Entry, Exit, and Productivity in Tunisian Manufacturing Industries

Ben Jelili, Riadh and Goaied, Mohamed

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Khalid Sekkat,
EDITOR

Market Dynamics and Productivity in Developing Countries

Economic Reforms in the Middle East and North Africa

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Chapter 4
Entry, Exit, and Productivity in Tunisian Manufacturing Industries

Riadh Ben Jelili and Mohamed Goaied

4.1 Introduction

For a number of MENA economies, the barriers to entrepreneurship manifest by the unfriendly environment for start-ups and relatively high regulatory and administrative burdens are estimated to be among the highest in the world. Potential investors and existing firms in those countries face a complex regulations and licensing requirements which are often unclear or inconsistent with international norms. Policy, regulatory and institutional distortions, as well as constraints and barriers to efficient private sector investment, operations and exit, are then prevalent throughout the region. Complexity and the rents created by economic distortions breed administrative discretion and corruption. The bureaucratic burden is often especially heavy for small and medium enterprises. Higher levels of government rent seeking and/or bureaucratic obstacles to legal firm entry will lead to a greater bifurcation of firm sizes – very small informal firms, relatively large formal firms and an absence of medium sized formal firms.

However, almost all countries in the MENA region entered the new millennium with large unemployment rates. In this context, decision makers emphasize the role of efficient markets which could lead to higher firm creation rates and thereby, to lower unemployment rates. Aside to direct employment effects, high firm creation rates are supposed to have a positive impact on the technical and organizational change of economies because new firms are on average, better equipped with the latest technical and organizational knowledge. The structural change of the economy goes hand in hand with high firm creation which is believed to be an important channel of GDP growth.

Indeed, in addition to expanding the range of products, entry can first create more competition, lower prices for consumers, and may lead to better technology adoption. Changes in the status of existing firms from informal to formal may also have important effects on GDP growth. Indeed, it is likely that informal firms have

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less secure property rights and thus lower than optimal investment and productivity growth, leading to lower profits and value added. Starting a firm with expansive potential is finally an option for educated and high-skilled workers. In presence of labor market frictions, this additional option can be seen as reducing the probability of ending up in a low-wage job and hence, increases the incentives for education.

The structure of this chapter is as follows. The first section deals with regulations, upgrading program and business environment in Tunisia. Data used to analyze patterns of entry and exit in Tunisian manufacturing industries and their impact on firm's performance are presented in Sect. 4.2. The main shortcomings of the data sources constructed for this purpose will also be discussed, and some descriptive statistics based on the entry–exit data sets will be presented in order to highlight, according to the literature, some stylized facts about entry and exit. The determinants of entry and exit process are discussed in Sect. 4.3. This section focuses on the implications that the interdependence between aggregate entry and exit has for the analysis of manufacturing industry dynamics in Tunisia. The purpose of the forth section is to investigate whether entry and exit of firms affect performance and labor productivity.

4.2 Regulations, Upgrading Program and Business Environment in Tunisia

The ability to start a firm is limited by several factors including the burden of complying with regulations governing business activity. Excessive governmental regulations can provide an incentive to operate in the informal sector, or may prevent some entrepreneurs from operating at all. Based on the data from 85 countries, Djankov et al. (2002) find that the countries with more open access to political power, greater constraints on the executive, and greater political rights have less burdensome regulation of entry than do the countries with less representative, less limited, and less free governments. They also find that "stricter" regulation of entry is associated with sharply higher levels of corruption, and a greater relative size of the unofficial economy.

In a more recent paper Djankov et al. (2006) create an index of the burden of regulation based on average country rankings in the World Bank's "Doing Business" indicators. They find that countries that are in the highest (best) quartile of this index grow 2.3 percentage points faster than countries in the lowest (worst) quartile. This effect is more than twice the effect on GDP growth of going from the second quartile to the highest quartile in terms of primary school enrollment. The authors stress that initiative such as a "one-stop shop" for business registration could accelerate GDP growth.

It also arises from the preceding papers that the magnitude of the effect of lower registration costs on firm creations is an empirical issue. Indeed, if the main reason that firms choose to be informal is the desire to evade taxes, making registration procedures more efficient would likely have little impact. It is also possible that

entrepreneurs are able to avoid the excessive regulations through bribes, thus effectively reducing the impact of regulation. Finally, it is possible that the most important constraint on firm creation in developing countries is the availability of credit or other complementary inputs.

4.2.1 Tunisian Institutional Context

Through a combination of colonial heritage and 1950s development philosophy, Tunisia has historically had a highly centralized economic system controlled by the government particularly since 1961. The post-independence government pushed towards a centrally planned system, although one moderately open to the outside economy. The government ran the banking system, transportation, and some of the major industries. It controlled import and export of most goods and fixed their prices at levels unrelated to either internal or world markets. It also supported the industrial sector by investing directly in some existing industrial projects.

In May 1964, the National Assembly enacted the expropriation of all foreign-owned lands, to establish 300 state co-operative farms. By 1969, the collectivization rate achieved 90% in the agriculture sector alone. The government also promoted the institution of co-operatives in other economic sectors: wholesale and retail trade, industry, banking, in addition to the already controlled transports, power and mines sectors.[1]

The cooperative experiment only ran for few years (1964–1969) before encountering unbeatable difficulties. The central planned development strategy came to a halt in September 1969. Beginning in the seventies, a new economic policy was put in place, consisting in the promotion of the private sector while continuing to support an expanding public sector. Trade policy continued to strongly protect Tunisian manufacturing, but important incentives were also granted to the off-shore sector, thus attracting significant domestic and foreign investment to exporting activities, mainly to textiles, and resulting in a significant expansion of manufacturing exports.

The new emphasis in the Tunisian economic planning was on labor intensive manufacturing industry, financed by private investors. The new political regime pursued the creation of new institutions that would promote the private sector, such as the Investment Promotion Agency (API), the Industrial Real Estate Agency (AFI), the Centre for export Promotion (CEPEX), and the Fund for Industrial Promotion and Investment (FOPRODI), with the aim to streamline and simplify industrial policy.

The first law offering incentives to foreign investors for the establishment of manufacturing industries was promulgated in 1972 (law 72-38). This law granted to approved industrial projects a wide range of tax concessions and duty-free import of capital equipment, raw materials and semi-processed goods. The new units were to produce mainly for export, and this reduced further the linkages with the Tunisian economic base. Under this law, foreign investors were exempted from

corporate income tax during the first 10 years of operation and, amongst other benefits, they were permitted to repatriate profits free of tax.

Offshore industrialization was promoted under the decree 73-19, by which API was also established and charged to promote new investment opportunities and to streamline investment procedures by introducing potential investors to the legislative mechanisms. More than 500 foreign firms established their production units under law 72-38 between 1973 and 1978.

FOPRODI was created in 1974 with three important objectives:

1. Increasing entrepreneurship by promoting new entrepreneurs in SMEs (defined as firms with capital of up to one million Tunisian Dinars).
2. Helping decentralize manufacturing activities in a country in which these activities had been highly concentrated in the coastal region in general and its three principal cities (Tunis, Sfax, and Sousse) in particular.
3. Lowering country's persistently high official unemployment rate (of about 16%).

A second industrial investment law was introduced in 1974 (law 74-74), which sought to relate incentives more closely to employment creation. The law was also intended to encourage Tunisian private investment, which had previously been less favored than foreign one.

The constitution of industrial zones is also subject to open competition since 1973, when the government founded the AFI in charge of facilitating the establishment and equipment of such zones.

However, the return to a market economy announced by the government was less decisive than is appeared to be. Tunisia still maintained extensive price subsidization, the financial sector was entirely administered by the government, and the economy was protected through very high customs rights and import restrictions.

By the end of the 1970s, Tunisia appeared to be over-dependent on oil revenues, having extended its foreign borrowings and showing no stable productive base, capable of absorbing excess labor force and of exporting a diversified and competitive range of goods. In particular, the lack of basic state investment in infrastructure had blocked growth and deterred private investment.

The sixth development plan (1982–1986) was an austerity plan, designed to introduce the economic adjustments necessary to prepare Tunisia for an era of reduced income from petroleum. Investment was directed towards non-oil industries, severe controls were maintained on external debt and balance of payments, cuts in public investment and consumption were decided, also though wage freezes and import restrictions.

Beginning in 1987, the government embarked on a structural adjustment program (SAP) which envisaged significant readjustments in the essential instruments of the economic and financial policy, especially in the fields of taxation, price determination, foreign trade, public utilities and income policy. One of the targets of the program was the reallocation of tasks between the economic players, to be realized through the total or partial cession of some public utilities to the benefit of banks, parent companies or private individuals.

The SAP strategy was carried out under the Seventh (1987–1991) and the Eighth (1992–1996) Development Plans. While the first Plan was intended to achieve macro-economic stability and to introduce the initial measures of structural liberalization, in terms of sectoral, financial and trade reforms, the main orientation of the second Plan was to increase efficiency and promote market mechanisms through legislative framework which would encourage foreign investment, accelerate privatization, develop the stock market, and deepen integration with the European market.

The readjustment of the industrial policy was obvious in the new investment code, Law 87-51, intended to unify and simplify the investment laws of 1972 and 1981. The new Code granted several tax and financial incentives, especially to wholly exporting industries and was aimed at promoting a major liberalization of the Tunisian industrial sector. At the same time, the prior approval of manufacturing investment by the API was removed (since 1987), the three industrial support agencies were merged into a single Industrial Promotion Agency, and investment undertaking has been greatly facilitated through the establishment of a one-stop shop, where all the administrative and legal services involved in the opening of a business are gathered. In the case of FDI, there are no restrictions on investment in off-shore activities, but the prior approval is still needed for all investment in activities serving the domestic market. Domestic price deregulation was enacted in 1991 and a shift from a positive list to a negative list regime was introduced in trade policy in 1994.

This reform has shortened the delays involved in setting up a company. A unified investment incentive code was also put in place in 1993, replacing sectoral codes with fiscal and financial incentives varying across economic activities. The new code set incentives based on the cross-cutting objectives of exports, regional development and acquisition of new technology. The code, designed to unify the existing sectoral codes in a "Code Unique," regulates all productive sectors, except projects relating to mining, energy production, finance and foreign trade, which are governed by specific laws.

Thanks to this new legislation, investment in agriculture, manufacturing industries (excluding the mechanical weaving of rugs and carpets, weapons manufacture, the recycling processing of waste and garbage), agribusiness, certain totally exporting services and services related to industry, and public works requires no previous authorization, but a simple declaration to the competent authority. The incentive system includes schemes very favorable to investment, a 10-year tax holiday and total exemption from import duties and the value added tax for totally exporting projects and generous income tax exemption measures on reinvested income.

The Code distinguishes between two categories of investment, offshore, in which foreign capital accounts for at least 66% of equity, and at least 80% of the production is designed to export, and on-shore, in which foreign equity is limited to 49% in non-industrial projects, while industrial projects can reach 100% of foreign equity. Additional incentives are provided to off-shore industries or totally exporting industries.

With respect to small and medium enterprises (SMEs), the Code enlists particular incentives under articles 46bis and 47. SMEs in agriculture, industry and services can benefit from an equity participation of the State and a grant covering part of the expenditures incurred for studies and technical assistance; both benefits are granted through the FOPRODI.

In 1992, Tunisia approved of a law for geographically bounded free trade zones, and the zones of Bizerte (60 km north of Tunis) and Zarzis (450 km south of Tunis) were created. They were installed in order to offer an even more favorable environment for foreign investors. The free trade zone at Zarzis, operational since 1995, is specialized in services of the oil sector, and the other one at Bizerte, includes industry and construction, ship repair and demolition activities, as well as several services. The land is state-owned, but managed by a private company. The geographic aspect as well as the infrastructure and proximity to the markets give both Bizerte and Zarzis a great potential to attract foreign investment into the zones.

Some flexibility has also been brought to the labor market since 1994, through two important reforms involving firing and the limited duration contract. Prior to this law, compensation was left completely to the judge's decision, which created a lot of uncertainty for both employees and employers. This law set a scale limiting compensation between 1 and 2 months per year worked and to a maximum of 3 years of salary. The limited duration work contract has been generalized since 1996, regardless of the nature of the work involved. According to a law enacted in 1996, an employer can conclude with an employee, a work contract for a limited duration, provided that the total period of work does not exceed 4 years, including renewals. At the end of the 4 year-period, the employer has to either fire the employee or grant him the permanent worker status. These reforms of labor legislation allow both a great deal of employment flexibility and minimum job security and compensation in case of firing.

In February 1999, the government created the Fonds d'Incitation à l'Innovation dans les Technologies de l'Information (FITI) to support small-scale investments by the private sector in information technologies. The government cofinances up to 49% or a maximum of 200,000 TD for information technology projects, if the following conditions are met: the project is approved by, and presented to, FITI by a venture capital firm (SICAR), and the SICAR commits to provide at least 30% of the startup capital of the project; the investor provides at least 2% of the startup capital; and FITI's cofinancing is not higher than the share of the SICAR in the startup capital.

More recently (November 2003), the Tunisian government launched the Industrial Modernization Program[2] (PMI), financed by a European Union donation to prepare the country economy enters the free trade area planned by the association agreement accord with the European Union, for which final establishment is set to 2008. The program has strived to speed up the rate of setting up enterprises and to diversify the industrial base. Investment is supported by using modern management methods that are underpinned by innovation and through new information and communication technologies. Innovation plays a key role in this context, since it allows Tunisian companies to position themselves better in relation

to other emerging countries. The PMI also provides a technical assistance of a more institutional kind in Metrology, Standardization, Industrial Property and the access of SMEs to financing.

4.2.2 Tunisian Upgrading (Mise à Niveau) Program

The external outlook for Tunisia changed dramatically in the mid-1990s with the Association Agreement with the EU and the phase out of the Multi-Fiber Arrangements (MFA). Their implementations will result in a very large fall in effective protection for domestic industries and in increased competition on export markets. To date, the private sector has assumed a wait-and-see attitude, as indicated by a weak investment performance, particularly in the manufacturing sector while sentiment remains positive. However, opportunistic investments have occurred to take advantage of temporary distortions in effective protection caused by the phased implementation of the EU agreement.

A key government initiative to meet the twin competitive challenges of the EU agreement and the phasing out of the MFA has been a large program of *Mise à Niveau*, which includes investment incentives for selected producers in sectors that either have had strong export performance in the recent past (textiles and garments, and mechanical and electrical products) or that are judged to have good potential (agro-processing), to help manufacturing industry adapt and upgrade its methods and practices of organization, management, innovation, training, technology, distribution, marketing, communications, and research and development.

The *Mise à Niveau Program* (PMN), implemented since 1995, includes a number of projects destined to enterprises and to their environment to allow the productive system to compete at an international level. It is addressed to the private sector enterprises which have a margin of growth, an expanding market and, above all, which express the intention to upgrade themselves. The target of this program is to restructure 4,000 firms in 10 years, given that enterprises can take advantage of the program more than once, if they have promising plans and produce good results.

The program is divided into two phases:

1. The first one covering the period 1995–2000, is aimed at reinforcing Tunisian firms ability to face international competition.
2. The second one, covering the period 2001–2005, aims to consolidate the process of economic upgrading, extending it to trade and services.

To participate in the program, an enterprise must submit a detailed application and demonstrate strong growth potential, a good market and promising products at existing quality/price ratios that can be improved. Size, industry, and location are supposedly not a factor determining acceptance in the program; however, the program has sectoral targets for participation that reveal an export oriented bias in favor of the textile and clothing, and the mechanical and electrical subsectors.

By March 2007, 3,735 firms have joined the program; of these 9 have been rejected and 2,489 have received the approval for their plans from the steering committee involving a total planned investment of 3881 million TD (about 2982 million US$), of which 20% was allocated to food processing business, 20% to textiles and clothing, 19% to building materials, ceramics and glass products, 16% to mechanical, electric and electronics, 7% to chemicals, 4% to leather, and the remaining 14% to unclassified activities. The remaining 1,237 dossiers were still at the diagnostic level (cf. Table 4.1).

Over time, the program has increased its focus on SMEs. The average size of investments in the PMN declined from 3 million TD in 1996 to 1.6 million in 2007 (March). In addition, the share of enterprises with less than 100 employees rose from 29% of total enterprises participating in the program in 1996, to almost 2/3 in 2007 (March).

Enterprises that are in financial difficulties are excluded from the PMN, but are provided assistance in resolving these problems under the law 95-34 of April 17, 1995. The law creates a Monitoring Committee called "*Commission de suivi des entreprises économiques*" charged to collect information on the activities of enterprises and to provide information to the President of First Instance Court, who is responsible for administering the bankruptcy law, warning of enterprises in difficulty, and proposing restructuring plans. There is also a Bureau of assistance to enterprises whose activities involve three phases of assistance. The first two phases are administrative and try to help enterprises reach an agreement with their creditors to continue their operations and, thus, avoid failure. The third phase is judicial and seeks to help enterprises to get recapitalized after bankruptcy. No financial support is provided for the enterprises, but when they are successfully restructured, they are eligible for support under the PMN.

The government has recently established a PMN for services tied to industry. These include the key services that are important in improving the productivity and competitiveness of the industrial sector. The service PMN covers business services, engineering, informatics, training, agricultural consultants. Other important services, such as financial services, telecommunications, electricity, and transportation, are already being upgraded under other programs. It is expected to function like the PMN for manufacturing enterprises, with similar approval procedures and funding from the Fonds de Développement de la Competitivité (FODEC).

4.2.3 Business Environment in Tunisia

4.2.3.1 Starting a Business

Reductions in start-up costs can take two forms. One is to reduce the bureaucratic hurdles that increase the start-up costs for new firms. The second is to provide institutions for venture capital as well as public financial support for new firms.

Table 4.1 Participation to the Mise à Niveau Program – March 2007

	Food processing	Leather and shoes	Chemical	Wood, cork, furniture and diverse	Building materials, ceramics and glass	Mechanical, metal works, electric and electronics	Textiles and clothing	Total
Approved	327	191	137	336	124	303	1,071	2,489
Investment amount million dinars	787	150	264	526	756	630	768	3,881
Share of investment by sector (%)	20	4	7	14	19	16	20	100
Immaterial Investment	85	36	34	62	48	100	152	517
Share of immaterial investment (%)	11	24	13	12	6	16	20	13
Precede granted	105	24	36	77	76	94	137	549
Dossiers at the diagnostic level	201	74	68	189	115	175	415	1,237
Dossiers refused	3	–	1	–	–	5	–	9
Total adhesion	531	265	206	525	239	483	1,486	3,735

Source: Programme de mise à niveau, Ministère de l'Industrie; de l'Energie et des Petites et Moyennes Entreprises. http://www.pmn.nat.tn/www/fr/REPAR_SECT.ASP

Business registration is relatively fast and efficient in Tunisia when compared with countries at similar levels of economic development. It takes ten procedures (10.3 in MENA) and only 11 days (40.9 days in MENA) to start up a business. By contrast, in Hungary, although the number of procedures is only six, it takes about 38 days to start up a business.

The one-stop shop of the API, which was certified ISO 9002 in June 2000, has undoubtedly facilitated business registration and starts up in the manufacturing sector. It informs prospective entrepreneurs on the procedures for statistical and tax registration, assists with on-line registration, provides 24 h responses to business related queries and maintains a detailed database on the registered companies.

However, prior authorizations relating to environment, labor and sectoral regulations are still relatively numerous and impinge on the establishment of new businesses in non manufacturing sectors. Delays are also reported in securing finance, land and in obtaining the construction permit. If these are added up, the effective period to start up a business in Tunisia may exceed 2 years.

4.2.3.2 Hiring and Firing Rules

In Tunisia, hiring rules are flexible but termination regulations are rigid and too protective when compared with its peers. Surveys of managers show that employment regulation is seen to be a bottleneck to improving efficiency, and thus productivity of investment.

Indeed, Tunisia compares favorably with other countries in the MENA and OECD regions in terms of flexibility in hiring. The legal conditions of employment – covering flexibility in working time requirements, mandatory payment for non-working days, and minimum wage legislation – also compare favorably with the selected peers. Labor reforms in Tunisia have introduced flexibility in hiring. The 1996 revision of the labor code introduced fixed-term contracts, covering by 2001 about 15% of the labor force. According to the Labor Code, businesses can hire workers on part-time or fixed term contracts for any job, without specifying maximum duration of the contract.

However, there are areas where regulatory reform could introduce more flexibility. Tunisia restricts the use of fixed contracts, and the use of temporary help agency workers is not allowed for example.

Flexibility of firing encompasses grounds for dismissal, procedures for dismissal, notice periods, and severance payments. Compared with other countries in the region, Tunisian termination rules seem to be rigid and too protective.

Dismissals for economic reasons are still heavily regulated. Companies must notify the labor inspector of planned dismissals in writing 1 month ahead, indicating the reasons and the workers affected. The inspector may propose alternatives to layoffs. If these proposals are not accepted by the employer, the case goes to the regional tripartite committee of labor inspector, employer organization, and labor union (*commission du contrôle des licenciements*). The committee decides by a majority vote (if the inspector and union reject the proposal, no dismissal is possible). It may also suggest retraining, reduced hours, or early retirement. Only 14% of

dismissals end up being accepted. As a result, annual layoffs are less than 1% of the workforce, compared with more than 10% in the average OCDE country. Yet, the unemployment rate remains persistently high, above the OECD average.

As a result, private enterprises in Tunisia find it hard to restructure, and small firms often find solutions outside the legal framework. In Tunisia, an estimated 38% of business activity takes place in the informal sector. International evidence shows that heavy labor market regulation encourages entrepreneurs to operate in the informal economy. This is also likely to hamper private investment. Indeed, firms in the informal sector do not operate at full capacity, while their counterparts in the formal sector suffer from unfair competition, and may thus not expand capacity at potential.

4.2.3.3 Credit Facilities

In Tunisia, there exists a public credit bureau (*Centrale de Risques*) established in 1958, which is supervised by the Central Bank of Tunisia. The length of historical data collected is 10 years, on a total of 56,000 credit reports. However, it records only loans above a minimum size of 13 605USD, indicating a focus on monitoring systemic risk. Fewer regulatory restrictions on credit information sharing will benefit small firms' access to finance the most. In terms of the scope of credit information distribution, only positive data is made available in Tunisia – that is, total loans outstanding, assets and personal information. Access to credit information is limited to the creditor's own customers. Thus, weaknesses in design makes Tunisia's public credit registry a less valuable tool for lenders than in similar countries. Access of lenders to credit information is also hampered by the absence of private credit registries.

In deciding whether to extend credit and at what interest rate, lenders need to know what share of debt they can recover if the borrower defaults. Collateral laws enable firms to use their assets as security to generate capital and strengthen the incentives of debtors to repay their loans. By providing creditors with the right to an asset on default, collateral also reduces a lender's costs of screening loan applicants.

However, over-collateralization restricts access to credit by the private sector, particularly for small firms. The value of collateral depends largely on the ease of creating and enforcing security agreements. The value of collateral also depends on the efficiency of the insolvency regime, as creditors are concerned about recovering collateral if a firm goes bankrupt. Bankruptcy laws define who controls the insolvency process, who has rights to the property of a bankrupt firm and with what priority, and the efficiency of realizing the rights. In Tunisia, there are no legal protections along any of these dimensions. This leads creditors to either increase the price of loans to adjust for the additional risk or decrease the amount of loans.

4.2.3.4 Enforcing Contracts

In Tunisia, there are no requirements to appoint a lawyer or initiate a protest procedure before a public notary. The creditor files a claim in a court, and the court issues a summons to the debtor. The recovery of overdue small debts is normally achieved by

means of a special procedure called "*injonction de payer*" before a general-jurisdiction judge. Provided that the debt has proven an established, the judge grants the injunction to pay. The debtor cannot oppose the order. Therefore, the civil lawsuit excludes the usual stages of service of process, opposition, hearing and gathering of the evidence. This simplified procedure for small debt recovery, which does not mandate legal representation, helps reduce the legal costs which amount to 17% of the total enforcement cost.

4.2.3.5 Closing a Business

In Tunisia, the bankruptcy process is short. It takes 1.3 years, shorter than in countries in the MENA region and in OECD. Moreover, the bankruptcy process is not as costly as it is in peer countries. It represents about 7% of estate, compared to 12.1% in the MENA region.

The Tunisian jurisdiction, like many other jurisdictions of French-legal origin, has attempted to reach the goals of insolvency by giving broader powers to the court. But evidence shows that expanding court powers in bankruptcy proceedings do not have the desired effects.

Involving creditors and other stakeholders in the insolvency process is important to preserve absolute priority of creditors' claims. In Tunisia, the bankruptcy report is filed only with the court and is not accessible to creditors. Such a report would inform the creditors and provide a higher chance of maintaining absolute priority. Another set of judicial procedures defines the powers of various stakeholders in formulating and adopting a rehabilitation plan. The Tunisian bankruptcy law mandates the formulation of a plan by the court, without the effective participation of creditors or management. Adopting a rehabilitation plan without considering their views does not help achieve the insolvency goal of preserving the value of creditor's claims.

4.3 Firm Demographics Data in Tunisia: Some Stylized Facts

The purpose of this section is to describe the data used to analyse patterns of entry and exit in Tunisian manufacturing industries. Some descriptive statistics based on the entry–exit data sets will be presented in order to highlight, according to the literature, some stylised facts about entry and exit.

4.3.1 Data Sources

Two sources of information are used to build manufacturing entry and exit database. The first comes from administrative files including the National Repertory of firms in Tunisia, which is based on continuous report of fiscal

affiliation of firms. The main advantage of administrative data set rest in the full coverage of the business registers of firms' population in the Tunisian Manufacturing sector. Nevertheless, this data set has also some important weaknesses such as the accuracy of information of exitors by year and for each industry, and the lack of information on the characteristics of entrants/exitors, except industry affiliation.

To circumvent these weaknesses, an additional source of administrative file related to the quarterly register of employees taken from the Tunisian National Social Security Fund (CNSS) is used; it constitutes a valuable database of private firm affiliates. At the Tunisian National Institute of Statistics (INS), this second source is merged with firms' fiscal register.[3] The database constituted will serve as a basis for computing series on the number of entering (new), exiting (out of business) and total firms with ten workers or more, by year and by industry over the period 1996–2004.

4.3.2 Characteristics of Entry and Exit Process of Firms

A considered manufacturing firm is assumed in business, if it has a positive number of employees. The entry–exit data set contains three basic variables:

- T_{it}: Total Numbers of firms active in the ith industry at the end of period t.
- E_{it}: Number of new firms that entered the ith industry in year t.
- X_{it}: Number of firms that exited the ith industry in year t.

For comparability across sectors, entry and exit rates are defined with respect to the current year's stock of establishments:

- $\text{Entry rate in } t = \dfrac{E_{it}}{T_{it-1}}$

- $\text{Exit rate in } t = \dfrac{X_{it}}{T_{it-1}}$

- Turnover = Entry rate + exit rate
- Net entry rate = Entry rate − exit rate

Fact 1: Sizeable firm turnover in all manufacturing industries

Our data confirm a relative high firm churning in all sectors. In Fig. 4.1, we present average annual entry and exit rates over the period 1996–2004, for the considered 15 manufacturing industries. Total firm turnover involves 4–12% of all firms in most manufacturing industries and more than 12% in three sectors: 31.4% in textile industries, 14.4% in wood products and 12.4% in leather and footwear industries.

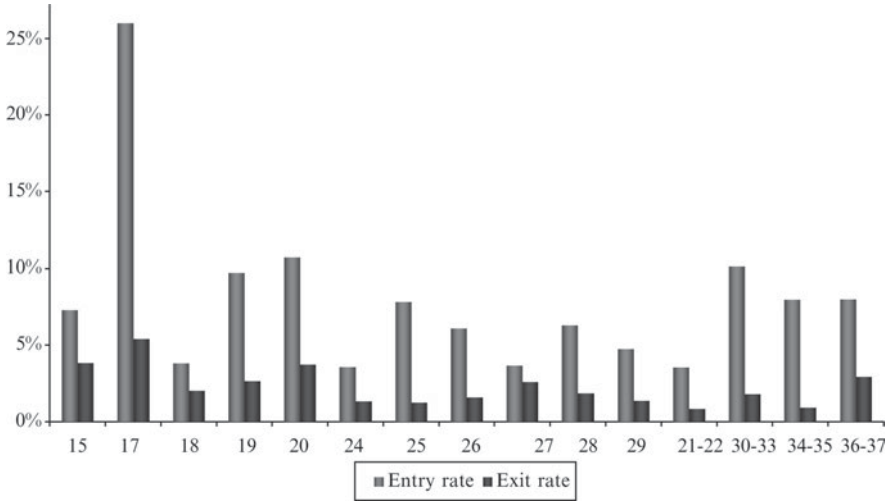

Fig. 4.1 Firm turnover rate in manufacturing industries, mean 1996–2004

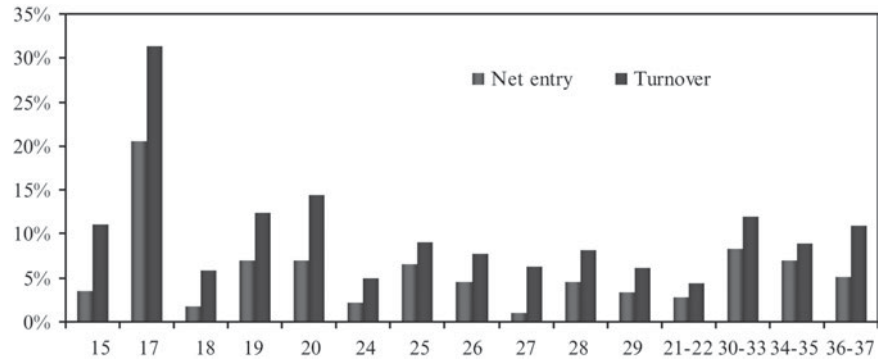

Fig. 4.2 Average net entry by sectors, 1996–2004

Over the sample period (1996–2004), we have an annual average exit rate of 2.3%, which is comparable to exit rates found in other developing regions. For instance, Clerides et al. (1998) report annual average exit rates for Colombia of 1.7%, for Morocco of 3.7% and for Mexico of 1.5%. The entry rate in our sample is much higher, on average 8% per year. This compares to entry rates of 2.7%, 4.9% and 4.8% reported for Colombia, Morocco and Mexico respectively. The higher entry rates in the Tunisian economy are not that surprising, taking into account that the entry of new firms was an important component of the restructuring process concerning the manufacturing industries since 1995.

The data confirm previous findings that, in all sectors, net entry is far less important than the gross flows of entry and exit that generate it (cf. Fig. 4.2 and Table 4.2). This suggests that the entry of new firms in the market is largely

Table 4.2 Firm turnover rate in manufacturing industries, mean 1996–2004

Code	Industry	Entry rate	Exit rate	Turnover
15	Food industries	0.073	0.038	0.111
17	Textile industries	0.260	0.054	0.314
18	Clothing and lining industries	0.038	0.020	0.058
19	Leather and footwear industries	0.097	0.026	0.124
20	Wood products	0.107	0.037	0.144
24	Chemical industries	0.036	0.013	0.049
25	Plastics material and rubber industries	0.078	0.012	0.091
26	Mineral non metallic products	0.061	0.016	0.077
27	Metallurgy	0.037	0.026	0.063
28	Fabricated metal products	0.063	0.018	0.081
29	Machinery and equipment	0.047	0.014	0.061
21–22	Paper and cardboard industries, printing and related support activities	0.036	0.008	0.044
30–33	Electrical equipment, radio and TV and other communications equipment, Measuring and medical instruments	0.101	0.018	0.119
34–35	Motor vehicle manufacturing, other transportation equipment	0.080	0.009	0.089
36–37	Miscellaneous manufacturing	0.080	0.029	0.109

Source: Authors' calculation based on INS data

driven by a search process rather than augmenting the number of competitors in the market.

Fact 2: Firm turnover is principally driven by small and medium sized firms

An important step in the analysis of creative destruction consists of looking at the distribution of firm by size across industries. Size is a crucial dimension in the analysis of firm entry and exit for several reasons. Small firms seem to be affected by greater mixing, but also have greater potential for expansion. Thus, a distribution of firms skewed towards small units may imply higher entry and exit, but also greater post entry growth of successful firms. Alternatively, it may point to a sectoral specialization of the given country towards newer industries, where mixing tends to be larger and more firms experiment with different technologies.

However, any observed difference in one single indicator, like firm size, cannot, as such, be taken to indicate differences in the magnitude or characteristics of creative destruction. The distribution of firm by size is likely to be influenced by the overall dimension of the internal market as well as the business environment in which firms operate that can discourage firm expansion. So, the analysis of firm size should be taken as one of the important aspects that, together with the others on firm demographics, will enable to identify a coherent story about cross-sectoral differences in creative destruction.

Size seems to be an important dimension in the analysis of firm entry and exit in Tunisian manufacturing industries. Not surprisingly, small firms (fewer than 60 employees in average) account for more than 75% of total firm turnover

Table 4.3 Average workers per exiting firm

Code	Average size	1996	1997	1998	1999	2000	2001	2002	2003	2004
15	Food industries	25	21	26	16	33	19	19	15	13
17	Textile industries	51	85	53	51	60	66	40	63	41
18	Clothing and lining industries	59	68	54	43	63	80	56	99	111
19	Leather and footwear industries	45	39	65	10	100	42	42	25	24
20	Wood products	13	37	27	25	36	62	43	96	14
24	Chemical industries	26	32	–	21	59	15	53	14	22
25	Plastics material and rubber Industries	11	–	12	33	13	25	–	23	–
26	Mineral non metallic products	15	24	87	30	21	69	15	15	109
27	Metallurgy	–	126	13	31	25	14	48	–	–
28	Fabricated metal products	21	21	42	29	31	26	49	42	13
29	Machinery and equipment	15	63	88	22	17	18	13	–	70
21–22	Paper and cardboard industries, printing and related support activities	29	–	13	44	–	–	43	–	24
30–33	Electrical equipment, radio and TV and other communications equipment, measuring and medical instruments	–	19	127	47	224	52	70	114	17
34–35	Motor vehicle manufacturing, other transportation equipment	–	–	–	16	53	–	–	18	–
36–37	Miscellaneous manufacturing	30	17	27	40	45	23	125	159	30
	All industries	28	46	49	30	56	39	47	57	41

Source: Authors' calculation based on INS data

Table 4.4 Average workers per firm entrants

Code	Average size	1996	1997	1998	1999	2000	2001	2002	2003	2004
15	Food industries	30	27	32	22	23	23	27	23	27
17	Textile industries	53	59	51	51	51	41	61	45	53
18	Clothing and lining industries	64	77	68	75	93	72	134	79	42
19	Leather and footwear industries	50	99	93	41	65	26	53	70	75
20	Wood products	18	21	17	26	20	22	27	30	21
24	Chemical industries	53	39	14	56	32	23	23	18	50
25	Plastics material and rubber Industries	27	25	47	31	42	27	22	36	23
26	Mineral non metallic products	69	33	49	49	42	31	26	23	18
27	Metallurgy	25	15	12	20	153	31		127	
28	Fabricated metal products	30	33	20	21	18	18	22	19	50
29	Machinery and equipment	15	36	33	22	21	31	16	68	36
21–22	Paper and cardboard industries, printing and related support activities	25	18	39	33	29	19	21	16	18
30–33	Electrical equipment, radio and TV and other communications equipment, measuring and medical instruments	71	146	113	66	155	56	101	46	37
34–35	Motor vehicle manufacturing, other transportation equipment	11	62	215	75	374	64	13	150	81
36–37	Miscellaneous manufacturing	50	31	70	39	24	33	37	16	31
	All industries	39	48	58	42	76	34	41	51	40

Source: Authors' calculation based on INS data

Table 4.5 Average workers per active firm

Code	Average size	1996	1997	1998	1999	2000	2001	2002	2003	2004
15	Food industries	47	54	54	65	55	49	50	50	50
17	Textile industries	87	66	44	115	119	120	111	96	84
18	Clothing and lining industries	85	97	99	78	59	57	62	76	92
19	Leather and footwear industries	60	66	63	63	66	72	76	77	74
20	Wood products	33	32	40	73	42	42	44	38	33
24	Chemical industries	113	89	79	78	80	80	85	58	67
25	Plastics material and rubber Industries	60	57	57	61	60	59	66	63	60
26	Mineral non metallic products	83	75	73	58	78	72	79	77	74
27	Metallurgy	125	114	111	123	129	132	104	92	85
28	Fabricated metal products	54	55	51	268	54	50	46	43	45
29	Machinery and equipment	65	46	46	63	42	44	53	53	48
21–22	Paper and cardboard industries, printing and related support activities	59	58	61	42	48	45	51	49	49
30–33	Electrical equipment, radio and TV and other communications equipment, Measuring and medical instruments	112	147	131	140	145	135	141	153	158
34–35	Motor vehicle manufacturing, other transportation equipment	113	118	147	120	93	86	89	89	97
36–37	Miscellaneous manufacturing	72	65	54	20	85	96	97	97	82
	All industries	78	76	74	91	77	76	77	74	73

Source: Authors' calculation based on INS data

Table 4.6 Average size of exitors and entrants, 1996–2004

	Exitors			Entrants		
Code	Average size	Share in total exit (%)	Average exit rate (%)	Average size	Share in total entry (%)	Average entry rate (%)
15	21	20.7	3.8	26	12.9	7.3
17	57	26.4	5.4	52	36.6	26.0
18	70	20.9	2.0	78	12.6	3.8
19	43	5.5	2.6	63	6.3	9.7
20	39	2.7	3.7	22	2.7	10.7
24	30	2.1	1.3	34	2.0	3.6
25	20	1.4	1.2	31	3.0	7.8
26	43	4.5	1.6	38	5.5	6.1
27	43	1.1	2.6	55	0.5	3.7
28	30	4.0	1.8	25	4.5	6.3
29	38	1.3	1.4	31	1.4	4.7
21–22	31	1.3	0.8	24	1.8	3.6
30–33	84	2.9	1.8	88	5.0	10.1
34–35	29	0.4	0.9	116	1.1	8.0
36–37	55	4.7	2.9	37	4.1	8.0
All industries	44	100	2.3	48	100	8.0

Source: Authors' calculation based on INS data

(cf. Tables 4.3–4.6) and firm turnover tend generally to decline with average size. However, this is not completely true for measuring and medical instruments industries, where relatively high turnover (11.9%) and medium average size (84) are jointly observed. This suggests a possible role of the business environment that reduces firm dynamics among medium-sized businesses.

It is also interesting to look at the dispersion of firm by size within each subsector. Table 4.7 presents average within coefficient of variation of firm size, normalized by the overall manufacturing sector coefficient of variation[4]. If technological factors were predominant in determining the heterogeneity of firm size across sectors, the values should be concentrated around one. If, on the contrary, the size differences were explained mainly by sectoral factors inducing a consistent bias within sectors, then we would expect the sub-sectors with an overall value above (below) the average to be characterized by values generally above (below) one in the sub-sectors.

Textile (17), Chemical (24), Mineral non metallic products (26) and Fabricated Metal Products (28) industries display greater within-industry dispersion in firm size. This is due to the fact that in particular, in textile industries small businesses coexist with large multi-plant enterprises.

The relatively high turnover rates amongst small-medium sectors suggest that the process of entry and exit involves a proportionally low number of workers. For most sectors, new firms are only 32–63%, the average size of incumbents

Table 4.7 Within-industry coefficient of variation of firm size

Sectors	1997	1998	1999	2000	2001	2002	2003	Average
15	1.15	0.94	1.05	1.06	0.98	0.79	0.83	0.97
17	1.30	1.36	1.29	1.24	1.06	0.93	0.90	1.16
18	0.58	0.59	0.59	0.65	0.69	0.67	0.59	0.62
19	0.82	0.78	0.95	1.15	0.98	0.91	0.92	0.93
20	0.64	0.74	0.61	0.64	0.64	0.56	0.72	0.65
24	0.80	1.13	1.15	1.24	1.25	1.14	0.99	1.10
25	0.84	0.81	0.84	0.86	0.77	0.89	0.84	0.84
26	0.90	0.88	1.08	1.68	1.37	1.17	0.80	1.13
27	0.56	0.64	0.76	0.25	0.62	0.93	0.75	0.64
28	0.83	1.17	1.18	0.89	1.19	1.42	1.06	1.10
29	1.46	0.95	1.30	1.01	0.94	1.03	0.75	1.06
21–22	0.98	1.05	1.02	1.00	0.96	1.00	0.97	1.00
30–33	1.18	1.20	1.21	0.75	0.75	0.75	0.75	0.94
34–35	0.92	0.88	0.90	0.87	0.91	0.92	0.95	0.91
36–37	0.83	0.85	0.68	0.73	0.70	0.63	1.25	0.81

Source: Authors' calculation based on INS data

Table 4.8 Average size of entrants and exitors in proportion of incumbents average size, 1996–2004

	Average size/Incumbents average size (%)	
Sectors	Entrants	Exitors
15	49.3	39.3
17	55.1	60.5
18	99.9	89.7
19	92.6	63.4
20	53.8	94.1
24	41.9	37.2
25	51.4	32.3
26	50.7	57.3
27	48.4	38.0
28	34.4	40.9
29	60.4	74.7
21–22	47.3	59.6
30–33	62.6	59.6
34–35	109.7	27.4
36–37	49.5	74.0

Source: Authors' calculation based on INS data

(cf. Table 4.8). The relatively low entry and exit costs may increase incentives to start up relatively small businesses in Tunisian manufacturing industries.

Fact 3: The creative destruction process is the predominant factor driving entry and exit in many manufacturing industries

It is interesting to compare entry and exit rates across sectors to test two competing conjectures: one hypothesis is that entry and exit rates at the sectoral level are

mostly driven by sectoral shocks. Sectors with positive profit shocks will have high entry and sectors with negative profit shocks will have high exit. If sectoral profit shocks are the predominant source of variation, then the cross-sectional correlation between entry and exit rates should be negative. Alternatively, entry and exit rates at the sectoral level might be driven by the within sector creative destruction process. A sector with a high dispersion of idiosyncratic shocks and/or low barriers to entry and exit will exhibit both high entry and high exit rates. If the creative destruction process is the predominant factor driving entry and exit, then the cross-sectional correlation of entry and exit should be positive.

As indicated in Table 4.9, there is a high correlation of industry-level entry rates with exit rate (coefficient of correlation 0.75 for all industries), suggesting that firm turnover not only account for the life cycle of different industries, but also for a continuous process of reallocation of resources in which new businesses (firms) displace obsolete units. The correlation is particularly high in Fabricated Metal Products (0.83), Clothing and Lining (0.81), Wood Products (0.75) and Textile Industries (0.60). Conversely, weaker correlation of entry and exit rates across industries is observed in five industries: Paper and Cardboard, Printing and related support activities (0.001), Chemical (−0.07), Motor vehicle manufacturing and other transportation equipment (−0.09), Food Industries (0.20) and Plastics material and rubber Industries (−0.25); this weaker correlation seems to

Table 4.9 Correlation between entry and exit rate, 1996–2004

Code	Industry	Correlation between entry and exit rate
15	Food industries	0.203
17	Textile industries	0.601
18	Clothing and lining industries	0.807
19	Leather and footwear industries	0.342
20	Wood products	0.745
24	Chemical Industries	–0.066
25	Plastics material and rubber Industries	–0.226
26	Mineral non metallic products	0.390
27	Metallurgy	0.548
28	Fabricated metal products	0.831
29	Machinery and equipment	0.376
21–22	Paper and cardboard industries, printing and related support activities	0.001
30–33	Electrical equipment, radio and TV and other communications equipment, Measuring and medical instruments	0.246
34–35	Motor vehicle manufacturing, other transportation equipment	–0.091
36–37	Miscellaneous manufacturing	–0.499
	All industries	0.749

Source: Authors' calculation based on INS data

be largely due to the systemic changes in which some over-populated industries shrank while expanded.

4.4 Determinants of Entry and Exit

The theoretical and empirical literature addressing the dynamics of entry and exit is considerable and uses a variety of terms to refer to it, such as turnover, turbulence, mobility, and market selection intensity. In the present section, the term turnover is used to refer to the sum of entry and exit rates in a specific industry. Turnover as a market selection process restructures industries, relocates their confines and changes the foundations of competition. It is not surprising, therefore, to find so many papers investigating the reasons behind the inflows and outflows of firms. Yet, the only studies that are of interest in this section are those that analyse the determinants of the rates of entry and exit in manufacturing industries. It focuses on the implications that the interdependence between aggregate entry and exit has for the analysis of manufacturing industry dynamics in Tunisia.

4.4.1 Theoretical Background

Studies of entry and exit have shown that the factors underlying these phenomena are very diverse, being related with industry-specific and firm-specific causes, as well as with changes in the macroeconomic and political environment. Turnover is therefore fed by a variety of factors occurring at the firm, market and macroeconomic levels, which can be either momentary or persistent over time.

Various studies suggest that different stages of the cycle yield different regularities in entry and exit rates. A series of empirical studies has shown that entry rates are higher than exit rates in the earlier phases of industry life cycle (Agarwal 1997; Agarwal and Audretsch 2001; Klepper and Simons 2005). As industries age and set standards, the focus of innovative activity switches from product to process, opportunities for scale economies emerge and shakeout begins. Exit rates overtake entry rates and turnover levels decrease. The important conclusion emerging from these studies is that levels of turnover are higher in earlier stages of the industry or product life cycle.

However, the high correlation between the rates of entry and exit found in different countries and periods suggests that these are not isolated phenomena. In our context, for example, the correlation between the annual rates of entry and exit in the Tunisian manufacturing industry is 0.75. Also, as the detail of Table 4.9 shows, in most of the Tunisian manufacturing sectors, the correlations over the period of analysis defining our data set are effectively positive and significant. Modeling the empirical behavior of these variables, therefore requires some form of interrelation in the econometric specifications. Following the influential paper by Shapiro and Khemani (1987), this is usually done in two ways: via the error terms, maintaining certain symmetry in the vector of explanatory variables, i.e.

estimating a system of seemingly unrelated regressions; or via the explanatory variables, including entry and exit, i.e. estimating a simultaneous equations model. These two approaches have become a benchmark and are the starting point for our empirical investigation.

4.4.1.1 Entry, Exit, and Symmetry Hypothesis

One possible explanation for the statistical regularities around the rates of entry and exit is that their determinants are in fact the same. This would imply perfect symmetry in the vector of explanatory variables. In empirical works, however, it is common to employ a weak version in which only some of the regressors are the same and allow for correlation between the error terms of the entry and exit equations. These regressors are "common" (structural or behavioral) barriers in the sense that they affect both entry and exit.

Well-known examples of these barriers are assets that, because of their specificity and durability, become sunk costs. On the one hand, investing in such assets is a requirement for entry and, if the potential entrant effectively becomes an incumbent, the investment eventually becomes a discouragement to exit. On the other hand, these barriers to exit can also raise barriers to entry because they can alter the expectations of the potential entrants directly by increasing the discount factor of the expected benefits; and/or indirectly as a form of signaling that incumbents will behave aggressively against the entrants.

The hypothesis of symmetry is usually tested by using seemingly unrelated regressions system specifications (*SUR*). Statistically significant coefficients for the barriers to exit (respectively entry) included in the entry (respectively exit) equation would support accepting this hypothesis.

4.4.1.2 Entry, Exit, and Simultaneity Hypothesis

An alternative or complementary explanation is that entry and exit are interrelated in a Schumpeterian setting of creative destruction process. The entry of new, supposed more efficient, firms in a market causes the exit of the relatively less efficient producers and there is consequently a displacement effect. However, existing firms leave behind an emptiness of resources and sets of unsatisfied customers that are an appealing carrot for potential entrants. This may change the subjective probability of success for the potential entrants to the extent that they may indeed, decide to enter and replace those who have left. The outcome of these opposite effects is known in the literature as the revolving door phenomenon or the negative feedback model.

However, what we observe really is not necessarily a creative destruction, but simply trial and error processes. Indeed, some industries may have higher or lower rates than others, just because of their idiosyncratic characteristics. If that is the case, the relation between entry and exit is mostly due to fluctuations in demand, as in the market size model of Geroski and Mazzucato (2001). Changes in the size

of the markets are finally responsible for the success or failure of many firms and for movements on the fringes of industries. Therefore, industry turnover is not necessarily due to displacement-vacuum effects.

The displacement/replacement effects would be supported by statistically significant coefficients of the entry and exit variables on the right hand side of the exit and entry equations, respectively. Otherwise, the natural churning view would be accepted.

4.4.2 Econometric Specifications and Results

Following Shapiro and Khemani (1987), the basic model of entry or exit is characterized by:

$$\text{Entry or exit} = f\left(\text{Barriers to entry/exit; incentives; interaction entry/exit; controls}\right)$$

where entry (exit) are measured typically as the number of entry (exit) or the entry (exit) rate.

Barriers to entry/Exit and/or strategic actions (*BARRIERS*) is a vector and usually represented by generally time-invariant vectors of structural characteristics of the industry (minimum efficient scale, advertising, R&D, capital intensity, sunk costs etc.) that are considered to deter entry or exit. The literature on entry barriers emphasizes that there are market conditions that allow incumbents to raise prices above costs persistently without attracting entry. The distinctive element of entry barriers is that they create an asymmetry between incumbents and potential new entrants. Barriers to entry are rents derived from incumbency which impose an entry cost to entrants, which incumbents do not have to pay.

Exit barriers in turn, make it more difficult for incumbents to exit the markets (e.g., sunk costs). A number of contributions have asserted that barriers to exit are related to barriers to entry, that is they create mobility barriers. The basic idea behind this assert is that exit barriers increase the costs of exit, and thus create a zone of inaction where entrants are less likely to enter and incumbents less likely to exit. This suggests that a simple distinction between entry and exit barriers is not easily possible. However, this type of modeling has also drawbacks. Caves (1998) for example, points out that the inclusion of concentration variables and price cost margins as separate regressors the risk of adding redundancy if one accepts the view proposed by the Structure-Conduct-Performance paradigm where structural characteristics constrain the number of firms in the market and lead to an equilibrium characterized by concentration. Structural and strategic entry barriers may also introduce a difficulty, insofar as they are different in one specific characteristic. As noted by Roberts and Thompson (2003), strategic entry barriers are essentially an ex-ante phenomenon, while structural entry barriers are both ex-ante and ex-post phenomena.

The incentives (*INCENTIVES*) vector captures changing market conditions that create opportunities for new entrants. Two typical variables commonly considered

are profits and industry growth. While the effect of the latter is not unambiguously to foster entry and to reduce exit, the sign of profits as price-cost margins is more ambiguous (Caves, 1998; Roberts and Thompson 2003).

The interaction entry/exit refers to the intertemporal relationship between entry and exit. Roberts and Thompson (2003) among others provide a study of the interaction between entry and exit which can encompass a number of cases: (1) displacement, where the entry of firms leads to the exit of firms, (2) replacement, where the exit of a firm opens room for the entry of new firms, (3) demonstration, where entry leads to more entry via a demonstration effect, (4) shakeout, where wave of entry is followed by a wave of exit, this leads to a revolving door hypothesis, where the simultaneous entry of firms leads to the subsequent exit of the same firms.

Beside industry characteristics, variables related to firm or sector specific characteristics can also be included (*CONTROLS*). This is usually done in order to study the post-entry performance of new firms.

Bearing in mind these considerations, the following relations between entry and exit were estimated where in all models the dependent variables are the natural logs of the gross rates of entry and exit, calculated after adding 1 to the number of entries and exits in each sector *i* and period *t* to avoid the indeterminacy caused by zero entry and exit:

Model 1: Symmetry

$$\mathrm{Ln}\left(Entry_{i,t}+1\right)= f(BARRIERS_{i,t};INCENTIVES_{i,t};CONTROLS)+\lambda_i+u_{i,t}$$

$$\mathrm{Ln}\left(Exit_{i,t}+1\right)= g(BARRIERS_{i,t};INCENTIVES_{i,t};CONTROLS)+\mu_i+v_{i,t}$$

Model 2: Simultaneity

$$\mathrm{Ln}\left(Entry_{i,t}+1\right)= f(BARRIERS_{i,t};INCENTIVES_{i,t};CONTROLS;\ \mathrm{Ln}(Exit_{i,t}+1))+\lambda_i+u_{i,t}$$

$$\mathrm{Ln}\left(Entry_{i,t}+1\right)= g(BARRIERS_{i,t};INCENTIVES_{i,t};CONTROLS;\ \mathrm{Ln}(Entry_{i,t}+1))+u_i+\upsilon_{i,t}$$

The considered explanatory variables are as follows:

- Structural barriers and strategic actions (*BARRIERS*):
- Entry barriers include market structure and capital requirements. These are approximated, respectively, by an index of concentration *CR4* and the average gross investment accounted in the sector *GROSSI*.

Exit barriers are reduced to sunk costs, which we proxy with the average investment per worker *SUNKC*.

- Incentives (*INCENTIVES*):
- Incentives are approximated by the export propensity *EXPROP* corresponding to the value of exports as a proportion of manufacturers' value added, the rate of profit at the industry level *PROFIT* approximated by the proportion of gross operating surplus, calculated from the value added at factor cost less the labor factor costs, to value added, the labor productivity *LPROD* defined as the ratio of real value added to total employees and the industry labor growth rate *LABORGR*.
- Sector specific characteristics (*CONTROLS*):
- Sectoral characteristics considered are the coefficient of variation of labor size *CVSIZE* and production *CVPROD*, measured as the ratio of the standard deviation of labor size and production to the mean of labor size and production respectively.

Tables 4.***10*** and 4.11 show the results under the symmetry hypothesis (Model 1). If we focus on the statistically significant estimates for the whole sector, we find that in general, the signs are in conformity with the predictions. According to these estimates, industry concentration index and capital requirements constitute important

Table 4.10 Determinants of entry rate

	Model 1[a]	Model 2[a]
Constant	0.17	0.14
	(3.28)	(4.88)
CR4	−0.26	−0.26
	(−3.4)	(−2.61)
GROSSI(-1)	−0.03	−0.03
	(−1.51)	(−1.93)
LABORGR	0.03	0.04
	(0.94)	(1.27)
PROFIT	−0.09	−0.10
	(−2.11)	(−3.43)
EXPROP	0.01	0.01
	(2.47)	(2.07)
CVSIZE	0.02	0.02
	(2.82)	(3.21)
CVPROD	0.00	0.00
	(−0.02)	(0.36)
LPROD	2.85	3.09
	(1.98)	(1.96)
LOGEXIT	–	0.69
		(3.4)
Adjusted R^2	0.69	0.71
Sample (adjusted): 1998–2003; Cross-sections included: 15		

[a]Estimation method: Panel least squares; White cross-section standard errors and covariance (d.f. corrected); Effects specification: cross-section fixed (dummy variables) and period fixed (dummy variables); *t*-statistics in parenthesis

Table 4.11 Determinants of exit rate

	Model 1[a]	Model 2[a]
Constant	0.04	0.03
	(2.19)	(2.24)
SUNKC	−4.94	−5.38
	(−2.17)	(−2.46)
LABORGR	−0.01	−0.01
	(−1.36)	(−2.16)
PROFIT	0.00	0.01
	(0.17)	(0.63)
EXPROP	0.00	0.00
	(0.35)	(−0.23)
CVSIZE	0.00	0.00
	(0.57)	(0.2)
CVPROD	−0.01	−0.01
	(−2.45)	(−2.52)
LPROD	0.49	0.20
	(1.47)	(0.69)
LOGENTRY	–	0.10
		(3.71)
Adjusted R^2	0.53	0.56
Sample (adjusted): 1998–2003 Cross-sections included: 15		

[a]Estimation method: Panel least squares; White cross-section standard errors and covariance (d.f. corrected); Effects specification: cross-section fixed (dummy variables) and period fixed (dummy variables); *t*-statistics in parenthesis

barriers to entry. As for exits, sunk costs approximated by the average investment per worker, act as barrier. However, we find no evidence of symmetry in the vector of explanatory variables.

A barrier, which gives major advantages for the incumbents, is the realization of scale economies which act as a barrier for the entrants principally via an absolute capital requirement effect (past GROSSI and SUNKC). Absolute capital requirements effect arises from the large investment outlays necessary to build an appropriate sized plant. The size of the disadvantage so created depends on the absolute size of minimum efficient plants. The imperfections in capital markets, which affect the availability of finances (credit) for investments, add to the disadvantage of the entrants. Dixit (1981) has discussed the use of investment as an entry barrier. This materializes when capital expenditures once made, become irreversible or sunk in the next period. Then an established firm might be able to commit to producing an output that it could not sustain at equilibrium if its first period expenditure were irreversible. Sunk expenditure lowers the incumbent's marginal cost for any output below the full capacity level, which, in turn discourages the firm from cutting output in response to entry. Dixit also shows that potential entry may encourage an incumbent firm to invest more in irreversible capital which has the

effect of increasing the incumbent's post entry equilibrium output, while lowering the entrant's post entry equilibrium output and price. Sunk costs are a barrier that permits the incumbents to act strategically and forces the entrant to operate at a large scale in order to make profits. Capital investment can be an effective entry deterrent in the above model even if the potential entrant has the same cost function as the incumbent or even if the entrant has lower cost. This is because the extent to which costs are sunk plays an important strategic role in permitting the established firm to commit to a level of output that it would maintain if entry were to occur. The established firm's technology with its sunk capital cost is a mechanism by which the firm can sustain the aggressive market share.

Entry is positively associated with export orientation, market size dispersion and labor productivity. It is negatively associated to profit rate. It seems that the defense of high rents gives incumbents an incentive for ex-post retaliation. Knowledge, about this probably leads to a situation where high profits do not lead to new entry. Labor growth rate and production dispersion within firms deterred exit.

Tables 4.***10*** and 4.***11*** show also the results under the simultaneity hypothesis. Model 2 as cited by Evans and Siegfried (1992) is "*looking for an explanation of residual entry, over and above that which is determined by exit, and residual exit, exceeding that which is determined by entry*." The estimates support the existence of displacement replacement effects and do not reveal any hint of symmetry in any explanatory variables.

From the goodness-of-fit measures (in the bottom rows of Tables 3.1 and 3.2), the explanatory power of the model is relatively high with an adjusted R squared ranging between 53 and 71%. The statistical significance of the interaction effect between entry and exit suggests that Model 2 is indeed the best specification. Accordingly, the estimates from this model should be considered as the basis for the comparisons with other studies.[5]

4.5 Turnover, Economic Performance, and Productivity

The theory attached to firms' turnover goes back to Schumpeter. His theory is that growth, innovation and business dynamics are inherently connected and the economy develops through a process of competition and selection. Firms gain an advantage through innovation. In this way, they achieve excess profit which encourages imitation and entry. As a result, profits drop and the firms are stimulated to innovate again. As not all firms have the abilities to innovate, selection occurs. From this point of view, the entry of new firms is essential because entrants bring with them new ideas, methods and products. The exit of some firms is equally important, because the majority of these firms show bad performances and do no longer contribute to the growth of the economy. Furthermore, exit of firms creates room for new entries. Accordingly, Schumpeter states that a high level of turnover of firms contributes to economic growth because of its contribution to selection and innovation.

The purpose of this forth section is to investigate using a panel of manufacturing industry data for the years 1996 up to and including 2004 whether entry and exit of firms affect performance and labor productivity.

4.5.1 Impact of Entry and Exit Rates on Economic Performance

Many studies dealing with the impact of firm entry and exit on economic performance, focus on the relationship between firm entry and exit and productivity growth. Scarpetta et al. (2002) studied several OECD countries; the empirical results show significant differences in the contributions of entry to aggregate productivity. For the European countries, firm entry has a positive contribution to growth, but the effect is small, whereas in US, firm entry has a negative impact on growth. However, the results are unanimous for the impact of the firm exit, in the sense that the exit of low productivity firms has a positive impact on aggregate growth. The authors argue that the results may differ according to whether the economic performance indicator is measured by TFP or Labor productivity. Besides, Cincera and Galgau (2005) argues that the entry and exit of firms has an impact on both the level and the growth rate of total factor productivity.

In the present study, we concentrate on the main findings on the impact of the entry and exit rates on economic performance as measured by the growth of output. Consequently, we will run an extended Cobb–Douglas function, defined as follows:

$$\ln(Y_{it}) = \alpha_0 + \alpha_1 \ln(K_{it}) + \alpha_2 \ln(L_{it}) + \sum_{p=1}^{2} \lambda_p \ln(E_{it-p} + 1) + \sum_{q=1}^{2} \beta_q \ln(X_{it-q} + 1) + \varepsilon_{it} \tag{4.1}$$

where $i = 1 \ldots 15$, $t = 1997–2005$.

Y, K, and L represent respectively value added, capital and labor in the considered industry. Entry rate, E, and exit rate, X, are assumed to affect the production process instantaneously and with lagged components. Hence, the dynamics of entry and exit on the production process will be considered by introducing entry and exit rates to the production function, according to a distributed lag model. An alternative specification to be tested is to introduce into the production equation, production, capital and labor variables in first differences rather in levels. Hence, we will have:

$$\Delta \ln(Y_{it}) = \alpha n_0 + \alpha_1 \Delta \ln(K_{it}) + \alpha_2 \Delta \ln(L_{it}) + \sum_{p=1}^{2} \theta_p \ln(E_{it-p} + 1) + \sum_{q=1}^{2} \mu_q \ln(X_{it-q} + 1) + \varepsilon_{it} \tag{4.2}$$

The two alternative specifications presented above, are tested using a panel data of 15 manufacturing industries covering the period 1995–2004. Specification (2) has been tested using proxies for value added, capital and labor extracted from the annual firm surveys covering the period 1997–2003. Thus, we use for each sector and for each year medians values of firm value added, capital and labor. Several specifications have been tested whether output and inputs variables in the production function have been introduced in levels or in differences and whether the heterogeneity across industries is supposed to be fixed or random. Our favorite results for the impact of firm entry and exit on output growth are reported in Table 4.12.[6]

We observe a negative impact of an increase in the current firm entry rate, which is significant at the 10% confidence level, with a 1% increase in the current entry rate leading to a decrease by 1.04%.[7] However, we do not find a significant relationship between firm entry lagged by 1 and 2 years respectively. Besides, the coefficients of the exit rates are not significant for all the specifications. An exception concerns, results of specification (1) where we find that the exit rate lagged by 1 year has a positive impact on the production process.

The general policy implications that we can draw from the empirical analysis are not clear and do not support any economic considerations that influence entry and exit in

Table 4.12 Impact of entry and exit on economic performance; dependent variable lnY

	Specification (1)	Specification (2)	
	Fixed effect model	Fixed effect model	Random effect model
Constant	2.95	–	−0.026
	(4.64)		(−0.11)
Labor	0.37	0.93	0.93
	(4.97)	(5.4)	(6.11)
Capital	0.24	0.28	0.29
	(4.44)	(2.6)	(3.10)
Entry	−0.74	−1.22	−1.04
	(−1.93)	(−1.62)	(−1.63)
Entry(−1)	−0.55	0.75	0.67
	(−1.79)	(−0.95)	(1.15)
Entry(−2)	−0.04	–	–
	(−0.14)		
Exit	1.09	2.39	1.02
	(1.17)	(1.15)	(0.65)
Exit(−1)	2.15	2.20	0.72
	(2.31)	(1.11)	(1.53)
Exit(−2)	1.49	–	–
	(1.57)		
Obs	105	90	90
R^2	0.58	0.67	0.60
Haussman specification test		$x^2(6) = 1.6$	p-Value 0.95

Note: Robust *t*-statistics in brackets fonts below the corresponding coefficients.
Specification (1) and (2) indicate that value added, capital and labor variables are introduced alternatively in levels or differences into the production function.

order to improve economic performance.[8] The results obtained are not robust and stress the limits of the present study, which are due to data availability and measurement errors. Besides, estimation results may be plagued by problems of reverse causality.

4.5.2 Labor Productivity and Firm Turnovers

This section focuses on the dynamics of labor productivity in the manufacturing sector during the 1996–2004 period, the period for which the data are readily available. We analyze labor productivity, and not total factor productivity (TFP), because of two equally important reasons. First, labor productivity is an important macroeconomic indicator of earning capacity, and a reference statistical information closely followed by the public and policy-makers alike. Second, the data on capital stocks required to study TFP are not of the same good quality as the other data and exist for only a proportion of the firms in the sample seriously limiting the scope of the analysis.

Figure 4.3 and Table 4.13 show the basic aggregate patterns using the INS aggregate data for the period 1984–2004.

Table 4.13 reveals that value-added grew rapidly between 1996 and 2004 (7% in average). Capital investment also grew at a relatively fast pace (6% in average). However, growth in worker-year and value-added per worker-year has been modest and quite erratic during this period, at an average rate of 2% and 5% per year respectively.

As mentioned above, the purpose of this part is to investigate whether entry and exit of firms affects labor productivity. A model for labor productivity is developed and estimated using a panel of 15 manufacturing sectors data for the years 1996 up to and including 2004. Table 4.14 presents averages of labor productivity.

To investigate the impact of firm dynamics (turnover) on productivity, the following equation for labor productivity is estimated:

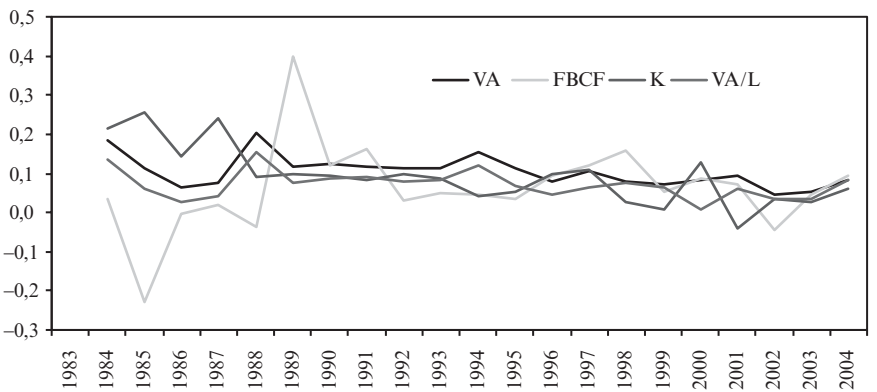

Fig. 4.3 Manufacturing sector, 1984–2004 growth rates (%)

Table 4.13 Manufacturing sector, 1984–2004 growth rates (%)

Period	Worker-years	Value added	Investment	Stock of capital	Value added per worker
1984	0.04	0.19	0.03	0.21	0.13
1985	0.05	0.11	–0.23	0.26	0.06
1986	0.04	0.07	0.00	0.14	0.03
1987	0.03	0.07	0.02	0.24	0.04
1988	0.04	0.20	–0.04	0.09	0.16
1989	0.04	0.12	0.40	0.10	0.07
1990	0.03	0.12	0.12	0.09	0.09
1991	0.02	0.12	0.16	0.08	0.09
1992	0.03	0.11	0.03	0.10	0.08
1993	0.03	0.11	0.05	0.09	0.08
1994	0.03	0.15	0.05	0.04	0.12
1995	0.04	0.11	0.04	0.05	0.07
1996	0.03	0.08	0.10	0.10	0.04
1997	0.04	0.10	0.12	0.11	0.07
1998	0.00	0.08	0.16	0.03	0.08
1999	0.01	0.07	0.05	0.01	0.07
2000	0.07	0.08	0.09	0.13	0.01
2001	0.03	0.10	0.07	–0.04	0.06
2002	0.01	0.05	–0.05	0.04	0.03
2003	0.02	0.05	0.05	0.03	0.03
2004	0.00	0.08	0.09	0.06	0.08
1984–2004	0.03	0.10	0.05	0.09	0.07
1996–2004	0.02	0.07	0.06	0.04	0.05

Source: Authors' calculation based on INS and IEQ aggregated data

$$Labor\ \ \mathrm{Pr}oductivity_{it} = \alpha_0 + \alpha_1 Dummy(\Delta L_{it} > 0) + \sum_{j=0}^{1} \beta_j TURNOVER_{i,t-j} + \varepsilon_{it} \quad (3)$$

Firm downsizing, i.e., a reduction in the size of the firm's labor force, is often rationalized as an integral part of a process of structural change that will eventually result in productivity gains. It is interesting then to try and confront this notion with our data.

We regressed labor productivity between 1996 and 2004 on a dummy variable Dummy($\Delta L > 0$) equal to one for firms that increased their number of worker-years during the period, and zero for those that did not and on present and lagged *TURNOVER* (as well as industry and temporal dummies). Table 4.***15*** presents this result.

The estimated coefficient of the dummy variable indicates that, within the same industry, firms that increased their labor force experienced 2 constant Dinars lower productivity growth than firms that decreased their workers.[9] These results also tell us that firm turnovers contribute positively and significantly to the increase of labor productivity.

Table 4.14 Labor productivity across industries (in 1,000 Dinars), 1997–2004

SECTOR	Mean	Std. Dev.	Max	Min.	Obs.
Food industries	1.81	0.20	2.07	1.47	8
Textile industries	0.44	0.31	1.02	0.25	8
Clothing and lining industries	0.81	0.22	1.15	0.57	8
Leather and footwear industries	1.06	0.08	1.18	0.97	8
Wood products	5.95	1.21	7.61	3.56	8
Chemical industries	2.74	0.46	3.62	2.19	8
Plastics material and rubber industries	1.46	0.07	1.56	1.33	8
Mineral non metallic products	1.37	0.14	1.70	1.22	8
Metallurgy	1.47	0.10	1.64	1.35	8
Fabricated metal products	1.12	0.09	1.28	0.98	8
Machinery and equipment	0.38	0.05	0.48	0.28	8
Paper and cardboard industries, printing and related support activities	1.12	0.14	1.28	0.94	8
Electrical equipment, radio and TV and other communications equipment, Measuring and medical instruments	0.85	0.05	0.93	0.78	8
Motor vehicle manufacturing, other transportation equipment	1.96	0.44	2.37	1.24	8
Miscellaneous manufacturing	0.37	0.07	0.49	0.30	8
All	1.53	1.39	7.61	0.25	120

Table 4.15 Labor productivity and turnover

Variable	Coefficient[a]
CONST	0.01
	(9.26)
Dummy(DL > 0)	−0.002
	(−2.83)
TURNOVER	0.019
	(3.69)
TURNOVER(−1)	0.02
	(2.25)
Adjusted R^2	0.94
Sample (adjusted): 1997–2004; Cross-sections included: 15	

[a]Estimation method: Panel least squares; White cross-section standard errors and covariance (d.f. corrected); Effects specification: Cross-section fixed (dummy variables) and period fixed (dummy variables); *t*-statistics in parenthesis

One problem with modeling the consequences of turnover is the possibility of simultaneity: on the one hand, economic growth encourages entry, entry in turn has consequences for exits and, on the other hand, entries and exits affect economic growth. In ideal circumstances, this entire process should be modeled.

We chose a simple approach in this study which can be refined later. Nevertheless, this approach has provided reliable indications that turnover does affect labor productivity.

4.6 Conclusion

While there has been a profusion of theoretical work on entry and exit of firms, there is comparatively little empirical work in the area even for developed countries (Disney et al. 2003). Firm entry and exit is a part of the market selection process, by which resources are reallocated within or across industries. The process of entry and exit influences economic performance through firms' internal restructuring, reallocation of resources among firms and changes in market shares of incumbents. It also induces the introduction of new technologies, thereby improving economic performance. Unfortunately, shortage in firm demographics data in Tunisia and its coverage enables researchers to draw concrete inferences on firm dynamics and poses an important obstacle to analyzing births and deaths of enterprises. This data shortage necessitates the need for more effort to be done on data collection and dissemination for better understanding of the within-firm growth and market dynamics.

The major contribution of the study presented in this chapter is to circumvent this data shortage by merging, for the first time in Tunisia, administrative files based on continuous report of fiscal affiliation of firms with the register of firm affiliates at the National Social Security Fund (CNSS) in order to compute series on the number of entering (new), exiting (out of business) and total private firms with ten workers or more, by year and by industry over the 1996–2004 period.

First, the empirical findings of the chapter establish three basic stylized facts: a relative high firm churning in all Tunisian manufacturing sectors, firm turnover is principally driven by small and medium-sized firms and the creative destruction process is the predominant factor driving entry and exit in many manufacturing industries.

By developing a comprehensive picture of the magnitude, characteristics and effectiveness of the creative destruction process, the paper provides policy makers with a better understanding of the market's selection process at the sectoral level. While heterogeneity in productivity is a common finding in firm-level micro data, the easy entry and exit of firms is necessary if these micro differences are to be exploited in a way that contributes to aggregate productivity growth. The combination of heterogeneity in productivity and easy entry and exit of firms is found to characterize the manufacturing sector in Tunisia. Accordingly, obstacles to free entry and exit slow the reallocation process and are likely to slow (labor) productivity growth.

Second, focusing on the implications that the interdependence between aggregate entry and exit has for the analysis of manufacturing industry dynamics in Tunisia, the empirical investigations revealed that:

- Industry concentration index and capital requirements constitute important barriers to entry. As for exits, sunk costs approximated by the average investment

per worker, act as barrier. However, no evidence of symmetry in the vector of explanatory variables is established.

- Entry is positively associated with export orientation, market size dispersion and labor productivity. It is negatively associated to profit rate. It seems that the defense of high rents gives incumbents an incentive for ex-post retaliation. Knowledge about this probably leads to a situation where high profits do not lead to new entry. Labor growth rate and production dispersion within firms deterred exit.
- Estimates also support the existence of displacement, replacement effects and do not reveal any hint of symmetry in any explanatory variables.

Finally, firm turnovers contribute positively and significantly to the increase of labor productivity.

4.7 Notes

1. For more details see Morrisson and Talbi (1996), Murphy (1999), and Di Tommaso et al. (2001).
2. http://www.pmi.tn/en/index.php
3. In fact, the National Repertory of firm in Tunisia is a continuous updated register of entry, exit and active firms based on a mix of two administrative files: The fiscal annual register coming from the general direction of fiscal control and the National quarterly register of employees taken from the CNSS.
4. The coefficient of variation is used because the dispersion of size across industries is not in general independent from the average size: sectors with larger size also tend to display higher standard deviations.
5. Even though the above methodology provides us reasonably good estimates of the height of the overall barriers to entry and exit it suffers from inaccuracies introduced by the use of the kinds of variables that proxy barriers. Moreover, the data available for cross section examination by itself is capable of inducing biases in the measure. Thus it can only be considered as a first step in analysing the extent of barriers. Added to this is the possibility of inter-industry variations in erecting barriers. As entry and exit are discrete and involve a time lag to respond to incentives, which differ across industries, a more suitable method will be to examine a panel of firms across industry groups.
6. Several specifications have also been tested assuming that entry and exit rates are endogenous. The results obtained are not significant and will not be reported.
7. Economic analysis on the impact of the entry and exit rates on output growth concern the results reported in column 2 and 3 of Table 5.1.
8. Our results are in contradiction with the main findings of Cincera and Galgau (2005) who find appositive correlation between entry and the growth of production.
9. The result remains unchanged after controlling for changes in the capital stock by introducing a dummy variable equal 1 for firms that increased their real investment.

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