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The mediation role of public governance in the relationship between entrepreneurship and economic growth

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Abstract

Purpose – The purpose of this paper is to investigate the mediation role of public governance in the relationship between entrepreneurship and economic growth in the United Arab Emirates (UAE).
Design/methodology/approach – To achieve this aim, the study uses a 20-year time series analysis (1996–2015) and tests the effect of entrepreneurship on economic growth, through public governance, via a mediator model.
Findings – The study has determined that public governance buoys the positive effect that entrepreneurship activities exert on economic growth in the UAE. Based on this determination, the study posits a set of recommendations that focus on supporting entrepreneurship activities that play a significant role in economic growth.
Originality/value – The study adds to the literature on the impact of entrepreneurship on economies dependent on oil revenues *vis-à-vis* a public policy perspective. The study provides insights into the type of entrepreneurship that most efficaciously suits the Emirati social and cultural milieu in terms of fostering national economic growth. In addition, the study limns a vision of the role of public governance in creating an enabling environment that stimulates entrepreneurial activity and, in turn, increases economic growth in the Emirates.

Keywords United Arab Emirates, Economic growth, Entrepreneurship, Mediation model, Public governance

Paper type Research paper

1. Introduction

Entrepreneurship is widely regarded as an essential stimulant of economic growth. Entrepreneurship generates job opportunities through the entrepreneurial activity and innovations of small- and medium-sized enterprises (SMEs); a recognized engine for economic growth (Bourne, 2011; Yang and Li, 2011). Accordingly, many governments have effectuated policies designed to stimulate entrepreneurship activities (Méndez-Picazo *et al.*, 2012).

In the Gulf Cooperation Council (GCC) countries in general, and the United Arab Emirates (UAE) in particular, entrepreneurship has been closely linked to plans for

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economic diversification away from dependence on the oil and gas sector of the economy. Through a time-series analysis over a 20-year period, this study gauges the impact of entrepreneurial activity on the level of diversification in the UAE. In parallel, this study provides insights for policy makers and legislators, in terms of the enactment of economic policies that can serve to maximize this impact.

Entrepreneurship contributes to economic growth, in conformity with the long-run strategy of economic diversification, involving private sector innovation through creation of SMEs that use knowledge as an input. Economic growth creates new job opportunities as new markets open up through such innovation (Sabella *et al.*, 2014). Equipped with this knowledge and understanding of the vital role that entrepreneurship plays in ushering in sustainable growth, the UAE appears to have presciently realized the imperative of promoting entrepreneurship education in support of SMEs in its strategy to become a competitive knowledge economy. To build a more sustainable and diversified economy, in line with social and economic development plans (such as: Emirates 2021, Dubai 2015, and Abu Dhabi 2030), the UAE has invested considerable government proceeds, generated from the previous era of high oil prices, into programs that promote entrepreneurship. This is manifest in the government's sponsorship of new enterprises, and nurturing of SMEs (Al-Sokari *et al.*, 2014), through various legislative initiatives. A key question addressed by this study is the extent to which the Emirati government has succeeded in realizing its vision for economic diversification through support of entrepreneurship.

Many studies have investigated the relationship between entrepreneurship and economic growth, albeit in developed economies, finding that a positive relationship exists between the two variables. This study, with respect to the case of the UAE, not only delves into the role that entrepreneurship plays in economic growth, but furthermore seeks to understand the extent to which legislative and general policy initiatives contribute to buoying levels of entrepreneurship activity (Sabella *et al.*, 2014).

In the previous era of high oil prices, the Gulf countries managed to achieve substantial progress in both economic and human development (Al-Abbas, 2012). Among these countries, the UAE ranked 7th in the world in terms of per capita income, and 34th in terms of human development[1], with a low level of unemployment that stood at 4.3 percent (2010). In spite of this, the Gulf countries have not yet achieved truly sustainable economic growth, given spotty progress in economic diversification. However, the UAE stands out insofar as it has managed to shrink the oil and gas sector contribution to, and share of, the economy from 41 percent in 2000 to 31 percent in 2015[2] (helped by recent falling oil prices). Achieving sustainable development, or rather the failure to achieve sustainable development thus far, has forced Gulf governments, including the UAE, to abandon the old development model, centered on oil revenues, with a view to diversifying sources of national income. Hence, this study assesses the role that government legislation plays in fostering entrepreneurship as a key driver of economic diversification in the UAE.

The UAE was recently ranked as the first country in the MENA region, and 19th worldwide, for entrepreneurship according to the Global Entrepreneurship and Development Institute Index (2016). Concomitantly, such achievements warrant further research and motivate researchers to investigate the factors that played a role in achieving such advanced positions for the UAE. In terms of public governance, for instance, the UAE has traditionally scored high rates in most public governance milestones, which put it in the second place following Qatar among GCC countries. Additionally, the economic growth rate in the UAE has been among the highest in the GCC countries, in recent years.

The rest of the paper is organized as follows: the second part presents a literature review from which hypothesis development proceeds. The third part, in explicating methodology

and sampling technique, articulates the study model, variables and metrics. The fourth part elaborates a descriptive study. The fifth part discusses the empirical results. In the final part, conclusions are put forth and a consideration of implications receives attention. Future studies are suggested.

2. Literature review and hypothesis development

Economic activity in general, in which individuals freely and safely engage in economic transactions, requires a sound legal and regulatory environment. Within this context, public governance serves as a cornerstone of economic progress by protecting contractual and property rights, without which individuals would refrain from undertaking investment. Additionally, good public governance dictates the creation of an inclusive environment, one within which a large section of the society can participate in economic activities (Acemoglu, 2003). North (1990) posits that the level of institutional development, as influenced by historical, cultural, social and political factors, is a key driver of entrepreneurship activities.

Establishing a direct relationship between entrepreneurship and economic growth entails evaluating a set of interactive factors that are difficult to measure (Sabella *et al.*, 2014). Previous studies and researchers have been divided on the effect that entrepreneurship has on economic growth. Some conclude that entrepreneurship buoys economic growth through increasing job opportunities and production, indicative of a positive relationship between entrepreneurship and economic growth (Schumpeter, 1911/1934; Kirzner, 1973; Carree *et al.*, 2003; Martinez, 2005). While other researchers posit that entrepreneurship can have no impact on economic growth on the grounds that entrepreneurship merely exploits surplus revenues (Minniti and Levesque, 2006).

In his seminal study, Schumpeter (1911/1934) explores the relationship between entrepreneurship and economic growth, and finds that entrepreneurship (in transforming new ideas, through innovation, into new products or services that create employment and generate gross fixed capital formation) contributes to economic growth. Acs (1992) supports these findings in the way that entrepreneurs are viewed as agents that transform new ideas into new products which actively contribute to the creation of jobs and to the improvement of the economy (Sabella *et al.*, 2014). Beyond generating employment, entrepreneurship is seen to increase the competitiveness of markets, with the effect of ratcheting up the production of new high value-added goods. In so doing, entrepreneurship exerts a positive influence on economic growth (Naude, 2008). Carree *et al.* (2002) also find that entrepreneurship stimulates economic growth through the increase of productive capacity, and through inventing creative methods for purchase and distribution. Minniti and Levesque (2006) corroborate these findings *vis-à-vis* the significance of entrepreneurship, insofar as they viewed this significance as stemming from its being a source of creativity, that mobilizes non- or under-utilized resources, with the effect of making them functional in contributing to national economic growth. In a study on the impact of entrepreneurship on economic growth, conducted on 13 European countries, Carree and Thurik (1998) find a positive relationship between the two variables. Méndez-Picazo *et al.*, 2012 demonstrates a positive correlation between entrepreneurship and economic growth.

In investigating the relationship between entrepreneurship and economic growth, it is expedient to distinguish between supply and demand of entrepreneurship: the demand refers to the opportunities available for economic activity, while the supply refers to the required skills and available resources (Audretsch *et al.*, 2002).

The relationship between entrepreneurial start-up formation, and individuals' share in the national income, is not linear but of a "U" shape. Countries with low per capita income have a rise in entrepreneurship activities as the individuals attempt to improve their income; countries

with high per capita also have a rise in entrepreneurship activities due to the availability of financial resources, technology and governmental support. However, entrepreneurship may differ in these two types of economies inasmuch as one kind of entrepreneurship is based on necessity (so-called "necessity entrepreneurship"), while the other is motivated by opportunity (so-called "opportunity entrepreneurship") (Minniti *et al.*, 2005). "Necessity entrepreneurship" and "opportunity entrepreneurship" impact economic growth in different ways, with the former having the effect of "increas[ing] the flexibility and productivity of the economic system and contribut[ing] to a higher degree of job satisfaction." The latter, by comparison, namely, "opportunity entrepreneurship," is found to stimulate "competitiveness, economic growth and job creation" to a greater extent (Wennekers *et al.*, 2010).

Wong *et al.* (2005) provided theoretical evidence on the relationship between entrepreneurship and economic growth. The positive influence of entrepreneurial activity on economic growth spans the capacity for inventiveness generation, resource synergies and competition magnification effects. In most studies concluding the non-impact of entrepreneurship on economic growth, control factors on entrepreneurship activities and their motives appear absent, with the result that the integrity of the drawn conclusions can easily be gainsaid (Valliere and Peterson, 2009). Moreover, such a conclusions are counterintuitive inasmuch as new knowledge, beyond doubt, contributes to economic growth (even if the mechanism through which this knowledge is put into practice, and its role in economic development, is contentious and varies in its dynamics among economies, as based on evidence). Rather than asseverating, like Carlsson *et al.* (2009), the absence of any correlation between entrepreneurship and economic growth, Acs and Armington (2006) maintains that entrepreneurial activities impact economic growth negatively.

Tang and Koveos (2004) alternatively bifurcate entrepreneurship, in terms of impact on economic growth, into "Venture Entrepreneurship (VE), which deals with new venture creation, and Innovation Entrepreneurship (IE), which involves innovations within existing enterprises. VE is found to be positively related to GDP growth rate. IE is negatively related to the economic growth rate in high-income countries, while the findings for middle- and low-income countries are mixed."

Three theories address these positive influences ascribed to entrepreneurial activity. Valliere and Peterson (2009) associate driving down transportation costs as key environmental endowments that drive economic growth. These variables explain divergence between developing and developed country economic growth patterns. Krugman (1991a, 1991b, 1991c) likewise noted that geographic and internal factors play a significant role in impacting patterns of economic development. Local inventiveness theory explains economic growth as being internally driven by local inventiveness (Romer, 1990; Nijkamp and Poot, 1998), in contrast to modern classical theory which ignores the source of technology (Valliere and Peterson, 2009). Consequently, economies grow at rates commensurate with levels of local inventiveness (Suarez-Villa, 2000). Local investment generates indigenous knowledge which, over time, spawns innovation with linkages to multiple sectors of the economy (Valliere and Peterson, 2009; Glaeser *et al.*, 1999; Sternberg and Wennekers, 2005; Anselin *et al.*, 2000; Acs and Varga, 2005). Innovation can be generated through entrepreneurial activity involving, for instance, technological breakthroughs in production processes, and through new market entries across industrial sectors and geographies. Collectively these phenomena, in aggregate, create job opportunities pushing economies toward full employment and ratcheting up economic growth (Audretsch and Keilbach, 2004). Valliere and Peterson (2009) identify two criteria – increasing individuals' participation in economic activity and increasing demand for local products – as key to local inventiveness that drives economic growth.

In institutional theory, institutions facilitate economic growth as they support entrepreneurs gain access to sources of capital, technology and know-how

(Méndez-Picazo *et al.*, 2012). Strong institutions act as fillip spurring entrepreneurial activity, whereas weak institutions act as a brake on entrepreneurial activity. Depending on their effectiveness, institutional structures set up by the government impact corporate planning and policy, learning and technology systems, administration and finance, either spurring or deterring, or having no effect on, entrepreneurship (Freeman, 1988; Lundvall, 1988; Nelson, 1988). At a minimum, institutional structures ought to create a conducive environment that fosters entrepreneurship, given appropriate laws and regulations are already in place (Gwartney *et al.*, 1999). In other words, creation of a suitable investment environment is necessary to encourage development, entrepreneurship and economic growth (Boettke and Coyne, 2003) through incentivizing individual economic actors to channel efforts into entrepreneurship (Audretsch *et al.*, 2002).

Under the first assumption, we investigate whether entrepreneurship, positing economic growth, is contingent upon other factors such as public governance. This study is expected to provide insights, for economic policy makers and legislators, that allow a better understanding of the nature of entrepreneurship in the UAE, and how it can act as an engine of economic growth. The insights gained from this study should be particularly useful in shedding light on the role of public governance in creating an enabling environment for entrepreneurship. Furthermore, this study provides insights into the role that public governance plays in the relationship between entrepreneurship and economic growth, through the prism of experience of the UAE.

Relying on the previous theoretical discussion, the study's hypothesis may be formulated as follows: "Public Governance Mediates the Relationship between Entrepreneurship and Economic Growth."

3. Empirical methodology

3.1 Study models

The preliminary analysis of this study evaluates the effect of entrepreneurship activity on economic growth between 1996 and 2015 in the UAE. Then, it endeavors to test the effect of public governance on the effect of entrepreneurship in relation to economic growth in the UAE, employing a time series analysis within this period. In furtherance of this follow-on analysis, an extensive neoclassical product function of growth, stemming from the following function, is adopted in which labor and capital are factors of production that drive economic growth:

$$\text{EconGrowth}_t = \alpha + \beta_1 \text{Labor}_t + \beta_2 \text{Capital}_t + \varepsilon_t. \quad (1)$$

This relationship is extended by including control variables to the model; namely, oil price (oil_t) and level of economic diversification in the UAE (Diver_t), so the formula becomes:

$$\text{EconGrowth}_t = \alpha + \beta_1 \text{Labor}_t + \beta_2 \text{Capital}_t + \beta_3 \text{Oil}_t + \beta_4 \text{Diver}_t + \varepsilon_t. \quad (2)$$

The oil price and the extent of diversification impact GDP. With respect to oil exporting countries, a rise in oil prices increases national income and governmental revenues. Many international studies (Audretsch *et al.*, 2002; Wong *et al.*, 2005; Hamdan, 2017) consider economic diversification as a key driver of economic development: the greater the level of diversification, the greater the economic growth rate. Both serve as control variables between economic growth and entrepreneurship.

3.2 Mediated model

In the mediated model, there is no relation between the dependent and independent variables. The independent variable first affects the mediator variable, and then affects

the independent variable. Thus, there is a causal chain of effects between the dependent and independent variables (Namazi and Namazi, 2016). Figure 1 illustrates the relationship between public governance as a mediator between entrepreneurship and economic growth.

To test the mediator model, entrepreneurship should have an effect on economic growth (Path c), and this effect should be statistically significant, through the following model:

$$\text{EconGrowth}_t = \alpha + \beta_1 \text{Labor}_t + \beta_2 \text{Capital}_t + \beta_3 \text{Oil}_t + \beta_4 \text{Diver}_t + \beta_5 \text{Entrp}_t + \varepsilon_t. \quad (3)$$

In the following step, we find the effect of entrepreneurship on public governance (Path a), and this effect should be statistically significant, through the following model:

$$\text{Governance}_t = \alpha + \beta_1 \text{Entrp}_t + \varepsilon_t. \quad (4)$$

In the third step, we will find the effect of entrepreneurship and public governance together on economic growth (Paths c′and b), and add control variables as following:

$$\text{EconGrowth}_t = \alpha + \beta_1 \text{Labor}_t + \beta_2 \text{Capital}_t + \beta_3 \text{Oil}_t + \beta_4 \text{Diver}_t + \beta_5 \text{Entrp}_t + \beta_6 \text{Governance}_t + \varepsilon_t. \quad (5)$$

Therefore, the effect of public governance, in the relationship taken together with entrepreneurship, is the result of multiplying Paths c and b.

3.3 Measurement of variables

This part of the study elaborates on metrics adopted with respect to each of the variables entering into the model defined above.

3.3.1 Measuring economic growth in terms of production function variables. In keeping with past studies assessing entrepreneurship, growth in GDP is employed as a measure of economic growth (Audretsch and Fritsch, 1996, 2002; Acs and Armington, 2006; Fritsch and Mueller, 2004; Saberi and Hamdan, 2019), and serves as the dependent variable in the model.

As for the metrics for independent variables in the model, the following are employed.

3.3.1.1 Oil price. West Texas price average (adopted by Gulf States) is employed in the study as a gauge of oil price.

3.3.1.2 Economic diversification. This study employs the Gini coefficient as a measure of industrial concentration, designed by Si Gini, in which concentration is "Very high" if the rate exceeds (0.7), "High" if the coefficient ranges between (0.5–0.7), "Average" between

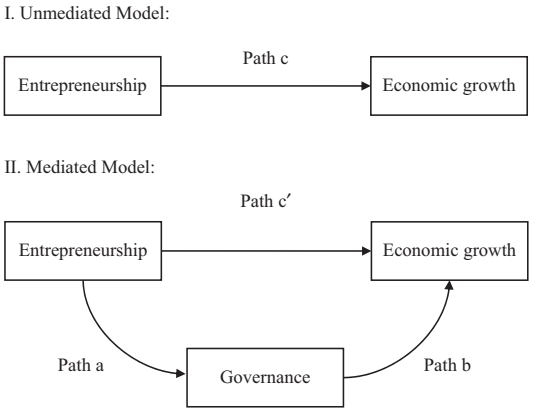

Figure 1.
Unmediated and mediated models

(0.35–0.5), and "Weak" if it was found to be less than (0.35). The lower the Gini coefficient, the greater the level of economic diversification. The following formula illustrates the coefficient:

$$\text{Gini}_t = 1 - \sum_{k=1}^{n} (x_k - x_{k-1})(y_k + y_{k+1}). \quad (6)$$

x_k represents the frequent ascendance of the relative accumulation of the total variable (GDP sector). y_k represents the ascendance of relative accumulation of sector number; n represents the number of economic sectors constituting GDP. The Gini index ranges between 0 and 1. If the coefficient is equal to 0, then the economic diversification is complete, and if it is equal to 1, the diversification is nil – a case in which economic products are centered on one activity, and other activities do not contribute to GDP.

3.3.2 Measuring entrepreneurship variables and public governance. Three metrics are employed in this study to gauge entrepreneurial activity, whereas a single index of effectiveness, based on five sub-indices, serves as a proxy for public government effectiveness as follows.

3.3.2.1 Entrepreneurship. The study, in measuring entrepreneurship, employs the number of newly created enterprises in the UAE (derived from the World Bank database). The number of newly created enterprises was used as an entrepreneurship measure in the study Model No. (3). In contrast, the descriptive portion of the study employed data derived from the Global Entrepreneurship Monitor (GEM).

3.3.2.2 Public governance scale. Five sub-indices, drawn from World Bank Reports between (1996 and 2015), have been aggregated to generate a proxy for the level of public governance in the UAE: control of corruption, government effectiveness, political stability, rule of law and regulatory quality.

3.4 Data sources

The study taps secondary sources of data extant in World Bank database, General Statistics of the UAE and GEM.

3.4.1 Global Entrepreneurship Monitor (GEM). Based on primary survey data, the GEM has been widely used to measure entrepreneurship by offering uniform definitions and data collection that can be comparable across countries (Sternberg and Wennekers, 2005; Valliere and Peterson, 2009). According to the GEM (2015) report, the GEM index is an annual assessment of the national level of entrepreneurial activity, which was expanded from 10 countries in 1999 to 73 countries in the year 2014, representing 72.4 percent of the world's population, 90 percent of the world's GDP, and including both developed and developing countries (Singer *et al.*, 2015). The GEM index uses different and distinct indices to measure total entrepreneurial activity. These indices include both the nascent entrepreneurship rate and gazelle firms. The nascent entrepreneurship rate is "the number of people actively involved in starting a new venture, as a percentage of the adult population (18–64 years of age)" (Wennekers *et al.*, 2005). Gazelle firms are "all start-ups and newly formed businesses (less than 42 months old) which expect to employ at least 20 employees in 5 years" (Valliere and Peterson, 2009). The GEM data also distinguishes between opportunity and necessity of nascent entrepreneurial activity, based on the motives for individuals to participate in entrepreneurial activities. Opportunity entrepreneurs are those who recognize a business opportunity (i.e. they choose to start a venture as one of several possible career alternatives), while necessity entrepreneurs are those who realize entrepreneurship as their last option (i.e. they feel obliged to start their own business because all other work alternatives are either absent or insufficient) (Wennekers *et al.*, 2005; Valliere and Peterson, 2009; Singer *et al.*, 2015).

4. Descriptive study

4.1 The environment of public governance in the UAE

Table I shows the five indices capturing the effectiveness of public governance in the UAE (1996–2015) that are aggregated on an annual basis. The table reveals that the UAE has achieved significant progress in improving the environment of public governance. Governmental effectiveness constitutes the strongest sub-index, followed by corruption control, which left unchecked acts as a major impediment to economic growth. By 2015, the UAE achieved an overall score of over 80 percent for the effectiveness of public governance, with a CAGR over 19 years of 0.84 percent per annum (notwithstanding that the political stability sub-index, lower in 2015 than it had been in 1996, has acted as a drag on overall public governance effectiveness). It is hypothesized that improving the public governance environment creates an enabling environment for entrepreneurial activity that buoys economic growth.

4.2 Entrepreneurship, economic growth and public governance

Table II reveals that the rate of growth for newly created enterprises has generally accelerated during the study period. The number of newly created enterprises had increased from 2,047 in 1996 to 14,964 in 2015, which indicates a concerted effort by the Emirati Government directed toward enhancing the role of the private sector and entrepreneurship in UAE's economy (Table III).

Oil prices have been increasing noticeably during the study period until 2014, where these prices started to deteriorate. However, economic diversification indicators for the UAE were not significantly affected during this period, with only a marginal change.

In the correlation matrix, we notice that oil prices are found to be positively related with entrepreneurial activity. This is due to a high level of governmental support for entrepreneurship which is at least partly made possible by increased oil price returns. Although the Emirati economy bears some resemblance to other GCC economies, insofar as they are all oil-dependent and reliant on fossil fuels as a bedrock of the economy, the study results interestingly indicate a positive relationship between oil prices and GDP growth. Pearson's test indicates a positive and significant ($p < 0.1$) correlation between entrepreneurship indicators and GDP growth.

In order to examine the effects of the public governance environment on entrepreneurship activity in the UAE, the time series was bifurcated into: annual periods in which a rise in public governance effectiveness stimulating entrepreneurial activity manifests and annual periods in which a rise in public governance effectiveness imparts no effect on entrepreneurial activity with reference to the aggregate value of the public governance index. In every period, activity mean was calculated, and results are shown in Table IV. The table used the *t*-test and *z*-test to assess significance of differences in mean values.

Table IV shows that the periods with a "stimulating" environment witnessed entrepreneurial growth entailing, presumably, more SMEs. The difference between the two periods was highly significant according to both the *t*-test and *z*-test. One can infer that improved public governance, though institutional development, creates an environment conducive to the takeoff and proliferation of entrepreneurial activities in an economy.

5. Empirical study

5.1 Identification of structural breaks

Several recent studies document the presence of structural breaks in oil prices that need to be considered in time series analyses (Mensi *et al.*, 2015; Ewing and Malik (2010)). Accordingly,

Table I.
Public governance environment in UAE

	Years											
Public governance and institutional indicators	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
Control of corruption	55.6	58.5	58.0	61.0	63.4	66.7	84.9	81.0	84.9	82.9	79.5	84.0
Government effectiveness	72.7	74.6	76.6	78.6	78.0	80.1	77.1	72.2	76.6	74.1	79.5	79.6
Political stability	74.9	76.8	72.9	74.8	77.8	79.8	76.3	81.2	73.4	74.4	76.8	81.2
Rule of law	74.5	76.4	70.6	72.4	75.0	76.9	83.3	70.6	76.5	71.1	70.1	71.4
Regulatory quality	66.5	68.2	73.2	75.1	71.3	73.1	71.8	68.4	64.6	63.2	61.2	60.3
Public governance index	68.8	70.9	70.3	72.4	73.1	75.3	78.7	74.7	75.2	73.1	73.4	75.3

	Years								Analysis
Public governance and institutional indicators	2008	2009	2010	2011	2012	2013	2014	2015	CAGR
Control of corruption	83.5	79.9	80.0	82.0	83.4	87.7	84.1	82.7	2.11%
Government effectiveness	78.2	81.3	78.0	82.0	83.4	83.4	90.4	91.8	1.24%
Political stability	69.7	81.0	73.0	73.5	73.5	75.4	71.4	71.4	–0.25%
Rule of Law	68.9	65.6	61.2	66.8	73.9	75.4	80.3	82.7	0.55%
Regulatory quality	64.9	63.0	62.6	65.7	67.1	70.9	76.4	75.0	0.72%
Public governance index	73.0	74.2	71.0	74.0	76.3	78.5	80.5	80.7	0.84%

Source: http://info.worldbank.org/governance/wgi/#home

Year	Number of newly created enterprises	Oil	GDP growth	GDP Growth from non-oil sector	Capital	Labor	Gini index
1996	2,047	22.119	0.058	0.095	56,717	1,350	0.528
1997	2,311	20.608	0.082	0.106	60,778	1,447	0.471
1998	2,609	14.422	0.003	0.054	58,362	1,390	0.489
1999	2,946	19.345	0.029	0.072	65,126	1,551	0.475
2000	3,327	63.846	0.109	0.107	80,468	1,916	0.491
2001	3,756	66.060	0.014	0.043	79,593	1,929	0.533
2002	4,242	26.185	0.063	0.087	84,981	2,176	0.514
2003	5,239	72.221	0.132	0.104	94,947	2,334	0.504
2004	6,626	41.506	0.189	0.126	101,433	2,459	0.478
2005	7,036	56.637	0.222	0.133	121,912	2,800	0.506
2006	7,756	66.055	0.230	0.172	143,390	3,106	0.502
2007	8,810	82.589	0.161	0.227	223,283	3,823	0.510
2008	9,259	83.734	0.223	0.166	259,220	4,902	0.491
2009	6,086	81.548	-0.196	-0.071	269,224	4,899	0.452
2010	7,700	84.889	0.129	0.059	262,571	4,904	0.455
2011	9,127	85.900	0.218	0.080	274,258	4,909	0.503
2012	10,814	94.062	0.071	0.071	300,445	4,914	0.473
2013	12,050	97.983	0.041	0.077	309,840	4,919	0.460
2014	13,428	71.186	0.034	0.081	336,945	4,925	0.468
2015	14,964	48.657	−0.079	0.074	354,435	4,930	0.490

Table II.
Indicators of economics and entrepreneurship

		1	3	4	6	7	8
1	Number of newly created enterprises						
3	Oil	0.758***					
		0.000					
4	GDP growth	0.424*	0.519**				
		0.080	0.027				
6	Capital	0.933***	0.778***	0.373			
		0.000	0.000	0.128			
7	Labor	0.932***	0.823***	0.446*	0.989***		
		0.000	0.000	0.063	0.000		
8	Gini index	−0.305	−0.178	0.019	−0.440*	−0.423*	
		0.191	0.452	0.94	0.052	0.063	

Notes: Correlation value (top), *p*-value (bottom). The natural logarithm of the variables was used. *,**,***Correlation is significant at 10, 5 and 1 percent levels, respectively

Table III.
Pearson correlations matrix

our study avails of Inclan and Tiao's (1994) and used the Iterated Cumulative Sums of Squares (ICSS) algorithm to capture the structural breaks in international oil prices. Andreou and Ghysels (2002), Kang *et al.* (2011), Kumar and Maheswaran (2013), Mensi *et al.* (2014) and Vivian and Wohar (2012) effectively used the same.

Based on the ICSS algorithm test, several breaks documented in Table V and Figure 2 are incorporated into the regression models to achieve more valid results.

We notice two structural breaks in the time series occurred in year 2000 and 2008, one of which is attributable to the global financial crisis. As evident from Figure 2, the 2008 break was steeper than the one in 2000. To overcome this, a dummy variable was added to the

Governance/entrepreneurship	Mean of number of newly created enterprises	SD	Number of observation
Presence of institutional stimulation of entrepreneurship activity	8,602	4,009	10
Absence of institutional stimulation of entrepreneurship activity	5,412	3,004	10
Differences tests			
Parametric test			
t-test	4.764***		
p-value	0.001		
Non-parametric test			
z-test	−2.701***		
p-value	0.007		

Table IV.
Governance and entrepreneurship

Notes: The *t*-statistic is based on parametric test dependent samples "Paired Samples Statistics" *t*-test, and *z*-statistic is based on non-parametric test Wilcoxon Z. ***Significant at 1 percent

Series	Break points	ICSS algorithm test Time period	SD
Oil price (WTI)	2	Year of 2000	5.145
		Year of 2008	18.546

Table V.
ICSS algorithm test

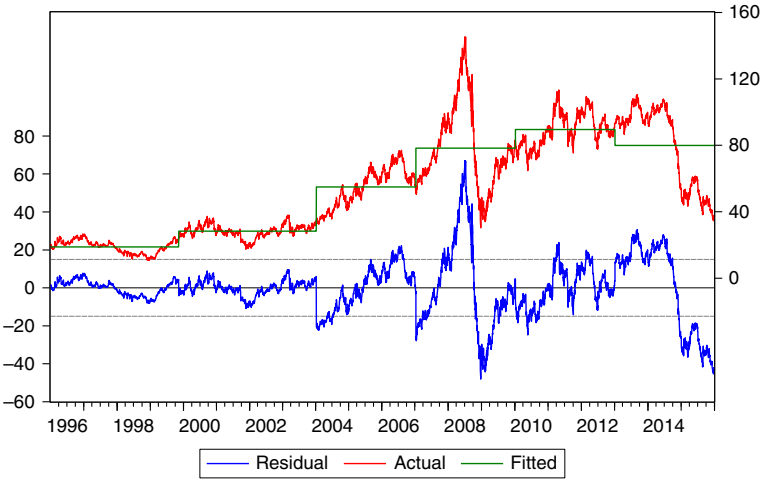

Figure 2.
Structural breaks

study model number 5 representing these structural breaks to end up with the final model of the study:

$$\text{EconGrowth}_t = \alpha + \beta_1 \text{Labor}_t + \beta_2 \text{Capital}_t + \beta_3 \text{Oil}_t + \beta_4 \text{Diver}_t + \beta_5 \text{Entrp}_t + \beta_6 \text{Governance}_t + \beta_7 \text{StrBreakDV}_t + \varepsilon_t, \quad (7)$$

where the StrBreakDV is the structural break for the year 2008, by giving observations before 2008 (0) and (1) to observations after that period.

5.2 Hypothesis testing

The mediated model steps were followed in the study methodology to test the mediation effect of public governance on the relationship between entrepreneurship and economic growth. The results are presented in Table VI.

When we apply "Path c" of the direct relation between entrepreneurship (using the number of newly created enterprises as a proxy for entrepreneurship) and economic growth (GDP), we find that entrepreneurship positively affects economic growth in the UAE. T-test = 2.457; $p < 0.05$, R^2 = 59.7 percent, Adj. R^2 = 41.1 percent and F-test for the model was statistically significant, at less than 5 percent.

During the second step in testing "Path a," we arrive at the relationship between entrepreneurship and public governance. The relation was found to be statistically significant and R^2 was 53.1 percent, while adj. R^2 was 50.5 percent.

In the third step, we test "Paths b and c" by finding the effect of entrepreneurship, public governance and other control variables on economic growth in the UAE. T-test = 3.923; $p < 0.05$ for entrepreneurship was found to be greater than its value in "Path c" (unmediated model) while t-test = 2.764; $p < 0.05$ was found for public governance. Thus, we can accept the study hypothesis which indicates the presence of a mediation role for public governance in the relationship between entrepreneurship and economic growth in the UAE.

Testing path	t-test	p-value	R^2	Adjusted R^2	F-statistic	p-value
Path c: DV = GDP			0.597	0.411	3.205**	0.037
Independent variable						
Entrepreneurship	2.457**	0.029				
Production function and control variables						
Labor	2.370**	0.034				
Capital	−3.143***	0.008				
Oil price	0.368	0.719				
Economic diversification	0.555	0.588				
Structural breaks dummy variable	0.092	0.928				
Path a: DV = Public governance			0.531	0.505	20.402***	0.000
Independent variable						
Entrepreneurship	4.517***	0.000				
Paths b and c': DV = GDP			0.754	0.610	5.242***	0.006
Independent variables						
Entrepreneurship	3.923***	0.002				
Public governance	2.764**	0.017				
Production function and control variables						
Labor	2.224**	0.046				
Capital	−3.514***	0.004				
Oil price	0.625	0.544				
Economic diversification	0.765	0.459				
Structural breaks dummy variable	0.002	0.998				

Notes: Using the number of newly created enterprises as a proxy for entrepreneurship. **,***Significant at 5 and 1 percent levels, respectively

Table VI. Unmediated and mediated models

5.3 Additional results

In Table VI, test results on several production function and control variables in the model of economic growth in UAE are displayed. Interestingly, the level of economic diversification imparts significant impact on economic growth in the UAE. Although statistically significant in all models of the study, economic diversification, proxied by the Gini coefficient, is subject to a dual interpretation, drawing inferences from the results presented in Table VI, depending on whether economic growth is viewed economy-wide or limited to the non-oil sectors of the economy. Given that economy-wide growth gives a negative β, diversification yields the following dynamic: the greater the diversification away from the oil-sector toward non-oil sector, the greater the economic growth attainable. However, given that, restricted to the non-oil sectors, the β is also negative, diversification yields an alternate dynamic: the greater the concentration of sectors composing the non-oil sector, the greater the economic growth. (Although beyond the scope of this study, that phenomenon may be attributable to linkages from industrial clusters resulting from concentration.) This suggests that the key driver of sustainable growth in the economy of the UAE is reposed in the non-oil sector, which, for the most part, monopolizes the stimulus imparted by entrepreneurial activity in the economy. From Table VI, we notice that oil prices in all models have a positive effect on economic growth in the UAE. Despite the UAE's efforts to diversify its economy away from oil-dependence, as per the results in Table VI, oil still has a key effect in the economy.

6. Conclusion, recommendations, limitation and future studies

6.1 Conclusion

This study aimed to investigate the role that public governance plays in the UAE as a vehicle for creating a suitable and conducive investment environment for entrepreneurs, as well as the extent to which entrepreneurship can achieve its goals of economic growth through diversification. In furtherance of these dual objectives, the study posited a testable hypothesis to assess the tripartite relationship among entrepreneurship, public governance and economic growth. The study employed a mediator model built from the basic production function (labor and capital) to which environmental and entrepreneurship variables were added: oil-barrel price and level of economic diversification with respect to the former, and rate of formation and number of new enterprises with respect to the latter. In each instance, the null hypothesis was rejected in favor of the first alternate hypothesis linked respectively to the positive effect of entrepreneurship on economic growth and the mediation effect of public governance on entrepreneurship (as a key driver of growth particularly with respect to non-oil sectors of the economy). From this vantage-point, the study aligns itself with previous research that finds that entrepreneurship imparts economic growth, in contrast to studies maintaining that entrepreneurship is unrelated to, or has a deleterious effect on, economic growth. Conclusions of this study can be clustered as follows: the results show a positive influence, with statistical significance, of entrepreneurship on economic growth in the UAE. Such results disregard public governance. The study suggests that good public governance catalyzes entrepreneurship as a key driver of economic growth. At any given level of public governance, entrepreneurship generates economic growth; as the level of public governance increases, the extent to which entrepreneurship generates economic growth increases. With good public governance progressively increasing over a long-term period of two decades, the UAE presents an example of an economy benefiting from commensurately increasing levels of entrepreneurial activity that are beneficial in terms of stimulus to economic growth and diversification. Entrepreneurship activity serves to foster economic diversification. In the UAE, however, the impact of diversification on economic growth is complex, insofar as the evidence

indicates that diversification away from the oil-sector to non-oil sectors has a positive effect on economic growth.

6.2 Recommendations

Over the course of the last two decades, significant strides have been made, taken aggregately, in public governance. However, as previously mentioned, it is important to note that the sub-indices of political stability and regulatory quality have served as a drag on public governance. Putting aside political stability as an environmental variable difficult to control for, the UAE government ought to consider further improvements in regulations designed specifically to cater to SMEs as well as to foster entrepreneurial activities. More profess in the rule of law is a secondary area of improvement:

(1) National development funds ought to be earmarked for micro-financing of entrepreneurs, encouraging creation of small enterprise, including provision of seed money and incubators.

(2) Concentrated industrial clusters, in the non-oil sectors, ought to receive targeted incentives, with a view to national specialization, rather than encouraging diversification across an extensive range on non-fossil fuel-based industries and services. In countries with undiversified developing economies with large oil-sectors, the adoption and inauguration of national strategies should aim to progressively improve public governance. This can serve as a powerful indirect means to foster entrepreneurship, with a view to working constantly on improving the institutional and regulatory environment, in such a way as to reinforce economic activity in general and entrepreneurial activity in particular. To build a legal system that contributes to the success and sustainability of risk-taking underpins entrepreneurship.

Cultivation of entrepreneurship directly as a mechanism to achieve diversification as well as economic growth requires a culture that respects and encourages entrepreneurs as risk-taking motors of innovation, and an educational system that integrates entrepreneurial skills and training at all levels. Ministries of Commerce can activate networks of entrepreneurs designed to foster knowledge dissemination and innovation that channels risk-taking into successful enterprise creation.

6.3 Limitation of the study and future studies

The study aims to investigate the role that entrepreneurship plays in the economic growth of the UAE, as mediated by a generalized index of public governance developed by the World Bank. Rather than rely on an index that is not specifically related to laws and regulations directly affecting entrepreneurial activity, it would behoove us to compare rates of entrepreneurship and impact of entrepreneurship on economic growth by dividing the data into time series tranches that reflect the institution of specific legal and regulatory milestones inaugurated by the UAE, while testing for differences in effect among such tranches. Taking into consideration other variables rather than just public governance milestones, one may consider the role of women entrepreneurs and gender capacities that may affect entrepreneurial activity which in turn affects economic growth. The role of developing human capital via education and training may warrant further attention as well.

Notes

1. http://www.hdr.undp.org/en/2018-update (accessed October 17, 2019).
2. http://trendsinstitution.org/uae-economic-diversification-record/ (accessed March 13, 2018).

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