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FIRM PERFORMANCE IN TOURISM ASSOCIATED SECTORS: EVIDENCE FROM MENA COUNTRIES

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ABSTRACT

This paper presents an empirical analysis of firm performance in a number of sectors associated with tourism (hotels, restaurants, passenger transport and travel agencies) for Middle Eastern and North African (MENA) countries. It focuses on whether management actions taken by firms enhance firm performance and provides a broader perspective by sector than the many studies of hotel efficiency. Data for the study were taken from the 2013 BEEPS enterprise survey of MENA countries. The analysis uses a different approach from the commonly applied data envelopment analysis. Both stochastic frontier estimation and propensity score matching are used. The use of the latter technique is of particular value in dealing with firm heterogeneity. The study finds that some but not all business development measures do improve firm performance. The results suggest that firms do not have to simply passively respond to locational effects - an appropriate intervention can result in improved performance.

FIRM PERFORMANCE IN TOURISM AND ASSOCIATED SECTORS: EVIDENCE FROM MENA COUNTRIES

1. INTRODUCTION

Existing literature emphasises the importance of efficiency and firm performance studies for both managers and policy makers in the hospitality sector. For example Chen (2007) argues that effective marketing operations and strengthening the quality of service are essential to the survival of hotels and that efficiency measurement is of critical importance for performance to be improved by managers. It is also clear from a number studies, such as Gonclaves (2013), that efficiency often depends on hotel location as much as management and thus the environment in which hospitality firms operate is of similar importance. This creates two different sets of forces affecting firm performance – environmental and managerial. This study considers the relative importance of these influences in Middle East and North African (MENA) countries.

There is an extensive literature dealing with hotel efficiency in particular, where these are frequently single country studies. For example, Olivera et al (2013a) considers the efficiency of a sample of 84 hotels in the Algarve region of Portugal and Assaf and Cvelbar (2011) examine hotel efficiency in Slovenia. These are useful but there are advantages in application of similar analysis using multi-country studies. In particular, it is difficult to identify the influences of a specific location without a sample that includes a range of different locations. Thus, given the comparatively few multi-country studies of firm performance an important contribution of this paper is to provide insights gained from a multi-country sample on the influence of national factors on firm performance.

As noted above, the literature of firm performance in the context of tourism is dominated by studies of hotel efficiency. Therefore, another significant contribution of this paper is to widen the analysis to a broader range of activities associated with tourism. This study examines the effects of both locational factors and management choices for a sample of firm including hotels, restaurants and bars, passenger transport (land and air) and travel agencies. In so doing it provides an insight into a wider range of tourism associated activities than the hotel sector alone.

A third contribution is methodological. Much of the existing literature uses stochastic frontier or data envelopment analysis to measure form efficiency and performance. This study also uses propensity score matching, a technique not widely applied to hotel and tourism related efficiency. This has particular advantages for dealing with firm heterogeneity and here is used to test the role of different managerial actions more precisely.

2. LITERATURE REVIEW

Assaf et al (2012) correctly note that the literature on frontier efficiency in tourism is well established. Their comprehensive review shows that a majority of these studies use data envelope analysis (DEA) but a comparatively small number take a stochastic frontier approach, which is the method of choice in this paper. Assaf et al (2012) develop a metafrontier model that they apply to a sample of Taiwanese hotels, finding both size and ownership to have important effects on efficiency. Assaf (2012) also uses a combination of DEA and stochastic frontier models to analyse the efficiency of hotels and tour operators for a sample that includes several countries in the Asia-Pacific region. Important efficiency differences are found between countries, explained in part by infrastructure and the number of tourist attractions.

Olivera et al (2013a) use a DEA approach to examine the efficiency of a sample of 84 hotels in the Algarve region of Portugal and find that star ratings do not impact efficiency levels and that hotels without golf courses are more efficient. Peypoch and Solonandrasana (2006) comment on the application to tourism of new efficiency measures developed within DEA methodology. In a further paper, Peypoch and Solonandrasana (2008) propose an aggregate productivity indicator for tourism firms. Goncalves (2013) used a Luenberger productivity indicator to analyse efficiency and productivity for French ski resorts, finding a decrease in productivity in most cases. Using Hyperbolic Network Data Envelopment Analysis (HNDEA), Yu and Lee (2009) finds that some hotels have highly efficient production operations while others excel in their marketing operations, suggesting that productive efficiency and service effectiveness differ across hotel businesses in Taiwan. Barros (2005) uses a DEA approach to analyse a sample of 43 hotels in 2001 that belong to the Portuguese state-owned hotel chain, Pousadas de Portugal finding persistent low efficiency.

Pulina et.al (2010) investigate the efficiency of hotels in 20 regions of Italy using Data Envelopment Analysis. Their results show that the efficiency of hotels in Sardinia is less than those in the North and Centre of Italy reflecting underlying economic disparities between these regions. Barros and Santos (2006) use DEA to analyse efficiency of a sample of 15 hotels from Portugal. Barros et al (2009) examine the efficiency of a sample of Portugese hotels using DEA and, in particular, the directional distance function and the Luenberger productivity indicator. Barros et al (2011) use DEA analysis to compare the performance of 22 French tourist regions. Their study finds several drivers for performance, with the endowment of beaches being of particular importance. These DEA studies show that the issue of efficiency is of importance to the study of tourism. Moreover, they demonstrate that it requires empirical research to determine the causes and consequences of differences in efficiency.

A minority of studies of efficiency of firms in the hospitality sector have used a stochastic frontier approach. Chen (2007) use a stochastic cost frontier to estimate the efficiency of a sample of 55 hotels in Taiwan in 2002, finding that hotels typically operated at 80% efficiency. Hotels that were

part of a chain were also found to be more efficient than independents. Hu et al (2010) use a stochastic cost frontier to analyse a sample of 65 international tourist hotels from Taiwan and find tourism guides and proximity to airports to be of particular consequence for cost efficiency. Bernini and Guizzardi (2010) analysed a panel of 1906 Italian hotels over the period 1998-2005 using a stochastic frontier production function and find that the main drivers of efficiency were internal to the firm and, in particular, the management of human resources. Barros (2004) analyses the technical efficiency of a Portuguese state-owned hotel chain, Pousadas de Portugal, using a stochastic cost frontier although the results are at best mixed and efficient scores are low.

A very small number of studies have addressed efficiency studies to the hospitality sector in transitional countries. Assaf and Barros (2013) use a semi-parametric stochastic frontier model to analyse a sample of 519 hotels, drawn from 37 countries over the period 2006 to 2008. Their sample of countries, although not specifically or uniquely drawn from transitional countries does include several such economies. Their study found important efficiency differences between international hotel chains. They also found ownership and location to be important in determining efficiency. Assaf and Cvelbar (2011) use a Bayesian frontier approach to examine hotel efficiency in Slovenia using a sample of 23 hotels over the period 2004-2008. Their study finds that international attractiveness and privatisation increase efficiency whilst management tenure reduces it. Finally, Assaf and Celbar (2010) analysed a sample of 24 hotels from Slovenia using DEA, concluding that hotel age, size and star rating are important in determining hotel efficiency.

This paper examines firm performance for a number of tourism associated sectors. A number of studies have conducted similar research for the wider economy of East European and former Soviet countries, many of which have used the 2002 *Business Environment and Enterprise Survey* (BEEPS) conducted by the World Bank and the EBRD (see Fries et al (2011) for a detailed discussion. Using these data many studies find that corruption is less damaging to firm performance than cumbersome business regulation and that the quality of the business environment affects investment in the sector. De Rosa et al (2010) use the 2009 BEEPS survey to analyse the effects of corruption on firm level productivity. They model the effects of corruption on total factor productivity using an augmented production function and find that corruption has adverse effects on productivity. Ismail et al (2013) also use the 2002 BEEPS survey to analyse the influence of managerial ties and strategic initiatives on firm performance in Central Asia and the Caucasus, finding both to be important. Spencer and Gomez (2011) use the BEEPS database to estimate the impact of institutionalised corruption in both host and source countries on the subsidiaries of multinational enterprises (MNEs), finding these influences to be of significance. Correa et al (2010) use the BEEPS data for 2002 and 2005 to examine the reasons for differing rates of technological diffusion in East European and Central Asian countries. They find foreign direct investment and private ownership to be amongst the important influences.

The BEEPS database is not isolated but forms part of a wider and increasingly standardised database of enterprise surveys provided by the World Bank. There are a number of relevant studies using these data to analyse similar and related issues to those considered in this paper but for the wider economy. Dethier et al (2011) provide a useful survey of the literature using World Bank and similar enterprise surveys to analyse firm performance. Xu (2011) provides a survey of the literature using enterprise surveys to analyse the effects of the business climate on economic development. Clarke (2011) uses data from World Bank enterprise surveys to analyse corruption at the firm level in African countries. Jensen et al (2010) use World Bank enterprise survey data and finds evidence to suggest that survey responses on corruption tend to be biased in more authoritarian countries. Ma et al (2010) use data from the World Bank enterprise survey for a sample of 28 developing countries,drawn from all regions of the world to estimate the influence of contract enforcement and relationship-specific investment on international trade, finding both to be of significance.

3. METHODOLOGY

This study uses two main methodologies – stochastic frontier analysis and propensity score matching. A stochastic frontier model is used to identify important determinants of productive efficiency for the sample as a whole. Propensity Score Matching (PSM) is used for more specific, precise analysis of individual sectors and individual determinants. In particular, it focuses on identifying the effect (or not) of specific actions on firm performance.

Frontier Models and Firm Level Efficiency

The measurement of firm level technical efficiency has become commonplace with the development of frontier production functions. Thus, the impact of deregulation and the move to a competitive market system is modelled using a frontier approach and from this individual firm level efficiency levels are constructed. The approach can be deterministic, where all deviations from the frontier are attributed to inefficiency, or stochastic, where it is possible to discriminate between random errors and differences in inefficiency. The stochastic frontier model was originally proposed by Aigner, Lovell and Schmidt (1977)[1], and extended to include the characteristics of the firm that explain the inefficiency, following the work of Battese and Coelli (1995). This approach allows the use of panel data and the technical inefficiency effects are specified as factors that interact with the input variables of the frontier function. Whereas ordinary least squares (OLS) estimation takes the average line of best fit through the observations (a mean response function) and tacitly assumes that all the firms are efficient, this can be misleading if there are considerable differences in efficiency levels. Tests show whether a production frontier is the appropriate model, and efficiency levels are estimated for each firm, for each year.

[1] See Fried, Lovell and Schmidt (1993) for a comprehensive survey of methods and applications.

Thus, the frontier model identifies the firms that represent best practice, and the inefficiencies are explained using the method of maximum likelihood to estimate the unknown parameters, with the stochastic frontier and the inefficiency effects estimated simultaneously. The theory is stated briefly here but is described in full in Coelli (1995) and Coelli, Rao and Battese (1998) and many applications are discussed in Bravo-Ureta and Pinheiro (1993). The estimating equation is

$$y_{it} = f(x_{j,it}, t, \beta) + \varepsilon_{it} \quad where\ \varepsilon_i = V_{it} - U_{it}$$
$$with \quad U_{it} \sim |N(\mu_{it}, \sigma_U^2)| \quad and \quad V_{it} \sim N(0, \sigma_V^2) \qquad \textbf{(1)}$$

where f(.) is a suitable functional form, y_{it} is an output measure of firm *i* at time t, $x_{j,it}$ is the corresponding level of input *j* and β is a vector of parameters to be estimated. The V_{it}*'s* are independently and identically distributed random error terms and uncorrelated with the regressors, and the U_{it}'s are non-negative random variables associated with the technical inefficiency of the firm.[2] In the second part of the model, this inefficiency term, U_{it}, is made an explicit function of *k* explanatory variables, $z_{k,it}$, that represent firm characteristics. The U_{it} are independently but not identically distributed (iid) as non-negative truncations of the normal distribution, expressed

$$U_{it} \sim N\left[\delta_0 + \sum_{k=1}^{M} \delta_k z_{k,it}, \sigma^2\right] \qquad \textbf{(2)}$$

The firm level technical efficiency is defined in terms of the ratio of the observed output to the frontier output, conditional on the levels of inputs used by that firm. Thus, the technical efficiency of firm *i* at time t can be expressed in terms of the errors as

$$TE_{it} = E[\exp(-U_{it})|(V_{it} - U_{it})] \qquad \textbf{(3)}$$

which is the expectation of the exponentiated technical inefficiencies, conditional on the error, ε_{it}. Since U_{it} is a non-negative random variable these technical efficiencies are defined between zero and unity, where unity indicates that this firm is technically efficient.

[2] If the residuals are negatively skewed, the maximum likelihood estimator for the stochastic frontier production function model is simply OLS (See Waldman (1992)). In this case, either the model is mis-specified or the data are not consistent with the functional form.

Propensity Score Matching (PSM)

The core idea of a matching approach is simple. First it is necessary to define a *treatment*, in this case, for example, the introduction of a new service and an *outcome* – for example higher sales per worker. In this paper two different propositions are considered – productivity (sales per worker and profitability (profit per worker). An immediately intuitive approach would be to assess whether the mean sales per worker is statistically significantly greater for firms who introduced a new product or service than those that did not. The difficulty with such an approach is that to avoid selection bias, it is necessary to construct a control group (of non-EU members) that matches the *treated* group (EU members) as closely as possible in all key characteristics other than the treatment. The selection of a suitable control group is the process of *matching* and this is intended to replicate the process of random sampling using non-experimental observed data.

Detailed discussions of the matching methodology can be found in several sources, for example, Dehejia and Wahba (2002) and Deheja (2005). A number of studies involving economic applications also include useful explanations of this technique (see Sianesi, 2004; Blundell et al., 2005). The matching approach focuses on three key parameters:

- ATE – the average treatment effect in the population (defined as all treated and untreated firms or individuals).
- ATT – the average treatment effect for treated firms (from countries that joined the EU in 2004 or 2007)
- ATNT – the average treatment for those that were not treated (firms from non-EU member countries).

These are defined as:

$$ATE = E(Y_{1i} - Y_{0i}) \equiv E(\beta_i) \quad \textbf{(4)}$$

$$ATT = E(Y_{1i} - Y_{0i} | D_i = 1) \equiv E(\beta_i | D_i = 1) \quad \textbf{(5)}$$

$$ATNT = E(Y_{1i} - Y_{0i} | D_i = 0) \equiv E(\beta_i | D_i = 0) \quad \textbf{(6)}$$

where Y is the outcome, with subscript 1 for those firms that are *treated* and subscript 0 for those that are not. D is an indicator of the treatment received (by definition 1 for treated and 0 for non-treated).

The naïve estimator of the effects of treatment (such as new management practices) on any particular outcome is to simply compare the means of the treated (EU) firms. Such an approach is biased for two sets of reasons. The first is bias from selection on observables (comparing firms that are not comparable or weighting comparable individuals differently) and the second is bias from selection on unobservables. The latter is actually a version of the problem of possibly excluded confounding variables. As always, there is no guarantee that an important confounding variable has been excluded,

but steps can be taken to limit this possibility. A common approach, which is followed in this paper, is to use a sufficient number of potentially relevant variables in selecting from observables. For example, managerial experience is one of the selection variables on the grounds that experience is likely to result in better performance.

Reducing bias from selection on observables is more complex. To estimate ATT it is necessary to assume that all relevant differences are captured in the observed attributes of the treated and untreated firms (that is, no bias from selection on unobservables) and that both treated and untreated firms can be observed to have shared attributes (common support). Selection uses a propensity score p(x) where:

$$p(x) \equiv P(D=1|X=x) = E(D|X=x) \quad \textbf{(7)}$$

A common approach is to use a probit model to define the propensity score and that is the approach in this study. This probit model is not in itself a causal model but acts as a way of identifying and summarising the key characteristics of the *treated* firms. The next step is to use the propensity score for matching, that is, to pair each *treated* firm with a comparable *untreated* firm. There are several ways of conducting this matching process. The approach used in this study was kernel density matching, using bootstrapped standard errors. The matching process is intended to reduce bias on observables – to reduce the difference between the sample of treated firms and the control group of untreated firms in observable characteristics. However, matching estimators cannot control for bias on unobservables (the equivalent of one or more confounding variables). Estimation of the probit model was conducted from general to specific. To reduce the risk of bias on observables as many potentially relevant variables as possible were included to reduce the risk of bias on unobservables. But, as King and Nielsen (2016) have pointed out, this creates a further risk of bias from matching on irrelevant variables. To reduce this risk the probit model was re-estimated with those variables found to be (jointly) statistically insignificant excluded.

The final step in the matching process is to assess how effective the process of matching was in selecting a control group from the untreated (non-EU) firms that was comparable to the treated (EU) group. Checks on the closeness of matching are presented in Appendix 4.

4. DATA, MODELS AND ESTIMATION

The data were taken from the MENA enterprise survey conducted jointly by the European Bank for Reconstruction and Development (EBRD) and the World Bank. Details of the tourism associated industries and the sample size for each are included in Appendix 1. Details of the 10 MENA countries included are in Appendix 2.

Stochastc Frontier Analysis

The variables used in the translog specification of the frontier were:

- *Q* , output, measured as annual sales in US $
- *K*, capital, measured as the declared value of total assets
- *L*, labour force calculated as the number of full-time permanent employees plus the full-time equivalent of temporary employees.

The variables used to model the inefficiency terms include both firm level variables (to capture firm characteristics) and country level variables (to capture effects of the national business environment). The firm level variables were:

- *foreign*, the percentage foreign ownership of the firm
- *age*, the age of the firm in years (a proxy for organisational experience)
- *mgrexp*, the number of years of experience of the senior manager
- *local,* (0,1) takes the value of 1 if the main market is local, 0 otherwise
- *degree,* the proportion of the labour force with a university education
- *secondary,* the proportion of the labour force with a secondary education
- *poored,* the extent to which the firm perceives poorly educated labour to be a constraint (scored 0-4)
- *infra,* perceived constraints arising from infrastructure – the mean response to three different infrastructure question, each scored 0-4. Details of the questions are in Appendix 3
- *burcy,* perceived constraints arising from bureaucracy – the mean response to four different bureaucracy questions, each scored 0-4. Details of the questions are also in Appendix 3
- *newprod*, (0,1), taking on the value of 1 where the form introduced a new product or service within the last three years, 0 otherwise
- *newmgt* (0,1), taking on the value of 1 when the firm introduced new organisation or management practices, 0 otherwise
- *newmktg* (0,1), taking on the value of 1 when the firm introduced new marketing methods, 0 otherwise.

The country level variables (all taken from the World Bank's *World Development Indicators* database) were:

- *regeff*, the regulatory efficiency measure known as "distance to frontier"
- *legal,* a measure of legal efficacy

- *gdpcap,* per capita GDP.[3]

Propensity Score Matching (PSM)

Two main outcome variables, both intended to capture the effects on firm performance, were used. These were:

- the log of sales per worker, and
- the log of profit per worker.

Both are standard measures of firm performance.

The PSM analysis sought to focus on the role of firm decisions in determining firm performance. In particular three different treatment variables were used. These were:

- *newprod*, (0,1)
- *newmgt* (0,1)
- *newmktg* (0,1)

These treatment variables have already been briefly described and a more detailed definition is provided in Appendix 3.

For PSM it is necessary to create a propensity score to select a "matched" control group which provides a basis for comparison with the "treated" firms. This was done using a probit model. The firm level variables used to explain each treatment variable were all those listed for the stochastic frontier analysis plus the following:

- *compet*, the number of direct competitors faced by the firm
- *training (0,1),* taking on the value of 1 if the firm provides training
- *licensing (0,1)* if the firm licenses foreign technology

As with the stochastic frontier all variables were included in the initial estimation of propensity scores to reduce the risk of an omitted confounding variable. However, recent work by has shown that matching estimates of treatment effects can biased if matching was conducted using irrelevant variables. To reduce this risk all variables which were jointly insignificant were excluded from the final propensity score and, hence, the matching process. For the propensity score matching we applied the analysis to the full sample and (separately) to the three individual sectors with sufficient observations.

[3] To reduce the risk of an omitted (confounding) variable initial estimation was conducted using all variables and most of those found jointly to be statistically insignificant were omitted from later estimation. These are not reported but are available from the authors on request.

5. STOCHASTIC FRONTIER ANALYSIS

Table 1 presents the results of the stochastic production frontier estimation for the full sample. Estimation was conducted using a general to specific approach to reduce the risk of an omitted confounding variable and initially the full set of variables was used. The results in Table 1 exclude a number of variables in the inefficiency model that were (jointly) statistically insignificant.

Firm size was found to have a statistically significant and positive effect on inefficiency at 95% confidence. This suggests that in MENA countries, diseconomies of scale exist within this sample of tourism associated industries. Across all economic sectors this might be a surprising finding but for a sample that includes activities such as restaurants, bars, taxis and travel agencies it is much less at variance with casual observation.

Both (perceived) infrastructure and bureaucratic obstacles were positive and statistically significant at 90% confidence. Obstacles arising from infrastructure and bureaucracy reduce the productive efficiency of the firm in this sample of tourism associated sectors is expected not just in these activities but also the wider economy. GDP per capita was found to have a statistically significant negative effect on inefficiency (at 90% confidence). This implies that firms in higher income countries are typically more efficient than ones in lower income economies.

The inefficiency model included three variables to capture the effects of different strategic actions taken by firms – the introduction of (a) a new product or service, *newprod*, (b) new marketing, *newmktg*, and (c) new organisational or new management practices, *newmgt.* Neither *newmktg,* nor *newmgt* were found to have a statistically significant effect. The variable *newprod* was found to have a statistically significant negative effect on inefficiency (at 90% confidence). This suggests that the introduction of a new product or service was associated with greater efficiency.

Table 1: Stochastic Production Frontier Estimation				
Variable	**Description**	**Coefficient**	**Standard Error**	**z**
Deterministic Component of Stochastic Production Frontier Model				
Dependent variable = lnq (log of sales)				
Constant		9.12138***	0.5960	15.31
LNK	log(capital)	0.01079	0.0104	1.04
LNL	log(labour)	.58783*	0.3053	1.93
LNSQK	log(capital), squared	.00649***	0.0024	2.74
LNSQL	log(labour), squared	.06961*	0.0422	1.65
LNKL	log(capital).log(labour)	-0.01746	0.0117	-1.49
Parameters in variance of v (symmetric)				
Constant		1.18487***	0.0621	19.09
Inefficiency Model - parameters in variance of u (one sided)				
Constant		-13.4526*	7.4823	-1.8
SIZE	firm size class	.84938**	0.3983	2.13
MGREXP	senior manager's experience	0.03192	0.0241	1.33
INFRA	infrastructure constraints (0-4)	.50244*	0.2595	1.94
BURCY	bureaucratic constraints (0-4)	.47201*	0.2770	1.7
NEWPROD	new product or service (0,1)	-1.57446*	0.9308	-1.69
NEWMGT	new management practices (0,1)	0.62121	0.6299	0.99
NEWMKTG	new marketing (0,1)	-0.62473	0.6642	-0.94
REGEFF	regulatory efficiency (country)	0.19975	0.1229	1.63
GDPCAP	GDP per capita (country)	-.00099*	0.0005	-1.88
Note: ***, **, * ==> Significance at 1%, 5%, 10% level				
Observations : 634				
Log likelihood function -1306.82808				
Gamma {sigma(u)^2/sigma^2} = 0 .23100				
Var[u]/{{Var[u]+Var[v]} = .09841				
LR test for inefficiency vs. OLS: 35.460 (Chi squared, 9 degrees of freedom)				

Table 2 reports mean values of technical efficiency (see equation 3) by sector and Table 3 by country. The measure of technical efficiency can vary between 0 and 1. Values close to 1 represent high levels of efficiency and values close to zero low efficiency.

Table 2: Mean Efficiency by Sector		
ISIC (Revision 3) Classification		**Mean**
Code	**Description**	**Efficiency**
5510	Hotels and other short-stay accommodation	0.5529
5520	Restaurants, bars and canteens	0.6001
6021	Scheduled passenger land transport (other than rail)	0.6212
6022	Non-scheduled passenger land transport (other than rail)	0.6042
6210	Scheduled air transport	0.6624
6220	Non-scheduled air transport	0.4605
6304	Travel agencies and tour operators	0.5337
	Full Sample	**0.5629**

Table 3: Mean Efficiency by Country	
Country	**Mean Efficiency**
Djibouti	0.69065
Egypt	0.48231
Israel	0.99999
Jordan	0.72260
Lebanon	0.95953
Morocco	0.52492
Tunisia	0.68242
West Bank and Gaza	0.55678
Yemen	0.31692
Full Sample	**0.56290**

Efficiency values do show some variation by sector, with non-scheduled air transport being the least efficient and scheduled air transport. However, sample sizes are very small for air transport. Travel agencies tend to have lower technical efficiency than other sectors and restaurants and bars higher efficiency.

There is considerable variation in technical efficiency between countries across the full sample. Firms from both Israel and Lebanon are consistently close to the technically efficient frontier. Egypt, Morocco and Yemen all exhibit much lower mean technical efficiency.

6. PROPENSITY SCORE MATCHING (PSM)

The PSM analysis focuses on the extent to which certain actions taken by the firm – introducing a new product or service, introducing new management practices or new marketing methods – affect their performance. As with the stochastic frontier analysis this is done for the full sample. It is also repeated individually for each of the three sectors with sufficient observations – hotels, restaurants etc and travel agencies. This provides an understanding of behavioural differences between sectors.

The results for the full sample are presented in Table 4. They suggest that introducing new marketing methods does not typically result in a statistically significant change in either productivity (sales per worker) or profitability (profit per worker). That is, the results show that new marketing methods are not, in themselves, a source of improved performance of firms in tourism associated sectors in MENA. However, this does not exclude the possibility that they may improve performance when used in conjunction with another "treatment". For example, new marketing methods may not yield performance results on their own but may be effective in supporting the introduction of new services.

Table 4 shows that introducing a new product or service has a statistically significant effect on productivity (sales per worker) at the 90% confidence level. The results show no statistically significant effect on profit per worker. Of the three strategies considered introducing new organisation or management practices is the only one supported as being full effective by the evidence. The

treatment effect of management changes is statistically significant at 99% confidence for both productivity (sales per worker) and profitability (profit per worker).

Table 4 : Propensity Score Matching for the Full Sample (kernel density matching, bootstrapped standard errors)										
Variable	Sample	Treated	Controls	Difference	Standard Error	T-stat	Treatment assignment	Common Support Off	Common Support On	Total
treatment: newmktg										
lspw	Unmatched	8.4133	8.3148	0.0984	0.1950	0.50	Untreated	0	504	504
	ATT	8.4133	8.1235	0.2897	0.2857	1.01	Treated	0	127	127
							Total	0	631	631
lppw	Unmatched	7.9987	8.0135	-0.0149	0.2522	-0.06	Untreated	0	458	458
	ATT	7.9987	7.8659	0.1327	0.3265	0.41	Treated	0	101	101
							Total	0	559	559
treatment: newprod										
lspw	Unmatched	8.6152	8.2761	0.3391	0.2065	1.64	Untreated	0	522	522
	ATT	8.6360	8.2194	0.4166	0.2522	1.65*	Treated	2	107	109
							Total	2	629	631
lppw	Unmatched	8.1517	7.9842	0.1675	0.2651	0.63	Untreated	0	470	470
	ATT	8.1781	7.9854	0.1927	0.3045	0.63	Treated	2	87	89
							Total	2	557	559
treatment: newmgt										
lspw	Unmatched	8.8550	8.1768	0.6783	0.1972	3.44	Untreated	0	467	467
	ATT	8.8550	8.0695	0.7855	0.2217	3.54***	Treated	0	120	120
							Total	0	587	587
lppw	Unmatched	8.5010	7.8550	0.6460	0.2459	2.63	Untreated	0	411	411
	ATT	8.4921	7.8308	0.6613	0.2586	2.56***	Treated	1	109	110
							Total	1	520	521
Note: *** significant at 99%, ** at 95%, * at 90%										

Table 5 repeats the PSM analysis for those three individual sectors with a sufficient number of observations – hotels, restaurants and bars and travel agencies. For the hotel sector the treatment effect of new marketing methods is not statistically significant with respect to both productivity and profitability. For both the introduction of new products (services) and new management practices the treatment effect on profitability is statistically significant at 95% and 90% confidence. The evidence is that firms who took either action experienced higher profitability that comparable firms that did not. Neither the treatment effect for new products nor new management practices was statistically significant in relation to productivity in the hotel sector. For the restaurant and bars sector neither new marketing nor the introduction of new products or services had any statistically significant effect on either productivity of profitability. The treatment effect for new management practices was both positive and statistically significant (at 90% confidence) with respect to productivity for restaurants and bars but not with respect to profitability.

The treatment effect of new marketing methods was, as for both the other sectors, statistically insignificant for travel agencies, with respect to both productivity and profitability. For the same sector the introduction of a new product or service had a positive and statistically significant effect (at 95% confidence) on productivity but not on profitability. For new management practices the treatment effect was likewise positive and statistically significant (at 90% confidence) with respect to productivity but statistically insignificant with respect to profitability.

Table 5 : Propensity Score Matching for Key Sectors (kernel density matching with bootstrapped standard errors)										
Variable	**Sample**	**Treated**	**Controls**	**Difference**	**Standard Error**	**T-stat**	**Treatment assignment**	**Common Support Off**	**Common Support On**	**Total**
Hotels										
treatment: newmktg										
lspw	Unmatched	8.2602	7.9245	0.3358	0.5278	0.64	Untreated	0	76	76
	ATT	8.3920	8.0138	0.3782	0.9799	0.39	Treated	3	19	22
							Total	3	95	98
lppw	Unmatched	8.0012	7.8876	0.1136	0.5839	0.19	Untreated	0	69	69
	ATT	8.0561	8.8264	-0.7703	0.9890	-0.78	Treated	4	11	15
							Total	4	80	84
treatment: newprod										
lspw	Unmatched	8.1653	7.9510	0.2143	0.5260	0.41	Untreated	0	71	71
	ATT	8.1925	7.8021	0.3904	0.8671	0.45	Treated	4	19	23
							Total	4	90	94
lppw	Unmatched	8.6821	7.6204	1.0617	0.5374	1.98	Untreated	0	63	63
	ATT	9.0336	7.0031	2.0305	1.0198	1.99**	Treated	5	12	17
							Total	5	75	80
treatment: newmgt										
lspw	Unmatched	8.4962	7.9524	0.5438	0.4150	1.31	Untreated	0	106	106
	ATT	8.4962	8.0929	0.4033	0.4772	0.85	Treated	0	34	34
							Total	0	140	140
lppw	Unmatched	8.3482	7.5283	0.8199	0.4203	1.95	Untreated	0	91	91
	ATT	8.2618	7.4229	0.8389	0.4795	1.75*	Treated	1	31	32
							Total	1		123
Restaurants										
Variable	**Sample**	**Treated**	**Controls**	**Difference**	**Standard Error**	**T-stat**	**Treatment assignment**	**Common Support Off**	**Common Support On**	**Total**
treatment: newmktg										
lspw	Unmatched	8.0643	8.1238	-0.0595	0.3485	-0.17	Untreated	0	177	177
	ATT	8.0643	7.9047	0.1597	0.4584	0.35	Treated	0	34	34
							Total	0	211	211
lppw	Unmatched	7.9290	7.5400	0.3890	0.4702	0.83	Untreated	0	150	150
	ATT	7.9290	7.0416	0.8874	0.5900	1.50	Treated	0	24	24
							Total	0	174	174
treatment: newprod										
lspw	Unmatched	8.0026	8.0937	-0.0911	0.3592	-0.25	Untreated	0	158	158
	ATT	7.7678	7.9932	-0.2254	0.4779	-0.47	Treated	4	29	33
							Total	4	187	191
lppw	Unmatched	7.5566	7.5705	-0.0139	0.4482	-0.03	Untreated	0	131	131
	ATT	7.2102	7.9416	-0.7314	0.5684	-1.29	Treated	4	22	26
							Total	4	153	157
treatment: newmgt										
lspw	Unmatched	8.5850	7.9950	0.5900	0.3262	1.81	Untreated	0	168	168
	ATT	8.5850	7.8678	0.7172	0.3947	1.82*	Treated	0	40	40
							Total	0	208	208
lppw	Unmatched	8.1468	7.4958	0.6510	0.4189	1.55	Untreated	0	139	139
	ATT	8.1468	7.5350	0.6118	0.3862	1.58	Treated	0	32	32
							Total	0	171	171
Travel Agencies										
Variable	**Sample**	**Treated**	**Controls**	**Difference**	**Standard Error**	**T-stat**	**Treatment assignment**	**Common Support Off**	**Common Support On**	**Total**
treatment: newmktg										
lspw	Unmatched	8.5789	8.6650	-0.0862	0.3493	-0.25	Untreated	0	166	166
	ATT	8.5789	8.9111	-0.3322	0.3855	-0.86	Treated	0	40	40
							Total	0	206	206
lppw	Unmatched	7.8366	8.6084	-0.7719	0.4461	-1.73	Untreated	0	157	157
	ATT	7.8366	8.5202	-0.6836	0.5290	-1.29	Treated	0	36	36
							Total	0	193	193
treatment: newprod										
lspw	Unmatched	9.7063	8.5569	1.1493	0.4259	2.7	Untreated	0	176	176
	ATT	9.7063	8.6742	1.0321	0.5232	1.97**	Treated	0	25	25
							Total	0	201	201
lppw	Unmatched	8.7028	8.4242	0.2786	0.5483	0.51	Untreated	0	164	164
	ATT	9.0905	8.4094	0.6811	0.6235	1.09	Treated	1	22	23
							Total	1	186	187
treatment: newmgt										
lspw	Unmatched	9.4760	8.4111	1.0649	0.4313	2.47	Untreated	0	125	125
	ATT	9.3301	8.4507	0.8794	0.5090	1.73*	Treated	1	24	25
							Total	1	149	150
lppw	Unmatched	8.9090	8.3749	0.5341	0.5518	0.97	Untreated	0	116	116
	ATT	8.7346	8.5705	0.1641	0.6152	0.27	Treated	1	23	24
							Total	1	139	140
Note: *** significant at 99%, ** at 95%, * at 90%										

The analysis for the full sample found no statistically significant treatment effect of new marketing methods on either productivity or profitability. The same conclusion applied to each of the three, more detailed sectors. The introduction of a new product or service on productivity (positive and statistically significant in the full sample) was only found to have a statistically significant and positive treatment effect for travel agencies but not for either hotels or restaurants and bars. The treatment effect of new management practices (positive and statistically significant for both productivity and profitability in the full sample) was found to have a positive and statistically significant effect on productivity but not profitability for both travel agencies and restaurants and bars.

5. CONCLUSIONS

From the perspective of managers of firms in tourism and associated sectors in the MENA countries this study offers a degree of optimism. It suggests that positive actions by management such as introducing new products or services can achieve improved firm performance in terms of productivity or profitability. That is, despite high degrees of competition and a prevalence of small enterprises, firms in these sectors do not have to behave as passive price takers but can actively affect outcomes. The success of such actions is not universal or guaranteed. In many cases this study found no statistically significant effect, particularly with respect to the introduction of new marketing methods. The success or not of any particular one of these actions depends, amongst other considerations, on the sector and the intended outcome. Of the three sets of actions considered the effect of new management practices on productivity comes closest to having a universal positive effect.

The study offers a methodological contribution to a literature focused on predominantly hotel efficiency. It does this, in part, by widening the area of interest to a number of other sectors associated with tourism and also includes a number of countries, that allowing variances in national attributes. It also applies a propensity score methodology, an approach not yet widely applied in efficiency studies related to tourism. The use of this approach offers significant benefits in dealing with firm heterogeneity, allowing clear inferences to be drawn.

The location of, in particular, hotels but also other firms engaged with tourism has long been established as a key influence on performance, along with the local business environment. This always creates a degree of concern as to what extent the lessons drawn from one location can be extended to others. That this study is a multi-country one offers some reassurance that the findings are or relevance in a wider context. Perhaps the most relevant conclusion of this study is that firm performance is not wholly driven by location. Active and appropriate managerial actions can and do also shape form performance.

REFERENCES

Aigner Dennis, Lovell C A Knox and Schmidt Peter (1977), Formulation and Estimation of Stochastic Frontier Models, Journal of Econometrics, 1, 21-37.

Assaf, A. (2012). Benchmarking the Asia Pacific tourism industry: A Bayesian combination of DEA and stochastic frontier. Tourism Management, 33(5), 1122-1127.

Assaf, A. G., & Barros, C. P. (2013). A global benchmarking of the hotel industry. Tourism Economics, 19(4), 811-821.

Assaf, A., Barros, C. P., & Josiassen, A. (2012). Hotel efficiency: A bootstrapped metafrontier approach. International Journal of Hospitality Management, 31, 621-629.

Assaf, A., & Cvelbar, K. L. (2011). Privatization, market competition, international attractiveness, management tenure and hotel performance: Evidence from Slovenia. International Journal of Hospitality Management, 30(2), 391-397.

Baltagi Badi (1995), Econometric Analysis of Panel Data, Wiley, Chichester.

Barros, Carlos Pestana (2004). A stochastic cost frontier in the Portuguese hotel industry. Tourism Economics, Volume 10, Number 2,177-192(16)

Barros, C. P. (2005). Measuring efficiency in the hotel sector. Annals of Tourism Research, 32(2), 456-477.

Barros, C. A. P., & Santos, C. A. (2006). The measurement of efficiency in Portuguese hotels using data envelopment analysis. Journal of Hospitality & Tourism Research, 30(3), 378-400.

Barros, C. P., Peypoch, N., & Solonandrasana, B. (2009). Efficiency and productivity growth in hotel industry. International Journal of Tourism Research, 11(4), 389-402.

Barros, C. P., Botti, L., Peypoch, N., Robinot, E., & Solonandrasana, B. (2011). Performance of French destinations: Tourism attraction perspectives. Tourism Management, 32(1), 141-146.

Battese George and Coelli Timothy (1995), A Model for Technical Inefficiency Effects in a Stochastic

Frontier Production Function for Panel Data, Empirical Economics, 20, 325-332.

Bernini, C., & Guizzardi, A. (2010). Internal and locational factors affecting hotel industry efficiency: evidence from Italian business corporations. Tourism Economics, 16(4), 883-913.

Bravo-Ureta B and Pinheiro A (1993), Efficiency Analysis of Developing Country Agriculture: A Review of the Frontier Function Literature, Agricultural and Resource Economics Review 22: 88-101.

Chen, C. F. (2007). Applying the stochastic frontier approach to measure hotel managerial efficiency in Taiwan. Tourism Management, 28(3), 696-702.

Claessens Sjin, Djankov S and Xu L (2000), Corporate Performance in the East Asian Financial Crisis, The World Bank Research Observer, 151, 23–46.

Clarke, George RG. "How Petty is Petty Corruption? Evidence from Firm Surveys in Africa." World Development 39.7 (2011): 1122-1132.

Coelli Timothy (1995), Estimators and Hypothesis tests for a Stochastic Frontier Function: A Monte Carlo Analysis, Journal of Productivity Analysis, 6, 247-68.

Coelli Timothy (1995a), Recent Developments in Frontier Modelling and Efficiency Measurement, Australian Journal of Agricultural Economics, 39:3, 219-245.

Coelli Timothy, Rao Prahad and Battese George (1998), An Introduction to Efficiency and Productivity Analysis. Boston, Mass: Kluwer Academic Publishers.

Correa, Paulo G., Ana M. Fernandes, and Chris J. Uregian. "Technology adoption and the investment climate: firm-level evidence for Eastern Europe and Central Asia." The World Bank Economic Review 24.1 (2010): 121-147.

De Rosa, Donato, Nishaal Gooroochurn, and Holger Gorg. "Corruption and productivity: firm-level evidence from the BEEPS survey." World Bank Policy Research Working Paper Series, Vol (2010).

Dethier, Jean-Jacques, Maximilian Hirn, and Stéphane Straub. "Explaining enterprise performance in developing countries with business climate survey data." The World Bank Research Observer 26.2 (2011): 258-309.

Fare Rolf, Grosskopf Shawna and Lovell C A Knox (1985), The Measurement of Efficiency of Production, Kluwer Academic Publishers, Boston

Farrell Michael (1957), The Measurement of Productive Efficiency, Journal of the Royal Statistical Society, Series A, CXX, Part 3, 253-90.

Fried Harold, Lovell C A Knox and Schmidt Shelton (1993), The Measurement of Productive Efficiency: Techniques and Applications, New York: Oxford University Press.

Fries, Steven, Tatiana Lysenko, and Saso Polanec. The 2002 business environment and enterprise performance survey: results from a survey of 6,100 firms. No. 84. 2003.

Goncalves, O. (2013). Efficiency and productivity of French ski resorts. Tourism Management

Harvey C and Roper A (1999), The Asian Bet, in Harwood, Litan Pomerleano (eds), The Crisis in Emerging Financial Markets, Brookings Institution Press, 1999, pp 29–115.

Hu, J. L., Chiu, C. N., Shieh, H. S., & Huang, C. H. (2010). A stochastic cost efficiency analysis of international tourist hotels in Taiwan. International Journal of Hospitality Management, 29(1), 99-107.

Ismail, Kiran M., et al. "Managerial ties, strategic initiatives, and firm performance in Central Asia and the Caucasus." Asia Pacific Journal of Management (2013): 1-14.

Jensen, Nathan M., Quan Li, and Aminur Rahman. "Understanding corruption and firm responses in cross-national firm-level surveys." Journal of International Business Studies 41.9 (2010): 1481-1504.

King, G., & Nielsen, R. (2016). Why propensity scores should not be used for matching. Copy at http://j. mp/1sexgVw Download Citation BibTex Tagged XML Download Paper, 378.

Kodde David and Palm Franz (1986), Wald Criteria for Jointly Testing Equality and Inequality Restrictions, Econometrica, 54: 5, 1243-48.

Ma, Yue, Baozhi Qu, and Yifan Zhang. "Judicial quality, contract intensity and trade: Firm-level evidence from developing and transition countries." Journal of Comparative Economics 38.2 (2010): 146-159.

Oliveira, R., Pedro, M. I., & Marques, R. C. (2013a). Efficiency and its determinants in Portuguese hotels in the Algarve. Tourism Management, 36, 641-649.

Oliveira, R., Pedro, M. I., & Marques, R. C. (2013b). Efficiency performance of the Algarve hotels using a revenue function. International Journal of Hospitality Management, 35, 59-67.

Peypoch, N., & Solonandrasana, B. (2006). Technical efficiency in the tourism industry. Tourism Economics, 12(4), 653-657.

Peypoch, N., & Solonandrasana, B. (2008). Aggregate efficiency and productivity analysis in the tourism industry. Tourism Economics, 14(1), 45-56.

Pulina, Manuela, Detotto, Claudio and Paba, Antonello. (2010). An investigation into the relationship between size and efficiency of the Italian hospitality sector: A window DEA approach. European Journal of Operational Research. Volume 204, Issue 3, 613–620.

Shephard Ronald (1970), Theory of Cost and Production Functions, Princeton University Press,

Princeton.

Spencer, Jennifer, and Carolina Gomez. "MNEs and corruption: The impact of national institutions and subsidiary strategy." Strategic Management Journal 32.3 (2011): 280-300.

Toyoda Toshihisa (1974), Use of the Chow Test under Heteroscedasticity, Econometrica, 601-8.

Waldman David (1982), A Stationary Point for the Stochastic Frontier Likelihood, Journal of Econometrics, 18, 275-79.

Xu, Lixin Colin. "The effects of business environments on development: Surveying new firm-level evidence." The World Bank Research Observer 26.2 (2011): 310-340.

Yu, Ming-Miin and Lee, Bruce C.Y. (2009). Efficiency and effectiveness of service business: Evidence from international tourist hotels in Taiwan. Tourism Management. Volume 30, Issue 4, 571–580.

APPENDIX 1: Sectoral Composition of the Sample				
ISIC (Revision 3) Classification			Mean Firm	Mean Sales
Code	Description	Sample	Employees	(000 US $)
5510	Hotels and other short-stay accommodation	149	82	3,227
5520	Restaurants, bars and canteens	212	36	1,249
6021	Scheduled passenger land transport (other than rail)	21	195	2,427
6022	Non-scheduled passenger land transport (other than rail)	32	89	904
6210	Scheduled air transport	4	66	1,112
6220	Non-scheduled air transport	1	320	4,318
6304	Travel agencies and tour operators	215	68	2,687
	Full Sample	**634**	**66**	**2,227**

Appendix 2: Country Composition of the Sample			
Country	Sample	Mean Firm	Mean Sales
		Employees	(000 US $)
Djibouti	38	29	1182
Egypt	294	78	1414
Israel	17	255	18680
Jordan	31	29	193
Lebanon	41	56	9694
Morocco	36	102	3801
Tunisia	63	66	593
Turkey	13	19	448
West Bank and Gaza	65	24	389
Yemen	36	26	701
Full Sample	**634**	**66**	**2227**

Appendix 3: Selected Enterprise Survey Questions

Variable *Newprod* (0,1):

During the last three years, has this establishment introduced new or significantly improved products or services? Please exclude the simple resale of new goods purchased from others and changes of a solely aesthetic nature.

Variable *Newmgt (0,1):*

During the last three years, has this establishment introduced any new or significantly improved organizational structures or management practices?

Variable *Newmktg (0,1):*

During the last three years, has this establishment introduced new or significantly improved marketing methods?

Component questions for the infrastructure obstacles variable *infra* :

- *Is electricity No Obstacle, a Minor Obstacle, a Moderate Obstacle, a Major Obstacle, or a Very Severe Obstacle to the current operations of this establishment?*
- *Is Telecommunications No Obstacle, a Minor Obstacle, a Moderate Obstacle, a Major Obstacle, or a Very Severe Obstacle to the current operations of this establishment?*
- *Is transport No Obstacle, a Minor Obstacle, a Moderate Obstacle, a Major Obstacle, or a Very Severe Obstacle to the current operations of this establishment?*

Component questions for the bureaucratic obstacles variable *burcy* :

- *Are customs and trade regulations No Obstacle, a Minor Obstacle, a Moderate obstacle, a Major Obstacle, or a Very Severe Obstacle to the current operations of this establishment?*
- *Is Tax administration No Obstacle, a Minor Obstacle, a Moderate obstacle, a Major Obstacle, or a Very Severe Obstacle to the current operations of this establishment?*
- *Are Business licensing and permits No Obstacle, a Minor Obstacle, a Moderate obstacle, a Major Obstacle, or a Very Severe Obstacle to the current operations of this establishment?*
- *Are labor regulations No Obstacle, a Minor Obstacle, a Moderate Obstacle, a Major Obstacle, or a Very Severe Obstacle to the current operations of this establishment?*