PATTERNS AND DETERMINANTS OF ENTRY AND EXIT IN TURKISH MANUFACTURING INDUSTRIES

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PATTERNS AND DETERMINANTS OF ENTRY AND EXIT IN TURKISH MANUFACTURING INDUSTRIES

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Abstract: This paper aims to examine the main determinants of entry and exit rates in Turkish manufacturing industries. In order to take account for the dynamic structure of entry and exit and to account for the interdependence between entry and exit rates, GMM and seemingly unrelated regression (SUR) methodologies are employed respectively. 4-digit data on Turkish manufacturing industries are used covering a 7 year period of 1995-2001. Different from most studies, in addition to micro variables macro variables are also included in the study. The results of both models support wide empirical literature and suggest that entry and exit are interdependent and also are dynamic in structure. The results reveal that macroeconomic structure and policies play a crucial role on firms’ entry and exit decisions in Turkish manufacturing industries.

Keywords: Entry, Exit, Dynamic Panel Data, Seemingly Unrelated Regressions, Turkish Manufacturing

An earlier version of this study has been presented at the European Network on the Economics of the Firm (ENEF) 2009 Conference in Paris.
1. Introduction

Entry and exit of firms are highly discussed topics in economics literature; because firm mobility plays a crucial role in all markets. Since number of firms is fixed in the short run, profit of the firm is a function of price and quantity in the short run. In the long run, however, when entry and exit becomes feasible, profit becomes a function of number of firms in the market. Additionally, number of firms in a market becomes endogenous in the long run, while it is exogenous in the short run (Dunne et al, 2009).

In market system, entry and exit works as a selection process. Entry brings new and efficient capital to the market while exit clears the old and inefficient ones. This selection process is affected by barriers to entry and exit and factors that may trigger entry and exit. These barriers and incentives to entry and exit can be seen as effects of market and firm structure. Moreover, entry and exit take place in this process also by affecting each other.

Bain (1956) is considered as the beginning of the studies concerning barriers to entry. According to Bain, entry barriers can be described as; the conditions which enable existing firms to determine a price over minimum average costs without encouraging new firm entry. Bain states that scale economies, product differentiation and absolute cost advantages are the main determinants of entry. After the theoretical and empirical studies about entry barriers and especially after Caves and Porter (1976), a growing attention in the literature has also been devoted to the exit of firms.

Firm entry and exit represent a significant part of industrial organization. The main reasons behind entry and exit have been investigated for decades and attracted attention for several reasons. First of all, understanding entry and exit patterns is vital to understand the market structure in an industry. Secondly understanding the main reasons behind firm entry and exit are also important for policy makers in order to try to keep unemployment rates at a
minimum or to determine growing industries or even to see how an industry may react to a possible economic shocks or fluctuations. Industrial organization theory and empirical studies on the subject indicate that there are several incentives and barriers (impediments) to entry and exit\(^2\).

High rates of current and past profits and high or increasing rates of market demand are seen as incentives to entry. On the other hand; scale economies, cost barriers, multi-plant operations, limit pricing, excess capacity and advertising are seen as barriers to entry in the industrial organization theory.

There are also some factors that can be seen as incentives and/or barriers under different circumstances such as; product differentiation, R&D and innovation and finally diversification. These factors become incentives when they are realized by entrants however are entry barriers when realized by incumbents. Furthermore, low current and past profit rates, low or declining rates of market demand and displacement of old firms with new firms are recognized as incentives to exit. And finally, sunk costs, low managerial skills and diversification can be listed as barriers to exit.

Entry and exit are important in a market because, entry can increase competition in the market. Even when there is no entry, threat of entry can force incumbents to act as if they were operating in a competitive market. Further, entry brings new and efficient technology and also new products to the market. In addition, entry increases employment opportunities. Exit, on the other hand can have severe increasing effects on unemployment; however it can be argued that in the long run exit clears out the old and inefficient technology from the market (Sigfried & Evans, 1994); (Ilmakunnas & Topi, 1999); (Kleijweg & Lever, 1996))

\(^2\) Incentives and barriers to entry and exit are summarized following Sigfried and Evans (1994).
In this context, the main focus of this paper is to analyse the determinants of entry and exit rates in Turkish manufacturing industries. As mentioned before; entry and exit are also important in terms of policy making as well as industrial organization. It is important to understand the basic structure of an industry and the main reasons behind firm entry and exit to industries. In this context, both micro and macro variables are used in this study. Using macro variables grants the advantage of seeing how Turkish manufacturing industries might react to macroeconomic factors and might give insight about how shocks might affect the market structure and also might provide vital implications such as how the negative effects of macroeconomic factors can be minimized. Furthermore, this study also contributes to the literature in terms of the empirical methodologies employed.

Remainder of this paper is organized as follows; section 2 provides information about the previous literature, section 3 describes the data and methodologies used, section 4 present the estimation results and finally section 5 concludes the study.

2. **Empirical Background**

Dunne et al (1988), use plant level US data to examine patterns of gross entry, exit and survival rates of firms in US manufacturing industry, covering a period of 1963-1982. Their findings show that the highest survival rates are observed among diversifiers. Baldwin and Gorecki (1991) investigate firm entry and exit in Canadian manufacturing covering 1970-1982 period. Their data allow following plants through time and also making it possible to link plants under common ownership. With such detailed information, authors grouped firms as entrants, exitors and continuing. However; the limitation of their study is that they only performed descriptive analysis of the data rather than conducting an econometric analysis.

Mayer and Chappell (1992) use the same data set as Chappell et al (1990) however employ a slightly different methodology. Determinants of entry and exit are investigated using 1972-
1977 US manufacturing industry data in both studies. Chappell et al (1990) argues entry and exit data are integer values and hence needed to be handled differently than classical regression assumptions. According to Chappell et al (1990), entry and exit data should be estimated using probability distribution models and hence employs a univariate Poisson distribution. Mayer and Chappell (1992), on the other hand use bivariate Poisson distribution analysis, arguing observations on entry and exit have some common aspects. They argue that even though entry and exit can be influenced by common elements, it is important and essential to separate the two. Authors estimate entry and exit models which have common independent variables with a quasi-maximum likelihood method.

Ilmakunnas and Topi (1999) investigate determinants of entry and exit on Finnish manufacturing industry for 1988-1993. This study differs from most of the previous literature in terms of arguing macroeconomic factors have equally important effects on firm entry and exit as microeconomic factors. Hence they use both macro and micro variables as determinants of entry and exit in the study. Micro variables include; profit rates, market size and demand growth. Macro variables include variables such as GDP growth and unemployment. Authors also consider the possibility of interdependency between entry and exit and therefore include lagged values of entry and exit in corresponding models. However, they still estimated two separate entry and exit models. They use Poisson and Negative Binomial models as a method of estimation. Findings indicate macroeconomic influences are also important on firms’ entry and exit decisions. In this study, authors take into account the statistical properties of the data and hence used count data models to strictly nonnegative integer values. While quite important and insightful, using count data models make it impossible to take into account the interdependency of entry and exit.

Doi (1999) investigates firm exit only in Japanese manufacturing industries using profitability, industry growth and several exit barriers such as concentration rate, scale
economies, R&D intensity as independent variables. These variables are suggested in previous theory and proven to determine the main reasons behind firm exit. However, author chooses to employ OLS as a method of estimation and such methodology choice stands as a limitation to this study.

Empirical literature on firm mobility reviewed so far, mainly neglects the interdependence of entry and exit on the models they use. Some like Ilmakunnas and Topi (1999) mention a possible interdependence, however still choose to estimate entry and exit separately. Ignoring the effect of entry and exit on each other by conducting the analysis for entry and exit separately does not provide a complete picture of firm mobility and may lead to lose some information in this process. In this respect, the “symmetry hypothesis” suggested by Caves and Porter (1976) implies a symmetrical relationship between entry and exit barriers; suggesting that the interdependence between entry and exit is important and should be considered.

Shapiro and Khemani (1987) investigate the symmetry hypothesis using data from Canadian manufacturing industry for the years 1972-1976. They estimate two equations while employing entry in the exit equation and vice versa. They adopt seemingly unrelated regressions (SUR) technique as an estimation method. Authors use pretty standard independent variables such as profitability, industry growth rate, economies of scale, advertising ratio and concentration index. Findings support the symmetry hypothesis and indicate that such symmetry arises because barriers to exit are also barriers to entry.

Austin and Rosenbaum (1990) examine the determinants of entry and exit rates in US manufacturing industries using 4-digit data. They employ OLS and simultaneous equations as methods of estimation. Their findings indicate profits increase entry rates and advertising and
sunk costs act as barriers to entry. However they argue while entry and exit are definitely related, it seems unclear that if they are simultaneously determined or not.

Kleijweg and Lever (1996) examine entry and exit in Dutch manufacturing industries for the years 1986-1990. They use different definitions of entry and exit to investigate similarities and differences among their determinants. Authors also specify entry and exit as a function of incentives and barriers. As incentives they use; export share, expected profitability and production growth. As barriers they use capital intensity, advertising intensity, R&D intensity and concentration ratio. Entry and exit equations are estimated both separately and simultaneously. Findings indicate that there are different patterns for different kinds of entry and exit.

Numerous empirical works on entry and exit imply high current and past profit rates and market growth triggers entry and reduce exit. Highly concentrated industries usually have lower entry rates. However there is less support and ambiguous results from evidence that entry and exit barriers from scale economies, excess capacity and limit pricing. Sunk costs have found to be significant actors as exit barriers. Finally R&D intensity does not seem to be an efficient entry barrier. Further a common finding in the literature is that entry and exit are interdependent. Reviewing previous literature on entry and exit allows us making some generalizations. First of all, entry and exit are quite common in almost every industry. Secondly, majority of the variation in firm mobility in the form of both entry and exit across industries and over time can be classified as ‘within’ industry variation. And finally entry and exit rates are highly and positively correlated.

It should also be mentioned that studies on entry and exit concerning Turkish manufacturing industries are quite scarce. Kaya and Ucdogruk (2002) analyses the entry and exit determinants in Turkish manufacturing industries for the 1981-1997 period using a dynamic
panel data analysis. They estimate entry and exit equations separately and use standard micro variables such as; profit, output growth, concentration, labour productivity and wage and productivity differentials. However, they do not take into account the interdependent structure of entry and exit. Further, Gunalp and Cilasun (2006) investigate the determinants of entry in Turkish manufacturing industries covering the 1993-1999 period. They only estimate the entry equation using a dynamic approach. However, they acknowledge the possible interdependency between entry and exit and include the past exit rate into the entry equation. The variables they use include minimum efficient scale, capital and advertisement expenditures, productivity, industry growth concentration, rental expenditures and also export. As well as realizing the possible interdependency problem they also the possible importance of the macroeconomic variables and include export into the equation.

Our study take the entry and exit investigations for Turkish manufacturing industries one step further by using SUR methodology to take into account the possible interdependence and further including more macro variables into the equations and hence differs from other studies concerning Turkish manufacturing industries.

3. Data and Methodology

Data set obtained from Turkish Statistical Institute (TurkStat); covers 1995-2001 and provides detailed information on Turkish manufacturing industry. Data set covering 1995-2001 period provides information on gross entry and exit of firms to and from industries, only available for 4-digit on industry level. This data set only covers a 7 year period because of unavailability of gross entry and exit data regarding Turkish manufacturing industry prior to 1995. Further data sets end at year 2001, because data for post 2001 period is not compatible with pre 2001 data because of major changes in data collection procedures.
Evidence from previous literature suggests that profit rates and/or profitability of firms are important on firms’ entry and exit decisions. Dunne et. al. (2009), estimate a profit function and find that profitability has an important and significant affect on potential entrants. Sigfried and Evans (1994) argue that current and past profits are one of the main incentives to enter and usually have a positive relationship with entry. Further Austin and Rosenbaum (1990) finds that for US manufacturing industries high profits increase entry rates. Similarly Storey (1991) lists profit levels under the “pull hypothesis”; i.e. profits are seen as the main attraction for firms to enter the market. Doi (1999) while examining firm exit in Japanese firms also considers profitability to be one of the main determinants and finds a significant and negative impact from profitability on firm exit. Ilmakunnas and Topi (1999) while investigating both microeconomic and macroeconomic influences on entry and exit also argue as a microeconomic factor high profit rates attract entry and low profit rates or losses encourage exit. Klaijweg and Lever (1996) includes expected profitability in both entry and exit equations as an incentive to entry and barrier to exit. Mayer and Chappel (1992) use profit rates in entry and exit equations and find significant impact from profits on both entry and exit. As a result it, is possible to say that most researchers use profit rates or profitability in their analyses and find that profit is one of the main factors that affects entry and exit.

Another important variable that influences entry and exit is industry growth. Similar to profit, industry growth is also used in most of the empirical studies and findings indicate that it has a positive impact on entry and a negative impact on exit. Hence; it can be said that industry growth act as an incentive to entry and a barrier to exit.3

Apart from profitability and industry growth, those seen as two main factors that affect entry and exit, several additional variables are also used in previous studies such as; scale

3 (Baldwin & Gorecki, 1991); (Berlgrund & Brannas, 2001); (Chappell, Kimeyni, & Mayer, 1990); (Doi, 1999); (Dunne, Klimek, Roberts, & Xu, 2009); (Dunne, Roberts, & Samuelson, 1888); (Georski, 1995); (Ilmakunnas & Topi, 1999); (Mayer & Chappell, 1992).
economies, cost barriers, limit pricing, excess capacity, product differentiation, R&D expenditures, sunk costs and many others as incentives and/or barriers to entry and exit.

The independent variables used in this study intended to encompass commonly used variables in the literature. Variables used in this study and their sign expectations can be summarized as follows:

Table 1: Variables definitions and sign expectations

<table>
<thead>
<tr>
<th>Variable</th>
<th>Description</th>
<th>Sign expectation</th>
<th>Entry</th>
<th>Exit</th>
</tr>
</thead>
<tbody>
<tr>
<td>EXIT (Exit rate)</td>
<td>The share of firm exit in total number of firms at time t</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ENTRY (Entry rate)</td>
<td>The share of firm entry in total number of firms at time t</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>IGR (Industry growth rate)</td>
<td>The ratio of the difference between total industry income at time t and output at time t-1 to output at time t-1</td>
<td>positive</td>
<td></td>
<td>negative</td>
</tr>
<tr>
<td>CONC (Concentration ratio)</td>
<td>Herfindahl index</td>
<td>ambiguous</td>
<td></td>
<td>ambiguous</td>
</tr>
<tr>
<td>PROFIT (Profit rate)</td>
<td>The share of the difference of value added and payments to workers over total sales</td>
<td>positive</td>
<td></td>
<td>negative</td>
</tr>
<tr>
<td>X (Export rate)</td>
<td>The ratio of industry exports to industry output</td>
<td>positive</td>
<td></td>
<td>negative</td>
</tr>
<tr>
<td>M (Import rate)</td>
<td>The ratio of industry imports to industry output</td>
<td>ambiguous</td>
<td></td>
<td>ambiguous</td>
</tr>
<tr>
<td>INF (Inflation rate)</td>
<td>Inflation rate at time t</td>
<td>negative</td>
<td></td>
<td>positive</td>
</tr>
<tr>
<td>PROD</td>
<td>Labour productivity</td>
<td>-</td>
<td></td>
<td>negative</td>
</tr>
<tr>
<td>SUNK</td>
<td>Sunk costs proxied by investments in fixed capital</td>
<td>-</td>
<td></td>
<td>negative</td>
</tr>
</tbody>
</table>

Panel data or longitudinal data sets are defined as data sets that combine time series and cross sections in other words panel data sets are repeated measurements at different points in time on the same unit such as an individual, household, country, firm or in this case industry. Estimations based on panel data sets can therefore capture variation in cross sectional units.
over time. However, modelling in this setting requires more complex stochastic specifications. The main focus of the analysis when using panel data is the heterogeneity across cross-sectional units (Greene (2002); Wooldridge (2002)). In this context, using panel data provides some important advantages such as: controlling for individual heterogeneity, more information since it combines cross section and time series information, more variability and less collinearity among variables and finally more degrees of freedom and as a result of all these features it can improve efficiency. Panel data are better suited to investigate the dynamics of a certain relationship. Panel data are more reliable since they are usually gathered on micro units; hence do not contain the risk of bias resulting from aggregation (Baltagi, 2001)

As a result, it is possible to say that using a panel data set gives researcher flexibility when investigating differences in behaviours across cross sectional units (Greene, 2002). However it should be noted that there are also some disadvantages that arise from using panel data such as; problems with design and collection of the data, distortions of measurement errors and wide format of the data; panel data usually have a shorter time dimension than cross sectional units which can create problems in regression (Baltagi, 2001)

This study employs two-step system GMM; dynamic panel data estimation method and seemingly unrelated regression models. Many economic relationships are actually dynamic in nature and one of the advantages of panel data is that it gives the researcher required tools for the estimation of a dynamic relationship. These dynamic relationships are characterised by the presence of a lagged dependent variable in the model as an explanatory variable. Consider the following model:

\[
y_{it} = \delta y_{i,t-1} + x_{it}' \beta + u_{it} \quad i=1,\ldots,N \text{ and } t=1,\ldots,T
\] (1)
Where, $u_{it} = \mu_i + v_{it}$ is the composite error term, including both the time invariant individual heterogeneity and the remainder error term. It is assumed that; $\mu_i \sim \text{IID}(0, \sigma_{\mu}^2)$ and $v_{it} \sim \text{IID}(0, \sigma_v^2)$ independent of each other and among themselves. Since $y_{it}$ is a function of $\mu_i$, $y_{it-1}$ is also a function of $\mu_i$. Therefore a right hand regressor in (1) is correlated with the error term. Hence it is possible to say that, the methods discussed above such as OLS, fixed and random effects is not suitable for the estimation of such modelling. Even if the $v_{it}$ is not serially correlated, $y_{it-1}$ being correlated with $\mu_i$ causes the OLS estimator to be biased and inconsistent. The within transformation for the fixed effects estimator will difference out the time invariant parameters such as $\mu_i$, however $(y_{it} - \bar{y}_i)$ will still be correlated with $(v_{it} - \bar{v}_i)$ and hence the fixed effects estimator will also be biased and inconsistent for small T panels, which is typical with panel data sets as mentioned before (small T, large N). Similarly, the random effects estimator which requires $\mu_i$ and $x_{it}$ to be uncorrelated will also be biased in a dynamic panel data setting.

Seemingly unrelated regressions\(^4\) approach is quite popular in the econometrics literature. This approach allows the researcher to estimate a set of equations with different dependent variables, which can potentially be estimated on their own, as a system. Zellner’s (1962) seemingly unrelated regressions (SUR) approach allows for estimating p equations assuming error terms are correlated across equations. The general model can be specified as:

\[
y_{it} = x_{it}'\beta + u_{it} \\
z_{it} = m_{it}'\beta + a_{it} \\
f_{it} = k_{it}'\beta + b_{it}
\] (2)

\(^4\) (Baltagi, 2001) (Wooldridge, 2002)
Avery (1977) considers such model (2) with error component disturbances and Nguyen and Nguyen (2010) develop a model for SUR in panel data building upon Biorn (2004). This model particularly deals with unbalanced panels; however can be used with balanced panels as well. Hence with Avery (1977); the composite error term can be written as: $u_{it}=\mu_i+v_{it}$ and with Nguyen and Nguyen’s (2010) work, $\beta$’s can be estimated using a one way random effects estimation, letting the composite error terms in each equation interact with each other while estimating.

4. Results

Estimation results are provided in tables 2a and 2b. Table 2a shows the results from GMM estimation.

**Table 2a: Results from GMM**

<table>
<thead>
<tr>
<th>Entry EXIT</th>
<th>Entry EXIT</th>
</tr>
</thead>
<tbody>
<tr>
<td>ENTRY$<em>{t-1}$/EXIT$</em>{t-1}$</td>
<td>0.7153*** (0.058)</td>
</tr>
<tr>
<td>IGR</td>
<td>1.0131** (0.385)</td>
</tr>
<tr>
<td>PROFIT</td>
<td>1.7277*** (0.585)</td>
</tr>
<tr>
<td>CONCENTRATION</td>
<td>-0.089 (0.732)</td>
</tr>
<tr>
<td>X</td>
<td>0.290** (0.136)</td>
</tr>
<tr>
<td>M</td>
<td>-0.0702** (0.029)</td>
</tr>
<tr>
<td>INFLATION</td>
<td>-0.010** (0.004)</td>
</tr>
<tr>
<td>PROD</td>
<td>-</td>
</tr>
<tr>
<td>SUNK</td>
<td>-</td>
</tr>
<tr>
<td>Year dummies</td>
<td>Yes</td>
</tr>
</tbody>
</table>
GMM estimation results are robust to clusters in the data and two-step system GMM estimation methodology is employed. According to these results; entry and exit are both affected by their past levels; which indicate a dynamic relationship as expected, which can be interpreted as high levels of past entry triggers current entry and similarly high levels of past exit triggers current exit levels. According to GMM results profit and industry growth rates positively affect entry as micro variables. Further macro variables; export import and inflation are also statistically significant. Export has a positive impact on entry while import and inflation has negative effects; as expected. Results indicate that export possibilities in an industry triggers entry. However, import is negatively correlated with entry; indicating that in Turkish manufacturing industries import increases competition and hence acts as an entry barrier. Further; inflation which can also be seen as a sign for macroeconomic volatility and which is quite important for Turkish economy also acts as an entry barrier; however the impact is quite small. Highest impacts on entry are from profit and industry growth rate respectively which is consistent with previous literature. Concentration is statistically insignificant.

Results from the exit equation indicates that profit and industry growth rate have negative effects on exit as expected. However the impacts of these variables are small in magnitude when compared with the entry equation. The highest impact in exit equation is from sunk
costs. Results indicate that sunk costs are negatively correlated with exit as expected and quite important in Turkish manufacturing industries. The importance of sunk costs also explains why profit and industry growth rate have small impacts. Even though profit and industry growth are important in Turkish manufacturing industries, high levels of sunk costs prevent firms to act according to profit and industry growth rates, which is also consistent with the theory and expectations. Further concentration rate has a negative and significant impact on exit rates, indicating high levels of concentration triggers exit. Furthermore export has a negative impact on exit rates as expected and import has a positive impact indicating competition increases exit in Turkish manufacturing industries consisting with entry equation results. Finally labour productivity has a small and negative impact on exit rates in Turkish manufacturing.

GMM results indicate that highest impact on firm entry is from profit rates; where highest impact on exit is from sunk costs. These results also indicate that entry and exit rates have dynamic patterns. According to the results it is also possible to say that macro variables also have impacts on entry and exit.

Table 2b provides the results from seemingly unrelated regression; the case where interdependency between entry and exit are taken into account. However, in this case the dynamic relationship cannot be taken into account. It should be mentioned that when using SUR methodology past profit rates are used rather than current ones. While GMM methodology is employed we considered the possible predetermined structure of the profit rates and used past profit rates as instruments, however, instrumenting is not possible with the SUR methodology.
### Table 2b: Seemingly unrelated regression (SUR) results

<table>
<thead>
<tr>
<th></th>
<th>Entry</th>
<th>Exit</th>
</tr>
</thead>
<tbody>
<tr>
<td>ENTRY</td>
<td>-</td>
<td>-0.0031***</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(0.000)</td>
</tr>
<tr>
<td>EXIT</td>
<td>0.0211***</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>(0.001)</td>
<td></td>
</tr>
<tr>
<td>PROFIT</td>
<td>0.8010**</td>
<td>0.0731</td>
</tr>
<tr>
<td></td>
<td>(0.278)</td>
<td>(0.212)</td>
</tr>
<tr>
<td>IGR</td>
<td>0.0735</td>
<td>-0.0085</td>
</tr>
<tr>
<td></td>
<td>(0.066)</td>
<td>(0.051)</td>
</tr>
<tr>
<td>X</td>
<td>0.5027***</td>
<td>-0.4066***</td>
</tr>
<tr>
<td></td>
<td>(0.021)</td>
<td>(0.018)</td>
</tr>
<tr>
<td>M</td>
<td>-0.1304***</td>
<td>0.1095***</td>
</tr>
<tr>
<td></td>
<td>(0.007)</td>
<td>(0.006)</td>
</tr>
<tr>
<td>INF</td>
<td>-0.0021*</td>
<td>0.005</td>
</tr>
<tr>
<td></td>
<td>(0.001)</td>
<td>(0.000)</td>
</tr>
<tr>
<td>PROD</td>
<td>-</td>
<td>-0.0001***</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(0.000)</td>
</tr>
<tr>
<td>SUNK</td>
<td>-</td>
<td>-21.0796***</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(5.988)</td>
</tr>
</tbody>
</table>

Number of obs. 414  
Number of eqn. 2  
Number of panels 6  

*** 0.01<\p, ** 0.05<\p, * 0.1<\p  
Numbers in parentheses are standard errors

Seemingly unrelated regression results support the symmetry hypothesis and indicate that entry and exit rates are interdependent as suggested by the symmetry hypothesis. The results suggest that increased entry rates negatively affect exit rates. Further, increased exit rates have a positive impact on entry rates, as expected. Further the results indicate that profit has a
positive and statistically significant impact on entry, as expected, however no statistically significant impact on exit. Industry growth rate is statistically insignificant and thus has no effect on entry and exit. Export, import, inflation, labour productivity and sunk costs are statistically significant and their signs are as expected. Again, sunk costs have the highest impact on exit rates consisting with the GMM results. The importance of sunk costs in Turkish manufacturing industries can explain the statistically insignificant profit variable in case of exit rates. Existence of sunk costs might be preventing the firms to act according to the profit rates.

5. Conclusions and Discussions

As mentioned before the main focus of this study was to examine the main determinants of firm entry and exit for Turkish manufacturing industries. For such analysis, 1995-2001 panel data regarding Turkish manufacturing industries is used and GMM and SUR methodologies are employed. One of the main contributions of this study is the use of different estimation techniques. Both results are consistent with each other however both methodologies solve only one part of the problem. GMM methodology takes into account the dynamic pattern on the other hand cannot deal with the interdependency. Similarly, SUR methodology deals with the interdependency however neglects the dynamic relationship. Notwithstanding the limitations of these models, combining the results from each methodology provides important insights for this issue and indicates that entry and exit have a dynamic and interdependent relationship. Furthermore both results indicate the importance of macro variables for Turkish manufacturing industries. Therefore, it is possible to say that macro variables should also be taken into account when entry and exit are examined. Finally as well as the dynamic structure, the interdependence is also quite important.
This study has some limitations regarding the data in terms of its relatively short time dimension; however a seven year period panel data is still thought to reveal important information on Turkish manufacturing industries for the medium run. Results from econometric analyses indicate the importance of macroeconomic variables as well as the dynamic structure of entry and exit in Turkish manufacturing industries. Furthermore, in this study some possibly important variables such as R&D and advertisement expenditures are left out because of the data limitation. Finally firm or plant level data could have been more suitable for this study. These limitations can be taken into consideration for future research and if such data is acquired it will most certainly reveal more detailed information on the subject.

It is possible to derive some policy implications according to the estimation results. First of all; profit has an important impact on entry rates in Turkish manufacturing. It is clear that in Turkish manufacturing industries firms tend to enter when find it profitable. However, the results also indicate that sunk costs are dominant in Turkish manufacturing industries. This can be interpreted as when firms decide to enter considering the current and past profit rates in the industry, they need to invest an important deal and hence the existence of such investments prevents them from exiting the industry in spite of the declining profit rates. In terms of policy, such situation can be seen as helpful. Existence of the sunk costs forces firms to stay in the industry longer and hence Turkish manufacturing industries become more resistant to various kinds of shocks in the economy. Further, as can be seen from the results export possibilities in an industry increases entry and deters exit. Hence in a similar manner, it can be said that export possibilities are important in the sense that such possibility can prevent firms to exit in case of a domestic economic shock or down turn. Furthermore, import in Turkish manufacturing industry has a negative impact on domestic firms. Such issue have two important aspects. First, is that in Turkish manufacturing import should be used in
moderation in order to protect the domestic production. Secondly, import can be used to keep domestic firms under control in terms of price, to protect consumers. Finally, it is clear that firms do react to the inflation rate which can be seen as a sign of macroeconomic stability. As a result macroeconomic structure and the policies applied play a crucial role on firms’ decisions in Turkish manufacturing industries.
References


