The Significance of Competition and Persistence of Firm-Level Profitability in Tunisia

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Abstract

Strange as it may seem, in the light of market-oriented reforms which many Middle East and North African (MENA) countries have been implementing over the last two decades, there are not many empirical studies on the topic of competition environment in this area of the world. There are an uncovered handful of comparative international studies for some developing countries in the region which provide data on variables such as three or four-firm concentration ratios. Even this information tends to be somewhat dated. There also exist for a few countries more detailed studies usually in the standard structure-conduct-performance paradigm. However, to our knowledge, there is no empirical detailed evidence on manufacturing degree of competition within the area constituted by the MENA countries.

This study tries to fill this gap by investigating the degree of competition in the Tunisian manufacturing sector. More precisely, it aims to shed some light on the nature and intensity of competition focusing on the issue of persistence in corporate profit rates. It does so by examining the dynamics of firm level profitability data from 1984 to 1994 for 70 of the largest manufacturing companies in Tunisia. In particular, the paper tries to answer three questions that are central to the evaluation of industry dynamics: (1) do competitive forces successfully eliminate excess profits? (2) how quickly does this erosion process take place? and (3) which factors account for the observed differences in persistent profitability and for the speed of adjustment to the norm?

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Introduction

The received image of emerging markets as being basically characterised by pervasive and inefficient government controls on economic activity, lack of competition, immature and imperfect capital markets and poor corporate governance is far from being the whole picture[2]. That is the broad message of this paper on the basis of analysis and evidence from Tunisian manufacturing sector.

Indeed, despite shortcomings in corporate governance, Tunisia seems to have vivacious product markets and display as much intensity of competition as that observed in advanced countries. The evolution of Tunisians' product and capital markets provides a solid basis for future advance. A central developmental issue is how to use these social assets for promoting and completing the industrial revolution that many developing countries like Tunisia embarked on in the second half of the twentieth century.

Institutions such as competition, stock markets, banks and good corporate governance are required not just for their own sakes but more as a means to an end – the fast growth of these countries' real economies and other developmental goals. The mere existence of these institutional mechanisms is no guarantee of their being successfully harnessed for economic development.

Following the pioneering work of Mueller (1986) and Mueller and Geroski (see Mueller, 1990), there is a well established literature which measures the intensity of competition for an economy or an industry in terms of the persistency of firm profitability[3]. The simple intuition behind this methodology is the view that ceteris paribus, the more intense the competition in an industry, the lower is likely to be the persistence of corporate profitability over time in the industry. Companies may earn monopoly rents from temporary advantages, howsoever acquired whether through monopoly power or good management; such profits will not persist for long in competitive markets. Thus, a time series analysis of corporate profits sheds light on the dynamics of the competition process which the commonly used static measures of competition, e. g. the various concentration measures based on size distribution of firms, cannot do.

Following the same methodology, one objective of this study is to shed some light on the nature and intensity of competition focusing on the issue of persistence in corporate rates of return in the Tunisian manufacturing sectors. It does so by examining the dynamics of firm level profitability data from 1984 to 1994 for 70 of

[2] Laffont (1998) suggests in one hand that many developing countries exhibit segmented product markets, discretionary government regulations and considerable corruption and hence are not very competitive

[3] For recent contributions, see among others, Odagiri (1994), Waring (1996) and Goddar, Wilson (1999).

the largest manufacturing companies in Tunisia. In particular, the paper tries to answer three questions that are central to the evaluation of industry dynamics: do competitive forces successfully eliminate excess profits? how quickly does this erosion process take place? and which factors account for the observed differences in persistent profitability and for the speed of adjustment to the norm?

Before going into the details of the underlying methodology reported in section II, it is worth drawing attention in section I to some of the distinctive features of the environment in which Tunisian companies operated over the 1980s and 1990s period.

I. Manufacturing Sector Performance, Firms' Size Distribution and Market Concentration

In Tunisia, manufacturing firms have been called upon to play a key role in the transformation and development of the Tunisian economy since the launching of market oriented reforms fifteen years ago.

Over the past three decades, the manufacturing sector has been comparatively dynamic, growing at an average real rate of 6 per cent since 1987. In 2002, manufacturing sector employed 21.3 per cent of the entire labour force and accounted for 87 percent of total merchandise export earnings, making it the second nation's largest sector. However, this sector remains fairly small, particularly when compared to countries that have achieved fast economic growth. This is cause for concern for two principal reasons:

- first, it is well documented that in the process of development the manufacturing sector usually increases its share in GDP, and often represents the main engine of growth, and
- second, the process of globalization in Tunisia has been accompanied by trade liberalization which has placed additional pressures on industries causing some to decline and others to grow. Contributing to the globalization pressures is the emergence of dynamic new export-oriented economies in Asia that are forcing structural change in order to increase the Tunisian's manufacturing sector ability to expand and adapt to world market conditions.

A. Performance and Protection

We consider here the performance of the manufacturing sector over the period from 1984 until 2002. Table 1 presents some data on trends in manufacturing GDP

growth, share and investment rate over this period, along with the corresponding information for the economy as a whole.

Output in the economy as a whole has undergone a sustained expansion since 1988 growing at an average rate of 4.3 per cent per annum. In the manufacturing sector, output growth has been generally faster than average over the period 1984-2002 (5.2 per cent growth rate in average per annum in the manufacturing sector versus 3.8 per cent for the overall GDP growth rate) and hence the share of the economy's output attributable to manufacturing has improved from 15.2 per cent of total output in the period 1984-87, to nearly 18 per cent in average in 1988-2002. Over the same period:

- contribution of the manufacturing sector to overall GDP growth rate increased significantly (26.3 per cent in average) compared to a contribution of 9.1 per cent in average in 1984-1987,
- private sector share in the manufacturing value added increased notably from 70.4 per cent in 1988 to 96 per cent in 2002,
- the manufacturing sector accounts for around 15 per cent of the overall gross fixed capital formation never and the proportion of manufacturing investment undertaken by the private sector attains 86.3 per cent in average in 1996-2002,
- investment rate in the manufacturing sector shows a similar pattern of gradual improvement in 1988-1991 as in the overall economy (around 23 per cent in average), and a relative decline since 1992 (an average investment rate of 19.5 per cent). Since the mid 1990s the proportion of overall GDP accounted for by gross fixed capital formation never attains the average level of 27.7 per cent realized in 1984-1987.

<Insert Table 1>

Over the observed period, the recorded level of employment in manufacturing has continuously increased, from 17.2 per cent in 1984 to 21.3 per cent in 2002. The manufacturing sector is actually the second largest employer, and the largest employer of full time workers.

Since 1995, the manufacturing employment share has increased more sharply than that in total GDP, reflecting the fact that trend rate of growth in manufacturing output per worker compares not favourably with that achieved for all the economy especially at the end of the observed period (Graph 1 and 2). This fact seems to be

correlated to the relative decline in the accumulation rate and in the share of manufacturing stock of capital.

<Insert Table 2>
<Insert Graph 1>
<Insert Graph 2>

The effective rate of protection (ERP) seeks to capture in a single figure support to productive factors resulting from a complex tariff structure. By including the price-distorting effects on intermediate inputs as well as on output, ERP of industry provides a measure of the net effect of border policies. It evaluates the increase in industry's value added per unit of output under protection as a percentage of the free trade value added per unit and constitutes a useful summary indicator of the manufacturing sector's exposure to international competition.

Since 1977 Tunisia has benefited from a cooperation agreement with the EU that granted Tunisian manufactured exports duty-free access to EU markets. The 1995 Association Agreement with the EU established reciprocal treatment by granting EU manufactured exports, which represent three quarters of Tunisia's imports from the EU, duty-free access to Tunisian markets after a 12-year adjustment period. The schedule for the removal of tariffs on manufactures is:

- Immediately: For primary materials and equipment not made in Tunisia, representing 12% of manufactured imports from the EU. This stage is fully implemented.
- Gradually over 5 years, one fifth per year: For finished products not made locally and certain materials, representing 28% of manufactured imports from the EU. This stage is also fully implemented.
- Over 12 years, one twelfth per year: For products produced locally that are capable of competing, representing 30% of manufactured imports from the EU. The implementation of this stage is in progress.
- Four-year delay, one eighth per year thereafter: For products made locally for which the enterprises need restructuring, representing the remaining 30% of manufactured imports from the EU. Implementation of this stage has started in 2000.

ERP witnessed a rapid decline, during 1986-1990, by 26 points. It increased, particularly during 1990-1997. It is worth noting that this was not due to a more protectionist policy, but rather to Tunisia's adhesion to GATT in 1989, and consequently to its commitments to transform all forms of non-tariff protection into tariff equivalent.

Currently in its ninth year of implementation, the agreement has resulted in a temporary but sizable increase in effective protection for most manufacturing enterprises producing for the domestic market (Graph 3), as a result of the full implementation of the first two measures above. The completion of the implementation of the third measure and, most important, the implementation of the last measure will gradually lead to a very large reduction in effective protection for enterprises producing for the domestic market, which is effectively observed since 2000.

<Insert Graph 3>

B. Size Distribution and Market Concentration

The prevalence of small plants is highlighted in Table 3. In the manufacturing sector, firms with fewer than 50 employees account for 51 percent of all active firms, and companies with fewer than 200 employees account for 89 percent of all companies.

The limited size of firms is particularly pronounced in wood products and diverse Industries (where firms fewer than 50 employees account for 66 percent of all active enterprises), chemical Industries and Building Materials (65 per cent of total firms in this sector employ less than 50 employees), and food processing (64,5 per cent of total firms in this sector employ less than 50 employees).

<Insert Table 3>

Firms in textile, clothing, leather and shoes sector are relatively larger: companies with more than 100 employees account for 40,4 percent of all companies (only 28,3 per cent for all manufacturing sectors). This sector is also characterized by a relatively weaker inequality in terms of firm size distribution (Graph 4) and an important propensity to export, confirming *"that exporting tends to be concentrated in the larger production units in an industry has been found for several countries ..."* (Caves 1989).

<Insert Graph 4>

Table 4 reports the CR4 and CR8 concentration ratios for the 20 manufacturing industries in 1997, 1999 and 2001 calculated on the basis of 1800 Tunisian manufacturing firms (1590 in 1997 and 1510 in 1999) from the Enterprises Repertory (National Institute of Statistic) which use the same classification scheme.

The average Tunisian manufacturing concentration ratio (CR4) is 56,2 per cent in 2001 and 57,2 per cent in 1997. Looking at the differences in the levels, one finds great variation across industries. The most concentrated industries are other

transportation equipment (CR4 of 95,4 per cent in 2001), measuring and medical instruments (92,8 per cent), metallurgy (84,8 per cent) and radio and TV and other communications equipment (80,9 per cent).

<Insert Table 4>

II. Persistence of Profitability

A. Relevance of profitability and the implications for competition policy

Profitability appraisal and its tools are of relevance to a wide range of competition policy issues. An obvious example is the assessment of market power or the degree of competition in the market, since these concepts are defined in terms of firms' ability to raise prices consistently and profitably above competitive levels. In addition there are many other applications of profitability assessment summarized in Table 5.

<Insert Table 5>

Despite the relevance of profitability assessment, it is not yet a commonly and systematically applied tool in competition policy in developed countries, other than for pricing practices such as predation and margin squeeze. The reasons are of two sorts:

- ✓ Conceptual: it has not been well established what profitability analysis should be measuring — i.e. what is the relevant measure of profitability, and what is the most appropriate competitive benchmark?
- ✓ Practical: profitability analysis raises various measurement and interpretation issues. For example, accounting data, which is normally the primary source of information, is rarely presented in such a way that it can be easily and readily used for economic analysis for competition policy purposes. Furthermore, accounting policies are far from uniform across companies and countries. Even if profits can be measured, profitability figures can be difficult to interpret. For example, when are profits too high or too low, and what is the relevant time period to consider? If high profits are found, are they due to market power or to superior efficiency?

B. Econometric methodology

Static measures of concentration inadequately reflect competition intensity since, despite high industry concentration ratios, competition between oligopolistic firms may be intense over market share, design, sales, etc. Such competitive dynamics may be better captured by examining the persistence of corporate rates of return. If competition is intense there is unlikely to be persistency in the profitability of

competing firms. Those with above average profits in one period will not be expected to maintain the same level of profits in the subsequent period since they will be eroded by competitors. With less intense competition, profitability differences between firms may be more persistent.

This essentially Schumpeterian perspective on the competition process has been adopted in PP studies, which are typically based on estimation of the following first-order auto-regressive equation for corporate profitability[4].

$$P_{it} = \alpha_i + \lambda_i P_{it-1} + u_{it} \qquad (1)$$

where P_{it} is the profitability of firm (sector) *i* in time *t*, α_i and λ_i are the parameters to be estimated, and *u* is the usual error term. The coefficient λ_i is interpreted as the speed of adjustment of excess profits to the norm and, if $\lambda_i \in]-1;1[$, the equilibrium or long-run profitability level of firm *i* is given by:

$$P_i^{LR} = \frac{\alpha_i}{1-\lambda_i} \qquad (2)$$

Equation (1) has the virtue of not requiring any unobservable variables to map competitive dynamics. *However*, as noted by Glen, Lee and Singh (2001), henceforth GLS, *the equation does not differentiate between different sources of persistency, specifically those arising from persistent monopoly power or those due to continuous good management and hence persistent efficiency. Entry and exit forces which erode excess profits apply to both sources of such profits*.

Following GLS and to control for business cycles and other macroeconomic shocks, the regression analysis is conducted in terms of the variable $Y_{it} = P_{it} - \overline{P}_t$, where $\overline{P}_t$ is the average of the P_{it} across firms. Y_{it} thus represents the deviation of the profitability of representative firm in sector *i* at time *t* from the average profitability of all other firms in the country sample at that time. Given the relatively short time dimension of the data, the analysis is based on second-order autoregressive models of the form:

$$Y_{it} = \alpha_i + \lambda_{1i} Y_{it-1} + \lambda_{2i} Y_{it-2} + \varepsilon_{it} \qquad (3)$$

The presence of a unit root, which indicates that shocks to profitability persist indefinitely, implies that (3) can be written in first difference form. Im, Pesaran and Shin (2003), hereafter IPS, have provided a relatively powerful test of the unit root hypothesis in situations where the data under investigation also have a cross-

[4] A summary of earlier studies of persistence in profits are presented in Lipczinsky and Wilson (2001)

sectional dimension. The 'standardised t-bar test' proposed by IPS exploits the panel structure of the data and is based on the average value of the Augmented Dickey-Fuller statistic calculated for each of the individual firm's or sector's data, adfi; i.e. the average value of the t-statistic on the coefficient β_i in the rewritten version of (3) given by the Dickey-Fuller regression:

$$\Delta Y_{it} = \alpha_i + \beta_i Y_{it-1} + \gamma_i \Delta Y_{it-1} + \varepsilon_{it} \qquad (4)$$

where $\beta_i = -(1 - \lambda_{1i} - \lambda_{2i})$ and $\gamma_i = -\lambda_{2i}$. To take into account the short time series available while recognising the requirement that the ε_{it} do not display serial correlation, two sets of tests of the unit root hypothesis were therefore conducted; in the first (unrestricted) set, ΔY_{it-1} is included in all regressions while, in the second (parsimonious) set, the test is conducted on the basis of regressions chosen through a specification search in which the Schwarz-Bayesian Criterion is calculated to decide whether or not to exclude the lagged ΔY_{it-1} term. In both cases the appropriate standardised t-bar statistic is calculated and compared to the relevant critical values.

As mentioned above, panel unit root tests developed by IPS are used to explore the panel time series properties of the variables. This test addresses the low power of the conventional unit root tests by exploiting the cross-sectional and time series information. We briefly outline the methodology used by IPS for testing unit roots before presenting the results.

IPS (2003) suggest a panel unit root test in the context of a heterogeneous panel. This basically applies the ADF test to individual series thus allowing each series to have its own short-run dynamics and the overall t-test statistic is based on the arithmetic mean of all individual countries' ADF statistic. Suppose a series (such as GDP, rate of return or price) can be represented by the ADF (suppose without trend):

$$\Delta Y_{it} = \alpha_i + \beta_i Y_{it-1} + \sum_{j=1}^{p_i} \gamma_{i,j} \Delta Y_{it-j} + \varepsilon_{it} \qquad (5)$$

The IPS tests, which are based on N individual regressions, allow both the trend and the serial correlation coefficient to vary across the units under the alternative, in addition to the mean and variance. It also allows for the heterogeneity in the value β_i under the alternative hypothesis.

IPS test for the null hypothesis that β_i is null for all observations *i* versus an alternative that some of the β_i s are less than zero. They propose tests based on the average over the individual units of a Lagrange-multiplier test of the hypothesis

that $\beta_i = 0$ as well as tests based on the average of the augmented Dickey-Fuller statistics, which they find to have somewhat better finite sample properties than the L-M test.

IPS average ADF test can be implemented following the steps described below:

1. Given the specification (5), with or without time trend, standard panel unit root test based on the augmented ADF statistics for each firm, sector or country i is conducted. $t_i(N,T)$ is the cross sectionally augmented Dickey-Fuller (CADF) statistic for the ith cross section unit given by the t-ratio of the coefficient of Y_{it-1} in the CADF regression.

2. The t_{bar} statistic is then formed as a simple average of the individual $t_i(N,T)$ statistic:

$$t_{bar} = \frac{1}{N}\sum_{i=1}^{N} t_i(N,T;p_i),$$

where p_i is the lag order in the ADF regression (5).

3. Finally, a standardised t-bar statistic for unit root test is evaluated as:

$$Z_{t_{bar}} = \frac{\sqrt{N}\left(t_{bar} - E(\eta)\right)}{\sqrt{Var(\eta)}},$$

$E(\eta)$ and $V(\eta)$ are obtained from the results of Monte Carlo simulation carried out by IPS and are available from their table (2); they have tabulated them for various time periods and lags. When the ADF has different augmentation lags p_i the two terms $E(\eta)$ and $V(\eta)$ in the equation above are replaced by corresponding group averages of the tabulated values of $E(\eta, p_i)$ and $V(\eta, p_i)$ respectively.

C. Econometric evidence

Persistence in Tunisian manufacturing sectors is investigated here using a data set consisting of annual observations (1984-1994) on profitability, defined as the profit rate which corresponds to the ratio of operating surplus at the current period to the aggregate capital stock at the end of the last period *t*-1 evaluated at current investment prices, for a sample subset of the 100 largest listed manufacturing corporations (in terms of value added at factors costs). The subset of 70 corporations represents those firms which have a common run of data during the

period 1984-1994 (11 observations)[5]; firms with broken runs of data are excluded on the grounds that time series methods are inapplicable with such short time series. Graph 5 provides the means of corporate profitability for each sector.

<Insert Graph 5>

Given the limited number of temporal observations, a parsimonious specification of (4) where ΔY_{it-1} is dropped and a time trend is included in all regressions is kept to test for the presence of unit roots.

Table 6 summarises the relevant results obtained by estimating equation (4) across all firms following the specification search described above.

<Insert Table 6

The most important results are:

1. While the regression model (4) is very simple, the fit of the regression is reasonable in most cases, with the average adjusted R^2 of 0.337. The great majority of individual regressions have an adjusted R^2 in excess of 0.2.
2. The results of the unit root tests suggest that this hypothesis is rejected. Indeed, the standardised $t_{bar}(Z_{t_{bar}})$, evaluated from the critical values $E(\eta) = -2.166$ and $V(\eta) = 1.132$ for T = 10, is sufficiently weak (-2.9323) compared to the critical value at 5 per cent level obtained by interpolation between the relevant values for small samples provided in IPS (-2.388). The panel structure of the data set allows us to infer that profitability data is stationary.
3. The mean value of λ in Table 2 is relatively small (0.308), and the estimated standard error suggest it is precisely estimated (0.004). This result suggests a rapid speed of adjustment for excess short-run profits; nearly all of the impact of a profitability shock dissipates within 1.44 years.
4. Most importantly, our results are in line with those reported in GLS (2001) concerning firms in emerging markets, and more precisely with GLS central result: "*...there is less persistence in developing than in advanced economies.*"
5. Estimated mean value of long-run profitability is statistically close to zero (mean value of -0,002 with relatively important estimated standard errors).

[5] The subset of 70 corporations is constituted by 14 firms from Food Processing sectors, 8 firms from Building Materials sectors, 13 firms from Mechanical, Metal, Electrical and Electronics sectors, 6 from Chemical Industries, 15 from Textiles, Clothing Leather and Shoes sectors and 14 firms from Diverse Industries.

A competition-based interpretation is also compatible with the conclusions of a recent review article of Tybout (2000) on developing country manufacturing firms. He suggests that the common belief concerning the lack of competition in emerging markets and the inefficiency of their firms is not supported by evidence. He concludes:

> *"Indeed, although the issue remains open, the existing empirical literature does not support the notion that LDC manufacturers are relatively stagnant and inefficient. Turnover rates in plants and jobs are at least as high as those found in the OECD, and the amount of cross-plant dispersion in measured productivity rates is not generally greater. Also, although small-scale production is relatively common in LDCs, there do not appear to be major gains from better exploitation of scale economies." (p. 38).*

(in progress)

Conclusion

(in progress)

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Tables and Figures

Table 1: **Growth (real) and Investment Rate Trends in Tunisia (per cent), 1984-2002**

Years	Overall GDP Growth	Manufacturing GDP Growth	Manufacturing Share in GDP	Aggregate Investment rate	Manufacturing Investment rate	Private sector share Manufacturing Value added
1984-1987	2,4	4,6	15,2	27,7	31,4	72
1988	1,6	6,3	16,8	20,6	18,8	70,4
1989	3,5	6,9	17,0	22,5	23,6	68,8
1990	7,1	6,3	16,9	24,4	23,6	72,3
1991	3,9	3,9	16,9	24,0	24,5	74,1
1992	7,8	6,5	16,5	27,2	22,7	76,1
1993	2,2	4,9	17,2	28,1	21,5	77,7
1994	3,2	8,6	18,5	27,0	19,4	78,0
1995	2,4	4,4	19,0	24,2	18,1	80,6
1996	7,1	2,7	18,3	23,2	18,4	81,1
1997	5,4	7,5	18,5	24,7	18,6	84,2
1998	4,8	4,3	18,5	24,9	20,0	89,5
1999	6,1	5,6	18,1	25,4	19,6	90,4
2000	4,7	6,6	18,2	26,3	19,6	89,1
2001	4,9	6,9	18,5	26,2	19,2	89,5
2002	1,7	2,0	18,6	25,2	17,5	96,0

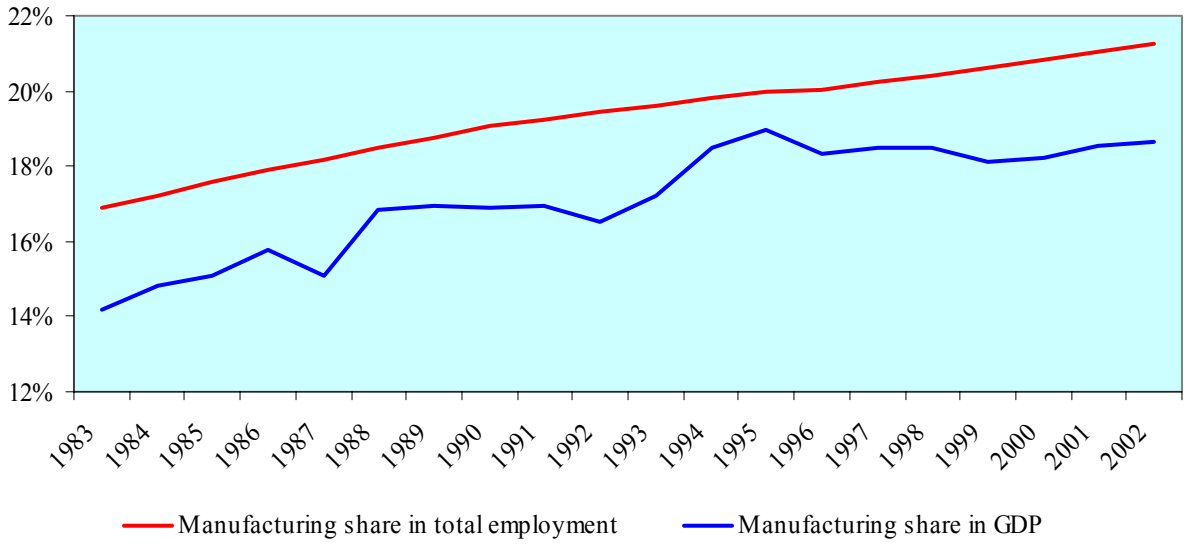
Source: Institut National de la Statistique

Table 2: **Manufacturing Employment and Stock of Capital Trends**

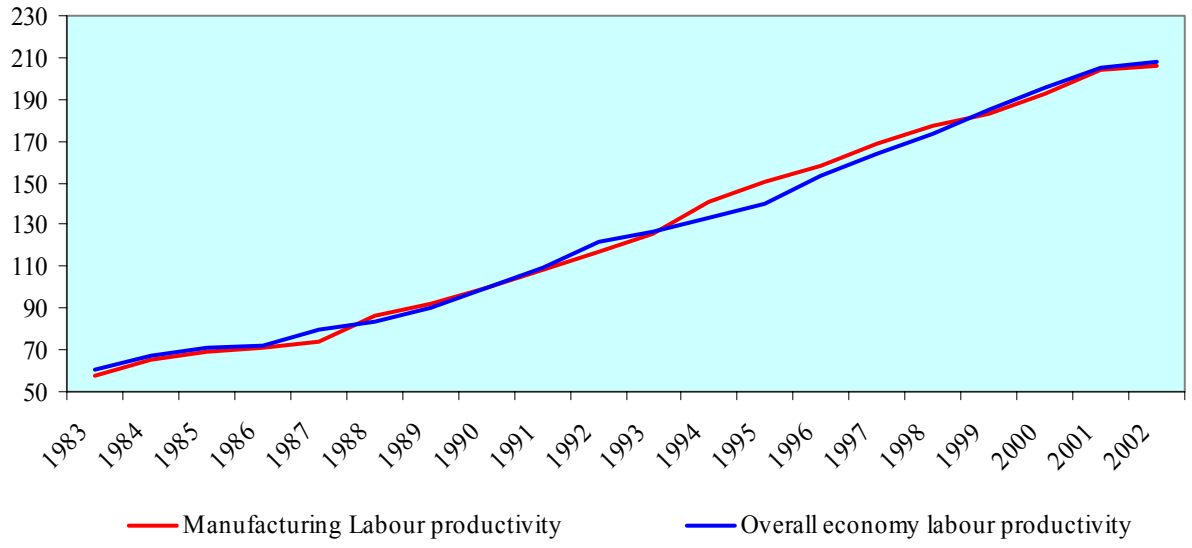
Years	Manufacturing Employment		Manufacturing Stock of Capital (volume MD)	
	Level ('000s)	Share of total	Level	Share of total
1984	311,5	17,2%	6935,8	19,4%
1988	376,5	18,5%	7531,4	18,5%
1989	390,5	18,8%	7439,2	18,2%
1990	405,5	19,1%	7453,6	18,0%
1991	416,5	19,2%	7470,5	17,6%
1992	430,5	19,4%	7521,3	17,4%
1993	445,5	19,6%	7586,8	17,0%
1994	461,5	19,8%	7617,8	16,6%
1995	477,5	20,0%	7645,7	16,1%
1996	490,5	20,1%	7651,3	15,8%
1997	506,5	20,2%	7635,2	15,4%
1998	522,5	20,4%	7638,8	15,0%
1999	540,7	20,6%	7705,8	14,6%
2000	559,1	20,8%	7791,0	14,3%
2001	579,5	21,1%	7846,3	13,9%
2002	600,3	21,3%	7946,6	13,5%

Source: Institut d'Economie Quantitative

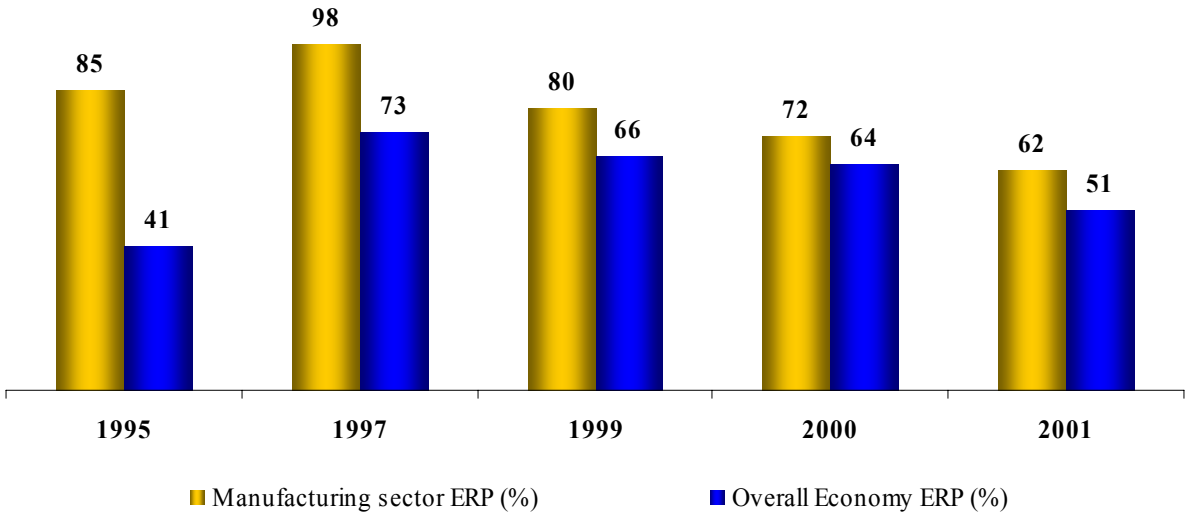
Graph 1: **Manufacturing Share in Total Employment and GDP**



Graph 2: **Labour Productivity Trends, 1990=100**



Graph 3: **Effective Rate of Protection in Tunisia**



Source: Institut d'Economie Quantitative, 2003

Table 3: **Size distribution of the Tunisian manufacturing firms, 2000**

	<10	[10;50[	[50;100[	[100;200[	[200;300[	[300;400[	[400;500[	+ 500	**Total**
Food Processing	58	93	36	26	9	5	1	6	234
Building Materials	28	142	37	31	10	5	2	8	263
Mechanical, Metal, Electrical, Electronics	10	51	13	18	4	5	1	5	107
Chemical Industries	18	76	28	17	5	0	0	1	145
Textiles, Clothing Leather and Shoes	37	154	166	147	52	17	11	15	599
Wood products and diverse Industries	23	90	29	19	4	2	3	1	171
Manufacturing sectors	**174**	**606**	**309**						

Graph 4: **Gini index of Tunisian manufacturing firm size distribution, 2000**

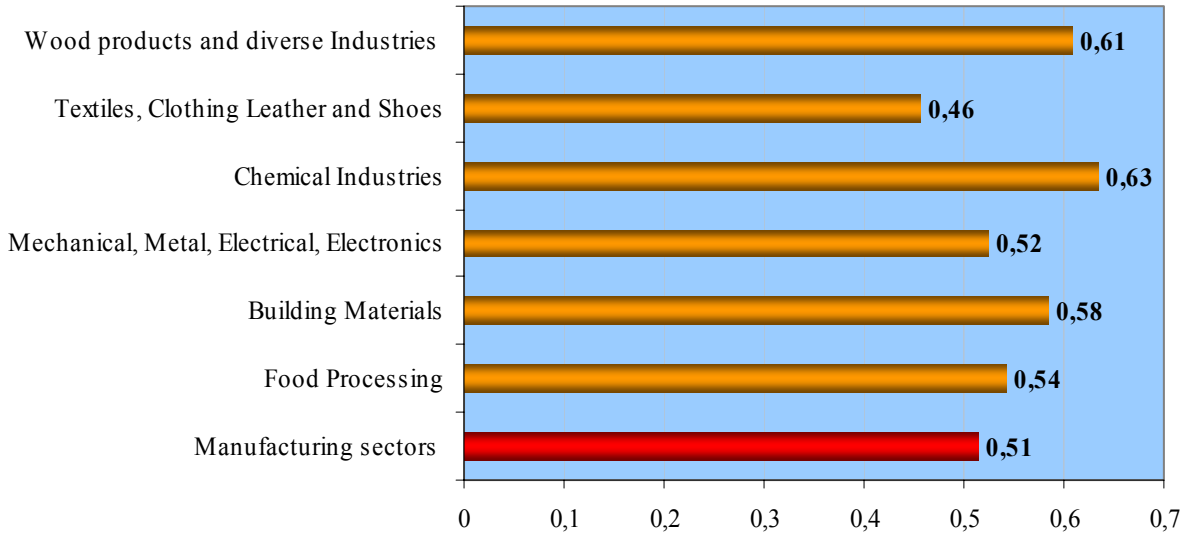


Table 4: **Share of Value Added Accounted for by the 4 and 8 Largest Companies in Tunisian Manufacturing Industries**

NAT Code	Industry	Share of value added (per cent) accounted for the					
		4 largest companies CR4			8 largest companies CR8		
		1997	1999	2001	1997	1999	2001
14	Extractive Industries	52,28	50,66	64,13	76,46	77,17	85,55
15	Food Industries	29,34	26,44	30,52	46,74	39,54	42,05
17	Textile Industries	41,23	43,37	40,56	49,09	53,63	52,42
18	Clothing and Lining Industries	9,86	11,01	12,81	16,48	16,42	18,24
19	Leather and Footwear Industries	19,88	30,54	36,01	33,93	43,49	46,47
20	Wood Products	69,06	54,86	66,34	86,59	77,38	87,27
21	Paper and Cardboard Industries	74,34	70,32	66,54	89,02	88,67	85,81
22	Printing and related support activities	61,51	67,96	70,61	79,56	85,05	83,24
24	Chemical Industries	77,50	76,88	66,73	84,47	86,27	76,70
25	Plastics material and rubber Industries	61,70	54,72	58,00	71,80	66,21	70,30
26	Mineral non metallic products	39,08	37,30	35,32	56,03	56,32	60,31
27	Metallurgy	91,62	83,75	84,84	95,73	95,60	92,87
28	Fabricated Metal Products	26,88	38,53	34,43	45,88	53,54	51,37
29	Machinery and Equipment	66,94	64,10	54,10	81,33	81,15	73,35
31	Electrical equipment	40,22	42,01	44,38	64,25	61,01	61,92
32	Radio and TV and other communications equipment	89,80	75,79	80,89	99,21	97,46	98,57
33	Measuring and medical instruments	98,92	97,55	92,81	100	100	100
34	Motor vehicle manufacturing	79,82	70,45	63,48	91,63	88,56	82,67
35	Other transportation equipment	87,93	96,45	95,40	98,26	100	100
36	Wood products and miscellaneous manufacturing	26,00	27,57	26,51	43,22	46,58	44,28

TABLE 5: **RELEVANCE OF PROFITABILITY APPRAISAL IN COMPETITION POLICY**

Context within competition analysis	Relevant question
Assessing market power or degree of competitiveness in a market	Are profits persistently in excess of the competitive benchmark?
Market definition	Are prices in excess of marginal costs?
Assessment of entry barriers	Are profits of the firms in the market persistently in excess of the competitive benchmark?
Excessive pricing	Are profits persistently in excess of the competitive benchmark?
Margin squeeze	Is the vertically integrated firm's downstream operation making excessively low profits?
Predation and cross-subsidy	Are profits excessively low or are prices below the relevant cost floor?
Coordinated effects in merger cases	Is pre-merger profitability in excess of the competitive benchmark; in which case the merger may lead to a further lessening of competition?
Failing-firm defence in merger cases	Is the acquired firm so unprofitable that it is likely to exit the market?
State aid	Is the state investment or grant making a normal market return such that a private investor would have made the same investment?
Quantification of damages and determination of fines	To what extent have the perpetrators profited from the infringement; and to what extent have the victims forgone profits?

Graph 5: **Mean Corporate Profit Rate (1984-1994)**

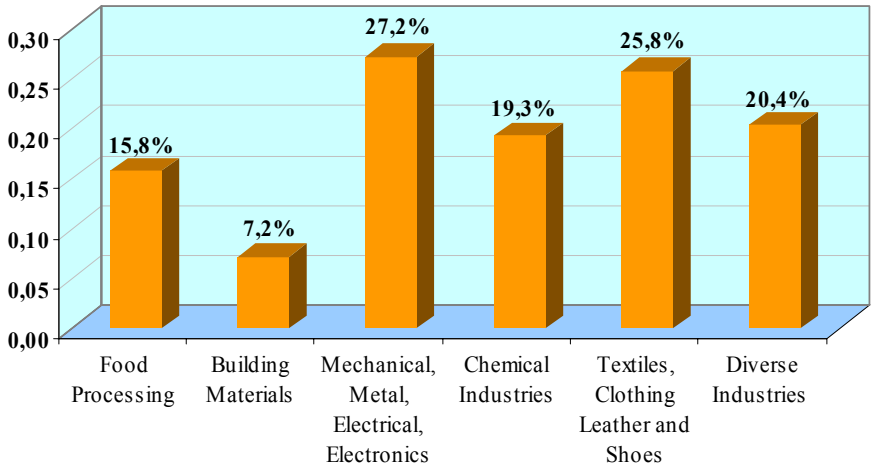


Table 6: **Results on the estimated ADF regressions, 1985-1994**

Firm N°	α	λ	St Error λ	ADFi	Adjust. R^2
1	-0,001912	-0,001642	0,377317	-2,654641	0,415342
2	-0,087089	0,352362	0,349747	-1,851733	0,137081
3	-0,125837	0,425689	0,346588	-1,657042	0,283121
4	-0,082104	0,420558	0,597822	-0,969256	-0,0112
5	-0,097583	0,305264	0,374921	-1,853017	0,156258
6	-0,058208	0,345964	0,253346	-2,581592	0,436117
7	-0,127484	-0,493293	0,350567	-4,259645	0,64349
8	0,038055	0,461776	0,344541	-1,562148	0,04825
9	-0,131918	0,201157	0,374494	-2,133127	0,221017
10	0,214065	-0,031854	0,376335	-2,741852	0,383479
11	-0,023569	0,120198	0,42324	-2,078732	0,243524
12	-0,163256	-0,490598	0,32532	-4,581944	0,685268
13	-0,185421	-0,09807	0,378498	-2,901128	0,416232
14	-0,055358	0,134849	0,494983	-1,747839	0,204979
15	-0,178209	0,080744	0,408026	-2,252933	0,335274
16	-0,049282	0,028946	0,412995	-2,351252	0,3202
17	0,065542	0,580871	0,403669	-1,038298	0,006322
18	-0,07902	-0,352162	0,336301	-4,020687	0,615502
19	-0,083879	0,223181	0,331382	-2,344176	0,286338
20	1,729051	0,629674	0,266844	-1,387801	0,161972
21	-0,233572	0,021485	0,398881	-2,453152	0,310003
22	0,096323	0,327842	0,462898	-1,452065	0,14767
23	-0,109902	0,035084	0,064793	-14,89233	0,97122
24	-0,082437	1,030754	0,871378	0,035293	0,116572
25	-0,116166	0,225573	0,273828	-2,828148	0,418155
26	-0,007477	0,05407	0,332245	-2,847086	0,451921
27	1,348606	-0,399445	0,345617	-4,049123	0,616328
28	-0,142214	0,309945	0,330845	-2,085733	0,3682

29	-1,812485	-0,212628	0,397325	-3,051982	0,450926
30	0,023243	0,509261	0,295114	-1,662879	0,085996
31	-0,050311	0,115449	0,245445	-3,603866	0,574613
32	0,086669	0,43034	0,313055	-1,819681	0,182498
33	0,053568	0,516312	0,264394	-1,829421	0,453826
34	-0,067462	0,453461	0,342982	-1,593494	0,057055
35	-0,087923	0,190382	0,29934	-2,70468	0,382465
36	0,09615	0,581597	0,299333	-1,397786	0,086681
37	0,05137	0,673732	0,344309	-0,947602	0,112943
38	-0,072036	0,216543	0,361924	-2,1647	0,232852
39	-0,075467	0,171496	0,370552	-2,235863	0,291551
40	-0,113684	0,424534	0,290161	-1,983262	0,205376
41	-0,138448	-0,094152	0,295213	-3,706311	0,610577
42	-0,158566	0,221492	0,394379	-1,974009	0,18004
43	-0,168903	0,189532	0,403988	-2,006169	0,199572
44	-0,057553	0,691534	0,408415	-0,755277	-0,090705
45	-0,119107	0,084373	0,375402	-2,439057	0,3154
46	-0,097657	0,482056	0,309248	-1,674851	0,128927
47	-0,117218	0,358874	0,39528	-1,621953	0,0738
48	-0,17899	0,209232	0,147403	-5,364685	0,801766
49	-0,216148	-0,539199	0,403171	-3,817734	0,592581
50	-0,02871	0,369984	0,352362	-1,787981	0,117621
51	-0,110142	0,278932	0,365143	-1,974754	0,174329
52	0,057493	-0,426385	0,269649	-5,289773	0,748675
53	0,457161	-0,162471	0,36797	-3,159148	0,472025
54	-0,108206	-0,139225	0,368011	-3,095626	0,476997
55	0,965704	9,413676	3,208378	2,622408	0,554244
56	-0,053847	0,090492	0,286015	-3,179936	0,551955
57	0,829262	0,248281	0,386521	-1,944834	0,194846
58	-0,080896	0,399473	0,383651	-1,565293	0,063191
59	-0,077862	0,190693	0,329028	-2,459693	0,31434
60	0,066459	-0,257377	0,438918	-2,864718	0,468439
61	-0,134928	-0,255058	0,405099	-3,09815	0,492152
62	-0,113607	0,539552	0,237384	-1,939672	0,257361
63	-0,112735	0,240716	0,388609	-1,953853	0,285071
64	0,025396	0,416095	0,218656	-2,670429	0,45273
65	0,207732	0,003765	0,391863	-2,542302	0,332537
66	0,497197	0,225573	0,26655	-2,90537	0,462094
67	-0,129212	0,285081	0,325923	-2,193524	0,254864
68	0,01917	0,056324	0,277688	-3,398331	0,637033
69	-0,169474	0,265924	0,281258	-2,609979	0,378631
70	-0,187132	-0,344123	0,352324	-3,815019	0,582481
Mean	**-0,002**	**0,308**	**-**	**-2,539**	**0,337**
St error	***0,396***	***1,139***	**-**	***1,884***	***0,213***