A research note on multinationality and firm performance: nonparametric frontier analysis

Kevin Grant[1*], Roman Matousek[1], Martin Meyer[1],

Nickolaos G. Tzeremes[2]

[1]*Kent Business School, University of Kent, Canterbury, Kent, CT2 7PE, UK.*
*Corresponding author's e-mail address: K.Grant@kent.ac.uk
[2]*Laboratory of Operations Research, Department of Economics, University of Thessaly, Korai, Volos, Greece.*

Abstract

Purpose

- The study provides a fresh and new insight into the examination of performance-multinationality relationship by overcoming severe methodological constraints of previous research.

Design/methodology/approach

- We estimate firms' efficiency levels in a production function type framework through technical efficiency levels with a nonparametric - Data Envelopment Analysis (DEA). We include in our sample firms from both developed and developing economies, from different national origins, and different sectoral characteristics with a particular focus on Knowledge Intensive Business Services - KIBS and Capital Intensive Business Services – CIBS.

Findings

- The study confirms the existence of the three-stage sigmoid (S-shaped) hypothesis between multinationality and firm performance that is measured through technical efficiency levels.

Originality/value

- We propose the application of different firm's performance measurement providing us with the ability to capture firm's managerial decision process reflecting also crucial aspects of the organizational learning theory.

Keywords: Management, DEA, firm, performance, multinationality

1. Introduction

While economies in the industrialised World are becoming increasingly knowledge and information driven and intensive, much of the work on capturing and measuring organisational performance, especially on transnational comparisons, is still constrained and steeped in the thinking of the manufacturing era (Chatha & Butt, 2015). There is a consensus that a firms' internationalization has a number of business, corporate and social advantages and leads to the improvement of a firm's performance through organizational learning, market expansion, risk diversification, technological transfer, reach and richness of the product and service offering amongst many others (e.g., Johanson & Vahlne, 1977; Kogut, 1985; Porter, 1990; Kobrin, 1991; Dunning, 1993; Kotabe et al., 2002, among others) .

Contemporary empirical research that seeks to measure the impact of the degree of internationalization on firm performance has been rather inconclusive, e.g., Contractor et al (2003) and Contractor (2007). However, it must be mentioned that despite the empirical evidence of a positive effect of internationalization on firm performance there are few early empirical studies providing evidence that the internationalization has no effect on firm performance (Buckley et al., 1997, 1984; Morck & Yeung, 1991). Other threads of research argue that internationalization has either a positive or negative linear relationship associated to a firm's performance. Studies have shown that there is a nonlinear relationship a 'U'-or an inverted 'U'-shape form[1].

Contrary to previous findings, Contractor et al. (2003); Lu and Beamish (2004); Thomas and Eden (2004) and Contractor (2007) demonstrate that the relationship between firm performance and multinationality has three stages and resembles an S-shaped relationship.

This research note extends the work of Kathuria et al. (2008), building on the work of Wu and Barnes (2012) who used Data Envelopment Analysis (DEA) to explore partner performance for selection in the supply chain and the work of Koster and Van Nus (2009), also using DEA, explored the performance of container terminal firms. Hsu et

[1] See Contractor et al., (2003) for an extensive literature review on the subject matter.

al. (2015) also demonstrated a curvilinear U-shaped relationship suggesting the benefits of R&D on internationalization eventually outweigh the costs after critical levels of intensity and diversity had been achieved to enrich firm performance.

These studies all found differences in performance in terms of growth strategies in a range of manufacturing and service firms. By revisiting the concept in a current business landscape Khavul et al. (2012) suggest that a significant difference in the effects of international strategic orientation in terms of overall organisation performance and responsiveness is evident in the business cycle (Navarro et al., 2010).

This research note suggests that the contradictions in earlier research findings and the inconclusiveness of the findings may be due to: an a priori assumption concerning a functional form of the examined relationship by deploying parametric techniques for their analysis is appropriate. This inaccuracy may have led to conflicting results. Second, studies tend to measure a firm's performance by using univariate accounting ratios such as Return on Assets (ROA), Return on Equity (ROE), sales growth, Tobin's Q amongst others. The area of measuring performance tends to be informed by partisan accounting methods, as outlined earlier, which adopt semi at best, often an illusionary objective, short term evaluation (Mouritsen et al., 2009). These partisan ratios do not capture the overall firm performance. Accountants have suggested an array of measures (recorded value, assessed value, earning potential, Return on Investment, etc.) which reflects a disciplinary, historic and current view of what constitutes performance. Operations managers offer a set of measures that reflect how they perceive the world, with stock value, esteem value, replacement value, etc., when taken systemically indicate a view of a firms performance.

Contemporary research in operations management and business evaluation indicate that these accounting ratios are not fit for purpose when seeking to measure a firm 'true' performance. (e.g., Mantere and Ketokivi, 2013; Steigenberger, 2014, among others).

This study is different, as it provides a renewed investigation of the performance-multinationality relationship by taking into account the above mentioned critical issues, by providing supporting evidence on the validity of the three-stage theory of

internationalization as proposed by Contractor et al. (2003). This is timely and of benefit to managers and policy makers for several reasons, presented below.

Unlike the individual accounting ratios, we propose the application of different firm's performance measurement providing us with the ability to capture a firm's managerial decision process reflecting crucial aspects of the organizational learning theory. We measure a firm's performance by estimating the firms' efficiency levels in a production function type framework. Specifically we measure a firm's performance by estimating their technical efficiency levels with a nonparametric technique known as Data Envelopment Analysis (DEA). DEA is often applied to the field of operations management (Wu and Barnes, 2012; de Koster et al., 2009; Ramanathan, 2005; Leachman et al., 2005) to quantity firm performance.

This applied methodological approach tackles the problems highlighted by current studies on measuring firm performance (Mantere and Ketokivi, 2013; Steigenberger, 2014) by providing a comparison, almost meta-analysis, based benchmarking protocol. This allows for the comparison between regression and non-regression based techniques and that area regression based analysis is more robust.

Chen et al. (2015) demonstrate that the DEA approach enables managers to understand their firm performance, a more robust and enriching way than simply relying on accounting and other financial ratios.

The use of efficiency measures is not new in the field of internationalization or operations management for that matter. Assaf et al. (2012) use cost-efficiency measure in their study measuring the effect of multinationality for a sample of retail firms.

To extend and enrich the debate on how to measure and evaluate a firm's performance and to offset earlier methodological issues, we deploy a new time-dependent conditional frontier model (Mastromarco and Simar, 2014) based on the recent advances introduced by Bădin et al. (2012). This allows researchers and evaluators to capture the effect of multinationality. The model is able to address the dynamic effects involved when examining the relationships between efficiency and performance via organizational learning (Assaf et al., 2012). This approach provides us with several

unique modelling advantages when seeking to examine directly the effect of multinationality accommodating in our measurement both firms' efficiency levels and technological disruptive change, which are the two key mechanisms to drive organisational performance improvement. The intellectual contribution relates to unpacking the notion that multinationality contributes to technological change through know-how and know-what in order to bring about efficacy, effective and efficient business practices with regards to the actuality and productivity levels of the firm. To date, there is little research that adequately unpicks the relationship of how multinationality affects firm's technological change.

Our final contribution is that our model is empirical informed, via more comprehensive data set, which extends the methodology shortcoming preened earlier in other studies. The research sample comprises both developed and developing economies, from different national origins, and different sectorial characteristics with a particular focus on Knowledge Intensive Business Services - KIBS and Capital Intensive Business Services (CIBS), rather than solely on manufacturing based firms. As a proxy of firms' multinationality level we are using the Transnationality Index (TNI) calculated by UNCTAD.

Having provided and synthesis of the key issues and how this paper contributes to the current conversations in the area, the next section describes the data and methodology developed. This is followed by the presentation of the empirical data and finally, we conclude this research note with managerial implications of our results.

2. Data and Methodology

2.1. Variable description

In order to attempt to evaluate the nexus and interplay between the degree of multinationality and firm performance we apply a sample of the World's top 100 non-financial firms, ranked by the size of foreign assets[2] from 2001to 2012. The sample includes leading international firms from twenty one countries and twenty nine

[2]The data set has been extracted from World Investment Reports (WIR) issued by UNCTAD. The data can be downloaded from: http://unctad.org/en/Pages/DIAE/World%20Investment%20Report/WIR-Series.aspx.

industries. The sample's characteristics enable us to provide a more robust picture of the internationalization- firm performance relationship, avoiding the more traditional sampling bias caused by estimating the relationship for a single country and/or for a single industry (Contractor, 2007).

In Appendix 1 we list the firms, the selected industries and the countries that we include in our sample strategy. Furthermore, we capture a firm's dynamic learning effect by covering the period of eleven years. We have collected the data from annual World Investment Reports issued by UNCTAD. These reports include data from the largest transnational corporation (TNCs) from developed and developing countries.

The firm's multinationality level is measured through the Transnationality Index (TNI) calculated by UNCTAD. TNI is a composite index which measures firms' degree of internationalization (DOI) and is calculated as the average of three ratios: foreign assets to total assets, foreign sales to total sales and foreign employment to total employment. Table 1 presents the descriptive statistics of the variables used.

[Table 1 about here]

2.2. Methodological Approach

As presented earlier we have outlined the novelty of our approach in order to measure a firm's performance through firm technical efficiency instead of individual accounting ratios. This proposed measurement is more suitable since it reveals the management ability to utilize efficiently firm's resources, threshold and core competencies. Our premise is a firm is technically efficient if produces the maximum output from a given quantity of inputs, such as labour and capital. A firm's managerial efficiency is measured by deploying a well-established methodological approach known as DEA. DEA is a mathematical programming technique that estimates the relative efficiency of production units and identifies best practice frontiers. DEA was initially introduced by Charnes et al. (1978) which encompass the construction of a non-parametric piece-wise surface (i.e. the empirical frontier) over the examined data. Scores equal to 1 are indicated as being technically efficient whereas firms' with technical efficient values

less than 1 suggests that the firm is technical inefficient[3]. Furthermore, following Daouia and Simar (2007) we apply also robust frontiers (known as *Order-α* frontiers) in order to be able to evaluate the effect of multinationality on firms' taking into account extremes and outliers in our data. When applying robust frontiers, technical efficient firms can take values of their efficiency scores greater than 1, whereas the technical inefficient firms are taking values less than 1.

Based on the developments by Bădin et al. (2012), we apply the most recent approach introduced by Mastromarco and Simar (2014) to calculate time-dependent conditional efficiency measurements both for the full and robust frontiers. In our case, the time-dependent conditional efficiency measures enable us to estimate firms' technical efficiency by taking into account both the effects of time and firms' multinationality levels[4].

A final stage of our analysis incorporated the methodological approach by Bădin et al. (2012) that allows researchers and evaluators to visualise the effect of time and multinationality on firm performance. Therefore, by regressing firm's multinationality levels (MULTI) and time (YEAR) on the two ratios constructed from the full (Q) and robust (Q_α) frontiers[5] we are able to account for the effects of time and multinationality on firms' estimated performances without assuming any functional relationship between the examined variables. Therefore having a firm's i at time t we can estimate the following nonparametric regressions as:

$$Q_{it} = m\left(TIME_t, MULTI_{it}\right) + u_{it}, \tag{1}$$

$$Q_{\alpha,it} = m\left(TIME_t, MULTI_{it}\right) + u_{it}. \tag{2}$$

[3] For our frontier analysis we are apply output oriented models. In our DEA setting we allow for variable returns to scale (VRS) in order to capture potential firms' scale effects in our efficiency measurement (Banker et al., 1984).

[4]This implies that our estimated conditional efficiency scores presented in this study are calculated based on the assumption that time and multinationality influence the boundary of the attainable set Bădin et al. (2012).

[5] Q is the ratio of time-dependent conditional efficiency estimate to the original (unconditional) efficiency estimate constructed from the full frontiers. Whereas Q_α is the ratio of time-dependent conditional efficiency estimate to the original (unconditional) efficiency estimate constructed from the robust (*Order-α*) frontier.

Our first regression (equation 1) determines the effect of time and multinationality on a firm's boundary (i.e. we seek to detect any potential technological change- swift of the frontier). However, the second regression (equation 2) seeks to measure the effect of multinationality and time on the distributions of firms' efficiencies[6]. An increasing regression line indicates a positive effect of multinationality and time on firms' technological change (shift on the frontier) and on the distribution of their efficiencies (technological catch-up).

3. Empirical results

Prior to our analysis about firm efficiency and multinationality, we provide an overview about firms' mean and standard deviation (Std) values of the conditional and unconditional technical efficiency estimates both for the full (Subfigure 1a) and the partial frontiers (Subfigure 1b). We observe the mean original technical efficiency estimates (VRS-Mean) are much higher compared to the mean conditional to time and multinationality technical efficiency estimates (VRSt,z-Mean). This indicates that when we account for the effect of time and multinationality firms' technical efficiency estimates tend to decrease. This is also confirmed for the robust measures reported in Subfigure 1b. The reported standard deviation values (Std) values of firms' efficiency estimates have increased considerably in 2007 onwards. This corresponds with the outbreak of the Global Financial Crisis. An increase in the volatility reveals distortions in firms' technical efficiency. These findings are evident for both for the full and robust frontiers.

[Figure 1 about here]

Figure 2 then illustrates the effect of time and multinationality on firms' efficiency levels and technological change. Specifically, Subfigures 2a, 2c and 2e, examine the effect of time and multinationality on firms' efficiency levels, whereas Subfigures 2b, 2d and 2f, examine the effect on firms' technological change. Sub-figure 2a examines for the entire sample the effect of multinationality and time on firms' distribution of

[6] Following Li and Racine (2007) we have used a local constant estimator and for bandwidth selection we have applied the Least Squares Cross-Validation (LSCV) criterion.

technical efficiency levels. The results support the three-stage sigmoid (S-shaped) hypothesis as introduced by Contractor *et al.*, (2003) and further discussed in Contractor (2007). The results show that in the initial stage of internationalization, i.e., up to 40% level the firms fail to have any technical efficiency gains due to costs and barriers to international expansion. However, once a firm overcomes this initial stage of multinationality, i.e., from 40% to 70% the effect is positive. This indicates technical efficiency gains due to the benefits linked with firms' international expansion. Finally, for a higher degree of multinationality, i.e., greater than 70% the effect of multinationality on firms' technical efficiency levels is negative. That means that firms have been over-internationalized with increased global coordination and managerial costs (Contractor, 2007). The effect of time in this case is positive suggesting that firms' have increases their technical efficiency levels over the examined period (this is also confirmed from the results presented on Figure 1).

Furthermore, from Sub-figure 2b (examine the entire sample) we can suggest that multinationality has an inverted U-shape relationship with firms' technological change suggesting that firms can increase their technological change as they internationalize their operations abroad up to a certain level, which after that level diminishing returns of multinationality start to arise. The effect of time appears to be negative suggesting that firms' could not sustain to keep increasing their technological change diachronically. This evidence is presented for the first time in the literature linking firms' technological change with their multinationality levels.

We follow Contractor et al. (2003) and we separate our sample into two sub-samples. The first sub-sample includes only firms from knowledge intensive business services (KIBS) and the second sub-sample include firms from capital intensive business services (CIBS). It is evident from Subfigures 2c, 2d, 2e and 2f that the pattern of overall effects of multinationality on firms efficiencies and technological changes remain unchanged regardless the fact if the firms are from KIBS or CIBS.

A closer analysis reveals that the turning points are different for firms from KIBS and CIBS (Subfigures 2c and 2e) in the case of firm efficiency. The turning point for knowledge based firms is 78% (Subfigure 2c), whereas, for capital intensive is 70%

(Subfigure 2e). What is important is the fact that in both cases we confirm the presence of the sigmoid hypothesis introduced by Contractor et al. (2003).

If we turn our attention to technological change, we observe that the turning points are again different for firms from KIBS and CIBS (Subfigure 2d and 2f). This indicates also different effects of multinationality on a firm's technological change. It is evident that knowledge intensive firms need to achieve a higher degree of internationalization compared to capital intensive firms in order to maximize the multinationality gains on their technological change initiatives. The turning point for knowledge intensive firms is 80% (Subfigure 2d), whereas, for capital intensive is just 70% (Subfigure 2f). In other words, diminishing returns on technological change come faster on capital intensive firms and slower for knowledge intensive firms.

Our results indicate that firms from KIBS require a higher degree of internationalization to maximize firm efficiency and technological changes. In addition we confirm the present of the three stage-theory as discussed by Contractor et al. (2003) for firms from CIBS.

[Figure 2 about here]

4. Conclusions & managerial implications

The study confirms the existence of the three-stage sigmoid (S-shaped) hypothesis between multinationality and a firm's performance when measured through technical efficiency levels. Despite the fact we use a different way of measuring firm performance we validated the three stage hypothesis of multinationality as introduced by Contractor *et al.*, (2003). We further extend our analysis by providing, for the first time, evidence of an inverted 'U'-shape relationship between multinationality and firm's technological change. Moreover, we argue that the multinationality and firm performance relationship is a non-linear (Contarctor et al., 2003).

We argue that firms' benefit of multinationality in terms of firm performance is exhausted after the degree of internationalization reaches the level of 80% and 70% for KIBS and CIBS respectively. Contractor et. al (2003) reports similar results but their

results do not provide sufficient support for CIBS. We also explore a new relationship on firm performance and technological change. In other words, we quantify a degree of internationalization that is needed to shift a production frontier due to the introduction of new technologies (in both sectors, i.e., KIBS and CIBS). The results show that capital intensive service sectors do not require the same degree of multinationality compared to knowledge-based firms in order to maximise the technological change.

This study has multidimensional implications in terms of the adopted managerial and business strategies. Firstly, multinationality has to be adopted as an integral managerial strategy that improves firm performance. Secondly, we reject the previous findings about the U-shaped and inverted U-shaped performance. We confirm that multinationality is effective but the managers face the problem of finding the optimal degree of multinationality due to a sigmoid type of internationality. Thirdly, the benefit of multinationality is not exhausted rapidly. This allows managers to adopt relatively aggressive strategies for achieving an appropriate level of multinationality. In other words, managers can afford to adopt a long-term expansion plan. A very gradual decline in firm performance after achieving the first stage of multinationality should lead to the change or reduction in the degree of multinationality. Our findings confirm that the decline is only a temporary event before reaching the second stage of multinationality. Fourthly, managers face a critical decision which is related to overexpansion of firms' production processes. If managers are not able to have a control of this process then the third stage will come and diminishing returns will be appear. The duration and the path of expansion are unique for every firm and is determined by firm's internal and external factors.

Managers have to be aware of the fact that empirical evidence reveals that the multinationality – performance relationship is a three-stage dynamic process.

Finally, since Johnson and Kaplan (1987) published their key text, Relevance Lost – The Rise and Fall of Management Accounting, performance measurement has gained a new lease of life, both in practice and research (Neely, 1999). Today, being able to empirically compare the performance of firms in order to identify the performance gaps and improvement opportunities is critical. This research note contributes to by positing a contribution to a gap by identifying appropriate measures and how they should be

combined and used in order to measure different firms' performance comparatively, in particular our findings on "what measures to use" and "how to use these measures" will allow for more meaningful comparisons of the performance of different firms, operating in different sectors and geographical regions.

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Appendix 1

Firm names:

ABB, Abbott Laboratories, AES Corporation, Alcan Inc., Alcoa, Anglo American, Astrazeneca Plc, BAE Systems Plc, BASF AG, Bayer AG, Bertelsmann, BHP Billiton Group, BMW AG, British American Tobacco Plc, British Petroleum Company Plc, Carrefour SA, Cemex S.A., ChevronTexaco Corp., CITIC Group, Coca-Cola Company, Compagnie De Saint-Gobain SA, Conoco Inc., CRH Plc, Daimler Chrysler AG, Deutsche Post AG, Deutsche Telekom AG, Diageo Plc, Dow Chemical Company, E.On, Electricité De France, Endesa, ENI Group, ExxonMobil Corporation, Fiat Spa, Ford Motor Company, France Telecom, General Electric, General Motors, Glaxo Smithkline Plc, Hewlett-Packard, Hitachi Ltd., Holcim Agf, Honda Motor Co Ltd., Hutchison Whampoa Ltd., Hyundai Motor Company, IBM, Inbev, Johnson & Johnson, Kraft Foods Inc., Lafarge SA, LG Electronics Inc., Liberty Global Inc, Linde AG, LVmh Moët-Hennessy Louis Vuitton SA, Marubeni Corporation, Matsushita Electric Industrial Co., Ltd., McDonald's Corporation, Metro AG, Mitsubishi Corporation, Mitsui & Co Ltd., National Grid Transco, Nestlé SA, Nissan Motor Co Ltd., Nokia, Novartis, Pernod Ricard SA, Petronas - Petroliam Nasional Bhd, Pfizer Inc, Philips Electronics, Pinault-Printemps Redoute SA, Procter & Gamble, Renault SA, Repsol YPF SA, Rio Tinto Plc, Roche Group, Royal Dutch/Shell Group, RWE Group, Sabmiller PLC, Samsung Electronics Co., Ltd., Sanofi-Aventis, Siemens AG, Singtel Ltd., Sony Corporation, Statoil Asa, Suez, Telefonica SA, Thomson Corporation, Thyssenkrupp AG, Total Fina Elf, Toyota Motor Corporation, Unilever, United Technologies Corporation, Veolia Environnement SA, Vivendi Universal, Vodafone, Volkswagen Group, Volvo AB, Wal-Mart Stores, WPP Group Plc, Xstrata PLC.

Appendix 2

Country of origin and industries of the examined firms:

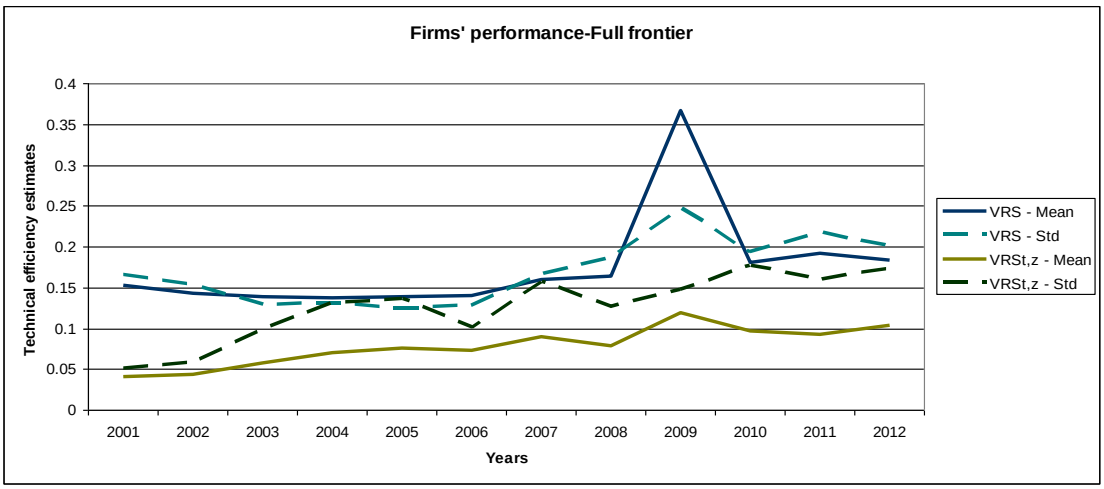
Country	Number of firms	Industry	Number of firms
Australia	1	Beverages	1
Canada	2	Business services	1
China	1	Chemicals	1
Finland	1	Construction materials	3
France	14	Consumer goods/brewers	2
Germany	14	Diversified	5
Hong Kong, China	1	Electrical & electronic equipment	10
Ireland	1	Electricity, gas and water	7
Italy	2	Food, beverages and tobacco	4
Japan	9	Industrial trucks, tractors, trailers and stackers	1
Korea Republic	3	Lumber and other building materials dealers	1
Malaysia	1	Luxury goods	1
Mexico	1	Machinery and equipment	1
Netherlands	2	Media	1
Norway	1	Metal and metal products	3
Singapore	1	Mining & quarrying	4
Spain	3	Motor vehicles	13
Sweden	1	Non-metallic mineral products	1
Switzerland	5	Petroleum expl./ref./distr.	10
United Kingdom	15	Pharmaceuticals/chemicals	10
United States	21	Printing & publishing	1
		Restaurants	1
		Retail	4
		Telecommunications	7
		Tobacco	1
		Transport and storage	1
		Transport equipment	2
		Water Supply	1
		Wholesale trade	2

Table 1: Descriptive statistics of the variables

	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
						Total Assets (in million US dollars) - Input						
Max	495210.00	575244.00	647483.00	750507.00	673342.00	697239.00	795337.00	797769.00	797769.00	751216.00	717242.00	685328.00
Min	11066.00	11066.00	13976.00	16044.00	19013.00	20132.00	21288.00	21288.00	21886.93	21886.93	21886.93	21886.93
Mean	62929.46	68537.57	78278.64	86336.32	87842.70	92189.00	105088.17	105915.86	105859.30	113658.38	118277.77	121794.67
Std	68207.84	76860.71	88189.50	98211.21	92415.59	88930.63	98416.91	99496.09	99523.51	99138.54	100398.34	106535.21
						Total number of employees - Input						
Max	1383000	1400000	1500000	1710000	1800000	1910000	2055000	2100000	465000	2160800	2100000	2200000
Min	13236	17684	17684	17684	17684	17684	3729	3856	9850	10374	10374	10374
Mean	143450	141990	141021	143962	148182	151948	154134	158819	90618	151581	155156	158155
Std	163521	164028	172248	189758	198188	209277	220993	225676	92740	230887	226350	235635
						Total Sales (in million US dollars) - Output						
Max	217799.00	244524.00	256329.00	291252.00	358955.00	365467.00	390328.00	459579.00	2100000.00	408085.00	470171.00	467153.00
Min	4054.00	5151.00	5151.00	5151.00	5151.00	6413.00	7296.00	7296.00	3856.00	3856.00	3856.00	7296.00
Mean	45854.09	47686.37	54105.76	59264.98	65466.44	69941.10	79840.11	83065.44	151149.79	83345.65	92044.37	88981.35
Std	44142.26	46909.03	52319.92	61702.83	68419.99	71899.05	75842.08	84500.98	224778.70	75600.39	89005.27	87615.90
						Degree of multinationality / TNI (percentage) - Exogenous variable						
Max	100.00	97.90	98.00	97.30	97.20	94.50	94.50	93.16	93.16	96.76	96.89	96.89
Min	20.40	15.90	20.40	20.40	20.40	20.40	17.70	20.98	20.98	23.21	23.21	29.03
Mean	58.08	56.86	57.66	59.05	59.74	60.78	62.23	62.38	62.36	63.88	65.14	66.30
Std	19.83	19.22	18.33	18.01	17.12	16.66	16.58	16.51	16.58	17.08	17.15	15.69

Figure 1: Diachronic representation of firms' technical efficiency estimates

1a



1b

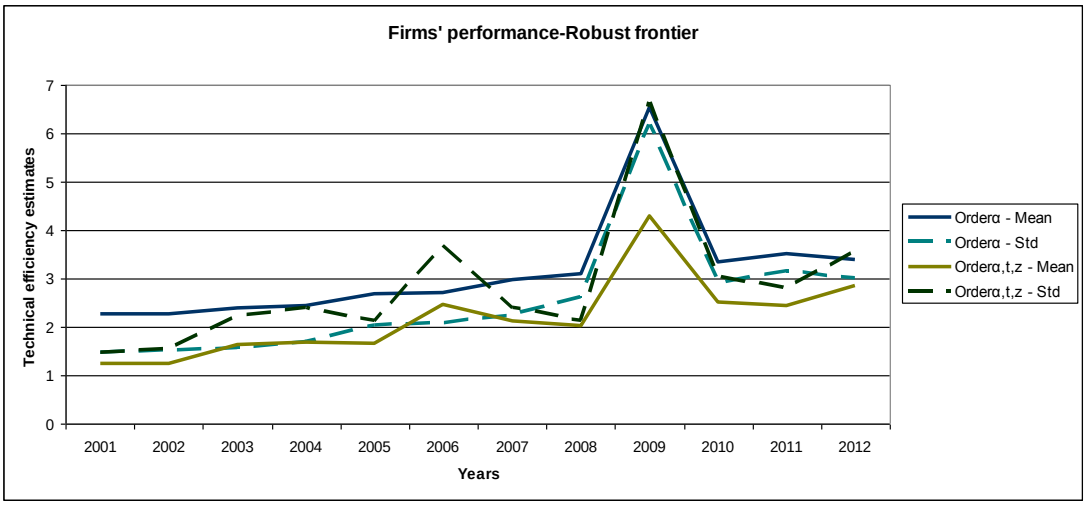
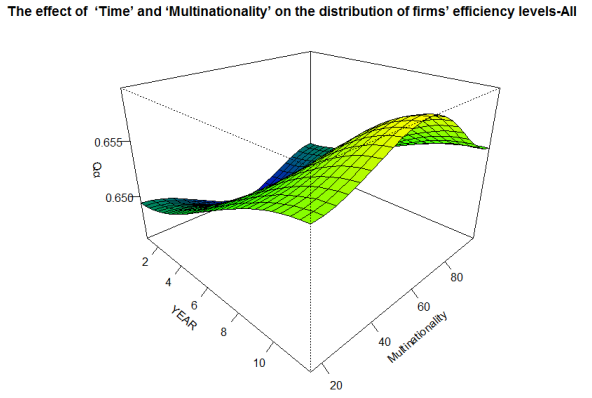


Figure 2: The effect of multinationality on firms' performance

2a



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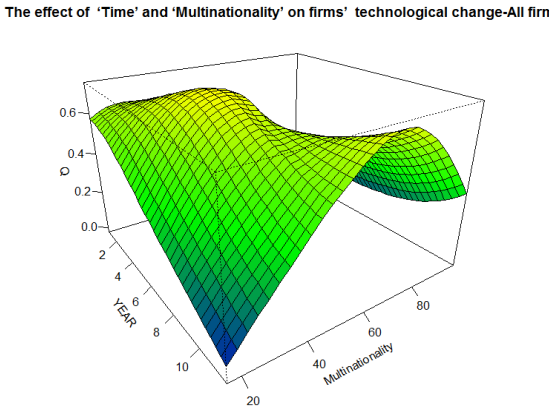

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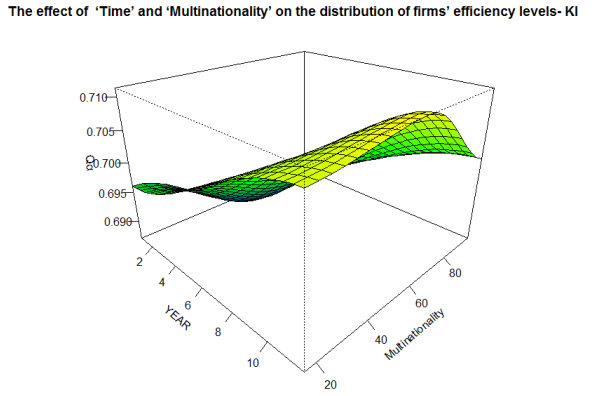

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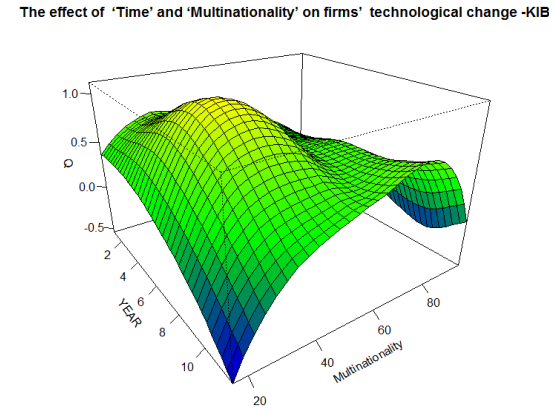

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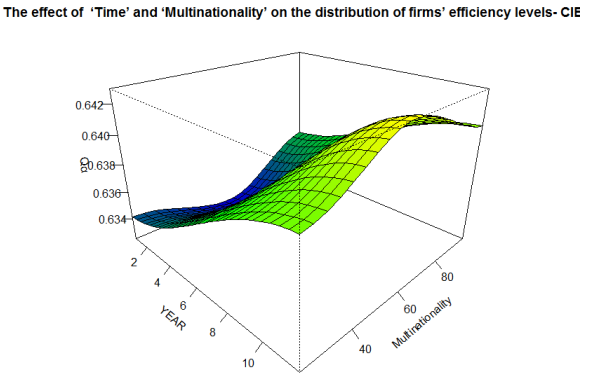

2f