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Competition, Competition Policy and Economic Efficiency in the MENA Region

Jordan's Country Report

By

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Final Report

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Executive Summary

By early 'nineties, only 15 countries had adopted competition laws. By the end of the decade approximately 90 had done so and many of the original 15 had taken steps to strengthen their competition laws and institutions. Moreover, the member states of the WTO commenced negotiations that will probably lead to the development of a treaty to govern competition in international markets.

The objective of this study is to assess the state of competition in Jordan. It analyses the status of competition in the manufacturing sector and addresses the Jordanian competition policy, legislation and enforcement compared to other selected MENA countries that has enacted competition laws such as Morocco, Tunisia and Egypt.

To assess competition in the Jordanian manufacturing sector, the study overviews the manufacturing sector in terms of its major industries, firm's size distribution, market structure, employment, value added and cost structure.

The contribution of the manufacturing sector to GDP was 15% in 2004. The sector is dominated by the consumer and intermediate goods. Capital goods contribution in the value added is limited. However, consumer goods constituted 45.3% of the value added on average while intermediate goods constituted 41.7%. Growth of these industries is driven mainly by growth in domestic demand more than growth in external markets.

The Jordanian manufacturing sector is dominated by enterprises employing less than 5 employees. Structure of firm's size has not altered fundamentally over the last few years. Share of small firms group increased from 71.7% in 1994 to 84% in 2001, due to the easy entry to the market and low cost to start-up such businesses. The medium scale group share seems to be declining with its share dropped from a level of 25.5% in 1994 to only 12% in 2002. The large firms' number has proportionally declined over the same period. Apparently, growth in terms of the number of small firms outpaced that for the other groups.

The largest employment contributor in the manufacturing sector is food industries followed by the textile. They generate nearly 8% and 10% of the value added respectively. Textile industry generates about 10% of the total employment when added to the wearing apparel sector, while it generates nearly 4.5% of the manufacturing sector value added.

This analysis mirrors the labor intensive nature of these industries. The same applies to the fixture and furniture sector which generates 7.3% of the employment in the manufacturing sector and contributes only 2% in the value added. On the other hand there are industries that generate high value added such as tobacco and petroleum refinery. However, their contribution to the employment in the sector is limited.

When computing cost structure of manufacturing sector in Jordan, it indicates that intermediate inputs and/or raw materials in particular are the most important element. However, most of the raw materials are imported which means that the sector is highly sensitive to changes in import tariffs on raw materials.

Also, to portray an accurate picture for the state of competition in the manufacturing sector in Jordan, the study estimated the degree of specialization in the economy using Gini Coefficient for both the value added and employment.

Results for the year 2001 showed clearly that Jordanian manufacturing sector is characterized with high equality among sector where minimal specialization occurs.

The Gini coefficient for value added pertaining the overall sector is 0.2%, while the Gini coefficient for employment was 0.052. These results indicate that the wealth creation in the Jordanian manufacturing sector is not related to a specific sector. All sub sectors contribute almost equally to either value added or employment.

Moreover, the study calculated the concentration and market penetration to assess the degree and effectiveness of competition in the manufacturing sector. It analyzed also competition and market performance using productivity and technical efficiency.

The findings of the study indicate clearly that the Jordanian manufacturing sector is highly concentrated. The largest three firms in the different sub-sectors tend to hold a market share of more than an average of 77% during 1994 to 2001. Ten out of the twenty eight sub-sectors of which the data is available, the largest three firms hold a share of more than 90%. While only five sub-sectors have concentration ratio less than 40%. The only sector that maintains a concentration ratio of 100% is the petroleum refineries sub-sector due to the franchise power granted to the only petroleum refinery in Jordan.

Industries with high concentration (80 and higher) generate about 54 percent of the value added and employ 34 percent of the labor force. The second group with concentration between 40 and 79 generates 25 percent of the value added and employ 29 percent of the labor force. These are industries that are more labor intensive than the first group. The least concentrated group is industries with concentration below 40 percent generate 10.5 of the value added and employs 27 percent of the sector's labor force. This group is apparently a labor intensive and it is dominated by small firms.

Overall, the concentration index over the period 1994-2001, declined marginally although there are a growing number of firms in few sectors. It seems that new entrants are operating and competing at a lower scale and they are unable to join the largest three companies in the various sectors.

Considering import penetration, the study indicates that markets may be highly contestable even if domestic activities are highly concentrated. This mainly happens when they are sufficiently open to competition from foreign goods and services. The Jordanian manufacturing sector didn't witness significant changes in the value of import penetration during the period 1990 to 2001. The highest ratio that was witnessed during that period was 53.6% in year 1990, while the lowest ratio was 45.3% in the year 1999. However, the year 2001 witnessed an increase over its level during 1999 to reach 51.8%.

Import penetration decreased slightly from 53.6% in 1994, to nearly 51% in 2001. Variations in import penetration were modest over time. Standard deviation in import penetration for the whole sector was 2% during the period 1994 to 2001. These results, in many cases, reflect developments in trade policies and manufacturing sector in Jordan. The relatively high import penetration suggests that intra-industry is high and that many manufacturers were exposed to competition from abroad. Price differences between imported items and domestically produced goods exist as a result of tariff and non-tariff barriers and transportation costs.

As far as the productivity is concerned, findings of the study revealed that, on average the estimated productivity over the decade of eighties were negative. This trend was reversed during the decade of the nineties. These results were valid for all the sectors under investigation, except for that of the textile sector.

However, the behavior of the estimated productivity is not consistent overtime or a cross sectors. Performance seems to be sector specific. The results did not distinguish any of the sectors over time, that has a clear performance trend, most if not all sectors went through a high and low times. This pattern makes it difficult to draw conclusion regarding the relationship between market structure variables, the state of competition in the country and the overall performance.

To illustrate the competition status, the following correlations were computed: Concentration with Technical Efficiency; Export Orientation with Technical Efficiency; and Import Penetration with Productivity.

For most of the studied sectors, the spearman correlation coefficient between concentration index and technical efficiency was significant and negative. This means that less competition is associated with low productivity. This also indicates from a policy making point of view, that concentration has not led to the exploitation of the economies of scale. It was rather misused and has negative implications on productivity. This also suggests that, we need to compare the performance of the large and small firms, since productivity gain could be generated at the second level in terms of size in few sectors.

Meanwhile export expansion, measured as the share of export to gross output, was found to be insignificantly correlated with the growth of the (SR) or (TFP). Exports grew at a rapid rate. The estimated coefficient was insignificant although, it holds the expected positive sign in few cases. This weak correlation between export and (SR) or technical efficiency is normal since Jordanian exporters perceived the export markets as an expansion of the domestic market.

Moreover, exports were, in many cases, the result of bilateral government arrangements and were directed to few markets only. Weak correlation could be explained in terms of the high concentration of exports in few markets, whereby export oriented industries became very vulnerable to the swings in the regional markets, without succeeding in penetrating new markets to compensate the lost markets.

In the meantime, Import Penetration (IMP) was negatively correlated with the estimated (SR) or with the level of concentration. This indicator was also insignificant in determining the level of the (SR).

The study explains that the behavior of the coefficient varies between sectors without clear pattern. The level of aggregation utilized in this analysis might hide some details which might reveal the true relationship between the market structure variables. One of the reasons behind this unexpected relationship between openness and the (SR) growth may be attributed to some measurement errors that could arise from the definition of the openness as adopted here. The measure does not differentiate between imported raw materials and the final goods. This may overstate the level of manufactured imports relative to the gross output and could lead to wrong conclusions in a country characterized by its high dependency on imports.

The study examined, as well, the subsistence and effect of vertical aspects of competition in the Jordanian economy including vertical restraints and market entry barriers. Around 50 companies were interviewed from eight selected industries: Textiles and Clothing, Beverage, Paper and Paper products, Electrical Machinery, Pharmaceuticals, Cars, Paintings and chemicals, Vegetable Oil and Plastic.

Findings suggest that the Jordanian market does not suffer badly from unfair competitive practices due to vertical restraints. Except in few cases, it was noticed that, rarely the supplier and distributor are engaged in any price related or non-price related agreement that impose a vertical restrain. Nonetheless, the importance of getting the market players aware of their right to fight against such measures should be an important government endeavor. However, the majority of the interviewed companies agreed that limited access to funds is the major entry barrier. It was also clear from the survey that the Jordanian industrialists are not aware of the competition Law and its contents.

The Jordanian Competition Law was enforced in year 2002 under the temporarily law (49) after two previous attempts failed to issuing an anti-trust and competition law in 1996 and 1998. This Law is now replaced with a permanent law No. (33) for year 2004 which is endorsed by the parliament and ratified by the HM the King. The Law takes into consideration Jordan's international commitments and tackles the existing Jordanian relevant laws.

A Competition Directorate was established in year 2003 to implement the Law. The Directorate is not independent as it is within the Ministry of Industry and Trade and reports to the Minister. A National Competition Committee was formed by end 2003 with a very limited role mainly on overseeing the strategy and giving directions for the Directorate.

So far there have been several cases that were investigated under the current law. It is fair to believe that few Jordanian markets are suffering from collusive behavior and abuse of dominant positions, particularly in view of the high degree of concentration observed in many sectors. This record shows that developing a competition tradition and culture is a slow process and that the enactment of a competition law is only a starting point in that process.

Literature Overview

Most of the previous empirical work concerning the manufacturing sector, focused their analysis on estimating productivity growth over time by estimating Solow Residual (SR) *inter-alia* (Bani Hani 1989, Khateeb 1996) by adopting various methodologies for this purpose. This type of studies measured productivity at both aggregate level and disaggregate (firm) level. At the aggregate level they estimated productivity growth overtime and illustrated their cyclical changes. Studies at the firm level used limited sources and they did not place emphasis on particular sectors. They tend to pool data at the firm level and were more concerned about the consistency of the theoretical framework and the empirical findings.

Other studies focused on policy analysis of the process of industrialization, *inter-alia* (Zaghlool, I. and M. Hazaima: 1999, or Homsy: 2002). Very few studies have focused on the market structure and how this structure influence performance. Earlier investigation was conducted within the context of import-substitution polices and dealt with the current polices without critical assessment of their outcome on the performance. This was the case for a period of time as a result of inadequate data that matches exports and imports with output.

The overall conclusion emerged out of these studies was that productivity growth was negative or at best low. Recommendations were focused on policy changes in order to alter the market structure. However, previous work stop short of investigating the market structure and to draw more specific polices based on some factual findings.

Nevertheless, few studies established a link between market power, measured by concentration index (labor or value added), foreign trade variables and competition and competitiveness. For example, Nasr (1984), investigated the level of concentration in the manufacturing sector in Jordan for one year. However no attempt was made to link market performance with the state of competition in the manufacturing sector.

Muhtaseb (1995) has covered certain important aspects of the trade paradigm and focused on import penetration; Al-Hajji et al. (1997a, 1997b) have described qualitatively the competitiveness of the manufacturing sector, using primary survey data. More recently, MMIS, a local management Consulting Firm, has conducted a study on “Investment Strategy for the Manufacturing Sector” (2001) utilizing various competitiveness techniques, such as the ranking of manufacturing industries, based on selected performance criteria, cost structure analysis and cluster analysis at the manufacturing sector level.

Quite recently, the Competitiveness Unit at the Ministry of Planning published the “Jordan Competitiveness Book” which contains a series of studies¹ concerning market structure at sub-sectoral and micro level. These studies covered multitudes of sectors focused on specific products and investigate their linkages with other sectors. Those studies followed the cluster approach, based on M.E. Porter diamond methodology, they covered wide spectrum of sectors including services and manufacturing. These studies did not investigate the overall picture of the concerned sectors in terms of their market dynamics.

¹ *Jordan Competitiveness Book: Confronting the Competitiveness Challenge*, 2003, Ministry of Planning. Amman-Jordan.

Hence, this study fills an important gap in the existing literature where it is going to link domestic market conditions with foreign trade variables within the context of the new legal competition framework which has been introduced recently.

Specific Remarks

Variables such as concentration, import penetration, and firm size were not available in the UNDO data set. In addition, data covering the period 1980-2002 were not available concerning all variables. The data to cover the entire period under investigation needed to be extrapolated. Whenever this done, it was mentioned.

Since, capital stock and capital cost are going to be used as independent variables in the estimations; it was found that, utilizing the DOS data set will be more convenient and consistent. The methodology utilized in estimating the capital stock, is consistent with what is suggested by the report's methodology. The capital stock was first estimated utilizing the perpetual inventory method by using the year 1994 as the base year for estimating the initial capital. In the next step, the capital cost was estimated following the steps suggested by the study methodology with slight changes from the original equation. The actual level of inflation was used, instead of the expected level of inflation, since the actual estimates of the inflation are available.

In addition we utilized different methodology in deflating the capital stock. Details of this methodology will be provided later.²

Concentration was estimated for the largest three companies in terms of the value added. The number of employees was difficult to gather over the period under investigation.

The DOS have changed the methodology in gathering data and in classifying certain activities since 1996. This has resulted in few changes in the number of companies over time. The changes in methodology explain why the number of firms or employees may decline without any solid justification. Surely, it does not reflect exit and entry movements from the industrial market rather it reflects the changes in the adopted methodology.

Furthermore, in order to estimate efficiency, we utilized the UNIDO data set. However, in order to obtain the fixed price series we adopted different deflators which we believe are more precise.

² We have utilized the perpetual inventory method to estimate the current series of the capital stock by using the year 1994 as the base year to estimate the initial capital. In the second step we breakdown capital stock into machinery and equipment and construction. For each part of the capital stock we utilized the relevant price deflator. This is slightly different from the original proposed methodology.

Introduction

The current state of globalization as well as the intensification of mergers, especially cross-border mergers; trade liberalization which has resulted in significant reductions of tariff barriers and has shifted some of the attention among WTO members from tariff reductions to other impediments to market access, all leads to business anticompetitive practices which considered as serious restraints.

This caricature represents fairly accurately where the renewed interest in competition policy and competition law comes from. It has ensured that, whereas at the beginning of the 'nineties, about 15 countries had adopted competition laws, by the end of the decade approximately 90 had done so and many of the original 15 had taken steps to strengthen their competition laws and institutions. In addition, the member states of the WTO commenced negotiations that will probably lead to the development of a treaty to govern competition in international markets.

Jordan, however, has not been out of this liberalization trend, even though the pace of the reform has been slower than some of the emerging countries. The private sector's share in production and investment is rising, due mainly to the deregulation of many activities that had been previously reserved for the public sector. Price regulation has also been lifted on the bulk of goods and services in Jordan and there is an increasing reliance on markets in their determination. These major shifts in the control of production and prices from the public sector to private firms have drawn attention to the importance of establishing a competition system serving the objectives of efficiency and fairness.

It is generally recognized that competition policy should not be construed in the narrow sense of anti-trust law, but in the larger sense of all policies preventing barriers to entry and fostering market contestability. Trade liberalization is considered as a major component of these policies, particularly in countries with small markets captured, under protection, by a small number of firms. Such is the case of almost all MENA economies where the number of firms tends to be very small in the industrial sector and in services. Under such domestic market structures import liberalization would exert enough pressure on domestic firms to ensure that markets are functioning competitively, regardless of the enactment of a competition law.

Due to the significant importance of trade liberalization to discourage anticompetitive practices, it is not sufficient. The practice in many developed and developing countries alike, is to enforce other regulatory measures that may underpin fair competitive practices and restrict imports: standards and norms, sanitary and phyto-sanitary control and, more seriously, anti-dumping. Restrictive measures other than tariffs are as prevalent, if not more, in most developing countries, including Jordan.

Furthermore, practices by exporting firms may still impair competition in importing countries, even if there are no government restrictions. In the absence of domestic competition law, these firms may enter into exclusive or selective arrangements and impose the prohibition of parallel imports on their branded products.

The objective of this study is to assess the state of competition legislation and enforcement in Jordan. It first analyzes the state of competition in the Jordanian economy addressing the manufacturing sector in specific. Then it analyzes competition legislation and enforcement in the country. The analysis will be compiled

in a report including other MENA countries that has enacted competition laws for comparison purposes.

Overview of the Jordanian Economy

Macroeconomic Policies

After the crisis of 1989, the first priority of macroeconomic policies in Jordan was to restore stability and confidence in the Jordanian economy. The difficulties of macroeconomic management had been exacerbated by the collapse of the third largest bank in August 1989 and a doubling of the external debt burden, which amounted to about twice the level of GDP in 1990. In addition, the negative repercussions of the Gulf war and the return of Jordanian workers expelled from Kuwait in 1991-92 required the Jordanian authorities to adapt their policies to a changing environment.

Jordanian efforts introduced within the framework of two IMF stand-by arrangements in 1989 and 1992. As a result, the Jordanian Dinar stabilized against the U.S. dollar and the SDR in 1992. The Central Bank of Jordan (CBJ) kept monetary expansion broadly in line with macroeconomic developments, thus holding a tight control on excess liquidity. Initially, monetary policy was enforced through direct controls and high reserve requirements. Over time, however, the CBJ shifted to indirect controls of monetary policy, notably with the introduction of CBJ certificates of deposit in 1993, a gradual reduction of reserve requirements, and the liberalization of current and capital account transactions.

Trade Liberalization

Trade liberalization has been the thrust of the adjustment efforts. During successive rounds of liberalization, quantitative barriers to imports and tariffs were eliminated or reduced on a multilateral or regional basis, opening Jordan to world markets. Simultaneously, the Jordanian government pursued a strategy of obtaining preferential market access for Jordanian exports through bilateral trade initiatives.

The comparison with the import-substitution policies of the past is revealing. Until the late 1980s, Jordan had a high and complex tariff structure, with a maximum tariff rate of 318% and an average weighted tariff rate of 19%. Widespread exemptions implied that 51% of all imports were exempted from import duty. In addition, about 40% of imports were subject to quantitative restrictions. The tariff structure was also characterized by a high degree of variation.

Currently, Jordan has a simple import tariff structure, with an average weighted import tariff rate of 13%, a maximum rate of 30%, and a standard deviation of 15.7%. Non-tariff barriers are limited to the exclusive trading rights for petroleum products, due to expire in 2008. Exemptions have also been reduced significantly with a small portion of imports now exempted from import duties.

More importantly, Jordan acceded to the WTO in 2000 with a commitment to gradually reduce tariff and non-tariff barriers over the next eight years. In particular, the maximum tariff rate will be reduced to 20% by 2010 under the WTO agreements.

Multilateral liberalization has been complemented with a series of bilateral trade agreements aimed at increasing market access for Jordanian exports. Beyond the special access granted to the Qualified Industrial Zones (QIZs) in 1996, Jordan ratified a Free Trade Agreement with the United States in 2001 and an Association

Agreement with the European Union (EU) in 2002. Jordan is also a member of the Arab Free Trade Agreement since 1998 and has signed bilateral free trade agreements with most countries of the MENA region and some European countries that are not yet members of the EU. In addition, the government launched in 2001 an ambitious project, the Aqaba Special Economic Zone, aimed at providing free-trade zone status and a streamlined administration with significant tax and infrastructure incentives.

Deregulation of Commodity Prices

Another policy challenge faced the Jordanian authorities in the early 1990s, was the extensive regulation of domestic commodity prices. These regulated prices included most food staples (wheat, barley, sugar, rice, milk, meat, etc.) and domestic petroleum product prices, accounting for an estimated 34% of the average consumption basket.

The food subsidies were established in 1989-90 with the intent of protecting the poor following the exchange rate crisis, but resulted in distortions of relative prices and a generalized subsidy system that benefited the rich more than the poor. The impact on the budget was also substantial, with the overall cost of food subsidies amounting to over 3% of GDP in 1990. The prices of petroleum products had been regulated even before the crisis, reflecting subsidized crude oil received from neighboring Arab countries. The subsidies on petroleum products covered all industrial and commercial uses.

The main goal of government policy was to move away from general subsidies in favor of direct transfers to the poor. This involved a gradual increase in commodity prices that was politically very difficult to introduce. Most explicit food subsidies were gradually reduced and eliminated in 1999. In addition, the market for two food staples (chaff and barley) was liberalized in 2002, leaving only a small subsidy on wheat. For petroleum product prices, the authorities adopted a policy of gradual price increases to bring prices in line with international market prices over the long run. The IMF estimated that only 10-15% of the average consumption basket is estimated to be still regulated.

It should be mentioned that the drive to adopt the competition law, was very much motivated by these policy changes described above, especially after 1996 when the Ministry of supply was canceled.

Overview of the Manufacturing Sector in Jordan

The manufacturing sector in Jordan is dominated by the consumer goods and intermediate goods. Capital goods contribution in the value added is limited. As the table below shows consumer goods constitutes 45.3% of the value added on average, and intermediate goods constitutes 41.7% on average. It is quite clearly that growth of these industries was driven by growth in domestic demand more than growth in external markets.

Table (1): Structure of the Manufacturing Sector ³

	Average Period (1) (1994-1997) JD000	Period (1) %	Average Period (2) (1998-2001) JD000	Period (1) %
Consumer Goods	320,672	45.6%	412,882	45.1%
Intermediate Goods	290,118	41.3%	384,575	42.0%
Capital Goods	92,081	13.1%	118,482	12.9%
Total	702,871	100%	915,939	100%

Source: industrial census, several issues, DOS (Jordan)

In terms of employment, food industries are the largest contributor in the manufacturing sector by nearly employing 15% on average of the total employment in the sector over the last decade, while it generates nearly 8% of the value added. The second largest industry in terms of employment is the textile industry. It generates about 10% of the total employment when added to the wearing apparel sector, while it generates nearly 4.5% of the manufacturing sector value added. However, this analysis mirrors the labor intensive nature of these industries. The same applies to the fixture and furniture sector which generates 7.3% of the employment in the manufacturing sector and contributes only 2% in the value added.

On the other hand there are industries that generate high value added such as tobacco and petroleum refinery. However, their contribution to the employment in the sector is limited as shown below in table (2).

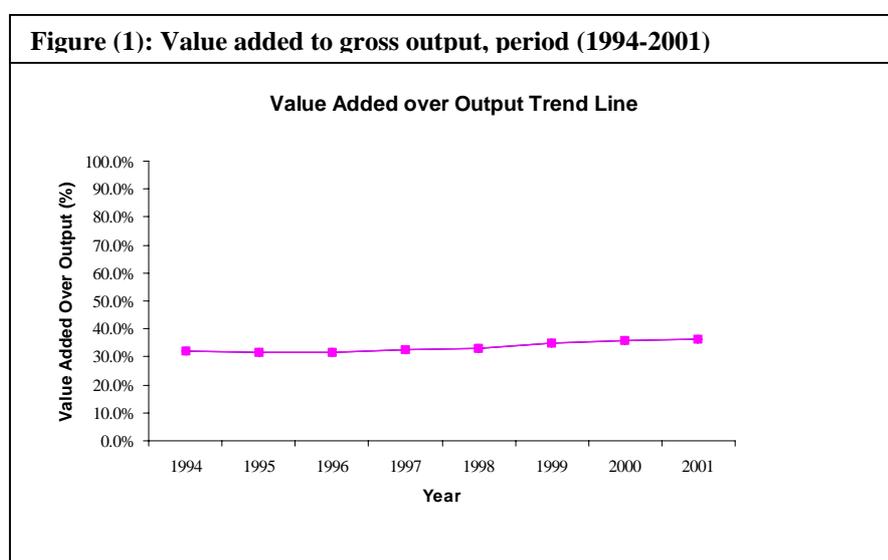
³ Consumer goods include: food products, beverages, tobacco, textiles, leather products, footwear, wood and furniture, paper products, printing and publishing. Intermediate goods include: chemicals, petroleum, rubber and rubber products, plastic products, non metallic products. Capital goods include: metallic products, non-electrical products, electrical products, transport equipment.

Table (2): Average Employment and Value added of the Manufacturing Sector for the Period (1994-2001)

ISIC2	Sector	Average Value Added (1994-2001)		Average Employment (1994-2001)	
		Value (JD 000)	%	Number	%
290	Other Mining	188,198	17.3%	8,422	6.9%
311	Food manufacturing	81,439	7.5%	18,141	14.7%
313	Beverage industries	46,020	4.2%	2,604	2.1%
314	Tobacco manufactures	107,421	9.8%	1,115	0.9%
321	Manufacture of textiles	20,659	1.9%	3,440	2.8%
322	Manufacture of wearing apparel, except footwear	27,177	2.4%	10,043	8.0%
323	Manufacture of leather and products of leather, leather substitutes and fur, except footwear and wearing apparel	0		476	0.4%
324	Manufacture of footwear, except vulcanized or molded rubber or plastic footwear	5,856	0.5%	1,705	1.4%
331	Manufacture of wood and wood and cork products, except furniture	6,391	0.6%	3,073	2.5%
332	Manufacture of furniture and fixtures, except primarily of metal	22,792	2.1%	9,123	7.4%
341	Manufacture of paper and paper products	23,315	2.1%	3,161	2.6%
342	Printing, publishing and allied industries	25,707	2.3%	1,274	1.0%
351	Manufacture of industrial chemicals	59,913	5.4%	6,596	5.4%
352	Manufacture of other chemical products	80,446	7.2%	6,999	5.7%
353	Petroleum refineries	54,073	4.9%	2,236	1.8%
355	Manufacture of rubber products	1,133	0.1%	213	0.2%
356	Manufacture of plastic products not elsewhere classified	24,751	2.3%	4,194	3.4%
362	Manufacture of glass and glass products	1,127	0.1%	285	0.2%
369	Manufacture of other non-metallic mineral products	115,903	10.7%	13,419	10.9%
371	Iron and steel basic industries	26,432	2.4%	1,361	1.1%
372	Non-ferrous metal basic industries	7,543	0.7%	851	0.7%
381	Manufacture of fabricated metal products, except machinery and equipment	32,557	3.0%	10,882	8.9%
382	Manufacture of machinery except electrical	6,235	0.6%	970	0.8%
383	Manufacture of electrical machinery apparatus, appliances and supplies	24,857	2.3%	3,335	2.7%
384	Manufacture of transport equipment	7,657	0.7%	1,031	0.8%
385	Manufacture of professional and scientific, and measuring and controlling equipment not elsewhere classified, and of photographic and optical goods	2,047	0.2%	624	0.5%
390	Other Manufacturing Industries	3,399	0.3%	1,715	1.4%
410	Electricity, Gas and Steam	93,328	8.5%	5,908	4.8%

Source: Department of Statistics

The percentage of the value added to gross output, which could be utilized as a proxy to productivity shows a stable trend since the early nineties. This percentage reached for the whole sector an average of (33.4%) over the period 1994-2001.



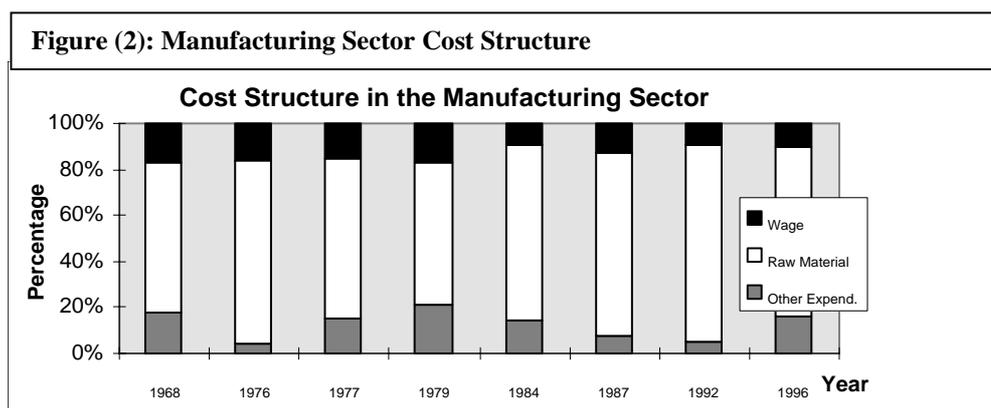
Source: Department of Statistics

The highest ratio was achieved in the printing publishing and furniture and allied sector due to the service nature of the industry which generally generates high value added. The second highest value added in the sector was achieved in the tobacco industry; however, this is not an indicator of productivity but represents the taxes and the regulated nature of this particular sector. Away from these two sectors this indicator goes below 50% for almost all the sectors in the manufacturing industry, while the average reaches 33%. Sectors above the average of 33% include:

- Other mining sector (57.8%)
- Beverage industries (49.7%)
- Manufacture of textiles (37.7%)
- Manufacture of wearing apparel except footwear (51.8%)
- Manufacture of footwear (36%)
- Manufacture of furniture and fixtures, except primarily of metal (38.1%)
- Manufacture of rubber products (42%)
- Manufacture of glass and glass products (35.4%)
- Manufacture of other nonmetallic mineral products (47.8%)
- Manufacture of fabricated metal products, except machinery and equipment (34.2%)
- Manufacture of machinery except electrical (33.9%)
- Manufacture of professional and scientific and measuring and controlling equipment (38.9%)
- Other manufacturing industries (33.6%)
- Electricity, gas and steam (44.3%)

Nevertheless, our investigation will establish the link between the degree of competition and productivity in later sections. The relatively low percentage of the value added to gross output, point to the high proportion of intermediate demand (cost structure) used in the manufacturing sector in Jordan.

A decomposition of the cost structure shows that, raw materials are the most important element in the cost structure over a fairly long period. This fact has not changed over time as can be seen from figure (2) below.



Source: estimated from DOS statistical bulletins.

The cost structure indicates that, intermediate inputs and/or raw materials in particular by and large are the most important element. Given the fact that most of the raw materials are imported, means that the sector is highly sensitive to changes in import tariffs on raw materials.

Performance in the manufacturing sector and its structure was greatly influenced by the manufacturing policies that were adopted over time. Protection and weak

competition arguably are the most important factors in this regard. In the following section we will focus on the state of competition and the most important factors affecting market structure and hence performance in the manufacturing sector.

The State of Competition in Jordan

Anticompetitive behavior depends largely on both the degree of concentration and openness or market penetration. If there are a small number of firms that hold a very large share of a market, then it would be easier for them to agree on collusive actions to fix prices, rig bids or share the market. However, if imports represent a relatively large share of domestic demand and are allowed to respond freely to domestic restrictive actions, then imports will play more or less the same dissuasive role against anticompetitive practices that a large number of domestic competitors would have played. Thus, both high market concentration and low import penetration are significant indicators of potential impairment of the competition process.

In Jordan, and for the purpose of our study to portray an accurate picture for the state of competition in the manufacturing sector, the degree of specialization in the economy was calculated to pin point if the Jordanian economy is specialized around a certain sector or activity. The Gini Coefficient for both the value added and employment of the manufacturing sector in Jordan were computed utilizing the equations given in the project methodology.

Given the nature of the Gini Coefficient as a measure of the degree of inequality in the distribution of the two elements, value added and employment, an analysis of this indicator for the Jordanian manufacturing sector was conducted. The results for the year 2001 show clearly that Jordanian manufacturing sector is characterized with high equality where minimal specialization occurs. These results indicate that the wealth creation in the Jordanian manufacturing sector is not related to a specific sector. All sub sectors contribute almost equally to either value added or employment. The Gini coefficient for value added pertaining the overall sector is 0.2%, while the Gini coefficient for employment was 0.052. These results indicate higher equality when considering employment, while the sector witnesses less equality when considering value added and wealth creation.

Market concentration has been challenged on the ground that what matters from the competition standpoint is not the number of firms per se, but whether there are barriers to entry to a market that would make the incumbents' situation and power incontestable by potential entrants. However, it is still an important indicator of market power that competition authorities throughout the world use in their surveillance of the competition process.

The results given in table (3) below, show the degree of concentration across Jordanian industries averaged for the period 1994 till 2001. Concentration is measured by the shares of the three largest firms in value added for the industry during that period.

The table indicates clearly that the Jordanian manufacturing sector is highly concentrated. The largest three firms in the different sub-sectors tend to hold a market share of more than an average of 77% during 1994 to 2001. Ten out of the twenty eight sub-sectors of which the data is available, the largest three firms hold a share of more than 90%. While only five sub-sectors have concentration ratio less than 40%. The only sector that maintains a concentration ratio of 100% is the petroleum

refineries sub-sector due to the franchise power granted to the only petroleum refinery in Jordan. The only sector with no concentration data available is the manufacture of other non-metallic mineral products. The five sub-sectors that exhibited the least concentration in their market during the period 1994-2001, are:

- Manufacture of furniture and fixtures, except primarily of metal (16.4%)
- Manufacture of plastic products not elsewhere classified (19.3%)
- Manufacture of wearing apparel (27.1%)
- Manufacture of wood and wood and cork products, except furniture (28%)
- Manufacture of fabricated metal products (29.6%)

However, taking 2001 year in specific, the figures also indicate that most of the Jordanian industries are highly concentrated. This is due to the limited size of the domestic market as well as to the legacy of investment licensing which was enforced until the late eighties. The largest three firms in 16 out of the 28 sectors generate more than 70% of the total value added generated in the sector. The most concentrated industries are petroleum refineries and manufacture of rubber products. The share of the largest three firms in total value-added for those two sectors stands at about 100%. Tobacco manufactures, 99.9%, and the manufacture of electrical machinery, apparatus, appliances and supplies, 97.5%. The least concentrated sectors are:

- Manufacture of plastic products not elsewhere classified (16.9%),
- Manufacture of furniture and fixtures except primarily of metal (20%), and
- Manufacture of wearing apparel except footwear at 38.8%, which are, interestingly, the most export-oriented industry in Jordan.

Manufacturing of wearing apparel except footwear is not highly concentrated; however, there is a growing trend in the concentration ratio in this sector. The ratio increased from a level of 19% in 1994 to a level 38% in 2001. While other sectors showed a marked increase in their concentration index such the manufacture of machinery except electrical and the manufacture of fabricated metal products except machinery and equipment. Some of the sectors that witnessed a decline in their concentration ratio are iron and steel basic industries, manufacture of professional and scientific equipment, manufacture of transport equipment, and the electricity, gas and steam sub-sector. Changes in the concentration ratio are subject to market conditions and the overall growth not sector's specific. These changes are related to how markets react and how private-public respond to policy changes.

However, the average values of the period 1994-2001 indicate clearly that the industries with high concentration values are the sectors that contribute more to the manufacturing sector's value added and employment. However, the industries with concentration ratio greater than 90%, contributed by 53.8% to the manufacturing sector value added. While its contribution to the employment reached an average of 34.5% during the period 1994-2001.

Finally, it is worth noting that there is no reason to believe that, the concentration ratio at a more disaggregate level differs significantly from the level of analysis that is conducted.

Table (3): Average Employment and Value added for different concentration ratio categories, for the Period (1994-2001)

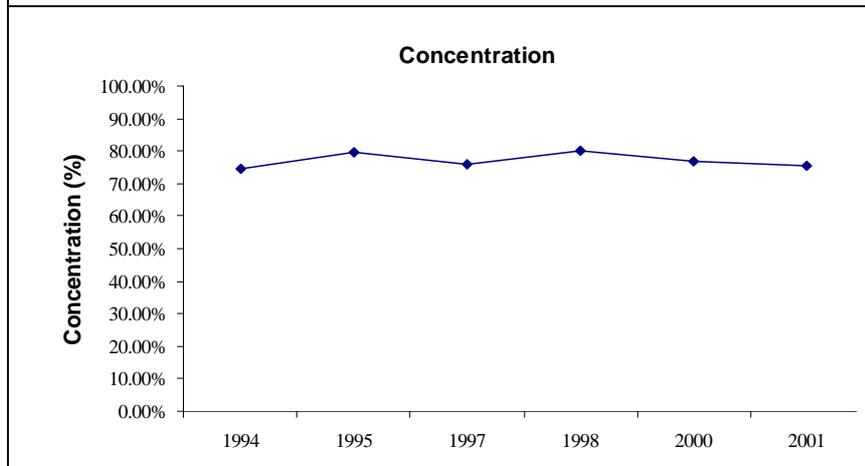
Indicator	Sectors	Average Value Added Share	Average Employment Share	Average Concentration Ratio
Sectors with concentration more than 80 percent	Other mining	17.2%	6.9%	95.4%
	Beverage industries	4.2%	1.9%	92.3%
	Tobacco manufactures	9.8%	0.8%	94.9%
	Manufacture of leather and products of leather		0.3%	92.7%
	Petroleum refineries	4.9%	1.6%	100%
	Manufacture of industrial chemicals	5.5%	4.8%	90.0%
	Non ferrous metal basic industries	0.7%	0.6%	95%
	Manufacture of electrical machinery, apparatus and supplies	2.3%	2.4%	97.5%
	Manufacture of transport equipment	0.7%	0.8%	93.9%
Electricity, gas and steam	8.5%	14.4%	98.7%	
	Sub-Total	53.8%	34.5%	
40-79 percentage	Food manufacturing	7.4%	13.2%	48.9%
	Manufacture of textiles	1.9%	2.5%	77.7%
	Manufacture of footwear	0.5%	1.2%	58.8%
	Manufacture of paper and paper products	2.1%	2.3%	72.3%
	Printing, publishing and allied industries	2.3%	0.9%	66.9%
	Manufacture of other chemical products	7.3%	5.1%	62.2%
	Manufacture of rubber products	0.1%	0.2%	79.9%
	Manufacture of glass and glass products	0.1%	0.2%	64.8%
	Manufacture of pottery, china, and earthen ware			79.0%
	Iron and steel basic industries	2.4%	1.0%	75.4%
	Manufacture of machinery, except electrical	0.6%	0.7%	66.4%
Manufacture of professional and scientific and measuring and controlling equipment	0.2%	0.5%	69.4%	
Other manufacturing industries	0.3%	1.3%	65.2%	
	Sub-Total	25.2%	29.1%	
Firms below 40 percentage	Manufacture of wood, and wood and cork products, except furniture	0.6%	2.2%	28%
	Manufacture of wearing apparel	2.5%	7.3%	27.1%
	Manufacture of plastic products not elsewhere classified	2.3%	3.1%	19.3%
	Manufacture of fabricated metal products	3.0%	7.9%	29.6%
	Manufacture of furniture and fixtures, except primarily of metal	2.1%	6.7%	16.4%
	Sub-Total	10.5%	27.2%	
Others	Manufacture of other non metallic mineral products	10.6%	9.8%	
	Total Industry	100%	100%	77.1%

Source: Estimated from the Department of Statistics Industrial Surveys.

It can be seen from the table above that industries with high concentration (80 and higher) generates about 54 percent of the value added and employ 34 percent of the labor force. The second group with concentration between 40 and 79 generates 25 percent of the value added and employ 29 percent of the labor force. These are industries that are more labor intensive than the first group. The least concentrated group that is industries with concentration below 40 percent generate 10.5 of the value added and employ 27 percent of the sector's labor force. This group is apparently a labor intensive and it is dominated by small firms.

Overall the concentration index over the period 1994-2001, declined marginally as can be observed from figure (3) below. It is worth mentioning that, although there is a growing number of firms in few sectors, it seems that new entrants are operating and competing at a lower scale and they are unable to join the largest three companies in the various sectors.

Figure (3): Development of the manufacturing sector concentration ratio during the period 1994-2001



Source: generated from the Department of Statistics industrial surveys.

In fact, the findings concerning concentration ratio are very much proportional to the distribution of firm size among the sectors. The least concentrated sectors are the sectors that are dominated by small and medium scale enterprises SMEs such as the manufacture of wearing apparel, manufacture of wood and wood and cork products except furniture, manufacture of furniture and fixtures except primarily of metal. Wherein, companies employing 1-4 employees represent 83.5%, 93%, and 87.1% of the overall companies working in these industries respectively. On the other hand the highest concentrated are those sectors with high percentage of large companies such as, petroleum refineries, electricity, gas and steam, and the tobacco manufacturers.

By large, the Jordanian manufacturing sector is dominated by enterprises employing less than 5 employees. This category contributed to about 82.6% of the total enterprises operating in this sector in the year 2000. The companies employing 5-19 employees contributed to just over 14% of the value added. The remaining 3.4% represented companies that employ 20 or more employees. The sectors that mostly employ less than 5 employees which most of them show low concentration are:

- Manufacture of furniture and fixtures, except that of base metal (ISIC2 332)
- Manufacture of wood and wood and cork products, except furniture (ISIC2 331)
- Manufacture of fabricated metal products, except machinery and equipment (ISIC2 381)
- Manufacture of leather and products of leather, leather substitutes and fur, except footwear and wearing apparel (ISIC2 323)
- Manufacture of wearing apparel, except footwear (ISIC2 322)

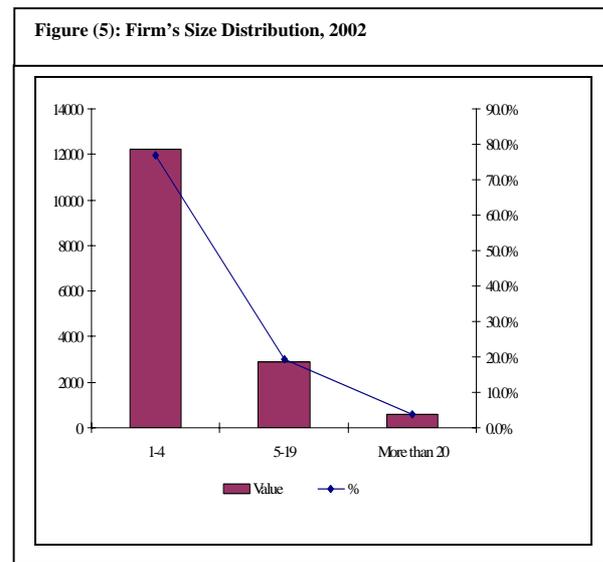
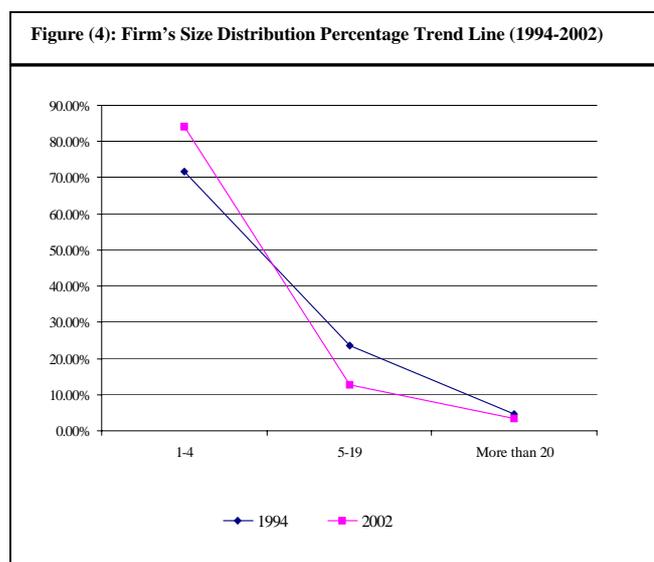
Whenever the start up cost is low, sectors seems to be dominated by small firms as shown above. The structure of these firms is small plants or workshops and not proper factories as conventionally defined. Small plants or workshops are competing at the lower level of the market segment and their contribution to the total value added is limited. Hence there might be some changes within the same group of small firms but very few can progress to join the larger group overtime. Normally production techniques are simple in this group and it is owned-managed style. Unlike the case in the developed countries, SMEs are concentrated in labor intensive and traditional activities with low levels of productivity and poor quality of products. There is very

little dynamism in this group, and few graduates into larger sizes and modern technologies.⁴

The second group (5-19), represents what could be classified as the medium scale industries for the purpose of this analysis. Start up cost in these industries is higher than the first group and require minimum level of professionalism and skills to run. These industries include chemical products, paper and paper products and plastic and plastic industries.

The third group includes either regulated industries such as tobacco and petroleum, or large scale industries by definition such as: metal industries or intensive capital industries such as manufacture of machinery and electrical. The communality between large industries is that they need high capital and must function at minimum capacity which entails large scale investment. The cost of entry and exist is also high. Indeed export ratio in these industries is also low, indicating that they primarily cater for the domestic market subject to certain arrangements. Moreover, sectors dominated by these firms are highly concentrated.

Structure of firm's size has not altered fundamentally over the last few years. Small firms group continues to dominate the sector. There share even increased from 71.7% in 1994 to 84% in 2001, due to the easy entry to the market and low cost to start-up such businesses. The medium scale group share seems to be declining with its share dropped from a level of 25.5% in 1994 to only 12% in 2002. The large firms' number has proportionally declined over the same period. Apparently, growth in terms of the number of small firms outpaced that for the other groups.



Source: Estimated from the Department of Statistics Data

Yet, the percentage of value added generated by small firms is not easy to determine, data on the distribution of value added according to size is also not directly available. Given our earlier findings regarding the concentration level, it is quite clear that large firms, despite their small number, are generating most of the value added at sub-sectoral level. Hence leaving little market share for the small and medium scale industries.

⁴ Mansour Antinio (2001), "Support Services and the Competitiveness of SMEs in the MENA region", Working Paper No. 56 ESCWA. Beirut-Lebanon.

From the above, it is obvious that manufacturing sector is not highly specialized in terms of Gini coefficient for the value added and employment. Within each sector, however, there exists a high degree of concentration, in terms of the value added. This analysis reveals that while at inter-industry level there is nearly an oligoplastic structure with few producers controlling the market, at intra-industry level, the value added and employment are not concentrated in specific sectors.

Considering import penetration, markets may be highly contestable even if domestic activities are highly concentrated. This mainly happens when they are sufficiently open to competition from foreign goods and services. Import penetration is a measure of openness equal to the ratio of imports to domestic demand. The Jordanian manufacturing sector didn't witness significant changes in the value of import penetration during the period 1990 to 2001. The highest ratio that was witnessed during that period was 53.6% in year 1990, while the lowest ratio was 45.3% in the year 1999. However, the year 2001 witnessed an increase over its level during 1999 to reach 51.8%.

Import penetration shows substantial variation across industries and less variation over time. High import penetration is found in transport, electrical machinery and basic metal. Moderate rates are found for paper products, printing, chemical and metal products. The lower rates are in industries such beverages and tobacco, leather and non-metallic products, petroleum industry.



Source: Estimated from the Department of Statistics Data

Import penetration decreased slightly from 53.6% in 1994, to nearly 51% in 2001. Variations in import penetration were modest over time. Standard deviation in import penetration for the whole sector was 2% during the period 1994 to 2001. These results, in many cases, reflect developments in trade policies and manufacturing sector in Jordan. The relatively high import penetration suggests that intra-industry is high and that many manufacturers were exposed to competition from abroad. Price differences between imported items and domestically produced goods exist as a result of tariff and non-tariff barriers and transportation costs.

Inter-industry differences in import penetration rates suggest that these differences are the result of enforced polices and are not sector's specific. Government policies prohibit import and/or to monopolize imports caused such phenomenon in many cases.

Table (4): Average Import Penetration Percentage, 1994-2001

ISIC2	Description	Average Import Penetration (1990-2001) (%)
290	Other Mining	8.8%
311	Food manufacturing	52.4%
313	Beverage industries	13.3%
314	Tobacco manufactures	3.4%
321	Manufacture of textiles	74.0%
322	Manufacture of wearing apparel, except footwear	65.5%
323	Manufacture of leather and products of leather, leather substitutes and fur, except footwear and wearing apparel	35.1%
324	Manufacture of footwear, except vulcanized or moulded rubber or plastic footwear	41.8%
331	Manufacture of wood and wood and cork products, except furniture	78.4%
332	Manufacture of furniture and fixtures, except primarily of metal	63.6%
341	Manufacture of paper and paper products	13.2%
351	Manufacture of industrial chemicals	44.1%
352	Manufacture of other chemical products	67.6%
353	Petroleum refineries	16.2%
355	Manufacture of rubber products	93.2%
356	Manufacture of plastic products not elsewhere classified	65.3%
362	Manufacture of glass and glass products	86.0%
369	Manufacture of other non-metallic mineral products	8.5%
371	Iron and steel basic industries	50.8%
372	Non-ferrous metal basic industries	82.0%
381	Manufacture of fabricated metal products, except machinery and equipment	54.0%
382	Manufacture of machinery except electrical	93.4%
383	Manufacture of electrical machinery apparatus, appliances and supplies	88.3%
384	Manufacture of transport equipment	96.7%
385	Manufacture of professional and scientific, and measuring and controlling equipment not elsewhere classified, and of photographic and optical goods	97.0%
390	Other Manufacturing Industries	67.6%
410	Electricity, Gas and Steam	0.0%

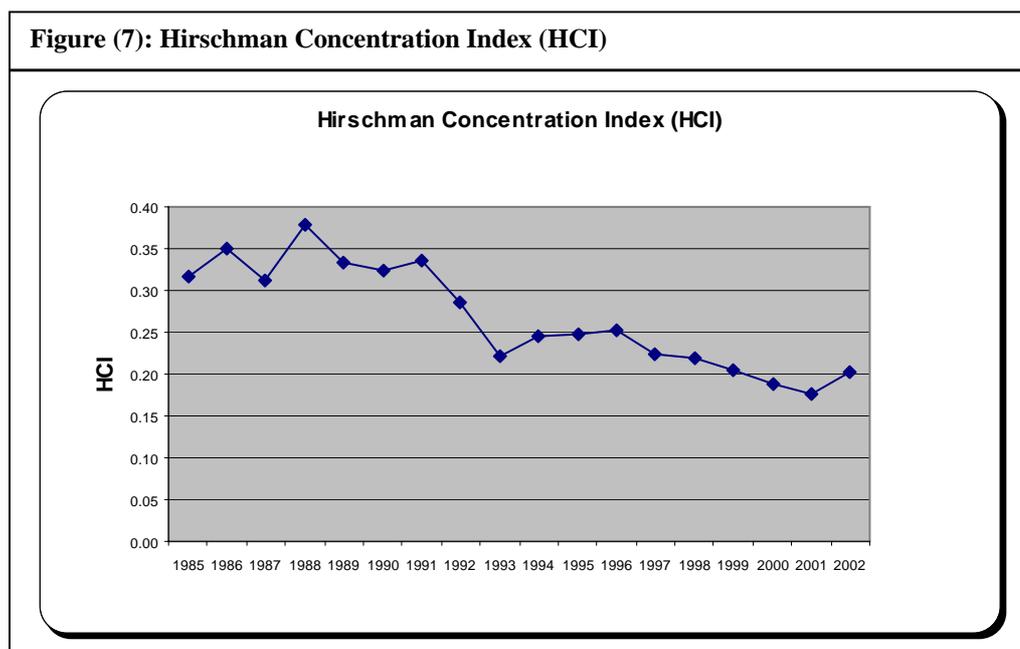
Source: Estimated form the Department of Statistics Data

In order to examine further the issue of commodity concentration, export concentration index, which is known also as Hirschman Concentration Index (HCI), was estimated. The indicator was computed according to the following equation:

$$HCI = \frac{\sqrt{\sum_{i=1}^n \left(\frac{x_i}{X}\right)^2} - \sqrt{\frac{1}{n}}}{1 - \sqrt{\frac{1}{n}}}, \text{ where } X = \sum_{i=1}^n x_i$$

Where (x_i) is the Jordan's exports of four ISIC digits-products, (X) denotes Jordan's total export for each year, and (n) denotes the number of trade lines included in each year. Our estimation covers the period 1985-2002. The lower the value of this index, the less concentrated the country's exports.

According to estimated results, HCI index has been declining since 1985. As the figure below demonstrates, HCI index decreased from a level of 0.317% in 1985, to 0.20% in 2002. It is difficult to decide whether this outcome has resulted from policy changes or was a natural consequence. It requires disentangling policy implications, from what would have been the case if there have been no liberalization measures. Based on the above analysis, one can argue that there was some commodity diversification in Jordan during the period 1985-2002, although this was not accompanied by similar geographical diversification. This indicates that commodity diversification was driven by changes in demand in Jordan's traditional markets and was new demand in more challenging markets.⁵



Source: own estimates based on the external trade statistics 1985-2002, DOS.

It has been argued (Hoekman *et al.* 2002) that intra-industry trade (IIT) has positive influence on the success or failure of efforts to promote industrialization and growth. Exchanging intra-industry trade exchange is expected to produce extra gains from international trade and above those associated with comparative advantage. It allows a country to take advantage of larger markets. By enhancing IIT, countries can simultaneously reduce the number of similar products while increasing the variety of goods available to domestic consumers. The IIT index ranges between zero and one, with larger value indicating a greater level of trade between firms in the same industry. Higher IIT value suggests that net gain from specialization in different products is being exploited and that the participating country is increasing its integration into the world economy. IIT is calculated as follows:

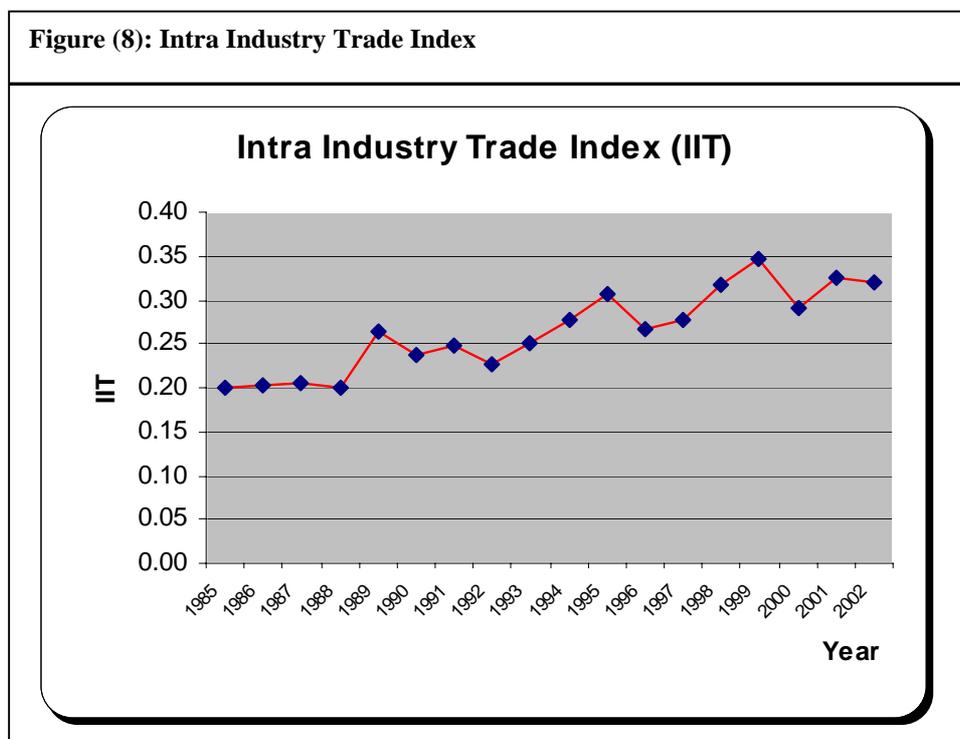
$$IIT_{jk} = 1 - \frac{\sum |X_{ijk} - M_{ijk}|}{X_{ijk} + M_{ijk}}$$

Where (X_{ijk}) and (M_{ijk}) represent exports and imports of products from industry (i) in country (j) to and from country (k).⁶

⁵ it is worth noting that Jordan managed to increase its export from the software and high technology industries over the last few years. According to the World Development Report, Jordan's high technology exports constitutes nearly 8% percent of its manufactured exports in 2001.

⁶ for more details on this measure and other indicators see : Hoekman *et al.* (2002), *Development, Trade, and the WTO*. The World Bank, Washington DC.

However, according to the estimations done for Jordan, the country achieved a good progress with the IIT indicator from a level of nearly 20% in 1985 to 32% in 2002. A particular improvement was witnessed during the period 1995-2002. This mirrors higher level of specialization and competition. The IIT in Europe is over 70%, reflecting an advanced level of specialization and indicating the wide variety of choices available in the EU markets. The figure below exhibits the case for Jordan



Source: own estimates based on the external trade statistics 1985-2002, DOS

The Herfindahl index for industry-level shows substantial variation across industries in each year and less variation within industries over time.

High values of the concentration index suggest that there exists a large dispersion in plant size within each industry which we have demonstrated when we present firms size in terms of employment.

The preceding analysis brings out two important factors that may weaken domestic competition in Jordan; firstly, the high degree of concentration and its stable trend over time, secondly, the little improvement in import penetration since 1990.

Nevertheless, there has been a declining trend in the concentration ratio since 1994, it dropped from 80% in 1998, to about 75% in 2001, with many of the sub-groups witnessing a decline in their concentration ratio. This could be viewed as a move towards a more competitive environment.

Productivity Analysis

The aim of this section is to investigate the link between market structure variables and Total Factor Productivity (TFP) in the manufacturing sector in Jordan over the period (1980-2002). The period under investigation will be divided into two sub-periods reflecting the different economic and trade policies that were adopted.

The first period will cover the years (1980-1989), which was a period of high growth accompanied by restricted trade regime especially during the last years of the decade. The second period will cover the years (1990-2001) and can be referred to as the period of liberalization. This period witnessed the adoption of the economic adjustment program.

In this analysis (SR) will be estimated under constant return to scale (CRS), and then the assumption of perfect competition assumption will be relaxed by introducing the estimated mark-up in the analysis. Moreover, variables that reflect market structure such as concentration, import penetration will be introduced in order to investigate how market structure affects the overall performance for some sectors.

The analysis will focus on the following sectors, according to the project's methodology: Textile and Clothing, Beverages, Paper and Paper products, Electrical Machinery, Pharmaceuticals, Transport Equipment, in addition to dairy products and Plastic Industries which were added and will be considered especially when analyzing the vertical integration aspects.

Many industries in Jordan were originally established during an early stage of the country development to serve growing domestic demand. It was noticed that capital accumulation continued to grow during the decade of the nineties. There are two reasons that could explain the continuity in capital accumulation, despite the declining of output in some sub-groups, especially during the second period.

Firstly, during the decades of the seventies and eighties real interest rate was very low. The cost of borrowing was equal to or even less than the level of inflation, thus encouraging firms to borrow from the commercial banks and the Industrial Development Bank (IDB) in order to finance their purchase of capital. On average, the rate of inflation, as measured by the GDP deflator during the seventies and early eighties, averaged 7% annually, compared to 8% interest rate on the industrial loans advanced by IDB.

Secondly, investment laws were introduced in 1971 and 1973 which provided full exemption from import duties on all imports to all projects benefiting from these laws. In addition, imported capital equipments were also exempted from tariffs. Moreover, this period was one with an abundant foreign reserve accompanied by an overvalued exchange, rate thus encouraging further imports.

The other factor of production is labor. The number of employees for all sectors grew consistently for the period under investigation. It is easier to follow developments in the number of employees and their compensation more than the capital because it is easier to estimate. It can be argued that, value added per employee is a reliable index of the actual capital input used. This is based on the assumption that the degree of

utilization of capacity is directly proportional to the level of employment and the fact that Labor Productivity (LP) is not a function of the degree of utilization of capacity.

Labor productivity, which is measured as the real value added in real terms divided by the number of employees, increased at a rapid rate during the period (1980-1990) for most of the sectors under investigation as can be seen from table 5 below. However it witnessed a slowdown during the decade of the nineties.

Table (5): Value Added per Worker at Constant 1994 Prices (1980-2001)

ISIC2	Sector	Value added per employee (1980) JD000	Value added per employee (1990) JD000	Value added per employee (2001) JD000
311	Food Manufacturing	6.0	6.6	5.3
321	Manufacture of Textiles	2.8	11.7	6.5
322	Manufacture of wearing apparel except footwear	2.2	4.1	3.2
313	Beverage Industries	6.2	23.6	17.7
341	Manufacture of Paper and Paper Products	2.8	8.9	11.9
382	Manufacture of Electrical Machinery, Apparatus, Appliances and Supplies	-----	9.6	5.8
352	Manufacture of Other Chemical Products	4.8	5.7	13.4
384	Manufacture of Transport Equipment	2.6	6.5	7.5
356	Manufacture of Plastic Products not Else where Classified	4.4	5.9	6.8

Finally, while interpreting labor productivity alone one should keep in mind that the contribution of capital is being implicitly misattributed to labor. This necessitates the estimation of TFP in order to account for all production factors.

Having examined the partial productivity measures, it would be more accurate to examine further the total factor productivity measure. The analysis will use the neo-classical growth by employing the aggregate Cobb-Douglas production function which is going to be used and defined as:

$$Y_t = A_t K_t^\alpha L_t^\beta$$

Where the variables Y, K and L denote real value added, capital stock and labor (Number of employees) respectively. α and β are the output elasticities with respect to capital and labor respectively. A_t denotes productivity growth with t denotes a time subscript. The above equations could be written in terms of growth rate as follows:

$$\Delta A = \Delta Y - (\alpha \Delta K + \beta \Delta L) \quad (\text{where } \Delta \text{ denotes rates of growth}).$$

ΔA is the total factor productivity growth, or what is referred to normally as “Solow Residual” (SR). The coefficients α and β represent the shares of capital and labor in value added respectively. β was estimated as the share of wages to the value added for each sector over the period under investigation. The share of capital was estimated as a residual (1- β).

Many studies, however, estimated the (SR) in manufacturing sector by using aggregated standard production function such as Cobb-Douglas production function. This stems from the neo-classical view of firms as the key productive factors transferring inputs into outputs according to a production function. In return, the production function defines the maximum output level achievable with any given quantity of inputs.

Comparison of performance patterns among the different sub-groups is likely to reveal things about trade variables and market structure, because all industries were subject to roughly the same measurement errors and changes in macro conditions with some industries undergoing different amount of changes in protection.

Table 6 shows the results of estimating (SR)⁷ over the period (1980-2001). The calculations utilized the least square method as the basis for analysis, in this methodology; productivity growth was measured as the “residual”.

The first round of estimation assumes perfect competition and constant return to scale. In the second round of calculations the assumption of perfect competition will be relaxed by introducing the mark-up figures in the analysis.

The results revealed that, on average the estimated (SR) over the decade of eighties were negative. This trend was reversed during the decade of the nineties. These results were valid for all the sectors under investigation, except for that of the textile sector.

Appendix 1 shows the fluctuation in the estimated (SR) and Technical Efficiency (TE) over the period under investigation.⁸ Performance at sub-sectoral level seems to be influenced by the overall performance of the economy. This can be seen by observing the decline in most of the sectors we are investigating during the late eighties and early nineties when the economy gone through a time of turbulence.

The first sub-period (1980-90) was faced with a series of disturbances following the fall in demand both in the domestic and the regional markets. This led the government to deploy tariffs and non-tariff measures in order to increase protection offered to the domestic industries.

Many of the industries that achieved negative or low growth in the (SR) during the first period had subsequently succeeded on average in improving their performance during the period (1990-2001), amongst them are, beverages, printing, chemical products and transport equipments. However, few other industries such as, textile and clothing, wearing apparel, and basic metals achieved a moderate growth in the estimated (SR). Since, during this period, these industries started to take their share in the domestic market after achieving a level of maturity that allows them to compete in the domestic market with the competitive imports.

The estimates of (SR) should not be interpreted as measuring technical change only in the sense of a shift in the frontier of production possibilities. Instead, the measures must be interpreted broadly to include factors such as industries and plant organization, know-how, or changes in response to disruptions in the production process that affect capacity utilization (Nihimizu *et al.* 1986: 288). Overall, the current analysis did not deviate from the standard neo-classical mainstream which treats the production unit as a ‘black box’. Industries that appear to have undergone negative productivity change may reflect irregularities attributable to the sustained use of inappropriate economic policies or errors in calculations.

⁷ We are using in this section SR to represent the TFP as conventionally estimated. Whenever we use the terminology productivity we mean to generalize both the SR and the TE.

⁸ We introduce the technical efficiency here for comparison reasons only. More elaboration will be made in the following sections.

According to Nishimizu et al. (1991: 251-52), long-run competitive equilibrium should minimize differences in TFP growth rates among different industries. This is the case because high rates of TFP growth permit producers to increase more rapidly the compensation of production factors. Resources should be pulled toward high productivity growth industries until differential in growth rates and levels of productivity are eliminated. Apparently, this conclusion assumes that factors of production are movable and that there are no other impediments to resource mobility such as lack of information and government intervention. Following is a detailed analysis in the performance of some sectors in Jordan

The estimated (SR) for the food industries reveals that during the decade of eighties (SR) was fluctuating up and down. However, over the period (1987-1990), there was a continues decline, this trend was reversed throughout the period (1992-1998) with the year 1999 witnessing a decline before it regain its momentum over the years 2000 and 2001. For the whole period, output elasticity for the factors of production seems to be below than the expected values, with that for labor estimated at 14% and 20% for capital. The estimated coefficient holds the expected positive trend and was spastically significant.

ISIC	C	A	1-A	Adjusted R ²	D-W
311	11.69432 (0.0184)	0.142745 (0.06765)	0.203151 (0.0028)	0.439719	2.146286
313	18.89191 (0.0000)	0.601322 (0.0231)	0.884954 (0.0209)	0.532445	1.712272
321	14.34068 (0.0000)	0.574813 (0.0001)	0.243692 (0.0187)	0.784499	1.7017991
322	10.63630 (0.0016)	0.540533 (0.0523)	0.695484 (0.0000)	0.844515	1.863461
331	2.487800 (0.1322)	0.760670 (0.0001)	0.051121 (0.1044)	0.538642	1.715388
341	12.95908 (0.0207)	0.920925 (0.0631)	0.836825 (0.0000)	0.691501	1.880725
342	20.88156 (0.0152)	0.726363 (0.0142)	0.655344 (0.0763)	0.743643	1.609850
351	35.95951 (0.0001)	1.900854 (0.0005)	0.605485 (0.0078)	0.571485	1.767174
352	23.06991 (0.0026)	0.813248 (0.0000)	0.387469 (0.0964)	0.768107	1.813280
356	5.297260 (0.0005)	0.201661 (0.0062)	0.534559 (0.0034)	0.500233	1.688641
371	9.506581 (0.0000)	0.081621 (0.1352)	0.267487 (0.0002)	0.641897	2.039713
383	44.11841 (0.0150)	0.781825 (0.0263)	0.740394 (0.0005)	0.450049	1.610678
384	26.88306 (0.0018)	0.734294 (0.0115)	0.616624 (0.0646)	0.238471	1.618172

Equation: $\Delta q = C + \alpha AK + \beta AL + SR$

For beverage industries the story is rather different. Output is positively and highly correlated with the labor and capital. The estimated elasticity with respects to labor was found to be 60% and 88% for capital. The period (1981-1984) was a period of strong growth and the estimated TFP was positive. However, as the purchasing power in the domestic market declined, the sector started to suffer. TFP witnessed a decline throughout the period that started in 1985 and lasted until 1993. Indeed the period which referred to as the period of liberalization witnessed positive growth of the estimated (SR) for this sector.

Considering the textile sector, during the decade of eighties, the estimated (SR) witnessed a decline. This negative trend was reserved during the period (1987-1990) before it slums again. During the period of liberalization, performance has deteriorated further probably as a result of opening the market and the inability of the sector to compete with imports crossing the board from neighboring Syria benefiting from a duty free access. Furthermore the sector could not compete with cheap imports from Asia as well. The estimated TE for the sector followed the same performance path as the (SR).

The sector that relates to textiles is the wearing apparel sector, the performance of this sector and its trend analysis was identical to that of textiles except for the last few years when it witnessed a slightly different pattern.

Table (7): Estimated Solow Residual (1980-1990)

year	RES-311	RES-313	RES-321	RES-322	RES-331	RES-341	RES-342	RESID351	RES-352	RES-356	RES-371	RES-383	RES-384
1981	-0.0781	0.2370	-0.1159	0.0718	0.1322	0.2390	0.3319	0.0223	0.0157	0.1809	0.1063	-0.4173	0.5073
1982	0.0822	0.1692	-0.2707	-0.2812	0.1858	-0.3854	0.2196	-0.2323	-0.0584	0.1803	-0.0229	-1.1544	-0.6741
1983	-0.0345	0.0874	-0.0266	-0.3991	-0.2001	-0.8100	-0.0781	-0.1673	-0.2730	0.0571	0.0772	-0.9187	0.1668
1984	0.0982	0.1338	0.1270	-0.1454	0.1474	-0.4826	0.0405	0.5811	-0.1870	-0.0308	-0.2430	-0.1247	-2.5702
1985	0.0469	-0.0775	0.2539	0.1144	0.2437	0.0869	-0.2274	-0.2526	-0.3414	-0.1819	-0.0878	-0.7925	-1.6252
1986	0.0718	-0.0913	-0.0328	0.2117	0.0263	-0.1091	0.1897	-0.9189	-0.1061	-0.0743	-0.0426	-0.4513	-1.5834
1987	-0.0999	-0.0135	0.1262	0.0024	-0.1760	0.3115	-0.4804	-0.1859	-0.0296	-0.2835	0.0276	1.1755	-0.6824
1988	-0.3034	0.0369	0.0808	0.0782	-0.4539	0.1555	-0.0570	-0.0807	-0.3201	-0.5058	0.1125	0.0170	0.1668
1989	-0.0268	-0.2391	0.0094	0.0000	0.0743	-0.1553	-0.5539	-0.3675	-0.3440	-0.0619	0.0338	0.8327	-0.2596
1990	0.0174	-0.4426	-0.1363	-0.1494	-0.1584	-0.1442	-0.6377	-0.8615	-0.2727	-0.2650	-0.2062	0.5784	-1.2494
1991	-0.5429	-0.4781	0.1216	0.1391	-0.0781	-0.0772	-0.4829	-1.2158	-0.1524	0.4560	0.0681	0.6376	-0.9036
1992	0.2166	-0.6041	-0.0687	-0.1014	-0.0479	0.0680	0.6551	0.6955	0.5901	0.0022	0.0421	-0.7856	1.4590
1993	-0.1698	-0.2794	-0.2012	-0.2602	0.1702	0.4194	-0.1138	0.9349	0.3899	-0.4110	0.0211	-0.2486	1.6282
1994	0.2512	0.0655	0.0323	0.5337	0.0959	0.4268	0.0377	0.6162	0.3326	0.0480	0.0803	0.6923	2.5039
1995	0.2654	0.2551	0.2770	0.2753	0.1058	0.4511	0.4788	0.4362	0.4472	0.2499	-0.0458	0.0699	2.1260
1996	0.0543	0.3846	0.2521	-0.1156	0.1003	0.0144	0.1507	-0.4362	0.2733	-0.1823	0.0149	-0.2315	-0.0670
1997	0.0209	0.1726	0.1263	0.1699	-0.0760	-0.1480	0.2227	-0.4854	0.7197	0.1471	-0.1419	0.1801	0.0064
1998	0.1772	-0.2872	-0.0130	-0.2831	0.0818	-0.4163	-0.0601	0.3402	0.1728	-0.0430	-0.1260	0.7534	-0.2055
1999	-0.1293	0.3890	-0.2265	-0.0195	-0.0394	-0.1690	0.0762	0.6522	-0.4391	0.2632	0.2395	0.1126	0.2496
2000	0.0582	0.2594	-0.3061	-0.1450	-0.0742	0.1072	0.0461	0.5223	-0.4016	0.2016	-0.1221	0.6896	0.3321
2001	0.0245	0.3225	-0.1159	0.3034	-0.0595	0.6171	0.2423	0.4133	-0.0159	0.2531	0.2148	0.6896	0.6741

Source: own estimates based on UNIDO and DOS data.

On the other hand, the chemical industries sector, which covers; pharmaceuticals, soaps, detergents, cosmetics, witnessed a strong setback in TFP growth during this period. For many items in this sub-group customers have the choice of domestic or imported products. This market structure would expect to create strong incentives for development of products with proper quality and design.

In this sector, most of the Jordanian pharmaceutical companies focused on the same product categories, mostly reproduction of in-patent products, due to high profit margin and highly local demand as revealed by a study conducted by the Ministry of Planning (1999). Therefore, this sub-group suffered from the low level of capacity utilization. In order to achieve reasonable economies of scale, this sub-group was highly dependent on exports which reached about 67% of the industry gross output over the period (1990-2001). Therefore, performance in the sector has been vulnerable to downturn in the region, due to the fact that most of its exports are directed to the neighboring countries. This high vulnerability could be seen from the fluctuations in the estimated (SR) and (TE) over the two sub-periods that were investigated. Furthermore, it is worth mentioning that pharmaceutical products are subject to strict control and determined by a joint committee from both the public and the private sectors. The committee sets the price according to the international prices whenever they are available for the same product or by observing prices in the regional market. Namely the benchmark is the Saudi Arabia market, the rationale for this is that Saudi Arabia is richer country and it imposes no taxes on pharmaceutical. Some official arguing that many items, where there are adequate competition, especially the over-counter items should be freed with their prices determined subject to market forces. However, it seems there exist a strong lobby that prefers the status quo and enjoy the existing market arrangements.⁹

⁹ This argument is based on personnel interview conducted with the Director of Food and Medicin n Jordan.

Similar to the other groups, chemical industries are highly dependent on imported raw materials, therefore competitiveness is a direct function of the cost of raw material and efficiency of its usage.

The rest of the sectors comprise the non-metallic mineral products, Plastic and the basic metal industries. These industries are linked to the domestic market and the estimated (SR), as mentioned earlier, was negative during the eighties and on average positive during the nineties. Their estimated elasticities with respect to labor and capital are reasonable and consistent with the overall performance indicators.

The non-electrical machinery sector is characterized by the large number of the small firms operating in the sector. Most of the firms in this sub-group were highly dependent on the development of the domestic construction sector. Therefore, performance in this group was highly sensitive to the growth in the domestic demand. Industries in this sub-group achieved a low growth rate in their (SR) during the first period. Many of this sub-group's products such as basic metal and non-metallic output enjoy natural protection due to the high transportation costs associated with the competitive imports.

However, the strongest performer in the decade of the nineties was the transport sector, with a growth of nearly 70% in its (SR) values, followed by electrical machinery sector, which is a modern sector that utilizes new technology.

Overall the behavior of the estimated (SR) is not consistent overtime or a cross sectors. Performance seems to be sector specific. The results did not distinguish any of the sectors over time, that has a clear performance trend, most if not all sectors went through a high and low times. This pattern makes it difficult to draw conclusion regarding the relationship between market structure variables, the state of competition in the country and the overall performance.

In general the correlation coefficient as estimated explains on average more than 50% of the changes in the dependent variable for the entire sectors. However there were some variations in the magnitude of the relation with sectors such as transport where the explanatory power is fairly low, thus casts doubt on the exceptionally high (SR) estimates. While other sectors such as wearing apparel shows high correlation coefficient.

Technical efficiency

In order to estimate the technical efficiency, the mark up was first estimated. The estimates revealed some variations in the estimated mark up during the period (1980-2001), and over the intervals which was identified for the mark up estimation.

Mark-up represents the ratio of prices to marginal cost and was estimated according. This means, at least in theory, that the higher the mark-up, the lower the competition. The highest mark-up was estimated for the chemical sector, and reached 2.15 which resulted basically as a result of high mark-up after 1991. The concentration ratio in this sector was estimated at an average of 62% during the period (1996-2001), while the import penetration reached 67% during the period (1990-2001). Nevertheless, these indicators do not justify the high-mark-up ratio in this sector.

On the other extreme, there are few sectors that barely cover their costs such as, the furniture and wood products and the transport industry. The furniture and wood

products sector is characterized by its low level of concentration which is estimated 24% and a relatively high import penetration estimated at 78%, a combination that means a high level of competition and hence low mark-up.

Table (8): Estimated Mark-Up Ratio

ISIC2	1981-1986	1987-1991	1991-1996	1996-2001	Average 1981-2001
311	1.64476	1.55863	1.63592	1.76008	1.63592
314	1.56746	1.62814	1.96509	2.63771	1.84445
321	1.42173	1.02613	1.57191	1.27723	1.23924
322	2.12085	0.85592	0.94844	0.99899	1.02738
331	0.84984	1.12203	1.69971	0.65393	0.95237
341	1.51368	0.95101	1.36823	1.31763	1.31763
342	1.01196	0.99741	1.29685	0.75256	1.07472
351	1.52896	1.45427	2.15902	2.91757	2.15902
352	1.49121	1.11438	1.59064	1.00624	1.22766
356	0.77695	1.78252	2.56976	2.11748	1.86665
371	1.96126	1.35658	1.68129	1.56735	1.54847
383	1.21796	0.75794	1.89469	1.89650	1.18643
384	0.99234	0.83247	1.09439	0.91196	0.99234

Dr. Hana the only activity that exceeds 2 is the activity 351 and not the 322 and 356 as appeared in your evaluation comments. The above estimate followed the methodology described by Khaled, I think we need to look into variations in the several sub-periods which might explain this outstanding figures. We tried to estimate it again and ended up with the same figures. I elaborated above that we take MU as the prices relative to MC and intuitively I think given the distortion in the market it may exceeds 2.

For the transport sector, the low mark-up seems to be a result of the high import penetration ratio, which is estimated at 96% though the sector enjoys a high level of concentration. This suggests that high level of concentration alone does not necessarily lead to high exploitation of the market, what is puzzling though in this sector in particular is the high (SR) and (TE) estimates, which has not been reflected in a high mark-up.¹⁰

It should be noted that, within each sector there are firms that make profit and there are the under achievers who incur losses. The aggregation leads some times to misleading conclusions regarding the overall sector's performance.

Changes in (TE) over time followed the same pattern similar to that of the (SR), which implies a strong association between the two variables. Indeed a positive and significant relation was found between the two variables for all sectors. However, fluctuations in the (SR) were higher than that for the TE, indicating that for some sectors there was a movement towards the production frontier while for some sectors

¹⁰ It seems that one has to double check the data concerning this sector. Especially the capital stock series.

there was a movement away from the production frontiers. Needless to say the distinction between the two kind of movement is practically very difficult.

Although we conclude that, the manufacturing sector in general is highly concentrated, it seems that this concentration has not been translated into high mark-up figures. Reasons for this, we believe, are related to the high import penetration and the external competition which offers many alternatives in the domestic market for the consumer to choose.

However, there are some price differences between domestically produced goods and the similar imported items. Moreover, moderate mark-up could be attributed to some government policies which have kept prices under control, especially the prices of the basic commodities and food items. In addition, there are several state owned/managed consumer associations that function in the country. These associations enjoy tax exemptions and can import products up to a certain limit on duty free basis. These associations, according to some officials, operate as anchor, and through them, the government can influence and fix the prices. This healthy picture was re-enforced by our fieldwork findings which indicate that there are limited anti-competition practices in general.¹¹

The overall trend in the (TE) is similar to that for (SR) (see graphs in Annex 1). The decade of the eighties witnessed a decline, while during the nineties a progress was achieved.

Table (9): Estimated Technical Efficiency for the Selected Sectors 1981-2001

year	RES-311	RES-313	RES-321	RES-322	RES-331	RES-341	RES-342	RES-351	RES-352	RES-356	RES-371	RES-383	RES-384
1981	-0.22208	0.21123	-0.09797	-0.04548	0.12002	-0.49382	-0.02006	-0.13654	-0.31517	0.19968	-0.12184	-0.49849	0.69921
1982	0.09487	0.34352	-0.22274	-0.25250	0.17553	-0.31082	0.30073	-0.39057	0.03933	0.33957	0.05988	-0.68284	-0.45550
1983	0.07202	0.34386	-0.05563	-0.21768	-0.06531	-0.63571	0.08778	-0.14346	-0.13988	0.22012	0.13570	-1.26769	0.17324
1984	0.00912	0.03526	0.02247	-0.02274	0.02190	0.09477	0.18317	0.79386	-0.41737	0.16494	-0.29988	-0.47079	-2.36013
1985	0.08209	0.07745	0.23374	0.02854	0.24679	-0.10281	-0.35654	-0.39735	-0.19692	-0.20212	-0.19300	-0.94003	-1.49901
1986	0.15608	0.13533	0.15485	0.13781	0.12783	-0.08359	-0.25338	-1.36733	-0.11190	-0.16089	-0.03543	-0.28561	-1.63396
1987	-0.05127	-0.22781	0.11019	-0.04312	-0.13116	0.11140	-0.21045	-0.90500	-0.03806	-0.36692	0.03598	0.66958	-0.72130
1988	-0.37743	-0.57694	0.12979	0.29758	-0.36366	0.26830	-0.20705	-0.19710	-0.12578	-0.78870	0.13977	-0.22950	-0.42594
1989	-0.44990	-0.68587	-0.20103	0.04975	-0.13949	0.04523	0.36399	-1.11551	-0.30505	-0.65686	-0.08244	-0.06767	0.03388
1990	-0.13974	0.33136	-0.24382	0.01353	-0.09511	-0.27968	-0.83006	-1.96079	-0.27052	-0.51088	-0.30569	0.53038	-0.16998
1991	-0.57277	-0.59029	0.05131	0.15493	-0.11537	-0.14845	-0.59614	-1.91971	-0.19447	0.30358	0.04319	0.88182	-0.77019
1992	0.00596	-0.08872	0.01785	-0.11964	-0.05572	-0.08513	0.22612	-0.05110	0.02519	0.12565	0.15633	0.06522	0.02348
1993	-0.09285	0.00981	-0.21514	-0.07066	0.08734	0.23035	-0.03245	1.41233	0.62239	-0.59844	0.04732	-0.55885	1.62553
1994	0.26340	-0.13413	-0.00885	0.55622	0.11176	0.23273	0.07826	2.12931	0.74126	-0.13302	0.12163	0.12737	2.75560
1995	0.46468	-0.38622	0.25698	0.17405	0.09931	0.59436	0.50743	1.01131	0.20356	0.39815	-0.00668	-0.00109	1.82806
1996	0.22105	-0.33082	0.31088	-0.12909	0.09510	0.19137	0.18393	-0.77160	0.32097	-0.09062	0.04841	-0.19466	-0.43244
1997	0.12213	-0.34277	0.28758	0.13442	-0.00548	-0.01505	0.22411	-0.14587	0.56899	0.48576	-0.05609	0.05125	0.04146
1998	0.21106	0.49067	-0.00137	-0.14340	0.01138	-0.49241	-0.10620	0.08684	0.29539	-0.00809	-0.22745	0.67495	-0.19001
1999	0.02511	0.50514	-0.10342	-0.16720	0.00934	-0.15244	0.07946	1.80007	-0.33899	0.38802	0.24800	0.07917	0.43104
2000	0.05443	0.38882	-0.29782	-0.33533	-0.07245	0.25129	0.09436	1.18135	-0.34461	0.42192	0.02369	0.93115	0.41937
2001	0.12404	0.49112	-0.12785	-0.61232	-0.06254	0.78011	0.28301	1.08688	-0.01836	0.46913	0.26860	1.18633	0.62757

Source: own estimates, employing data from several industrial surveys, DOS.

*Estimates of transport industries are not reliable. Many problems have been observed when estimating capital and output for these two sub-groups.

In order for the study to relate market structure with performance, three hypotheses will be tested. The first claims that high concentration will be negatively correlated with technical efficiency, *citrus Paribas*. The second, concerns export orientation and hypothesizes that export expansion is positively correlated with (TFP) or technical efficiency. The third argues that high import penetration should stimulate productivity in the domestic market all through the competition pressure. Annex II present the results of the correlation matrix.

¹¹ In Jordan there are eleven commodities that are still subject to either the monopoly of the government in import such as the wheat. The Ministry of Trade and Industry has a list of commodities classified as strategic. The list could be expanded if the government observe any anti-competition behaviour. Currently the list of the strategic commodities includes *inter-alia*, bread, medicine, wheat and chaff.

It should be noted that these hypotheses are not mutually exclusive. Neither the postulated effects of policy choices on productivity performance is independent of each other. It is likely that, the net effect is a combination of these phenomena simultaneously. However, the distinction between these policies may prove difficult in the applied world.

In order to test these hypotheses, ideally, a multiple panel regression should be run with the estimated technical efficiency as the dependent variable. However due to data insufficiency, a bivariate correlations was used to test the three hypotheses between the different variables. The results indicated the following:

One of the most striking fact emerged out of the correlation matrix which covers the period 1980-2002, was the relationship between concentration and the estimated productivity. For most of the sectors, the spearman correlation coefficient between concentration index and technical efficiency was significant and negative. This simply means that less competition is associated with low productivity. A finding that is consistent with the neo-classical paradigm, which claims that competition, is the road to enhance productivity. The pattern of this relation applies both on the (SR) and the (TE), though it was more consistent with the (TE).

From a policy making point of view, this indicates that concentration has not led to the exploitation of the economies of scale, but was misused and has negative implications on productivity. This also suggests that, we need to compare the performance of the large and small firms, since productivity gain could be generated at the second level in terms of size in few sectors.

What could not be established is the expected negative correlation between concentration and the (IMP). Although, there were few cases when the correlation was significant and took the expected negative signs.

Export expansion, measured as the share of export to gross output, was found to be insignificantly correlated with the growth of the (SR) or (TFP), hence challenge the conventional wisdom that engagement in export should enhance productivity. Although exports grew at a rapid rate, however, the estimated coefficients was insignificant, nevertheless, it holds the expected positive sign in few cases.

This weak correlation between export and (SR) or technical efficiency came as no surprise, since Jordanian exporters perceived the export markets as an expansion of the domestic market. Moreover exports were, in many cases, the result of bilateral government arrangements and were directed to few markets only. Weak correlation could be explained in terms of the high concentration of exports in few markets, whereby export oriented industries became very vulnerable to the swings in the regional markets, without succeeding in penetrating new markets to compensate the lost markets.

It is worth mentioning as well that during the 'liberalization period', industries with high level of exports, i.e. export-oriented industries, have not showed a different pattern of behavior in order to face the adverse effects of external shocks. Trade literature argues that export oriented industries, except primary exports, which show low demand price elasticity, can cope better with the adverse economic conditions, because they are able to diversify their sources of income and they are in a better position to restore their lost markets. For this argument to be true, manufactured

exports should be based on true price competitiveness. There are few cases where exports found to be positively correlated with the technical efficiency, however, this could not be generalized. In this context, it is worthy to note that in 2003 the value of goods exported from Jordan under trade agreements constitutes more than 90% of the total Jordanian exports. That is, exports are more or less the product of bilateral agreements and official intervention.

Import penetration (IMP), is expected to enhance productivity. The findings do not lend support to this argument. The IMP was found negatively correlated with the estimated (SR) or with the level of concentration. This indicator was also insignificant in determining the level of the (SR). The behavior of the coefficient varies between sectors without clear pattern. The level of aggregation utilized in this analysis might hide some details which might reveal the true relationship between the market structure variables.

One of the reasons behind this unexpected relationship between openness and the (SR) growth may be attributed to some measurement errors that could arise from the definition of the openness as adopted here. The measure does not differentiate between imported raw materials and the final goods; this may overstate the level of manufactured imports relative to the gross output and could lead to wrong conclusions in a country characterized by its high dependency on imports. For example we found that imported raw material for metal products and pharmaceuticals industries are classified as imports of final goods according to the harmonized system for foreign trades.¹²

It seems that over the entire period under investigation, (TFP) growth was not a significant factor in achieving growth. Factors accumulation seems to be the major contributor to the growth.

Technical progress was unimportant as a source to be ascribed, due to the following reasons:

- In many of (SR) studies, gross capital stock, normally, was used to represent the capital element to the extent that physical depreciation is significant, the measured capital stock will overstate the correct capital stock, and the estimated capital augmentation rate may understate the true augmentation rate;
- Jordanian manufacturers have invested very little in research and development, thus limit the potential of achieving high rate of technical efficiency;
- Industries in Jordan employed matured technologies and imported capital goods at prices reflecting amortized research and development and other development costs;
- Capital goods installed in Jordan are likely to be on shelf variety, and therefore the possibility of indigenous improvement is limited;
- Furthermore, many industries nurtured behind walls of protection.

Finally, the direction of causation between the explanatory variables and the dependent variable has not been established. There are certainly some other missing

¹² More puzzling in this regard is the fact that some times custom officers are concerned about the tariff rates more than classification of the commodity. That is whether the imported item is subject to for example 5 or 10 percent more than where it should be classified in terms of its economic function. This practice which is difficult to estimate might overstate the import figures from certain items.

variables which might influence the behavior of (TFP). These variables include; the type of ownership, the size of the firm and the management of the firm...etc.

Unfortunately, these indicators are not available at the second digit of the ISIC classification for the entire period (1980-1990), which made it difficult to pursue a meaningful comparison using the missing variables. It is more likely that what is observed is the net effect of all the hypothesized forces. Since the hypotheses are not mutually exclusive, making a distinction among all the different hypotheses can be quite difficult.

In conclusion, the analysis showed that there are differences in the level of the growth of (SR) between the different sub-groups of the analyzed industries over time. However, no consistent trend has emerged to support the argument that (SR) variations over time can be ascribed to trade policies or to the market structure alone.

Overall, the findings support the argument that there is a correlation between trade policies and market structure on one hand, and the growth in productivity on the other hand. The analysis revealed a significant negative relation between concentration and productivity. In addition, an argument exist that high concentration has been associated with over-pricing as estimated by the mark-up.

However, the association between productivity and trade variables seems to be weaker than what postulated in the theory, especially the one between (IMP) and the estimated productivity. Two reasons may explain this; first, it is widely recognized in the industrial literature that one can not explain changes in productivity in the context of market structure alone. Second, there are some other distortions prevail in the market, such as government intervention and pricing policies which influence the pattern of the relationship between trade policies and the productivity growth.

However, at this level of aggregation, it was difficult to attribute part of the productivity growth differences to the market structure and the trade policies per se. Moreover, no unique pattern of productivity growth in the export oriented industries has emerged. Hence, one cannot easily argue that export oriented industries outperformed other industries over the period under investigation.

Thus far we have assumed the horizontal aspects of the markets are the only industrial relations that dominate the market. We have not presented the kind of relation that exist between market players and to what extent they influence their behavior. In the following section we will present the main findings of nearly 50 structures interview conducted for the purpose of the study by utilizing the suggested questionnaire in the methodology report.

Vertical Aspects of Competition: Questionnaire Analysis and Results

This section examines the subsistence and effect of vertical aspects of competition in the Jordanian economy. Vertical restraints (Vertical aspects of competition) by definition are restrictions that are set through agreements or concerted practices among two or more firms at different levels of production or distribution chains relating to the conditions under which parties may purchase, sell or resell certain goods or services. Vertical restraints fall under two categories: price related or resale price maintenance (RPM) and non-price related, including exclusive dealing, exclusive purchasing, territory and consumer allocation, tying etc.

The impact of vertical restraints on market competition is mixed. On the one hand, vertical restraints can facilitate market penetration by new entrants, reduce transaction costs and get rid of free riders, thus enhancing inter-brand competition. On the other hand, vertical restraints can partition and foreclose the market, increase barriers to other entrants and stifle intra-brand competition.

For the purpose of this study, and to have a closer look at the vertical aspects of competition and market entry barriers in Jordan, around 50 companies were interviewed from eight selected industries: Textiles and Clothing, Beverage, Paper and Paper products, Electrical Machinery, Pharmaceuticals, Cars, Paintings and chemicals, Vegetable Oil and Plastic. Most of these companies are legally stated as Unincorporated and Limited Liabilities, while few of them were Corporations.

The interviewed sample was a mix of manufacturers, suppliers and distributors. In this regard, more than 54% of the surveyed companies are producers of final products, 23% are suppliers of intermediate products and 19% are distributors or wholesalers.

Packing firms are mostly suppliers of intermediate products while Pharmaceutical, Food and Beverage and Electrical Machineries are mostly producers of final product. Textile & clothing are supplier of intermediate products, producer of final products and distributors.
--

The size of companies interviewed tends to be medium to large. Around 79% of the interviewed companies are employing more than 20 employees, while only 2% employs between 5-20 and 0.4% have less than 5 employees. The majority of the interviewed companies are owned by Jordanians. Yet, only one company was fully owned by foreigners and none of them was owned by the public sector.¹³

Most of the interviewed companies (87%) own one plant only. However, there are two companies who owned 7 and 22 plants respectively. While the rest of the 13% own between 2 to 3 plants.

Majority of the interviewed companies are engaged in export activities. About 33% of the interviewed companies export directly more than 30% of their products, 24% of the companies export between 10 - 30% of their products, 15% export less than 8%, while 28% of the companies sell their products to the domestic market and do not export at all. However, none of the exporting companies export indirectly through distributors or exporters.

Except for the pharmaceutical industry which has about 50% share in the regional market, none of the other surveyed industries have any market share in the region. Their average share in the national market is 25%.

Investigating certain arrangements between undertakings at different levels in the production/ distribution chain, e.g. agreements between suppliers and their distributors and/or retailers in the Jordanian market is the core of the current survey analysis.

¹³ Although the sector is dominated by the small companies in terms of number. However, vertical aspects of the market relation are more likely to exist between medium to large firms.

To understand the current relations at the vertical level, the type of customers of the interviewed companies were firstly analyzed. In the local market, 23% of the companies sell to wholesalers, 16% to large domestic firms, 19% to SMEs domestically owned, 24% to foreign firms located in Jordan and 8% directly to the consumers. Nonetheless, only 3% of the companies sell their products to their parent companies or affiliated subsidiaries with a share that ranges from 20% to 80%. Also, a small share which does not exceed 6% of the companies sells their products to government and local communities.

Table (11) : Survey Results on Vertical Aspect of Competition

Percentage of companies sell in the local market to:							
	whole saler	large domestic firms	SMEs	foreign firms	Government	parent company	Consumers
Packaging	1%	40%	4%	37%	0%	15%	3%
Pharmaceuticals	14%	5%	27%	49%	6%	0%	0%
Food & Beverage	40%	4%	32%	12%	10%	1%	1%
Electricals	41%	3%	15%	16%	0%	20%	6%
Chemicals	15%	36%	31%	11%	2%	0%	5%
Cars	5%	15%	0%	26%	5%	0%	49%
Paper	38%	39%	7%	4%	10%	0%	2%
Textile & Clothing	20%	9%	15%	27%	6%	3%	20%

On the other end of the supply chain, suppliers which may impose certain arrangements on their customers and hinder fair competitive practices are considered, of which the availability of suppliers is considered an important factor. In Jordan, only 15% of the surveyed companies indicated that their suppliers are sole in the market (one supplier only for each firm). While 55% said that there are only few suppliers (2-8) and 33% pointed out that there are numerous suppliers (10 and above).

The intensive of suppliers of a same product in the same market varies from one industry to another. For example, suppliers to Chemical and Paints products are much more intensive than other industries (235 supplier); while there are only few for the car industry and electrical products (10 suppliers).

	No. of firms that supply same product in the market
Packaging	20
Pharmaceuticals	74
Food & Beverage	54
Electrical Products	10
Chemicals & Paints	235
Cars	10
Paper	42
Textile & Clothing	87
Grand Total	532

As far as the concentration of suppliers, most of the interviewed companies stated that there are no special requests or conditions imposed from their suppliers regarding their selling price. Only 9% of the interviewed companies mentioned that they have such arrangements with their suppliers and that it is mentioned explicitly in the contract, but agreed that such conditions have positive impact on their profits and not the other way around.

Only one company, represents 2% of the total sample, mentioned that it has an implicit long term contract with its supplier where the supplier requests selling a minimum quantity below a certain price. Furthermore this company was not allowed to buy its product from alternative supplier. This company pointed out that such

arrangement does not affect its profit and that they do not get additional services or concessions in return for their compliance with the agreement.

However, all the companies agreed that their suppliers do not request that they do not sell similar products or brands or buy other products only from their suppliers.

Table 12 : Survey Results : Share of Raw Material

These results are reasonably understood when considering that, in average, 68% of the raw materials used by the interviewed companies are imported directly from outside Jordan, while 25% is purchased from the local market.

	Share of Raw Material		
	Local Market	Directly Imported	Indirectly Imported
Packaging	0%	97%	3%
Pharmaceuticals	16%	84%	0%
Food & Beverage	33%	67%	0%
Electrical Products	34%	66%	0%
Chemicals & Paints	35%	47%	18%
Cars	13%	20%	0%
Paper	28%	73%	0%
Textile & Clothing	28%	72%	0%
Grand Total	25%	68%	2%

To measure this independence of distributors from their suppliers, an indicator was created indicating to what extent the suppliers finance the assets of their distributors. Most of the Jordanian interviewed companies stated that their assets are self-financed including rental or purchase of building, furniture, tools, machinery and cost of advertising and marketing. Only one company states that their supplier finances the costs of advertising and marketing.

Therefore, competition in the local market is fierce, where all the surveyed companies have competitors in the local market except for the car industry who has single supplier and no competitors.

In the pharmaceutical industry, one can observe a clear healthy situation as there are foreign and local competitors and suppliers. This also applies to vegetable oil and paper products' market.

However, the persistence of foreign competitive companies in the local market was not seen for electrical equipments industry, plastic products, paintings and chemicals, and beverages producers. As for the garment industry, the results which indicates the absence of foreign competitive companies in the local market was mainly due to the fact that most of the foreign companies that operate in the Jordanian market are targeting exports and do not sell in the domestic market.

Moreover, vertical aspects of competition become vital, when competitiveness is mainly determined by the prices only. In Jordan, most of the interviewed firms agreed that not only the price but the quality also play a critical role in their products competition. This fact reduces the effect of the vertical aspects which arises as a result of imposing unfair competitive practices.

In Jordan, Most of the interviewed firms agreed that price and quality play a critical role in their products competition. Around 57% believes that a combination of both price and quality is the most important means of competition. Yet, 33% believes that

price is the most important competition factor while only 11% considers quality as the only critical competition factor.

This fact is reinforced even further, when considering the government controls over prices. In this regard, the majority of the interviewed companies (92%) believe that prices are market driven. While, only 8% of the companies, mainly in the Pharmaceutical industry, agree that government imposes controls over their products' prices which affect negatively their economic performance. In Jordan, the Ministry of Health still determines ceilings for pricing local produced pharmaceuticals arguing that such products are socially and politically sensitive and thus should be kept under control. On the other hand, the government gives preferential treatment to Jordanian pharmaceuticals in government tenders.

Furthermore, one company in the beverage sector producing alcoholic drinks indicated that the special tax imposed by the government on their product is very high and unjustifiable, and affects their product's competitiveness.

Marketing on the other hand, is a factor that affects the existence of a fair competitive market. Whenever marketing and promotional activities exist, a more competitive market environment is expected. In Jordan, the marketing and promotion function are very weak. Although 37% of the interviewed companies described that advertising, marketing and public relations are very important factors to their economic performance. 22% of the companies perceive it as less important. Most of these companies allocate a very small budget for marketing activities that does not exceed 0.007% of their total budget, except for the pharmaceutical and beverage industries, which spend in average 0.05% and 0.03% of their budget respectively.

Another factor that plays a vital role when analyzing the vertical aspects of competition in any market is entry barriers of the industry. If the entry barriers to any industry are significant and deter new entrants to the sector, unfair competitive practices may exist due to high level of concentration that could associate it. Furthermore, according to the interviewed companies, there are major entry barriers to their respective industries. Around 87% regards limited access to funds as the major entry barrier. Another 70% of the companies stated that economies-of-scale is the second important obstacle while 41% said that legal restriction is another major impediment. The companies classified the major entry barriers to their respective industries from the most to the least important as follows:

1. Limited access to funds
2. Economies of scales
3. Limited access to human resources
4. legal restrictions
5. limited access to technological knowledge
6. the need to establish a new brand identity (high advertising cost)
7. high costs of learning (in production, marketing, etc.)
8. existence of patents or other IPRs

A closer look at the sectoral level reveals that textiles and clothing, pharmaceuticals, paper and paper board rated limited access to fund as the major entry barrier to their industry. While the other surveyed sectors classified economies of scale as their major entry barrier. The only exception was the electrical machinery sector who rated legal restrictions as their major entry barrier followed by economies of scale and limited access to fund respectively. Also, the vegetable oil sector puts both economies

of scale and limited access to fund on equal footing when considering the major barrier to their industry.

To a certain extent, it is understandable that vegetable oil products, plastics, beverages and chemicals rated economies of scale as their major entry barrier due to the fact that these industries are highly dependent on the local market. The other industries, meanwhile, which rated limited access to fund as their major entry barrier are the ones characterized as being export oriented industries and to some extent capital intensive.

In conclusion, all the previously stated results indicate that the Jordanian market does not suffer badly from unfair competitive practices due to vertical restraints (vertical aspects of competition). It was noticed that, rarely the supplier and distributor are engaged in any price related or non-price related agreement that impose a vertical restraint. Nonetheless, the importance of getting the market players aware of their right to fight against such measures should be an important government endeavor.

It was clearly noticed from the survey that the Jordanian industrialists are not aware of the competition Law and its contents. Around 52% of the interviewed companies are not aware of the lately endorsed Jordanian Competition Law. From the 48% who are aware of the law, only 4% know about it in details while 35% have just a general knowledge of its content. Yet, 54% of the companies didn't answer this question regarding their knowledge of its contents.

Around 41% of the surveyed companies gave their assessment of the Competition Law which rated as follows:

- 79% of the 41 percent respondents agree that the law stimulate investment while 16% disagreed and 5% strongly disagreed,
- in answering the question on how restrictive the law is, 84 % disagreed that the law is very restrictive and impose penalties while 16% thought it is, and finally
- 83% agreed that the law meets its context while 17% disagreed.

In general, the received answers of the respondents suggest that there is a fair satisfaction of the law and its context.

The findings of the survey indicate that the Jordanian market enjoys a fairly good competitive environment. Almost 90% of the surveyed companies did not report that they need to go to court as their partners comply with fair competition rules. From the rest 10%, four companies had to go to court as their partners imitated design, brand and trade name of their products. Three of these cases were finalized. However, it was mentioned that there are many cases still in courts regarding intellectual property rights rather than cases related to horizontal or vertical aspects of competition.

It is worth mentioning that from the cases dealt with by the Competition Directorate at the Ministry of Trade and Industry so far in the survey non is classified as unfair competition case related to the vertical restraints. Imitating brands or copying trade names or violating Intellectual Property Rights (IPRs) is not considered unfair competition case.

A competition case is when distortion in the market occurs due to vertical or horizontal restraint. This indicates that Jordanian industrialists lack the proper understanding of the Competition law especially the economic perspective of it as it was previously mentioned in the analysis where 4% only from the surveyed companies know in details about the law.

The State of Competition Policy

In 2004, Jordan has enacted the Competition Law No. (33) For year 2004 (Hereinafter referred to as the “Law”) as part of the modernization of its national legal framework towards consolidating market economy. This Law replaced the temporarily Law No (49) which was ratified in August 2002.

The Law in its final version fortifies the efforts made at the regulation and affirmation of competitive freedoms within the country. It takes into account common international standards, national interests and current economic transition that the national economy is undergoing.

The Competition Law aims at establishing and securing principle of market forces and economic freedoms especially freedom of prices. It takes necessary measures to the regulation of free competition in a manner which serves the national economy of Jordan and protects the interests of the consumer.

Box (1): Freedom of Prices

The law is based on freedom of prices in accordance with market conditions and principles of free competition, excluding:

- Prices of basic commodities such as bread and fuel that are regulated by other laws.
- Prices that are set by the Council of Ministers to cope with exceptional circumstances.

The endorsement of the Competition Law came to:

- Maintain an environment based on healthy competition that is vital for improving economic efficiency, developing competitiveness, enhancing consumer welfare and thus achieving sustained growth.
- Provide strong incentives for promoting private entrepreneurship and attracting foreign direct investment.
- Protect consumers from anti-competitive practices
- Contribute to the success of economic reforms and market openness.

The main principles upon which the Law was drafted are:

- Prohibiting arrangements and acts that aim to disrupt competition through sharing of markets or hindering of prices.
- Establishing freedom of prices as a general rule.
- Conciliation of the provisions of the Law with the rules and commitments of Jordan such as the Arab Project for the Harmonization of Competition Rules and the Euro-Jordan Association Agreement.
- Prohibiting abuse of dominant positions in the market.
- Subjecting economic concentration operations to administrative regulation and licensing.
- Updating the systems responsible for the application of the Law and the protection of competition.
- Setting deterrent sanctions to prevent violations.

The provisions of the Law shall apply to all activities of production, commerce and service provision in Jordan, in addition to any economic activities that take place outside Jordan but have an effect within it. (Article 3)

The Law tackles the following main areas of competition:

Anti-Competitive Practices (Horizontal Practices)

The Law prohibits all practices, alliances and agreements that disrupt or limit competition, particularly those that are aimed at fixing the prices of products or services, sharing of markets, hindering the entry of establishments or collusion in tenders.

With the exception of the prices of certain products or services, the Law provides that the prices of products and services shall be set in accordance with **market conditions** and the principles of free competition.

Moreover, it is prohibited in the Law for an enterprise with a dominant position in the market to abuse its position by disrupting competition including the fixing of prices or conditions of resale of products or services, hindering the entry of other establishments into the market, discriminating between customers in similar contracts or seeking to monopolize resources necessary for the operations of a competitor.

Certain practices may, by virtue of decisions of the Council of Ministers or, in certain other circumstances by a decision of the Minister of Industry and Trade (hereinafter referred to as the “Minister”), be excluded from being considered as practices that disrupt competition within the meaning of the Law.

Some practices are deemed permissible by the government to cope with exceptional circumstances, an emergency or a natural catastrophe. Meanwhile, some other practices are exempted by the Minister based on their positive outcomes and the resulting public interest. Relevant enterprises should request to be granted this exemption in accordance with as designated forms.

Practices Detrimental to the Fairness of Commercial Transactions (Vertical Practice):

The Law regulates the activity of any producer, importer, wholesaler or service provider whereby it prohibits any such person from setting a minimum resale price for a product or service, or subjecting another party to or receive from it preferential and unjustified prices or conditions of sale or purchase in a manner which imparts to such party a benefit as regards competition or causes harm thereto.

Moreover, the Law prohibits any enterprise from resale of a product as is at a price below its actual purchase price plus the applicable taxes, charges and transport costs, if any, if the purpose of such sale is the disruption of competition.

Economic Concentration:

Articles (9) and (10) of the Law deal with economic concentrations whereby certain economic concentrations are made subject to the approval of the Minister. An economic concentration is any activity which results in the full or partial transfer of ownership

Box (2)

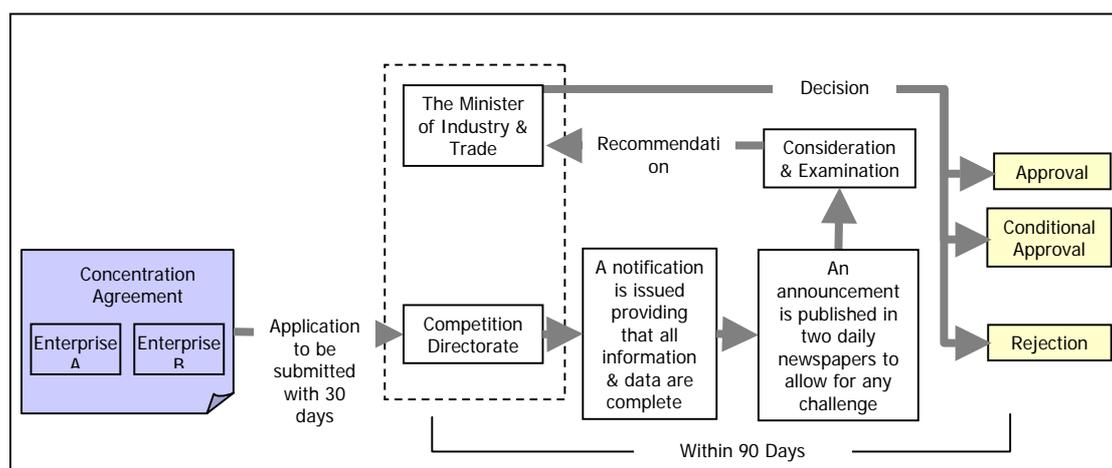
What is an Economic Concentration?

It is the control of one enterprise over another through a complete or partial transfer of any of the following:

- Ownership
- Usufruct in property
- Rights
- Stocks
- Shares
- Obligations

of or interest in the property, rights, shares or obligations of an enterprise to another, and which may enable an enterprise or group of enterprises to control another enterprise or group of enterprises.

Economic concentration operations that have an impact on the level of competition in the market by causing or enforcing a dominant position shall be subject to the approval of the Minister, if the total share of the enterprise or enterprises concerned in the operation exceeds (40%)¹⁴ of the total transactions in the market. Accordingly, a petition shall be submitted to the Directorate of Competition at the Ministry of Industry and Trade, and the Directorate shall publish the petition in an announcement in two daily newspapers. Such announcement shall contain an invitation to any interested party to present its opinion regarding such petition.



The following must be attached to the application form:

- The Articles and Memorandum of Association
- Draft of the Concentration Agreement
- A list of the main goods and services of the enterprise.
- A report on the economic implications of the operation.
- Financial Statements for the last two years.

The Minister may issue a decision regarding the petition as follows:

- Approve the economic concentration operation.
- Approve the economic concentration operation provided that the enterprise concerned undertakes to meet conditions specified by the Minister.
- Reject the economic concentration operation.

The decision of the Minister may be appealed before the Higher Court of Justice.

Sanctions:

The Law specifies the sanctions to be applied upon violation of the provisions of the Law, all of which are constituted of fines. However, the issuance of a verdict setting a fine in accordance with the provisions of this Law shall not preclude an order of

¹⁴ One has to be careful when interpreting the size of the market. The law has not specified the geographical boundaries or limits. The definition of what is the market even is not clear not only in Jordan but in countries such as the USA.

imprisonment in accordance with the provisions of the Penal Code or any other law as provided in Article (26) of the Law.

The Law provides that the amount of benefit received by the violator and the value of the damage suffered by others shall be taken into consideration when setting the amount of the fine.

Reconciliation of Status:

It is provided in the Law that every establishment is required to reconcile its status with the provisions of this Law within a period not exceeding four months after the date of coming into force of this Law, including the removal of every practice, agreement or arrangement that **took place** prior to the coming into force of this Law or **the request** for exemption as per Article (7) of this Law.

Who can launch a trial?

Lawsuits related to anti-competitive practices maybe instituted by the following parties:

- The Minister of Industry and Trade.
- Private sector enterprises
- Licensed consumer protection associations.
- Any group of at least five consumers who have suffered damage
- Chambers of industry and trade
- Professional and union associations
- Sectoral and regulatory commissions.

Cases not considered as anti-competitive practices according to the Jordanian Law:

The following cases are not considered anti-competitive practices:

- Practices that result from the implementation of an enforceable law.
- Practices that are deemed permissible by the government to cope with exceptional circumstances, an emergency or a natural catastrophe.
- Practices exempted by the Minister of Industry and Trade based on their positive outcomes and the resulting public interest. Relevant enterprises should request to be granted this exemption in accordance with a designed form.

The Law exempted agreements with minor importance provided that they do not fix price levels or share markets. The Minister of Industry and Trade sets the threshold for market share below which agreements qualify as minor importance agreements. This threshold should not exceed 10%.

Exemptions are granted to achieve positive outcomes that are in the public interest and which may not be achieved without such exemptions, such as improving the competitiveness of enterprises, improving the production and distribution processes, and providing benefits to consumers.

Enforcement of the Competition Law

Enforcement of the law is the responsibility of the Competition Directorate at the Ministry of Industry and Trade in Jordan. The duties and powers of the Competition Directorate at the Ministry of Industry and Trade in Jordan are stipulated in Article (12) of the Law, and they include:

- Contributing to setting the general plan for competition and the legislation relating thereto.
- Promoting and protecting the culture of competition.
- Conducting investigations into those practices it uncovers or receives complaints of, or those assigned to it by the competent courts, and preparing reports on its findings.
- Receiving and following up petitions relating to economic concentration operations.

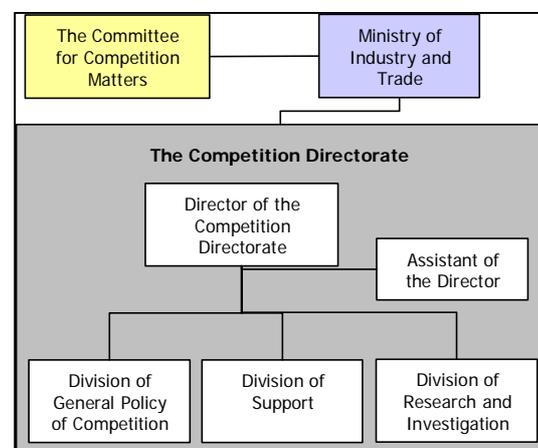
The investigative powers of the Directorate include the power to enter into commercial establishments and inspect documents, and the Director may request any person who has or may have knowledge of information relating to a violation, to testify in an investigation. If the violation is established, the Minister shall, upon the recommendation of the Director, refer the violation to court.

Competition Directorate in its endeavor to enforce the articles of the Competition Law depends currently on performing its duties on the following competent staff:

- Director, legal background
- 2 economists
- 3 legal staff
- 1 industrial engineer intern
- 1 short-term international legal adviser
- 1 long-term local economist adviser

Moreover, the Law provides for the formation of a committee called the “Committee for Competition Matters”. The Committee shall be chaired by the Minister and include the membership of certain other persons such as the Director General of the Insurance Regulatory Board, the Chief Executive Officer of the Telecommunications Regulatory Commission and the Director General of the Transport Regulatory Board. The Committee shall be responsible for presenting consultations and advice regarding the general plan of competition in various sectors and reviewing matters related to the provisions of this Law.

Furthermore, the Court of First Instance (the Amman Court in the first two years) shall have the jurisdiction to hear cases relating to any violation of the provisions of this Law pertaining to anti-competitive practices, economic concentrations and non-compliance with certain decisions issued by the Minister pursuant to this Law. All other violations of the provisions of this Law shall be subject to the general rules of court jurisdiction. Moreover, one or more specialized judges who have been



appointed by a decision of the Judicial Board shall be assigned to hear cases of practices that are in violation of competition.

The Law specifies the parties that may institute cases relating to practices in violation of competition, and such cases shall be granted summary status while the court shall have the power to issue **temporary** orders or decisions. Decisions of the court may be appealed before the Court of Appeal and the Court of Cassation.

Nevertheless, evaluation of the degree of enforcement is limited due to the fact that the Competition Directorate experience in enforcing the law is still short. A salient feature of the directorate record is the number of cases brought to it by the industry. Over a two-year period, from its creation in August-2002 to mid-2004, the directorate addressed the following cases:

Exemption petitions:

- Steel industry:
The steel cartel petitioned to be exempted from articles 5 & 6 of the Competition Law, and accordingly an extension for realignment. Both applications were rejected by the Directorate.
- Specialized Tourism transport:
A ticketing alliance of three companies who operate in tourism transport petitioned to be exempted from articles 5 & 6 of the Competition Law. The Directorate initiated an economic analysis of the impact of this alliance and established contact with the tourism and transport ministries to incorporate their visions in the study. A decision has not been issued yet.
- Energy Sector:
The Ministry of Energy petitioned to exempt the company resulting from the joint venture between Jordan, Egypt, Syria, and Lebanon from articles 5 & 6 of the Competition Law. The formed company will enjoy exclusivity rights in gas transport. The Directorate is looking into the petition.

Complaints:

- Aluminum profiles industry:
 - a. One of the colluding companies in the aluminum profile cartel filed a complaint with the Directorate to dismantle the cartel in accordance with article 5 of the Competition Law. The Directorate underwent an elaborate economic study, and will soon issue its findings.
 - b. A company filed a complaint claiming that a competitor is selling below cost to disrupt competition. The Directorate conducted an economic study, and issued its ruling rejecting the complaint since the accused party was not found guilty of selling below cost to disrupt competition.
- Machinery and vehicles spare parts:
A company filed a complaint claiming that a competitor is selling at a price below its cost in order to disrupt competition. The Directorate initiated an investigation into the case and issued its findings that the accused party is not selling below cost to disrupt competition. The complaint has been thus rejected.

- Dairy Products:
The union for cow nurturers complained orally to the Directorate regarding the abuse of dominant position practiced on them by the informal cartel of dairy products producers. The complaint came at a time when the dairy producers are threatening to raise prices. Such a collective raise sheds suspicion on potential implicit collusion between the dairy producers.

Economics concentration applications:

- Agricultural seeds:
The Directorate received a petition to approve an economic concentration operation. The operation involves a take over of an agricultural seeds producer by a private equity firm. Both firms are located in the US. The Directorate published an announcement in two daily newspapers asking interested party to supply the Directorate with their opinions. The Directorate is currently studying the application to issue its decision.

Consultations:

- Cement industry:
The Directorate was consulted regarding the applicability of the Competition Law on the cement company's decision to raise prices. The Directorate concluded that this practice is not in conflict with Jordan's Competition Law and issued recommendations on how to address this issue in the concerned sector in the short and long run.
- Meat industry:
Couple of months prior to the holy month of Ramadhan, the Directorate received a consultation request regarding the increase in meat prices which could have potentially resulted from anticompetitive activities in that sector. This issue was addressed with a sense of urgency especially before a serious problem would arise as a result of the anticipated increased demand during the holy month of Ramadhan the Directorate conducted field investigations which pointed out to the barriers that prevent competitors from entering the market. Talks were held between the various bodies that regulate this industry such as the Ministry of Agriculture and Ministry of Health to discuss the potential for opening up new import markets, and removing barriers of entry to this industry. The adopted policies succeeded in bringing the prices down and maintaining them at reasonable levels during Ramadhan.
- The Potash industry:
A consultation was requested from the Directorate regarding an amendment to a law which grants exclusivity rights to the privatized Potash mining company. The Directorate issued a communication regarding this issue.
- The Steel Industry:
A consultation was requested regarding an application to establish a union for the oligopolistic steel producers industry for fears of using the union as an umbrella to engage in anti-competitive activities. The Directorate issued a communication regarding this issue.

However, the level of activity that is currently taking place is expected to accelerate in the coming future, since the directorate was assigned the task to protect and foster competition in a country that has been undergoing profound economic restructuring and where economic power has been shifting from the public to the private sector. It is easy to believe that some Jordanian markets are suffering from collusive behavior and abuse of dominant positions, particularly in view of the high degree of concentration observed in many sectors. This record shows that developing a competition tradition and culture is a slow process and that the enactment of a competition law is only a starting point in that process.

Conclusion

It was evident that there is a strong link between market structure and performance. As Jordan moves towards a more liberal economy there has been a growing need to adopt laws and regulations that will mitigate the adverse implications of this openness on consumers. However any analysis of competition and performance should consider the horizontal as well as vertical aspects of the market structure.

As the case in several countries there is a high degree of concentration within the manufacturing sector that needs to be addressed in order to protect small producers from the anti-competitive practices. The overall picture that emerged in the case of Jordan is not too bad and indicate that there is a fairly good level of competition that exists.

There is a need to empower the competition directorate in order strengthen the enforcement of the law and clearly there is a need to advocate the competition law more vigorously.

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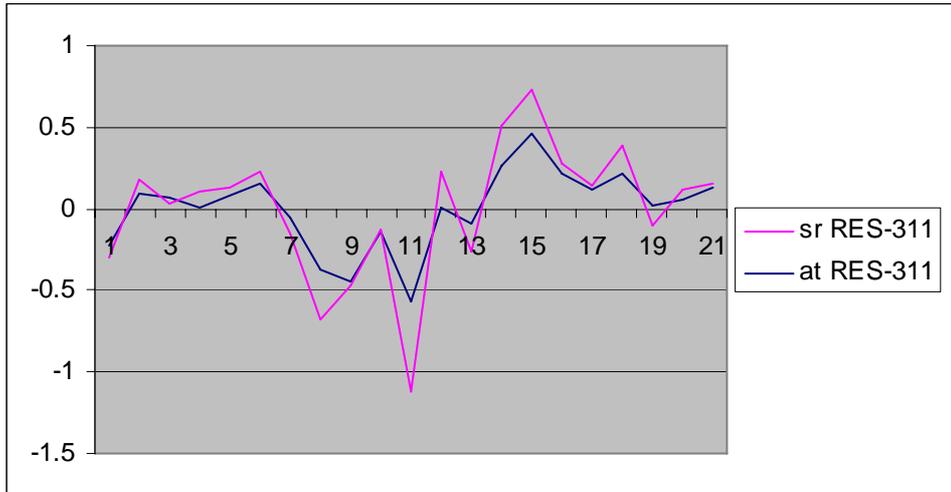
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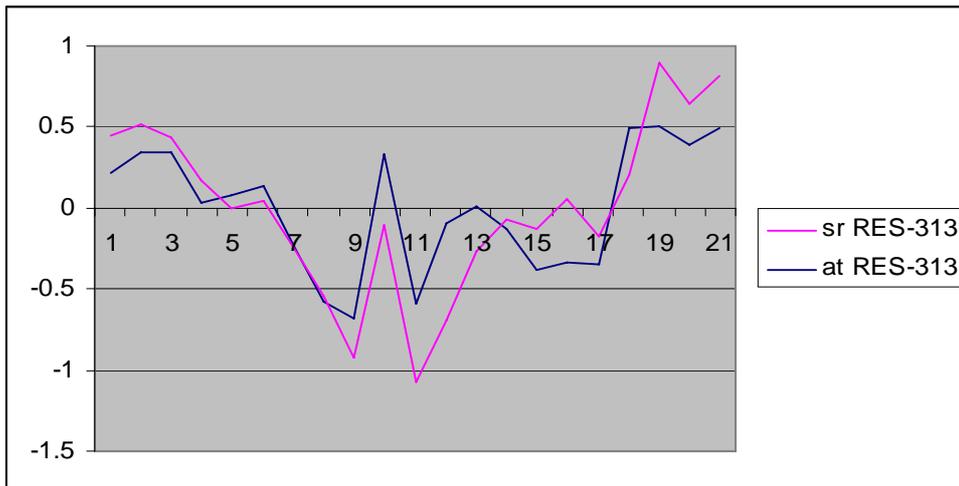
Annex 1

Technical Efficiency (at) and Solow Residual (sr).

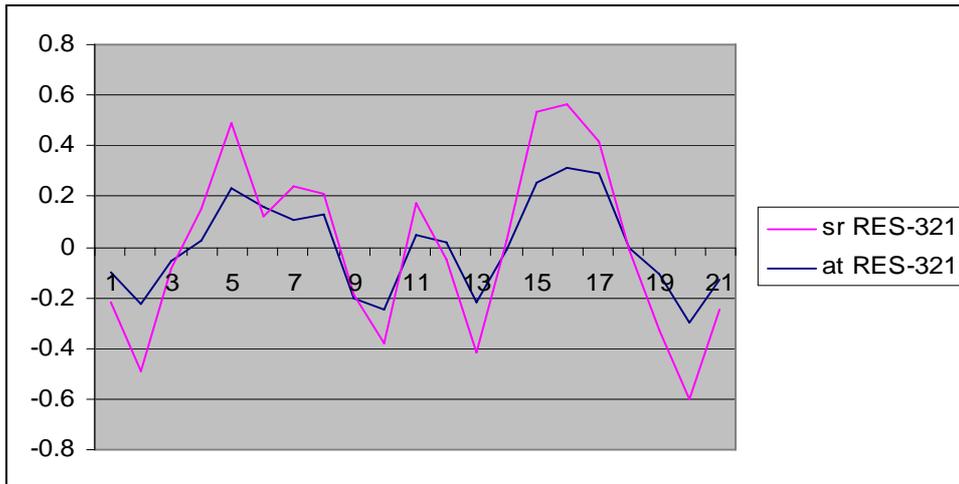
Food Industry



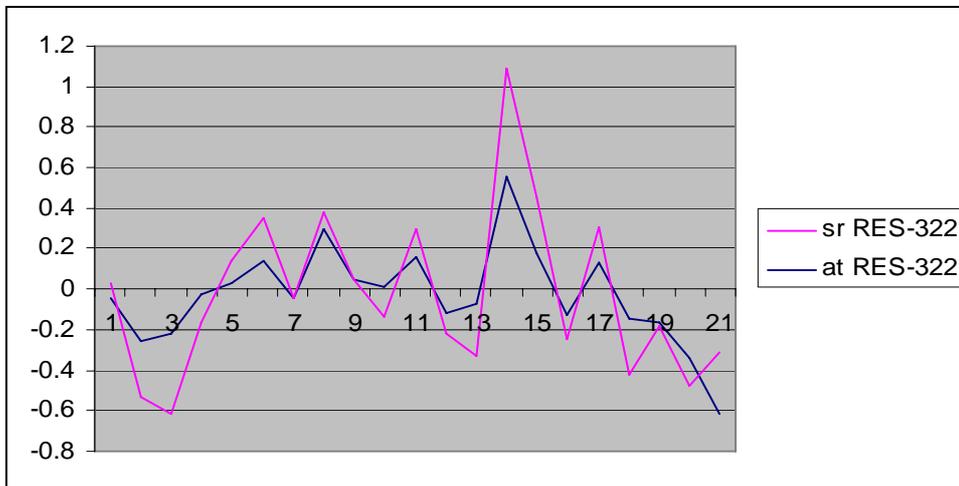
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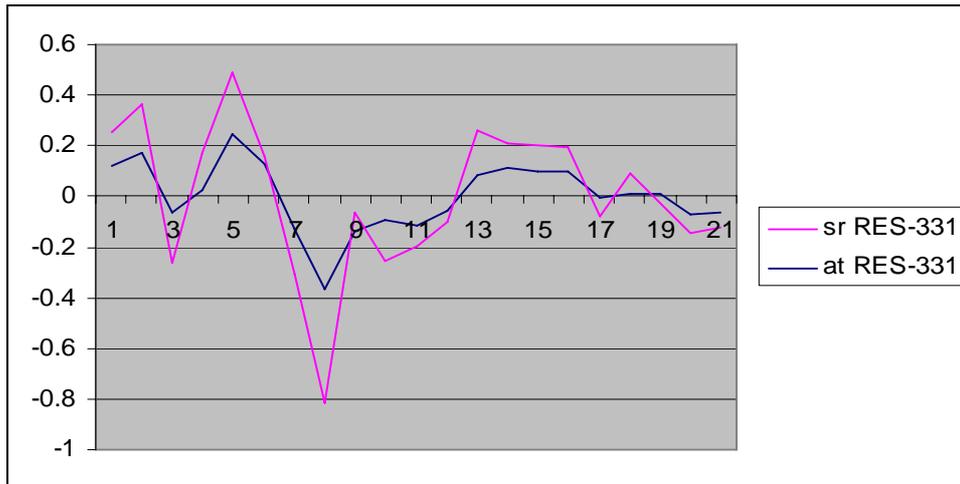
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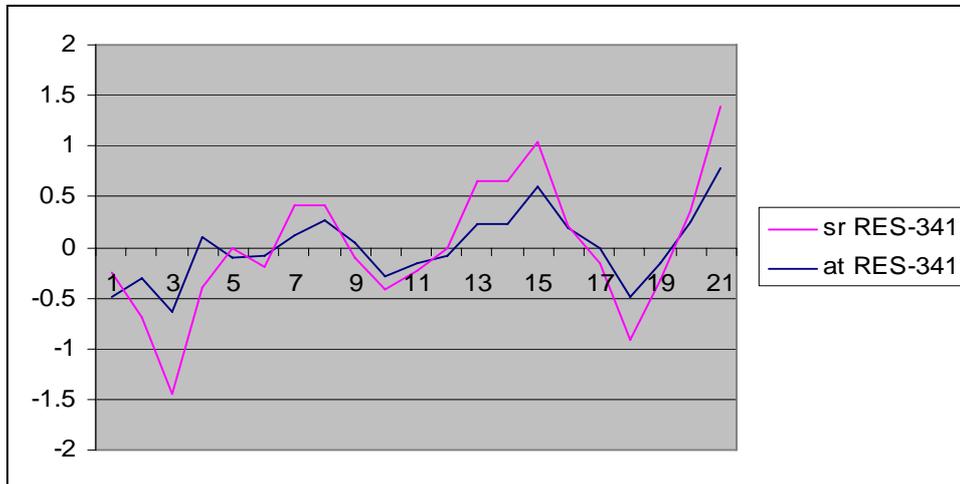
Wearing Apparel



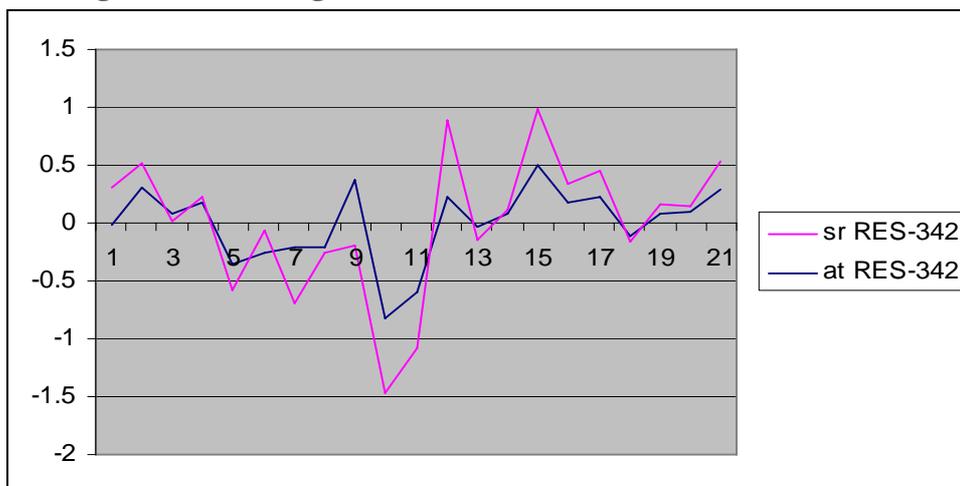
Wood and Furniture



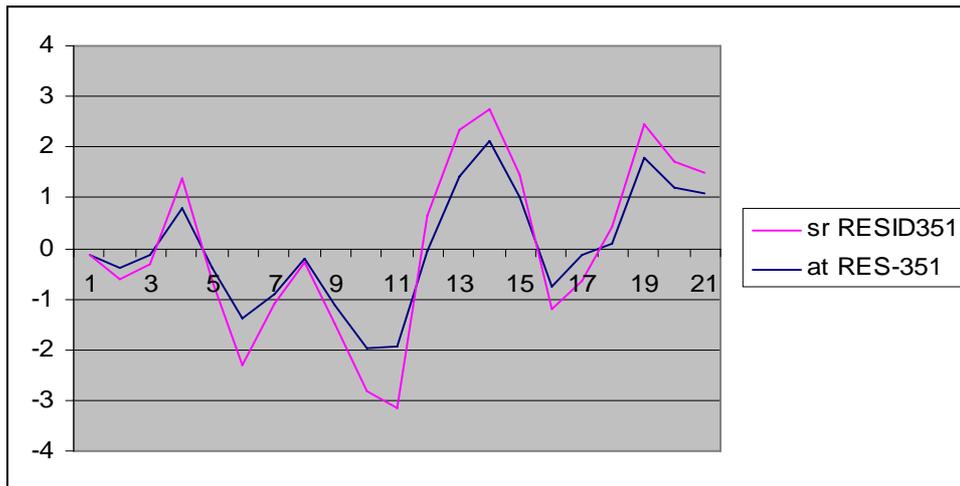
Paper and Paper Products



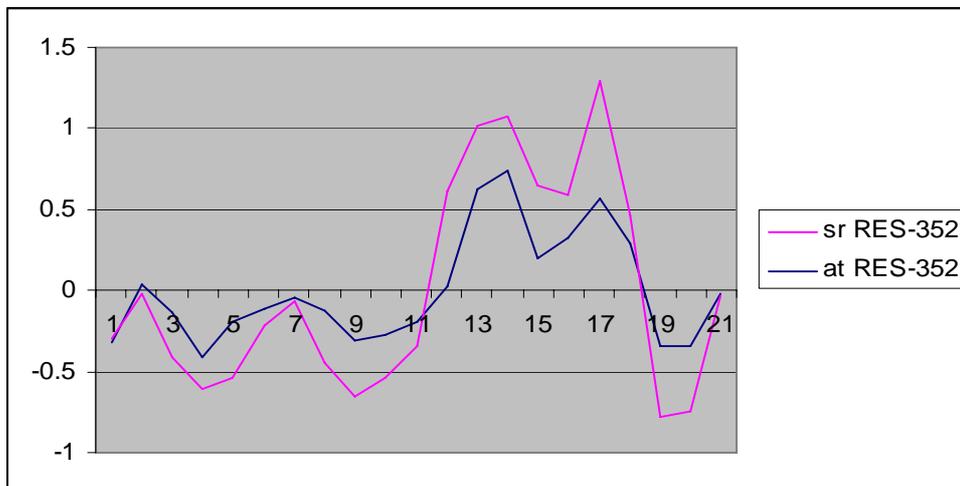
Printing and Publishing



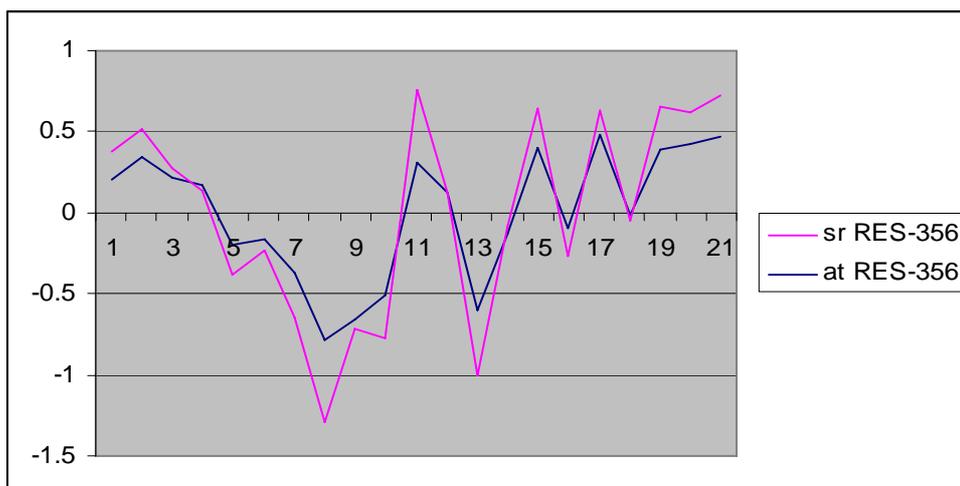
Industrial Chemicals including pharmaceutical



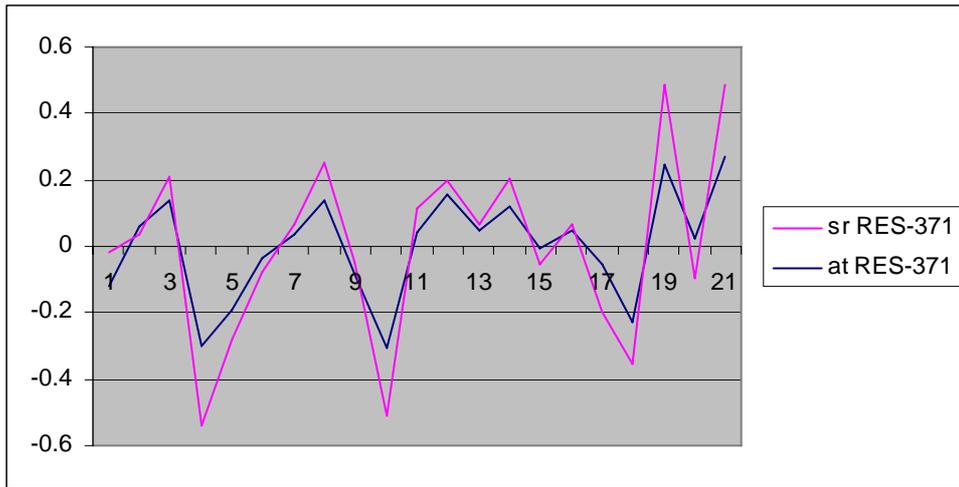
Industrial chemicals



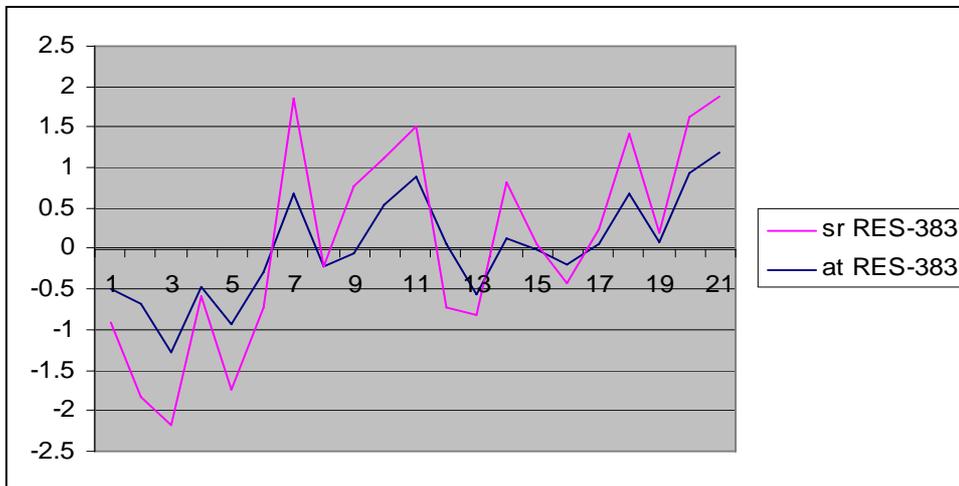
Plastic Products



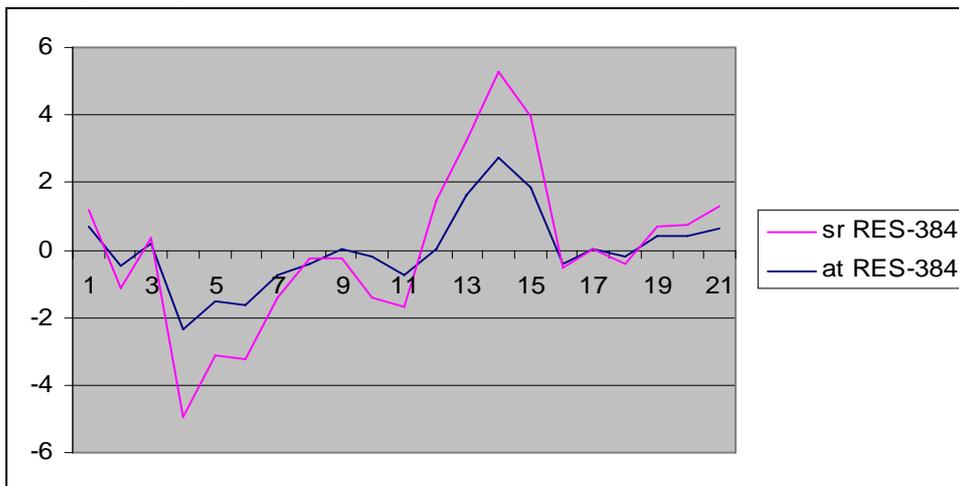
Basic Metal and Fabricated metal



Electrical Machinery



Transport Equipment



Annex II

Correlation Analysis (1980-2002)

AT denotes technical efficiency, SR: Solow Residual, CONVA, concentration Index,

EXP: exports, IMPO Import penetration.

ISIC : 311 Food Industries

Correlations

		AT	SR	CONVA	EXP	IMPO
AT	Pearson Correlation	1	.815(*)	.594	.916(**)	.767(*)
	Sig. (2-tailed)	.	.026	.121	.001	.026
	N	8	7	8	8	8
SR	Pearson Correlation	.815(*)	1	.712	.638	.497
	Sig. (2-tailed)	.026	.	.073	.123	.257
	N	7	7	7	7	7
CONVA	Pearson Correlation	.594	.712	1	.494	.246
	Sig. (2-tailed)	.121	.073	.	.213	.556
	N	8	7	8	8	8
EXP	Pearson Correlation	.916(**)	.638	.494	1	.716(*)
	Sig. (2-tailed)	.001	.123	.213	.	.046
	N	8	7	8	8	8
IMPO	Pearson Correlation	.767(*)	.497	.246	.716(*)	1
	Sig. (2-tailed)	.026	.257	.556	.046	.
	N	8	7	8	8	8

* Correlation is significant at the 0.05 level (2-tailed).

** Correlation is significant at the 0.01 level (2-tailed).

Correlations

			AT	SR	CONVA	EXP	IMPO
Spearman's rho	AT	Correlation Coefficient	1.000	.714	.548	.905(**)	.833(*)
		Sig. (2-tailed)	.	.071	.160	.002	.010
		N	8	7	8	8	8
	SR	Correlation Coefficient	.714	1.000	.571	.536	.250
		Sig. (2-tailed)	.071	.	.180	.215	.589
		N	7	7	7	7	7
	CONVA	Correlation Coefficient	.548	.571	1.000	.619	.357
		Sig. (2-tailed)	.160	.180	.	.102	.385
		N	8	7	8	8	8
	EXP	Correlation Coefficient	.905(**)	.536	.619	1.000	.881(**)
		Sig. (2-tailed)	.002	.215	.102	.	.004
		N	8	7	8	8	8
	IMPO	Correlation Coefficient	.833(*)	.250	.357	.881(**)	1.000
		Sig. (2-tailed)	.010	.589	.385	.004	.
		N	8	7	8	8	8

** Correlation is significant at the 0.01 level (2-tailed).

* Correlation is significant at the 0.05 level (2-tailed).

ISIC 313 Beverage

Correlations

		AT	SR	EXP	IMPO	CONVA
AT	Pearson	1	-.172	-.399	.681	-.453
	Correlation					
	Sig. (2-tailed)	.	.684	.327	.063	.260
	N	8	8	8	8	8
SR	Pearson	-.172	1	.406	.291	-.311
	Correlation					
	Sig. (2-tailed)	.684	.	.318	.484	.454
	N	8	8	8	8	8
EXP	Pearson	-.399	.406	1	-.513	-.460
	Correlation					
	Sig. (2-tailed)	.327	.318	.	.193	.252
	N	8	8	8	8	8
IMPO	Pearson	.681	.291	-.513	1	-.188
	Correlation					
	Sig. (2-tailed)	.063	.484	.193	.	.655
	N	8	8	8	8	8
CONVA	Pearson	-.453	-.311	-.460	-.188	1
	Correlation					
	Sig. (2-tailed)	.260	.454	.252	.655	.
	N	8	8	8	8	8

Correlations

			AT	SR	EXP	IMPO	CONVA
Spearman's rho	AT	Correlation	1.000	.333	-.429	.619	-.619
		Coefficient					
		Sig. (2-tailed)	.	.420	.289	.102	.102
	N	8	8	8	8	8	
	SR	Correlation	.333	1.000	.119	.476	-.667
		Coefficient					
		Sig. (2-tailed)	.420	.	.779	.233	.071
	N	8	8	8	8	8	
	EXP	Correlation	-.429	.119	1.000	-.405	-.190
		Coefficient					
		Sig. (2-tailed)	.289	.779	.	.320	.651
	N	8	8	8	8	8	
	IMPO	Correlation	.619	.476	-.405	1.000	-.524
		Coefficient					
		Sig. (2-tailed)	.102	.233	.320	.	.183
	N	8	8	8	8	8	
	CONVA	Correlation	-.619	-.667	-.190	-.524	1.000
		Coefficient					
		Sig. (2-tailed)	.102	.071	.651	.183	.
	N	8	8	8	8	8	

ISIC: 321 Textile

Correlations

		AT	SR	EXP	IMPO	CONVA
AT	Pearson Correlation	1	.946(**)	.049	-.712(*)	-.752(*)
	Sig. (2-tailed)	.	.000	.909	.048	.031
	N	8	8	8	8	8
SR	Pearson Correlation	.946(**)	1	-.042	-.694	-.717(*)
	Sig. (2-tailed)	.000	.	.921	.056	.045
	N	8	8	8	8	8
EXP	Pearson Correlation	.049	-.042	1	-.075	-.617
	Sig. (2-tailed)	.909	.921	.	.860	.103
	N	8	8	8	8	8
IMPO	Pearson Correlation	-.712(*)	-.694	-.075	1	.606
	Sig. (2-tailed)	.048	.056	.860	.	.112
	N	8	8	8	8	8
CONVA	Pearson Correlation	-.752(*)	-.717(*)	-.617	.606	1
	Sig. (2-tailed)	.031	.045	.103	.112	.
	N	8	8	8	8	8

** Correlation is significant at the 0.01 level (2-tailed).

* Correlation is significant at the 0.05 level (2-tailed).

Correlations

			AT	SR	EXP	IMPO	CONVA
Spearman's rho	AT	Correlation Coefficient	1.000	.881(**)	.000	-.810(*)	-.690
		Sig. (2-tailed)	.	.004	1.000	.015	.058
		N	8	8	8	8	8
	SR	Correlation Coefficient	.881(**)	1.000	.071	-.667	-.667
		Sig. (2-tailed)	.004	.	.867	.071	.071
		N	8	8	8	8	8
	EXP	Correlation Coefficient	.000	.071	1.000	.238	-.595
		Sig. (2-tailed)	1.000	.867	.	.570	.120
		N	8	8	8	8	8
	IMPO	Correlation Coefficient	-.810(*)	-.667	.238	1.000	.476
		Sig. (2-tailed)	.015	.071	.570	.	.233
		N	8	8	8	8	8
	CONVA	Correlation Coefficient	-.690	-.667	-.595	.476	1.000
		Sig. (2-tailed)	.058	.071	.120	.233	.
		N	8	8	8	8	8

** Correlation is significant at the 0.01 level (2-tailed).

* Correlation is significant at the 0.05 level (2-tailed).

ISIC 322 Wearing Apparel

Correlations

		AT	SR	EXP	IMPO	CONVA
AT	Pearson Correlation	1	.493	-.850(**)	.383	-.754(*)
	Sig. (2-tailed)	.	.215	.008	.349	.031
	N	8	8	8	8	8
SR	Pearson Correlation	.493	1	-.046	-.513	-.121
	Sig. (2-tailed)	.215	.	.914	.193	.775
	N	8	8	8	8	8
EXP	Pearson Correlation	-.850(**)	-.046	1	-.706	.794(*)
	Sig. (2-tailed)	.008	.914	.	.050	.019
	N	8	8	8	8	8
IMPO	Pearson Correlation	.383	-.513	-.706	1	-.353
	Sig. (2-tailed)	.349	.193	.050	.	.392
	N	8	8	8	8	8
CONVA	Pearson Correlation	-.754(*)	-.121	.794(*)	-.353	1
	Sig. (2-tailed)	.031	.775	.019	.392	.
	N	8	8	8	8	8

** Correlation is significant at the 0.01 level (2-tailed).

* Correlation is significant at the 0.05 level (2-tailed).

Correlations

			AT	SR	EXP	IMPO	CONVA
Spearman's rho	AT	Correlation Coefficient	1.000	.381	-.833(*)	-.190	-.810(*)
		Sig. (2-tailed)	.	.352	.010	.651	.015
		N	8	8	8	8	8
	SR	Correlation Coefficient	.381	1.000	-.405	-.929(**)	-.095
		Sig. (2-tailed)	.352	.	.320	.001	.823
		N	8	8	8	8	8
	EXP	Correlation Coefficient	-.833(*)	-.405	1.000	.310	.548
		Sig. (2-tailed)	.010	.320	.	.456	.160
		N	8	8	8	8	8
	IMP O	Correlation Coefficient	-.190	-.929(**)	.310	1.000	-.095
		Sig. (2-tailed)	.651	.001	.456	.	.823
		N	8	8	8	8	8
	CON VA	Correlation Coefficient	-.810(*)	-.095	.548	-.095	1.000
		Sig. (2-tailed)	.015	.823	.160	.823	.
		N	8	8	8	8	8

* Correlation is significant at the 0.05 level (2-tailed).

** Correlation is significant at the 0.01 level (2-tailed).

ISIC 331 Wood and Furniture

Correlations

		AT	SR	EXP	IMPO	CONVA
AT	Pearson Correlation	1	.872(**)	-.782(*)	-.569	-.412
	Sig. (2-tailed)	.	.005	.022	.141	.310
	N	8	8	8	8	8
SR	Pearson Correlation	.872(**)	1	-.768(*)	-.484	-.342
	Sig. (2-tailed)	.005	.	.026	.224	.407
	N	8	8	8	8	8
EXP	Pearson Correlation	-.782(*)	-.768(*)	1	.811(*)	.663
	Sig. (2-tailed)	.022	.026	.	.015	.073
	N	8	8	8	8	8
IMPO	Pearson Correlation	-.569	-.484	.811(*)	1	.517
	Sig. (2-tailed)	.141	.224	.015	.	.190
	N	8	8	8	8	8
CONVA	Pearson Correlation	-.412	-.342	.663	.517	1
	Sig. (2-tailed)	.310	.407	.073	.190	.
	N	8	8	8	8	8

** Correlation is significant at the 0.01 level (2-tailed).

* Correlation is significant at the 0.05 level (2-tailed).

Correlations

			AT	SR	EXP	IMPO	CONVA
Spearman's rho	AT	Correlation Coefficient	1.000	.857(**)	-.738(*)	-.500	.000
		Sig. (2-tailed)	.	.007	.037	.207	1.000
		N	8	8	8	8	8
	SR	Correlation Coefficient	.857(**)	1.000	-.714(*)	-.119	.048
		Sig. (2-tailed)	.007	.	.047	.779	.911
		N	8	8	8	8	8
	EXP	Correlation Coefficient	-.738(*)	-.714(*)	1.000	.548	.571
		Sig. (2-tailed)	.037	.047	.	.160	.139
		N	8	8	8	8	8
	IMP O	Correlation Coefficient	-.500	-.119	.548	1.000	.405
		Sig. (2-tailed)	.207	.779	.160	.	.320
		N	8	8	8	8	8
	CONVA	Correlation Coefficient	.000	.048	.571	.405	1.000
		Sig. (2-tailed)	1.000	.911	.139	.320	.
		N	8	8	8	8	8

** Correlation is significant at the 0.01 level (2-tailed).

* Correlation is significant at the 0.05 level (2-tailed).

ISIC 341 Paper and Paper Products

Correlations

		AT	SR	EXP	IMPO	CONVA
AT	Pearson Correlation	1	.943(**)	-.025	.071	-.082
	Sig. (2-tailed)	.	.000	.953	.868	.846
	N	8	8	8	8	8
SR	Pearson Correlation	.943(**)	1	-.191	-.112	-.091
	Sig. (2-tailed)	.000	.	.650	.792	.830
	N	8	8	8	8	8
EXP	Pearson Correlation	-.025	-.191	1	.769(*)	-.371
	Sig. (2-tailed)	.953	.650	.	.026	.366
	N	8	8	8	8	8
IMPO	Pearson Correlation	.071	-.112	.769(*)	1	.214
	Sig. (2-tailed)	.868	.792	.026	.	.611
	N	8	8	8	8	8
CONVA	Pearson Correlation	-.082	-.091	-.371	.214	1
	Sig. (2-tailed)	.846	.830	.366	.611	.
	N	8	8	8	8	8

** Correlation is significant at the 0.01 level (2-tailed).

* Correlation is significant at the 0.05 level (2-tailed).

Correlations

			AT	SR	EXP	IMPO	CONVA
Spearman's rho	AT	Correlation Coefficient	1.000	.976(**)	.095	.167	-.333
		Sig. (2-tailed)	.	.000	.823	.693	.420
		N	8	8	8	8	8
	SR	Correlation Coefficient	.976(**)	1.000	-.048	.048	-.214
		Sig. (2-tailed)	.000	.	.911	.911	.610
		N	8	8	8	8	8
	EXP	Correlation Coefficient	.095	-.048	1.000	.738(*)	-.571
		Sig. (2-tailed)	.823	.911	.	.037	.139
		N	8	8	8	8	8
	IMPO	Correlation Coefficient	.167	.048	.738(*)	1.000	-.071
		Sig. (2-tailed)	.693	.911	.037	.	.867
		N	8	8	8	8	8
	CONVA	Correlation Coefficient	-.333	-.214	-.571	-.071	1.000
		Sig. (2-tailed)	.420	.610	.139	.867	.
		N	8	8	8	8	8

** Correlation is significant at the 0.01 level (2-tailed).

* Correlation is significant at the 0.05 level (2-tailed).

SISIC 342 Printing and Publishing

Correlations

		AT	SR	EXP	IMPO	CONVA
AT	Pearson	1	.987(**)	.288	.157	.179
	Correlation					
	Sig. (2-tailed)					
	N	8	8	8	8	8
SR	Pearson	.987(**)	1	.343	.037	.201
	Correlation					
	Sig. (2-tailed)					
	N	8	8	8	8	8
EXP	Pearson	.288	.343	1	.186	.870(**)
	Correlation					
	Sig. (2-tailed)					
	N	8	8	8	8	8
IMPO	Pearson	.157	.037	.186	1	.429
	Correlation					
	Sig. (2-tailed)					
	N	8	8	8	8	8
CONVA	Pearson	.179	.201	.870(**)	.429	1
	Correlation					
	Sig. (2-tailed)					
	N	8	8	8	8	8

** Correlation is significant at the 0.01 level (2-tailed).

Correlations

			AT	SR	EXP	IMPO	CONVA
Spearman's rho	AT	Correlation	1.000	.976(**)	.071	.214	.143
		Coefficient					
		Sig. (2-tailed)					
	N	8	8	8	8	8	
	SR	Correlation	.976(**)	1.000	.024	.048	.071
		Coefficient					
		Sig. (2-tailed)					
	N	8	8	8	8	8	
	EXP	Correlation	.071	.024	1.000	.286	.976(**)
		Coefficient					
		Sig. (2-tailed)					
	N	8	8	8	8	8	
	IMP O	Correlation	.214	.048	.286	1.000	.405
		Coefficient					
		Sig. (2-tailed)					
	N	8	8	8	8	8	
	CON VA	Correlation	.143	.071	.976(**)	.405	1.000
		Coefficient					
		Sig. (2-tailed)					
	N	8	8	8	8	8	

** Correlation is significant at the 0.01 level (2-tailed).

ISIC 351 Industrial Chemicals including pharmaceutical

Correlations

		AT	SR	EXP	IMPO	CONVA
AT	Pearson Correlation	1	.879(**)	-.202	.027	-.489
	Sig. (2-tailed)	.	.004	.632	.950	.219
	N	8	8	8	8	8
SR	Pearson Correlation	.879(**)	1	-.154	-.107	-.177
	Sig. (2-tailed)	.004	.	.715	.801	.675
	N	8	8	8	8	8
EXP	Pearson Correlation	-.202	-.154	1	.620	.168
	Sig. (2-tailed)	.632	.715	.	.101	.691
	N	8	8	8	8	8
IMPO	Pearson Correlation	.027	-.107	.620	1	-.054
	Sig. (2-tailed)	.950	.801	.101	.	.899
	N	8	8	8	8	8
CONVA	Pearson Correlation	-.489	-.177	.168	-.054	1
	Sig. (2-tailed)	.219	.675	.691	.899	.
	N	8	8	8	8	8

** Correlation is significant at the 0.01 level (2-tailed).

Correlations

			AT	SR	EXP	IMPO	CONVA
Spearman's rho	AT	Correlation Coefficient	1.000	.929(**)	-.095	.071	-.381
		Sig. (2-tailed)	.	.001	.823	.867	.352
		N	8	8	8	8	8
	SR	Correlation Coefficient	.929(**)	1.000	.024	.000	-.333
		Sig. (2-tailed)	.001	.	.955	1.000	.420
		N	8	8	8	8	8
	EXP	Correlation Coefficient	-.095	.024	1.000	.714(*)	.024
		Sig. (2-tailed)	.823	.955	.	.047	.955
		N	8	8	8	8	8
	IMPO	Correlation Coefficient	.071	.000	.714(*)	1.000	-.143
		Sig. (2-tailed)	.867	1.000	.047	.	.736
		N	8	8	8	8	8
	CONVA	Correlation Coefficient	-.381	-.333	.024	-.143	1.000
		Sig. (2-tailed)	.352	.420	.955	.736	.
		N	8	8	8	8	8

** Correlation is significant at the 0.01 level (2-tailed).

* Correlation is significant at the 0.05 level (2-tailed).

ISIC 352 Industrial chemicals

Correlations

		AT	SR	EXP	IMPO	CONVA
AT	Pearson Correlation	1	.881(**)	.589	.532	.386
	Sig. (2-tailed)	.	.004	.125	.175	.345
	N	8	8	8	8	8
SR	Pearson Correlation	.881(**)	1	.736(*)	.677	.647
	Sig. (2-tailed)	.004	.	.038	.065	.083
	N	8	8	8	8	8
EXP	Pearson Correlation	.589	.736(*)	1	.989(**)	.339
	Sig. (2-tailed)	.125	.038	.	.000	.412
	N	8	8	8	8	8
IMPO	Pearson Correlation	.532	.677	.989(**)	1	.322
	Sig. (2-tailed)	.175	.065	.000	.	.436
	N	8	8	8	8	8
CONVA	Pearson Correlation	.386	.647	.339	.322	1
	Sig. (2-tailed)	.345	.083	.412	.436	.
	N	8	8	8	8	8

** Correlation is significant at the 0.01 level (2-tailed).

* Correlation is significant at the 0.05 level (2-tailed).

Correlations

			AT	SR	EXP	IMPO	CONVA
Spearman's rho	AT	Correlation Coefficient	1.000	.786(*)	.571	.571	.405
		Sig. (2-tailed)	.	.021	.139	.139	.320
		N	8	8	8	8	8
	SR	Correlation Coefficient	.786(*)	1.000	.690	.690	.619
		Sig. (2-tailed)	.021	.	.058	.058	.102
		N	8	8	8	8	8
	EXP	Correlation Coefficient	.571	.690	1.000	1.000(**)	.333
		Sig. (2-tailed)	.139	.058	.	.	.420
		N	8	8	8	8	8
	IMPO	Correlation Coefficient	.571	.690	1.000(**)	1.000	.333
		Sig. (2-tailed)	.139	.058	.	.	.420
		N	8	8	8	8	8
	CONVA	Correlation Coefficient	.405	.619	.333	.333	1.000
		Sig. (2-tailed)	.320	.102	.420	.420	.
		N	8	8	8	8	8

* Correlation is significant at the 0.05 level (2-tailed).

** Correlation is significant at the 0.01 level (2-tailed).

ISIC 356 Plastic Products

Correlations

		AT	SR	EXP	IMPO	CONVA
AT	Pearson Correlation	1	.854(**)	-.101	-.725(*)	-.760(*)
	Sig. (2-tailed)	.	.007	.812	.042	.028
	N	8	8	8	8	8
SR	Pearson Correlation	.854(**)	1	-.243	-.765(*)	-.598
	Sig. (2-tailed)	.007	.	.562	.027	.117
	N	8	8	8	8	8
EXP	Pearson Correlation	-.101	-.243	1	.710(*)	.278
	Sig. (2-tailed)	.812	.562	.	.048	.504
	N	8	8	8	8	8
IMPO	Pearson Correlation	-.725(*)	-.765(*)	.710(*)	1	.625
	Sig. (2-tailed)	.042	.027	.048	.	.098
	N	8	8	8	8	8
CONVA	Pearson Correlation	-.760(*)	-.598	.278	.625	1
	Sig. (2-tailed)	.028	.117	.504	.098	.
	N	8	8	8	8	8

** Correlation is significant at the 0.01 level (2-tailed).

* Correlation is significant at the 0.05 level (2-tailed).

Correlations

			AT	SR	EXP	IMPO	CONVA
Spearman's rho	AT	Correlation Coefficient	1.000	.524	-.048	-.571	-.905(**)
		Sig. (2-tailed)	.	.183	.911	.139	.002
		N	8	8	8	8	8
	SR	Correlation Coefficient	.524	1.000	-.167	-.548	-.595
		Sig. (2-tailed)	.183	.	.693	.160	.120
		N	8	8	8	8	8
	EXP	Correlation Coefficient	-.048	-.167	1.000	.714(*)	.143
		Sig. (2-tailed)	.911	.693	.	.047	.736
		N	8	8	8	8	8
	IMPO	Correlation Coefficient	-.571	-.548	.714(*)	1.000	.476
		Sig. (2-tailed)	.139	.160	.047	.	.233
		N	8	8	8	8	8
	CONVA	Correlation Coefficient	-.905(**)	-.595	.143	.476	1.000
		Sig. (2-tailed)	.002	.120	.736	.233	.
		N	8	8	8	8	8

** Correlation is significant at the 0.01 level (2-tailed).

* Correlation is significant at the 0.05 level (2-tailed).

ISIC 371 Basic Metal and Fabricated metal

Correlations

		AT	SR	EXP	IMPO	CONVA
AT	Pearson Correlation	1	.902(**)	.496	.099	.201
	Sig. (2-tailed)	.	.002	.211	.816	.632
	N	8	8	8	8	8
SR	Pearson Correlation	.902(**)	1	.437	.142	.324
	Sig. (2-tailed)	.002	.	.279	.737	.433
	N	8	8	8	8	8
EXP	Pearson Correlation	.496	.437	1	.363	-.271
	Sig. (2-tailed)	.211	.279	.	.377	.516
	N	8	8	8	8	8
IMPO	Pearson Correlation	.099	.142	.363	1	.534
	Sig. (2-tailed)	.816	.737	.377	.	.173
	N	8	8	8	8	8
CONVA	Pearson Correlation	.201	.324	-.271	.534	1
	Sig. (2-tailed)	.632	.433	.516	.173	.
	N	8	8	8	8	8

** Correlation is significant at the 0.01 level (2-tailed).

Correlations

			AT	SR	EXP	IMPO	CONVA
Spearman's rho	AT	Correlation Coefficient	1.000	.929(**)	.286	.095	.214
		Sig. (2-tailed)	.	.001	.493	.823	.610
		N	8	8	8	8	8
	SR	Correlation Coefficient	.929(**)	1.000	.214	.119	.429
		Sig. (2-tailed)	.001	.	.610	.779	.289
		N	8	8	8	8	8
	EXP	Correlation Coefficient	.286	.214	1.000	.357	-.190
		Sig. (2-tailed)	.493	.610	.	.385	.651
		N	8	8	8	8	8
	IMPO	Correlation Coefficient	.095	.119	.357	1.000	.429
		Sig. (2-tailed)	.823	.779	.385	.	.289
		N	8	8	8	8	8
	CONVA	Correlation Coefficient	.214	.429	-.190	.429	1.000
		Sig. (2-tailed)	.610	.289	.651	.289	.
		N	8	8	8	8	8

** Correlation is significant at the 0.01 level (2-tailed).

ISIC 383 Electrical Machinery

Correlations

		AT	SR	EXP	IMPO	CONVA
AT	Pearson Correlation	1	.796(*)	.472	.597	-.079
	Sig. (2-tailed)	.	.018	.237	.118	.852
	N	8	8	8	8	8
SR	Pearson Correlation	.796(*)	1	.272	.234	-.097
	Sig. (2-tailed)	.018	.	.514	.578	.819
	N	8	8	8	8	8
EXP	Pearson Correlation	.472	.272	1	.687	.036
	Sig. (2-tailed)	.237	.514	.	.060	.932
	N	8	8	8	8	8
IMPO	Pearson Correlation	.597	.234	.687	1	.048
	Sig. (2-tailed)	.118	.578	.060	.	.910
	N	8	8	8	8	8
CONVA	Pearson Correlation	-.079	-.097	.036	.048	1
	Sig. (2-tailed)	.852	.819	.932	.910	.
	N	8	8	8	8	8

* Correlation is significant at the 0.05 level (2-tailed).

Correlations

			AT	SR	EXP	IMPO	CONVA
Spearman's rho	AT	Correlation Coefficient	1.000	.786(*)	.738(*)	.476	-.048
		Sig. (2-tailed)	.	.021	.037	.233	.911
		N	8	8	8	8	8
	SR	Correlation Coefficient	.786(*)	1.000	.405	.000	-.238
		Sig. (2-tailed)	.021	.	.320	1.000	.570
		N	8	8	8	8	8
	EXP	Correlation Coefficient	.738(*)	.405	1.000	.619	-.024
		Sig. (2-tailed)	.037	.320	.	.102	.955
		N	8	8	8	8	8
	IMPO	Correlation Coefficient	.476	.000	.619	1.000	.119
		Sig. (2-tailed)	.233	1.000	.102	.	.779
		N	8	8	8	8	8
	CONVA	Correlation Coefficient	-.048	-.238	-.024	.119	1.000
		Sig. (2-tailed)	.911	.570	.955	.779	.
		N	8	8	8	8	8

* Correlation is significant at the 0.05 level (2-tailed).

ISIC 384 Electrical Machinery

Correlations

		AT	SR	EXP	IMPO	CONVA
AT	Pearson Correlation	1	.980(**)	-.006	-.597	.321
	Sig. (2-tailed)	.	.000	.988	.118	.438
	N	8	8	8	8	8
SR	Pearson Correlation	.980(**)	1	-.034	-.567	.280
	Sig. (2-tailed)	.000	.	.936	.143	.502
	N	8	8	8	8	8
EXP	Pearson Correlation	-.006	-.034	1	.484	.194
	Sig. (2-tailed)	.988	.936	.	.224	.645
	N	8	8	8	8	8
IMPO	Pearson Correlation	-.597	-.567	.484	1	-.515
	Sig. (2-tailed)	.118	.143	.224	.	.191
	N	8	8	8	8	8
CONVA	Pearson Correlation	.321	.280	.194	-.515	1
	Sig. (2-tailed)	.438	.502	.645	.191	.
	N	8	8	8	8	8

** Correlation is significant at the 0.01 level (2-tailed).

Correlations

			AT	SR	EXP	IMPO	CONVA
Spearman's rho	AT	Correlation Coefficient	1.000	.952(**)	.119	-.190	.143
		Sig. (2-tailed)	.	.000	.779	.651	.736
		N	8	8	8	8	8
	SR	Correlation Coefficient	.952(**)	1.000	.143	-.214	-.024
		Sig. (2-tailed)	.000	.	.736	.610	.955
		N	8	8	8	8	8
	EXP	Correlation Coefficient	.119	.143	1.000	.690	.000
		Sig. (2-tailed)	.779	.736	.	.058	1.000
		N	8	8	8	8	8
	IMPO	Correlation Coefficient	-.190	-.214	.690	1.000	-.333
		Sig. (2-tailed)	.651	.610	.058	.	.420
		N	8	8	8	8	8
	CONVA	Correlation Coefficient	.143	-.024	.000	-.333	1.000
		Sig. (2-tailed)	.736	.955	1.000	.420	.
		N	8	8	8	8	8

** Correlation is significant at the 0.01 level (2-tailed).