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INVESTMENT, MARKUP AND CAPACITY UTILIZATION IN TUNISIA

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Abstract

Using data from the Tunisian private manufacturing sector, a theory-consistent model of the investment behavior is estimated. In this model, investment is entirely profit-driven where the profit variable is decomposed into three components: the markup rate on variable costs, the capacity utilization rate and the discrepancy between the optimal and the actual capital-labor ratios. These three components can be related to the usual three determinants of investment: profitability, pressure of demand and relative factor costs respectively. The interpretation of coefficients and the formulation are however different. The econometric investigation demonstrates a clear and strong statistical relationship between investment expenditures and these three determinants.

Introduction

The potential role of a Euro-Mediterranean Agreement, signed between Tunisia and the EU, in helping the Tunisian government implement structural economic reforms undertaken since 1986 and in bringing about a sustainable recovery in economic activity depends crucially on the behavior of investment. Since the expansion of public investment is usually constrained as part of fiscal austerity measures embodied in a structural economic reform, the required recovery of investment has to come largely from the private sector. The behavior of private investment has therefore been a major focus of attention in assessing the trade liberalization reform outcome in Tunisia.

Although gross fixed capital formation raised annually at an average of 9.5 per cent in the private manufacturing sector during 1990-1996, the importance of structural and institutional reforms has also led to some waiting behavior. The relative weakness in private manufacturing investment since 1992 has been an important policy concern, as accelerating capital accumulation was considered key to the strategy for improving competitiveness of the Tunisian manufactured goods sector.

Given the contrast between the sophistication of the theoretical models of investment and the crudeness of many applied work on investment in LDCs, the main motivation for this paper is to estimate an investment rate equation within a theory-consistent framework[1]. It presents an empirical model of private corporate investment behavior in Tunisia, using annual and sectoral data on capital expenditure in the manufacturing sector for 1984-1996, which is compatible with the logic of a quantity rationing model with monopolistic competition on the goods market.

Indeed, a variety of features related to the manufacturing environment in Tunisia accommodate with the monopolistic competition framework:

- Many small to medium sized firms;
- Less than perfect information, so firm has some control over price;
- Similar product, but not identical;
- Easy, but not free, entry.

[1]Blejer and Khan (1984) point out that there is a gap between the theory of investment and the models that have been specified for developing countries. This gap is due to the institutional and structural features of developing countries. The absence of well-developed financial markets, the greater role of the government in investment, the lack of data on capital stock, distortions created by foreign exchange constraints and other market imperfections are the characteristics of developing countries which have hindered the application of the theories of investment in these countries.

A large part of empirical literature which attempts to model aggregate or sectoral investment by private agents in less-developed countries is surveyed by Servén and Solimano (1994) and Chibber, Dailami and Shafik, (1992).

Following Sneessens (1995) and Sneessens and Maillard (1988), a monopolistic competition framework with endogenous price setting is assumed. Goods demand rationing results from uncertainty about demand conditions or supply constraints.

The approach to modeling technological constraints is in the *putty-clay* tradition. Thus, technical coefficients associated with labor and capital are fixed in the short-run and adjusted in the longer run so as to minimize production costs.

The paper is structured as follows. Theoretical considerations behind the investment function used in the empirical analysis are specified in the two first sections. We begin in section 1 with the description of individual firm behavior in the short run, where the production technology and the aggregate production capacity are taken as given. Investment behavior and its impact on the latter two variables are considered in section 2. Section 3 describes the empirical procedure. Section 4 is devoted to the econometric aspects and empirical results. The main conclusions are summarized in section 5.

1. Individual Firm Behavior

Let N be a large number of identical firms indexed by i. Each firm uses two inputs, labor (L) and capital (K). The firm's optimal production technology is determined by cost minimization and adjusts slowly to relative factor changes. The production technology is identical for all the firms and described by the output-labor (α) and output-capital (β) ratios:

$$Y_i^P = \beta K \mu_i \tag{1}$$

$$Y_i^P = \alpha L_i \tag{2}$$

where $K \equiv NK_i$ is the aggregate capital stock, μ_i is a random term, Y_i^P is the firm's capacity output level and L_i its associated potential employment level.

The supply of labor to firm i, L_i^S, is supposed to be equal to the aggregate labor supply L^S divided by the number of firms plus a stochastic disturbance ν_i. Full employment output firm level is then expressed as:

$$Y_i^S = \alpha \frac{L^S}{N} \nu_i \tag{3}$$

Each firm perceives a demand Y_i^D considered as a fraction of the total aggregate demand (Y^D) where firm's market share depends on the number of competing firms, the price P_i set by the firm relative to the aggregate price level P and on the disturbance term η_i :

$$Y_i^D = \left(\frac{P_i}{P}\right)^{-\varepsilon_D}\left(\frac{Y^D}{N}\right)\eta_i \tag{4}$$

where ε_D is the price elasticity of demand.

At the announced price level, the firm produces whatever is demanded, as long as it has the required production capacity and labor force to do so. Thus, current output level is determined as the minimum of demand, capacity output and full-employment output:

$$Y_i = \min\left(Y_i^D, Y_i^P, Y_i^S\right) \tag{5}$$

The price level announced by the firm corresponds to the one that maximizes its expected profits:

$$\max_{P_i}\left\{\left(P_i - \frac{1}{\alpha}w\right)E(Y_i) - \textit{fixed costs}\right\} \tag{6}$$

where w is the nominal wage rate.

By making a specific assumption about the form of the statistical disturbance the expected output level can be written as [2]:

$$E(Y_i) = \left(E(Y_i^D)^{-\rho} + E(Y_i^P)^{-\rho} + E(Y_i^S)^{-\rho}\right)^{-1/\rho} \tag{7}$$

which explains actual aggregate output in terms of final demand, potential output and full employment output. The parameter ρ, derived from the covariance matrix of deviations from the means, is a measure of the *mismatch* between supply and demand across micromarkets. When ρ tends to infinity, the mismatch disappears and the *« min »* is attained in the limit.

Given (7), optimal pricing rule can be expressed as:

$$P_i = \left(1 + \frac{1}{\varepsilon^D\left(\frac{E(Y_i)}{E(Y_i^D)}\right)^{\rho} - 1}\right)\frac{1}{\alpha}w \tag{8}$$

With a CES approximation of the expected output level (equation (7)), the probability (π_i) of facing a sales constraints would be :

$$\pi_i \equiv P(Y_i = Y_i^D) = \left(\frac{E(Y_i)}{E(Y_i^D)}\right)^{\rho} \tag{9}$$

Thus, the optimal pricing rule is a markup on unit variable costs ($\frac{1}{\alpha}w$), where the markup rate is equal to $m \equiv (\varepsilon^D \pi_i - 1)^{-1}$.

2. Aggregate Level and Investment

At the time they fix prices, all the firms are supposed to be in the same situation and environment. Differences appear only later on, when the distributions have their specific values and the input and output decisions have to be made. At an equilibrium, each firm will thus charge the same price.

Considering a sufficiently large number of firms and assuming $E(\mu_i) = E(\nu_i) = E(\eta_i) = 1$, the aggregate relationships can be derived quite easily:

$$Y = \left(\left(Y^D\right)^{-\rho} + \left(Y^P\right)^{-\rho} + \left(Y^S\right)^{-\rho}\right)^{-1/\rho} \tag{10}$$

$$Y^P = \beta K \tag{11}$$

$$Y^S = \alpha L \tag{12}$$

A simple constant price elasticity function is considered:

$$Y^D = d_0 P^{-\varepsilon_D} \tag{13}$$

where d_0 stands for the autonomous demand for goods.

At equilibrium:

$$\pi \equiv P(Y = Y^D) = \left(\frac{Y}{Y^D}\right)^{\rho} \tag{14}$$

[2] For details see Gouriéroux *et al.* (1984) and Lambert (1988).

$$P=\left(1+\frac{1}{\varepsilon_D\pi-1}\right)\frac{1}{\alpha}w=(1+m)\frac{1}{\alpha}w \tag{15}$$

Equations (11)-(15) jointly determine the short-run equilibrium. In the long-run, investment produces changes in the technical coefficients and in the aggregate production capacity or equivalently in the degree of capacity utilization, until these variables reach their optimal values.

Assuming that the ex-ante technological constraint is Cobb-Douglas with constant returns to scale, the technical coefficients are adjusted in the long run so as to minimize average production costs:

$$\begin{cases}\min\limits_{\alpha,\beta}\left\{\frac{1}{\alpha}w+\frac{1}{DUC}\frac{1}{\beta}c\right\}\\ s/c \quad 1=a\left(\frac{1}{\alpha}\right)^{\delta}\left(\frac{1}{\beta}\right)^{1-\delta}\end{cases} \tag{16}$$

where c is the capital usage cost and DUC is the degree of capacity utilization:

$$\frac{K}{L}=\frac{\alpha}{\beta}=\frac{1-\delta}{\delta}\frac{w}{c\frac{1}{DUC}} \tag{17}$$

Substituting (17) into the Cobb-Douglas function, one can derive expressions for the *ex ante* labor-output and capital-output ratios:

$$\alpha=a\left(\frac{1-\delta}{\delta}\right)^{1-\delta}\left(\frac{w}{c}\right)^{1-\delta}DUC^{1-\delta} \tag{18}$$

$$\beta=a\left(\frac{1-\delta}{\delta}\right)^{-\delta}\left(\frac{w}{c}\right)^{-\delta}DUC^{-\delta} \tag{19}$$

As it is usual in monopolistic competition models, the production capacity adjusts in the long run until the price level is equal to the total average production cost:

$$P=\frac{1}{\alpha}w-\frac{1}{\beta}\frac{1}{DUC}c \tag{20}$$

Following the logic of the monopolistic competition model, it is assumed that the net investment rate is positive when there are positive pure profits, as it is also the case in the Q-theory of investment.

Denoting the pure profit rate per unit of output by Π:

$$\Pi=P-\left(\frac{1}{\alpha}w+\frac{1}{\beta}\frac{1}{DUC}c\right),$$

then it is easy to verify this equivalence:

$$\Pi>0 \text{ if and only if } mDUC\left(\frac{\frac{1}{\alpha}w}{\frac{1}{\beta}c}\right)>1, \tag{21}$$

where m, the markup rate, corresponds in the long-run to $m^*=(1-\delta)/\delta$.

Given the equilibrium long-run capital-labor ratio, $\left(\frac{K}{L}\right)^*=\frac{1-\delta}{\delta}\frac{w}{c}DUC$, it is possible to rewrite expression (21) in terms of the discrepancies between the actual and the long-run equilibrium values of the markup rate, the degree of capacity utilization and the capital-labor ratio:

$$mDUC\left(\frac{\frac{1}{\alpha}w}{\frac{1}{\beta}c}\right)=\frac{m}{\frac{1-\delta}{\delta}}\frac{\frac{1-\delta}{\delta}\frac{w}{c}DUC^*}{\frac{\alpha}{\beta}}\frac{DUC}{DUC^*}=\frac{m}{m^*}\frac{\left(\frac{K}{L}\right)^*}{\left(\frac{K}{L}\right)}\frac{DUC}{DUC^*} \tag{22}$$

In this expression, the pure profit rate is considered as the net outcome of three different influences coming from the markup rate, the production technology and the degree of capacity utilization, each measured with respect to its long run value.

The aggregate investment rate function can be expressed as:

$$\frac{I}{K}=\frac{I}{K}\left(\frac{m}{m^*},\frac{DUC}{DUC^*},\frac{(K/L)}{(K/L)^*}\right) \tag{23}$$

where:

$$\frac{\partial(I/K)}{\partial j}>0 \text{ for } j=\frac{m}{m^*},\frac{DUC}{DUC^*},\frac{(K/L)}{(K/L)^*}.$$

3. Empirical Implementation

Assuming that DUC^* is constant and taking into account the constancy of the long-run equilibrium value of the markup rate ($m^*=(1-\delta)/\delta$), the following empirical counterpart of equation (23) is suggested for estimation purposes:

$$\frac{I_t}{K_{t-1}} = \varphi_0 + \varphi_1 Ln(m_t) + \varphi_2 Ln(DUC_t) + \varphi_3 Ln\left(\frac{\beta w}{\alpha c}\right)_t,$$

or its dynamic form to account for the persistence of investment spending:

$$\frac{I_t}{K_{t-1}} = \varphi_0 + \varphi_1 \lambda Ln(m_t) + \varphi_2 \lambda Ln(DUC_t) + \varphi_3 \lambda Ln\left(\frac{\beta w}{\alpha c}\right)_t + (1-\lambda)\frac{I_{t-1}}{K_{t-2}} + \xi_t. \tag{24}$$

where the coefficients φ_i, i = 1,2,3, point out the speed of adjustment to a discrepancy between the actual and the optimal value of the corresponding variable.

Equation (24) remains fairly close to standard investment equations in that it holds the three standard components: profit variable (*m*), demand consideration (*DUC*) and relative factor cost effect $(\beta w/\alpha c)$. It also requires estimates of technical productivity α and β, the markup rate and the degree of capacity utilization.

Estimates of technical coefficients and markup rate

If long-run cost considerations only are taken into account, and temporary disturbances such as sales constraints are neglected, a Cobb-Douglas production function is readily shown to imply an output-labor and output-capital ratios that remain proportional to relative labor costs:

$$Ln\left(\frac{Y}{L}\right)_t = \alpha_0 + \alpha_1 t + (1-\delta)\phi_\alpha(\Lambda) Ln\left(\frac{w}{c}\right)_t + u_t, \tag{25}$$

$$Ln\left(\frac{Y}{K}\right)_t = \beta_0 + \beta_1 t - \delta\phi_\beta(\Lambda) Ln\left(\frac{w}{c}\right)_t + v_t, \tag{26}$$

where $\alpha_1 t$ and $\beta_1 t$ allow for exogenous technical progress, δ is the coefficient of labor in the Cobb-Douglas function and $\phi_j(\Lambda)$, $j = \alpha, \beta$, is a lag polynomial function representing the slow adjustment of the capital-ratio to relative cost changes.

The values of the technical coefficients α and β used in estimating the investment rate are those obtained from the joint estimation of the technical relationships (25) and (26). A series for the user cost of capital *c* is constructed from the price of capital goods p_I, the capital depreciation τ and the nominal market interest rate *r* as $c_t = p_I(r - \dot{p}_I + \tau)$. Capital depreciation rate τ if fixed to 5 per cent, which is equivalent to an average service life of 20 years.

Given equation (15) where at equilibrium, prices *P* are set as a markup on average cost, then the estimate of α is also used to generate the value of the markup rate as:

$$\hat{m}_t = (P_t - w_t/\hat{\alpha}_t)/(w_t/\hat{\alpha}_t) \tag{27}$$

Estimation of the degree of capacity utilization

Capacity or potential output (Y^P) is a latent variable, not directly observed. In principle, measured average productivity *Y/K* is related to the technical productivity β (equation (11)) by identity defining the degree of capacity utilization *DUC = Y/βK*. *K* defines at the same time the aggregate capital stock available to the manufacturing sector, and the sum of the capital stocks installed in the firms. *Ex post*, capital stock may not be fully utilized, because there is insufficient demand for the output or, less likely, because there is insufficient labor to man the machines.

In a developed economy, an empirical measure of *DUC* is available from business surveys of the manufacturing sector, where firms are asked to report their estimates of Y/Y^P. However, such measures are missing or not regularly available in Tunisia.

Given that potential output is not observed, it has to be estimated. For this purpose a *structural* approach is adopted to estimate *DUC* as the ratio of actual output to potential output calculated on the basis of an aggregate production function (Laxton and Tetlow 1992; De Masi 1997). Thus output is supposed to be characterized by a Cobb-Douglas production function:

$$y_t = tfp_t + \alpha l_t + (1-\alpha)k_t \tag{28}$$

where *y* is manufacturing sector value added, *tfp* is total factor productivity, *l* is employment in the manufacturing sector and *k* is the manufacturing sector capital stock, α is the average labor share of income, and variables are in logarithms. If the inputs are *equilibrium* values, then the production function provides an estimate of potential output.

This is typically made operational in the following way. First, using historical values of the labor share of income ($\hat{\alpha}$), total factor productivity is estimated as output less the weighted sum of effective labor and physical capital inputs:

$$tfp_t = y_t - \hat{\alpha} l_t - (1-\hat{\alpha})k_t \tag{29}$$

Second, *tfp* series is calculated and then smoothed using Hodrick-Prescott filter to provide a measure of trend factor productivity tfp^*. Next, the trend factor productivity series is substituted back into the production function along with actual capital stock and potential employment to provide a measure of manufacturing sector potential output, y^P, as :

$$y_t^P = tfp_t^* + \hat{\alpha} l_t^* + (1-\hat{\alpha})k_t \qquad (30)$$

where the level of potential employment in the manufacturing sector corresponds to the smoothed employment in this sector.

4. Estimation Results

The empirical investigation uses repeated time series observations, over the period 1984-1996, for 6 private manufacturing sectors: food processing, construction materials and glass, mechanical and electrical goods, chemical and rubber, textiles, clothing and leather goods and woodwork and paper. The data series used have been basically obtained or compiled from Institut National de Statistiques (INS), *National Account Statistics*, Tunis. Capital stock, price of output and of capital goods data are taken from Institut d'Economie Quantitative (IEQ) data bank, Tunis.

The manufacturing sector in Tunisia is relatively diversified. This sector which is mostly export-oriented accounted for about 21 percent of GDP in 1995-96. Since 1990, it has expanded annually at an average of 11.5 percent.

The total output produced by the private manufacturing sector increased by 120 per cent between 1990 and 1996. The output share of this sector in the total manufacturing production increased from 55.5 percent in 1990 to 64.1 percent in 1996.

Although gross fixed capital formation raised annually at an average of 9.5 per cent in the private manufacturing sector during 1990-1996, the importance of structural and institutional reforms have also led to some waiting behavior.

Structural reforms that improved the environment for manufacturing firms have continued through the 1990s, including corporate tax reform, approval of more liberal Investment Act and financial reforms.

Capacity Utilization of The Private Manufacturing Sector

Comparing the situation in 1996 with the one in 1984-1985, capacity utilization declined significantly in the private sector, especially in construction materials and glass, chemical and rubber, woodwork and paper sectors (see Figure 2). Average capacity utilization in the private manufacturing sector fell to 64 per cent in 1996 from 74 per cent in 1984.

A downward trend in average capacity utilization reflects a production decrease, especially in 1995-1996, to meet the significant decline in manufactured goods' export growth rate (see Figure 1). Thus, the low level of capacity utilization rate at the end of the observed period seems to be related to the extent of the problem of lack of demand (either domestic or foreign).

Excess capacity observed in food processing and chemical industries in 1995-1996 is probably due to recent private investment expansion in these sectors.

Investment Behavior

Like the growth performance, the Tunisian private investment performance weakened dramatically in 1985-1986 as a result of many macroeconomic imbalances. Hence, the pre-1987 period is excluded from the study because it had faced major economic crisis and policy changes that were implemented during this period.

Equation (24) was estimated using a form of panel data model in which data are typically observed for a relatively large number of periods (10 periods) for a relatively small number of cross sectional units (6 manufacturing sectors). For this situation, the choice of a GroupWise regression model seems to be appropriate. The model allows for GroupWise heteroskedasticity ($E(\xi_{it}^2) = \sigma_{ii}$), cross group correlation ($Cov(\xi_{it}, \xi_{jt}) = \sigma_{ij}$) and within group autocorrelation ($\xi_{it} = \rho\xi_{i,t-1} + u_{it}$) of the error term $\xi_{i,t}$ introduced in equation (24), where the subscript i indexes sectors and t indexes periods[3]. Estimators are obtained by three step *GLS* procedure.

Table 2 reports the estimation results. All the coefficients have the expected positive sign and are significantly different from zero.

Figures 3a-3f give an idea of the relative importance of the markup rate, the capacity utilization rate and the relative cost variable in explaining sector investment fluctuations. The effect of each of these three determinants is measured with respect to its sector average value. For example, the effect of the markup rate in sector i is measured as $\varphi_1\left(Ln(m_{it}) - Ln(\overline{m}_i)\right)$, where $\overline{m}_i$ is the sample average of m in sector i and $\varphi_1 = 0{,}016/(1-0{,}567) = 0{,}036$. For a given sector, the sum of the three effects computed is approximately equal to the discrepancy between the actual and the sample average investment rate.

[3] Although the model allows considerable flexibility, it does entail the necessary but not entirely plausible assumption, given the short observed time period, that there is no parameter variation across the cross-sectional units.

The fall in the investment rate between 1991 and 1994 appears to be due mainly to the fall in the degree of capacity utilization. After 1994, either *DCU* and relative factor costs stabilize, and the markup rate continues to rise.

5. Conclusion

This paper is devoted to the analysis of the Tunisian private investment behavior in the manufacturing sector in the context of a disequilibrium model with monopolistic competition in the goods market, where investment is entirely profit-driven. Using data on six manufacturing industries over the period 1984-1996, the econometric investigation demonstrates a clear and strong statistical relationship between investment expenditures and three determinants, namely the markup rate on variable production costs, the degree of capacity utilization and a measure of the discrepancy between the optimal and the actual capital labor ratios.

The fall in the private investment rate at the beginning of the 1990s appears to be mainly due to the fall in the degree of capacity utilization. It is also important to underline the diversity of the situation from one sector to another.

Ideally, further research should be conducted for the period 1997-2000, as well as investigations verifying the adequacy of applying the specified model to policy analysis and forecasting.

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Figure 1: Average Capacity Utilization, Production and Export Growth in Private Manufacturing Sector

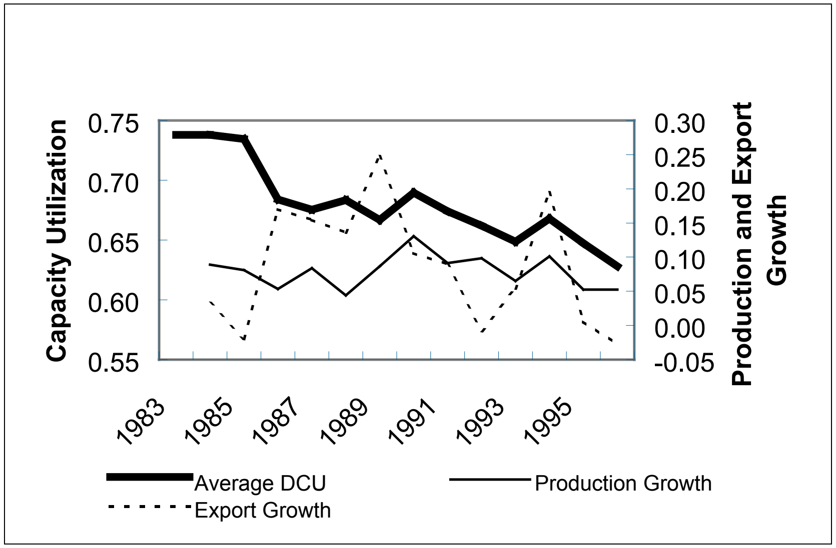

Figure 2a: Food Processing

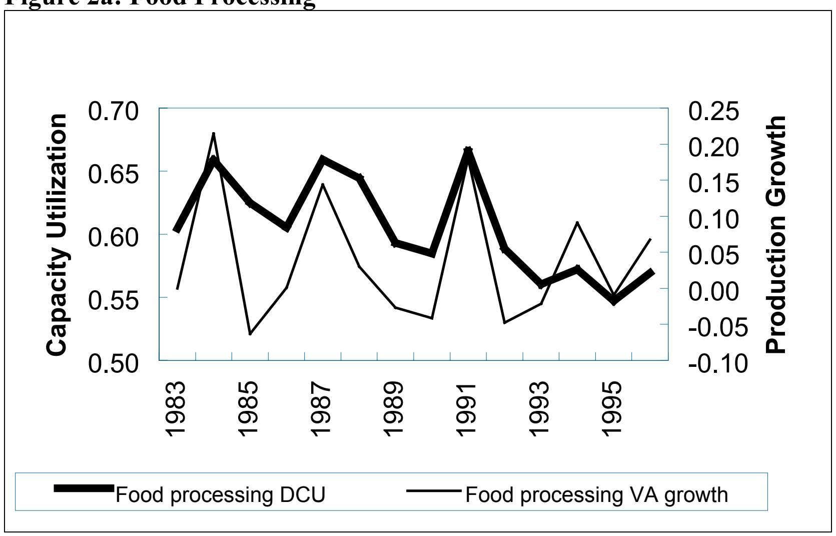

Figure 2b: Construction Materials and Glass

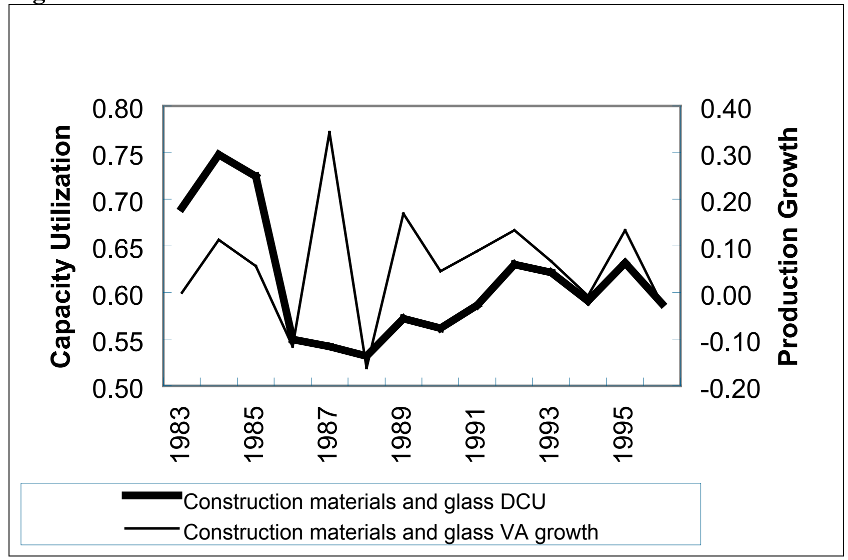

Figure 2c: Mechanical and Electrical Goods

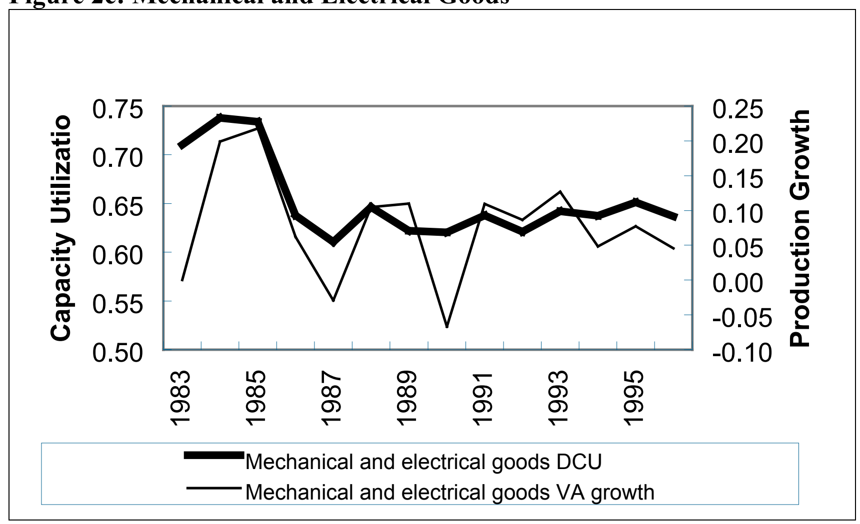

Figure 2d: Chemical and Rubber

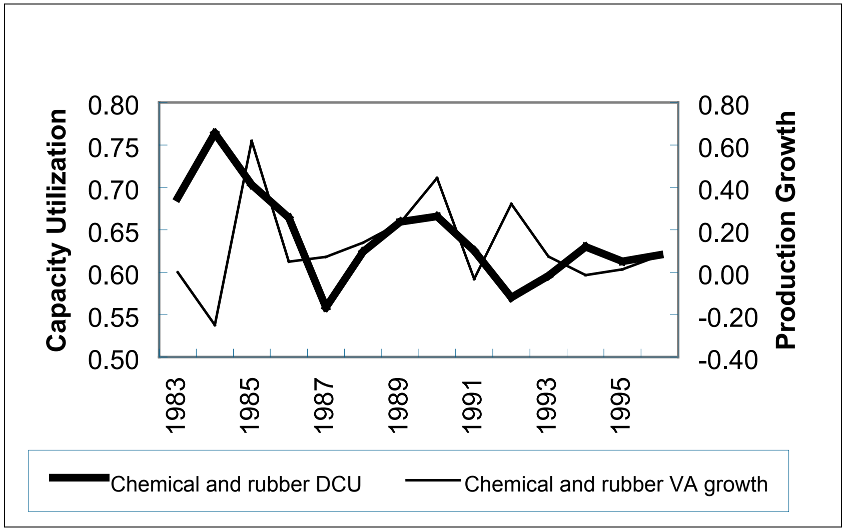

Figure 2f: Woodwork, Paper and Diverse

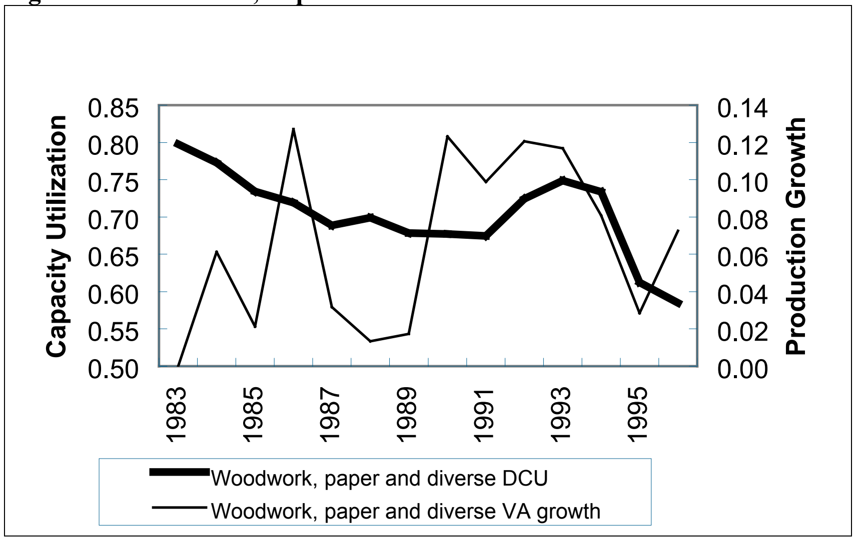

Figure 2e: Textiles, Clothing and Leather Goods

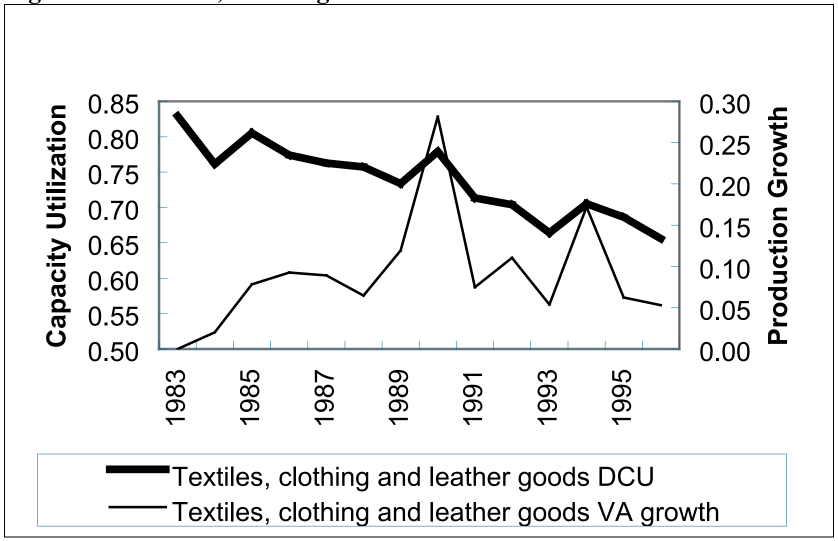

Figure 3: Observed and Simulated Investment Rate

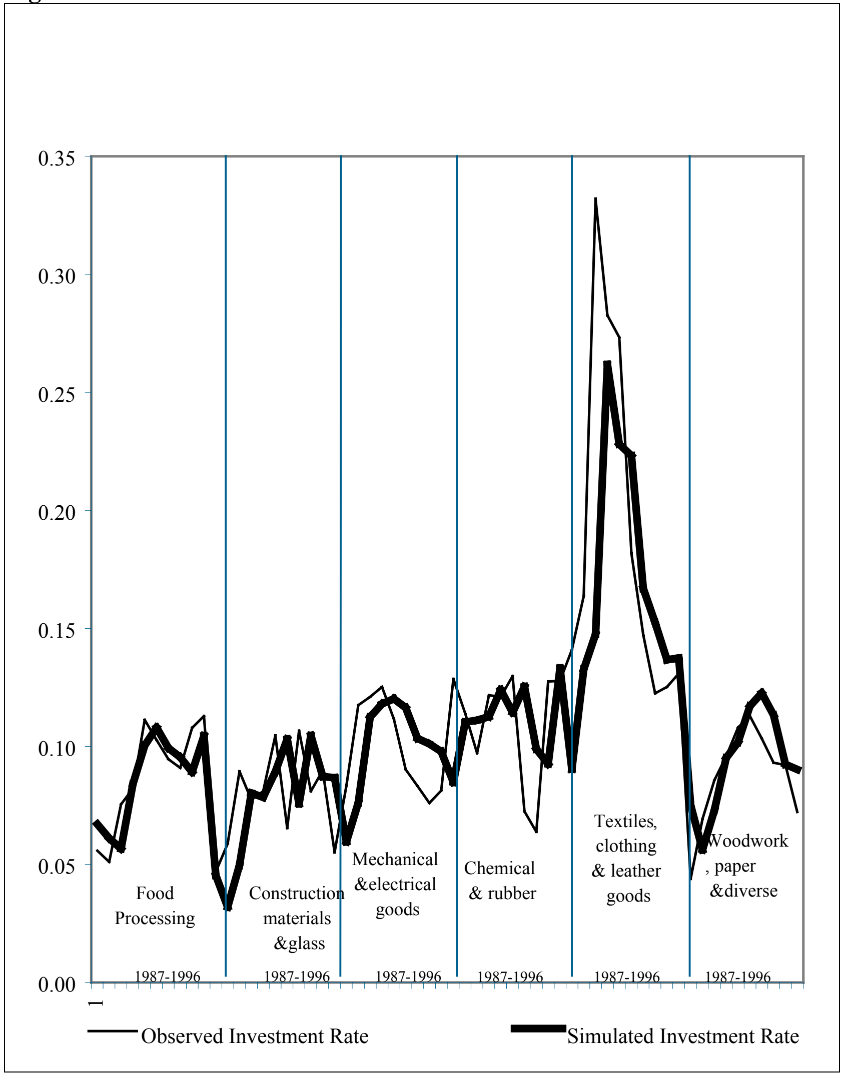

Figure 4a: Food Processing

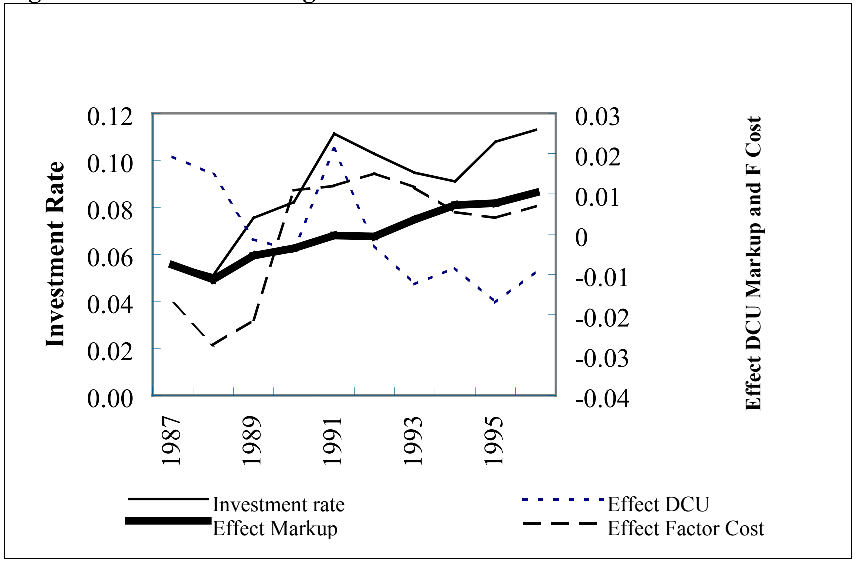

Figure 4b: Construction Materials and Glass

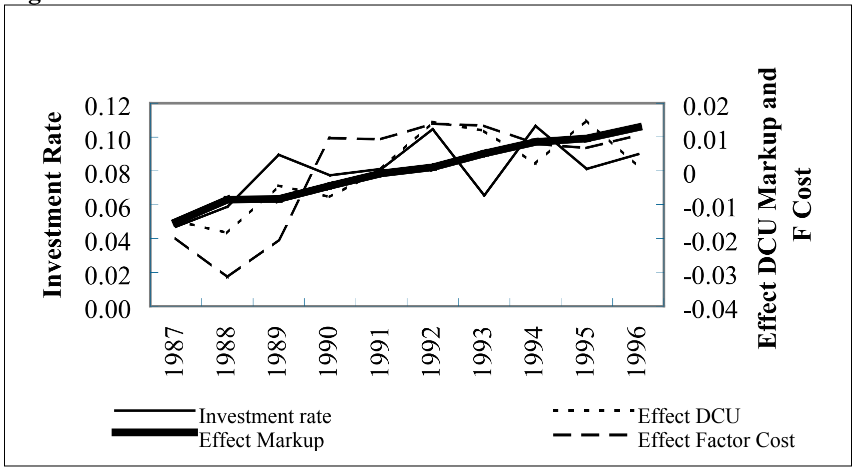

Figure 4c: Mechanical and Electrical Goods

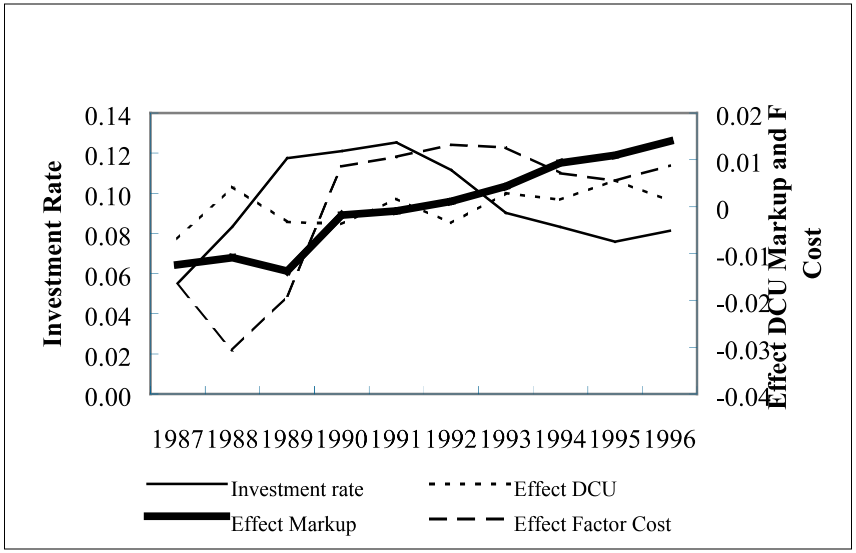

Figure 4d: Chemical and Rubber

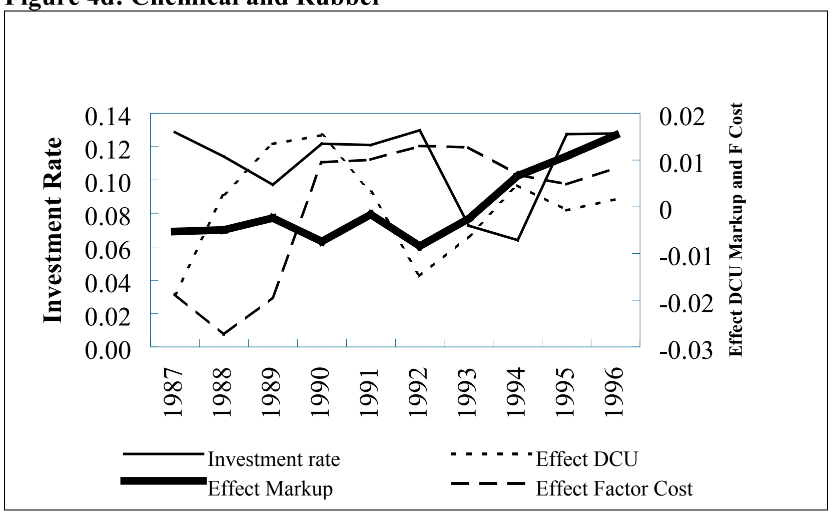

Figure 4e: Textiles, Clothing and Leather Goods

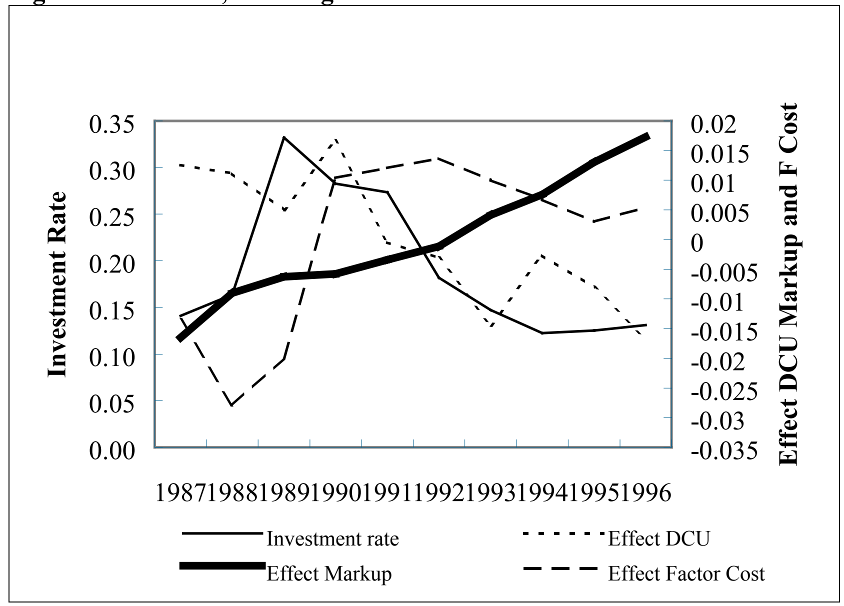

Figure 4f: Woodwork, Paper and Diverse

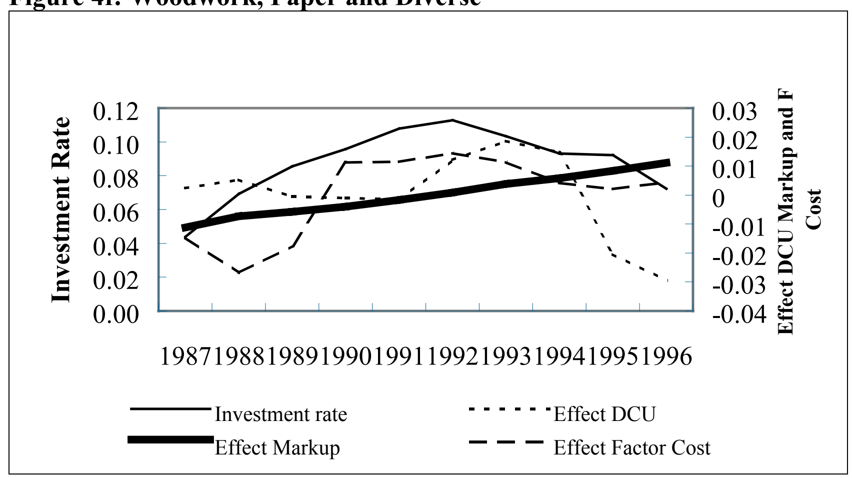

Table 1: Private Manufacturing Sector Indicators

	Annual Average							
	1984-1989	**1990**	**1991**	**1992**	**1993**	**1994**	**1995**	**1996**
Tunisian Manufacturing Sector Indicators								
General Indicators								
Value added (% of GDP)	0.18	0.19	0.19	0.19	0.20	0.21	0.22	0.21
Investment rate	0.26	0.24	0.25	0.23	0.21	0.19	0.18	0.18
Accumulation rate	0.07	0.05	0.05	0.05	0.05	0.05	0.05	0.05
Private investment/Total investment	0.49	0.71	0.76	0.76	0.68	0.70	0.75	0.77
Private investment growth	0.16	0.13	0.26	0.03	-0.06	0.07	0.12	0.12
Private Sector Indicators								
Private Investment Share (% Total Sectorial Investment)								
Food processing	0.65	0.59	0.69	0.68	0.65	0.65	0.75	0.77
Construction materials and glass	0.37	0.54	0.49	0.60	0.40	0.54	0.52	0.54
Mechanical and electrical goods	0.52	0.70	0.83	0.82	0.77	0.83	0.81	0.81
Chemical and rubber	0.28	0.56	0.59	0.61	0.30	0.25	0.53	0.53
Textiles, clothing and leather goods	0.69	0.86	0.93	0.93	0.93	0.93	0.95	0.96
Woodwork, paper and diverse	0.77	0.75	0.80	0.80	0.83	0.88	0.86	0.90
Value Added Growth								
Food processing	0.05	-0.04	0.18	-0.05	-0.02	0.09	-0.01	0.07
Construction materials and glass	0.07	0.05	0.09	0.13	0.07	-0.01	0.13	-0.02
Mechanical and electrical goods	0.11	-0.07	0.11	0.09	0.13	0.05	0.08	0.05
Chemical and rubber	0.14	0.44	-0.03	0.32	0.07	-0.01	0.01	0.08
Textiles, clothing and leather goods	0.08	0.28	0.07	0.11	0.05	0.17	0.06	0.05
Woodwork, paper and diverse	0.05	0.12	0.10	0.12	0.12	0.08	0.03	0.07
Gross Operating Surplus/Value Added								
Food processing	0.54	0.53	0.57	0.44	0.49	0.51	0.52	0.51
Construction materials and glass	0.44	0.33	0.42	0.47	0.49	0.46	0.55	0.53
Mechanical and electrical goods	0.45	0.39	0.44	0.43	0.43	0.47	0.51	0.50
Chemical and rubber	0.50	0.58	0.57	0.52	0.54	0.61	0.63	0.65
Textiles, clothing and leather goods	0.37	0.45	0.45	0.45	0.44	0.54	0.49	0.51
Woodwork, paper and diverse	0.46	0.45	0.45	0.48	0.50	0.53	0.52	0.54

Table 2: Estimation of the Investment Rate Equation

Coefficient of	**Estimate** *	**Standard Error**	**P-Value**
Constant	0.061	0.028	0.033
Markup	0.016	0.003	0.000
Degree of capacity utilization	0.084	0.014	0.000
Relative factor costs	0.009	0.003	0.002
Lagged investment rate	0.569	0.072	0.000

Notes: *Groupwise heteroskedastic and cross group correlated regression model estimated by iterated GLS; Common Autocorrelation Test Khi-squared (1) = 0.118 (p-value 0.730); Heteroskedasticity Test : Wald Statistic = 350.432 (p-value 0.000); Correlation Test : LR Statistic = 33.658 (p-value = 0.000); Log-likelihood function = 159.502.