بناء مؤشر مركّب لقياس تطور سوق دبي للأوراق المالية

خلود اليونس[1]، د. هيثم عيسى[2]، د. منال الموصلي[3]

الملخص:

يلاحظ وجود وفرةٍ في الأدبيات التي تدرس تطور الأسواق المالية، نتيجة الدور الذي تؤديه هذه الأسواق في توفير النقد والسيولة للأنشطة التجارية والاقتصادية المختلفة ونقل الأموال المُدخرة بعد الإنفاق الاستهلاكي على السلع المعيشية الأساسية وتوظيفها في قنوات الاستثمار المختلفة. يهدف هذا البحث إلى تجميع مؤشرٍ مركب لتطور سوق دبي المالي (سوق الأسهم)، حيث تعكس قيمة هذا المؤشر أربعة أبعادٍ من أبعاد تطور السوق المالي هي (العمق، وإمكانية الوصول، والاستقرار، والكفاءة)، بالإضافة الى تحليل أداء هذا السوق وفقاً لهذه الأبعاد وذلك خلال المدة من 2000 إلى 2021. تقيس الدراسة كل بُعد من هذه الأبعاد خلال أولاً حساب المتغيرات الخاصة به، ثانياً تطبيع هذه المتغيرات باستخدام طريقة (Min−Max Normalization) من أجل حساب المؤشر المركب لتطور سوق الأسهم يعكس جميع هذه الأبعاد. أظهرت النتائج أن مستوى تطور سوق دبي المالي (سوق الأسهم) انخفض في السنوات السبع الأخيرة من المدة المدروسة وذلك نتيجة التدهور الملحوظ في بُعدي العمق والاستقرار. كان أفضل مستوى تطور لسوق دبي المالي (سوق الأسهم) في عام 2014 وفقاً للمؤشر المركب، وكان أسوأ مستوى في عام 2009. بشكل أكثر تفصيلاً كان أفضل أداء لسوق دبي المالي بالنسبة لكل من بعدي العمق والكفاءة في عام 2014، بالنسبة لبعد الوصول كان في عام 2007، وبالنسبة لبعد الاستقرار كان في عام 2004.

توصي الدراسة بتبني سياسات تعزز رسملة سوق الأوراق المالية، والعمل على تطوير واستخدام وسائل أمنة لنشر المعلومات لضمان وصول المستثمرين بسهولة إلى هذه المعلومات وبطرائق أكثر شفافيةً وأقل تكلفة الأمر الذي من المرجّح أن يزيد كلاً من حجم التداول وقيمه، وبالتالي يؤثر إيجابياً في عمق سوق الأوراق المالية في دبي.

الكلمات المفتاحية: تطور السوق المالي، العمق، إمكانية الوصول، الكفاءة، الاستقرار، المؤشر المركب، سوق دبي المالي.

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[1] طالبة دكتوراه– قسم الإدارة المالية والمصرفية– المعهد العالي لإدارة الأعمال– دمشق

[2] أستاذ – قسم الاقتصاد– كلية الاقتصاد– جامعة دمشق

[3] أستاذ مساعد– قسم الإدارة المالية والمصرفية– المعهد العالي لإدارة الأعمال– دمشق

Building A Composite Index to Measure the Development of Dubai Securities Exchange

Kholoud Alyones[4], Dr. Haitham Issa[5], Dr. Manal Almously[6]

ABSTRACT:

There is a growing literature that studies the development of financial markets, which indicates the important role these markets play in providing cash and liquidity for various commercial and economic activities and transferring saved funds, remained after making consumption spending, and employing them in various investment channels. The objective of this research is to compile a composite index that reflects the development of Dubai financial market (stock market), with the value of this index reflects four dimensions of the development of financial market i.e. (depth, access, stability, and efficiency), in addition to analyzing the performance of this market according to these dimensions during the period from 2000 to 2021.

This study measures each dimension first by calculating the variables related to it, then normalizing these variables by applying the Min-Max Normalization method in order to compute a composite index for stock market development that reflects these dimensions altogether.

The results show that the level of development of Dubai stock market declined in the last seven years of the study period as a reason of a notable deterioration in the depth and stability dimensions. According to the composite index, the best level of development of Dubai stock market was in 2014, and the worst level was in 2009. In more details, the best performance of Dubai stock market for both depth and efficiency dimensions was in 2014, for access dimension was in 2007, and for the stability dimension was in 2004.

The study recommends adopting policies that enhances market capitalization of stock market, and secure means of disseminating information to ensure that investors gain easy access to this information and in more transparent and less costly ways, which most likely will increase the volume and values of trading, and thus positively affects the depth of Dubai stock market.

Keywords: Financial Market Development, Depth, Access, Efficiency, Stability, Composite Index, Dubai Financial Market.

[4] PHD student – Management of Financial& Banking section-HIBA - Damascus
[5] Professor- Department of Economics – Faculty of Economics-Damascus of University
[6] Associate Professor – Management of Financial& Banking section-HIBA-Damascus

1- Introduction:

In the past few decades, the overwhelming majority of world countries have paid a voluminous attention to the development of their financial markets, which reflects a clear recognition of the vital potential these markets have in promoting economic performance. This trend also comes within the framework of recent directives led by international and regional organizations aiming to strengthening the role of these markets in country's financial system. There is no doubt that financial markets represent one of the most important channels for mobilizing countries' scarce financial resources towards the most efficient and profitable economic sectors. In addition, these markets are key tools in attracting foreign investment; hence, they secure additional financial resources that contribute in financing local investment projects, which reduces the need for external borrowing. There also are many other valuable financial services provided by financial market such as increasing people's awareness of saving and rational investment, and reduce the costs of economic exchanges as well as the different types of risks associated with it.

2- Research problem:

The establishment and operation of financial markets in the GCC countries, including Dubai Financial Market, came in line with the growing conviction among economic actors at the local, regional and international levels of the importance of their contribution to the continuous development efforts. However, so far, the objectives of these markets are not fully accomplished despite the progress made in terms of their performance in the past years.

Dubai financial market has a special nature, due to the United Arab Emirates' UAE distinguished economic structure compared to its neighboring economies. Given the fact that UAE represents a global trade center for money and investment management, and that Dubai is not oil dependent, the Emirate is very vulnerable to any shock of any kind especially in the sectors related to the investments that Dubai financial market relies on. Despite the great polarizing role played by the financial markets in the Gulf countries, including the Dubai financial market, it still suffers from difficulties and obstacles and needs to implement systems for effectiveness. Therefore, it was necessary to look at measuring the development of Dubai financial market, and to analyze this development according to four dimensions of the financial market development. Thus, the research problem can be expressed by the following questions:

- What is the level of development of Dubai stock market according to the composite index?
- What is the level of development of Dubai stock market according to each dimension of the financial market development?

3- Research importance: This study recognizes that it is crucial to regularly assess and analyze the development of Dubai financial market from the perspective of four dimensions of the financial market development that are depth (size), access, efficiency and stability of the market. Then the results of this exploration are used to compile a single composite index of the development of Dubai financial market.

Syrian Arab Republic
Ministry of Higher Education & Scientific Research
Higher Institute of Business Administration Journal
Vol 2 No 2 (2023)

الجمهورية العربية السورية
وزارة التعليم العالي والبحث العلمي
مجلة المعهد العالي لإدارة الأعمال
المجلد 2 العدد 2 (2023)

4- **Research objectives:** The objective of this research is to compile a composite index that reflects the development of Dubai financial market (stock market), with the value of this index reflects four dimensions of the development of financial market i.e. (depth, access, stability, and efficiency), in addition to analyzing the performance of this market according to these dimensions during the period from 2000 to 2021.

5- The theoretical framework

The dimensions of development in the financial market are:

Depth (size): Financial depth indicates, in general, that the economy enjoys an abundance of funds, securities, financial tools, and institutions and enjoys more favorable conditions for development and modernization in the long run. It also reflects the compatibility between the volume of production and the size and structure of the financial sector in terms of savings, investments and redistribution mechanisms. Financial depth reveals the level of development of financial markets in terms of the efficiency of financial intermediation. The greater the financial depth, the greater the importance of the financial sector's ability to reallocate financial resources to support economic development (Mirkin, et al. 2013, 158). On the other hand, higher levels of depth in any market are prerequisite by all authorities responsible for the market as well as investors. Usually, higher levels of depth are accompanied by improvements in confidence levels because they contribute to the ease of liquidation in this market (Exberg, et al. 2015, 43)

Access: relevant studies recognize the possibility of investors and companies accessing the financial market as one of the indicators of the development of this market. According to this dimension, the lower the concentration level in a market, the more developed is this market. To make it clearer, a low level of concentration in a market indicates that access to that market is not limited only to large companies, but small companies can also obtain the necessary financing by entering the financial market and competing fairly (Cihak, et al. 2012, 12).

Efficiency: An efficient market is defined as a market populated by many rational, profit-maximizing, actively competing traders who try to predict future asset values with current available information (Woo, et al. 2020, 3). Another study views a financial market efficient if relevant information necessary for making transaction is correctly conveyed in the price. Since this concept of efficiency involves information modeling, the term "information efficiency" is also used to describe market efficiency (Walter, 2003, 3). Economic efficiency in stock markets requires achieving both operating efficiency and pricing efficiency (Ababsa, 2012, 30). This study addresses operating\internal efficiency, where operational performance is measured by calculating costs incurred during a particular economic or financial activity. Accordingly, it can be said that a financial market enjoys operating efficiency when it creates a state of balance between supply and demand while reducing transaction costs and fees, so that there is no opportunity for traders and market makers to achieve a higher profit margin (Yusuf, 2014,14).

Stability: Financial stability is a condition in which a financial system is able to withstand shocks without allowing for cumulative processes to adversely affect the allocation of savings, investment opportunities and payment processing in the economy (Padoa-schioppa, 2002, 20). In this regard,

Syrian Arab Republic
Ministry of Higher Education & Scientific Research
Higher Institute of Business Administration Journal
Vol 2 No 2 (2023)

الجمهورية العربية السورية
وزارة التعليم العالي والبحث العلمي
مجلة المعهد العالي لإدارة الأعمال
المجلد 2 العدد 2 (2023)

monitoring financial markets and properly evaluating their stability constitute tasks of great importance to policy makers (Nelson and Perli, 2007, 2).

6- Literature Review:

Across countries, financial markets vary markedly in their degree of development and characteristics. Analyzing and examining the level of development of these markets is very important, however, relevant literature reveals the existence of a variety of methods and points of view to accomplish this task.

Some studies relied on traditional indicators to analyze financial market development. Tursunbaevich, et al. (2022) addressed the development of stock markets in different regions of the world during the Covid-19 pandemic for the period from 2010 to 2020. The study measured total stock market capitalization of the member states of the World Federation of Stock Exchanges, the trading volume, the amount of stock trading, bonds and derivatives trading indicators. The results showed that in terms of index of capitalization, stock exchanges of United States and Japan were in the highest positions. Nyasha and Odhiambo (2013) explored the development of the stock market in the United States of America during the period from 1988 to 2011, using a list of indicators, the results revealed that noticeable development were achieved in terms of market capitalization, the trading volume, and the turnover ratio, however, the study observed that wide-ranging challenges still face the market. Mala and White (2006) examined Fiji's stock market (the South Pacific Stock Exchange) and its development during the period from 1996 to 2004, employing trading volume, trading value, market capitalization, market liquidity, market concentration and number of listings. The results showed that Fiji's stock market was quite small with low level of liquidity but high degree of concentration.

A large number of studies focused on one dimension of stock market development. Olbry´s and Ostrowski (2021) measured the depth of stock market in Warsaw Stock Exchange for three different periods, the pre-crisis sub-period from 6 /9/ 2005 to 31 /5/ 2007, the crisis sub-period on the WSE from 1 /7/ 2007 to 27 /2/ 2009, and the post-crisis sub-period from 2 /3/ 2009 to 19 /11/ 2010. The study used methodology based on entropy for measuring the market depth, and found that the market had high levels of both depth and liquidity. Ali, et al. (2018) analyzed the comparative efficiency of 12 Islamic and conventional stock markets counterparts, using the multifractal de-trended fluctuation analysis (MF-DFA) for the period of 1/1/2003 to 31/12/2016. The results showed that developed markets were relatively more efficient, all Islamic stock markets excluding were more efficient than their conventional counterparts except the cases of Russia, Jordan and Pakistan. Yuzbashev (2015) tested the weak form of efficiency in Dubai Financial Market (DFM) using three tests i.e., autocorrelation test, runs test and variance test. The results, based on data about closing prices for period 8/14/2008 to 7/24/2014, indicated that Dubai financial market was weakly inefficient. Li, et al. (2016) analyzed the stability of stock market by applying normalized diffusion entropy on data concerning daily close price of Dow Jones Industrial Average (DJIA) for period 28 /1/2006 to 1/6/2010. The results showed, in the first period, entropy values were at high level, which indicated the stability of the stock market, and during the period from 1/1/ 2006 to 1/7/ 2007, the stock market price was less volatility.

A strand of studies assessed financial market development from the perspective of bi-dimensional or multidimensional analysis. Burkaltseva, et al. (2021) evaluated the development of the stock market in the Russian Federation for period 2016 - 2020 using a single composite indicator of stock market development encompasses two sub-indicators (size and efficiency). The study found that the worst year of stock market development was in 2016, and the best year was in 2019.

Nastu, et al. (2020) explored and compared the level of financial development of EU member states during the period from 2000 to 2017, the study employed a methodology that included finding a composite index based on the main principal components that measure the development of the financial system, then, developing a categorical variable based on the values of the index and applying the Decision Trees algorithm. The results showed an underdeveloped financial level for Romania, while Luxembourg had a highest level of financial development.

Nath and Madhurima (2022) measured the financial sector development of Brunei Darussalam with a focus on the depth, access and efficiency dimensions during the period from 2014 to 2018. The results showed that the performance of Brunei Darussalam in terms of access to banks had been better than its most peers among Association of Southeast Asian Nations, while the efficiency of banking sector remained at a moderate level.

The literature on financial markets covers many other topics empirically and theoretically such as the relationship between financial market development and economic growth, the influence of the dimensions of financial system on economic growth, the role of financial markets in attracting foreign direct investment, the determinants of returns in financial markets…etc. This study was very selective by focusing, in this review, only on the literature closely related to its topic. To the best of our understanding, this study is the first attempt to assess the development of Dubai financial market using the four dimensions' perspective, where the depth, access, efficiency and stability of the Dubai financial market will be measured. Then the results of this exploration will be used to compile a composite index of the development of Dubai financial market.

Dubai Financial Market has been the subject on several studies, however, none of them considered the development of the market from the perspective of four dimensions. Elmadhoun and Reddy (2022) studied the effect of real earnings management on economic value added for the 52 companies listed on Dubai financial market. Banerjee (2019) investigated the possibility of using financial ratios as predictors of stock return for 30 companies from Dubai Financial Market and Abu Dhabi stock exchange. Kabar, et al. (2020) assessed the integration of Dubai financial market (Stock exchange) with Abu Dhabi stock exchange. Omet (2011) examined the liquidity of stock market with a comparative analysis of Abu Dhabi stock exchange and Dubai financial market. Mahdi, et al. (2020) used fundamental analysis and technical analysis to study the financial market conditions in the context of sustainable development of Dubai financial market. Moustafa (2013) investigated the impact of the corporatization of Dubai financial market on its efficiency.

7- Materials and Methods:

Dubai financial market constitutes the research community in this study, and its stock market is the research sample. The study aims at determining the development level of this market from a

Syrian Arab Republic
Ministry of Higher Education & Scientific Research
Higher Institute of Business Administration Journal
Vol 2 No 2 (2023)

الجمهورية العربية السورية
وزارة التعليم العالي والبحث العلمي
مجلة المعهد العالي لإدارة الأعمال
المجلد 2 العدد 2 (2023)

multidimensional perspective during the period from 2000 to 2021. To accomplish this task the inductive methodology will be adopted and applied on data[7] concerning Dubai financial market.
The study followed the standard approach to build the development index of financial market and on reducing multidimensional data to a single summary index. This approach can be summarized in the following steps: (i) normalization of the variables; (ii) assembling normalized variables into the sub-indices representing a specific functional dimension; and (iii) assembling the sub-indices into the final index (Svirydzenka, 2016, 6).
The measurement of the development of Dubai financial market (stock market) employes the standard approach as follows:

1. The calculation of indicators for each dimension separately as follows:
   - The depth dimension of stock market (Abdullah Khalil 2018, 7), (Saleh and Hussen, 2014, 74-75):

- Total market capitalization measured by the number of stocks of companies listed in the market multiplied by the closing price at the end of the year.
- Trading volume measured by the number of stocks traded during a specific period of time.
- Trading value measured by the value of the stocks traded during a certain period of time.

   - The access dimension of stock market (Anokye-Wusu, et al. 2015, 9):

- Total number of listed companies at the end of the year.
- Number of companies listed during the year.
- Concentration ratio (sum of the market share of the largest 5 companies in terms of market capitalization) (Cihak, et al. 2013, p: 15-16), (Bepari and Mollik, 2008, p: 9).
- Hirschman index (HHI) to measure the degree of monopoly (Rhoades, 1993, p: 188), and is calculated according to eq. (1).

$$HHI = \sum_{i=1}^{n} (MS_i)^2 \qquad (1)$$

   Where:
   MS_i: represents the market share of company i, where there are n companies in the market.
   - The efficiency[8] dimension of stock market:
     - Turnover ratio that equals the value of total stocks traded divided by market capitalization (Debbi and Bouabdallah, 2021, 127).
     - Average transaction cost that equals the total cost of transactions divided by number of transactions (Smia, 2018, 31).
   - The stability dimension of stock market: There are several indicators to measure market stability, including: Market to book ratio, price to earnings ratio and market volatility, this study focuses on measuring the market to book ratio (Sukcharoensin, 2013, 34) (Cihak, et al. 2012, p: 9) ،(Juko, 2019, p:14).

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[7] All data used in this study were drawn from the official website of Dubai financial market: https://www.dfm.ae/ar
[8] Precisely, the term efficiency in this study refers to operation efficiency.

2. The normalization of indicators for each dimension by applying the Min-Max Normalization method that converts the calculated indicators' values into degrees on a scale from 0 to 10 (Sukcharoensin, 2013, 344), (Grecu, et al. 2022, 599) as shown in equation (2):

$$C_{A,i} = \frac{Value_{A,i} - Min_A}{(Max_A - Min_A)/10} \qquad (2)$$

Where: $C_{A,i}$: the degree of indicator A in year i, $Value_{A,i}$: value of indicator A in year i. Min_A: minimum value of indicator A during period of study. Max_A: maximum value of indicator A during period of study. 10: The range of degrees.

For indicators that have an inverse effect, equation (3) was employed (Nagy, et al. 2018, 5):

$$C_{A,i} = \frac{Max_A - Value_{A,i}}{(Max_A - Min_A)} * 10 \qquad (3)$$

Where 0 and 10 indicate the worst and best performance respectively.

3. The compilation of each dimension's indicators into sub-indicators representing a specific dimension, by taking the average of the approved indicators of each dimension market.

4. Compiling the sub-indicators into a final index by calculating the sum of the four averages resulting from the four dimensions. This index represents the degree of financial market development according to the aforementioned dimensions (the highest/ lowest value represents the best/worst year of financial market respectively) (Svirydzenka, 2016, 15-20) and (Burkaltseva, 2021, 8).

8- Results and Discussion:

This section presents in details the calculation of the indicators of each dimension, the normalization of these indicators to compute the sub- indices of each dimension, and finally the aggregation of sub- indices into the final index.

8-1- Measuring the depth dimension of Dubai financial market (stock market):

In order to determine the degree of development of Dubai financial market in the depth dimension each year, three indicators were used namely: Total market capitalization, trading volume, and trading value. After collecting relevant data for each indicator for the whole period of study, these indicators were normalized using equation (2), then the annual composite sub- index of depth of stock market was calculated by taking the average of the normalized indicators. Table (1) shows the calculated values.

Table (1) Annual development of Dubai financial market (stock market) in the depth dimension during the period 2000-2021

year	Market depth indicators*			Normalization of depth indicators**			depth of Dubai stock market**
	trading volume (stock)	Trading Value (AED)	market capitalization (AED)	trading volume	Trading Value	market capitalization	
2000	22,516,071	407,922,832	326,284,257,100	0	0	1.22	0.41
2001	50,810,806	743,984,237	470,743,788,634	0.002	0.01	2.43	0.81
2002	136,294,957	2,006,568,913	549,570,509,238	0.01	0.04	3.09	1.05
2003	314,429,207	3,193,436,336	836,084,906,337	0.02	0.07	5.49	1.86
2004	5,088,402,750	48,627,955,408	1,375,075,746,178	0.32	1.20	10	3.84
2005	25,478,104,150	400,843,646,616	859,341,177,729	1.61	10	5.68	5.76
2006	36,344,319,648	332,863,805,886	411,740,027,691	2.29	8.30	1.94	4.18
2007	101,436,964,185	358,415,278,498	661,721,144,569	6.40	8.94	4.03	6.46
2008	73,981,961,016	289,812,474,701	263,352,545,919	4.67	7.23	0.70	4.20
2009	110,676,249,222	173,490,793,767	235,682,593,852	6.99	4.32	0.46	3.92
2010	38,385,826,916	69,655,655,272	216,877,096,771	2.42	1.73	0.31	1.49
2011	23,880,529,665	30,959,419,139	194,315,836,396	1.51	0.76	0.12	0.80
2012	37,623,877,112	45,163,082,710	180,191,591,649	2.37	1.12	0	1.16
2013	126,623,138,246	159,223,421,110	269,501,140,453	7.99	3.97	0.75	4.24
2014	158,379,774,052	376,284,850,272	297,891,887,221	10	9.39	0.99	6.79
2015	86,044,498,646	126,019,955,785	251,997,387,278	5.43	3.14	0.60	3.06
2016	97,906,099,711	118,986,560,120	280,542,420,091	6.18	2.96	0.84	3.33
2017	74,182,276,018	104,282,262,493	339,371,525,093	4.68	2.59	1.33	2.87
2018	38,883,116,705	54,518,032,083	307,436,127,534	2.45	1.35	1.06	1.62
2019	32,611,219,698	46,331,126,742	343,518,426,997	2.06	1.15	1.37	1.52
2020	57,831,445,804	60,212,359,125	307,235,904,889	3.65	1.49	1.06	2.07
2021	44,527,336,483	64,070,279,570	401,300,215,672	2.81	1.59	1.85	2.08
The average depth of the Dubai stock market during the period 2000-2021							**2.89**

Source: * the official website of Dubai financial market https://www.dfm.ae/ar   ** calculated by the researcher

Table (1) shows that the best level of development of Dubai financial market (stock market) in the depth dimension dated back to the year 2014, when it registered 6.79 degrees. In that year, the market achieved high values for both the trading volume and trading value. 2007 is the second-best year scoring 6.46 degrees by virtue of the high values of trading value. The worst performance in this dimension was in 2000, where the market started its activity on 26/3/2000. As shown in the table the market's performance in terms of the depth dimension made good progress from 2000 to

2009, but it deteriorated after that to reach 0.80 degrees in 2011, then it improved to attain the maximum degree in 2014, but it decreased in the last seven years. The average of depth in Dubai stock market for the period from 2000 to 2021 was 2.89 degrees, which is considered a weak degree of development.

8-2- Measuring the access dimension of Dubai financial market (stock market):

In order to determine the degree of development of Dubai financial market in the access dimension each year, four indicators were calculated, after that their values were normalized to compute the annual composite sub- index of access of stock market. This task goes through the following steps:

- Computing the four indicators: (i) total number of listed companies at the end of the year, (ii) the number of listed companies during the year, (iii) concentration ratio for the top five companies which equals the sum of market shares of the largest 5 companies in term of market capitalization, (iv) HHI index that is calculated based on equation (1).
- Normalizing the total number of listed companies at the end of the year and the number of listed companies during the year based on equation (2). An increase in these two indicators indicates an improvement in the access to the market.
- Normalizing the concentration ratio for the top five companies and HHI index, based on equation (3). An increase in these two indicators indicates a low access to the market.
- Calculating the annual composite sub-index in order to determine the degree of access to the stock market during each year. This is done by taking the average of normalized values of the four indicators. Table (2) shows the calculated values.

Syrian Arab Republic
Ministry of Higher Education & Scientific Research
Higher Institute of Business Administration Journal
Vol 2 No 2 (2023)

الجمهورية العربية السورية
وزارة التعليم العالي والبحث العلمي
مجلة المعهد العالي لإدارة الأعمال
المجلد 2 العدد 2 (2023)

Table (2) Annual development of Dubai financial market (stock market) in the access dimension during the period 2000-2021

year	Indicators of stock market access*				normalizations of indicators**				access of stock market**
	The number of listed companies at the end of the year	number of listed companies during the year	Concentration index for the top five companies	HHI index	The number of listed companies at the end of the year	number of listed companies during the year	Concentration index for the top five companies	HHI index	
2000	9	0	0.99	0.32	0	0	0	6.58	1.64
2001	9	0	0.93	0.21	0	0	1.24	7.96	2.30
2002	10	1	0.93	0.86	0.19	0.91	1.21	0	0.58
2003	11	1	0.89	0.20	0.38	0.91	1.90	8.05	2.81
2004	15	4	0.84	0.18	1.15	3.64	2.86	8.29	3.99
2005	26	11	0.64	0.10	3.27	10	6.39	9.34	7.25
2006	34	8	0.54	0.07	4.81	7.27	8.35	9.62	7.51
2007	44	10	0.51	0.06	6.73	9.09	8.88	9.81	8.63
2008	50	6	0.53	0.06	7.88	5.45	8.53	9.73	7.90
2009	52	2	0.44	0.04	8.27	1.82	10	10	7.52
2010	52	0	0.50	0.06	8.27	0	9.00	9.83	6.77
2011	52	0	0.54	0.07	8.27	0	8.20	9.71	6.55
2012	52	0	0.60	0.08	8.27	0	7.23	9.55	6.26
2013	53	1	0.57	0.07	8.46	0.91	7.75	9.64	6.69
2014	55	2	0.58	0.08	8.85	1.82	7.57	9.57	6.95
2015	56	1	0.58	0.08	9.04	0.91	7.46	9.59	6.75
2016	57	1	0.60	0.08	9.23	0.91	7.16	9.49	6.70
2017	59	2	0.60	0.08	9.62	1.82	7.24	9.57	7.06
2018	61	2	0.62	0.08	10	1.82	6.90	9.49	7.05
2019	61	0	0.66	0.11	10	0	6.09	9.22	6.33
2020	61	0	0.63	0.09	10	0	6.65	9.40	6.51
2021	61	0	0.59	0.08	10	0	7.43	9.53	6.74
The average access dimension of Dubai stock market during the period 2000-2021									**5.93**

Source: **calculated by the researcher   *The data used to calculate the variables obtained from https://www.dfm.ae/ar

Syrian Arab Republic
Ministry of Higher Education & Scientific Research
Higher Institute of Business Administration Journal
Vol 2 No 2 (2023)

الجمهورية العربية السورية
وزارة التعليم العالي والبحث العلمي
مجلة المعهد العالي لإدارة الأعمال
المجلد 2 العدد 2 (2023)

Table (2) shows that the concentration index for the top five companies ranges between 44% and 99%, which indicates a high market capitalization of the top five companies compared to the market capitalization of Dubai stock market. On the other hand, the HHI index fluctuated between 0.04 and 0.2 from 2003 onward, which affirms no existence of monopoly in Dubai stock market by a limited number of companies. The year 2002 represents an outlier at which the HHI index value attained 86%, which indicates the existence of monopoly in Dubai stock market by a limited number of companies in this year. It is clear that the ability of Dubai stock market to attract new companies was improving across time from 2000 to 2021 as shown by the increase in the index of the number of listed companies in the market.

Dubai stock market attained the highest level of development in the access dimension in 2007 (8.63). Two factors were responsible of this i.e. (i) the high value of the index of number of listed companies during the year, and (ii) The low values of both the HHI index and concentration index for the top five companies. The worst level of stock market development in this dimension was in 2002, when the monopoly index reached its maximum value and the concentration index for the top five companies registered high value. Altogether, the average value of the access dimension in Dubai stock market during the period from 2000 to 2021 was 5.93 degrees, which is considered a medium degree of development.

8-3-   Measuring the efficiency dimension of Dubai financial market (stock market):

The study assesses the efficiency dimension of Dubai financial market (stock market) by calculation two indicators i.e., turnover ratio and average transaction cost, then normalizing their values to compute a composite index. This task goes through the following steps:

- Calculating the efficiency indicators' values as follows: (i) turnover ratio that equals the value of total stocks traded divided by market capitalization and, (ii) average transaction cost.
- Normalizing the values of turnover ratio based on equation (2), where an increase in these values indicates an improvement in the efficiency of the market.
- Normalizing the values of average transaction cost using equation (3). Here, there is an inverse relationship between this index and the stock market efficiency.
- Using the normalized values from the previous two steps to calculated annual composite sub-index to determine the degree of stock market efficiency during each year. Table (3) shows the calculated values.

Table (3) Annual development of Dubai financial market (stock market) in the efficiency dimension during the period 2000-2021

year	Indicators of stock market efficiency*		normalizations of indicators**		efficiency of Dubai stock market**
	Turnover ratio	Average ransaction cost (AED)	Turnover ratio	Average transaction cost (AED)	
2000	0.0013	388.60	0	9.59	4.79
2001	0.002	347.16	0.003	10	5.00
2002	0.004	506.34	0.02	8.42	4.22
2003	0.004	799.90	0.02	5.49	2.76
2004	0.035	1,337.10	0.27	0.15	0.21
2005	0.466	1,351.95	3.69	0	1.84
2006	0.808	870.61	6.40	4.79	5.59
2007	0.542	982.48	4.28	3.68	3.98
2008	1.100	839.13	8.71	5.10	6.91
2009	0.736	521.71	5.82	8.26	7.04
2010	0.321	523.12	2.54	8.25	5.39
2011	0.159	439.43	1.25	9.08	5.17
2012	0.251	469.93	1.98	8.78	5.38
2013	0.591	707.28	4.67	6.42	5.54
2014	1.263	929.63	10	4.20	7.10
2015	0.500	559.64	3.95	7.89	5.92
2016	0.424	601.84	3.35	7.47	5.41
2017	0.307	637.73	2.43	7.11	4.77
2018	0.177	560.09	1.40	7.88	4.64
2019	0.135	492.78	1.06	8.55	4.80
2020	0.196	415.27	1.54	9.32	5.43
2021	0.160	481.96	1.26	8.66	4.96
The average efficiency dimension of Dubai stock market from 2000 to 2021					**4.86**

Source: **calculated by the researcher   *The data used to calculate the variables obtained from https://www.dfm.ae/ar

According to Table (3) turnover ratio in Dubai stock market was fluctuated during the period of study, with an upward trend almost during first eight years. In 2014, the value of this ratio jumped to its maximum level making it the best year in terms of liquidity in the Dubai stock market. Another notable issue is the decrease in average transaction cost in the second half of the period compared to the first one. This indicator attained it highest values (1337 and 1357) in the years 2004 and 2005 respectively. The best level of development in the efficiency dimension of Dubai stock market was in 2014 attaining 7.10 degrees. On the other hand, the worst level of development in this dimension was in 2004 with only 0.21 degrees, where the Dubai stock market had a high

value of average transaction cost and a low value of turnover ratio. Altogether, the average efficiency level in Dubai stock market during the whole period of study was 4.86 degrees, which is considered a medium degree of development.

8-4-   Measuring the stability dimension of Dubai financial market (stock market):

The study examines the development of Dubai financial market (stock market) in the stability dimension based using one index i.e., Market to Book ratio for total market. The measurement process begins with the calculation of the value of this index, followed by normalizing the obtained values according to equation (2), the annual sub-index corresponding to the stock market stability equals the values of normalized index; table (4) shows the calculated values.

Table (4) Annual development of Dubai financial market (stock market) stability during the period 2000-2021

year	Indicators of stock market stability*	normalizations of index**	stability of Dubai stock market**
	M/B ratio	M/B	
2000	15.11	2.72	2.72
2001	18.11	3.30	3.30
2002	38.65	7.24	7.24
2003	47.07	8.85	8.85
2004	53.06	10	10
2005	13.20	2.36	2.36
2006	4.01	0.59	0.59
2007	3.70	0.53	0.53
2008	1.54	0.12	0.12
2009	1.27	0.07	0.07
2010	1.15	0.05	0.05
2011	0.94	0.005	0.005
2012	0.92	0.001	0.001
2013	1.23	0.06	0.06
2014	1.25	0.06	0.06
2015	1.00	0.02	0.02
2016	1.06	0.03	0.03
2017	1.15	0.05	0.05
2018	1.02	0.02	0.02
2019	1.03	0.02	0.02
2020	0.91	0	0
2021	1.10	0.04	0.04
The average stability dimension of Dubai stock market from 2000 to 2021			**1.64**

Source: *All data used in this table were obtained from the official website of Dubai Financial Market https://www.dfm.ae/ar, **calculated by the researcher

Syrian Arab Republic
Ministry of Higher Education & Scientific Research
Higher Institute of Business Administration Journal
Vol 2 No 2 (2023)

الجمهورية العربية السورية
وزارة التعليم العالي والبحث العلمي
مجلة المعهد العالي لإدارة الأعمال
المجلد 2 العدد 2 (2023)

Table (4) shows a steady improvement in the stability dimension of Dubai stock market from 2000 to 2004 when it attained its highest degree, then after it followed a downward trend for the remaining period, and attained its lowest value in 2020. The average stability in Dubai stock market during the period from 2000 to 2021 was 1.64 degrees, which obviously represents an unacceptable performance in this dimension.

8-5- Computing the Composite Index of development of Dubai financial market (stock market) for the Period from 2000 To 2021

According to the approach followed in this study to assess the development of Dubai financial market (stock market) the final step is devoted to compiling the sub-indicators of each dimension derived above into a final composite index that represents the degree of development of Dubai financial market (stock market). As a role of thumb, the higher the value of this index, the better the development level of Dubai stock exchange and vice versa. The results of this compilation are depicted in table (5).

Table (5) Composite index of development of Dubai financial market (stock market) during the period 2000-2021

year	depth of Dubai stock market	access to Dubai stock market	efficiency of Dubai stock market	stability of Dubai stock market	composite index of Dubai stock market development
2000	0.41	1.64	4.79	2.72	9.57
2001	0.81	2.30	5.00	3.30	11.41
2002	1.05	0.58	4.22	7.24	13.08
2003	1.86	2.81	2.76	8.85	16.28
2004	3.84	3.99	0.21	10	18.04
2005	5.76	7.25	1.84	2.36	17.21
2006	4.18	7.51	5.59	0.59	17.88
2007	6.46	8.63	3.98	0.53	19.60
2008	4.20	7.90	6.91	0.12	19.13
2009	3.92	7.52	7.04	0.07	18.56
2010	1.49	6.77	5.39	0.05	13.70
2011	0.80	6.55	5.17	0.005	12.51
2012	1.16	6.26	5.38	0.001	12.81
2013	4.24	6.69	5.54	0.06	16.53
2014	6.79	6.95	7.10	0.06	20.91
2015	3.06	6.75	5.92	0.02	15.74
2016	3.33	6.70	5.41	0.03	15.46
2017	2.87	7.06	4.77	0.05	14.74
2018	1.62	7.05	4.64	0.02	13.34

Syrian Arab Republic
Ministry of Higher Education & Scientific Research
Higher Institute of Business Administration Journal
Vol 2 No 2 (2023)

الجمهورية العربية السورية
وزارة التعليم العالي والبحث العلمي
مجلة المعهد العالي لإدارة الأعمال
المجلد 2 العدد 2 (2023)

2019	1.52	6.33	4.80	0.02	12.68
2020	2.07	6.51	5.43	0	14.02
2021	2.08	6.74	4.96	0.04	13.81
average	**2.89**	**5.93**	**4.86**	**1.64**	**15.32**

Source: calculated by the researcher

Based on table (5) one could point to some key issues (i) the level of development of Dubai stock market ranges between 9.57 and 20.91, (ii) the worst performance of Dubai stock market was in 2000, then it gained momentum and registered its best performance in 2014, but the performance deteriorated slightly then-after to settle at 13.81 degrees in 2021, (iii) the average value of the composite index during the whole period of study was 15.32 degrees, which indicates an unexpected moderate performance, (iv) the progress achieved during the first 14 years if the period of study was due to the good performance in the efficiency dimension followed by the access dimension then the depth dimensions, (v) the weak development of Dubai stock market during the period after 2014 was the result of a notable deterioration in the depth and stability dimensions.
The study takes one more step forward in assessing the development of the Dubai financial market (stock market) by computing correlations coefficients among the dimensions of the development of the Dubai stock market (Juko, 2019). The results are depicted in table (6).

Table (6) Correlation between the dimensions of the development Dubai financial market (stock market)

	Depth	**Access**	**Efficiency**	**Stability**
Depth	1.000000	0.569460	0.007635	-0.139135
Access	0.569460	1.000000	0.356363	-0.740480
Efficiency	0.007635	0.356363	1.000000	-0.739054
Stability	-0.139135	-0.740480	-0.739054	1.000000

Source: Prepared by the researcher by using E-views 9

Table (6) reveals several important insights: (i) there is moderate positive correlation (0.57) between depth and access dimensions, (ii) there almost is no correlation (0.007) between depth and efficiency dimensions, (iii) there is weak and negative correlation (– 0.13) between the depth and stability dimensions, (iv) there is moderate positive correlation (0.35) between access and efficiency dimensions, (v) the correlation between access and stability dimensions is strong and negative (–0.74), (vi) there is strong and negative correlation (–0.74) between efficiency and stability dimensions.

9- Conclusion:

The core task of this study is twofold, first to analysis the development of Dubai stock market from a multidimensional perspective (depth, access, efficiency and stability) during the period from 2000 to 2021, second to use the results to compute a composite index of the financial market development that reflects the four dimensions. To fulfill this task, the study began by calculation

the indicators' values in each dimension, then normalizing them to compute a composite index of stock market development that reflects that dimension, and finally these sub-indices were compiled together to compute a composite index that reflects Dubai stock market development level. This was followed by calculating the correlation coefficients among these dimensions so as to gain more concrete results on the inter-relationships among these dimensions.

The result showed that the level of development of Dubai stock market declined in the last seven years of the period of study. The most obvious reason of that is the notable deterioration in the depth and stability dimensions. The best level of development of Dubai stock market was in 2014 according to composite index, and the worst level was in 2009. The average value of the composite index during the whole period of study was 15.32 degrees which reflects an unexpected moderate performance. In more details, the best performance of Dubai stock market for both depth and efficiency dimensions was in 2014, for access dimension was in 2007, and for the stability dimension was in 2004. In general, the index HHI proved no existence monopoly in Dubai stock market by a specific number of companies during the period of study. Average transaction cost decreased in the last few years of the study period. Similarly, the concentration index for the top five companies was high during the period of study, and that no new company was listed in the market in the last four years. The results of the correlation exercise revealed that improvements in either the depth or access dimensions would reinforce the other dimension. Similarly, but to a lower extant, better performance on the access or efficient dimension most likely would improve the performance on the other dimension. Finally, working on the stability dimension might have adverse effects on the other three dimensions.

Based on these results, several academic and policy implications could be drawn. First, from policy perspective, the study recommends the relevant authorities to adopt policies that enhances market capitalization of stock market, secure means of disseminating information to ensure that investors gain easy access to this information and in more transparent and less costly ways, which most likely will increase the volume and values of trading, and thus positively affects the depth of Dubai stock market. In addition, carefully designed plans are needed to encourage the listing of the companies in the Dubai stock market, hence, to strengthening the dimension of access to the market. The stability dimension could be enhanced by enacting appropriate measures to oblige companies to disclose their financial reports at the specified disclosure time, as this will represent a reassurance of good conditions on companies' side, making market prices reflect exactly the real situation of company. Finally, expanding market's price limits constitute a good option to follow as it will improve liquidity and market efficiency. Second, from academic viewpoint, the study recommends focusing research efforts on exploring the exact factors responsible of the change in the performance of Dubai stock market in each dimension. This would support the design of evidence-based plans to improve the market performance on each of the four dimensions. Moreover, linking the performance of Dubai stock market in each dimension to the key macroeconomic variables could be another venue for extending this paper.

Syrian Arab Republic
Ministry of Higher Education & Scientific Research
Higher Institute of Business Administration Journal
Vol 2 No 2 (2023)

الجمهورية العربية السورية
وزارة التعليم العالي والبحث العلمي
مجلة المعهد العالي لإدارة الأعمال
المجلد 2 العدد 2 (2023)

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