

JORDAN SMALL AND MEDIUM SCALE INDUSTRIES 2000-2010: PERIODICAL EVALUATION

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Abstract

The role of the industrial sector in the Jordanian economy is increasing year by year. Its share of GDP accounted for 23% in 2011 compared with 22% in 2007. In this sector, the debate always has been on its source of growth. Was the source of growth in this sector small scale or large scale industries? Many policy measures have also been adopted to encourage investment in the industrial sector. Those measures were biased towards large scale industries. This is reflected by the creation of industrial city zones in various parts of the country, as well as in the encouragement of investment laws.

This empirical research will answer the following questions; which was more successful small scale industries or large scale industries? Which was more successful labor intensive or capital intensive industries? Which were more successful private ownership industries or public ownership?

To provide answers to the previous questions, Jordan experience will be evaluated in light of the following:

- 1- Profit maximization is the prime goal of any investor, and the question is; which industries achieved higher profits, the small or larger scale industries?
- 2- The efficiency of any industry can be measured, in addition to its profitability, by its productivity level which is considered the source of profitability.
- 3- Capital intensive industries believed to be more productive than labor intensive industries. Therefore, the analyses will take these intensities into consideration when evaluating profitability and productivity levels.

Evaluating the previous three indicators (profitability, productivity, and capital and labor intensities, on the industry level not firm level), will be carried out to show the degree of

success of S&M industries in comparison with large scale industries prior and after the financial crisis of 2008.

This research concluded that small and medium scale industries were more successful than large scale industries.

Keywords: Industrial Efficiency, Productivity, Profitability, Capital and Labour Intensities

Introduction

Economically, the most efficient and successful industry is the highest productive and profitable one. These two measurements can't be evaluated with no attention to capital intensity in each industry, as it is known that capital intensity affects the level of productivity and profitability. Therefore, an evaluation of these measurements in Jordan will be applied on the (23) ISIC sectors for selected years in the period 2000 to 2010.

Definition: Large scale and small scale industries

There are many definitions to these two scales of the industry. A project which is considered large scale in Jordan would be small in another country. However, for the evaluation of the size of an enterprise we have to look to its capital, number of workers engaged with it, production, and sales of the enterprise. In this research two factors are taken to measure the size of the industry, these are; capital and labor force. The average of the labor force in each industry was calculated by dividing the number of workers in the industry on the number of the firms in the same industry. Then we derived a descending order of the (23) industry sectors according to the ISIC classifications. Number (1) in this order means the highest industry employing workers. Then we turn to the capital using the same procedures. We divided here the paid up capital of the industry by the number of firms in the industry. Number (1) means the highest industry in its capital.

Evaluation

Productivity (TP)

Some economists refer productivity to one factor of production, i. e. if they refer it to the number of workers, then it is labor productivity, and if they refer it to the capital, it is called capital productivity.

Referring productivity to one factor of production is questionable and unacceptable. All factors of production must be taken in the calculation of productivity, as all factors of production participated in the production. Therefore, the following formula for total productivity is taken in this research:

$$TP = (VA-EC) / (FA)$$

Where;

TP is the rate of total productivity

VA is the value added , or net output, of the industry

EC is the employee compensations in an industry

FA (or NFA) is the total, or net, fixed assets

Applying TP equation on the (23) - international standard for industrial classifications – (ISIC) coding for the industrial sector in Jordan, the results can be seen in Tables 1, 2, and 3 for selected years before and after the economic crisis in 2008, namely 2000, 2007, and 2010. Emphasis will be on the highest five industries only, as shown in Tables 5, 6, and 7.

The rate of productivity, for the whole industrial sector (the 23 sectors), shown increases from (31) in the year 2000, to (64) in 2007, and to (73) in 2010. This increase in (TP) after the economic crises in 2008 was due to the fact that, since the year 2000, privatization was hyper in Jordan, and most public firms were sold to the private sector which highlights profit maximization as its prime goal. Detailed results will be analyzed with the results for profitability and capital intensity, as all of these indicators have interrelationship and effects on each other, (see Section 5).

Table 1: The Year 2000 Indicators

Sectors / 2000 - ISIC Code	LN / EN	Order	CI=paid up capital / LN	Order	% TP = (VA – EC) /NFA	Order	% P = (NO-S) /sales	Order
1-Extraction of crude petroleum and natural gas	74	4	1216	13	436	1	95	3
2-Mining and quarrying	60	6	2220	7	45	8	91	7
3-Manufacture of food products and beverages	6	15	1295	12	33	19	92	5
4-Manufacture of tobacco	155	3	2759	5	416	2	98	1
5-Manufacture of textiles	4	18	1456	11	38	14	88	12
6-Manufacture of wearing apparel	7	14	152	23	37	15	71	23
7-Tanning and dressing leather	5	17	3418	4	37	16	86	18
8-Manufacture of wood and wood products	1	23	309	22	45	9	88	13
9-Manufacture of paper and paper products	28	9	2096	8	22	21	93	4
10-Publishing and printing production	10	13	907	17	40	12	82	19
11-Manufacture of coke	3418	1	936	16	60	5	96	2
12-Manufacture of chemicals	49	7	2361	6	35	17	92	6
13-Manufacture of rubber and products	18	11	1028	15	25	20	88	15
14-Manufacture of other non-metallic minerals	5	16	1132	14	43	10	87	16
15-Manufacture of basic metals	63	5	6272	1	33	18	90	8
16-Manufacture of fabricated	2	22	660	20	38	13	88	14

metal products								
17-Manufacture of machinery and equipments	16	12	690	19	54	6	87	17
18-Manufacture of electrical machinery	32	8	4186	3	47	7	90	9
19-Manufacture of medicals	4	19	1747	9	16	22	79	22
20-Manufacture of motor vehicles and trailers	19	10	893	18	62	4	90	10
21-Manufacture of other transport equipments	2	21	1700	10	102	3	81	21
22-Manufacture of furniture	2	20	389	21	43	11	82	20
23-Electricity and gas supply	1263	2	4736	2	7	23	89	11
Total	6		1552		31		91	

LN: labor number EN: establishments number CI: capital intensity VA: value added EC: employee compensations NFA: net fixed assets NO: net output WS: wages and salaries

Source: Department of Statistics, **Industry Surveys**, 2000, 2007, and 2010, Amman, Jordan, Various pages.

Profitability (P)

There is no doubt that all economic activities' ultimate goal is to maximize profits. Profits are the source of investment and consequent economic growth and development.

Profitability can be measured by the following formula;

$$P = (NO - W) / S$$

Where;

P is profitability rate

NO is net output

W is wages and salaries

S is sales

Tables 1, 2, and 3 show the profitability rates in the (23) (ISIC) sectors, and the overall industrial sector profitability. The profitability rate for the whole industrial sector was high over the whole period under study, and increased slightly from (91%) in 2000, to (94%) in 2007, and to (95%) in 2010. This rate of (P) is considered high, and it came as a result of the high rate of productivity. The sectoral profitability will be analyzed with the results of productivity and capital intensity, (Section 5).

Table 2: The Year 2007
Indicators

Sectors ISIC / 2007	LN /EN	Order	CI=paid up capital / LN	Order	% TP = (VA – EC) /NFA	Order	% P= (NO- WS) / sales	Order
1-Extraction of crude petroleum and natural gas	7	18	4673	6	133	7	89	16
2-Mining and quarrying	26	9	5433	4	130	8	95	6
3-Manufacture of food products and beverages	10	15	1009	12	53	17	94	10
4-Manufacture of tobacco	98	3	2498	7	387	2	99	3
5-Manufacture of textiles	9	16	671	14	59	15	95	7
6-Manufacture of wearing	17	11	204	22	238	3	88	17

apparel								
7-Tanning and dressing leather	11	13	352	19	51	19	88	18
8-Manufacture of wood and wood products	3	23	139	23	42	20	122	1
9-Manufacture of paper and paper products	37	5	1342	10	53	18	91	14
10-Publishing and printing production	12	12	586	17	63	14	85	20
11-Manufacture of coke	507	1	6312	3	159	4	98	5
12-Manufacture of chemicals	27	8	2202	8	84	11	93	11
13-Manufacture of rubber and plastic products	28	7	650	16	54	16	95	8
14-Manufacture of other non-metallic minerals	6	19	1103	11	77	12	93	12
15-Manufacture of basic metals	55	4	4755	5	121	9	99	4
16-Manufacture of fabricated metal products	4	22	240	20	140	5	94	9
17-Manufacture of machinery and equipments	18	10	883	13	134	6	92	13
18-Manufacture of electrical machinery	9	17	9004	2	65	13	102	2
19-Manufacture of medicals	4	20	508	18	39	21	83	21
20-Manufacture of motor vehicles and trailers	11	14	660	15	36	22	81	22
21-Manufacture of other transport equipments	34	6	1759	9	1480	1	68	23
22-Manufacture of furniture	4	21	220	21	103	10	86	19
23-Electricity and gas supply	344	2	16203	1	10	23	90	15
Total					64		94	

LN: labor number EN: establishments number CI: capital intensity VA: value added EC: employee compensations NFA: net fixed assets NO: net output WS: wages and salaries

Source: Department of Statistics, **Industry Surveys**, 2000, 2007, and 2010, Amman, Jordan, Various pages.

Capital Intensity (CI)

Two factors of production are so important in any production process, these are labor and capital. Any economy suffers from shortages in labor will channel investments towards capital intensive industries, and those countries with high level of unemployment will encourage investment in labor intensive industries.

The following formula was used in the calculations of capital intensities;

$$CI = FC / LN$$

Where;

CI is capital intensity

FC is net fixed capital for the industry

LN is labor number in the industry

Tables 1, 2, and 3 show the rates of capital intensity in the (23) industrial sectors. In 2000 the highest capital intensity was amounted to JD6272 in the basic metal industry, and JD16203 in the electricity and gas supply sector in 2007, and JD37471 in the manufacturing

of transport equipments in 2010. These rates explained as; employing one person in the basic metal industry in the year 2000 will force the industry to invest JD6272, and so on. In fact, in one glance to the (LN/EN) and the (CI) columns in the tables, one can conclude that most Jordanian industries were much more capital intensive rather than labor intensive.

Table 3: The Year 2010 Indicators

Sectors / 2010 - ISIC Code	LN / EN	Order	CI=paid up capital / LN	Order	% TP = (VA – EC) /NFA	Order	% P = (NO-WS) /sales	Order
1-Extraction of crude petroleum and natural gas	51	6	5882	7	126	4	83	21
2-Mining and quarrying	27	12	8214	4	107	8	91	14
3-Manufacture of food products and beverages	8	16	1119	15	75	12	94	8
4-Manufacture of tobacco	52	5	4025	9	670	1	98	3
5-Manufacture of textiles	4	20	1733	11	66	14	91	15
6-Manufacture of wearing apparel	99	3	399	20	405	2	86	17
7-Tanning and dressing leather	0	23	528	19	43	20	84	19
8-Manufacture of wood and wood products	3	22	103	22	59	16	101	2
9-Manufacture of paper and paper products	36	8	1445	13	44	19	95	7
10-Publishing and printing production	9	15	911	17	57	17	84	20
11-Manufacture of coke	246	1	13008	3	205	3	102	1
12-Manufacture of chemicals	26	13	3797	10	110	6	94	9
13-Manufacture of rubber and plastic products	23	14	1462	12	56	18	97	4
14-Manufacture of other non-metallic minerals	6	19	1043	16	69	13	93	11
15-Manufacture of basic metals	40	7	4401	8	80	11	95	6
16-Manufacture of fabricated metal products	3	21	310	21	86	9	92	12
17-Manufacture of machinery and equipments	7	17	7758	5	108	7	94	10
18-Manufacture of electrical machinery	27	11	7066	6	25	22	96	5
19-Manufacture of medicals	82	4	73	23	123	5	86	18
20-Manufacture of motor vehicles and trailers	7	18	1179	14	43	21	70	23
21-Manufacture of other transport equipments	34	9	37471	1	61	15	72	22
22-Manufacture of furniture	33	10	683	18	83	10	90	16
23-Electricity and gas supply	139	2	32114	2	12	23	91	13
Total					73		95	

LN: labor number EN: establishments number CI: capital intensity VA: value added EC: employee compensations NFA: net fixed assets NO: net output WS: wages and salaries

Source: Department of Statistics, **Industry Surveys**, 2000, 2007, and 2010, Amman, Jordan, Various pages.

Labor Intensity (LI)

This indicator is used to show how much the industry is labor intensive.

The following formula is used here;

$$LI = LN / EN$$

Where; LI is labor intensity

LN is the labor number in the industry

EN is the number of establishments in the industry

When applying this formula on the (23) industrial sectors in the years 2000, 2007, and 2010, one can conclude that two sectors had only been large scales in the year 2000 in terms of (LI). These were the coke industry and the electricity & gas supply industry. The average number of workers in each firm in these sectors was (3418) and (1262) respectively. In fact, these two industries were among the only (5) industries owned highly by the public sector. The government share was the lowest in the non-metallic industry and amounted to 15% compared with a 90% government share in the electricity and gas supply in 2000. This government share ownership was decreasing gradually up to 2010, (Table 4).

In the year 2007 all sectors were medium and small scale industries, as the highest (LI) was (507) in the coke industry. This has also repeated and deepened in 2010, as all industries became small scale and the highest number of workers in each establishment was (246) in the coke industry. This decline in (LI) in 2010 was the consequence to the economic crisis which affects the Jordanian economy late in 2010 and after as well as to the decrease in the government share ownership in the industrial sector which decreased gradually from 23% in 2000 to 18% in 2007 and to 17% in 2010.

Table 4: Government Contribution in Paid Up Capital 2000 - 2010

Sectors ISIC Coding	2000			2007			2010		
	A	B	B / A %	C	D	D /C %	E	F	F / E %
	Paid up Capital JD000	Gov. Contribn. JD000		Paid up Capital JD000	Gov. Cont. JD 000		Paid up Capital JD000	Gov. Cont. JD 000	
1-Extraction of crude petroleum and natural gas	9000	5400	60	15000	15000	100	15000	15000	100
2-Mining and quarrying	171480	83939	48.9	189444	32996	17.4	190644	58162	30.5
3-Manufacture of food products and beverages	267271	12936	4.8	329874	631	0.2	363061	4800	1.3
4-Manufacture of tobacco	25656	0	0.0	38969	800	2.1	45889	0	0.0
5-Manufacture of textiles	33788	1262	3.7	42048	2625	6.2	46697	3501	7.5

6-Manufacture of wearing apparel	21660	0	0.0	74710	0	0.0	91081	0	0.0
7-Tanning and dressing leather	56805	160	0.3	5252	150	2.9	4580	0	0.0
8-Manufacture of wood and wood products	3149	0	0.0	4575	0	0.0	3641	0	0.0
9-Manufacture of paper and paper products	55751	3381	6.1	52975	1350	2.5	52495	1583	3.0
10-Publishing and printing production	30817	2460	8.0	45216	5390	11.9	49657	5968	12.0
11-Manufacture of coke	32000	5760	18.0	32000	6720	21.0	32000	6720	21.0
12-Manufacture of chemicals	255664	2640	1.0	332876	1474	0.4	326048	3428	1.1
13-Manufacture of rubber and plastic products	45110	250	0.6	50487	0	0.0	69507	0	0.0
14-Manufacture of other non-metallic minerals	130731	19952	15.3	176233	19726	11.2	181163	17094	9.4
15-Manufacture of basic metals	164762	5546	3.4	142080	7318	5.2	151380	4139	2.7
16-Manufacture of fabricated metal products	46283	0	0.0	36247	0	0.0	47964	0	0.0
17-Manufacture of machinery and equipments	20397	0	0.0	39606	0	0.0	43369	0	0.0
18-Manufacture of electrical machinery	48892	0	0.0	141001	0	0.0	225699	0	0.0
19-Manufacture of medicals	12019	0	0.0	4141	0	0.0	3231	0	0.0
20-Manufacture of motor vehicles and trailers	8345	611	7.3	14910	273	1.8	14810	0	0.0
21-Manufacture of other transport equipments	102	0	0.0	7263	0	0.0	12740	0	0.0
22-Manufacture of furniture	28729	0	0.0	31432	0	0.0	68469	0	0.0
23-Electricity and gas supply	299000	269030	90.0	390500	314550	80.6	401100	303510	75.7
Total	1767443	413327	23.4	2196836	409910	18.7	2440225	423904	17.4

Department of Statistics, **Industry Survey 2000, 2007, 2010**, (Tables 3, 3, and 2 respectively)

Periodical Results' Analyses

The Year 2000 Results

1. The highest (3) profitable industries were the highest (3) industries in their (LI) and (TP). These were; tobacco, coke, and extraction of natural gas, and this reflects the theory which says the higher the productive firm is the higher the profitable one.
2. None of the highest (4) industries in their (CI) were among the highest (5) profitable and productive industries.
3. The lowest (3) profitable industries were the lowest (3) (LI) ones, namely; medicals, furniture, and manufacturing of transport equipment.
4. The previous two points, 2 and 3, highlight the fact that the most profitable industries are the highest labor intensive ones and not the highest capital intensive.

- The tobacco industry was 100% private ownership. Two of the highest (5) profitable industries were the highest in their government share in their capital. This share was 90% and 49% of the electricity & gas supply industry, and the mining & quarrying industry respectively.
- The lowest (3) industries in their (LI) and (CI) were; the wood products industry followed by the furniture industry, and the fabricated metal industry. These industries were small scale ones. The average number of workers in each establishment in these industries was (2) workers.
- One of the (3) lowest industries in their (LI) and (CI), was also among the lowest (4) industries in their sales.

In conclusion, it seems that the most successful industries in terms of their (P) and (TP) in 2000 were the medium and the large scale industries, in terms of (LI), namely; tobacco, coke, and extraction of natural gas, as shown in Table 5.

Table 5: The Top and the Lowest 5 Industries in Their Performance in 2000, Descending Order

The highest 5 industries	In terms of					
	LI	CI	Sales	TP	P	Government share in capital
ISIC	11	15	12	1	4	23
Industry number	23	23	3	4	11	1
	4	18	11	21	1	2
	1	7	2	20	9	11
	15	4	23	11	3	14
The lowest 5 industries	In terms of					
	LI	CI	Sales	TP	P	Government share in capital
ISIC	8	6	21	23	6	4
Industry number	16	8	19	19	19	6
	21	22	1	9	21	8
	22	16	8	13	22	16
	19	17	20	3	10	17 to 22

The ISIC industry number can be seen in Table 1.

The 2007 Results

- The highest (3) industries in their (LI) and (CI) were; the coke industry; the electricity & gas supply; and the basic metal industry. These three industries were also among the highest (5) industries in their (LI) in 2000. In fact these are medium size industries in both years, as the lowest number of workers in each establishment in these industries was (55) and the highest was (507) working.
- The coke industry and the mining & quarrying industry were among the first highest (5) industries in their (LI), (CI), and sales.

3. Two industries from the previous highest (3) in their (LI) and (CI) were also among the highest (5) profitable industries. These were the coke industry and the basic metal industry.
4. Two industries from the previous (3) in their (LI) and (CI) were also among the (5) highest industries owned by the government. These were the electricity & gas supply industry, and the coke industry. The government share in these industries was 80% and 21% respectively, (Table 4).
5. The lowest profitable and productive industries were the transport equipment industry, the motor vehicles & trailers industry, and the medicals manufacturing industry. All of these industries were small scale, as the number of workers in each establishment in these industries was ranged from the lowest (2) to the highest (4).

In conclusion, the most successful industries in 2007, in terms of their profitability and productivity, were the medium scale industries in terms of (LI). These were; the coke industry, the basic metal industry, and the electricity & gas supply industry (See Table 6).

Table 6: The Top and the Lowest 5 Industries in Their Performance in 2007 Descending Order

The highest 5 industries	In terms of					
	LI	CI	Sales	TP	P	Government share in capital
ISIC Industry number	11	23	11	21	8	1
	23	18	3	4	18	23
	4	11	12	17	4	11
	15	2	14	5	15	2
	9	15	2	9	11	10
The lowest 5 industries	In terms of					
	LI	CI	Sales	TP	P	Government share in capital
ISIC Industry number	8	8	21	23	21	6
	16	6	1	20	20	8
	22	22	19	19	19	13
	19	16	7	8	10	16
	14	7	8	7	22	17 to 22

The ISIC industry number can be seen in Table 1.

The 2010 Results

1. Among the highest (5) industries in their (LI) three of them remain the highest in their (LI) since 2007. These were the coke industry, the electricity & gas supply industry, and the tobacco industry. Also, (3) of the highest (5) industries remained among the highest (3) industries in their (CI) since 2007. These were the electricity & gas supply, the coke, and the mining & quarrying industry, (Table 7). The high rates of (LI) and (CI) for the above mentioned industries was due to the high rates of profitability in

these industries, which averaged, during the whole period, to 90% for the electricity & gas industry, 100% of the coke industry, and 92% of the mining & quarrying.

2. Among the previous (3) highest (CI), only one industry was among the highest (5) profitable and productive industries. This was the coke industry.
3. From the highest (5) profitable industries, two industries were (LI). These were the tobacco, and the coke industries. In fact these two industries became medium scale ones in 2010. The number of workers in each establishment in these industries ranged between the lowest (51) to the highest (246), (Table 3).
4. Since 2007, four industries remain in the group of the highest (5) profitable industries. These were; tobacco, wood products, coke, and electrical machinery industries. All of these were medium size industries with the exception of the wood industry which was a small scale industry.
5. Among the lowest (5) profitable industries (3) industries were the same ones since 2007. These were the motor vehicles & trailer industry, transport equipment industry, and the printing industry. All of these were small scale industries in terms of their (LI).

Table 7: The Top and the Lowest 5 Industries in Their Performance in 2010 Descending Order

The highest 5 industries	In terms of					
	LI	CI	Sales	TP	P	Government share in capital
ISIC Industry number	11	21	11	4	11	1
	23	23	3	6	8	23
	6	11	12	11	4	2
	19	2	2	1	13	11
	4	17	14	19	18	10
The lowest 5 industries	In terms of					
	LI	CI	Sales	TP	P	Government share in capital
ISIC Industry number	7	19	1	23	20	4
	8	8	7	18	21	6
	16	16	19	20	1	7
	5	6	20	7	10	8
	14	7	21	9	7	16 to 22

The ISIC industry number can be seen in Table 1.

Conclusions

In conclusion, the most successful industries in terms of profitability in 2010 were those classified as medium scale industries. They have remained the highest profitable ones since 2007. These were; tobacco, wood products, coke, and electrical machinery industries. The tobacco industry and the coke industry were labor intensive industries. They ranked number (5) and (1) respectively in their (LI). These two industries also were number (1) and

(3) in their productivity level and this reflects the theory which says productivity sustains profitability. In fact it was shown in the analyses that profitability was increasing gradually throughout the period 2000-2010. This indicates that the financial crisis of 2008 and beyond did not affect the level of success in the industrial sector in Jordan.

Also, it is concluded that the most successful industries in terms of profitability were those owned by the private sector throughout the period 2000 to 2010. This can be seen in the tobacco industry which was and still is 100% owned by the private sector, the wood industry was 100% owned by the private sector, the electrical machinery industry was 100% owned by the private sector, and the coke industry was 21% government share ownership (Table 4).

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