

References

Aghion, P., B. Nick, B. Richard, G. Rachel, and H. Peter, (2005), "Competition and Innovation: An inverted-U relationship," *Quarterly Journal of Economics*, 120, 701-728.

Banz, R., (1981), "The Relationship between Return and Market Value of Common Stocks," *Journal of Financial Economics*, 9, 3-18.

Barber, B. and J. Lyon, (1997), "Firm size, Book-to-market Ratio, and Security Returns: A Holdout Sample of Financial Firms," *Journal of Finance*, 52, 875-883.

Basu, S., (1977), "Investment Performance of Common Stocks in Relation to Their Price-Earnings Ratios: A Test of the Efficient Market Hypothesis," *Journal of Finance*, 32, 663-682.

Berk, J., (1995), "A Critique of Size-Related Anomalies," *Review of Financial Studies*, 8, 275-286.

Burgman, T., (1996), "An Empirical Examination of Multinational Capital Structure," *Journal of International Business Studies*, 27, 553-70.

Charitou, A. and E. Constantinidi, (2003), "Size and Book-to-Market Factors in Earnings, Cash Flows, and Stock Returns: Empirical Evidence for the UK," http://ssrn.com/abstract=498243.

Contractor, F. J., S. Kundu, and C. Hsu, (2003), "A Three-Stage Theory of International Expansion: The Link Between Multinationality and Performance in the Service Sector," *Journal of International Business Studies*, 34, 5-18.

Denis, D. J., D. K. Denis, and K. Yost, (2002), "Global Diversification, Industrial Diversification, and Firm Value," *Journal of Finance*, 57, 1951-1979.

Dumas, B. and B. Solnik, (1995), "The World Price of Foreign Exchange Risk," *Journal of Finance*, 50, 445-479.

Errunza, V. R. and L.W. Senbet, (1984), "International Corporate Diversification, Market Valuation, and Size-adjusted Evidence," *Journal of Finance*, 39, 727-743.

Fama, E. and K. R. French, (1992), "The Cross-section of Expected Stock Returns," *Journal of Finance*, 47, 427-465.

Fama, E. and K. R. French, (1993), "Common Risk Factors in the Returns on Stocks and Bonds," *Journal of Financial Economics*, 33, 3-56.

Fama, E. and K. R. French, (2015), "A Five-factor Asset Pricing Model," *Journal of Financial Economics*, 116, 1-22.

Fatemi, A., (1984), "Shareholder Benefits from Corporate International

Diversification," *Journal of Finance*, 43, 1325-1344.

Gallagher, D. R., K. Ignatieva, and J. McCulloch, (2015), "Industry Concentration, Excess Returns and Innovation in Australia," *Accounting & Finance*, 55, 443-466.

Gregory, A., R. Tharyan, and A. Christidis, (2013), "Constructing and Testing Alternative Versions of the Fama–French and Carhart models in the UK," *Journal of Business Finance and Accounting,* 40, 172-214.

Hashem, N. and L. Su, (2015), "Industry Concentration and the Cross-Section of Stock Returns: Evidence from the UK," *Journal of Business Economics and Management*, 16, 769-785.

Hitt, M. A., R. E. Hoskisson, and H. Kim, (1997), "International Diversification: Effects on Innovation and Firm Performance in Product-diversified Firms," *Academy of Management Journal,* 40, 767-768.

Holmström, B. and J. Tirole, (2001), "LAPM: A Liquidity-Based Asset Pricing Model," *Journal of Finance*, 56, 1837-1867.

Hon, M. and I. Tonks, (2003), "Momentum in the UK Stock Market," *Journal of Multinational Financial Management*, 13, 43-70.

Hou, K. and D. Robinson, (2006), "Industry Concentration and Average Stock Returns," *Journal of Finance*, 61, 1927-1956.

Hou, K., C. Xue, and L. Zhang, (2015), "Digesting Anomalies: An Investment Approach," *Review of Financial Studies,* 28, 650-705.

Jegadeesh, N. and S. Titman, (1993), "Returns to Buying Winners and Selling Losers: Implication for Stock Market Efficiency," *Journal of Finance*, 48, 65-91.

Kim, W. C., P. Hwang, and W. P. Burgers, (1993), "Multinationals' Diversification and the Risk-Return Trade-off," *Strategic Management Journal*, 14, 275–286.

Kothari, S. P. and J. Shanken, (1995), "Another Look at the Cross-Section of Expected Returns," *Journal of Finance*, 50, 185-224.

Lakonishok, J., A. Shileifer, and R. Vishny, (1994), "Contrarian Investment Extrapolation, and Risk," *Journal of Finance*, 49, 1541-1578.

Lee, K. and C. Kwok, (1988), "Multinational Corporations vs. Domestic Corporations: International Environmental Factors and Determinants of Capital Structure," *Journal of International Business Studies*, 19, 195-217.

Leledakis, G. N., I. Davidson, and J. Smith, (2004), "Does Firm Size Predict Stock Returns? Evidence from the London Stock Exchange," http://ssrn.com/abstract=492283.

Liu, W., N. Strong, and X. G. Xu, (1999), "The Profitability of Momentum Investing," *Journal of Business Finance and Accounting*, 26, 1043-1091.

Malin, M., and M. Veeraraghavan, (2004), "On the Robustness of the Fama and French Multifactor Model: Evidence from France, Germany, and the United Kingdom," *International Journal of Business and Economics*, 3, 155-176.

Merton, R., (1973), "An Intertemporal Capital Asset Pricing Model," *Econometrica*, 41, 867-888.

Michel, A. and I. Shaked, (1986), "Multinational Corporations versus Domestic

Corporations: Financial Performance and Characteristics," *Journal of International Business Studies*, 17, 89-100.

Miles, D. and A. Timmermann, (1996), "Variation in Expected Stock Returns: Evidence on the Pricing of Equities from a Cross-section of UK Companies," *Economica*, 63, 369-382.

Morck, R. and B. Yeung, (1991), "Why Investors Value Multinationality," *Journal of Business*, 64, 165-187.

Muradoglu, Y. and M. Whittington, (2001), "Predictability of UK Stock Returns by Using Debt Ratios," Cass Business School Research Paper.

Rosenberg, B., K. Reid, and R. Lanstein, (1985), "Persuasive Evidence of Market Inefficiency," *Journal of Portfolio Management*, 11, 9-16.

Ross, S., (1976), "The Arbitrage Theory of Capital Asset Pricing," *Journal of Economic Theory*, 13, 341–360.

Ruigrok, W. and H. Wagner, (2003), "Internationalization and Performance: An Organizational Learning Perspective," *Management International Review*, 43, 63-83.

Shapiro, A., (1978), "Financial Structure and the Cost of Capital in the Multinational Corporation," *Journal of Financial and Quantitative Analysis*, 13, 211-66.

Sharpe, W., (1964), "Capital Asset Prices: A Theory of Market Equilibrium under Conditions of Risk," *Journal of Finance*, 19, 425-442.

Shumway, T., (1997), "The Delisting Bias in CRSP Data," *Journal of Finance*, 52, 327- 340.

Sing, M. and A. Nejadmalayeri, (2004), "Internationalization, Capital Structure, and Cost of Capital: Evidence from French Corporations," *Journal of Multinational Financial Management*, 14, 153–169.

Sivaprasad, S. and Y. Muradoglu, (2009), "An Empirical Test on Leverage and Stock Returns," http://ssrn.com/abstract=1031987.

Strong, N. and X. G. Xu, (1997), "Explaining the Cross-section of UK Expected Stock Returns," *British Accounting Review*, 29, 1-23.

Sullivan, D., (1994), "Measuring the Degree of Internationalization of A Firm," *Journal of International Business Studies*, 25, 325-342.

Tallman, S. and J. Li, (1996), "Effects of International Diversity and Product Diversity on the Performance of Multinational Firms," *Academy of Management Journal*, 39, 179-196.