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ENTRY, EXIT, RESOURCE REALLOCATION AND PRODUCTIVITY GROWTH IN THE TUNISIAN PRIVATE MANUFACTURING INDUSTRIES

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Abstract

This paper is motivated by the growing empirical evidence suggesting large firm dynamism in all market oriented economies and the significant role that this dynamism plays in promoting reallocation of resources and ultimately productivity growth. It attempts to make two major contributions: circumventing shortage in firm demographics data in Tunisia by merging, for the first time in Tunisia, administrative files based on continuous report of fiscal affiliation of private firms with the register of firm affiliates at the National Social Security Fund in order to compute series on the number of entering (new), exiting (out of business) and total firms with 10 workers or more, by year and by industry over the 1996-2004 period; and providing a comprehensive picture of the magnitude, characteristics and effectiveness of the creative destruction process and making the first attempt at understanding the sources of observed variations across industries in Tunisia. The empirical findings of the paper 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. Moreover, 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 productivity growth.

ملخص

دفع إلي إعداد هذه الدراسة تلك الدلائل الخبروية المتزايدة التي تشير إلي ما تتعرض له الشركات من دينامية علي نطاق واسع في كافة أنواع الإقتصاد الموجهة نحو السوق. وإلي ذلك الدور ذي البال الذي تلعبه هذه الدينامية في تشجيع إعادة توزيع الموارد ثم زيادة الإنتاجية في نهاية المطاف. وتسعي الدراسة إلي تحقيق هدفين رئيسيين: التحايل علي نقص البيانات الديمغرافية الخاصة بالشركات في تونس بالدمج بين الملفات الإدارية القائمة علي التقارير المستمرة عن التبعية المالية للشركات الخاصة، الدمج بينها وبين سجل الشركات الفرعية في صندوق الضمان الاجتماعي القومي بغية إحصاء متسلسلة عن عدد الشركات التي يعمل بها عشرة عمال أو أكثر، والتي تدخل السوق أو تخرج منه، وكذا إجمالي هذه الشركات حسب كل عام وكل صناعة علي حدة خلال الفترة من 1996 حتى 2004، وكذا إعطاء صورة شاملة لحجم عملية الهدم والبناء(في مجال الشركات) ومميزاتها وفعاليتها وبذل أولي المحاولات لفهم أسباب ما يلاحظ من تفاوتات بين الصناعات المختلفة في تونس. وتؤكد النتائج الخبروية لهذه الدراسة علي ثلاث حقائق أساسية (اتخذت لنفسها أسلوب معينا) وهي: الارتفاع النسبي في تفاعل الشركات في كافة قطاعات الصناعة التونسية والتحول في الشركات يعتمد بصورة رئيسية علي الشركات صغيرة ومتوسطة الحجم، وعملية الهدم والبناء هي العامل السائد وراء الدخول والخروج في كثير من الصناعات. أضف إلي ذلك أن ارتباط التباين في الإنتاجية وسهولة دخول الشركات وخروجها يميزان القطاع الصناعي في تونس. ومن ثم نجد أن إعاقة حرية الدخول والخروج هذه من شأنها إبطاء عملية إعادة التوزيع ونمو الإنتاجية.

Introduction

Critical issues in Industrial Organization such as competition, efficiency and innovation, hinge to a large extent on the markets' selection process. A variety of authors who addressed these issues suggest that characteristics such as number and size distribution of firms, market shares, product variety and quality, and scale economies evolve through two kinds of processes by means of which the market selects successful firms: Trial-and-error processes, in which new firms enter markets and exit soon afterwards; and creative destruction processes, in which new firms enter markets and succeed, leading to the eventual exit of older incumbents.

Higher levels of entry and exit rates tend to occur in emerging or growing industries, or in industries under rapid structural change. Large waves of new entrants, either bringing innovative and more competitive products to the markets or just trying out their luck, lead to large waves of exits of those competitors whose abilities are at the fringe.

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; Klepper and Simons, 2005; Agarwal and Audretsch, 2001). As industries age and set standards, or dominant designs for their products, 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.

This paper is motivated by the growing empirical evidence suggesting large firm dynamism in all market oriented economies and the significant role that this dynamism plays in promoting reallocation of resources and ultimately productivity growth. It attempts to make two major contributions[1]:

- Shortage in firm demographics data in Tunisia and its coverage hinders researchers from drawing concrete inferences on firm dynamics and poses an important obstacle to analyzing births and deaths of enterprises. Accordingly, the first contribution of the paper is to circumvent this data constraint by merging, for the first time in Tunisia, administrative files based on continuous report of firms' fiscal affiliation 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 10 workers or more, by year and by industry over the 1996-2004 period.
- At a second stage, these series are associated to firm and sectoral panel data to provide a comprehensive picture of the magnitude, characteristics and effectiveness of the creative destruction process and, by exploiting the different dimensions of our data; we make the first attempt at understanding the sources of observed variations across industries in Tunisia.

The analysis is conducted in three steps. An overview of the magnitude of entry and exit across industries and size categories is provided in Section 1. In Section 2 the impact of new private firms on economic performance (productivity) is considered by adopting an approach based upon a cross-sectional decomposition of productivity growth into two terms involving the unweighted average of firm-level productivity plus a cross term that reflects the cross-sectional efficiency of the allocation of activity. Manufacturing firms are often struggling to

1 This paper reports on research from the IDRC project titled "Economic Reforms, Firms Entry and Exit and Competitiveness in MENA" which follows up on earlier work by the same team and the same project leader Pr. Khalid SEKKAT that investigated the status of competition policies in Morocco, Tunisia, Egypt and Jordan with an aim to examine whether economic liberalization in the four MENA countries, has improved productivity through the dynamics of firm's entry and exit in the manufacturing sector.

catch up technologically, to improve their competitiveness and to reallocate workers among diverse occupations. At the same time, various frictions hamper factor mobility, including regulations governing the creation and termination of firms, employment protection regulation or severance pay laws, credit market imperfections and non-competitive product or factor markets. Hence, labor market flexibility is needed at the micro level, so that both jobs and workers can move from less competitive sectors and firms to more competitive ones in order to ensure resource reallocation and productivity growth. Section 3 attempts to document patterns of job creation, destruction and net job creation in the Tunisian private manufacturing industries, using an unbalanced panel data set including information on 1,120 manufacturing firms with 10 or more employees, observed over the period 1999-2004. Section 4 concludes.

1. Characteristics of Entry and Exit Process of Firms

In this study, we use two sources of information for the construction of an entry-exit database. The first comes from administrative files including the National Repertory of firms in Tunisia, which is based on a continuous report of the fiscal affiliation of firms. The main advantage of this administrative dataset rests in the full coverage of the business registers of firms' population in the Tunisian manufacturing sector. Nevertheless, this dataset also has 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 entrant/exitors — except for industry affiliation. To circumvent these weaknesses an additional source of administrative files related to the quarterly register of employees taken from the 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.[2] The constituted database will serve as a basis for computing series on the number of entering (new), exiting (out of business) and total firms with 10 workers or more, by year and by industry over the period 1996-2004.

For the purpose of this study, a considered firm is assumed in business if it has a positive number of employees. The entry-exit dataset contains three basic variables:

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

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

- Entry Rate in t $= \dfrac{E_{it}}{T_{it-1}}$;
- 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 relatively high firm churning in all sectors. In Figure 1 we present the average annual entry and exit rates over the period 1996-2004 for the considered 15 manufacturing industries. Total firm turnover (entry plus exit rates) involves 4 to12 percent

2 In fact, the National Repertory of firms 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.

of all firms in most manufacturing industries and more than 12 percent in three sectors: 31.4% in textile industries, 14.4% in wood products and 12.4% in leather and footwear Industries.

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, Lach and Tybout (1998) report annual average exit rates of 1.7%, 3.7% and 1.5% for Colombia, Morocco and Mexico respectively. The entry rate in our sample is much higher (8% on average 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 in figure 1 confirms previous findings that in all sectors net entry (entry minus exit) is far less important than the gross flows of entry and exit (turnover) that generate it (Figure 2). This suggests that the entry of new firms to the market is largely driven by a search process rather than by 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 (Table 1). 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 us 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 on average) account for more than 75 percent of total firm turnover (see Tables 2 to 5) and firm turnover generally tends 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 sub-sector. Table 6 presents average within coefficient of variation of firm size, normalized by the overall manufacturing sector coefficient of variation[3]. 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

3 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.

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 the textile industries in particular, 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 to 63 percent the average size of incumbents (see Table 7). 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 8, 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 accounts for the life cycle of different industries but also for a continuous process of resource reallocation 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 be largely due to the systemic changes by which some over-populated industries shrank while others expanded.

2. Cross-sectional Efficiency of Activity Allocation

One way of assessing the impact of new firms on economic performance is to estimate the contribution of entries and exits on productivity (Baldwin, 1995; Disney et al., 2003; Foster et al., 2001; for a review, see Caves, 1998). A standard result of this type of analysis is that a considerable part of the productivity improvement can be attributed to the entrants with above-average productivity and the exit of businesses with relatively low productivity. A significant portion of improvements in productivity is due to the turnover of units and takes place within multi-plant firms that close down low-productivity plants and set up highly efficient new ones (Disney et al., 2003).

Unfortunately, the aggregated sectoral nature of entry and exit series confectioned and included in our database does not allow us to evaluate the competitiveness of the new entrants by examining the resource reallocation among firms to aggregate productivity growth (productivity decomposition methods).

However, as discussed in Bartelsman et al. (2005), distortions in market structure and institutions can distort the entry and exit margins in a variety of ways making the interpretation of the productivity decomposition methods difficult. An alternative simpler and more robust approach is to ask the question: Are resources allocated efficiently in a sector in the cross section at a given point in time? Dynamics can also be examined here to the extent that the nature of efficiency of the cross sectional allocation of businesses can vary over time.

The approach adopted in this section does not require an identification of entrants and exitors; it is based upon a simple cross-sectional decomposition of productivity growth developed by Olley and Pakes (1996). The authors note that in the cross section, the level of productivity for a sector at a point in time can be decomposed as follows:

$$\underbrace{P_t}_{\text{Weighted average productivity}} = \underbrace{\frac{1}{N_t}\sum_i P_{it}}_{\text{Unweighted average of firm-level productivity}} + \underbrace{\sum_i \Delta\theta_{it}\Delta P_{it}}_{\text{Allocative efficiency}} \quad (1)$$

where N is the number of businesses in the sector, P_t is an aggregate productivity measure (in our case labor productivity) for the considered sector at time t, θ_{it} is the share of firm i (employment share) in the given sector at time t, P_{it} is the productivity measure of an individual firm i at time t and Δ is the operator that represents the cross sectional deviation of the firm-level measure from the industry's simple average.

The simple interpretation of this decomposition is that aggregate productivity can be decomposed into two terms involving the unweighted average of firm-level productivity plus a cross term that reflects the cross-sectional efficiency of the allocation of activity. The cross term captures allocative efficiency since it reflects the extent to which firms with greater efficiency have a greater market share. Distortions to market structure and institutions unambiguously imply that the difference between weighted and unweighted productivity or equivalently the cross term should be smaller.

Figure 3 and Table 9 present measures of the gap between weighted and unweighted average productivity for the considered manufacturing industries. Figure shows the difference between the logarithm of employment-weighted labor productivity and the logarithm of unweighted average labor productivity[4], and measures how many percentage point higher aggregate manufacturing labor productivity is than average labor productivity of firms in a specific manufacturing industry. Clothing and Lining Industries are on top, enjoying a 65% productivity boost from rational allocation of resources, followed by Paper and Cardboard Industries, Printing and related support activities with 20.4%, and Mineral non-metallic products industries with 19%.

Table 9 presents the evolution over the period 1997-2003 in the manufacturing industries. A negative effect is observed mainly in Electrical Equipment, Radio and TV and other Communications equipment, Measuring and Medical Instruments industries (-7.1%) and Food industries (-1.5%). This negative effect means that allocation was worse than that resulting from a toss of the dice: for some reason resources were disproportionately allocated towards poor productivity firms.

4 This difference corresponds to $Log(P_t) - Log\left(\frac{1}{N_t}\sum_i P_{it}\right)$ or equivalently to $Log\left(\sum_i \Delta\theta_{it}\Delta P_{it}\right)$

3. Job Reallocation Process

Tunisian manufacturing industries have been experiencing rapid structural transformation since two decades. They are often struggling to catch up technologically, to improve their competitiveness, and to reallocate workers among diverse occupations. At the same time, various frictions hamper factor mobility, including regulations governing the creation and termination of firms, employment protection regulation or severance pay laws, credit market imperfections and non-competitive products or factor markets. Hence, labor market flexibility is needed at the micro level, so that both jobs and workers can move from less competitive sectors and firms to more competitive ones in order to ensure resource reallocation and productivity growth.

Until recently the literature has focused virtually entirely on movements in labor demand within continuing firms with both theory and empirical specifications derived from neo-classical profit or cost functions. However, as has now been documented extensively, a large fraction of movements in the stock of jobs arise from the entry and exit of firms. Davis et al. (1996a), for example, show that up to 25% of overall job changes in the US were due to firm births and deaths. Roberts (1996) finds that, in Chile (1979-86), Colombia (1977-91), Morocco (1984-89) and the US (1973-86), entry and exit contributed more to the net change in positions than did the expansion of continuing plants — although the contribution varied greatly across business cycle and period of adjustment.

In this section, we attempt to document patterns of job creation, destruction and net job creation in the Tunisian manufacturing industries, using annual firm-level observations (from *Employers Association of the North East* (*EANE)*. The unbalanced panel dataset at our disposal contains information on 1,120 manufacturing firms with 10 or more employees, observed over the period 1999-2004. The dataset is reasonably representative of manufacturing sectors, and apart from employment data, it includes a wide range of financial information (e.g. profit and loss account, balance sheet, etc.) and descriptive information (industry and activity codes, incorporation year, etc.).

However, there are also some limitations in our data. Indeed, in order to calculate changes in employment at firm level we have to separate firms according to whether they are continuing firms, new entrants or exitors. Spurious entrants and exitors may be accounted for, if we are not able to distinguish, for example, newly created firms from firms that simply enter the pool at a given period t but are already operating in the period before. The same problem arises if we cannot identify firms' closures from firms that exit the pool for other reasons. Unfortunately, our data do not provide any information in relation to the entry and exit of firms in and out of the sample. The strategy followed is to avoid the risk of false flows restricting our analysis to continuing firms, e.g. firms that are in the sample for at least two consecutive periods. This will lead, however, to a downward bias in the estimates of job flows, given that, according to previous studies, births and deaths of firms account for at least one quarter of the estimated job flows. Moreover the exclusion of job flows from new entry firms can penalize some sectors more than others given that the contribution of new entrants to job creation is higher in the innovative rather than in the traditional sectors.

Gross job flows is measured in the standard way, following Davis and Haltiwanger (1996). Denote the level of employment at firm *i* level in period *t* with n_{it} and let Δn_{it} be the change in employment between period *t* and *t*-1. Let S^+ be the set of firms in sector *S* with $\Delta n_{it} > 0$ and S^- be the set of firms in sector *S* with $\Delta n_{it} < 0$. Job creation is calculated by summing employment changes in S^+. Correspondingly, job destruction is calculated by summing all the (absolute) changes in S^-. Rates of job creation and job destruction are obtained by dividing by the size of sector. Firm size at time *t* is calculated as the average employment

between period t and t-1, i.e. $x_{it} = \frac{1}{2}(n_{it} + n_{i,t-1})$. Accordingly, the sector size is defined as $X_{st} = \sum_{i \in S} x_{it}$.

Job flow rates can equivalently be expressed as the size-weighted average over firms' growth rates as follows:

- Job creation: $JC_{st} = \sum_{i \in S_t^+} \theta_{it} \frac{x_{it}}{X_{st}}$,
- Job destruction: $JD_{st} = \sum_{i \in S_t^-} |\theta_{it}| \frac{x_{it}}{X_{st}}$

Where $\theta_{it} = \frac{\Delta n_{it}}{x_{it}}$ corresponds to the growth rate of employment[5].

The sum of the job creation rate and the job destruction rate is the job reallocation rate (*JR*). It gives the total number of employment positions reallocated in the economy. The difference between job creation and job destruction is the net employment growth (*NET*).

The considered measure of job reallocation (*JR*), however, reflects to a large degree the evolution in net aggregate employment and does not necessarily measure the real extent of the churning of jobs taking place. An alternative measure we use is the excess job reallocation rate (*EJR*), defined as the gross job reallocation rate minus the absolute value of the net employment growth rate (Davis and Haltiwanger, 1996). This measure indicates the amount of job reallocation that results after taking into account the gross job reallocation needed to accommodate a given net employment growth. As the gross job creation rate and the gross job destruction rate measure the flexibility of the labor market, gross job reallocation and, in particular, excess job reallocation can be interpreted also as an index of restructuring. If firms want to survive, they generally have to redefine product lines, close down inefficient plants, fire unproductive workers and hire workers and managers with the skills required in a market environment. If reallocation of resources from declining to growing firms, and from declining to growing sectors takes place smoothly we might expect that restructuring and excess job reallocation are positively correlated. If the reallocation of resources is difficult and the labor market is inflexible we might expect that restructuring is more difficult. For that reason we suggest that the turbulence and, thus, the underlying restructuring process will be best reflected in high excess job reallocation rates.

Table 10 reports the average aggregate rates of job creation (*JC*), job destruction (*JD*), job reallocation (JR), net employment growth (*NET*) and excess job reallocation rate (*EJR*) in each industry, averaged within the sample period (1999-2004). We first note the large flows, both regarding job creation and destruction, observable in all manufacturing industries. Although the majority of industries registered a net increase of employment within the study period, the coexistence of significant job creation and destruction flows is a mostly biased finding. Job creation rates moved between 3.4% in plastic material and rubber industries and 45.9% in electrical equipment, communications equipment, measuring and medical instruments industries, and job destruction rates from 3.5% in plastics material and rubber industries and 29.3% in electrical equipment, radio and TV and other communications

5 The growth measure defined above is monotonically correlated with the conventional measure defined as the change in employment divided by the lagged employment, and the two measures are approximately the same for small growth rates. Moreover, unlike the conventional measure, which ranges from –1 and $+\infty$, this measure of growth rate is symmetric around zero, being bounded in the interval [-2,2], allowing employment expansions and contractions to be treated symmetrically.

equipment, measuring and medical instruments. These developments led to job reallocation rates — a measure of labor market flexibility— of around 20% on average in all manufacturing industries — plastics material and rubber and metallurgy being the two industries with the lowest job reallocation (6.9% and 11.6% respectively) and electrical equipment, communications equipment, measuring and medical instruments industries being the highest (75.2%). This means that, on average, one fifth of jobs were either created or destroyed per year.

It is also interesting to note the very high, positive correlation between total job creation (*JC*) and total job destruction (*JD*) across industries; the correlation coefficient is 0.92 (Pearson, t = 8.6 and P-value=0.00). The correlation pattern suggests that the movement of jobs from declining to expanding industries is a small part of job creation and destruction.

Next, consider the correlation between excess job reallocation rate (*EJR*) and turnover rate as evaluated at the sectoral levels (entry rate plus exit rate). This correlation is negligible: the correlation coefficient is 0.014 (Pearson, t = 0.0516 and P-value=0.96). Hence, excess job reallocation is a poor indicator for the amount of adjustment in terms of entry and exit taking place within industries.

We can notice that electrical equipment, communications equipment, measuring and medical instruments, paper, cardboard and printing, and chemical industries have on average the highest excess job reallocation, 58.5%, 19.7% and 17.2% on average respectively.

With regards to size classes, we divide the sample in four categories: 10-49 employees; 50-99; 100-249; 250 and above. The process of job reallocation, as presented in Table 11 below, is clearly stronger among larger firms. In fact, there is an increasing relationship between the size of the firm and the intensity of job reallocation. Moreover, this increasing relationship is mainly due to the pattern of job creation, which shows a higher variation among firm size than the pattern of job destruction.

4. Conclusion

While there has been a profusion of theoretical work on the 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 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 this paper 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 10 workers or more, by year and by industry over the 1996-2004 period.

The empirical findings of the paper 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 productivity growth.

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Figure 1: Firm Turnover Rate in Manufacturing Industries *(Mean, 1996-2004)*

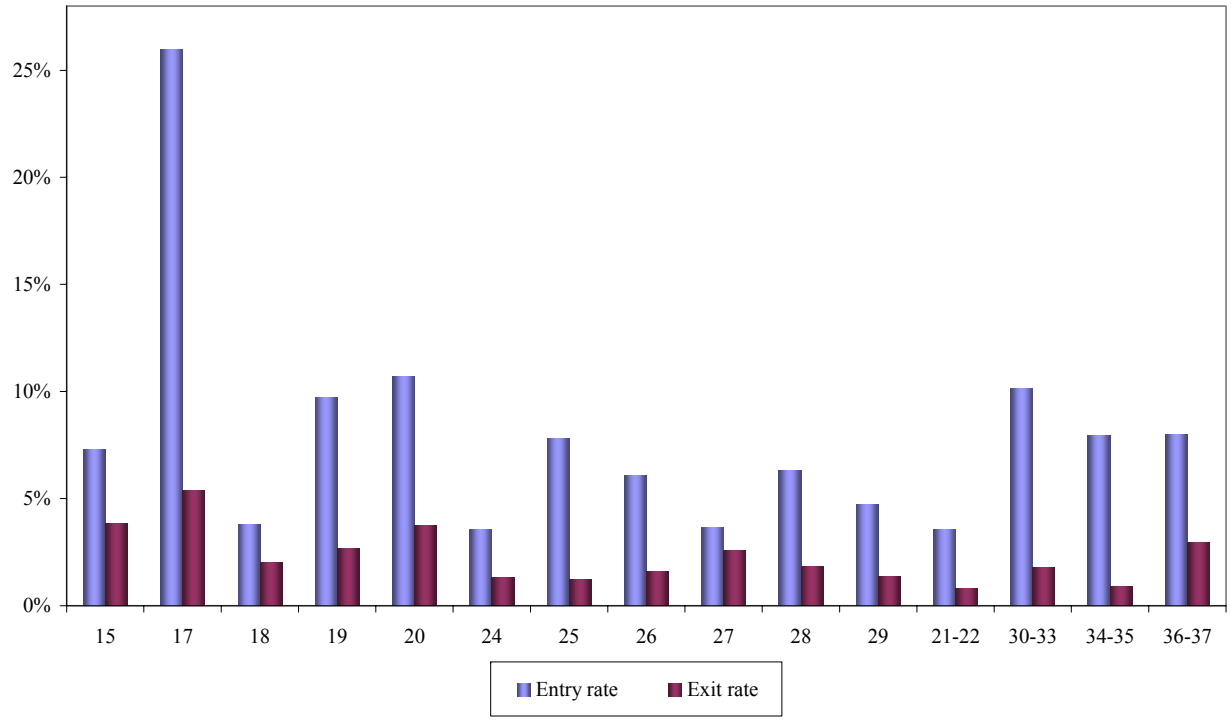

Figure 2: Average Net Entry by Sectors, 1996-2004

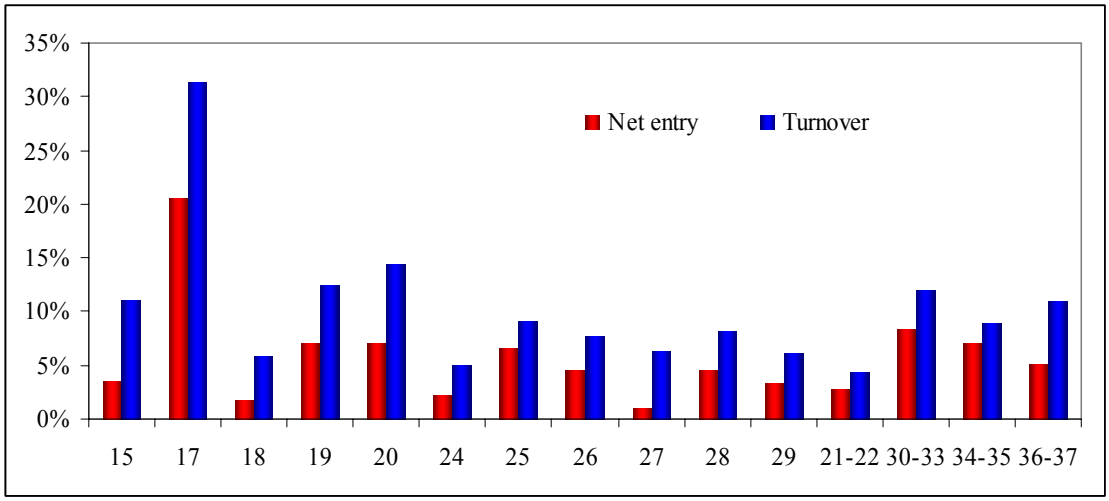

Figure 3: The Gap between Weighted and Unweighted Labor Productivity(*average, 1997-2003)*

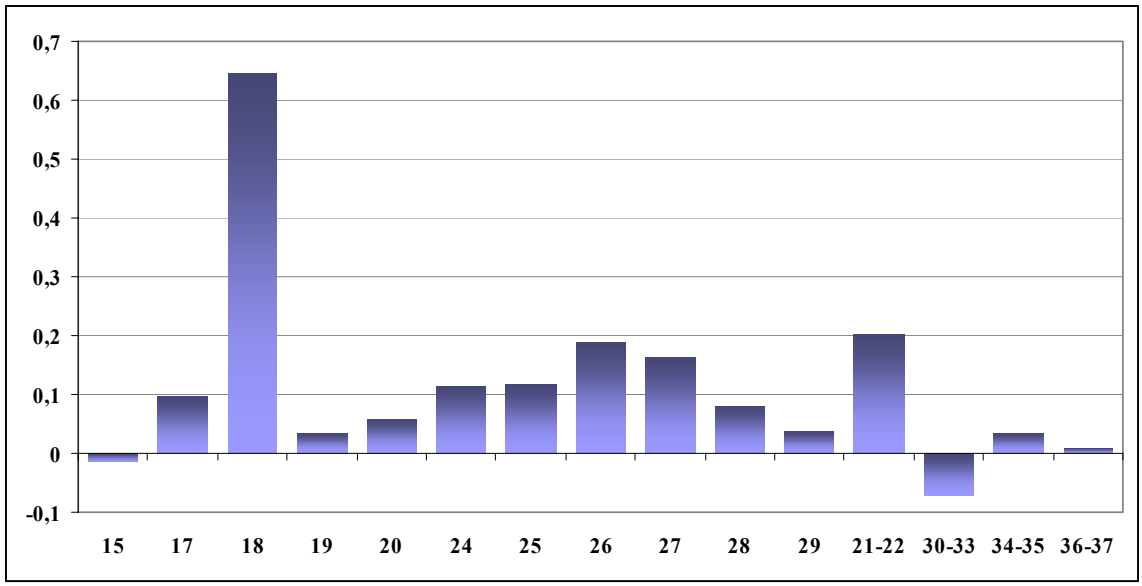

Table 1: Firm Turnover Rate in Manufacturing Industries *(mean, 1996-2004)*

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.

Table 2: 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 3: 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: 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 5: 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.

Table 6: 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 7: 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.

Table 8: 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.

Table 9: The Gap between Weighted and Unweighted Labor Productivity ((%), 1997-2003)

Sectors	1997	1998	1999	2000	2001	2002	2003	Average
15	-2,7	-3,2	-8,5	5,7	-3,5	-4,4	6,4	-1,5
17	8,8	16,0	10,7	13,4	12,9	4,8	0,6	9,6
18	60,8	61,4	42,4	78,3	74,3	75,3	60,6	64,7
19	-7,4	-2,1	-0,2	13,3	13,1	-0,7	7,3	3,3
20	11,7	-2,4	0,6	4,1	10,7	15,2	0,3	5,7
24	7,4	11,6	7,4	10,8	12,6	15,0	15,4	11,5
25	13,7	13,8	12,5	11,6	9,9	10,1	10,6	11,7
26	18,1	18,1	18,1	22,4	17,1	20,2	18,1	18,9
27	15,7	20,1	20,6	17,4	14,7	10,5	15,1	16,3
28	2,1	7,5	14,6	11,2	4,7	5,0	11,8	8,1
29	1,4	0,0	3,1	2,0	4,7	9,7	5,8	3,8
21-22	22,8	15,8	23,7	21,7	17,8	17,8	23,3	20,4
30-33	2,8	1,5	-11,0	-5,6	-11,2	-11,5	-14,8	-7,1
34-35	13,6	14,1	5,4	2,7	-3,6	6,7	-15,7	3,3
36-37	1,7	3,2	1,5	1,9	2,7	1,1	-5,8	0,9

Source: Authors' calculation based on INS data (ENAE).

Table 10: Average Job Flow Rates ((%), 1999-2004)

Code	Industry	JC	JD	JR	NET	EJR
15	Food Industries	7,4	8,1	15,6	-0,7	14,8
17	Textile Industries	7,0	5,8	12,9	1,2	11,6
18	Clothing and Lining Industries	8,9	7,0	15,9	2,0	13,9
19	Leather and Footwear Industries	8,8	5,5	14,3	3,2	11,1
20	Wood Products	12,7	7,4	20,2	5,3	14,9
24	Chemical Industries	11,6	8,6	20,2	3,0	17,2
25	Plastics Material and Rubber Industries	3,4	3,5	6,9	0,0	6,9
26	Mineral Non-metallic Products	6,0	7,0	13,0	-1,1	11,9
27	Metallurgy	6,4	5,1	11,6	1,3	10,3
28	Fabricated Metal Products	4,2	8,2	12,4	-4,1	8,3
29	Machinery and Equipment	6,7	11,8	18,5	-5,2	13,3
21-22	Paper and Cardboard Industries, Printing and related support activities	11,4	9,9	21,3	1,6	19,7
30-33	Electrical equipment, Radio and TV and other Communications Equipment, Measuring and Medical Instruments	45,9	29,3	75,2	16,6	58,5
34-35	Motor Vehicle Manufacturing, Other transportation equipment	16,4	7,9	24,3	8,6	15,7
36-37	Miscellaneous Manufacturing	12,1	8,4	20,4	3,7	16,8

Source: Authors' calculation based on INS data (ENAE).

Table 11: Average Job Flow Rates by Size ((%), 1999-2004)

Size	JC	JD	JR	NET
10-49 employees	18,5	15,0	33,5	3,5
50-99 employees	31,0	27,2	58,1	3,8
100-249 employees	55,6	38,8	94,5	16,8
250 and more employees	65,3	52,6	117,8	12,7

Source: Authors' calculation based on INS data (ENAE).