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Competition, Efficiency and Competition Policy in Tunisia



Country Report

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Executive Summary

Tunisian manufacturing sector plays an important role in the Tunisian economy. It contributes significantly to the Gross Domestic Product, employment, gross fixed capital formation, merchandise exports, and the use of advanced technologies. Accordingly, it has been called upon to play a key role in the transformation and development of the Tunisian economy since the launching of market oriented reforms.

The main purpose of this report is to investigate the degree of competition, to assess the performance of the manufacturing sector and to examine the relationship between this performance, the competition environment and competition policy in Tunisia during the period 1972 to 2002.

The report has four parts. Part one presents some general considerations regarding competition, trade in emerging economies and Tunisian background. The analysis presented in Part two attempts to explain the state of competition in Tunisian manufacturing sectors. It also presents results of the Survey on Competitive Environment of Firms in the Formal Manufacturing Sector. Part three examines the state of competition policy by addressing three aspects: competition policy provisions, competition policy implementation and a normative evaluation of the existing competition policy. Part four attempts to evaluate empirically the economic performance and to examine the dynamics of the competition process in manufacturing sectors in Tunisia.

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. That is the broad message of this report on the basis of analysis and evidence from Tunisian manufacturing sector.

Indeed, despite shortcomings in corporate governance, Tunisia seems to have relatively vivacious product markets and display as much intensity of competition as that observed in advanced countries. The average Tunisian manufacturing concentration ratio (CR4) is without doubt relatively high (56.2 per cent in 2001), but the econometric investigation indicates the presence of an aggregate moderate markups in the range of 20-21 percent, more in line with micro-economic evidence suggesting low profit margins in most manufacturing industries. This result is not surprising given the high import penetration observed in mainstream manufacturing

sectors, although the econometric analysis doesn't give support to import-discipline hypothesis.

Empirical investigation of competition process dynamics in manufacturing sectors in Tunisia, using the common methodology of "*Persistency of Profitability*", for a sample subset of the 100 largest listed manufacturing corporations in terms of value added at factors costs, validates the absence of 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.

The need for competition law in Tunisia was based primarily on two factors. First, the economic environment has been undergoing substantial transformation following the structural reforms initiated in 1986. Government controls on industry have been reduced, licensing and other restrictions on firms have been removed and the government has been moving out from non-essential commercial arenas. Lowering of barriers to external trade, generally, increased the scope of competition in the economy. Second, parallel to domestic reforms, the global economy has been undergoing wide ranging changes, resulting in far greater integration of markets and economies. An important element of the changing global environment was the signing of the WTO agreements. This need seems to be legitimate given the importance of respondents' percentage (82.5%) indicating the presence of entry (perceived) barriers.

One important issue that needs to be addressed concerns the presence of a sizeable informal sector. In this context, two related concerns can be made out: first of all, some see competition law as inflicting an extra unfair burden on the operators in the formal part of the economy while these operators are already competing with difficulty against the informal sector not subject to these rules. Secondly, there is a fear that competition law might be misused by the enforcers.

It might be worthwhile to research better why and how this informal sector tends to grow in the considered economy. It is quite possible that the informal sector develops not least due to the fact that there are too many restrictive regulations in the formal sector that prevent the entry of new comers. Another motive for the activity of the informal sector might be that firms with significant market power restrict their own output and impede entry to preserve their profits by means of anti-competitive practices. Consequently, there are compelling reasons for implementing a competition law and policy as a means of enlarging economic opportunities in the formal sector. It is also important to ensure that financial and capital markets, including the banking sector, operate along market principles.

Moreover, an argument can be made which puts into perspective the fear of some that competition law will add excessive or insupportable burden on firms in the formal sector that are already at a disadvantage compared to their competitors in the informal sector. It is clear that the benefits that may be expected from competition will depend to a large extent on the quality of the legal environment of business transactions.

Importance of manufacturing sectors in the economy and its evolution

1. 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 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.
2. 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.
3. 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 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.
4. 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. This fact seems to be correlated to the relative decline in the accumulation rate and in the share of manufacturing stock of capital.

5. The effective rate of protection (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 adherence to GATT in 1989, and consequently to its commitments to transform all forms of non-tariff protection into tariff equivalent.
6. In terms of value added, the food processing and textile, clothing, leather and shoes sectors predominate, accounting jointly for more than half of manufacturing value added. Clothing, leather and shoes sector makes significant contributions to manufacturing real value added growth rate, particularly during the 1990s. Moreover, this sector contributes to more than 50 per cent to manufacturing employment.
7. The manufacturing sector as a whole accounts for more than 86 per cent of goods exports in Tunisia. The importance of exporting varies across sub-sectors. At the end of the period 1984-2002, the majority of manufacturing exports were from the textiles, clothing, leather and shoes sector, which contributes to 54 per cent to manufacturing exports and exports 71 per cent of its output.

Foreign competition and its evolution

8. Net trade performance (NTP) is a useful measure in terms of summarising the key features of the trade data. NTP combines export and import flows for an industry into an index as follows: $(X - M) / (X + M)$. So, NTP will be +1 for an industry which exports but has no imports, and -1 for an importer with no exports. Between these limits the index is a convenient measure of the trade balance of each industry. A total of 26 manufacturing industries improved their net trade performance over the period and only 3 industries experienced a decline. In 2002 thirty two industries had positive trade balances, compared with 16 in 1983. The industries which have done best (NTP superior to +0,5) over the period 1983-2002 include: pasta and cousous; olive oil; canned vegetables and fruits, canned fish; wine; fertilizers; carpet; apparel; others leather and plastic products; and footwear.
9. Very high import penetration concerns mainly Mechanical, Metal, Electrical and Electronics sector, Chemical industries and Textiles, Clothing Leather and Shoes.
10. Over the period 1983-2002 Textiles, clothing leather and shoes had the highest exposure to international competition with an average index value (Export Ratio + (1 - Export Ratio)*Import Penetration) of 81,6 percent, followed by the

Mechanical, metal, electrical and electronics sector with an index value of 74,3 percent, and the Chemical Industries with an index value of 64,7 percent.

Specialization and its evolution

11. Over the period 1972-2000, the measure of the degree of inequality in the distribution of the value added (employment) varied between 50 per cent (50 per cent) and 64 percent (62 per cent). It decreased during the 1970s, increased from 1980, and stabilized around 58 per cent in 1990s. In terms of employment distribution, the end of the period is characterized by a significant increase of the inequality (around 61 per cent).

Firm size

12. Apart from a few dozen enterprises employing more than 500 workers and belonging mostly to the public sector and the financial sector, the majority of Tunisian firms are very small private units. Out of about 87,000 formal sector firms in 1996, only 1,400 employ more than 100 workers. In the industrial sector, firms with fewer than 20 employees account for almost 60 percent of all active private companies, and companies with fewer than 250 employees account for more than 94 percent of all companies.
13. 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). 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 and an important propensity to export.

Market concentration and Markup

14. 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).

15. Econometric results reveal the presence of an aggregate plausible and moderate markup for the manufacturing sector from 1984 through 2002. The distinction between the estimation methods appears to make relatively little difference to the implied markup in Tunisian manufacturing. The aggregate markup defined over gross output is in the range of 20-21 percent and the sectoral markups are in the range of 17-36 percent: 17 per cent in Textiles, Clothing and Leather Goods sector, 17,6 per cent in Chemical and Rubber sector, 17,8 per cent in Mechanical and Electrical Goods sector, 19,3 per cent in Food Processing sector, 24,7 per cent in Woodwork, Paper and Diverse sector and 36 per cent in Construction Materials and Glass sector.
16. The magnitude of the impact of import penetration both within industries and across the manufacturing sector is very weak. Indeed, increasing within and between industry import penetration ratio from its mean value of 10 per cent will lead an estimated implied markup of 1,21 to rise to 1,216, corresponding to an increase of 0,495 per cent.

Survey on Competitive Environment

17. The Survey on Competitive Environment of Firms in the Formal Manufacturing Sector had attracted effective participation of 40 companies (on 100). This had contributed to 40% of the total response rate: 35% of the respondents were from the export-oriented industries and 65% were from the domestic-oriented industries. The export-oriented industries covered the following sub-sectors namely Canned Fish, Miscellaneous Electrical Equipment, Base Chemical Products and Textile Spinning.
18. The dominant question in this section is whether respondents perceived major entry barriers in their industry. An important percentage of the respondents (82.5%) indicated the presence of entry barriers. Respondents are also asked to identify one or more types of entry barriers. Three factors were prominent; all of them concern the limited access to essential resources: financial resources (57.6%), qualified human resources (54.6%) and technological knowledge (51.5%). Financial resources restrictions were raised particularly by respondents belonging to Food processing (71.4%) and Miscellaneous industries (83.3%), while limited access to technological knowledge was more cited by respondents from Mechanical, Metal and Electrical (75%) and Chemical industries (80%);

limited access to qualified human resources was considered as the most dominant restriction in Textiles, clothing, leather and shoes industries (60%).

19. 10.8% of respondents have a supplier in position of monopoly in his market, 37.8% indicated that they are only few suppliers in his market and 51.4% stated that numerous suppliers are present in his market. Table 21 summarizes firm's perception of different vertical restraints in his market, whether the contract is explicit or implicit and how the specific practice affects firm profit

Competition Policy

20. To back up institutional reforms and to encourage the emergence of a competitive environment, a series of global and sectoral instruments have been promulgated in Tunisia, the most significant of which is the Competition and Prices Act No. 91-64 of 29 July 1991, which has been amended by Act No. 93-83 of 26 July 1993, by Act No. 95-42 of 24 April 1995, by Act No. 99-41 of 10 May 1999 and more recently by Act No. 74-2003 of 11 November 2003. The Act, establishing the principles of competition and prices policy, is divided into several parts and chapters on the various aspects of this policy.
21. The Competition Council (*Conseil de la Concurrence*), created pursuant to Act No. 95-42 of 24 April 1995, replaced the Competition Board (*Commission de la Concurrence*). The Council is empowered to perform two functions: a decision-making function and an advisory function
22. Tunisian Competition Authority is an Independent-Administrative Authority. Its independence is ensured by articles 9 and 15 of the Competition Act.
23. When speaking of the competition policy in Tunisia, one cannot but linger a little on the role played by the Minister in charge of trade who represents a key actor in the implementation of this policy and in its conduct.
24. The number of legal cases presented to the Council during the period 1992-2002, did not exceed 48, that is an average of 4.3 case per year and of 2.5 if we do not take into account the years 1993, 1999 and 2002 where the cases brought before the Council were respectively 9, 11 and 8 cases. The Council explains the relatively modest resorting to its competences by the various parties, by the transition of the Tunisian economy and a competition culture not deeply taken in by the operators.
25. The parties which have the most referred cases to the Council are respectively the economic enterprises which referred 39 cases to it, i.e. 81.2% of the total, and the

Minister in charge of trade 5 cases, i.e. 10.4%. It should be mentioned that the years 2001 and 2002 are characterised by two cases initiated by the Council itself. Out of the 48 petitions that were presented to the Council during this period, the Council has considered that 26 among them do not fall within its scope because almost all of them correspond to what it considers as cases pertaining to unfair competition and not to anticompetitive actions and that 5 were not, in essence, admissible.

26. As to consultative activity, the opinions issued by the Council relative to draft legislation and regulatory literature and specifications accounted for more than half of all the opinions issued over the period; 8 decisions concerned the concentration and mergers case and one opinion is about exclusive agreements.

Efficiency and dynamics of the competition process

27. We estimate time varying technical efficiency across Tunisian manufacturing firms using a stochastic frontier model. The advantage of this methodology is that it considers both inefficiency and random disturbances as reasons why production is not at the technological frontier. Another advantage of stochastic frontier models is that they allow for panel data estimation so as to not only measure efficiency differences across firms but also over time. The average technical efficiency is quite high; it ranges from 0.62 to 0.96.
28. The mean technical efficiency is high for firms belonging to Food Processing and Mechanical and Electrical Goods sectors. The results reveal also a steady decline in technical efficiency since 1991, which concerns all manufacturing firms, and principally firms belonging to Textiles, Clothing and Leather Goods and Woodwork, Paper and Diverse sectors.
29. Econometric results regarding the determinants of efficiency reveal that efficiency (inefficiency) of manufacturing firms increases (decreases) with the prevalence of foreign participation. The same goes for the effect of training rate variable which is highly significant contributor to technical efficiency. Given the absence of data on employees schooling, this variable can be considered as a proxy of human capital in each firm. There is also some evidence, showing that state participation is not conducive to technical inefficiency. Furthermore, the result shows small and medium firm size, likewise age of capital, appears to have a negative and significant influence on technical efficiency.
30. The average total factor productivity growth for the period 1985-94 has been positive and sluggish across all the industries (mean TFP rate of growth of 0.51

per cent). A comparison of TFP growth over time shows that it improved significantly in the sub-period 1990-1992, for all industries. The end of the period is marked by a decline in TFP growth rate, particularly in the industry groups like textiles, clothing and leather goods, and Woodwork, paper and diverse.

31. 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. Persistence in Tunisian manufacturing sectors is investigated here using a data set consisting of annual observations 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. The panel structure of the data set allows us to infer that profitability data is stationary.
32. Econometric 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 and estimated mean value of long-run profitability is statistically close to zero. A competition-based interpretation is also compatible with the conclusions of a recent review article, 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.

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Introduction

Strange as it may seem, in the light of market-oriented reforms which many MENA developing 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 (SCP) paradigm. However, to our knowledge, there is relatively limited empirical detailed evidence on manufacturing degree of competition within the area constituted by the MENA countries in general and Maghreb countries (Tunisia and Morocco) in particular.

In the absence of hard evidence, it is not surprising that there is considerable disagreement amongst economists speculating about the degree of competition in developing countries.

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 competitive¹. The advocates of the structuralist theory of the Asian financial crisis of 1997–1998 believe that the crisis-affected Asian countries, including the Republic of Korea, suffered from poor competitive environments that resulted in over-investment. Michael Porter (1990), on the other hand, suggests that the Republic of Korea *Chaebol* (large conglomerates) display highly competitive behaviour, and in the areas where the Republic of Korea has been internationally successful, these companies have been subject to intense national and international competition².

This report aims at filling this gap by investigating the degree of competition in the Tunisian manufacturing sector. This sector plays an important role in the Tunisian economy. It contributes significantly to the Gross Domestic Product, employment, gross fixed capital formation, merchandise exports, and the use of advanced technologies. Accordingly, it has been called upon to play a key role in the

¹Laffont, J.-J. , 1998. "Competition, Information, and Development", Annual World Bank Conference on Development Economics, 1998, pp.237-257.

² Porter, M. 1990. *The Competitive Advantage of Nations*, London; Macmillan Press

transformation and development of the Tunisian economy since the launching of market oriented reforms.

The main purpose of this report is to assess the performance of the manufacturing sector and to examine the relationship between this performance, the competition environment and competition policy in Tunisia during the period 1972 to 2002.

The study is divided into four parts. **Part One** presents some general considerations regarding competition, trade in emerging economies and Tunisian background. The analysis presented in **Part Two** attempts to explain the state of competition in Tunisian manufacturing sectors. It also presents results of the Survey on Competitive Environment of Firms in the Formal Manufacturing Sector. **Part Three** examines the state of competition policy by addressing three aspects: competition policy provisions, competition policy implementation and a normative evaluation of the existing competition policy. **Part Four** attempts to evaluate empirically the economic performance and to examine the **dynamics** of the competition process in manufacturing sectors in Tunisia.

Part 1: General Considerations and Tunisian Background

I. General considerations

1.1. Competition, trade and emerging economies

For almost half a century, the interface between trade and competition policies has received considerable attention from policy-makers, practitioners, and academics. The point of connection between these policies is that it is widely believed that free trade among nations does not only require the removal of public barriers to trade, as quotas and custom duties but also a series of obstacles originating in private restraints, such as abuse of dominance, import cartels, and vertical restraints. Competition policy would thus be a necessary complement to trade policy.

The importance of competition policy as a tool to promote market integration has long been understood in the EC. More recently, competition rules have been inserted in a series of regional or bilateral trade agreements concluded by the EC, such as the association agreements concluded by the EC with a variety of third countries. A similar approach can also be found in agreements concluded in other parts of the world³.

The relationship between trade and competition policies is also a major issue at the WTO level. Since the beginning of the 1990s, the EC has pressed its trading partners for the adoption of a competition law framework in the context of the WTO. The recent Doha Ministerial Declaration represented another major step as it provided that negotiations over competition would take place after the first WTO Ministerial Meeting based on modalities to be decided at the time.

As part of good governance and institution building, an increasing number of developing and least developed countries have adopted competition policies at national level, as part of a coherent set of policies to create comparative advantage and internationally competitive industries⁴. For instance, 5 of the 12 Mediterranean Partners⁵ have until now adopted a competition law (see Table below) and the development of such regimes remains a controversial matter.

³ For example, the Protocol for the Defence of Competition in MERCOSUR contains an ambitious agenda whereby member countries are called to harmonize their domestic competition laws and institutions are created to prevent anti-competitive behaviours that affect trade among the member countries.

⁴ Most developing countries have, until recently, operated without a formal competition policy. Until 1990 only 16 developing countries had a formal competition policy. With encouragement and technical assistance from international financial institutions and the WTO, 50 countries have completed legislation for competition laws in the 1990s, and another 27 are in the process of doing so. It should, however, be borne in mind that it takes about 10 years for countries to acquire the necessary expertise and experience to implement such laws effectively.

⁵ The 12 Mediterranean Partners are Cyprus, Malta, Turkey, Morocco, Algeria, Tunisia, Egypt, Jordan, Israel, Lebanon, Syria, and West Bank and Gaza.

Indeed, on the one hand, many authors argue that adoption of competition law regimes will be beneficial for emerging economies:

1. First, it is argued that the existence of a competition policy was a factor contributing to economic development. Michael Porter, for example, identifies a clear connection “*between domestic rivalry and the creation and persistence of competitive advantage in an industry*” (Porter, 1990). A strong competition policy would thus be essential to the upgrading of an economy.
2. Second, it is argued that developing countries are particularly vulnerable to international cartels involving firms based in the developed world (Levenstein and Suslow, 2001)⁶. The vulnerability of such countries would be in great linked to their inability to identify and prosecute such practices effectively. It is thus claimed by some that the best way for these countries to protect themselves against such practices is to adopt effective competition law regimes and institutions (Anderson and Holmes, 2002)⁷.
3. Third, some authors argue that one of the benefits of creating effective competition law institutions in emerging economies is that such institutions could engage in competition support (Kovacic, 1997)⁸. For example, they could promote competition by making the case for removal of regulatory or other restrictions so as to allow entry in certain sectors of the economy, which have been traditionally secluded from competition.

On the other hand, arguments are sometimes raised that emerging economies do not need a competition law framework:

1. First, it is sometimes argued that free trade would be by itself sufficient to protect the competitive process. It is certainly true that opening borders contributes to discipline firms, as imported products will compete with the local products. This argument, however, does not take into account the fact that there are non-tradable products and services, the providers of which will not be disciplined by import competition.
2. Second, it is also sometimes argued that adoption of competition rules may be counterproductive in small economies. Application of such rules might,

⁶ Levenstein, Margaret and Suslow, Valerie, 2001, “Private International Cartels and Their Effect on Developing Countries,” background paper for the World Bank’s Development Report 2001, 9 January.

⁷ Anderson, Robert D. and Holmes, Peter (2002) “Competition Policy and the Future of the Multilateral Trading System,” *Journal of International Economic Law*, 5: 531.

⁸ Kovacic, William E. (1997) “Getting Started: Creating New Competition Policy Institutions in Transition Economies,” *Brooklyn Journal of International Law*, 23: 403.

for instance, prevent some mergers necessary to help domestic players to gain the size necessary to be competitive on regional or international markets. However, this does not mean that no competition law should be adopted in such countries. It rather means that small economies need a competition policy that takes into account the specific market circumstances of these countries. For instance, Gal argues that “small economies need a specially tailored competition policy, because they face different welfare maximization issues than large ones” (Gal, 2001)⁹. More specifically, she claims that, given the importance of allowing producers in these countries to realize economies of scale, competition policy should exclusively focus on the promotion of economic efficiency, which should be given primacy over other goals sometimes promoted by competition regimes, such as the dispersion of economic power and the protection of small businesses.

3. Finally, some observers make the argument that competition policy would be a luxury for rich countries and that developing and transition economies have other, more pressing priorities. It is true that adoption and implementation of a competition policy might not be the most pressing reform for a country that has engaged on the path of a market economy.

⁹ Gal, Michal S. (2001) “Size Does Matter: The Effects of Market Size on Optimal Competition Policy,” *Southern California Law Review*, 74: 1437-1451.

Table 1: **Competition Laws in MEDA Countries**

COUNTRY	COMPETITION LEGISLATION	YEAR	ENFORCING BODY
ALGERIA	Competition Law	1995	Direction de la Concurrence
CYPRUS	Competition Law	1989	Ministry of Commerce and Industry
EGYPT	Draft Competition Law	-	-
ISRAEL	Trade Restrictions Law	1988	Antitrust Authority
JORDAN	Draft Competition Law	1998	-
	Law of unethical competition and commercial secrecy	2000	-
LEBANON	Draft Competition Law	-	-
LIBYA	-	-	-
MALTA	Competition Act	1994	Office for Fair Competition
MOROCCO	Competition Law	1999	Competition Council
PALESTINIAN AUTHORITY	-	-	-
SYRIA	-	-	-
TUNISIA	Competition Law	1991	Direction Générale de la Concurrence et du Commerce Intérieur
TURKEY	Competition Law	1994	Rekabet Kurumu Baskanligi (Turkish Competition Authority)

1.2. What kind of competition policy for emerging and developing countries

While there is growing consensus that competition laws and policies are necessary for sound economic development, there is still disagreement on how to achieve this objective. Key concerns which have been raised by developing countries considering adopting a competition law or strengthening competition in their economies referred to whether such a law is necessary given trade liberalisation, whether it would damage international competitiveness, and whether increased competition would raise unemployment or cause other social problems.

Several objections about competition policy objectives have been raised. In particular, concerns have been voiced about the constraining effects of competition policy on other development strategies and major debates have addressed the **potential conflict between competition policy**, on the one hand, and **strategic trade and industrial policies**, on the other. Strategic trade policy makes a

compelling argument in favour of temporary protection suggesting that development requires modern technology, which must be acquired and cultivated, and that learning by doing must occur within national borders and sheltered from import competition. Examples of successful industrial policies are found in past and recent history, particularly in East Asia. For such policies to succeed, governments must be able to identify strategically important industries and some firms that can act as national leaders once the learning-by-doing phase has been carried out under appropriate funding and protection. However, despite a number a success stories, no systematic positive relationship has been found between firm size and profit, export activity, or research and development, and an equally large number of notorious failures of industrial policy can be cited.

It is therefore not surprising that conflicting views on the relevance and the content of competition policy in developing countries still coexist.

On the basis of the modern theory of industrial organisation, as well as the history of competition policy in developed countries, Singh and Dhumale (1999)¹⁰ suggested that development-friendly competition policies need to have different objectives from those normally posited for advanced economies. Further, such policies also need to be specific to the stage of a country's economic and industrial development as well as its institutional and governance capacities. This analysis suggested the following concepts to address the developmental dimensions of competition policy:

- the need to emphasise **dynamic** rather than static **efficiency** as **the main purpose of competition policy** from the perspective of economic development;
- the concept of **optimal degree of competition** (as opposed to maximum or perfect competition) to promote long term growth of productivity;
- the related concept of **optimal combination of competition and co-operation** to achieve fast long term economic growth;
- the critical significance of maintaining the **private sector's propensity to invest at high levels** and hence the need for a steady growth of profits; the latter in turn may necessitate government co-ordination of investment decisions so as to prevent over-capacity and falling profits;

¹⁰ Singh, A. and R. Dhumale. 1999. "Competition Policy, Development and Developing Countries", T.R.A.D.E. Working Papers, November, Geneva: South Centre. (available at www.southcentre.org/publications/index.htm).

- the concept of **simulated competition**, i.e., contests, for state support which can be as powerful as real market competition;
- the **crucial importance of industrial policy** to achieve the structural changes required for economic development; this in turn requires **coherence between industrial and competition policies**.

II. The Tunisian Background

II.1. Global Performance

Significant structural changes in the Tunisian economy have taken place since the early 1970s. Between 1970 and 2002, the Tunisian economy grew at an average rate of 5 per cent, quite a reasonable rate by lower middle-income country and regional standards. Today, with a per capita GDP of about \$2,200, Tunisians have more than two-and a-half times the real income their parents had 30 years ago, and all indicators of their social and economic wellbeing have improved significantly.

Agriculture's share of the GDP declined steadily from about 28 percent in 1960 to 10 percent in 2002¹¹. At the same time, the manufacturing sector expanded very rapidly, increasing its portion of the gross domestic product from less than 8 percent in 1960 to 19 percent in 2002.

Tunisia is experiencing a relatively high degree of price stability with inflation levels well below 5% since the second half of the 1990's (2.7 percent in 2002) and a sustainable overall deficit, stood at 2 percent of GDP in 2002. The Tunisian monetary policy framework has remained broadly unchanged in recent years, but a revision of the current strategy has been ongoing. Targeting growth of broad money still represents the core of the monetary policy framework.

Regarding external situation, recent developments point to a further improvement of the trade and current account balance in 2003 on the back of a strong export performance. Greater exchange rate flexibility and the appreciation of the euro have led to depreciation of the Dinar in real effective terms. This flexibility has contributed to improve Tunisia's competitiveness and to strengthen its external position despite weak demand from the EU. These combined evolutions appear to have reduced the current account deficit to 3.6 per cent of GDP and the trade deficit to 10 percent of GDP in 2002.

¹¹ However, the impact of fluctuations of agricultural production on overall GDP remains relatively important particularly during years of agricultural contractions.

In 2002, export and import transactions, together, account for about 94 per cent of the gross national product. Moreover, a high degree of diversification took place, enabling Tunisia to boost its export items from a few numbers of commodities in the early 1960s to a wide range of products in 2002. Indeed, the share of the first three commodities in the total exports of goods and services decreased significantly from 37 per cent in the early 1980s to less than 20 per cent in 2002.

Tunisia is a major exporter of consumer goods and a major importer of intermediate products which it processes into finished products for export. It is also dependent on the outside world for capital goods (27.9 percent of total imports). Although energy is of relatively minor importance in Tunisia's foreign trade (9 percent of imports and exports), the negative balance of trade in these products is highly sensitive to international price trends. The food balance is negative while imports of consumer goods are high (6.3 percent of GDP in 2001, equivalent to 10.3 percent of private consumption).

Tunisia is also the most advanced of the Euro-Med partners as far as the introduction of a free trade area with the European Union is concerned. It started dismantling tariffs in 1996, before the entry into force of the EU-Tunisia Association Agreement in 1998. Tariff dismantling has seen a speeding up of the country's integration into the European market.

The market for the product remains generally dominated by EU countries (80 per cent of the Tunisian trading in 2002), and particularly by three EU countries (France, Italy and Germany monopolize more than 60 per cent of the Tunisian trading). Consequently, Tunisia's business cycle has shown a weak link with business cycles in these EU trading partners.

In terms of regulatory framework, market forces determine most prices in the Tunisian economy, as stated in the relevant legal base (July 1991 Competition and Prices Act). According to the Ministry of Development and International Cooperation, the free interplay of supply and demand determines approximately 87% of prices at the production level and around 81% at the distribution level. Nevertheless, administrative controls remain on many consumer products in particular and account for a large percentage of the typical basket of goods. The relevant legislation in the field of anti-trust is the Competition Law of 1991 (last amended in 2003) which takes its inspiration from French law

In the area of technical regulations and standards for industrial products, the Tunisian system of standards operates on the basis of a clear conceptual distinction between approved standards (compulsory for all) and other standards (non-

compulsory). The Ministry of Industry and Energy has overall responsibility for standardisation policy and supervision. Draft standards are prepared by technical committees under the auspices of the INNORPI, the national institute for standardisation and industrial property, which is a member of the International Standardisation Organisation (ISO).

II.2. Manufacturing Sector General Characteristics

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.

The following observations can be made about general characteristics of the manufacturing sector in Tunisia:

- The structure of manufacturing output deviated from the concentration on consumer goods (food processing) to give more weight to textiles, clothing and leather goods, which belong to an export-oriented industry. Table 2 illustrates this shift.

Table 2: **Structure of manufacturing value added, 1972-2002** (per cent)

	1972-1979	1980-1989	1990-1999	2000	2001	2002
Food processing	36	26	19	19	17	17
Construction materials and glass	8	12	11	9	9	9
Mechanical and electrical goods	14	15	14	14	15	15
Chemical and rubber	10	9	10	11	11	11
Textiles, clothing and leather goods	20	24	34	35	36	36
Woodwork, paper and diverse	11	12	13	13	13	13
Total	100	100	100	100	100	100

Source: Institut National de la Statistique.

Part of this shift resulted from a widespread concern in the late 1970s over limited demand in the domestic market. Also conducive circumstances in the world market at that time called for a shift in policies from producing for domestic markets to producing for export.

- The manufacturing activities that experienced the highest rates of growth (at constant prices) were those related to chemicals and rubber, construction materials and glass, woodwork, paper and diverse, and textiles, clothing and leather goods. Table 3 illustrates this evolution.

Table 3: **VA Real Growth Rate of different groups of industries 1973-1999** (per cent)

	1973-1979	1980-1989	1990-1999	2000-2002
Food processing	0.3	3.0	3.8	1.7
Construction materials and glass	16.6	9.6	3.8	5.4
Mechanical and electrical goods	9.9	8.8	4.7	8.0
Chemical and rubber	8.4	19.0	6.4	3.7
Textiles, clothing and leather goods	10.0	6.1	7.4	6.2
Woodwork, paper and diverse	12.1	8.8	6.2	5.4
Total	5.7	6.8	5.5	5.1

Source: *Institut National de la Statistique.*

- Table 4 shows private firm contribution to manufacturing value added. In 2002, this contribution amounted to about 96 per cent. It reached 100 per cent in textiles, almost 100 per cent in food processing and 95 percent in mechanical and electrical goods. During the period 1990-2002, the private manufacturing sector achieved high growth rate (about 13 per cent in average), mainly in construction materials and glass (about 16 percent), textiles and chemical and rubber (14 per cent).

Table 4: **Private firm contribution to value added** (per cent)

	1983-1989	1990-1999	2000	2001	2002
Manufacturing sector	71.7	80.4	89.1	89.5	96.0
Food processing	75.2	76.9	78.7	78.4	99.8
Construction materials and glass	42.3	54.4	85.9	86.1	85.7
Mechanical and electrical goods	67.3	80.4	96.2	94.6	94.8
Chemical and rubber	40.9	47.7	58.4	58.7	58.3
Textiles, clothing and leather goods	88.4	96.1	100	100	100
Woodwork, paper and diverse	88.2	89.1	95.6	96.0	100

Source: *Institut National de la Statistique.*

- Apart from a few dozen enterprises that can be considered as large (employing more than 500 workers) and belonging mostly to the public sector and the financial sector, the majority of Tunisian firms are very small private units. Out of about 87,000 formal sector firms in 1996, only 1,400 employ more than 100 workers. In the industrial sector, firms with fewer than 20 employees account for almost 60 percent of all active private companies, and companies with fewer than 250 employees account for more than 94 percent of all companies. In addition and for the same year, about 45 percent of manufacturing enterprises have a sales volume below 1/2 million Tunisian Dinar (approximately 0,4 million US\$), and 77 percent below 2 million Tunisian Dinar (approximately 1,6 US\$).

Table 5 provides evidence, taken from the directory of enterprises of the National Statistics Institute, about the prevalence of small enterprises in Tunisian manufacturing sectors in 2000. Indeed, small, medium and large firms constitute 52.5, 36.7 and 10.8 per cent, respectively, of the firms present in the directory. The size distribution varies by sector: firms in chemical and rubber, Woodwork, paper and diverse, and food processing sectors tend to be smaller; firms in the textile sectors are larger.

Table 5: Size* distribution of Tunisian Manufacturing enterprises
(per cent), 2000.

	Small	Medium	Large	Total
Food processing	66.1	25.8	8.1	100
Construction materials and glass	55.1	34.8	10.1	100
Mechanical and electrical goods	63.9	26.0	10.1	100
Chemical and rubber	69.4	27.1	3.5	100
Textiles, clothing and leather goods	33.6	51.5	14.9	100
Woodwork, paper and diverse	68.4	26.3	5.3	100
Manufacturing sectors	52.5	36.7	10.8	100

*Large firms are those having more than 200 permanent workers. Small firms are those having less than 20 permanent workers. Firms that are neither larger nor small are defined as medium size.

Source: Agence de Promotion de l'Industrie (API, 2000).

The limited size of firms is due to two main factors: family ownership and the highly protectionist policies that have lasted over more than three decades. Tunisian entrepreneurs have so far been very reticent to opening ownership outside family ties. Given limited financial resources, this attitude has restricted their choice of investment to small projects. The existence of high barriers to entry of imports has made many of such projects artificially profitable.

- Between other firm characteristics, the ownership structure and the legal status may be particularly relevant to evaluate economic performances. Table 6 illustrates the legal status of Tunisian manufacturing firms.

Table 6: **Legal Status of Tunisian manufacturing enterprises** (per cent), **2000**

	Uni- corporated	Corporation	Limited liability enterprises	Cooperative or SNC	Total
Food processing	31.4	20.8	39.8	8.1	100
Construction materials and glass	36.0	15.7	48.3	0.0	100
Mechanical and electrical goods	14.9	32.8	51.3	0.9	100
Chemical and rubber	8.2	42.4	47.1	2.4	100
Textiles, clothing and leather goods	8.1	15.4	75.5	1.0	100
Woodwork, paper and diverse	23.7	25.7	47.4	3.3	100
Manufacturing sectors	17.6	22.4	57.8	2.2	100

Source: *Agence de Promotion de l'Industrie (API, 2000)*.

In terms of legal status, 57.8 per cent of manufacturing firms are limited liability companies (SARL in French) and 22.4 per cent are corporations (SA in French); 17.6 per cent are unincorporated, and 2.2 per cent of firms have another legal status (cooperative or SNC in French). As could be expected, large firms are more likely to have a corporation status; small firms are more likely to be unincorporated.

- According to the Tunisian Industry Promotion Agency, in 2002, the total number of enterprises with foreign participation is 1 654 (31.4 per cent of manufacturing firms having 10 or more employees), of this number more than half are totally foreign owned and 1 370 (83 per cent) are totally exporting enterprises. Table 7 describes the structure of partnership in manufacturing sectors by countries.

Table 7: **Structure of Partnership in manufacturing sectors***, **2002**.

Sectors \ Countries	France	Italy	Germany	Belgium	Other	Total
Food Processing	28	23	1	4	42	98
Building Materials	16	14	-	2	27	59
Mechanical, Metal	37	20	3	3	34	97
Electrical, Electronics	48	42	30	3	32	155
Chemical Industries	31	9	4	1	30	75
Textiles and Clothing	399	213	139		227	1103
Leather and Shoes	44	48	7	7	26	132
Wood Industries	12	8	1	4	7	32
Diverse Industries	42	19	12	5	23	101
Total	657	396	197	154	448	1852

*Note: An enterprise may be counted for a number of times, Source: API.

Trade liberalization has placed additional pressures on industries pushing many manufacturing firms to open their capital to investors particularly

in terms of partnership with foreign firms.

A relatively important offshore sector was created through special incentives to counter the anti-export bias of its protected domestic economy in the 1970s and 1980s (See Table 8). While this policy stimulated the country's strong export performance and facilitated Tunisia's entry into export markets, it has not given the domestic private sector the stimulus to competitiveness that normally results from external trade and competition. The main reason is that the offshore sector has developed very few linkages with the onshore economy, and takes from it virtually no tradable inputs.

Table 8: Offshore and Onshore Enterprises, 1998

Sectors \ Countries	Number of Firms		Exports/Sales Percent
	Onshore	Offshore	
Food Processing	364	62	21.1
Building Materials	278	10	12.7
Mechanical, Metal	389	43	19.7
Electrical, Electronics	102	94	57.8
Chemical Industries	305	29	39.1
Textiles and Clothing	386	1436	81
Leather and Shoes	101	131	67.4
Wood Industries	94	15	17.4
Diverse Industries	190	54	20.3
Total	2209	1874	36.5

Source: Agence de Promotion de l'Industrie

Part 2: The State of Competition in Tunisian Manufacturing Sector

I. Manufacturing Sector Performance and Sectoral Contribution

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.

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

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.

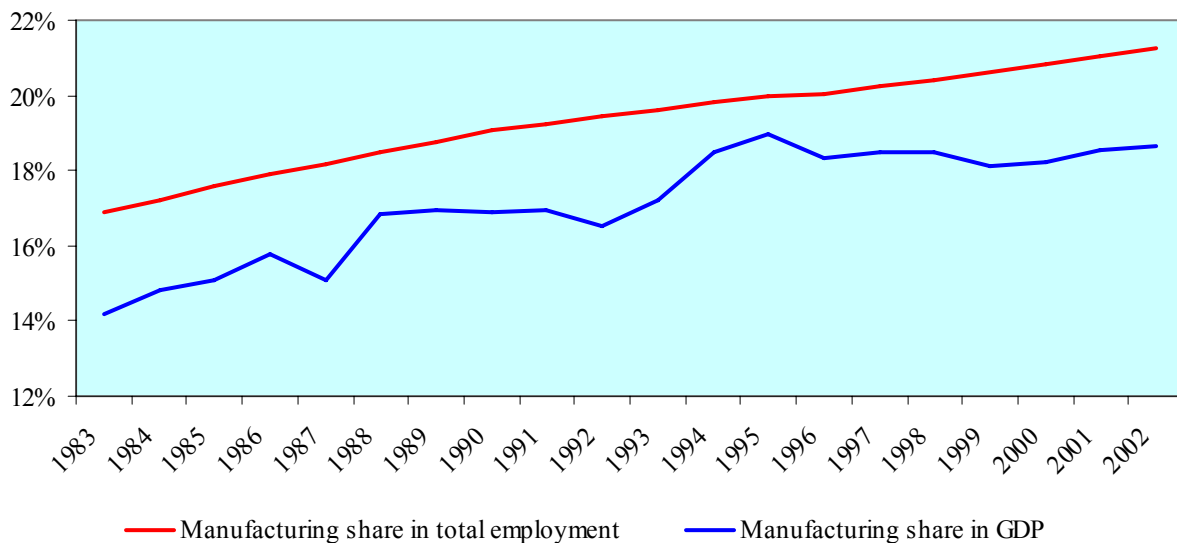
Since 1995, the manufacturing employment share has increased more sharply than that in total GDP, reflecting the fact that trend rate of growth in manufacturing output per worker compares not favourably with that achieved for all the economy especially at the end of the observed period (Graph 1 and 2).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

Table 2: Manufacturing Employment and Stock of Capital Trends

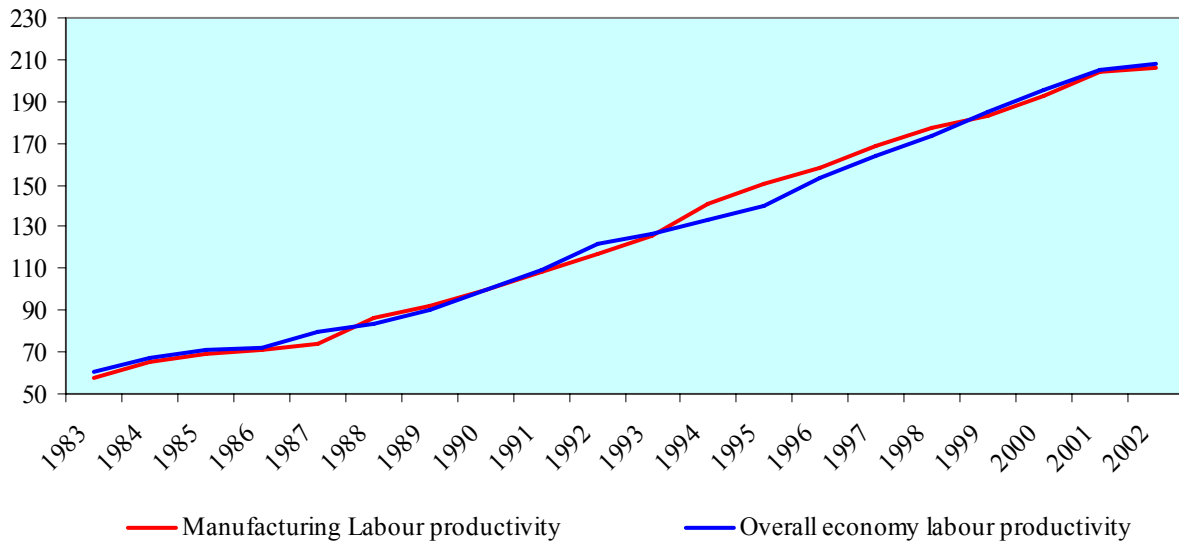
Years	Manufacturing Employment		Manufacturing Stock of Capital (volume MD)	
	Level ('000s)	Share of total	Level	Share of total
1984	311,5	17,2%	6935,8	19,4%
1988	376,5	18,5%	7531,4	18,5%
1989	390,5	18,8%	7439,2	18,2%
1990	405,5	19,1%	7453,6	18,0%
1991	416,5	19,2%	7470,5	17,6%
1992	430,5	19,4%	7521,3	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



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:

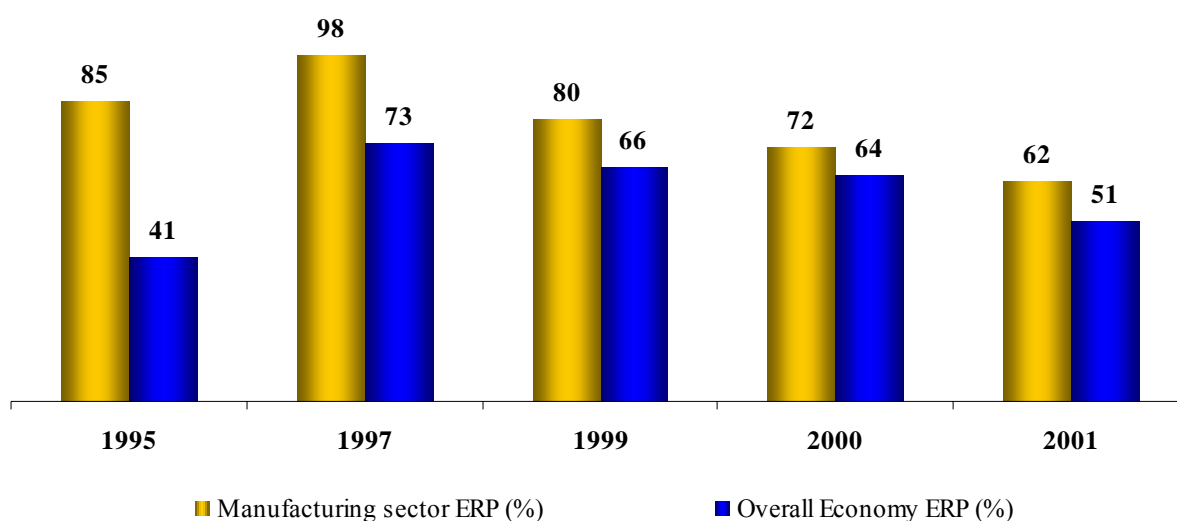
- Immediately: For primary materials and equipment not made in Tunisia, representing 12% of manufactured imports from the EU. This stage is fully implemented.
- Gradually over 5 years, one fifth per year: For finished products not made locally and certain materials, representing 28% of manufactured imports 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.

Graph 3: Effective Rate of Protection in Tunisia



Source: Institut d'Economie Quantitative, 2003

Consider now the composition of activities making up the manufacturing sector. Table 3 presents a disaggregation of the manufacturing sector into its main activities, reporting for each the contribution to overall value added and growth rate during 1984-2002.

Table 3: Sectoral Contributions to Manufacturing, 1984-2002

	Contribution to value added			Contribution to real value added growth rate		
	1984-1989	1990-1999	2000-2002	1984-1989	1990-1999	2000-2002
Food Processing	25.0	18.9	17.5	7.0	8.0	4.8
Building Materials	12.1	10.6	9.2	12.3	8.0	12.8
Mechanical, Metal, Electrical, Electronics	14.9	13.7	14.6	13.0	12.8	23.6
Chemical Industries	9.0	10.2	10.7	24.4	12.7	9.8
Textiles, Clothing Leather and Shoes	25.7	33.7	35.4	27.2	42.7	31.7
Diverse Industries	13.2	12.9	12.6	16.1	15.9	17.3
All	100	100	100	100	100	100

It is clear that in terms of value added, the food processing and textile, clothing, leather and shoes sectors predominate, accounting jointly for more than half of manufacturing value added. Clothing, leather and shoes sector makes significant contributions to manufacturing real value added growth rate, particularly during the 1990s. Moreover, this sector contributes to more than 50 per cent to manufacturing employment (Table 4).

Table 4: Sectoral Contributions to Employment, 1984-2002

	1984-1989	1990-1999	2000-2002
Food Processing	10.1	10.2	9.9
Building Materials	5.7	6.7	7.0
Mechanical, Metal, Electrical, Electronics	9.6	11.5	13.4
Chemical Industries	4.5	4.3	4.2
Textiles, Clothing Leather and Shoes	56.0	52.2	50.2
Diverse Industries	14.2	15.2	15.4
All	100	100	100

The manufacturing sector as a whole accounts for more than 86 per cent of goods exports in Tunisia. The importance of exporting varies across sub-sectors. Table 5 reports the contribution of different sub-sectors in manufacturing to overall manufacturing exports during the period 1984-2002. At the end of the period, the majority of manufacturing exports were from the textiles, clothing, leather and shoes sector, which contributes to 54 per cent to manufacturing exports and exports 71 per cent of its output (Table 6).

Table 5: **Sectoral Contributions to Export, 1984-2002**

	1984-1989	1990-1999	2000-2002
Food Processing	11.4	9.8	6.9
Building Materials	1.9	2.2	1.6
Mechanical, Metal, Electrical, Electronics	11.9	15.4	22.3
Chemical Industries	28.1	14.7	11.7
Textiles, Clothing Leather and Shoes	41.5	52.4	54.0
Diverse Industries	5.2	5.5	3.5
All	100	100	100

Table 6: **Share of Gross Output Exported, 1984-2002**

	1984-1989	1990-1999	2000-2002
Food Processing	11,4	9,8	6,9
Building Materials	1,9	2,2	1,6
Mechanical, Metal, Electrical, Electronics	11,9	15,4	22,3
Chemical Industries	28,1	14,7	11,7
Textiles, Clothing Leather and Shoes	41,5	52,4	54,0
Diverse Industries	5,2	5,5	3,5
All	100	100	100

II. Trade Performance and Specialization

II.1. Trade performance and Import penetration

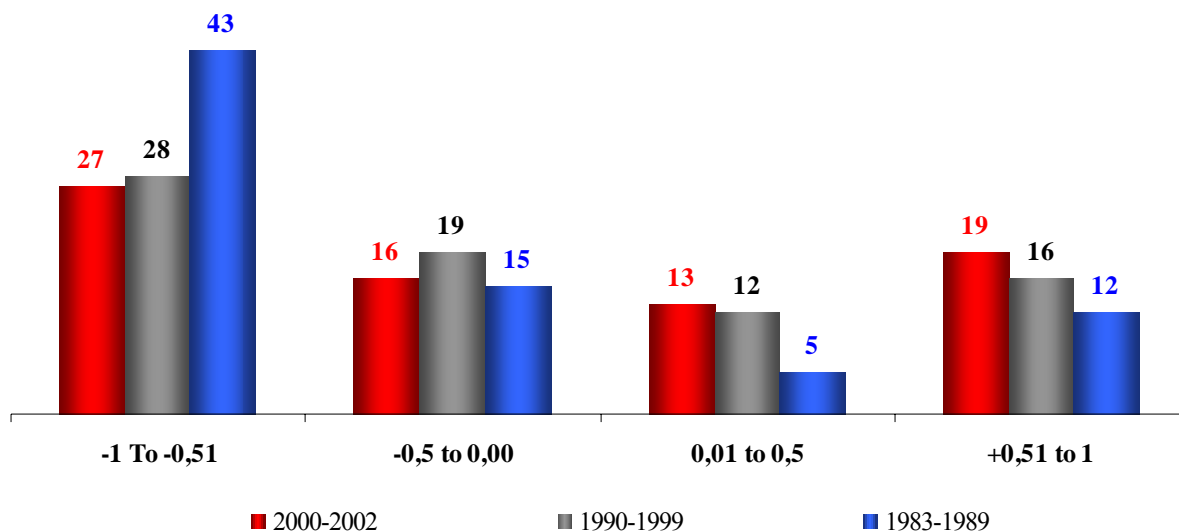
Net trade performance (NTP) is a useful measure in terms of summarising the key features of the trade data. NTP combines export and import flows for an industry into an index as follows: $(X - M) / (X + M)$. So, NTP will be +1 for an industry which exports but has no imports, and -1 for an importer with no exports. Between these limits the index is a convenient measure of the trade balance of each industry. The changes between 1983-1989 and 2000-2002 are shown in Table 7.

Table 7: **Net Trade Performance of Tunisian Manufacturing, 1983-2002**

NTP 1983-1989	NTP 2000-2002				Total
	+1 to 0,51	+0,5 to 0,01	0 to -0,5	-0,51 to -1	
+1 to 0,51	12	0	0	0	12
+0,5 to 0,01	0	4	1	0	5
0 to -0,5	4	4	5	2	15
-0,51 to -1	3	5	10	25	43
Total	19	13	16	27	75

The cells of table 7 contain the number of manufacturing industries classified in terms of their mean NTP values in 1983-1989 (rows) and 2000-2002 (columns). The main diagonal of the table shows the number of industries, 46 in all, which were in the same NTP range in 1983-1989 and 2000-2002. In this mercantilist framework, trade performance has improved over the decade. A total of 26 industries (below the diagonal) improved their net trade performance over the period and only 3 industries (above the diagonal) experienced a decline. In 2002 thirty two industries had positive trade balances, compared with 16 in 1983.

Graph 4: NTP distribution (number of manufacturing industries), 1983-2002



The industries which have done best (NTP superior to +0,5) over the period 1983-2002 include: pasta and cousous; olive oil; canned vegetables and fruits, canned fish; wine; fertilizers; carpet; apparel; others leather and plastic products; and footwear.

Table 8: Net Trade Performance of Tunisian Manufacturing

NAT Code	Industry	1983	1990	2002
111	Meat industries	-0,9679	-0,9738	0,8591
121	Milk industry	-0,9994	-0,9988	-0,6413
131	Grain Milling	0,2232	0,7602	-0,4638
132	Pasta and couscous	0,0769	0,5741	0,9958
133	Bread and pastries	-1,0000	0,5700	0,4589
134	Biscuits	-1,0000	0,9358	0,5626
141	Olive Oil	1,0000	1,0000	0,9725
142	Oils and fats processing	-1,0000	-0,9985	-0,5101
151	Canned vegetables and fruits	0,2004	0,6713	0,9933
152	Canned fish	0,8864	0,9695	0,9010
153	Other Conserving process	-1,0000	0,9221	-
161	Sugar industry	-0,9867	-0,9543	-0,9828
162	Chocolate and confectioners products	-0,6012	0,3858	0,1626
171	Miscellaneous food industries	-0,6987	-0,3017	-0,0901
172	Animal feed	-1,0000	-0,9884	0,2007
181	Non alcoholic beverages	-0,6090	0,5375	-0,1656
182	Wine	0,9351	0,8714	0,8463
183	Beer	0,8889	-0,1942	0,2071
184	Distilled alcoholic beverages	-0,9024	0,1076	0,2705
191	Tabacco	-0,8930	-0,0666	0,1778
211	Quarry products	-0,9853	-0,9056	-0,7291
212	Stone and marble polished	-0,9797	-0,6749	-0,2796
221	Cement and Plaster	-1,0000	0,9539	-0,0603
222	Cement based products	-1,0000	0,9791	0,5613
231	Brick industry	-0,5638	-0,5858	-0,8145
232	Tile industry	-0,4481	0,2285	0,1376
241	Glass industry	-0,9885	-0,6582	-0,6318
311	Iron and Steel	-0,9789	-0,7516	-0,8204
312	Metal and semi-products non ferrous	-0,7052	-0,6234	-0,6231
313	Foundries	-0,9916	-0,9439	-0,9841
321	Forge Products	-0,9940	-0,8609	-0,9875
322	Metallic construction and boilerworks	-0,8178	-0,7783	-0,9968
323	Metallic packaging	-0,4994	0,0454	-0,3332
324	Quincaillerie	-0,9225	-0,3281	0,9328
325	Metallic household appliances	-0,8959	-0,6569	-0,9321
331	Agricultural machinery	-0,9196	-0,9296	0,3793
332	Industrial machinery	-0,9666	-0,8668	0,9393
341	Spare parts for cars	-0,8768	-0,6120	0,2037
342	Cars and trucks	-0,9400	-0,8785	-0,9508
343	Bike and motor bike	-1,0000	-0,8808	-0,5215
351	Boats and repairing	-0,6587	0,3852	-0,9209
352	Transportation material and divers	-0,6112	-0,9047	-0,4037
361	Electrical equipment	-0,5705	0,0866	-0,0540
362	Miscellaneous Electrical Equipment	-0,4611	-0,3098	-0,1541
371	Electronic professional equipment	-0,9298	-0,7185	-0,6813
372	Electronic home appliances.	-0,7855	-0,1341	0,4650
381	Home appliances equipment	-0,9825	-0,8853	-0,5069

411	Fertilizers	0,9477	0,9859	0,9666
412	Divers fertilizers	0,7610	0,9709	0,9095
421	acide fluorhydrique,cryolithe	0,9942	0,9611	0,9969
422	Base chemical Products	-0,9473	-0,8411	-0,7471
431	Paint, ink, glue and colorants	-0,8244	-0,8006	-0,7395
432	Soap, detergents and disinfectants	-0,8644	-0,5377	-0,4300
433	Perfumes and Toiletry	-0,1352	0,0643	-0,0314
434	Miscellaneous Para-chemicals	-0,9372	-0,9339	-0,8130
441	Pharmaceutical products	-0,9471	-0,9170	-0,9091
451	Tires and Rubber products	-0,9692	-0,5143	-0,2989
511	Textile spinning	-0,9894	-0,9384	-0,7110
512	Textile weaving	-0,7754	-0,7659	-0,7909
513	Other textiles	-0,6076	-0,5590	-0,3902
521	Carpet	0,8320	0,9578	0,0428
531	Underwear	0,2335	0,3823	0,2580
541	Apparel	0,6877	0,7427	0,7505
551	Leather and skin work	-0,6501	-0,7426	0,4777
552	Other leather and plastic products	0,4921	0,5236	0,5951
553	Footwear	0,5662	0,6888	0,4777
611	Wood products	-0,8816	-0,8869	-0,7762
612	Building carpentry	0,4019	0,6886	0,8310
613	Bedding furniture	-0,9836	0,2350	0,4690
621	Paper pulp and cardboard	-0,5592	-0,7475	-0,7240
622	Packaging	-0,0131	-0,2959	0,2842
623	Paper-making	-0,3258	0,0716	0,6645
624	Printing works	-0,7830	-0,7830	-0,4274
631	Plastic products	-0,7998	-0,6473	-0,4658
641	Miscellaneous products	-0,2971	-0,2324	-0,2822

Table 9 provides a measure of competitiveness on the domestic market measured by the rate of import penetration. If Q, X and M stand, respectively, for the sectoral output, exports and imports, the domestic demand D will be equal to $D = Q - X + M$, and the rate of import penetration equals M / D . It should be emphasized that a low level of penetration does not necessarily mean that there are barriers to entry.

The table reveals a very high import penetration mainly in Mechanical, Metal, Electrical and Electronics sector, Chemical industries and Textiles, Clothing Leather and Shoes: boats and repairing (103 per cent in average over the period 1983-2002); electronic professional equipment (98 per cent); base chemical products (95 per cent); spare parts for cars (88 per cent); metal and semi-products non ferrous (86 per cent); metallic household appliances (79 per cent); pharmaceutical products (77 per cent) and underwear (71 per cent).

Table 9: Import Penetration in Tunisian Manufacturing Industries (%)

NAT Code	Industry	1983	1990	2001
111	Meat industries	5.9881	5.2618	0.0323
121	Milk industry	32.4498	21.3905	8.3191
131	Grain Miling	2.1774	0.8133	4.2388
132	Pasta and couscous	0.0197	0.1220	0.1144
133	Bread and pastries	0.0986	0.0377	0.0180
134	Biscuits	0.1530	0.1031	3.2823
141	Olive Oil	0.0000	0.0000	-2.2088
142	Oils and fats processing	54.2533	55.6402	49.5574
151	Canned vegetables and fruits	10.1309	1.7761	0.0858
152	Canned fish	5.7928	48.8105	6.7756
153	Other Conserving process	23.6518	0.4373	0.0401
161	Sugar industry	68.6073	71.3558	68.1066
162	Chocolate and confectioners products	1.5080	1.5442	5.8309
171	Miscellaneous food industries	24.8817	25.4192	26.2311
172	Animal feed	1.1893	2.3417	1.4656
181	Non alcoholic beverages	0.5534	0.2591	5.1457
182	Wine	1.3883	0.8273	0.9807
183	Beer	0.0166	0.5044	0.1804
184	Distilled alcoholic beverages	43.0934	55.9709	29.1156
191	Tabacco	4.2879	9.0558	6.7136
211	Quarry products	29.0153	32.8400	25.1811
212	Stone and marble polished	21.1764	13.7978	9.7332
221	Cement and Plaster	13.7090	0.5953	4.5682
222	Cement based products	3.3666	0.0308	0.3734
231	Brick industry	7.7381	7.3106	5.8291
232	Tile industry	31.8287	26.0830	20.4026
241	Glass industry	47.9873	45.9759	27.2131
311	Iron and Steel	52.6769	51.2008	39.8021
312	Metal and semi-products non ferrous	74.2193	87.2495	92.4813
313	Foundries	65.3813	34.3292	63.8759
321	Forge Products	12.7143	13.3520	11.7175
322	Metallic construction and boilerworks	26.1360	16.5885	8.6811
323	Metallic packaging	4.4025	1.9401	2.5681
324	Quincaillerie	64.1265	60.1656	0.0639
325	Metallic household appliances	72.6862	55.3761	70.4427
331	Agricultural machinery	101.7717	75.5278	18.9476
332	Industrial machinery	98.2186	98.6860	0.1895
341	Spare parts for cars	97.3547	91.5929	105.5700
342	Cars and trucks	66.6523	70.5165	98.0976
343	Bike and motor bike	55.4782	41.3544	29.1222
351	Boats and repairing	58.3143	338.9233	88.4055
361	Electrical equipment	55.1861	88.1280	57.9665
362	Miscellaneous Electrical Equipement	76.5017	71.6777	54.1853
371	Electronic professional equipment	98.0927	93.9140	108.0031
372	Electronic home appliances.	31.0803	29.2917	9.1210
381	Home appliances equipment	38.6854	29.1946	30.7932

411	Fertilizers	2.0589	0.4190	0.9584
412	Divers fertilizers	71.1725	8.1256	4.3344
421	acide fluorhydrique,cryolithe	-3.9634	-29.7884	-0.4775
422	Base chemical Products	95.8521	94.8386	97.2074
431	Paint, ink, glue and colorants	39.2631	36.3529	46.5754
432	Soap, detergents and disinfectants	11.9969	9.5493	21.9716
433	Perfumes and Toiletry	38.6949	25.4869	34.0924
434	Miscellaneous Para-chemicals	79.4496	69.7413	67.6187
441	Pharmaceutical products	88.0233	83.0329	63.1759
451	Tires and Rubber products	67.6128	44.5252	44.9025
511	Textile spinning	58.2768	61.2751	56.7695
512	Textile weaving	56.6276	70.7572	76.3704
513	Other textiles	60.8919	71.6056	67.5050
521	Carpet	2.7354	0.4912	0.8840
531	Underwear	57.7170	62.9345	127.1191
541	Apparel	24.0233	46.4388	55.8500
551	Leather and skin work	69.3551	62.1682	23.2969
552	Other leather and plastic products	25.0509	27.7630	32.6021
553	Footwear	8.0968	11.2353	23.2969
611	Wood products	72.9477	66.9862	60.4586
612	Building carpentry	0.1378	0.0227	0.3936
613	Bedding furniture	6.2533	1.7867	3.6554
621	Paper pulp and cardboard	61.0870	59.4204	64.1760
622	Packaging	6.8715	13.3505	16.7266
623	Paper-making	19.6729	7.3198	12.6310
624	Printing works	51.7370	36.3654	21.0562
631	Plastic products	41.2822	33.6461	41.2437
641	Miscellaneous products	49.1612	47.9740	34.4280

Table 10 gives the rate of exposure to international competition defined as:

$$\text{Export Ratio} + (1 - \text{Export Ratio}) * \text{Import Penetration.}$$

The construction of this indicator rests on the idea that the exported share of production is 100 percent exposed and that the share sold on the domestic market is exposed in the same proportion as the penetration of the market.

The table reveals over the period 1983-2002 that the sector “textiles, clothing leather and shoes” had the highest exposure to international competition with an average index value of 81,6 percent, followed by the “mechanical, metal, electrical and electronics” sector with an index value of 74,3 percent, and the “Chemical Industries” with an index value of 64,7 percent.

Table 10: Tunisian Manufacturing Sector Exposure to International Competition

NAT Code	Industry	1983	1990	2002
111	Meat industries	6,0855	5,3315	0,2019
121	Milk industry	32,4603	21,4030	10,3909
131	Grain Milling	5,4896	6,4447	7,5846
132	Pasta and couscous	0,0427	0,5708	19,4253
133	Bread and pastries	0,0986	0,1753	0,2004
134	Biscuits	0,1530	3,1190	9,0436
141	Olive Oil	72,4673	51,6568	86,3342
142	Oils and fats processing	54,2533	55,6806	77,2419
151	Canned vegetables and fruits	23,1396	10,0468	25,2364
152	Canned fish	53,3817	99,1808	56,5148
153	Other Conserving process	23,6518	10,1700	0,0000
161	Sugar industry	69,0604	72,9333	71,5611
162	Chocolate and confectioners products	1,8822	4,9091	10,7641
171	Miscellaneous food industries	29,0499	36,9483	31,7801
172	Animal feed	1,1893	2,3554	3,7718
181	Non alcoholic beverages	0,6877	1,1131	11,0670
182	Wine	30,5405	11,5602	13,3725
183	Beer	0,2983	0,8436	0,5278
184	Distilled alcoholic beverages	45,2215	82,9195	49,0344
191	Tabacco	4,5298	16,3448	13,0666
211	Quarry products	29,2297	34,4285	30,4268
212	Stone and marble polished	21,3933	16,3953	30,5496
221	Cement and Plaster	13,7090	20,7193	7,3776
222	Cement based products	3,3666	2,8591	1,9722
231	Brick industry	9,8472	9,1815	6,0882
232	Tile industry	42,1261	52,6729	38,8019
241	Glass industry	48,2630	54,0387	31,9082
311	Iron and Steel	53,2330	57,5201	36,5321
312	Metal and semi-products non ferrous	82,7870	95,0718	99,7493
313	Foundries	65,6558	35,3043	73,2800
321	Forge Products	12,7528	14,3389	10,7805
322	Metallic construction and boilerworks	28,6658	18,6071	10,8438
323	Metallic packaging	5,8502	4,0199	2,6246
324	Quincaillerie	66,5369	77,4206	3,0838
325	Metallic household appliances	76,1683	64,4980	78,0087
331	Agricultural machinery	98,7401	78,0059	43,9790
332	Industrial machinery	99,0795	99,7933	6,0652
341	Spare parts for cars	99,2256	97,6791	97,1042
342	Cars and trucks	68,5935	74,4662	97,9228
343	Bike and motor bike	55,4782	43,8639	32,5114
351	Boats and repairing	67,6322	-8,7962	82,5132
361	Electrical equipment	66,4758	98,7924	61,3165
362	Miscellaneous Electrical Equipement	89,3227	87,8627	71,9288
371	Electronic professional equipement	99,3357	98,2749	97,0139
372	Electronic home appliances.	34,6226	46,2813	19,6820
381	Home appliances equipement	39,0251	30,9269	36,1669

411	Fertilizers	45,0614	37,5323	47,3765
412	Divers fertilizers	98,4980	86,8660	38,2616
421	acide fluorhydrique,cryolithe	108,6374	112,2861	142,6513
422	Base chemical Products	97,4483	98,0037	99,0721
431	Paint, ink, glue and colorants	42,8203	40,1385	56,0089
432	Soap, detergents and disinfectants	12,8612	12,3316	36,2253
433	Perfumes and Toiletry	58,6017	46,3581	61,5196
434	Miscellaneous Para-chemicals	81,7367	71,9512	75,9771
441	Pharmaceutical products	90,0166	85,9985	62,8111
451	Tires and Rubber products	68,6365	55,8816	60,6516
511	Textile spinning	58,5861	63,1288	60,5845
512	Textile weaving	62,7754	77,8579	83,5353
513	Other textiles	71,6624	83,4281	83,8333
521	Carpet	25,5645	19,0199	4,9733
531	Underwear	86,7737	92,2780	95,2542
541	Apparel	71,9542	92,2054	94,9949
551	Leather and skin work	79,2921	69,5585	75,4021
552	Other leather and plastic products	62,1815	67,5931	82,6324
553	Footwear	30,2729	47,3824	75,4021
611	Wood products	76,8723	70,5663	62,6386
612	Building carpentry	0,4599	0,1454	2,1158
613	Bedding furniture	6,3050	4,5890	12,7071
621	Paper pulp and cardboard	73,0482	66,5071	78,2398
622	Packaging	13,1159	20,0442	27,2657
623	Paper-making	28,5694	15,0624	60,0816
624	Printing works	57,3065	40,5043	29,7236
631	Plastic products	45,5404	40,1446	54,2274
641	Miscellaneous products	66,6404	66,9545	42,0830

II.2. Specialization

The data used to evaluate specialization degree in Tunisian manufacturing sector are drawn from the UNIDO Industrial Statistics Database 2003. While the data base exists both at the 3- digit and 4-digit level of the International Standard Industrial Classification (ISIC), only the former was used, since the coverage of the latter is much more limited in term of time span.

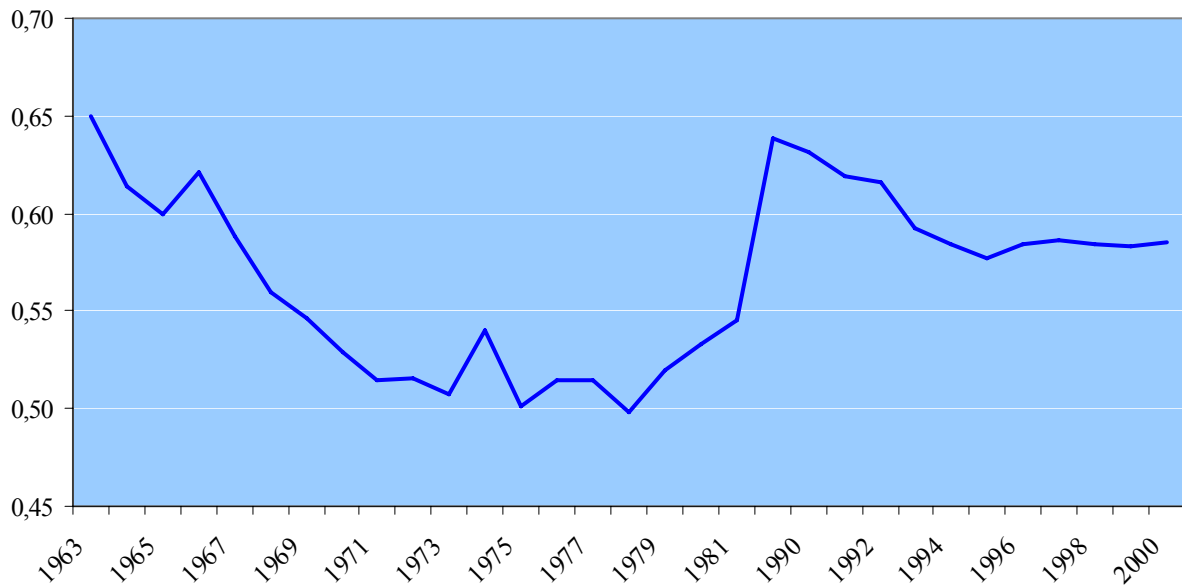
Table 11 reports Gini coefficient as a measure of the degree of inequality in the distribution of the value added and employment in Tunisian manufacturing sector. Graph 5 and 6 reveal that both measure don't exhibit the same pattern.

Table 11: Gini coefficient

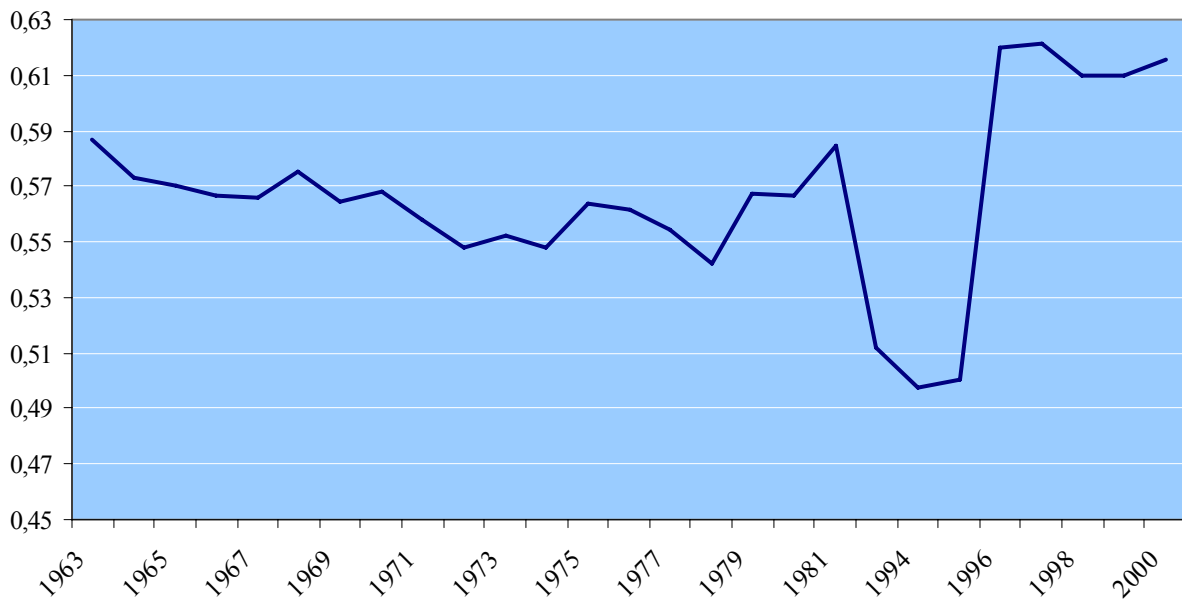
Year	Value Added	Employment
1972	0,5157	0,5478
1973	0,5071	0,5519
1974	0,5397	0,5478
1975	0,5016	0,5634
1976	0,5141	0,5615
1977	0,5146	0,5547
1978	0,4987	0,5421
1979	0,5192	0,5670
1980	0,5332	0,5667
1981	0,5455	0,5849
1989	0,6380	-
1990	0,6317	-
1991	0,6192	-
1992	0,6155	-
1993	0,5922	0,5116
1994	0,5840	0,4978
1995	0,5772	0,5007
1996	0,5840	0,6200
1997	0,5865	0,6214
1998	0,5844	0,6097
1999	0,5828	0,6097
2000	0,5849	0,6159

Source: Authors calculations from UNIDO, 2003 CD

Graph 5: Gini Tunisian Manufacturing Specialization Index (Value Added)



Graph 6: Gini Tunisian Manufacturing Specialization Index (Employment)



Over the period 1972-2000, the measure of the degree of inequality in the distribution of the value added (employment) varied between 50 per cent (50 per cent) and 64 percent (62 per cent). It decreased during the 1970s, increased from 1980, and stabilized around 58 per cent in 1990s. In terms of employment distribution, the end of the period is characterized by a significant increase of the inequality (around 61 per cent).

III. Firms' Size Distribution and Market Concentration

III.1. Size distribution

The prevalence of small plants is highlighted in Tables 12 and 13. 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).

Table 12: 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	258	84	34	18	36	1519

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 7) 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)¹².

¹² Caves, Richard E., 1989, "International Differences in Industrial Organization", in Richard Schmalensee and Robert Willig (Eds.), *Handbook of Industrial Organization*, Vol II. Amsterdam:North-Holland, pp. 1225-1250.

Graph 7: **Gini index of Tunisian manufacturing firm size distribution, 2000**

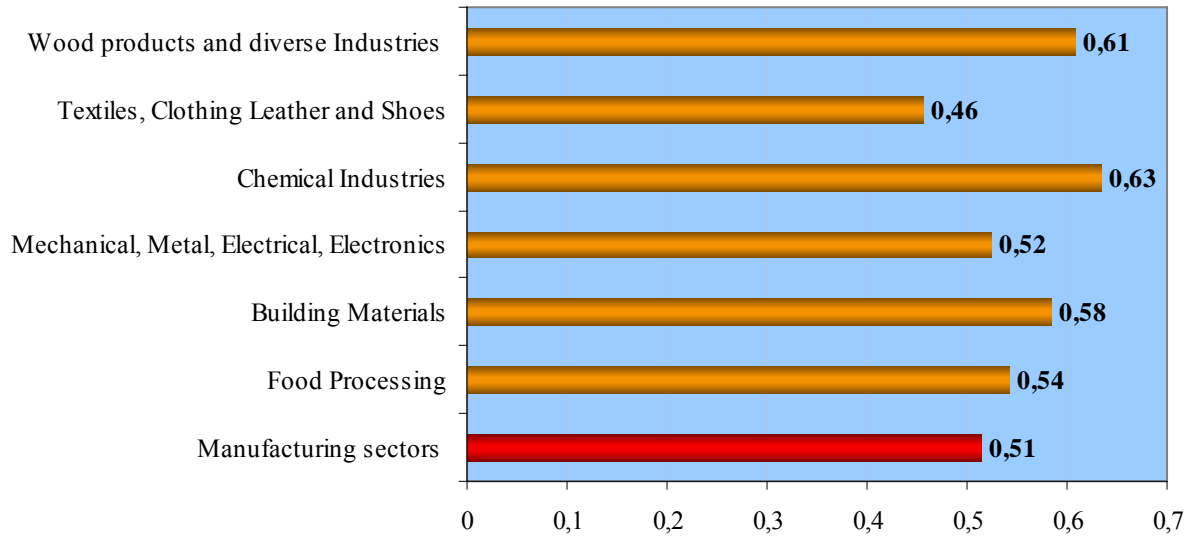


Table 13: Size distribution of the Tunisian manufacturing firms, 2000

Sector 3 digit NAT	Sector	<10	[10;50[	[50;100[	[100;200[	[200;300[	[300;400[	[400;500[	+ 500	Total
152	Canned fish	1	4	5	3	1	1			15
153	Canned vegetables and fruits		4	5	6	2	1	1		19
154	Olive oil, oils and fats processing	5	4	2	2					13
155	Milk industry	2	2	1	2		1		1	9
156	Grain Milling	1	2	2	8					13
157	Animal feed	1	12			1				14
158	Bread and pastries, sugar industry, biscuits, pasta and couscous	45	61	13	4	3	1		2	129
159	Distilled alcoholic beverages, beer and wine	3	4	7	1	2	1		1	19
160	Tabacco			1					2	3
141	Quarry products		7	2	1					10
142	Quarry products	4	6	2						12
143	Quarry products (phosphate)								1	1
145	Building Materials			1						1
261	Glass industry	1	9	4	2					16
262	Tile industry	1	1	2	1	3	1	1		10
263	Tile industry others		8	4	2	2				16
264	Brick industry	1	27	7	5	2	2		1	45
265	ciments,chaux et platre	3			2	1	1		2	9
266	ciments,chaux et platre	2	9	4	4		1			20
267	Stone and marble polished	1	17	2	2					22
271	Iron and Steel	1	1						1	3
275	Foundries	2	3	1	1				1	8
281	Metallic construction and boilerworks	1	12	2	3	1		1	1	21
285	Metal packaging	6	8	1						15
286	Metallic household appliances	1	12	1	2	1				17
287	Metallic packaging	4	22	4	6				1	37
291	Miscellaneous Electrical Equipement		5		2					7
293	Agricultural machinery	1	5		1	1				8
294	Industrial machinery		1							1
295	Industrial machinery	2	3	1						6
297	Home appliances equipement		1							1
311	Electronic professional equipement		3	1		1				5
312	Electronic professional equipement	1	8	1	2		1			13
313	Miscellaneous Electrical Equipement		1	1	4		2		1	9
314	Miscellaneous Electrical Equipement	1			2	1				4
315	Miscellaneous Electrical Equipement			2						2
316	Spare parts for cars	4	3		2	1			2	12
321	Electronic components		1	1	1		1			4
323	Electronic professional equipement		1	1				1	1	4
331	Electronic professional equipement (medical)		1	1						2
341	Cars		1						1	2
343	Cars and spare parts for cars		11	4	3					18

351	Boats and repairing		3			1				4
354	Bike and motor bike	1	3		1					5
241	Fertilizers, divers fertilizers and base chemical Products	3	7	1	1	1				13
243	Colorants, peintures, encres et colles	2	6	3	2					13
244	Pharmaceutical products	1	4	1	2	1				9
245	Soap, detergents and disinfectants	8	18	6	4	1				37
246	Paint, ink, glue and colorants		8	3						11
251	Tires and Rubber products		2	2	1				1	6
252	Tires and Rubber products	4	31	12	7	2				56
171	Textile spinning	4	9	5	1					19
172	Textile spinning	4	2	7	5	2			2	40
173	Others textile spinning	2	7	6	2					17
174	Other textiles		8	3	2			1		14
175	Carpet	3	14	6	3			1		27
176	Other textiles		1							1
177	Apparel and underwear	2	6	5	5					18
181	Leather apparel, professional apparel			2	1					3
182	Leather apparel, professional apparel	11	57	18	117	43	16	8	11	371
183	Leather apparel, professional apparel		1			1				2
191	Leather and skin work		4	2						6
192	Other leather and plastic products	3	7	3	3	2				18
193	Footwear	8	2	19	8	4	1	1	2	63
201	Wood products and building carpentry		2							2
202	Wood products and building carpentry			3	1					4
203	Wood products and building carpentry	3	8	1						12
205	Wood products and building carpentry	3	1	1						5
211	Printing works, packaging	1	2	1	2				1	7
212	Printing works, packaging	2	11	5	2		1			21
221	Printing works, packaging	2	2	1	2	1		1		9
222	Printing works, packaging	6	18	7	1			1		33
223	Printing works, packaging		2							2
361	Miscellaneous products	5	38	9	11	2	1	1		67
365	Miscellaneous products	1	6	1		1				9
Total		174	606	309	258	84	34	18	36	1519

Source: Répertoire des entreprises manufacturières, INS, 2000

III.2. Market concentration

One of the earliest measures of market power is the Lerner Index (L) which is defined as:

$$L = (\text{Price} - \text{Marginal Cost}) / \text{Price}.$$

The theoretical basis for the index comes from the assumption that firms with monopoly power can charge prices above marginal cost. The index can be derived from a profit maximizing single-product monopoly model or a one-stage Cournot oligopoly model. Because of the difficulties associated with obtaining marginal cost data, the index has not been used very often to measure market power. This notwithstanding, the Lerner Index's influence in the antitrust literature remains substantial chiefly through other measures of market power that rely on it indirectly to link pricing to market concentration. Two such indices are the M-firm concentration ratio (CRM) and the Herfindahl-Hirschman Index (HHI).

The M-firm concentration ratio (CRM) is defined as the cumulative market share of the number of firms, M, with the largest market shares:

$$CRM = \sum s_i, i = 1, 2, \dots, M$$

The variable s_i is the market share of the i-th firm. The most commonly used M-firm concentration ratios are the CR4 and CR8 – which measure the cumulative market shares of the four and eight largest firms in the industry, respectively.

Saving (1970)¹³ provides theoretical support for the use of the CRM as a measure of market power. In his paper, firms produce a homogeneous product and are divided into two groups – a collusive dominant group (consisting of M firms) and a price-taking fringe group. The dominant group as a whole jointly maximizes their profit given a conjectural derivative ($\lambda_{FM} = \Delta Q_F / \Delta Q_M$), which represents the fringe group's output (Q_F) response to the dominant group's output (Q_M). Saving shows that the Lerner Index (L_M) for the dominant group is related to the M-firm concentration ratio (CRM):

$$L_M = \frac{p - mc}{p} = \frac{(1 + \lambda_{FM})CRM}{\varepsilon_Q}$$

where p is price, mc is the (common) marginal cost of firms in the dominant group, and ε_Q is the absolute value of the market price elasticity of demand. Hence, the CRM is linked to market power via the dominant group's Lerner Index (LM). The

¹³ Saving, Thomas R. (1970) Concentration and the Degree of Monopoly, *International Economic Review*, **11**, 139-146.

excess of price over marginal cost as a proportion of price is directly proportional to the CRM.

The Herfindahl-Hirschman Index (HHI) is defined as the sum of the squared values of the n firm market shares:

$$HHI = \sum_{i=1}^n s_i^2, \quad i = 1, 2, \dots, n.$$

s_i is the market share of the i -th firm. As in the case of concentration ratio, the link between market power and the HHI is through the Lerner Index. It can be shown that the industry-average Lerner Index (L) for a homogenous product industry is given by:

$$L_M = \frac{(1 + \lambda)HHI}{\varepsilon_Q}$$

The variable λ is the conjectural derivative (assumed to be identical) for all firms in the industry, and ε_Q is the absolute value of the market price elasticity of demand. This equation reduces the variation in market shares to a single number, the average market share.

Table 14 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).

Table 14: 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

IV. Markup Pricing in Tunisian Manufacturing Sector

The main problem associated to the empirical measurement of the Lerner index and related measures arises from the fact that while prices can be measured, marginal costs are not directly observable. Therefore, indirect measures have to be developed.

Hall (1988) has suggested markup rate estimation based on a model for the Solow residual which has been extensively applied in the empirical literature¹⁴. Hall's approach has also been criticized and the results deemed somewhat dubious mostly because the estimation procedure requires use of instrumental variables which are difficult to find in the context of imperfect competition.

Roeger (1995) proposed an alternative method of computing markups founded on both the Solow residuals and the dual Solow residuals¹⁵. For a firm enjoying technical progress in the use of labor and capital, a reasonable approximation of its marginal cost (MC_t) can be given by the following expression:

$$MC_{it} = \frac{w_{it} \Delta L_{it} + c_{it} \Delta K_{it}}{\Delta Q_{it} - \theta_{it} Q_{it}}, \quad (1)$$

where θ_{it} corresponds to the rate of technical progress for each time period t and sector i .

Under the assumption of constant returns to scale and constant markup, equation (1) can be rephrased as follows:

$$\underbrace{\Delta q_{it} - \alpha \Delta l_{it} - (1 - \alpha) \Delta k_{it}}_{\text{Solow Residual (SR}_t)} = (\mu - 1) \alpha (\Delta l_{it} - \Delta k_{it}) + \theta_{it} \quad (2)$$

where the markup of price over marginal cost is : $\mu = P / MC$, with Δ denoting the first difference, lower case denotes the natural log transform, q , l , and k denote real value added, labour, and capital inputs, α is the labour share in value added, and $\theta \equiv \dot{A} / A$ denotes exogenous (Hicks-neutral) technological progress.

¹⁴ Hall, R., 1988. "The Relation between Price and Marginal Cost in U.S. Industry", *Journal of Political Economy* 96(5): 921-947.

¹⁵ Roeger, W., 1995, "Can Imperfect Competition explain the Difference between Primal and Dual Productivity Measures? Estimates for US Manufacturing", *Journal of Political Economy*, 103, 316-30

Under perfect competition $\mu = 1$, while imperfectly competitive markets allow $\mu > 1$.

Estimation of equation (2) faces the difficulty that the explanatory variables $(\Delta l - \Delta k)$ will themselves be correlated with the productivity shocks θ , and hence result in bias and inconsistency in the estimates of μ . One solution is to instrument, which in turn raises the requirement that the instruments are correlated with the factor inputs, but not technological change and hence the error term.

An alternative approach to avoid the endogeneity bias and instrumentation problems has been suggested by Roeger (1995). By computing the dual of the Solow residual (DSR), we can again obtain a relation of the price-based productivity measure to the mark-up:

$$DSR_{it} \equiv \alpha \Delta w_{it} + (1 - \alpha) \Delta r_{it} - \Delta p_{it} = (\mu - 1) \alpha (\Delta w_{it} - \Delta r_{it}) + \theta_{it} \quad (3)$$

with w , r denoting the natural logs of the wage rate and rental price of capital respectively. While equation (3) is subject to the same endogeneity problems, and hence instrumentation problems as equation (2), Roeger's insight was that subtraction of equation (3) from equation (2) would give us the nominal Solow residual (NSR), given by:

$$NSR_{it} \equiv \Delta(p_{it} + q_{it}) - \alpha \Delta(l_{it} + w_{it}) - (1 - \alpha) \Delta(k_{it} + r_{it}) = (\mu - 1) \alpha (\Delta(l_{it} + w_{it}) - \Delta(k_{it} + r_{it})) \quad (4)$$

in which the productivity shocks θ have cancelled out, removing the endogeneity problem, and hence the need for instrumentation.

Equation (4) is a rather tractable expression for the estimation of the markup ratio. Adding an error term, the markup can be estimated by standard OLS techniques. Alternatively, a markup coefficient could even be calculated algebraically for each year and each sector and a simple average computed over a given period:

$$\mu - 1 = \frac{\Delta(p_{it} + q_{it}) - \alpha \Delta(l_{it} + w_{it}) - (1 - \alpha) \Delta(k_{it} + r_{it})}{\alpha (\Delta(l_{it} + w_{it}) - \Delta(k_{it} + r_{it}))} \quad (5)$$

Oliveira Martins and Scarpetta (1999)¹⁶ demonstrate that where the assumption of constant returns to scale is dropped, equation (4) is actually:

$$NSR_{it} = \left(\frac{\mu}{\lambda} - 1 \right) \alpha (\Delta(l_{it} + w_{it}) - \Delta(k_{it} + r_{it})) \quad (6)$$

where $\lambda > 1$ denotes increasing returns to scale. From equation (6) it can be seen that with increasing returns to scale, the Roeger's method produces a downward bias in

¹⁶ Oliveira Martins, J., and Scarpetta, S., 1999, "The Levels and Cyclical Behaviour of Mark-ups Across Countries and Market Structures", OECD Economics Department Working Papers No. 213.

the estimation of the markup. Thus any estimate of mark-up that follows from Solow residuals should be interpreted as lowerbound values if increasing returns to scale are present.

Equation (4) can be easily extended in order to incorporate intermediate inputs and express the mark-up ratio over gross output (GO) instead of value added. This correction is important, insofar as the mark-up over value added induces a clear upward bias in the estimation (Basu and Fernald, 1995)¹⁷.

Taking into account intermediate inputs, equation (4) becomes:

$$\begin{aligned} NSRGO_{it} &\equiv \Delta(\tilde{p}_{it} + \tilde{q}_{it}) - \tilde{\alpha}\Delta(l_{it} + w_{it}) - \tilde{\beta}\Delta(m_{it} + p_{it}^m) - (1 - \tilde{\alpha} - \tilde{\beta})\Delta(k_{it} + r_{it}), \\ &= (\mu - 1)(\tilde{\alpha}\Delta(l_{it} + w_{it}) + \tilde{\beta}\Delta(m_{it} + p_{it}^m) - (\tilde{\alpha} + \tilde{\beta})\Delta(k_{it} + r_{it})) \end{aligned} \quad (7)$$

where \tilde{p} and \tilde{q} correspond to logarithms of gross output and its respective price, m and p^m to intermediate inputs and their prices, and $\tilde{\alpha}$ and $\tilde{\beta}$ to the share of labour and intermediate inputs in gross output value, respectively.

The appealing feature of Roeger's approach is that it helps to overcome some availability problems associated with price data. As equation (7) only requires nominal variables, there is no need to gather price indexes for intermediate inputs, an information that is not readily available. However, the treatment of capital costs still requires a separate computation for the growth rate of the rental price of capital, r .

Panel data set for six manufacturing sectors in Tunisian economy are employed for purposes of estimation with observations from 1984 through 2002: Food processing (FPI), Construction materials and glass (CMGI), Mechanical and electrical goods (MEGI), Chemical and rubber (CRI), Textiles, clothing and leather goods (TCLGI) and Woodwork, paper and diverse (WPDI). This provides a 19x6 panel with a total of 114 observations.

A simplified rental price of capital (r_t) inspired by the methodology of Hall and Jorgenson (1967) was defined as follows:

$$r_t = ((\tau_t - \pi_t^e) + \delta)p_t^I$$

where τ is the nominal market interest rate and π^e is the expected inflation rate which is generated using the low-frequency component of the annual percentage

¹⁷ Basu, S., and Fernald, J.G., 1995, "Are Apparent Productive Spillovers a Figment of Specification Error?" *Journal of Monetary Economics*, 36, 165-88.

change in the GDP deflator using Hodrick-Prescott filter. The difference between these two terms represents the expected real cost of funds for the firm. The parameter δ corresponds to the economic rate of depreciation. It was set at 5 per cent across all sectors which is equivalent to an average service life of 20 years and p^I represents the economy-wide deflator for the gross fixed investment.

The perpetual inventory method is used to estimate gross capital stock. The method involves adding, for each type of capital asset, capital formation to an initial estimate of the capital stock and subtracting capital assets that are withdrawn. The capital stock estimates of each asset type are then summed up to obtain the economy-wide capital stock estimates. The capital stock in the starting year (1960) is approximated by an equilibrium capital output ratio (IEQ, 1985)¹⁸.

The observed labor share and intermediate inputs share in total revenue are used in the definition of the dependent and explanatory variables.

In Tables 15 and 16 the estimation results for the manufacturing sectors given by the following specification are reported:

$$NSRGO_{it} = \gamma_{0i} + \gamma_i ROEGER_{it} + \varepsilon_{it}, \quad (8)$$

for $i = \text{FPI, CMGI, MEGI, CRI, TCLGI, WPDI}$; $t = 1973, \dots, 2002$

where:

$$ROEGER_{it} = \tilde{\alpha}\Delta(l_{it} + w_{it}) + \tilde{\beta}\Delta(m_{it} + p_{it}^m) - (\tilde{\alpha} + \tilde{\beta})\Delta(k_{it} + r_{it})$$

γ_i now measures $(\mu_i - 1)$, where μ_i is the markup for the sector i . There is a number of ways that we can use information about the structure of our pooled data in estimating equation (8). We might estimate a model with selected variables that have common or different coefficients across cross-sections. Three estimations procedure will be employed: pooled least squares, weighted least squares with estimated cross-section weights and seemingly unrelated regressions (SUR).

Results indicate the presence of an aggregate plausible and moderate markup for the manufacturing sector over the sample period. The distinction between the estimation methods appears to make relatively little difference to the implied markup in Tunisian manufacturing. The aggregate markup defined over gross output is in the range of 20-21 percent (Table 15) and the sectoral markups are in the range of 17-36 percent (Table 16): according to the GLS with cross section weights and fixed effect estimates, 17 per cent in Textiles, Clothing and Leather

¹⁸ Les Cahiers de l'IEQ, 1985, « Le stock de capital sur la période 1961-1981 », n°1, pp.106-133.

Goods sector, 17,6 per cent in Chemical and Rubber sector, 17,8 per cent in Mechanical and Electrical Goods sector, 19,3 per cent in Food Processing sector, 24,7 per cent in Woodwork, Paper and Diverse sector and 36 per cent in Construction Materials and Glass sector.

Table 15: Markup estimates, Tunisian manufacturing industries, Roeger specification with common cross section coefficients

	Markup*	Std, Error**	R²/Log-Lik.
Pooled Least Squares with fixed effect*	1,211	0,015	0,6397
GLS with Cross Section Weights*	1,198	0,012	0,7161
Seemingly Unrelated Regression	1,210	0,012	313,32

** White Heteroskedasticity-Consistent Standard Errors & Covariance

* Coefficient reported concerns the estimated margin (1-Markup)

Table16: Markup estimates, Tunisian manufacturing industries, Roeger specification with specific cross section coefficients

	Markup	Std, Error**	R²/Log-Lik.
Pooled Least Squares with fixed effect *			0,694094
Food processing	1,193	0,036	
Construction materials and glass	1,360	0,040	
Mechanical and electrical goods	1,178	0,036	
Chemical and rubber	1,176	0,028	
Textiles, clothing and leather goods	1,170	0,038	
Woodwork, paper and diverse	1,247	0,043	
GLS with Cross Section Weights and fixed effect *			0,744856
Food processing	1,193	0,029	
Construction materials and glass	1,360	0,068	
Mechanical and electrical goods	1,178	0,026	
Chemical and rubber	1,176	0,029	
Textiles, clothing and leather goods	1,170	0,030	
Woodwork, paper and diverse	1,247	0,025	
Seemingly Unrelated Regression with fixed effect			325,3138
Food processing	1,195	0,027	
Construction materials and glass	1,338	0,061	
Mechanical and electrical goods	1,175	0,023	
Chemical and rubber	1,195	0,026	
Textiles, clothing and leather goods	1,154	0,026	
Woodwork, paper and diverse	1,250	0,021	

** White Heteroskedasticity-Consistent Standard Errors & Covariance

* Coefficients reported concern the estimated margin (1-Markup)

V. Import Competition and Market Power

Tariff and other restrictions clearly carry implications for the degree of international competition to which domestic industry is exposed, and hence the magnitude of the feasible markup that domestic industry can maintain. By implication, the suggestion is that trade liberalization is a means by which inefficiency in production can be remedied.

Hakura (1998) offers one means of incorporating the open economy context into the estimation of markups over marginal cost¹⁹. The starting point of analysis is the suggestion that tariff and other trade restrictions shield domestic industry from international competition. Hence reduction in trade barriers should decrease the market power of domestic producers, through increased import penetration, decreasing mark-ups of price over marginal cost. The suggestion is thus that trade liberalization will reduce the pricing power of industry.

In order to see how changes in import (or export) penetration affected the price marginal cost markup, the weighted growth rates of inputs is interacted with the import (export) penetration ratios IPR (EPR) and the relationship tested by Hakura (1998) is given by:

$$dq_{it} = \beta_{it} d\tilde{x}_{it} + \gamma (IPR_{it} - \overline{IPR}_i) d\tilde{x}_{it} \quad (9)$$

$$\text{where } dq_{it} = dy_{it} + \frac{s_m}{1-s_m} dm \text{ and } d\tilde{x}_{it} = s_l dl_{it} + s_k dk_{it} + \frac{s_m}{1-s_m} dm_{it}$$

where dy denotes the log change in value added, s_j the share of factor J in value added (labor, capital and intermediate inputs) and i denotes the i 'th industry. While β provides a measure of the mark-up, γ captures the impact of deviations of import penetration from the sectoral mean value of import penetration on the mark-up. Where $\gamma < 0$, rising import penetration lowers the mark-up, where $\gamma > 0$, rising import penetration raises the mark-up.

The specification given by equation (9) is again subject to endogeneity problems, since production and input change decisions are likely to be simultaneous. Yet, it's again possible to subject the specification of (9) to the transformations suggested by Roeger (1995).

¹⁹ Hakura, D.S., 1998, "The Effects of European Economic Integration on the Profitability of Industry", International Monetary Fund Working Paper WP/98/85.

A final extension proves necessary due to the use of panel data in the present study. Estimation of the mark-up on an industry-by-industry basis requires a control only for within-industry variation of import penetration in order to capture trade effects. In a panel data context this is not sufficient, since variation in import penetration between industries is not captured, omitting an important source of heterogeneity between industries. For this reason the following specification will be adopted to test for the impact of import penetration on the mark-up:

$$\begin{aligned}
NSRGO_i = & (\mu - 1) \left(\tilde{\alpha} \Delta(l_{it} + w_{it}) + \tilde{\beta} \Delta(m_{it} + p_{it}^m) - (\tilde{\alpha} + \tilde{\beta}) \Delta(k_{it} + r_{it}) \right) \\
& + \theta_2 \left(IPR_{it} - \overline{IPR}_i \right) \left(\tilde{\alpha} \Delta(l_{it} + w_{it}) + \tilde{\beta} \Delta(m_{it} + p_{it}^m) - (\tilde{\alpha} + \tilde{\beta}) \Delta(k_{it} + r_{it}) \right) \\
& + \theta_3 \left(IPR_{it} - \overline{IPR} \right) \left(\tilde{\alpha} \Delta(l_{it} + w_{it}) + \tilde{\beta} \Delta(m_{it} + p_{it}^m) - (\tilde{\alpha} + \tilde{\beta}) \Delta(k_{it} + r_{it}) \right)
\end{aligned} \tag{10}$$

where \overline{IPR}_i denotes the mean import penetration for the i 'th industry, and \overline{IPR} denotes the mean import penetration across all industries. Thus θ_2 captures the impact of within-industry variation of import penetration, and θ_3 the between-industry variation in import penetration on the markup.

A symmetrical specification to equation (10) can be provided, replacing the import penetration term with export penetration.

In Tables 17 we report the estimation results for the manufacturing sectors of the specification (10) redefined as follows:

$$\begin{aligned}
NSRGO_{it} = & \theta_{0i} + \theta_{1i} ROEGER_{it} + \theta_{2i} \left(IPR_{it} - \overline{IPR}_i \right) ROEGER_{it} \\
& \theta_{3i} \left(IPR_{it} - \overline{IPR} \right) ROEGER_{it} + u_{it}
\end{aligned} \tag{11}$$

The magnitude of the markup parameter is consistent with that already estimated under the preceding section with the estimate ranging from 21 to 21,6 per cent for the specification controlling for import penetration.

Crucially, we find that increased import penetration ratios across the manufacturing sector serve to decrease industry markups but increased import penetration within industries serve rather to increase industry markups, since θ_2 is significantly positive and θ_3 is significantly negative (SUR model). This result is not surprising in the Tunisian manufacturing sectors context given the significant increase of the effective rate of protection particularly during 1990s, as a result of Tunisia's adherence to GATT in 1989, and consequently to its commitments to transform all forms of non-tariff protection into tariff equivalent (see Table 18).

However, the magnitude of the impact of import penetration both within industries and across the manufacturing sector is very weak. Indeed, increasing within and between industry import penetration ratio from its mean value of 10 per cent will lead an estimated implied markup of 1,21 to rise to 1,216 ($1,21 + 0,091 \cdot 10\% - 0,024 \cdot 10\%$) in the SUR regression, corresponding to an increase of 0,495 per cent.

Table 17: Markup estimates, Tunisian manufacturing industries, Hakura specification with common cross section coefficients

	Markup**	Θ_2	θ_3	R²/Log-Lik.
Pooled Least Squares with fixed effect	1,216	0,089	-0,042	0,6694
<i>Std.Error*</i>	<i>0,015</i>	<i>0,031</i>	<i>0,019</i>	
GLS with Cross Section Weights*	1,211	0,084	-0,006	0,7683
<i>Std.Error</i>	<i>0,012</i>	<i>0,017</i>	<i>0,012</i>	
Seemingly Unrelated Regression	1,210	0,091	-0,026	325,17
<i>Std. Error</i>	<i>0,012</i>	<i>0,012</i>	<i>0,009</i>	

* White Heteroskedasticity-Consistent Standard Errors & Covariance

** Coefficients reported concern the estimated margin (1-Markup)

Table 18: Effective Rate of Protection in Tunisian Manufacturing Sectors

	1995	1997	1999	2000	2001	2002
Manufacturing sector ERP (%)	85	98	80	72	62	58
Food Processing	71	59	60	65	69	70
Building Materials	85	154	119	85	76	70
Mechanical, Metal, Electrical, Electronics	64	144	78	88	54	53
Chemical Industries	65	102	78	60	39	45
Textiles, Clothing Leather and Shoes	126	106	91	79	71	59
Diverse Industries	69	82	68	56	41	41
Overall Economy ERP (%)	41	73	66	64	51	49

Source: Institut d'Economie Quantitative

VI. Survey on Competitive Environment of Firms in the Formal Manufacturing Sector in Tunisia: Analysis of Findings

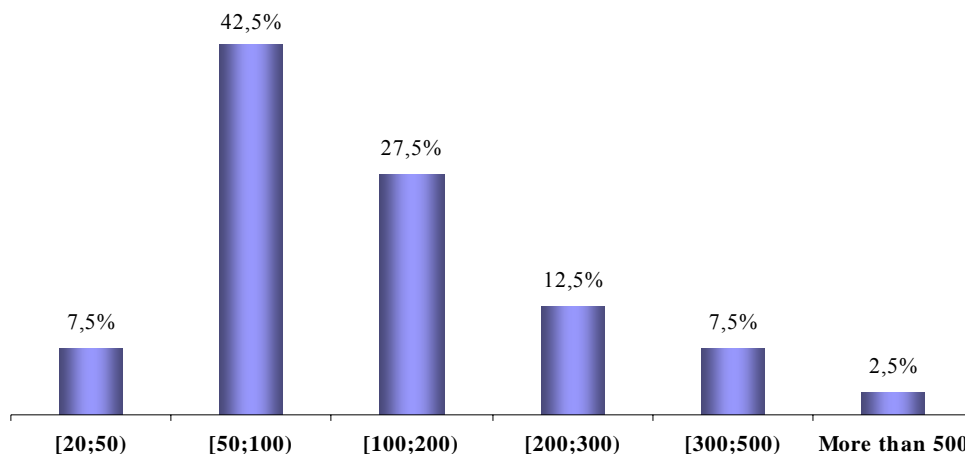
VI.1. Profile of Respondents

The Survey on Competitive Environment of Firms in the Formal Manufacturing Sector had attracted effective participation of 40 companies. This had contributed to 40% of the total response rate.

The survey findings showed that 35% of the respondents were from the export-oriented industries²⁰ and 65% were from the domestic-oriented industries. The export-oriented industries covered the following sub-sectors namely Canned Fish, Miscellaneous Electrical Equipment, Base Chemical Products and Textile Spinning.

In terms of company size, 7.5% of respondents comprised the small (less than 50 employees), 70% medium (more than 50 and less than 200 employees) and 22.5% large-sized industries (more than 200 employees). Respondents by company size are shown in Graph 8.

Graph 8: Respondents by company size

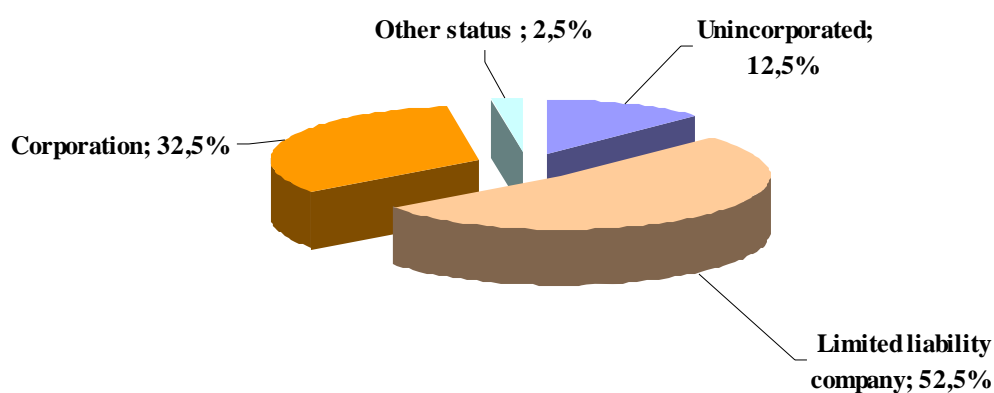


²⁰ Firms for which direct and indirect exports represent 50% or more of their turnover.

Based on the survey, 85.7% of the respondents in the export-oriented industries comprised the medium-sized industries and 14.3% was large-sized industries.

In terms of legal status, 52.5% of sample firms are limited liability companies (SARL), 32.5% are corporations (SA) and 12.5% are unincorporated. Only one firm have another legal status (cooperative or SNC).

Graph 9: Respondents by company legal status



As could be expected, large firms are more likely to have a corporation status; small and medium firms are more likely to be unincorporated.

Table 19: Respondents by size and legal status

	Unincorporated	Limited liability company	Corporation	Other status	Total
Small	0	2	1	0	3
Medium	5	16	6	1	28
Large	0	3	6	0	9
Total	5	21	13	1	40

In terms of firm position in the value chain of the industry, 86.5% of the respondents are producers of final products, 8.1% are suppliers of intermediate and final products, 2.7% are suppliers of raw materials, intermediate and final products and 2.7% are suppliers of raw materials.

Table 20: Respondents by sector and position in the value chain*

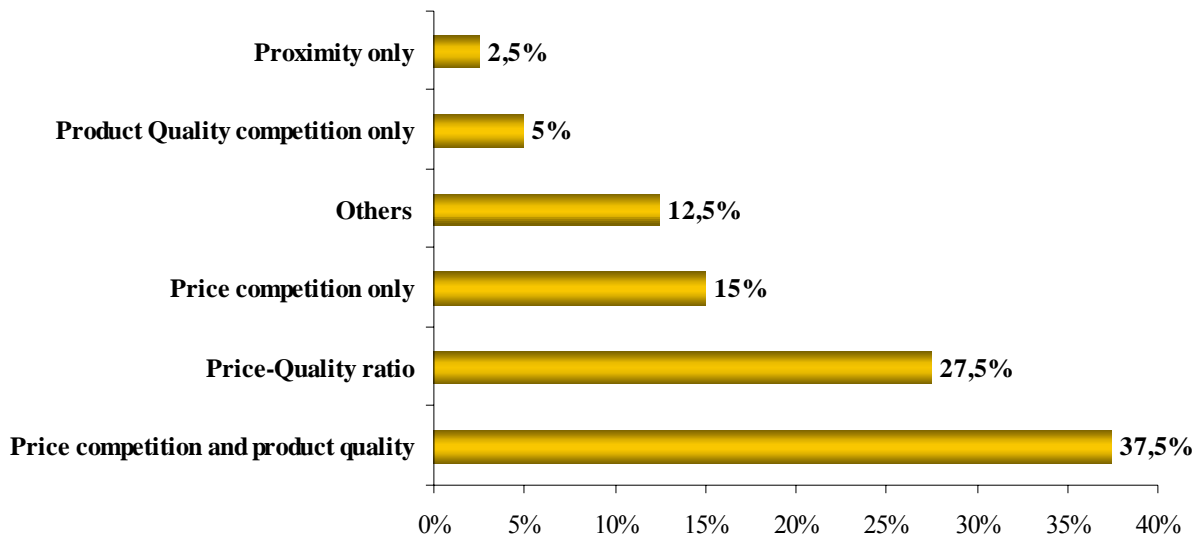
	Supplier of raw materials	Producer of final products	Supplier of raw materials, intermediate products and final products	Supplier of intermediate and final products	Total
Food processing	0	5	0	0	5
Building materials	0	2	0	1	3
Mechanical, Metal and Electrical industries	0	6	0	0	6
Chemical industries	1	5	0	0	6
Textiles, clothing, leather and shoes	0	9	0	1	10
Miscellaneous industries	0	5	1	1	7
Total	1	32	1	3	37

*We have 3 respondents which the position in the value chain is not indicated

VI.2. Competitive environment: Horizontal aspects

Firms are asked to identify the most important mean of competition of their major product (see Graph 10): 37.5% of firms nominated price competition and product quality as being the most important mean of competition, 27.5% nominated price-quality connection and 15% cited price competition only.

Graph 10: Most important mean of competition

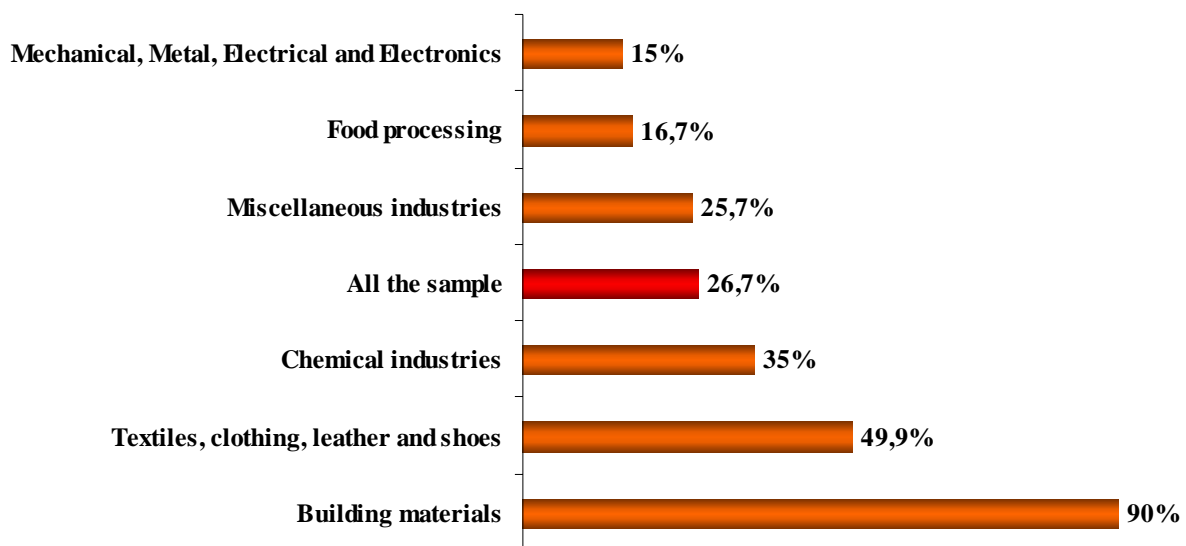


51.3% of respondents indicated government control the price of their principal product. Asked about how did this policy effect the economic performance of their firm, 20% of them declared that this policy have a strong positive effect, 55%

indicated a positive effect, 5% affirmed a negative effect and 20% stated that this policy have no effect on their performance.

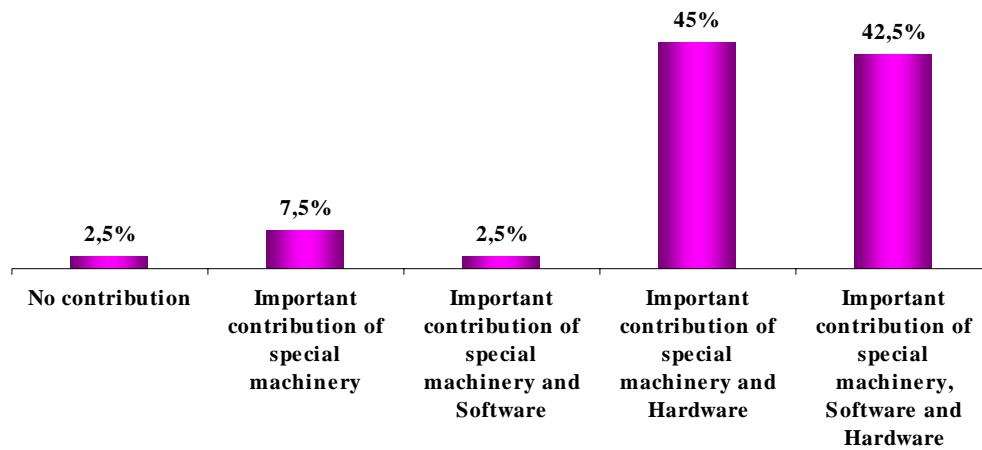
A very large proportion of the firms (94.6%) stated that their product requires a high specialized labor in a percentage varying between 10 and 90% (see Figure 4 for the sectoral high specialized labor requirement percentage). But only 37.5% of respondents declared that their product requires only high and medium specialized labor.

Graph 11: Percentage of High specialized labor by sector



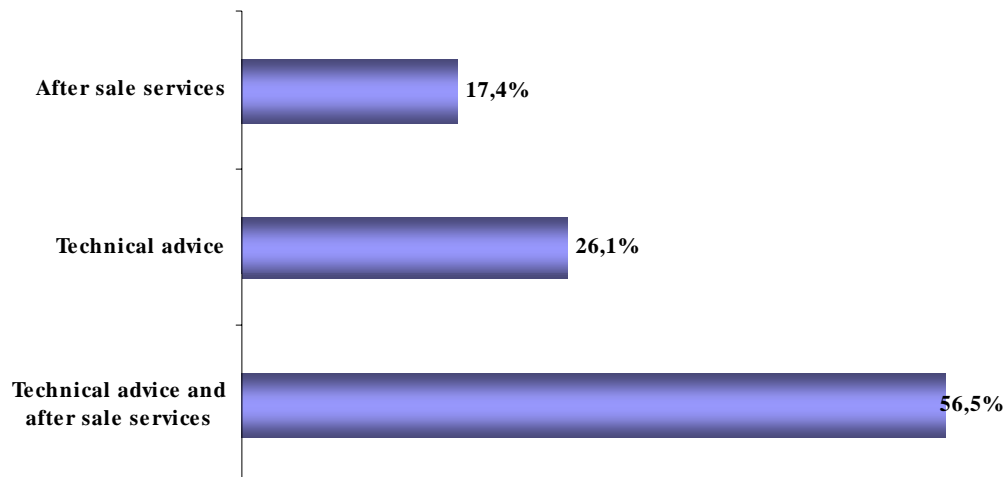
Asked about the contribution of special machinery, software and hardware for their product, 42.5% of respondents declared that contribution of both specialized inputs is important if not very important (see Graph 12)

Graph 12: Contribution of other specialized inputs



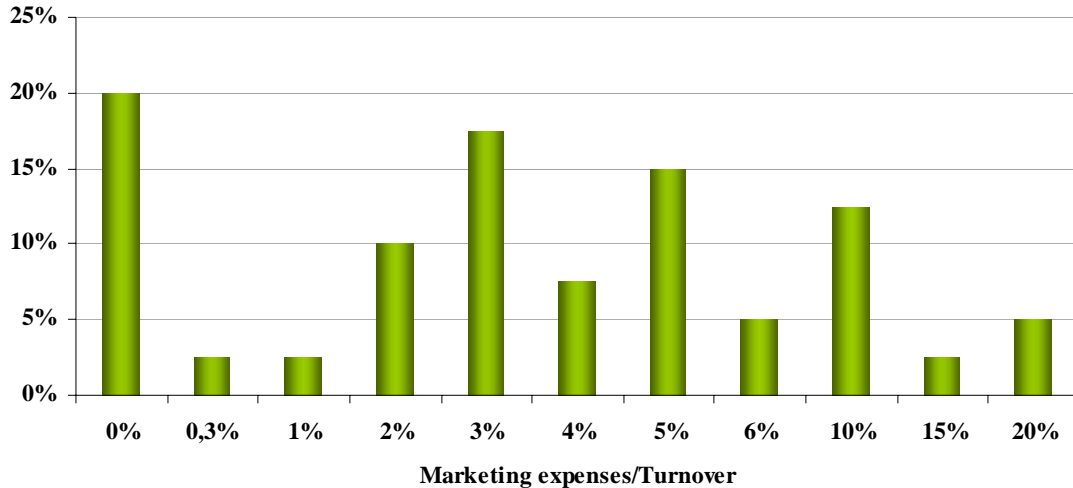
An important proportion (57.5%) of the respondents provides an extra service to clients: 56.5% of this service as technical advice and after sale services, 26.1% as technical advice only and 17.4% as after sale services only (Graph 13). All the respondents providing extra services consider such services at least important for the performance of their firm.

Graph 13: Nature of extra services to clients



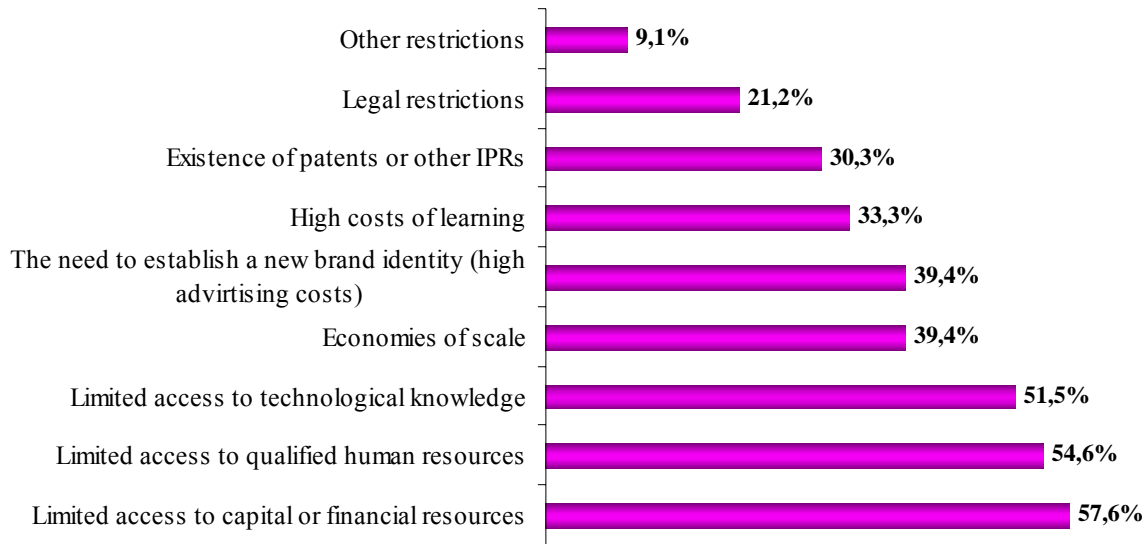
A large proportion of the firms (80%) declared a positive fraction of their turnover for marketing activities and communication (see Graph 14). The mean value of marketing activities expenses in proportion of turnover is 5.9%. Asked about the contribution of advertising, marketing and public relation to the economic performance of the firm, 87.5% of the respondents indicated at least an important contribution.

Graph 14: Marketing activities and communication expenses (% of turnover)



The dominant question in this section is whether respondents perceived major entry barriers in their industry. An important percentage of the respondents (82.5%) indicated the presence of entry barriers. Respondents are also asked to identify one or more types of entry barriers (Graph 15). Three factors were prominent; all of them concern the limited access to essential resources: financial resources (57.6%), qualified human resources (54.6%) and technological knowledge (51.5%). Financial resources restrictions were raised particularly by respondents belonging to Food processing (71.4%) and Miscellaneous industries (83.3%), while limited access to technological knowledge was more cited by respondents from Mechanical, Metal and Electrical (75%) and Chemical industries (80%); limited access to qualified human resources was considered as the most dominant restriction in Textiles, clothing, leather and shoes industries (60%).

Graph 15: **Major entry barriers in the concerned industry**



VI.3. Competitive environment: Vertical restraints

Manufacturers and suppliers often do not trade their goods through a simple linear pricing mechanism in which the manufacturers pay the suppliers an amount proportional to the quantity bought. Instead they use a variety of complex contracts. In the literature of industrial economics, these contracts are often referred to as vertical restraints. Examples of vertical restraints include nonlinear pricing, quantity forcing, full-line forcing, resale price maintenance, territorial restrictions, exclusive dealing, partial exclusive dealing, tie-in sales, and refusal to deal, and so on. Which set of vertical restraints will be used in practice depends on the market environment.

The third section of the questionnaire addresses the issue of vertical restraints by submitting to respondents questions regarding seven types of vertical restraints: resale price maintenance, quantity forcing, exclusive supply, exclusive dealing, tying arrangements, long term contract and franchising fee.

The results indicated that 10.8% of respondents have a supplier in position of monopoly in his market, 37.8% indicated that they are only few suppliers in his market and 51.4% stated that numerous suppliers are present in his market. Table 21 summarizes firm's perception of different vertical restraints in his market, whether the contract is explicit or implicit and how the specific practice affects firm profit.

Table 21: Respondent's perception of different vertical restraints

Vertical restraints	Frequency	Explicite in a contract	If not comply				Effect negatively firm profit
			Trial	Financial penalty	Refusal to supply	Suppression of payment facilities	
<i>Resale price maintenance</i>	32,5%	87,5%	0%	30,8%	69,2%	30,8%	50%
Do not sell above a certain price	0%	-	-	-	-	-	-
Do not sell below a certain price	5,0%	-	-	-	-	-	-
Sell at a certain fixed price	27,5%	-	-	-	-	-	-
<i>Quantity forcing</i>	36,1%	84,6%	7,7%	30,8%	53,8%	46,2%	12,5%
<i>Exclusive supply</i>	27,8%	90%	10%	30%	60%	80%	12,5%
<i>Exclusive dealing</i>	34,3%	100%	0%	16,7%	66,7%	58,3%	33,3%
<i>Tying arrangements</i>	36,1%	76,9%	7,7%	15,4%	61,5%	92,3%	23,1%
<i>Long term contract</i>	38,9%	100%	14,3%	28,6%	57,1%	92,9%	33,3%
Mean length (years)	4,62	-	-	-	-	-	-
Median lenght (years)	3,5	-	-	-	-	-	-
<i>Franchising fee</i>	30,6%	90,9%	9,1%	18,2%	45,5%	90,9%	9,1%

Part 3: The State of Competition Policy in Tunisia

I. Regulation and Competition in Tunisia: Global Framework

For over fifteen years now, Tunisia has set itself as an objective to draw up a development strategy aimed at securing, in its economic dimension, the improvement of individual as well as collective well-being.

It is in this respect and on the basis of a dynamic analysis of the observed and expected evolutions of the national as well as international environment, that it has adopted a strategy articulated, basically, around two choices.

The first one is the choice of transition towards a market economy following a progressive approach and well-balanced pace having made it possible to liberalize almost the whole market of goods and services, and, to a great extent, the labour market and to move forward in a relatively significant way in the liberalization of the financial market.

Of course, resorting to such an approach combining determination with respect to the economy reform and gradualism is accounted for, among other things, by the fact that it enabled:

- ✓ At the microeconomic level, to improve the adaptation capacity of the private sector which had to develop in a new context, and to change its vision, the logic of its behaviour and the foundations of its decision criteria,
- ✓ At the socio- economic level, to restrain and keep under control the social cost of the adjustment and the restructuring which the economy and the enterprise had to undergo representing a vector of greater socio-political stability allowing, in its turn, a better responsiveness of the private sector.

The second choice on which this strategy is based is that of the openness onto and the ever growing integration into the world economy and the vigorousness of a certain number of regional cooperation processes.

This double choice based on the development of private initiative, whether local or foreign, within a framework of openness and partnership implies undoubtedly all the importance granted by the elaborated strategy to a better knowledge of how the private sector, the business people and their expectations are perceived.

It is within this framework that comes the implementation, in a first sequence of the economy reform, of a coherent and multidimensional program having made it possible to impact all aspects including mainly the legislative and regulatory framework, the domestic and foreign trade, prices and investment, direct and

indirect investment, education and vocational training, infrastructure, the banking and financial system, the current convertibility of the Dinar and the administration.

The objective of this first sequence which extended from 1987 to 1995 was to lay down the market mechanisms after decades of economy planning and administration, to prepare the economy to the establishment of an evolving process of integration into the world economy and to liberate the energies and initiatives within the framework of a new balance of roles between the private and public sectors.

On the basis of the steps covered in terms of restructuring and reform of the enterprise and the economy, Tunisia decided to go forward in the integration of its economy into the world economy coupled with membership to the WTO and the signing of a partnership agreement with the EU, which Tunisia was, needless to say, the first country on the southern shore to sign with such an important economic space.

A second sequence of reforms was undertaken aimed at globally upgrading the economy and enabling the Tunisian enterprises to reach, in a more competitive context, a parity of performance both on the domestic and external markets.

The use of overall upgrading as a matrix to conduct the reform dynamic made it possible to:

- ✓ stress that the competitiveness of the enterprise depends also on that of its environment and to perceive it and assess it in terms of the respective roles of the private and public sectors at the level of the actions and reforms to undertake, and
- ✓ focus on the fact that the competitiveness requirements are not only texts or policies to implement but also mainly behaviours and attitudes which were required to adjust, not to say, change.

Concerning the components of the overall upgrading, it is worth reminding that concerning the environment and in relation to competitiveness, the undertaken actions covered:

- The adaptation of the legal framework through the setting up of a regulatory framework aimed at establishing clear and transparent game rules enhancing the confidence of the local and foreign operators and protecting them as much as possible from any form of anticompetitive practice or unfair competition,
- The development of human resources which has to meet two objectives: On the one hand, to provide, mainly through the vocational training apparatus, the needed skills for the enterprise in order to step up its flexibility and

capacity of coping with the evolution of demand, technologies and of markets, and on the other hand, to make it easier to integrate the biggest number of people in the economic sphere and the labour market by enhancing their capacity and their know-how.

- The development of infrastructure so as to improve the profitability of private investment, to facilitate and reduce the costs of marketing of goods and services and to further attract foreign direct investments.
- The stability of the macroeconomic framework to provide an adequate setting for the expectations and decisions of local and foreign private investors, and the access of the economy to the international financial market at reasonable conditions in order to finance the development effort and several fields related to the improvement of the competitiveness of the enterprise environment,
- The modernization of the banking and financial sector through the development, among other things, of the capacity to assess the project or the promoter-related risk and to make of the promoter a full actor in the restructuring dynamic of the enterprise and its quest for a better competitive positioning on the different markets,
- The upgrading of the administration and the reconsideration of its role so as to reduce the transaction costs and facilitate the transition of the economy and its restructuring.

In parallel with these actions, a national upgrading program (PNM) was initiated. It includes actions directly targeting enterprises and enabling to encourage them, on the basis of a diagnosis and through granting them bonuses and privileges, to undertake the required actions, in terms of material and immaterial investment, for the improvement of their competitive positioning on the various markets.

It is within the framework of this overall dynamic, that Tunisia gave particular attention to whatever is related to the competition policy whose scope, foundations and mechanisms had been defined by Law No. 91-64 dated 29 July 1991 relative to competition and prices and which was amended four times to give rise finally to the Law No. 20003-74 dated 11 November 2003.

It is worth reminding that this law stipulates in its general provisions in the first article that it aims at:

- ✓ defining the procedures governing the free price setting,
- ✓ setting up the rules providing for free competition, enacting to this effect the commitments to be borne by the producers, traders, service providers and other intermediaries, having to prevent any anticompetitive actions, ensuring

price transparency and eradicating restrictive practices and unlawful price rises, and

- ✓ enabling the monitoring of concentration and mergers

II. Competition Authority in Tunisia

As mentioned above, to back up institutional reforms and to encourage the emergence of a competitive environment, a series of global and sectoral instruments have been promulgated in Tunisia, the most significant of which is the Competition and Prices Act No. 91-64 of 29 July 1991, which has been amended by Act No. 93-83 of 26 July 1993, by Act No. 95-42 of 24 April 1995, by Act No. 99-41 of 10 May 1999 and more recently by Act No. 74-2003 of 11 November 2003. The Act, establishing the principles of competition and prices policy, is divided into several parts and chapters on the various aspects of this policy.

The Competition Council (*Conseil de la Concurrence*), created pursuant to Act No. 95-42 of 24 April 1995, replaced the Competition Board (*Commission de la Concurrence*). The Council is empowered to perform two functions: a decision-making function and an advisory function.

The Council is empowered to perform two functions:

- ***a decision-making function***: The Council is required to take cognizance in an adjudicatory capacity of applications pertaining to the anti-competitive practices stipulated in article 5. In this capacity it can impose financial penalties, order the closure of the firms, or grant injunctions ordering traders to cease the offending practices, and
- ***an advisory function***: The Council may be requested by the Ministry of Trade to give an opinion on draft laws and regulations and on competition-related issues, as well as on planned concentrations.

Tunisian Competition Authority is an Independent-Administrative Authority. Its independence is ensured by articles 9 and 15 of the Competition Act.

To ensure the Council's autonomy, the legislators conferred on it a privileged status that makes it more of a jurisdictional authority than an administrative one. This aim is reflected in two features: Membership of the Council, half of which consists of judges; the referral of cases by a range of bodies, namely, the Ministry of Trade, firms, professional bodies, trade unions, registered consumer organizations and chambers of agriculture, commerce and industry.

The monitoring and observance of the provisions of the Competition and Prices Act are matters for both the administration and the judiciary. There are at least three bodies that may intervene under a procedure laid down in the Act. These are the DGCRE (Direction Générale de la Concurrence et de la Recherche Economique, Ministry of Trade) and the regional offices of the Ministry of Trade, the Competition Council, and the ordinary law courts

The role and powers of each authority are clearly defined by the Act:

- **Price-control officials, police officers of the criminal investigation service and local authority officials** are authorized to enforce the Act. To this end, they have quite wide-ranging powers to carry out investigations and inquiries into all the subjects and practices (prices, competition) dealt with in the Act. However, only price-control inspectors are authorized to prepare cases for trial and to report offences relating to anti-competitive practices (article 5);
- **The Competition Council:** the Council has the task of ruling on the anti-competitive practices specified in article 5, that is, agreements and abuses of dominant positions, which are referred to it by applicants, including the Ministry of Trade, firms, organizations and professional bodies. In addition to its decision-making and advisory functions, the Board is empowered to order inquiries and investigations, which are carried out under the authority of the chairperson by “rapporteurs” appointed for this purpose;
- **The Ordinary law courts:** with the exception of the anti-competitive practices that fall within the jurisdiction of the Competition Council, all offences under the Competition and Prices Act are assigned to the jurisdiction of the ordinary law courts. In addition, these courts are authorized to nullify any agreements prohibited under article 5. They are also competent to rule on redress for damage suffered as a result of the anti-competitive offences specified in article 5 in cases on which the Council has already passed judgement. Similarly, the Council may transmit to the public prosecutor any cases in which individuals have participated by indirect means in violations of the prohibitions in article 5.

The President, vice-presidents, magistrates and others members of the Council are proposed by the Minister of Trade and appointed by decree by the President of the Republic

Competition Board has 13 members, including the President and two Vice-Presidents.

Backgrounds of members of Competition Board are as follows:

- Judiciary (magistrate): 7 members including the President and 2 vice-Presidents
- Public administration and business professions: 6 members

In the same vein, it is worth mentioning that the Law in Articles 12 (New), 13 (new) and 13A, makes for the appointment at the Council of respectively:

- ✓ A permanent secretary in charge mainly of the registration of petitions, of bookkeeping and filing, of drawing-up minutes of hearings and of deliberations and decisions of the Council and of any other mission entrusted to him/her by the Council's president.
- ✓ A general "*rapporteur*" and of recorders appointed by ordinance. The general "*rapporteur*" is responsible for coordination, follow-up, monitoring and supervision of the recorders' work.

The recorder's mission consists in initiating the investigation of petitions which are entrusted to him by the President of the Council. In this respect, he checks the documents of the case and can require from the corporate and natural persons, under the seal of the President of the Council, all the additional elements necessary for the investigations.

He can also, in compliance with the regulations and after permission from the Council's president, make all on the spot enquiries, ask to be handed any document he deems necessary for the investigation of the case or still initiate under the seal of the president, all enquiries or appraisals which will be carried out by the agents in charge of the economic and technical control.

The President can also appoint contractual recorders chosen for their experience and competence in the areas of competition and consumption.

- ✓ Of a government commissioner representing the Minister in charge of trade having as a mission to defend the general interest in issues related to anticompetitive actions mentioned in Article 5 of the Law and to present the administration's comments to the Council.

When speaking of the competition policy in Tunisia, one cannot but linger a little on the role played by the Minister in charge of trade who represents a key actor in the implementation of this policy and in its conduct. Among other things, the minister has as prerogatives to:

- ✓ Authorize concentration and mergers operations which can give rise to a dominant position (Article 7 new) and to concession and commercial

representation contracts (Article 5 new) and the agreements securing technological and economic progress,

- ✓ Bring before the Council petitions on his own initiative or upon request from the government (Article 11 new),
- ✓ Take precautionary transition measures against excessive price increases justified by crises or calamities (Article 4) or measures having to ensure or reinstate the conditions for adequate competition (Article 7A),
- ✓ Apply decisions taken by the Council (Article 35 new).

The General Competition and Economic Research Department was also assigned by the Decree n° 2966 of December 20, 2001 an important role in the implementation of the competition policy, mainly through fulfilling the following missions:

- ✓ The enforcement of laws and measures relative to competition and prices and to the contribution to the spread of competition culture
- ✓ The monitoring of concentration operations and the gathering of indicators in relation with the anticompetitive actions,
- ✓ The drawing up of petitions having to be filed before the Competition Council.

It is worth mentioning that this department can be entrusted by the Council's president to carry out queries or investigations regarding the cases referred to the Council (Article 11 New).

Appointments of the members of competition authority are:

- The President: last for 5 years renewable one time if he is not a magistrate.
- 2 vice-Presidents: last for 5 years renewable one time.
- 4 magistrates: last for 5 years renewable one time.
- 4 advisers: last for 4 years non renewable.
- 2 advisers: last for 6 years non renewable.

The budget for the competition authority is assigned as part the budget of a Ministry of Trade.

It is worth mentioning that this department can be entrusted by the Council's president to carry out queries or investigations regarding the cases referred to the Council (Article 11 New).

At this level of our developments, it is worth pointing out the interest shown by Tunisia to the ongoing adaptation of the competition policy to go hand in hand with

the economy reform and restructuring process aimed at ensuring its liberalization and its integration as provided for, among others, by Tunisia's commitments within the framework of its partnership agreement with the European Union and its membership in WTO.

This adaptation, also obtained by the successive amendments of the regulatory framework, is mainly visible through the broadening, in 1995, of the scope of the law on competition in its Article 5 (new) to include the issues of concentration and mergers, not provided for in its July 1991 initial version, as well as the strengthening of the expertise and the human resources put at the disposal of the Council to bestow on it the required efficiency through equipping it, for instance, with a general rapporteur, with the possibility of resorting to contractual recorders and with a government commissioner that did not exist in the initial version of this law.

As far as the referral of the cases to the Council is concerned, Article 11 of the Law stipulates that petitions are brought before the Competition Council by the Minister in charge of commerce, the enterprises, the professional organizations, trade unions, organizations or legally incorporated associations of consumers, or by the chambers of agriculture or commerce and industry, even if, as we are going to see later, in practice, it is the Minister in charge of trade who has mainly been the party to refer the most cases to the Council. In this respect, it should be mentioned that these amendments have now led to the fact that the Council can also automatically take proceedings in a case, in the event of a withdrawal of the petition by the concerned parties should the investigations carried out in a case it has had to examine show anticompetitive actions on a market directly related to that of the one subject of the petition.

Given that the law provides for the need to prescribe the actions related to the anticompetitive practices which are more than 3 years old, the Council, once the case is referred to it, will, as stipulated by Article 19 (new) of the Law, be faced with 2 courses of action:

- ✓ The first being the one where it considers that the facts put forward are outside its jurisdictions, as was the case with some of the petitions it has had to deal with or that they are not backed by evidence, in which case it will declare the petition non- admissible.
- ✓ The second case corresponds to that where it rules that the case is admissible in essence. Decisions rendered will then necessarily include :
 - The recognition of the reprehensible feature or not of the practices submitted to its investigation,

- The condemnation, if need be, of the authors of such actions to those sanctions mentioned in Article 34 of the current Law.

It should also be pointed out that by virtue of Article 20 (new) of this Law, the Competition Council is also entitled, if need be, to address injunctions to the operators concerned by the anticompetitive actions so as to put an end to these practices within a given deadline or also to impose on them particular conditions in the conduct of their business.

It can order the temporary closure of an establishment or of the guilty establishments for a period not exceeding 3 months knowing that their reopening can occur only after they have put an end to the actions for which they had been condemned. It can also, if it deems it necessary, hand over the case to the prosecutor in order for a lawsuit to be initiated.

In the event of an excessive exploitation of a dominant position ensuing from a case of concentration and mergers of enterprises, the Competition Council can suggest to the Minister in charge of trade to call upon, should the occasion arise, jointly with the Minister responsible for the concerned sector, through a counsel's decision, the enterprise or the enterprises at fault to modify, complete or terminate any agreement and any act by virtue of which the concentration and mergers giving rise to the violation was made notwithstanding the carrying out of the procedures mentioned in Articles 7 (new) and 8 (new).

III. Illegal practices under Competition Law

III.1. Competition Policy Conceptual Framework

In this part of the study devoted to the presentation of the different components of the competition policy in Tunisia, it will be worthwhile, beyond the institutional dimension, to re-examine certain important conceptual substructures of this policy on which the 2002 report of the Competition Council sheds good light.

In this respect, the Council considers, for example, an economic enterprise to be any physical person or corporate person taking up an economic activity and having commercial, financial, economic management autonomy.

As a result, it considers that the subsidiaries of the enterprises not showing such autonomy cannot be answerable to this law on competition.

It is also worth observing that by virtue of the Law but also and mainly through the Council's activity, the different decisions made by it and the various opinions it issued, being situated at the heart of the competition policy, this institution distinguishes between the anticompetitive actions and the unfair competition ones.

This distinction was corroborated by the Council's decision of 25 December 2002 relative to Case n° 9/93 which stipulates that « the unfair competition cases whose consequences are confined to one or a few enterprises without these cases affecting the market mechanisms and its normal functioning are answerable to before the common law courts ».

Hence, through this decision the Council confirms that what it considers as unfair competition is outside its jurisdictions and those of the competition law but falls within the powers of Article 92 of the obligations and Contracts Code.

Similarly and regarding agreements, forbidden by Article 5, whether these are vertical or horizontal, explicit or implicit, if they affect the good functioning of the market, the Council considers that the small enterprises do not fall within the powers of the competition Law, confirming it in the Decision 2135 of 19 December 2002 but that they can be sued for unfair competition issues.

It is also worth pointing out that the Council, as stipulated by Article 6 of the Law, does not consider to be anticompetitive any agreements or actions whose authors can prove that they have as an impact technical or economic progress and that they provide the users with an equitable share of the resulting profit. These actions are, however, subject to the permission of the Minister in Charge of trade after advice from the Council.

It is within this framework that comes the Council's opinion n°2267 of 12 December 2002 relative to the agreements between the insurance companies on the exchange of the Risk analysis data and information which the Council did not consider as anticompetitive actions despite their impact on price fixing. The same is said for the agreements concerning the collective coverage against the major risks.

As to the concentration and mergers operations having to meet simultaneously two conditions, namely that the entity to which they give rise should secure 30% of the market share and that it should have a turnover equal or higher than 3 million Dinars, these are subjected to an authorization from the Minister in charge of trade for which he seeks the Council's opinion.

The Council explains, in its 2002 report, that the fact of keeping both conditions makes it possible to take into account the liberalization of the markets and the potential of the enterprises operating on the Tunisian territory to withstand foreign competition as its opinion n°2266 dated September 24, 2002 appears to show.

In this respect, it should be pointed out that the Council suggests in this Report to change the Council's advisory opinion into a binding one because of the importance of the decision of the Minister in charge on the functioning of the market and the compliance with the competition rules. The Council justifies such a

proposal by the fact, among other things, that this decision must be based on an economic study which the Council actually proposes to conduct.

With regard to the situations of excessive exploitation of a dominant position on the market, it is to be pointed out that the Council has considered in its decision n°2135 of December 19, 2002 that a dominant position does not constitute in itself an impairment to the competition except if it leads to the elimination of competitors or to the hindrance of the normal functioning of the competition rules.

It has also considered that an economic enterprise is in a dominant position if this position bestows on it an economic power enabling it to handle and manage its clients according to its sole will.

This implies, in this case, that it finds itself in a position where, away from any market pressure, it can impose its conditions, control the market mechanisms and influence, in a fundamental manner, the situation of the operators on this market likely to result from its market share, its technological, commercial and financial capacities or from its geographical localisation.

As to the situations of excessive exploitation of a position of economic dependence, the Council in its appraisals considers that such practice concerns the case where an enterprise does not happen to have a dominant position but has a position which enables it to influence the market situation as a client mainly of the big retailers which have become capable of imposing their conditions on the producers and industrialists.

As to the exclusive concession and commercial representation agreements, Tunisia has chosen to subject them to the authorization of the Minister in charge of commerce. This is, as shown by the Competition Council's 2002 Report, unlike many other countries such as France, for instance, which considers them to be valid as long as the choice of the distributors is justified by the nature of the product or the capacity to provide well determined services.

Whatever the case may be and as shown by the 2002 report of the Council of Competition, two major principles have underlined the drawing up and mainly the implementation of the competition policy as well as its adaptation:

➤ ***Gradualism:***

The implementation of the competition policy in Tunisia was carried out, like all other reforms introduced in all the other areas, in a gradual way to ensure its efficiency and its consistency with the other components of the development strategy.

This progressivism translates the conviction in which the Council itself believes and which we find throughout its reports that competition is not seen as an end in

itself but as one of the levers of, even of the requirements of the liberalization of the economy, of its integration in the world economy and of making more dynamic the private sector whose responsiveness improvement has become one of the key conditions for the success of the adopted strategy.

This vision is very tangible in the approach which the Council has of its role and its contribution both of which are underlined in its 2001 Report, a report which was meant to be an evaluation of the first decade of its activity. Thus it is underlined that this role cannot be thoroughly understood unless we take into consideration that this Council was born in an environment which was fast shifting after many years of planned economy and protection having shaped the attitudes and behaviours of the various operators and thereby the functioning of the market.

It is within this perspective that we should see the four amendments introduced on this law so as to take into consideration the evolution and the inadequacies noticed whether in the scope or the means and procedures of the Council's intervention. All this should make it possible to improve the efficiency of its interventions and that of the framework of the competition policy itself.

➤ ***Flexibility:***

It is, to a great extent, in correlation with the approach based on progressiveness as far as the elaboration and the implementation of the competition policy is concerned.

Indeed, the Competition Council considers that this flexibility is justified by the need to take into consideration the higher interests of the country without, however, this flexibility leading to any kind of leniency in applying the competition rules. This can be achieved through providing for some exceptions subjected to the appraisal of the Minister in charge of trade and the Competition Council and relative to vital products of health, environment and culture and to the economic and technological progress.

This flexibility also reflects the determination to take into consideration in the elaboration of the competition policy, its implementation and its adaptation, the steps covered in the restructuring of the economy and the will to take into account the particularities of the country through refusing that the framework of competition be brought down to a standard framework that is imported and transplanted to a reality it is not ready for.

In its last two reports, the Competition Council has come up with several proposals aimed at making its role more dynamic and at improving the competition framework. These proposals can be summed up as follows:

- ✓ Enriching the procedure so as to provide the different parties more possibility for defence by introducing the possibility to appeal because right now there is only the possibility to lodge an appeal with the cassation court,
- ✓ Conferring to the Council the possibility to resort to an emergency procedure to take preventive measures putting an end to anticompetitive actions, something it is able to do now,
- ✓ Spreading even further the culture of competition and sensitising more the concerned parties as to its merits,
- ✓ Examining the possibility of further strengthening the administrative and financial autonomy of the Council to consolidate its perception among operators as an independent body, particularly that the Ministry of trade is often involved in the cases submitted to it,
- ✓ Reinforcing the means at its disposal with skills and qualifications through recruitment of specialists in the legal and economic fields related to competition and through the in-service training of the resource people already operating in its services,
- ✓ Developing its database through the provision of more data and studies.

III.2. Summary of illegal practices under Competition Law

Article 5 of the law prohibits:

- all concerted actions and explicit or implicit agreements aiming at restricting competition, particularly when they restrict price determination by market forces, market access by other firms, restrict or control production, markets, investments or technical progress, share markets or sources of supplies;
- the abuse of dominant position on the local market or on an important share thereof: Actions of abuse concern refusal to sell, tied sales, resale price maintenance, discrimination among customers or discontinuation of commercial relations for no valid reason or because the partner refuses to yield to unjustified commercial conditions;
- the abuse of a dependent situation in which a supplier or a customer is held, with no choice left for an alternative outlet for his products or source of supply for his purchases.

Two amendments of the 1991 Act were introduced to deal explicitly with exclusive arrangements: the explicit prohibition of all exclusive agreements of concessions and commercial representation, enacted in 1995, and the relative easing of this

prohibition by granting the minister in charge of trade the power to authorize such agreements on an exceptional basis, enacted in 1999. The latter amendment does not however spell out the conditions that need to be met in order to benefit from such exceptions.

The prohibition of exclusive agreements in the Tunisian legislation contrasts with the French or the EU legislation where a rule-of-reason is applied and where the competition authority weighs the likely anticompetitive against the pro-competitive effects of the intended contract.

The Tunisian law does not consider as anticompetitive behavior concerted actions or the abuse of a dominant position that generates technological or economic progress and where a fair share of this progress benefits to consumers. Authors of such practices need to provide evidence for the likelihood of such effects. These practices, which have to be submitted to the approval of the minister of trade who issues his decision after seeking the competition council's opinion, may be exempted from prosecution even if they eliminate competition from a substantial portion of the market.

Merger control was introduced only through the 1995 amendment. Mergers fall under the heading of concentration, defined as any action that transfers the property of a firm allowing another firm or group of firms to exert an important influence on other firms. Any concentration action resulting in a dominant market position has to be submitted to the minister's approval. Two conditions are involved, a joint market share of the parties involved exceeding 30 percent (issue of market definition), and total sales have to exceed a certain amount set by decree, currently standing at 3 MD.

It is important to notice that the minister of trade has no legal obligation to seek the opinion of the competition council on merger cases. Indeed, consultations of the latter are only optional.

IV. Competition Policy Implementation

IV.1. Cases and Consultations Typology

It is necessary to clarify that implementing competition law is the major activity of the competition authority. It is designed to ensure that businesses do not enter into agreements that prevent or distort competition, do not abuse their market power and do not engage in anticompetitive mergers. Competition law is directed at the autonomous behavior of businesses, not at behavior sanctioned by law. In fact a

competition law by itself does not impede the adoption of anti-competitive legislation.

As a consequence, a key activity that competition authorities perform is to advocate competition, to seek, in other words, to influence competition policy. The focus of this enquiry is to identify the ingredients for acquiring a reputation as an independent enforcer of competition law and as a credible advocate for competition policy.

It should be first pointed out that the Council, since its creation, has always had two missions, namely a legal one and an advisory one to which we can also add an activity which, without however being part of its official missions, is likely to become more and more important in terms of impact on the competition policy, namely its activity of investigation and guidance.

As previously indicated, within the framework of its two missions, the Council can be resorted to by the Minister in charge of Commerce, by the economic enterprises, by the professional organizations or trade unions, the incorporated organisations or groupings of consumers or by the chambers of agriculture or those of commerce and industry.

Table 1: Cases and consultations referred to competition council

Years	1992	1993	1994	1995		1996	1997	1998	1999	2000	2001	2002	TOTAL
				JUIN	JUIL								
Cases	1	9	4	3	1	2	1	1	11	4	3	8	48
Consultation requests			1	2		6	3	17	10		11	12	62

Source: Based on the Tunisian competition council's report, various issues

The number of legal cases presented to the Council during the period 1992-2002, as shown by Table 1, did not exceed 48, that is an average of 4.3 case per year and of 2.5 if we do not take into account the years 1993, 1999 and 2002 where the cases brought before the Council were respectively 9, 11 and 8 cases.

The Council explains, in its 2001 Report related to the evaluation of the first decade of its activity, the relatively modest resorting to its competences by the various parties, by the transition of the Tunisian economy and a competition culture not deeply taken in by the operators.

With respect to the opinions, their number was, over the same period, 62, that is an average of almost 5.6, higher to that recorded at the level of petitions, thus implying that the Council was resorted to more for its advisory mission than for its legal-related one.

As to the proceedings placed with the Council, it is to be said that the parties which have the most referred cases to the Council are respectively the economic enterprises which referred 39 cases to it, i.e. 81.2% of the total, and the Minister in charge of trade 5 cases, i.e. 10.4%. It should be mentioned that the years 2001 and 2002 are characterised by two cases initiated by the Council itself.

Table 2: Distribution of cases filed according to the nature of the plaintiff

Years	1992	1993	1994	1995		1996	1997	1998	1999	2000	2001	2002	TOTAL
				JUIN	JUIL								
Government (Minister of Trade)			1			1		1	2				5
Firms	1	9	2	3	1	1	1		9	3	2	7	39
Business associations or trade unions			1							1			2
Consumer protection associations													0
Farm, Industrial or commercial chambers													0
Initiation by the council											1	1	2
TOTAL	1	9	4	3	1	2	1	1	11	4	3	8	48

Source: Based on the Tunisian competition council's report, various issues

It is also important to observe that out of the 48 petitions that were presented to the Council during this period, the Council has considered that 26 among them do not fall within its scope because almost all of them correspond to what it considers as cases pertaining to unfair competition and not to anticompetitive actions and that 5 were not, in essence, admissible.

Table 3: **Decisions issued by the Council**

ANNEES	1992	1993	1994	1995		1996	1997	1998	1999	2000	2001	2002	TOTAL
				JUIN	JUIL								
Decisions			4	1			8	5	7	6	4	8	43
Withdrawal of the suit							2	1		1		1	5
Falling outside the Council's jurisdiction			4				5	4	3	4	2	4	26
No ground to continue the procedures							1		1		1	2	5
Cases sanctioned for guilt				1					3	1	1	1	7

Source: Based on the Tunisian competition council's report, various issues

As to consultative activity, the opinions issued by the Council relative to draft legislation and regulatory literature and specifications accounted for more than half of all the opinions issued over the period; 8 decisions concerned the concentration and mergers case and one opinion is about exclusive agreements.

Table 4: **Consultations of the competition council by nature**

Years	1992	1993	1994	1995		1996	1997	1998	1999	2000	2001	2002	TOTAL
				JUIN	JUIL								
Mergers								2	3	1	1	1	8
Exclusive and selective contracts										1			1
Draft legislation							2	6	4	3	3	6	24
Cahiers de Charge									6	2	4	2	14
Other issues							4	4	3	1	4	3	19
TOTAL							6	12	16	8	12	12	66

Source: Based on the Tunisian competition council's report, various issues

Table 5: **Distribution of cases filed by economic activity**

ANNEES	1992	1993	1994	1995		1996	1997	1998	1999	2000	2001	2002	TOTAL
				JUIN	JUIL								
Agro-Food Industry	1	1	1	1		1			2		2		9
Energy		1											1
Mechanical and Electrical Industry		2	2	2						2		1	9
Chemicals		1				1							2
Textiles, Apparel and Leather		1		1									2
Services		3	1				1	1	5	1	1	3	16
Handicrafts									2			2	4
Others manufacturing industry									1	1			2
Distribution									1			2	3
TOTAL	1	9	4	4	0	2	1	1	11	4	3	8	48

Source: Based on the Tunisian competition council's report, various issues

IV.2. Cases of anticompetitive actions investigated under the law

Finally, at this stage of our analysis, we need to present some cases to illustrate in practice the application of the regulations in force by the Competition Council and the type of motives it used to justify the decisions it made and consultative activities it undertook.

As far as decisions are concerned, among the cases which can be mentioned, there is that of the North Mechanical Industries enterprise "Imen" which filed a complaint against the enterprise "Electrode" accusing it of charging low prices, which thus made any competition difficult, and asking the Council to consider this situation as one of abuse of dominant position.

The investigations conducted by the Council have led it to notice that, unlike what the plaintiff claimed, the level of prices charged by "Electrode" was due to an effort to keep costs under control and that these prices were far from being lower than the

cost prices but, on the other hand, were close to the export prices and the international reference prices.

On this basis, the Council stated in its decision n°2 of April 8, 1999 that the provisions of Article 5 of the competition law were not applicable to this case and that the complaint was considered non admissible in substance.

Another example of a case falling under this category was that filed by « Le Comptoir de tissage de sac » (a jute bag manufacturer). This company lodged a complaint against the Cereals Marketing Board for failure to purchase from it while it is in a situation of economic dependency towards this Board.

The Council, in its decision n°3 of March 15, 2001, while admitting the existence of an economic dependency situation, considered that this petition was non admissible since the plaintiff participated in tenders made by the Board and was not selected because of its high prices.

As to cases of withdrawal of suits, that of the «National Federation of Tomato producers» should be mentioned because it has largely contributed to move forwards the regulation then in force.

The complaint in itself was lodged by this Federation against agri-business manufacturers for collusion on fixing the purchase price of fresh tomato with the approval of their union chamber which had itself announced this price. The decision of the Council n°1 of May 7, 1998 was merely to take notice of this and drop the case.

This case made it possible, however, to show one of the inadequacies of the law prevailing at that time, namely the impossibility for the Council, once the petition is withdrawn by the plaintiff, to carry on and extend its investigations on the anticompetitive actions at the level of an activity branch. The 1999 amendment remedied to this by empowering the Council to pursue on its own initiative such investigations whenever it deems it necessary.

As far as withdrawal of suits falling outside the Council's jurisdiction is concerned, one of the cases falling under this category, is the one relative to the complaint filed by « la Société Nationale de l'Emballage Moderne » (The National Company of Modern packaging) against « la société Belvédère de l'emballage » (The Belvedere Packaging Company), the former accusing the latter of enticing essential elements of its labour force away so as to harm and affect its activity.

The Council Considered, in its decision N° 5 of December 2000, that it is a case which involves only the relationship between two enterprises without affecting the good functioning of the packaging market and that, as a result, it does not fall

within the scope of an anticompetitive action and within the jurisdiction of the Council.

As a case admissible in substance, mention should be made of that filed by the Steel company “Hédidane” against “SOFOMECA” for lowering its prices down to a level making it impossible for the former to market its product.

The proceedings of the Council have shown that indeed SOFOMECA was charging prices not reflecting at all its costs which did not include any margin. This led, for example, to the total exclusion of « Hédidane » from the market of steel balls and, among other things, to SOFOMECA finding itself in a monopolistic situation on this market.

Hence, the Council considered, in its decision n°1 of November 6, 2002, that this petition was admissible and that the different elements of the case made it possible to state that SOFOMECA resorted to anticompetitive actions as per the provisions of Article 5 of the competition law.

As to the consultative activities, and more precisely in the area of concentration, the Council approved of the finalisation of many operations over the last few years after having examined their cases and where the key question it systematically asked itself was to determine what their impact on the functioning of the market relative to their sector was.

Within this framework, and because it considered that they did not affect competition, the Board authorized, for instance, the operations:

- ✓ Of merger between the ‘Tunisian firm of explosives’ and the firm ‘Nitrogil’, considering, in its decision n°1 of May 7, 1998, this merger as an internal restructuring operation between a parent company and its subsidiary,
- ✓ Of a merger between ‘Promogaz’ and the firm ‘Butagaz’ provided that the latter takes in charge the replacement of the Gas cylinders held by the former’s clients or refund the deposit in the event of the restitution of such cylinders (decision n°11 of December 10, 1998),
- ✓ Of the takeover of the firm F3T by the PAF firm, in the iron ore sector, arguing basically, in its decision n°2 of 1999, that this operation enabled them to improve their competitiveness without, however, harming competition in this sector,

On the other hand, the Council issued a unfavourable opinion as regards several of these cases arguing the same concern, i.e. their impact in terms of competition. It is worth mentioning here the merger case between the firm ‘Esso Standard’ and the Firm ‘Mobil Tunisie’. The Council justified its decision by the fact that this merger

was going to generate an economically dominant position affecting competition in the oil sector without yet being a source of economic or technological progress.

V. The status and perspectives of cooperation with the EU in the area of competition policy

The Association Agreement signed between the EU and Tunisia is essentially a Free Trade Agreement but contains also provisions on standards and norms, payments and capital movements, rights of establishment and services, competition, economic cooperation including technical assistance, in addition to political dialogue and cooperation in social and cultural matters. With respect to competition, the Association Agreement states that any provisions inconsistent with the rules of Articles 85, 86 and 92 of the Treaty establishing the European Community are incompatible with the proper functioning of the Agreement. It adds that the Association Council will adopt, within five years of the entry into force of the Agreement, the necessary rules for compliance with the competition provisions of the Treaty of Rome.

Tunisia has been among the first Euro-med southern partners to enact a competition law. The existing law is by and large consistent with EU competition legislation, with the exception of state aids which is a very complex issue, both for the EU and for Tunisia. The successive amendments of the Tunisian law have tended to reduce gaps with EU legislation.

Under the framework of the Association Agreement, the EU can assist to enhance the efficiency of the council's work. The following areas of technical assistance are worth considering:

- Internship for the training of the council's staff: investigations of cases, collection of relevant information, the conduct of on site collection of information, methodologies used in conducting a rule of reason approach with respect to vertical agreements, etc.
- Internship for students specialized in competition law.
- Assistance with databases: how to optimize the use of limited resources in order to collect the most relevant information on market structure and conduct? What sort of general information and literature should be sought and collected in preparation for the empowerment of the council with self-initiation?

- Assistance with programs to install a competition culture, particularly to enable firms to understand what is relevant for competition policy. How to adapt the spread of competition culture in an environment where small and medium enterprises make up the bulk of the economy?
- Cooperation agreements and positive comity.
- Harmonization of laws.
- Exchange of ideas on multilateral negotiations on competition policy.

**Part 4: Competition and Economic
Performance. Dynamics of the Competition
Process**

I. Performance and Technical Progress in Tunisian Manufacturing Firms: Firm-level econometric analysis

In this section, a panel of 265 firms in manufacturing industry, drawn from the Annual Firm Survey, with detailed information on output and input factors and firm ownership is used to estimate a translog stochastic production function for the period 1984-94. By adopting the time-varying inefficiency model developed by Battese and Coelli (1995)²¹, we seek to analyse technical (in)efficiency and to identify its determinants for each of the six manufacturing sectors, to examine industry-level total factor productivity performance, and to investigate the relationship between technical efficiency change and competition environment.

1.1. Methodology

- Traditionally, the analysis of firm performance has been done using conventional financial ratios such as the return on equity, return on assets, expense to premium ratios, etc. With the rapid evolution of frontier efficiency methodologies, the conventional methods are rapidly becoming obsolete. Frontier methodologies measure firm performance relative to “best practice” frontiers consisting of other firms in the industry. Such measures dominate traditional techniques in terms of developing meaningful and reliable measures of firm performance.

Assuming that the relationship between inputs (X_{it}) and outputs (Q_{it}) can be approximated by a production function that is known to the firm i for the year t , then the firm-specific production frontier corresponding to the best practice function is defined as follows:

$$Q_{it}^F = F(X_{it}, t), \quad (1)$$

where Q_{it}^F is the potential output level on the frontier at time t for firm i , given the technology $F(\cdot)$, assumed to be continuous, strictly increasing and quasi-concave, and X_{it} is a k order vector of inputs.

²¹ Battese, G. and Coelli, T. (1995). “A Model for Technical Inefficiency Effects in a Stochastic Frontier Production Function and Panel Data”, *Empirical Economics*, Vol. 20, 325-332.

A stochastic element can be introduced in the production function. Then, any observed output Q_{it} using for inputs X_{it} can be expressed as,

$$Q_{it} = F(X_{it}, t) \exp\{v_{it} - u_{it}\} \quad (2)$$

where $(v_{it} - u_{it})$ is composed error term combining a symmetric component v_{it} capturing random variation across firm and random shocks that are external to its control, and output-based technical inefficiency or efficiency error u_{it} accounting for production loss due to unit-specific technical inefficiency. u_{it} is always greater than or equal to zero and assumed to be and independent of the random error, v_{it} , which is assumed to have the usual properties (\sim iid $N(0, \sigma_v^2)$).

For the empirical analysis purpose, a parametric approach is adopted by considering the time-varying stochastic production frontier in translog form as:

$$\begin{aligned} \ln Q_{it} = & \alpha_0 + \alpha_L \ln L_{it} + \alpha_K \ln K_{it} + \frac{1}{2} \beta_{LL} (\ln L_{it})^2 + \frac{1}{2} \beta_{KK} (\ln K_{it})^2 + \beta_{LK} (\ln L_{it})(\ln K_{it}) \\ & + \beta_{iL} (\ln L_{it})t + \beta_{iK} (\ln K_{it})t + \alpha_t t + \frac{1}{2} \beta_{it} t^2 + (v_{it} - u_{it}) \end{aligned} \quad (3)$$

where Q_{it} corresponds to the value-added.

The distribution of technical inefficiency effects is taken to be the non-negative truncation of the normal distribution $N(m_{it}, \sigma_u^2)$, where:

$$m_{it} = Z_{it} \delta, \quad (4)$$

δ is a $1 \times p$ vector of parameters to be estimated, and Z_{it} a $p \times 1$ vector of variables which may influence the efficiency of a firm i .

Given the estimates of parameters in equation (3) and (4), the technical efficiency level of firm i at time t is then defined as the ratio of its means, given its realized firm effect, to the corresponding mean potential output,

$$TE_{it} = \frac{E(Q_{it}/u_{it}, L_{it}, K_{it})}{E(Q_{it}^F/L_{it}, K_{it})} = \exp\{-u_{it}\}, \quad (5)$$

The rate of technical progress TP_{it} is defined by:

$$TP_{it} = \frac{\partial \ln F(L_{it}, K_{it}, t)}{\partial t} = \alpha_t + \beta_{it} t + \beta_{iL} (\ln L_{it}) + \beta_{iK} (\ln K_{it}) \quad (6)$$

If technical change is non-neutral then TP_{it} may vary for different input vectors. Hence, following Coelli, Rao & Battese (1998)²², the geometric mean between adjacent periods as a proxy is used:

$$TP_{it} = \sqrt{\left(1 + \frac{\partial \ln F(L_{it}, K_{it}, t)}{\partial t}\right) \left(1 + \frac{\partial \ln F(L_{it}, K_{it}, t+1)}{\partial (t+1)}\right)} - 1 \quad (7)$$

Taking logs of equation (2) and totally differentiating it:

$$\begin{aligned} \dot{Q}_{it} &= \frac{d \ln F(L_{it}, K_{it}, t)}{dt} - \frac{du_{it}}{dt} + \frac{dv_{it}}{dt} \\ &= \frac{\partial \ln F(L_{it}, K_{it}, t)}{\partial t} + \sum_{J=K,L} \frac{\partial \ln F(L_{it}, K_{it}, t)}{\partial J_{it}} \frac{dJ_{it}}{dt} - \frac{du_{it}}{dt} \\ &= TP_{it} + \sum_{J=K,L} e_{it}^J \frac{dJ_{it}}{dt} - \frac{du_{it}}{dt} \end{aligned} \quad (8)$$

The second term on the right-hand side of (8) measures the input growth weighted by output elasticities e_{it}^J with respect to input J.

The conventional conceptualization of total factor productivity growth ($T\dot{F}P$) can be defined as output growth unexplained by inputs, i.e.:

$$T\dot{F}P \equiv \dot{Q}_{it} - \sum_{J=K,L} e_{it}^J \frac{dJ_{it}}{dt} \quad (9)$$

In equation (9), the output elasticities with respect to input J is supposed to be equal to input share in the total production cost under the assumption of perfect competition.

From equations (8) and (9), TFP growth consists of two components: technical progress, which corresponds to innovation and shifts in the frontier technology, and technical efficiency change or catching-up effect:

$$T\dot{F}P = TP_{it} - \frac{du_{it}}{dt} \quad (10)$$

The technical efficiency change (ΔTE_{it}) denotes movement toward or away from the frontier; it corresponds to the derivative of the negative of the inefficiency measure with respect to time.

²² Coelli, T.J., Prasada Rao, D.S., and Battese, G.E. (1998), An Introduction to Efficiency and Productivity Analysis, Kluwer Academic Publishers, Boston, 271 pp.

The decomposition of TFP growth is useful in distinguishing innovation or adoption of new technology by best practice firms from the diffusion of technology. Coexistence of a high rate of TP and a low rate of change in technical efficiency may reflect the failures in achieving technological mastery or diffusion (Kalirajan, Obwona & Zhao, 1996)²³.

With the translog, the elasticities of output with respect to labour and capital, respectively, can be estimated at each time period and at the mean inputs values across the sample (or sectoral sub-sample), (\tilde{L}, \tilde{K}) , as:

$$e_t^L = \alpha_L + \beta_{LL} \text{Ln}\tilde{L}_t + \beta_{LK} \text{Ln}\tilde{K}_t + \beta_{Lt} t \quad (11)$$

and,

$$e_t^K = \alpha_K + \beta_{KK} \text{Ln}\tilde{K}_t + \beta_{LK} \text{Ln}\tilde{L}_t + \beta_{Kt} t \quad (12)$$

So, one can compute returns to scale as $e_t = e_t^L + e_t^K$. An $e_t < 1$, $= 1$, and > 1 indicates decreasing, constant, and increasing returns to scale, respectively.

Taking into account the possibility of increasing or decreasing returns to scale, TFP growth is then the sum of the following three terms:

$$\dot{TFP} = \underbrace{\frac{TP_{it}}{TP_{it}}}_{\text{Technological Progress Affect}} + \underbrace{\frac{\Delta TE_{it}}{TE_{it}}}_{\text{Catching-up Effect}} + \underbrace{(e_t - 1) \left[\frac{e_t^K}{e_t} \frac{\Delta K_{it}}{K_{it}} + \frac{e_t^L}{e_t} \frac{\Delta L_{it}}{L_{it}} \right]}_{\text{Returns to Scale Effect}} \quad (13)$$

Increasing K and L by x per cent will increase output by more than x per cent if there is increasing returns to scale, and by less than x per cent if decreasing returns to scale are present. If there are constant returns to scale, then input changes do not affect changes in total factor productivity, and equation (10) is valid.

1.2. Econometric evidence

The econometric analysis is applied on a balanced panel of 265 manufacturing firms for which observations exist for all the years because the reliability of the measure of technical efficiency depends crucially upon the length of the time dimension of the panel. Firms are observed for a period of 11 years, from 1984 to 1994. Hence, a total of 2915 observations for 265 firms are used in the analysis.

²³ Kalirajan, K. P., Obwona, M. B. & Zhao, S. (1996) "A Decomposition of Total Factor productivity Growth: the Case of Chinese Agricultural Growth Before and After Reforms", American Journal of Agricultural Economics 78, p331-338.

The firms have been selected from the national annual survey report on firms carried out by the Tunisian National Statistic Institute, and data used concerning capital stock, age of capital, and investment, are taken from the Tunisian Quantitative Economics Institute.

The variables used in the analysis comprise value added, capital stock evaluated at historical values and calculated through perpetual inventory method, total labour used by type of qualification, age of capital, investment, short-term and long-term debts, exports, time invariant characteristics such as activity, whether or not the firm is an exporting. Data were deflated using the appropriate price index, thereby expressing all data in terms of values for 1990 (the base year of prices index). Table 1 provides a descriptive summary of the sample and variables in the data set.

Table 1: Descriptive summary of the sample and variables

	Industry	Code	Number of firms	Mean Ln(L)	Mean Ln(K)	Mean Foreign participation %	Mean Private local participation %	Mean State participation %
Food processing (FPI)	Milk industry	121	3	2,329	7,057	38	34	18
	Grain Milling	131	3	1,951	6,770	0	100	0
	Pasta and couscous	132	4	1,716	6,510	0	100	0
	Bread and pastries	133	8	1,176	5,143	0	100	0
	Biscuits	134	1	1,491	5,912	0	100	0
	Canned vegetables and fruits	151	4	1,391	6,404	0	100	0
	Canned fish	152	1	1,270	5,598	0	100	0
	Sugar industry	161	3	2,361	7,464	22	42	36
	Miscellaneous food industries	171	6	1,511	5,939	12	74	6
	Animal feed	172	2	1,423	5,954	0	100	0
	Non alcoholic beverages	181	5	1,994	6,645	46	52	3
	Wine	182	1	1,711	6,291	0	100	0
Construction materials and glass (CMGI)	Quarry products	211	2	1,968	6,514	50	50	0
	Stone and marble polished	212	7	1,341	5,480	0	100	0
	Cement and Plaster	221	1	2,959	8,211	0	1	99
	Cement based products	222	8	1,731	6,101	0	100	0
	Brick industry	231	6	2,141	6,628	8	86	4
	Tile industry	232	3	2,128	6,450	10	46	45
	Glass industry	241	4	1,887	6,352	0	100	0

Mechanical and electrical goods (MEGI)	Iron and Steel	311	1	2,186	7,170	0	100	0
	Metal and semi-products non ferrous	312	1	2,092	6,668	72	28	0
	Foundries	313	1	2,795	7,490	37	0	9
	Forge Products	321	4	1,488	5,747	0	100	0
	Metallic construction and boilerworks	322	9	1,964	6,170	0	88	0
	Quincaillerie	324	5	1,804	6,267	0	100	0
	Metallic household appliances	325	3	1,468	5,672	0	67	0
	Agricultural machinery	331	1	1,242	5,091	0	100	0
	Industrial machinery	332	3	1,442	5,569	0	100	0
	Spare parts for cars	341	1	1,774	6,291	0	100	0
	Boats and repairing	351	1	2,982	6,823	1	1	98
	Electrical equipment	361	4	1,949	6,317	0	96	0
	Miscellaneous Electrical Equipment	362	3	1,812	5,708	0	100	0
	Electronic professional equipment	371	3	1,910	6,061	33	67	0
Chemical and rubber (CRI)	Fertilizers	411	2	2,179	7,045	47	10	40
	Base chemical Products	422	2	1,656	6,334	0	79	0
	Paint, ink, glue and colorants	431	7	1,561	5,770	0	96	0
	Soap, detergents and disinfectants	432	9	1,805	6,324	0	100	0
	Perfumes and Toiletry	433	7	1,259	5,113	0	100	0
	Miscellaneous Para-chemicals	434	1	1,715	6,255	0	100	0
	Tires and Rubber products	451	2	1,835	6,363	0	100	0
Textiles, clothing and leather goods (TCLGI)	Textile spinning	511	5	1,509	5,977	0	100	0
	Textile weaving	512	23	1,784	6,202	1	96	1
	Other textiles	513	4	1,855	6,208	0	99	0
	Carpet	521	1	1,314	5,250	0	100	0
	Underwear	531	7	1,733	5,834	0	90	0
	Apparel	541	31	1,919	5,634	0	63	0
	Leather and skin work	551	2	1,582	5,967	0	100	0
	Other leather and plastic products	552	3	1,468	5,266	33	67	0
	Footwear	553	6	1,666	5,864	0	67	0
Woodwork, paper and diverse (WPDI)	Wood products	611	2	1,752	5,966	18	78	5
	Building carpentry	612	1	1,468	5,426	0	100	0
	Bedding furniture	613	7	1,958	6,002	18	75	0
	Paper pulp and cardboard	621	2	2,464	7,409	0	50	50
	Packaging	622	2	1,854	6,083	0	96	0
	Paper-making	623	2	1,844	6,330	0	100	0
	Printing works	624	8	1,691	6,048	4	75	21
	Plastic products	631	13	1,496	6,117	0	100	0
	Miscellaneous products	641	4	1,749	5,679	0	50	0

The parameters of the translog stochastic frontier model, defined by equations (3) and (4), are simultaneously estimated by the maximum likelihood method using the computer program, FRONTIER Version 4.1, designed by Coelli (1996). The

program provides maximum-likelihood estimates of the parameters and predicts technical efficiencies. It uses the following parameterization:

$$\sigma^2 = \sigma_v^2 + \sigma_u^2, \text{ and } \gamma = \sigma_u^2 / (\sigma_v^2 + \sigma_u^2),$$

Given the specifications of translog frontier with inefficiency effects expressed as an explicit function of firm-specific variables, and a random error, and given the results of statistical tests on the estimated parameters, the preferred frontier models are chosen and the estimates of their parameters are presented in Table 2.

Table 2: Maximum likelihood estimates of parameters, equations (3)-(4)

Variable	Parameter	Coefficient	Stand. Error	T-ratio
<i>Constant</i>	α_0	4.415	0.233	18.967*
<i>Log(L)</i>	α_L	2.089	0.113	18.530*
<i>Log(K)</i>	α_K	-0.727	0.097	-7.476*
<i>Log(L)²</i>	β_{LL}	0.099	0.028	3.530*
<i>Log(K)²</i>	β_{KK}	0.135	0.011	12.063*
<i>Log(L)*Log(K)</i>	β_{LK}	-0.293	0.029	-10.030*
<i>time</i>	α_t	-0.070	0.015	-4.621*
<i>Time²</i>	β_u	0.005	0.001	4.561*
<i>Inefficiency determinants</i>				
<i>Constant</i>	δ_0	0.358	0.046	7.860*
<i>Dummy FPI</i>	δ_1	-0.107	0.016	-6.570*
<i>Dummy CMGI</i>	δ_2	0.115	0.017	6.744*
<i>Dummy MEGI</i>	δ_3	-0.100	0.015	-6.509*
<i>Dummy CRI</i>	δ_4	-0.013	0.016	-0.782
<i>Dummy TCLGI</i>	δ_5	0.021	0.014	1.521
<i>Rate of skilled workers</i>	δ_6	-0.455	0.038	-12.089*
<i>Dummy FOREIGN</i>	δ_7	-0.097	0.021	-4.524*
<i>Age of capital AGEK</i>	δ_8	0.013	0.002	6.214*
<i>Dummy Firm size<100 employees</i>	δ_9	0.033	0.013	2.455*
<i>Dummy State participation > 25%</i>	δ_{10}	-0.085	0.029	-2.939*
<i>Dummy 1985</i>	δ_{11}	-0.088	0.022	-3.998*
<i>Dummy 1986</i>	δ_{12}	-0.177	0.028	-6.217*
<i>Dummy 1987</i>	δ_{13}	-0.212	0.034	-6.321*
<i>Dummy 1988</i>	δ_{14}	-0.241	0.038	-6.329*
<i>Dummy 1989</i>	δ_{15}	-0.273	0.041	-6.729*

<i>Dummy 1990</i>	δ_{16}	-0.305	0.043	-7.078*
<i>Dummy 1991</i>	δ_{17}	-0.319	0.043	-7.506*
<i>Dummy 1992</i>	δ_{18}	-0.313	0.041	-7.726*
<i>Dummy 1993</i>	δ_{19}	-0.270	0.036	-7.548*
<i>Dummy 1994</i>	δ_{20}	-0.216	0.034	-6.318*
<i>sigma-squared</i>	σ^2	0.038	0.001	35.138*
<i>gamma</i>	γ	0.062	0.015	4.185*
<i>Log-likelihood</i>		653.629		

Elasticities of mean output with respect to two input variables, labour and capital stock, are estimated at the mean values of the variables involved, by using equations (11) and (12). It should be noted that labour effort is a flow input variable while capital is a stock input variable, which excludes the possibility of direct comparison. Returns to scale range from 1,017 to 1,075, detailed information on returns to scale is presented in Table 3. It shows that the sum of inputs elasticities is always close to unity and the hypothesis of constant returns to scale is accepted in all years, and for all sectors²⁴. Thus, over the full period, it seems unlikely that firm size is a major cause of inefficiency in manufacturing.

Table 3: **Elasticities and Returns to Scale by year**

	1984	1990	1994	1984-1994
<i>Elasticities with respect to Labour</i>				
Food processing	0.566	0.583	0.583	0.576
Construction materials and glass	0.574	0.583	0.576	0.575
Mechanical and electrical goods	0.657	0.646	0.642	0.648
Chemical and rubber	0.635	0.618	0.610	0.620
Textiles, clothing and leather goods	0.722	0.718	0.726	0.716
Woodwork, paper and diverse	0.669	0.659	0.636	0.655

²⁴ In general, use of individual firm data, instead of the mean values, doesn't yield different results. The firm level returns to scale distribution by year is reported in the following table:

Returns to scale distribution (Frequency in %)											
	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994
Less than 0,96	5.3	5.3	5.3	5.3	6.0	6.4	6.8	6.8	6.0	6.0	5.7
from 0,96 to 1,08	52.8	51.3	52.8	52.5	52.8	52.5	53.6	54.0	52.8	54.3	54.3
from 1,08 to 1,2	41.1	42.6	40.8	41.5	40.4	40.4	39.2	38.9	40.4	38.9	39.2
more than 1,2	0.8	0.8	1.1	0.8	0.8	0.8	0.4	0.4	0.8	0.8	0.8

So, more than 90 % of firms have an estimated returns to scale between 0,96 and 1,2. Given this distribution, it might well be the case that a test for constant returns is accepted.

<i>Elasticities with respect to Capital</i>				
Food processing	0.496	0.471	0.469	0.480
Construction materials and glass	0.444	0.434	0.452	0.445
Mechanical and electrical goods	0.382	0.388	0.397	0.389
Chemical and rubber	0.423	0.435	0.446	0.437
Textiles, clothing and leather goods	0.352	0.352	0.343	0.356
Woodwork, paper and diverse	0.385	0.389	0.408	0.395
<i>Returns to scale</i>				
Food processing	1.062	1.054	1.052	1.056
Construction materials and glass	1.018	1.017	1.028	1.020
Mechanical and electrical goods	1.038	1.034	1.039	1.036
Chemical and rubber	1.058	1.054	1.057	1.057
Textiles, clothing and leather goods	1.073	1.070	1.069	1.072
Woodwork, paper and diverse	1.054	1.048	1.043	1.049

The elasticity of output with respect to labour is higher for the Textile, Clothing and Leather Goods firms than the other sectors. It ranges from 0.702 to 0.726, which reflects the high labour-use in this sector.

Econometric results regarding the determinants of efficiency reveal that efficiency (inefficiency) of manufacturing firms increases (decreases) with the prevalence of foreign participation (the sign of coefficient of inefficiency effect of FOREIGN is negative and significant at 5 per cent level). The same goes for the effect of training rate variable (TRAIN) which is highly significant contributor to technical efficiency. Given the absence of data on employees schooling, this variable can be considered as a proxy of human capital in each firm. There is also some evidence, showing that state participation (STATE) is not conducive to technical inefficiency. Furthermore, the result shows small and medium firm size (SMSIZE), likewise age of capital (AGEK), appears to have a negative and significant influence on technical efficiency.

The average technical efficiency, calculated by using equation (5), ranges from 0,62 to 0,96. The average efficiency score improved at first, recovered to a peak level in 1991, and fell in the last three years. The detailed information on mean technical efficiency is presented in Table 4.

The decomposition of total factor productivity change into technical efficiency change and technical change, by using equation (10), gives the possibility to understand whether the industries have improved their productivity levels simply through a more efficient use of existing technology or through technical progress. Growth in efficiency change can also be considered as an indicator of industry's performance in adapting the technology. The mean changes in efficiency and TFP of manufacturing industries are presented in Table 5.

The results reveal a steady decline in technical efficiency since 1991, which concerns all manufacturing firms, and principally firms belonging to Textiles, Clothing and Leather Goods and Woodwork, Paper and Diverse sectors. The average total factor productivity growth for the period 1985-94 has been positive and sluggish across all the industries (mean TFP rate of growth of 0.51 per cent). A comparison of TFP growth over time shows that it improved significantly in the sub-period 1990-1992, for all industries. The end of the period is marked by a decline in TFP growth rate, particularly in the industry groups like textiles, clothing and leather goods, and Woodwork, paper and diverse.

Table 4: Mean Technical Efficiency of Manufacturing Firms by Year

	Mean Technical Efficiency	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994
Food Processing	0.90	0.77	0.83	0.89	0.90	0.92	0.93	0.95	0.96	0.96	0.94	0.89
Construction												
Materials and Glass	0.76	0.62	0.68	0.73	0.75	0.77	0.80	0.82	0.83	0.82	0.79	0.77
Mechanical and Electrical Goods	0.91	0.76	0.83	0.89	0.91	0.93	0.94	0.96	0.96	0.96	0.94	0.92
Chemical and Rubber	0.86	0.68	0.75	0.83	0.86	0.88	0.90	0.93	0.94	0.93	0.91	0.87
Textiles, Clothing and Leather Goods	0.81	0.65	0.71	0.77	0.79	0.82	0.85	0.88	0.89	0.88	0.85	0.80
Woodwork, Paper and Diverse	0.85	0.69	0.76	0.82	0.85	0.87	0.89	0.91	0.92	0.92	0.89	0.84
Total Manufacturing Sector	0.84	0.69	0.75	0.81	0.84	0.86	0.88	0.90	0.91	0.90	0.88	0.84

Table 5: Efficiency Change and TFP Change in Manufacturing Industries

	1985	1989	1991	1993	1994	1985-94
Efficiency Change						
Food processing	0.056	0.017	0.009	-0.020	-0.042	0.012
Construction materials and glass	0.055	0.030	0.011	-0.033	-0.022	0.015
Mechanical and electrical goods	0.076	0.013	0.000	-0.018	-0.025	0.016
Chemical and rubber	0.065	0.021	0.011	-0.023	-0.042	0.018
Textiles, clothing and leather goods	0.056	0.026	0.009	-0.028	-0.049	0.015
Woodwork, paper and diverse	0.066	0.026	0.007	-0.031	-0.048	0.015
TFP Change						
Food processing	0.001	0.002	0.014	0.005	-0.007	0.002
Construction materials and glass	0.000	0.015	0.016	-0.008	0.013	0.005
Mechanical and electrical goods	0.021	-0.002	0.005	0.007	0.010	0.006
Chemical and rubber	0.009	0.006	0.016	0.001	-0.007	0.008
Textiles, clothing and leather goods	0.001	0.011	0.014	-0.003	-0.014	0.005
Woodwork, paper and diverse	0.011	0.011	0.012	-0.006	-0.013	0.005

At a second stage, a statistical analysis is performed to identify the determinants of technical efficiency change of the Tunisian manufacturing sector with a focus on the impact associated to investment rate and openness. For this purpose, an equation examining the impact of openness (OPENNESS) and investment effort (INVRATE) on technical efficiency change is specified as follows:

$$\Delta TE_{it} = \gamma_0 + \gamma_1 INVRATE_{it} + \gamma_2 (INVRATE_{it})^2 + \gamma_3 OPENNESS_{it} + \gamma_4 (OPENNESS_{it})^2 + \gamma_5 (INVRATE_{it})(OPENNESS_{it}) + \gamma_6 SIZE_{it} + \alpha_i + \beta_t + \varepsilon_{it}, \quad (14)$$

where SIZE is the firm size which refer to the number of full-time employees in the firm i at period t and ε_{it} a classical disturbance term.

Equation (14) allows for non-linearity in investment and openness impact on technical efficiency change. It includes firm-specific fixed-effect α_i , to capture time-invariant influences on a firm's mean level of technical efficiency change over the sample period. To capture economy-wide influences on technical efficiency change that are common to all manufacturing firms in any given year, a set of year time dummies is also included. In this specification, the variable SIZE is defined as a dummy variable equal to 1 if the number of full-time employees in the firm is less than 100 (to characterize small and medium firm in the sample), and 0 otherwise. The variable OPENNESS regards import penetration rate evaluated at a 3-digit level SIC sector-based data.

Fixed-effects OLS estimator is used to obtain estimates of the parameters in equation (14), the results of which are presented in Table 6.

Table 6: **LS with Group Dummy Variables and Period Effects estimates of (14)**

Variable	Parameter	Coefficient	Standard-error*	T-ratio	Mean of X
<i>Constant</i>	γ_0	0,016	0,003	5,334	
<i>INVRATE</i>	γ_1	0,007	0,002	4,415	0,347
<i>INVRATE²</i>	γ_2	-0,001	0,000	-3,874	0,5478
<i>OPENNESS</i>	γ_3	0,011	0,004	2,841	0,5499
<i>OPENNESS²</i>	γ_4	-0,001	0,000	-2,303	1,444
<i>INVRATE*OPENNESS</i>	γ_5	0,002	0,001	1,564	0,1813
<i>Small and Medium Firm Size Dummy</i>	γ_6	-0,011	0,003	-3,360	0,6917
	Mean of dependent variable			0,01524	
	Standard Deviation			0,0393	
	Observations			2650	
	Adjusted R-squared			0,60559	

*Heteroskedasticity-robust standard errors are reported.

The results highlight firstly, the existence of a positive and highly significant association between investment effort of firm and efficiency change. Evaluated at the mean values, the elasticity of efficiency change to investment rate is estimated at 0,174. This suggests that modernity of machinery and installations, caused by investment effort, plays an important role in the growth of the firm efficiency. That is, more investment effort gives the firm some competitive advantage.

Secondly, a negative correlation is obtained between the dummy indicating small and medium size firm (SIZE) and the efficiency change. This result indicates that large firms are in better position to improve their efficiency than small and medium firms. This may be the result of large firms having better access to credit than small firms to finance the implementation of new technology or because new technologies (computers) are more profitable when implemented on a larger scale.

Thirdly, there is a positive relationship between the degree of openness of the considered industry and efficiency change. The signs of the openness variable and of its square indicate (as for INVRATE variable) that efficiency increase with openness, reach a maximum, and then declines. Evaluated at the mean values, the elasticity of efficiency change to openness is estimated at 0,39 which is very significant. Therefore, the firms that operate in sectors with higher degree of openness, i.e. in more competitive sectors, have most incentive to improve its efficiency.

II. Persistence of Profitability and Intensity of Competition in Tunisian Manufacturing Sectors: Firm-level econometric analysis

The purpose of this section is to examine empirically the **dynamics** of the competition process in manufacturing sectors in Tunisia using the common methodology of "*Persistency of Profitability*" (PP) studies in industrial organization.

II.1. 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.

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

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:

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

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 $Y_{it} = P_{it} - \bar{P}_t$, where \bar{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:

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

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 (1997), hereafter IPS, have provided a relatively powerful test of the unit root hypothesis in situations where the data under investigation also have a cross-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, adf_i ; 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:

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

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):

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

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 i th 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:

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

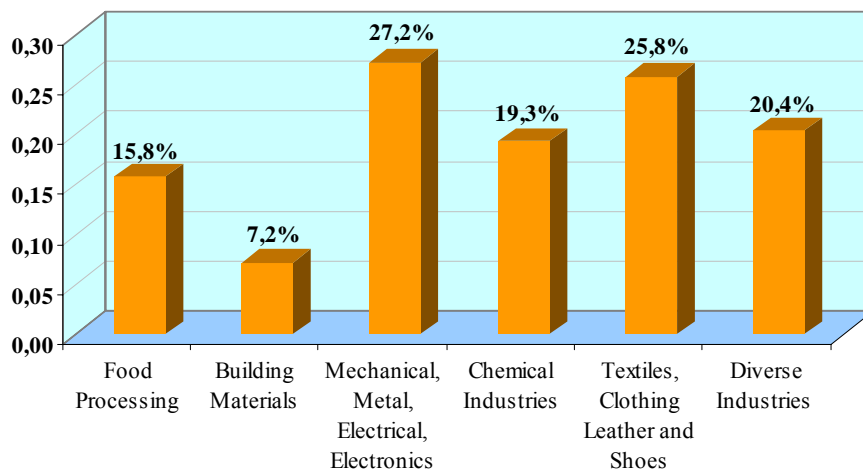
$E(\eta)$ and $V(\eta)$ are obtained from the results of Monte Carlo simulation carried out by IPS and are available from their table (2); they have tabulated them for various time periods and lags. When the ADF has different augmentation lags p_i the two terms $E(\eta)$ and $V(\eta)$ in the equation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

II.2. 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)²⁵; firms with broken runs of data are excluded on the grounds that time series methods are inapplicable with such short time series. Graph 1 provides the means of corporate profitability for each sector.

Graph 1: Mean Corporate Profit Rate (1984-1994)



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

²⁵ 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.

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).

A competition-based interpretation is also compatible with the conclusions of a recent review article, Tybout (2000)²⁶, 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).

Table 2: Results on the estimated ADF regressions, 1985-1994

Firm N°	α	λ	ADFi	Adjust. R²
Mean	-0,002	0,308	-2,539	0,337
St error	0,396	1,139	1,884	0,213

²⁶ Tybout, J.R., 2000. Manufacturing firms in developing countries: how well do they do, and why? Journal of Economic Literature XXXVIII (March), 11–44.