

# AN EMPIRICAL INVESTIGATION OF THE POST-IPO OPERATING PERFORMANCE IN THE SAUDI STOCK MARKET

## FINAL REPORT

Prepared for

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May 2018 G



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مسئوليتها عن ما ورد فيه من معلومات وبيانات، ولا يمكن تحميل الهيئة أو منسوبيها المسؤولية عن أية خسائر أو أضرار تنشأ عن استخدام هذا  
المستند، مع الأخذ بالاعتبار أن المعلومات والبيانات ووجهات النظر قابلة للتغيير دون إشعار مسبق

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\*This report is funded by the Saudi Capital Market Authority (CMA). This report is available in PDF format on CMA website at  
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## **I. Executive Summary**

Consistent with the empirical findings in the literature in developed and emerging markets, our analysis suggests that the operating performance, measured by return on assets (ROA) and return on equity (ROE), deteriorates in post-IPO period. The analysis has been conducted on the firm level, industry level, across time, based on the use of the IPO proceedings, and government holdings before and after the IPO. The main result of the analysis still holds in all specifications. Data Envelopment Analysis (DEA) technique has also been implemented to investigate the question in hand. DEA allows us to examine the difference between the pre-and the post-IPO operating performance based on several inputs and outputs. The empirical results are similar to the analysis of means. Most companies show a decline in their performance relative to their pre-IPO performance.

This is the final report of the project “An Empirical Investigation of the Post-IPO Operating Performance in the Saudi Stock Market”. This report summarizes the two previous reports and adds further analysis to the post-IPO operating performance across sectors, time, government ownership, and the IPO proceedings. Also, this report discusses the challenges and the opportunities encountered by the team throughout the project stages. Finally, the report concludes and gives recommendations that arise from the analysis and the investigation process.

## **II. Data Collection and the Initial Sample**

The initial sample collected for this study consists of Saudi firms that had public offerings from 1992 to 2016. The data is obtained from several sources. These sources include:

- Offering prospectuses.
- CMA filings
- Bloomberg
- Companies financial statements
- News reports for oversubscription data and number of subscribers (including Argam, Al-Eqtisadiyah, etc.).

The pre-IPO financial statements variables were hand collected from the IPO prospectuses, while the post-IPO financial statements variables were obtained from Bloomberg and companies financial statements.

The IPO information were collected from prospectuses and from CMA filings. The IPO information include, but not limited to, the following variables: IPO pricing, the IPO time line, legal advisors, underwriters, receiving banks, auditors, number of subscribers, retail offering size, total offering size, offering fees, etc.

The price performance of the companies in the sample were collected from Bloomberg and were also provided by the CMA.

### III. Descriptive Statistics

In this section, we provide some summary statistics from the data collected. The data consists of 167 public offerings that took place in the Saudi stock market between 1992 and 2016. Public offerings are initial public offerings (IPOs), right issues, or private placements. One hundred and sixty of these offerings are distributed on fourteen sectors: banking, cement, construction, food, industrial, insurance, informational technology and communication (ITC), media, multi-investment, petrochemicals, real estate, retail, tourism, and transportation. Out of the 160 offerings, 113 are IPOs, 38 are right issues, and 9 are private transactions. Table 1 summarizes the distribution of public offerings over sectors (sector classification is based on the old classification scheme).

<b>Sector</b>	<b>IPO</b>	<b>Right Issues</b>	<b>Private Transactions</b>
Banking	5	1	0
Cement	6	1	0
Construction	11	2	0
Food	5	0	3
Industrial	9	2	0
Insurance	37	15	0
ITC	5	3	0
Media	2	0	0
Multi-Investment	2	3	1
Petrochemicals	9	6	2
Real Estate	5	4	0
Retail	13	0	0
Tourism	2	0	2
Transportation	2	1	1
<b>Total</b>	<b>113</b>	<b>38</b>	<b>9</b>

The first day return, or the money left on the table, of an IPO attracted the attention of researchers over the years (Ritter, 1991; Megginson and Weiss, 1991; and Loughran and Ritter 2004). Thus, we collected data on the first day return of the offerings over the sample period. The first day return data cover the period from 2006 to 2016. The highest average first day return is in the ITC sector (414%; n=2). On the other hand, the sector that shows lowest average first day return is the transportation sector (3%; n=2).<sup>1</sup> Tables 2 shows the average first day return of the sample by sector and over time, respectively.

**Table 2:** Average first day return, money left on the table, by sector for the Saudi stock market over the period 2006-2016.

Sector	Mean	Median	Std. Dev	n
Banking	35%	35%	35%	2
Cement	77%	51%	74%	6
Construction	44%	10%	112%	8
Food	12%	15%	43%	3
Industrial	44%	24%	86%	6
Insurance	291%	254%	231%	32
ITC	414%	414%	376%	2
Media	164%	164%	0%	1
Multi-investment	46%	46%	60%	2
Petrochemicals	56%	30%	62%	4
Real Estate	8%	7%	34%	4
Retail	65%	19%	99%	11
Tourism	7%	7%	3%	2
Transportation	3%	3%	9%	2

Table, 3, shows the time series average of the first day return from 2006 to 2016.

**Table 3:** the average first day returns for each year over the period 2006-2016

Avg. First Day Return				
Year	Mean	Median	Std. Dev	n
2006	164%	164%	0%	1
2007	298%	262%	251%	24
2008	121%	60%	186%	12
2009	172%	120%	204%	10
2010	14%	0%	63%	9
2011	65%	7%	136%	4

<sup>1</sup> Note that the first trading day return was capped to 10% in May 2013.

<b>Table 3 Cont'd</b>				
<b>Year</b>	<b>Mean</b>	<b>Median</b>	<b>Std. Dev</b>	<b>n</b>
2012	81%	38%	133%	7
2013	104%	10%	167%	5
2014	9.8%	10%	23%	6
2015	10%	10%	0%	4
2016	10%	10%	25%	3

In this report, we will focus on four offering characteristics: offering size, percent offered, over subscription, and number of subscribers.

- Offering size is the riyal amount offered by the company to the public.
- Percent offered is the percentage of the company that is offered to the public in the public offering.
- Oversubscription is the collected proceeds divided by the offer size.
- Number of subscribers is the number of people that participated in the public offering.

Table 4 shows the summary statistics of the four variables over the sample period.<sup>2</sup>

<b>Table 4: Summary statistics of offering size, percent offered, oversubscription, and the number of subscribers over the sample period (1992-2016)</b>			
	<b>Mean</b>	<b>Median</b>	<b>Std. Dev</b>
Offering Size	1,056	365	2,268
Percent Offered	36	31	14
Oversubscription	456	301	542
No. Of Subscribers	1,913	1,225	2,111

These four variables vary widely across sector and across time. Table 5, shown in the next page, demonstrates the summary statistics of these four variables across sectors.

The largest public offering size varies between SR 22.5 billion (National Commercial Bank IPO) to SR 12 million (Borouj Insurance right issue) over the sample period. In terms of average offering size by sector, the banking sector has the highest average offering size (SR 6.9 billion; n=5) and the lowest average offering size is in the insurance sector (SR 143 million; n=45).

<sup>2</sup> Table A1 in the appendix of this report shows the summary statistics of the four variables categorized by sector and by offering type.

The percent offered ranges between 75% and 3.3%. The cement sector has the highest average of percent offered (50%; n=6), while the lowest offered percentage is in the multi-investment sector (18%; n=2).

The number of offerings over the sample period is concentrated in later years. Eighty-six offerings are concentrated in the last 10 years. During the same period, the liquidity in the market was high compared to historical level. Thus, the demand for offerings was high. This is evident in the oversubscription statistics. The average oversubscription is 4.5 times the offering size (n=113). The highest average oversubscription is in the ITC sector (1,911%; n=3), whereas the lowest oversubscription is in the Real estate sector (271%; n=5).

In terms of the number of subscribers, the average number of subscribers is 1.9 million for the overall sample. The number of subscribers varies between sectors. The Banking sector has the largest number of average subscribers per offering with 5 million subscribers (n=2). On the other hand, the Insurance sector has the lowest average number of subscribers among all sectors (963,000; n=32) over the sample period.

Table 5, next page, shows the summary statistics to four main IPO characteristics by sector: IPO size, percent offered, oversubscription, and number of subscribers. The IPO size is the dollar amount of the offering.

**Table 5:** Summary statistics for the four variables categorized by sector over the sample period (1992-1996)

Sector	Offering Size (SR Million)				Percent Offered (%)				Oversubscription (%)				Number of Subscribers (Thousands)			
	Mean	Median	Std. Dev	n	Mean	Median	Std. Dev	n	Mean	Median	Std. Dev	n	Mean	Median	Std. Dev	n
Banking	6,996	1,500	9,672	5	45	50	30	5	997	516	1,142	3	5,048	5,048	5,377	2
Cement	685	750	264	6	50	50	0	6	396	306	257	5	2,601	2,972	1,107	6
Construction	614	522	515	11	30	30	0	11	359	320	164	10	971	807	884	9
Food	945	507	876	5	30	30	0	5	466	400	261	5	1,631	938	1,371	3
Industrial	1,709	450	2,948	11	31	30	8	11	385	341	273	10	2,084	1,111	2,252	8
Insurance	143	80	212	45	42	40	9	45	610	520	453	43	963	843	648	32
ITC	2,330	1,000	2,831	5	31	30	12	5	1,911	350	2,762	3	4,893	4,800	3,591	3
Media	750	750	501	2	30	30	0	2	473	473	103	2	1,450	1,450	212	2
Multi-investment	2,081	2,081	1,623	2	18	18	18	2	293	293	40	2	2,326	2,326	1,520	2
Petrochemicals	2,281	1,969	2,154	9	40	45	12	9	319	270	176	8	4,493	4,520	2,647	8
Real Estate	1,798	2,014	1,142	5	26	30	8	5	271	280	134	5	4,067	1,996	3,745	5
Retail	902	396	467	13	29	30	0	13	439	471	325	13	2,236	1,360	758	11
Tourism	999	825	320	3	22	30	15	3	285	285	62	2	1,355	1,355	474	2
Transportation	1,553	1,553	1,792	2	30	30	0	2	670	670	467	2	1,575	1,575	460	2



#### IV. Uni-variate Analysis

The initial sample collected contained data on different types of offerings. For the purpose of our scope of analysis, we excluded all green field companies and all seasoned equity offerings. The analysis of the pre and post-IPO operating performance is extended to include 54 firms from 2004 to 2015. The firms included in the analysis are the firms that have operating performance three years before and three years after the public offerings.

The firms included in the sample are distributed across 13 industries. These industries are: banking, cement, construction, food, industrial, insurance, media, multi-investment, petrochemicals, real estate, retail, tourism, and transportation. Table 6 shows the distribution of the firms across industries.

**Table 6:** Pre-and post-IPO performance measures for 54 initial public offerings (IPOs) in the sample period 2004-2015. The performance measures are return on assets (ROA) and return on equity (ROE).\*

	ROA		ROE		n
	Pre-IPO	Post-IPO	Pre-IPO	Post-IPO	
Banking	2%	2%	18%	16%	1
Cement	6%	5%	9%	7%	6
Construction	17%	7%	35%	8%	11
Food	22%	17%	30%	25%	5
Industrial	8%	7%	16%	13%	7
Insurance	5%	9%	17%	23%	2
Media	15%	8%	20%	11%	1
Multi-Investment	8%	-5%	13%	-15%	2
Petrochemicals	18%	8%	41%	12%	3
Real Estate	12%	9%	15%	13%	2
Retail	12%	11%	22%	20%	14
Tourism	20%	14%	35%	29%	2
Transportation	19%	15%	34%	22%	2
<b>Total</b>	<b>13%</b>	<b>8%</b>	<b>23%</b>	<b>14%</b>	<b>54</b>

\*One observation, Kingdom holding, has been removed because it is considered as an outlier in the data.

In order to assess the impact of the IPO on the company performance, we collected the data on several performance measures of for the sample companies. In this report, we will demonstrate the difference in performance between the pre-and the post IPO period using the return on assets (ROA) and return on equity (ROE) as a performance measure (Jain and Kini, 1994; Al-Barrak, 2005; Alanazi et al., 2011).

The retail industry has the highest number of public offerings in our sample with 14 IPOs, while the banking industry has only one offering over the sample period. In terms of operating performance measured by the ROA, the food industry shows the highest pre-IPO operating performance (ROA=22%). In terms of ROE, the petrochemicals industry shows the highest pre-IPO operating performance (ROE=41%).

The average pre-IPO ROA across industries is 13%, while the average post-IPO ROA is 8%. In terms of ROE, the average pre-IPO ROE is 23%, whereas the average post-IPO ROE is 14%. The paired sample for means t-test for both performance measures, show that the post-IPO performance is significantly lower compared to the pre-IPO operating performance (ROA: [t-stat=3.3, p-value=0.002]; ROE: [t-stat=2.9, p-value=0.006]).

**Table 7:** Pre-and post-IPO performance measure for 54 IPO over the sample period 2004-2005. The performance measures are return on assets (ROA) and return on equity (ROE).

	ROA		ROE		n
	Pre-IPO	Post-IPO	Pre-IPO	Post-IPO	
2004	1%	11%	7%	25%	1
2005	15%	5%	17%	10%	3
2006	11%	11%	20%	19%	8
2007	14%	5%	29%	8%	8
2008	15%	3%	28%	-1%	6
2009	16%	10%	25%	15%	2
2010	13%	10%	32%	19%	5
2011	12%	13%	19%	20%	3
2012	19%	14%	30%	21%	6
2013	11%	6%	20%	12%	3
2014	8%	5%	17%	10%	5
2015	13%	11%	22%	17%	4
<b>Total</b>	<b>13%</b>	<b>9%</b>	<b>24%</b>	<b>15%</b>	<b>54</b>

Table 7, shows the pre-and the post-IPO performance measures tabulated across time. The table shows the highest number of IPOs included in our sample occurred in 2006 and 2007 (8 IPOs in each year). The lowest number of IPOs, however, occurred in 2004. Generally, the post-IPO performance shows a deterioration in the post-IPO period across the sample period except in 2011. The comparison of means shows that both operating performance measures are significantly higher in the pre-IPO period (ROA: [t-stat=2.2, p-value=0.02]; ROE: [t-stat=2.2, p-value=0.002]).

In addition, we classify our sample to three categories based on the use of the IPO proceedings. The first category includes the IPOs which the founders took the proceedings of the IPO. The second category include the IPOs in which the proceedings were used to finance an expansion project. The third category, is the IPOs in which the IPO proceedings were used to fund normal operations. Table 8 shows the pre-and the post-IPO operating performance measures for the three categories.

**Table 8:** The pre-and post-IPO operating performance, measured by return on assets (ROA) and return on equity (ROE), classified based on the use of the IPO proceedings. Panel (a) shows the difference in performance for IPOs in which the proceedings went to the original owners. Panel (b) demonstrates the difference in operating performance in IPOs where the proceedings went to an expansion project. Panel (c) shows the difference in the operating performance for IPOs where the IPO proceedings are used to finance normal operations.

	ROA		ROE		n
	Pre-IPO	Post-IPO	Pre-IPO	Post-IPO	
<b>Panel (a):</b> IPOs where the proceedings were paid to the original owners.					
Cement	7%	5%	9%	6%	4
Construction	14%	8%	24%	15%	2
Food	9%	10%	15%	13%	1
Industrial	2%	1%	2%	2%	1
Insurance	8%	7%	26%	20%	1
Petrochemicals	33%	1%	76%	2%	1
Retail	14%	7%	21%	10%	2
<b>Total</b>	<b>11%</b>	<b>6%</b>	<b>20%</b>	<b>9%</b>	<b>12</b>
<b>Panel (b):</b> IPOs where the proceedings were used to expand operations.					
	ROA		ROE		n
	Pre-IPO	Post-IPO	Pre-IPO	Post-IPO	
Banking	2%	2%	18%	16%	1
Construction	18%	7%	38%	6%	9
Food	25%	19%	34%	28%	4
Industrial	9%	8%	19%	15%	6
Insurance	1%	11%	7%	25%	1
Media	15%	8%	20%	11%	1
Multi-investment	8%	-5%	13%	-15%	2
Petrochemicals	3%	5%	6%	11%	1
Real Estate	12%	9%	15%	13%	2
Retail	13%	12%	25%	23%	9
Tourism	20%	14%	35%	29%	2
Transportation	19%	15%	34%	22%	2
<b>Total</b>	<b>14%</b>	<b>10%</b>	<b>26%</b>	<b>16%</b>	<b>40</b>

<b>Table 8, Cont'd</b>					
<b>Panel (c): IPOs where the proceedings were used to finance normal operations.</b>					
	<b>ROA</b>		<b>ROE</b>		<b>n</b>
	<b>Pre-IPO</b>	<b>Post-IPO</b>	<b>Pre-IPO</b>	<b>Post-IPO</b>	
Cement	5%	6%	7%	9%	2
Retail	14%	7%	17%	10%	1
<b>Total</b>	<b>3%</b>	<b>17%</b>	<b>4%</b>	<b>23%</b>	<b>3</b>
<b>Overall average</b>	<b>13%</b>	<b>9%</b>	<b>24%</b>	<b>15%</b>	<b>55</b>

The statistics shown in table 6 suggest that the deterioration of the post-IPO performance is independent from the use of the IPO proceedings. That is, the post-IPO performance, measured by ROA and ROE, is significantly lower in the three sub-groups. However, it is worth mentioning that the post-IPO performance of the petrochemicals industry is higher when the proceeds are used to expand operations as shown in Table 7-Panel (b).<sup>3</sup>

These results are consistent with the pilot analysis presented in the second progress report. Also, these results are consistent with empirical findings in the international markets. Jain and Kini (1994) show a significant decline in operating performance after the initial public offering. Loughran and Ritter (1997) document a decline in the operating performance for a sample of U.S. firms that conduct seasoned equity offerings. Cai and Wei (1997) study the long-run stock returns and operating performance of 180 IPOs listed on the Tokyo Stock exchange during 1971-1992 period. Their results show that the operating performance declines in the post-IPO period. Coakley et al. (2007) analyze the post-issue operating performance in the UK and they document a similar result. In emerging markets, Kim et al (2004) investigate the operating performance of firms that go public in the Thai market. Their results are consistent with the finding in other developed markets.

#### **V. Pre-and Post-IPO Operating Performance-Data Envelope Analysis (DEA)**

DEA is a multi-criteria decision-making tool used to compare the performance of companies relative to the performance of a single company or the performance of a company over years relative to its

<sup>3</sup> We also conducted the analysis on companies with government ownership and the results are similar. In addition, we analyzed the difference in IPO operating performance when the underwriter is different from the financial advisor. Our results show no significant difference between the two groups.

performance over a specific year. This tool is suitable if there are more than one measure of inputs and more than one measure of outputs.

The efficiency ratio includes all outputs and inputs needed to evaluate the performance of a company.

$$\text{Efficiency} = \frac{\text{weighted outputs}}{\text{weighted inputs}}$$

In the analysis in hand, the objective is to evaluate the performance of a company after the IPO compared with its performance before the IPO. Therefore, the objective function is to maximize the efficiency ratio for the IPO year.

$$\text{Maximize Efficiency (IPO)} = \frac{\sum_{j=1}^r u_j Y_{j\text{IPO}}}{\sum_{i=1}^s v_i X_{i\text{IPO}}}$$

With the constraints that the efficiency scores for all 7 years (3 years before the IPO, 3 years after the IPO and the IPO year) must be less than or equal 1. Mathematically, this is captured in the following inequality

$$\frac{\sum_{j=1}^r u_j y_{jt}}{\sum_{i=1}^s v_i x_{it}} \leq 1, \quad t = 1, \dots, 7$$

Where,

$y_{jt}$  = amount of output j in year t

$x_{it}$  = amount of input i in year t

$u_j$  = the weight given to output j

$v_i$  = the weight given to input i

t = 1, 3 years before the IPO

t = 2, 2 years before the IPO

t = 3, 1 year before the IPO

t = 4, IPO year

t = 5, 1 year after the IPO

t = 6, 2 years after the IPO

t = 7, 3 years after the IPO

For this specific research, the performance of the companies is evaluate based on two measures of outputs and three measures of inputs. The output measures are: operating income and sales; while the inputs are debt, equity, and working capital (Thore et al., 1994)

Data for these measures are collected for 3 years before the IPO and 3 years after the IPO as well as the year of IPO. For example, data for SADAFCO is shown in Table 9.

**Table 9:** An example of the inputs and outputs used to calculate the efficiency scores using Data Envelopment Analysis (DEA) for SADAFCO.

Year	Inputs			Outputs	
	Debt	Equity	Working Capital	Operating Income	Sales
-3	344.89	504.58	97.16	62.88	775.29
-2	312.19	514.77	201.03	77.91	759.32
-1	300.54	544.11	216.23	96.26	820.74
<b>0 (IPO)</b>	<b>321.60</b>	<b>561.97</b>	<b>209.12</b>	<b>92.08</b>	<b>862.73</b>
1	305.37	464.53	133.70	-8.86	826.52
2	239.96	492.33	189.14	39.72	768.49
3	248.65	515.27	262.12	49.65	878.23

The DEA utilizes an efficiency ratio that combines all these outputs and inputs in a single measure shown below

$$\text{Efficiency} = \frac{\text{weighted outputs}}{\text{weighted inputs}}$$

The reference year will be the IPO year. Therefore, for SADAFCO this efficiency ratio is

$$\text{Efficiency} = \frac{92.08u_1 + 862.73u_2}{321.60v_1 + 561.97v_2 + 209.12v_3}$$

The u's and v's are weights given to the outputs and inputs. DEA determines the values of u's and v's that maximize the efficiency ratio for the IPO year, with the constraints that the efficiency ratio for the IPO year as well as the ratios for the years before the IPO and the years after the IPO should be less than 1.

Therefore, the complete model for SADAFCO is

$$\text{Maximize } \frac{92.08u_1 + 862.73u_2}{321.60v_1 + 561.97v_2 + 209.12v_3}$$

Subjected to

$$\frac{62.88u_1 + 775.30u_2}{344.90v_1 + 504.58v_2 + 97.16v_3} \leq 1 \quad (3 \text{ years before the IPO})$$

$$\frac{77.92u_1 + 759.32u_2}{312.20v_1 + 514.77v_2 + 201.04v_3} \leq 1 \quad (2 \text{ years before the IPO})$$

$$\frac{96.27u_1 + 820.75u_2}{300.55v_1 + 544.20v_2 + 216.23v_3} \leq 1 \quad (1 \text{ year before the IPO})$$

$$\frac{92.08u_1 + 862.73u_2}{321.60v_1 + 561.97v_2 + 209.12v_3} \leq 1 \quad (\text{IPO year})$$

$$\frac{-8.87u_1 + 826.52u_2}{305.38v_1 + 464.54v_2 + 133.70v_3} \leq 1 \quad (1 \text{ year after the IPO})$$

$$\frac{39.72u_1 + 768.49u_2}{239.96v_1 + 492.34v_2 + 189.14v_3} \leq 1 \quad (2 \text{ years after the IPO})$$

$$\frac{49.65u_1 + 878.23u_2}{248.65v_1 + 515.28v_2 + 262.12v_3} \leq 1 \quad (3 \text{ years after the IPO})$$

Solving this optimization problem results in the following efficiency scores for the 7 years:

**Table 10:** The efficiency scores obtained by solving the DEA optimization problem for SADAFCO.

		Efficiency Scores over Years						
No	Company	-3	-2	-1	0 (IPO)	1	2	3
1	SADAFCO	0.96	0.95	1.00	1.00	0.91	0.91	1.00

The efficiency score for the IPO year is 1, which is the maximum score that can be achieved. Relative to this score the efficiency score 3 years before the IPO is 0.96. The efficiency score 2 years before the IPO is 0.95 etc. The average efficiency scores before and after the IPO for SADAFCO are shown in Table 11.

**Table 11:** The average DEA efficiency scores for SADAFCO.

		Average Efficiency Scores		
No	Company	Before IPO	IPO	After IPO
1	SADAFCO	0.97	1.00	0.94

Therefore, relative to the performance of the IPO year, the performance of SADAFCO after the IPO is worse than its performance before the IPO.

This analysis was performed on 28 companies that have all the required data. The results are shown in Table 12.

**Table 12:** The pre-and post-IPO DEA efficiency scores for 28 IPO firms that span over the sample period 2004-2013.

No	Company	Efficiency Scores over Years						
		-3	-2	-1	0 (IPO)	1	2	3
1	SADAFCO	0.96	0.95	1.00	1.00	0.91	0.91	1.00
2	Al-Marai	0.97	0.98	1.00	1.00	0.97	0.82	0.92
3	Aldrees	1.00	0.86	1.00	0.85	0.78	1.00	1.00
4	Saudi Paper	0.87	0.98	1.00	0.86	0.84	0.82	0.79
5	Saudi International Petrochemical	0.02	0.03	0.86	1.00	1.00	0.58	0.12
6	Al-Babtain	0.80	0.67	0.83	1.00	0.89	1.00	0.74
7	Al-Hukair	0.93	1.00	0.97	1.00	0.78	0.58	0.50
8	Al-Abdulatif Ind. Inv.	0.61	0.78	1.00	1.00	1.00	0.91	0.75
9	Saudi Printing and Packaging	0.50	0.53	0.33	1.00	1.00	0.71	0.81
10	Saudi Budget	-	1.00	0.85	0.83	0.88	0.93	0.40
11	AlKhaleej for Training	1.00	0.79	0.89	0.90	0.74	0.76	0.38
12	MESC	1.00	0.84	1.00	1.00	0.71	0.91	0.85
13	Astra Industries	0.77	0.91	1.00	1.00	0.74	0.65	0.53
14	Maaden	0.70	0.88	1.00	0.57	0.61	0.63	1.00
15	Halwani	0.97	0.96	1.00	0.90	0.99	1.00	0.67
16	Othaim	0.94	1.00	0.08	1.00	0.60	0.76	0.46
17	Chemanol	1.00	0.89	1.00	0.30	0.18	0.26	0.37
18	Saudi Steel Pipe	0.95	1.00	0.80	1.00	1.00	0.16	0.50
19	Mouwasat	0.81	0.73	0.76	1.00	0.98	0.90	1.00
20	AlSorayai	1.00	1.00	0.99	0.91	0.45	0.91	0.66
21	Herfy	0.92	0.91	1.00	1.00	0.88	1.00	1.00
22	Extra	0.78	1.00	0.89	1.00	0.92	0.94	0.83
23	Najran Cement	1.00	0.73	1.00	1.00	0.58	0.81	0.82
24	Madina Cement	0.13	1.00	0.70	0.70	0.33	0.28	0.24
25	Dallah	0.97	1.00	0.69	1.00	0.76	0.67	0.49
26	Northern Cement	0.01	1.00	0.17	1.00	0.18	0.34	0.31
27	Bwan	1.00	0.99	0.95	1.00	0.97	0.98	0.96
28	Riaya	1.00	0.96	1.00	0.83	0.92	0.98	1.00

The average efficiency scores before and after the IPO are presented in Table 13.



**Table 13:** The pre-and post-IPO average DEA efficiency scores for 28 firms over the sample period 2004-2013

No	Company	Average Efficiency Scores			Better Performance?
		Pre-IPO	IPO	Post-IPO	
1	SADAFCO	0.97	1.00	0.94	No
2	Al-Marai	0.98	1.00	0.90	No
3	Aldrees	0.95	0.85	0.93	No
4	Saudi Paper	0.95	0.86	0.82	No
5	Saudi International Petrochemical	0.30	1.00	0.57	Yes
6	Al-Babtain	0.76	1.00	0.88	Yes
7	Al-Hukair	0.97	1.00	0.62	No
8	Al-Abdulatif Ind. Inv.	0.79	1.00	0.88	Yes
9	Saudi Printing and Packaging	0.45	1.00	0.84	Yes
10	Saudi Budget	0.62	0.83	0.74	Yes
11	AlKhaleej for Training	0.89	0.90	0.63	No
12	MESC	0.95	1.00	0.82	No
13	Astra Industries	0.89	1.00	0.64	No
14	Maaden	0.86	0.57	0.75	No
15	Halwani	0.98	0.90	0.89	No
16	Othaim	0.67	1.00	0.61	No
17	Chemanol	0.96	0.30	0.27	No
18	Saudi Steel Pipe	0.92	1.00	0.55	No
19	Mouwasat	0.77	1.00	0.96	Yes
20	AlSorayai	1.00	0.91	0.67	No
21	Herfy	0.94	1.00	0.96	Yes
22	Extra	0.89	1.00	0.90	Yes
23	Najran Cement	0.91	1.00	0.73	No
24	Madina Cement	0.61	0.70	0.28	No
25	Dallah	0.89	1.00	0.64	No
26	Northern Cement	0.39	1.00	0.28	No
27	Bwan	0.98	1.00	0.97	No
28	Riaya	0.99	0.83	0.97	No

Eight companies perform better after the IPO year than before the IPO year while 20 companies perform worse. To test statistically if there is a significant reduction in performance for all these 28 companies, Wilcoxon Rank Sum Test (WRST) was used. The mean rank after the IPO is 23.68 while it is 33.32 before

the IPO. Statistically, there is a significant reduction in the performance of companies after the IPO compared with its performance before the IPO. Table 14 shows the results of the WRST.

**Table 14:** The results of the Wilcoxon Rank Sum Test (WRST) for pre-and post-IPO DEA efficiency scores.

	<b>Before/After</b>	<b>n</b>	<b>Mean Rank</b>	<b>Sum of Ranks</b>	<b>Significance. (1-tailed)</b>
Score	Before	28	33.32	933	0.013
	After	28	23.68	663	
	<b>Total</b>	<b>56</b>			

These results are consistent with the empirical findings in developed as well as the emerging markets. The operation performance, on average, deteriorates in the post-IPO period.

## VI. Conclusion

Consistent with the empirical findings in developed and emerging markets, our analysis suggest that the operating performance significantly deteriorate in the post-IPO period (three years after the IPO year). All other specifications support this conclusion. For example, the analysis is conducted after splitting the sample into three categories based on the use of the IPO proceedings. In addition, the same result is obtained when we compare the operating performance for IPOs that have the same lead underwriter and financial advisors.

In addition to the analysis of means, we conduct the analysis using DEA. The empirical results of the DEA support the conclusion that post-IPO performance significantly decline relative to the pre-IPO performance.

These results are consistent with the pilot analysis presented in the second progress report. Also, these results are consistent with empirical findings in the international markets. Jain and Kini (1994) show a significant decline in operating performance after the initial public offering. Loughran and Ritter (1997) document a decline in the operating performance for a sample of U.S. firms that conduct seasoned equity offerings. Cai and Wei (1997) study the long-run stock returns and operating performance of 180 IPOs listed on the Tokyo Stock exchange during 1971-1992 period. Their results show that the operating performance declines in the post-IPO period. Coakley et al. (2007) analyze the post-issue operating performance in the UK and they document a similar result. In emerging markets, Kim et al (2004) investigate the operating performance of firms that go public in the Thai market. Their results are consisted with the finding in other developed markets.

Based on our analysis, we recommend that the CMA continues with the current policy that allows the lead underwriter to be the financial advisor to the IPO firm. This practice is expected to reduce the moral hazard problem. Because the underwriter will bear severe consequences if the efforts to sell the shares did not succeed. However, further investigation needs to be conducted to examine the possibility of window dressing and earning management in the pre-IPO financial statements.

Please note that our results are obtained based on univariate analysis. In order to effectively investigate the underlying economic reasoning behind these results, further empirical investigation must be conducted.

## Appendix

**A1:** Summary statistics of offering size, percent offered, oversubscription, and number of subscribers by sectors and by offering type.

Sector	IPO			Right Issue			Private		
	Mean	Median	n	Mean	Median	n	Mean	Median	n
<b>Banking</b>									
Offering size	6996	1500	5	1312	1312	1			0
Percent Offered	45	50	5	58.33	58.33	1			0
Oversubscription	997	516	3	114	114	1			0
Number of Subscribers	6301	8800	3						
<b>Cement</b>									
Offering size	685	750	6	500	500	1			0
Percent Offered	50	50	6	12.5	12.5	1			0
Oversubscription	396	306	5	152	152	1			0
Number of Subscribers	2600	2972	6						
<b>Construction</b>									
Offering size	614	522	11	160	160	2			0
Percent Offered	30	30	11	24.545	24.545	2			0
Oversubscription	359	320	10	74.8	74.8	1			0
Number of Subscribers	1552	1300	11			0			
<b>Food</b>									
Offering size	945	507	5	577.0633	292.69	6	163	90	3
Percent Offered	30	30	5	46.55	50	6	7	6	3
Oversubscription	466	400	5	130.1633	110	3			
Number of Subscribers	1517	1000	5	3.55	3.55	1			
<b>Industrial</b>									
Offering size	1434	450	9	2947.5	2947.5	2			0
Percent Offered	34	30	9	22.175	22.175	2			0
Oversubscription	441	465.1	8	159.635	159.635	2			0
Number of Subscribers	2084	1110.5	8			0			0
<b>Insurance</b>									
Offering size	135	80	37	160.4667	150	15			0
Percent Offered	39	40	37	53.608	50	15			0
Oversubscription	730	700	35	115.85	93.69	15			0
Number of Subscribers	905	835	31	1392.07	1392.07	2			0
<b>ITC</b>									
Offering size	2330	1000	5	3058.333	2000	3			0
Percent Offered	31	30	5	52.89	55.5	3			0
Oversubscription	1911	350	3	144.8567	105	3			0
Number of Subscribers	4893	4800	3	40.765	40.765	2			

**A1 Cont'd:** Summary statistics of offering size, percent offered, oversubscription, and number of subscribers by sectors and by offering type.

<b>Media</b>									
Offering size	750	750	2			0			0
Percent Offered	30	30	2			0			0
Oversubscription	472.5	472.5	2			0			0
Number of Subscribers	1450	1450	2						
<b>Multi-Investment</b>									
Offering size	2081	2081	2	729.5833	648	3	38.56	38.56	1
Percent Offered	18	18	2	50.63	41.18	3	23.58	23.58	1
Oversubscription	293	293	2	138	111	3			
Number of Subscribers	2326	2326	2			0			
<b>Petrochemicals</b>									
Offering size	2281	1969	9	1590	1731	6	395	395	2
Percent Offered	40	45	9	37	38	6	19	19	2
Oversubscription	319	270	8	153	154	6			0
Number of Subscribers	4493	4520	8	13	13	3			0
<b>Real Estate</b>									
Offering size	1798	2014	5	1915	2040	4			0
Percent Offered	26	30	5	28	31	4			0
Oversubscription	271	280	5	126	125	3			0
Number of Subscribers	4067	1996	5	17	17	1			
<b>Retail</b>									
Offering size	557	396	13			0			0
Percent Offered	30	30	13			0			0
Oversubscription	503	471	13			0			0
Number of Subscribers	1403	1360	11						
<b>Tourism</b>									
Offering size	1097	1097	2			0	736	736	2
Percent Offered	30	30	2			0	16	16	2
Oversubscription	285	285	2			0			0
Number of Subscribers	1355	1355	2						0
<b>Transportation</b>									
Offering size	1553	1553	2	1440	1440	1	1753	1753	1
Percent Offered	30	30	2	29	29	1	20	20	1
Oversubscription	670	670	2	159	159	1			
Number of Subscribers	1575	1575	2			0			

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