Promoting the Entry of New Firms

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ABSTRACT. Although in the beginning the entry in the market of new companies has a positive effect on production and employment, the results don't seem to be so obvious in the long term. On the one hand, the possibilities of survival of the new companies are very scarce, on the other, the new companies that survive expel the less efficient incumbents from the market.

The results of the simulations show that the effects of the policies on the population of firms in the long term are quite small because the policies are strongly limited by the pressure that the new companies cause on the established ones. On the other hand, the policies favor an increase in productivity but in a different way depending on whether they favor the rotation or not.

1. Introduction

In many European countries, and from the European Commission, diverse policies have been developed to favor the creation of new companies, especially small and medium-sized ones, to reduce unemployment and to increase productivity.

Although the promotion of the creation of new companies has been an industrial policy much used, researches into the effects of these measures in the long term are scarce, especially from the point of view of the whole market and not only of those firms that have directly received public help. They are mainly centered in the results and possibilities of survival of the new firms and leave aside the effects that take place on the incumbents.

If a promotion policy gets an increase in the number of new companies, it cannot be considered that the sum of the workers of the new companies is the net effect in employment because the possibilities of the survival of new companies are very scarce and the survivors expel the less efficient incumbents from the market. On the other hand, as the expelled companies are generally more intensive in labor than the new ones, the net effect on employment can be even smaller.

The objective of the paper is to analyse the incidence in the long term of some policies of the promotion of new companies from a perspective of markets mobility. The model used is compatible with the abundant research carried out from the main approaches to the dynamic of markets: in the first place, the wide and often dispersed descriptive literature on the topic (Dunne et al., 1988; Baldwin, 1995); in second place, the literature based on the industry life cycles (Klepper, 1996; Afuah and Uterback, 1997) and, lastly, that related with the population ecology of organizations (Hannan and Freeman, 1989; Carroll and Hannan, 1995).

In this work four of the most used promotion measures for the creation of companies are analysed by means of agent-based simulation: reduction of the entry barriers, financial help for companies in crisis, trade protection and help for the growth of firms.

The effect of the reduction of the entry barriers is seen through three different policies:

Policy 1 considers that an increase of the gross rate of entry of an exogenous character takes place. That is to say, that the entries increase with independence of the observed profitability of the market. An example of this kind of policy is any reduction in bureaucratic obstacles.

Policy 2 supposes, to the contrary, that the answer of the entries regarding the profitability of the market increases. This is the case of a reduction in the financial costs for example.

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Lastly, *policy 3* combines policies 1 and 2.

The financial help for companies in crisis, normally the smaller and newer ones, is introduced in the model like a reduction of the probabilities that the firms are expelled from the market when their profitability is low (*policy 4*). Probably this supposition is excessively restrictive since it considers that the firms receive help during an indefinite period.

The changes in trade protection are included in the model like variations in the answer of the imports regarding the existence in the market of high prices (*policy 5*). This way, a high level of commercial protection supposes more difficulty so that foreign companies reduce the margins of national ones and the gross entry rate grows.

Finally, the help dedicated to the firm growth or, what is the same to reduce the disadvantages derived from the inefficient size are considered as a faster adjustment towards the optimum size in a typical neoclassical pattern (*policy 6*).

The analyzed promotion policies are shown in Table I.

2. The Driade model of market dynamics

To analyse these questions, the Driade model of firms' mobility developed in the Laboratory of Computational Finances of the University of Alcalá is used.

As in the standard models of mobility of firms, the entries affect the profitability of the market and the possibilities of survival of companies, as well as the market attractiveness for potential incoming firms. This way any policy that favors the entry or the survival of new companies will alter the evolution of the market.

In the model, two types of firms are considered: on the one hand, the initial incumbents, on the other, new companies that enter in the market. This division of the firms into two groups has been made to pick up the situation quite common in reality but barely tried in the literature in which there coexist in the market a group of well established firms with the turnover of companies of different characteristics, generally less efficient and smaller.

The demand function

The consumers' perception of an incomplete substitutability among the productions is carried out by the incoming ones, the established companies and the foreign firms suggests including them in the demand functions with specific coefficients. This product differentiation can be justified due to the different characteristics of the companies or, simply because the consumer has more trust in the product of the established firms than in the imports or the product of the incoming ones.

This way, the price at which the incumbents sell will be negatively affected by its production, as well as by the production carried out by the new companies and the imports. This way, the demand equation for the established companies can be specified in the following way:

$$P_{nt} = a_1 - a_2\, Q_{nt} - a_3\, Q_{et} - a_4\, M, \qquad (1)$$

TABLE I
The analyzed promotion policies

Policies	Target	Description
Policy 1	To increase the gross entires	The entries increase exogenously
Policy 2	To increase the gross entires	The answer of the entries regarding the profitability of the market increases
Policy 3	To increase the gross entires	Combine the previous ones
Policy 4	To reduce the gross exits	Reduction of the probabilities that the firms in crisis are expelled from the market
Policy 5	To reduce the foreign competence	Changes in imports
Policy 6	To reduce the disadvantages of size	Faster adjustment toward optimum size.

where P_{nt} is the price at which the companies settled on at the moment t sell its products, Q_n is the production level, Q_e the production of the incoming firms. The subindexes n and e refer to the populations of established and incoming firms respectively. The subindex t expresses the period to which the variable refers.

The demand function of the incoming firms is similar:

$$P_{et} = b_1 - b_2\, Q_{nt} - b_3\, Q_{et} - b_4\, M. \tag{2}$$

Distribution of sizes: capacity of production

The maximum capacity of production of the initial companies is distributed according to a lognormal function. This hypothesis on the distribution of the production leans on evidence that shows a marked asymmetry in the share distribution of the companies.

The capacities of the entries that take place in a certain period also follow lognormal distributions similar to those of the established companies, although generally with different characteristics. As in each period, the number of new firms is normally smaller than the number of established companies and their distribution will be below these. Since its size is usually smaller, its mode will be more to the left. In the case where, the incoming firms have the same average size as the established ones, their distribution would have the same mode.

Entries

The volume of entries of new firms depends on two kinds of variables. On the one hand, those that supposes a higher attractiveness by the sector; and the other, those that suppose a barrier to the entry.

The equation of entries follows, in this way, the habitual pattern: the entries that take place in the period t, E_{it}, depend on the expected benefits, $E\pi_{it}$, of the existent entry barriers in that period, B_{it} and of the exits that have taken place in the previous period, S_{it-1}.

$$E_{it} = f_1(E\pi_{it},\, B_{it},\, S_{it-1}). \tag{3}$$

The expected benefits are defined as the mean margin observed in the previous period in the specific market where the entries will take place. Although this hypothesis on the expectations that the incoming firms have about the expected benefits could be considered as excessively simplistic, it can be justified, at least in part, by supposing that the decision of entry takes place during the previous period, taking one period to carry out an effective entry. The supposition that the market to be considered by the potential entry is not the whole market but the market segment in which the entry will take place, constitutes a new contribution that allows us to pick up situations broadly observed in practice, where, in spite of the fact that the margins observed in the group of the market are low, high entry levels take place.

The margin of each of the groups of companies is calculated as the difference between its price and the average marginal costs of the companies that form the group divided by the price:

$$IL_{nt} = \frac{P_{nt} - (\sum CMg_{nt}/N_t)}{P_{nt}}, \tag{4}$$

$$IL_{et} = \frac{P_{et} - (\sum CMg_{et}/N_t)}{P_{et}}. \tag{5}$$

N_t and E_t being the number of companies of each of the groups and CMg_t the marginal costs of each of the companies.

There are two entry barriers included in the model: the average size shown by the incoming companies in the previous period. Tme_{t-1}, as a *proxy* of the existing scale economies, and an exogenous vector of other entry barriers, OBE_t that, by defect, takes the value zero (and that would include the entry barriers of any nature different to scale economies). This vector either allows the inclusion in the model of institutional changes or external interferences affecting the entries, favoring them or impeding them.

The exits were fundamentally included in the equation of entries for two reasons: in the first place, wide evidence points out the existence of a high correlation among both variables; in the second place, there are solid theoretical arguments based on supply and demand aspects.

From the supply point of view, the exit of firms favors the entry by means of the liberation of resources and productive factors. As Storey and Jones (1987) point out, exits can favor the creation of second-hand markets with physical assets to

reduced prices that would incentive the creation of new firms.

The explanations from the point of view of the demand are of two types: on the one hand, the exits leave a hole in the market of which the incoming firms can take advantage and on the other hand, the incumbents can act in a less hostile way when the entry is a substitution for an old firm and, therefore, it does not mean a reduction of their market share.

Also the "free space" was included as a variable favoring the entries, that is to say, the number of companies of optimal size that could still enter the market without supposing a complete suppression of the margins. This variable seeks to pick up the bigger facilities to the new entries when the number of companies in the market is scarce, as generally happens in the first phases of its development.

The free space, φ, is defined as the minimum number of companies that could enter the market with a positive margin, given the number of companies existant in the market. For this we calculated the number of firms of optimal size that fit in the market, η:

$$\frac{P_{tet} - CMg_{opet}}{CMg_{opet}} = \frac{b_1 - b_2\, Q_{nt} - b_3\, \eta Q_{opet} - CMg_{opet}}{CMg_{opet}} = 0, \tag{6}$$

$$\eta_t = \frac{b_1 - b_2\, Q_{nt} - CMg_{opet}}{b_3\, Q_{opet}}, \tag{7}$$

and the number of existent incoming firms, E_t is subtracted if it is bigger. In case the number of incoming survivors is bigger or equal to η, then φ takes the value zero.

$$\begin{cases} Si & \eta_t \leq E \Rightarrow \varphi_t = 0, \\ Si & \eta_t > E \Rightarrow \varphi_t = \eta_t - E_t. \end{cases} \tag{8}$$

The existence of sectors with a very different number of companies forces us to specify the equation of entries in relative terms instead of absolute, that is to say, by means of gross rates of entries

$$TBE_{et} = d_1 + d_2\, IL_{et-1} + d_3\, TBS_{et-1}\, d_4\, TM_{et-1} + d_5\, OBE_{et-1}\, d_6\, \varphi, \tag{9}$$

TBE_{et}, being the gross rate of entries in the moment t; IL_{et-1}, the average margin of the incoming firms in the previous period; TBS_{t-1}, the gross rate of exits; TME_{et-1}, the efficient minimum size, OBE_t, the exogenous vector of other entry barriers and φ the free space. The subindexes t and $t - 1$ indicate the period to which the variable refers.

Since the gross rate of entries is defined as the quotient between the entries and the total number of firms in the previous period, NT_{t-1}, the total number of entries can be expressed as:

$$E_{nt} = TBE_{nt} \times NT_{t-1}. \tag{10}$$

As the number of entries should be a natural number, when the total number of companies and the gross rate of entries take small values, it could happen that entries didn't take place, especially when the periods of reference were short. This point can be illustrated with an example. In a market formed by twenty companies, there are two entries annually, if the period of reference is yearly, there is no problem since the expected number of entries is a natural number; but, if it is bimonthly, the expected value for every period would be zero, if rounded down (the assumed approach), or six, if it was made up, although the expected value for the whole year is two so that an inconsistency would take place.

To palliate this problem, in those cases where the obtained total volume of entries of equation (10) became inferior to one, the obtained value of a binomial function of parameters (1, E_{nt}) was considered.

Imports

It is supposed that the imports only take place when the prices in the market ascend above the average of the last years. This way, when the prices observed in the previous period exceed the average, the imports depend on the elasticity of the imports regarding the relative price and on an aleatory variable. On the other side, the imports are zero when the observed prices in the previous period are inferior to the average.

$$M = m_1 \left(\frac{P_{n,\,t-1}}{\overline{P}_n} \right)^{m_2} \varepsilon_1 \quad \text{if} \quad P_{n,\,t-1} > P_n \tag{11}$$

or else

$$M_i = 0.$$

In this hypothesis underlies the idea that the domestic market is internationally competitive so the imports only take place when the internal supply is insufficient.

Firm growth

Firms don't remain unaltered in the market but rather vary their size, sometimes in a voluntary way to adapt to the characteristics of the market, and others forced by circumstances. To integrate this dynamic aspect into the model, the firms' size is settled down in the period t like a function of the size in the moment $t - 1$. It has been sought that this function is sufficiently flexible as to be able to pick up the two main groups of theories of a firm's growth: stochastic and deterministic.

The chosen functional form is:

$$q_{it} = \alpha \left[q_{it-1} \left(1 + \frac{N(0, 1)}{\tau} \right) \right] + (1 - \alpha) \left[q_{it-1} \left(1 + \lambda \frac{q_{opt} - q_{it-1}}{\tau} \right) \right], \quad (12)$$

where α and λ are coefficients between zero and one, $N(0, 1)$ is a random variable that follows a normal distribution with average zero and typical deviation one, τ an adjustment coefficient and q_{opt} is the optimal size.

It is a pondered average of both types of factors where the coefficient α determines the relative importance of each of them. If α is equal to one, the growth is purely stochastic, while if it is equal to zero, it is completely deterministic.

In the deterministic part, the coefficient λ indicates the speed with which the company adjusts its size by reducing its gap regarding the best one. The value one would indicate that the company acquires in a single period the optimal size; on the contrary, the value zero would indicate that the company doesn't vary its size.

It is considered that the available technologies are unique and the same goes for all the companies of each of the groups, so that for each of them exists only as a function of costs that determines the average costs of each firm in the function of their production. It is maybe an excessive simplification but it has been adopted in order to clarify the central object of the analysis. In any event, the analysis could be centered on the sectors where the differences in the functions of costs of the companies are small.

The cost functions used are Cobb-Douglas. This specification was chosen because of its considerable flexibility and its wide use in the literature.

For the established companies, the function of costs can be expressed as:

$$c_{nt}(w_{nt}, r_{nt}, q_{it}) = A_n^{\frac{-1}{a_n + b_n}} \left[\left(\frac{a_n}{b_n} \right)^{\frac{b_n}{a_n + b_n}} + \left(\frac{a_n}{b_n} \right)^{\frac{-a_n}{a_n + b_n}} \right] \times w_{nt}^{\frac{a_n}{a_n + b_n}} r_{nt}^{\frac{a_n}{a_n + b_n}} q_{it}^{\frac{1}{a_n + b_n}}, \quad (13)$$

where w and r are the price of the factor's labor and capital. The functions of marginal and average costs are, therefore:

$$cmg_{nt}(w_{nt}, r_{nt}, q_{it}) = \frac{\partial c_{nt}(w_{nt}, r_{nt}, q_{it})}{\partial q_{it}}, \quad (14)$$

$$cme_{nt}(w_{nt}, r_{nt}, q_{it}) = \frac{c_{nt}(w_{nt}, r_{nt}, q_{it})}{q_{it}}. \quad (15)$$

For the case of the incoming companies, the cost functions are defined in a similar way:

$$c_{et}(w_{et}, r_{et}, q_{jt}) = A_e^{\frac{-1}{a_e + b_e}} \left[\left(\frac{a_e}{b_e} \right)^{\frac{b_e}{a_e + b_e}} + \left(\frac{a_e}{b_e} \right)^{\frac{-a_e}{a_e + b_e}} \right] \times w_{et}^{\frac{a_e}{a_e + b_e}} r_{et}^{\frac{a_e}{a_e + b_e}} q_{jt}^{\frac{1}{a_e + b_e}}, \quad (16)$$

$$cmg_{et}(w_{et}, r_{et}, q_{jt}) = \frac{\partial c_{et}(w_{et}, r_{et}, q_{jt})}{\partial q_{jt}}, \quad (17)$$

$$cme_{et}(w_{et}, r_{et}, q_{jt}) = \frac{c_{et}(w_{et}, r_{et}, q_{jt})}{q_{jt}}. \quad (18)$$

The inclusion of differed costs among companies gives the model a major realism allowing, at least

partly, to eliminate the problems pointed out by Tybout (1992) deriving from consideration of homogeneous firms.

The functions of conditioned demand of the factors, capital and labour, for the already established companies are defined as:

$$k_{nt}(w_{nt}, r_{nt}, q_{it}) = A_n^{\frac{-1}{a_n + b_n}} \left[\frac{a_n a_r}{b_n w_r} \right]^{\frac{b_n}{a_n + b_n}} q_{it}^{\frac{1}{a_n + b_n}}, \tag{19}$$

$$l_{nt}(w_{nt}, r_{nt}, q_{it}) = A_n^{\frac{-1}{a_n + b_n}} \left[\frac{a_n a_r}{b_n w_r} \right]^{\frac{-a_n}{a_n + b_n}} q_{it}^{\frac{1}{a_n + b_n}}. \tag{20}$$

And for the case of the incoming ones:

$$k_{et}(w_{et}, r_{et}, q_{jt}) = A_e^{\frac{-1}{a_e + b_e}} \left[\frac{a_e a_e}{b_e w_e} \right]^{\frac{b_e}{a_e + b_e}} q_{jt}^{\frac{1}{a_e + b_e}}, \tag{21}$$

$$l_{et}(w_{et}, r_{et}, q_{jt}) = A_n^{\frac{-1}{a_e + b_e}} \left[\frac{a_e a_e}{b_e w_e} \right]^{\frac{-a_e}{a_e + b_e}} q_{jt}^{\frac{1}{a_e + b_e}}. \tag{22}$$

This way, the model allows the introduction of differences in the costs of the factors of the established companies and of the incoming ones. This aspect seems to have special relevance from the point of view of the relative competitiveness of incoming and established firms.

Production

When the companies suffer a lack of information on the real behavior of their competitors, they consider that they will behave in the same way as their group; however, each of them settles down individually to the production level that maximizes its benefit provided it is smaller or equal to its capacity of production, in which case they produce this. That is to say, the maximum production of a company is limited by its capacity being only variable in the long term.

For this, the supply of the market is estimated rationally by the companies period by period at the moment of deciding its production level in order to achieve its objective of maximization of benefits. It is supposed that the companies, to determine their production for the following period, observe the current prices and productions and estimate the production of their competitors in the function of their experience, under the hypothesis that those will maintain their more recent behavior rules.

The supply that the market expects from the established companies is:

$$E(Q_{nt}) = \overline{Q}_{nt} + h_1(p_{n,\,t-1} - \overline{p}_{nt}) + h_2(Q_{n,\,t-1} = \overline{Q}_{nt}), \tag{23}$$

where the variables marked with an overbar indicate mobile averages of the last k periods.

To determine the production expected in period t, the market estimates the answer coefficients to the variations of the prices and the quantities, h_1 and h_2, given the experience obtained in the last k periods, and supposes that they will stay stable during the period t.

Similarly, the expected production for the incoming companies is:

$$E(Q_{et}) = \overline{Q}_{et} + h_3(p_{e,\,t-1} - \overline{p}_{et}) + h_4(Q_{e,\,t-1} = \overline{Q}_{et}). \tag{24}$$

The decisions of the production of the established companies and of the incoming, although similar, are not the same because they have different demand curves.

For the case of an established firm, the revenues depend on the production of established competitors, Q^*_{nit}, the total production of the incoming firms, Q_{et}, and its own production, p_{it}; while its costs only depend on its production.

To calculate the production level estimated by each company for their competitors, it has been considered that all companies suppose that their competitors will maintain the same production pattern as so far. This supposition implies a major rationality by agents other than the Cournot's model, when considering that the competitors adapt future production to the current situation of the market to maximize their benefits.

The production estimated by the established company i for its established competitors, Q^*_{ni}, is similar to the production that the market expects

for the whole group, less the expected production for it:

$$\mathrm{E}(Q^*_{nit}) = E(Q_{nit}) - E(q_{nit}). \tag{25}$$

The production that the market expects for each of the established companies is similar to that of the market in its group:

$$E(q_{nit}) = \overline{q}_{nit} + h_{i1}(p_{n,\,t-1} - \overline{p}_{nt}) + h_{i2}(q_{ni,\,t-1} = \overline{q}_{nit}), \tag{26}$$

being calculated period to period in the same way as the total production. This way, the function of benefits to maximize is as:

$$\Pi_{nit} = p_{nt}(Q^*_{nit},\, Q_{et},\, q_{nit})q_{nit} - c_n(q_{nit}). \tag{27}$$

The condition of first order can then be expressed as:

$$\begin{aligned}\frac{\partial \Pi_{nit}}{\partial q_{nit}} &= p_{nt}\,(Q^*_{nit},\, Q_{et},\, q_{nit}) \\ &\quad + q_{nit}\frac{\partial p_{nt}(Q^*_{nit},\, Q_{et},\, q_{nit})}{\partial q_{nit}} - \frac{\partial c_n(q_{nit})}{\partial q_{nit}} \\ &= 0,\end{aligned} \tag{28}$$

$$\begin{aligned}&p_{nt}\,(Q^*_{nit},\, Q_{et},\, q_{nit}) + q_{nit}\frac{\partial p_{nt}(Q^*_{nit},\, Q_{et},\, q_{nit})}{\partial q_{nit}} \\ &\quad = \frac{\partial c_n(q_{nit})}{\partial q_{nit}},\end{aligned} \tag{29}$$

$$IMg_{nit} = CMg_{nit}, \tag{30}$$

with what the optimal production will be:

$$q_{nit} = \frac{\dfrac{\partial c_n(q_{nit})}{\partial q_{nit}} - p_{nt}\,(Q^*_{nit},\, Q_{et},\, q_{nit}) + q_{nit}}{\dfrac{\partial p_{nt}(Q^*_{nit},\, Q_{et},\, q_{nit})}{\partial q_{nit}}}. \tag{31}$$

Similarly, for the case of the incoming ones:

$$\Pi_{ejt} = p_{et}(Q^*_{ejt},\, Q_{nt},\, q_{ejt})q_{ejt} - c_{et}(q_{ejt}), \tag{32}$$

$$IMg_{ejt} = CMg_{ejt}, \tag{33}$$

$$q_{eit} = \frac{\dfrac{\partial c_{et}(q_{ejt})}{\partial q_{ejt}} - p_{et}\,(Q^*_{ejt},\, Q_{nt},\, q_{ejt}) + q_{nit}}{\dfrac{\partial p_{et}(Q^*_{nt},\, Q_{et},\, q_{ejt})}{\partial q_{ejt}}}. \tag{34}$$

Exits

Although the profitability doesn't necessarily assure the survival of a company, the probabilities of being expelled from the market depend to great measure on its margin: the lower it is, the less will be the possibilities of survival. This relationship is not lineal, since starting from certain levels of profitability, no significant elevations in the possibilities of survival take place; however, the reductions in the margins below a critical level, as small as they are, suppose a significant increase of the probabilities of being expelled from the market.

To pick up on the model, this nonlineal relationship with the probability of survival of the firms is defined as a Bernoulli distribution of parameter p,

$$\theta = \mathrm{B}(p), \tag{35}$$

where p is a logistical function that depends on the margin (Lerner's index) including the differentiation premium for the accuracy of the produced characteristics:

$$p = \frac{1}{1 + e^{-\frac{IL_i - \alpha}{\beta}}}. \tag{36}$$

This specification of the function of exits picks up a fact broadly observed in the reality: the exit of a company usually takes place either because the results of a concrete period are so negative that they make it impossible to continue its activity in the market, or because they accumulate several years of not very favorable results.

If there are scale economies, the differences of size between the firms and, therefore, of average costs, supposes that there simultaneously exist companies with high probabilities of survival and companies with practically none.

3. Computer implementation and calibration

Once the model of firm mobility had been developed, it was observed that it was unapproachable by means of the conventional mathematical methodology. For this reason, the agent-based simulation was used.

The model was developed in MALTLAB™. The program is structured in modules that represent partial aspects of the problem, as the determination of the equilibrium price of the market, the entry of new companies or the determination of the strategies that can be freely modified without affecting the rest of the modules, facilitating the analysis of the effects on the model of changes in the exogenous variables or in the initial hypotheses.

The calibration of the model can be carried out by means of two alternatives, although not necessarily excluding ways, depending on the object of the analysis. The first one consists in the use of estimates for the coefficients and the exogenous variables coming from empiric studies on real markets. The second way consists in the introduction of alternative values, theoretically acceptable, in order to value the effect of the changes in the parameters on the general behavior of the model, using resampling methods.

Although possible, using real data of specific markets goes beyond the objectives of this work. On the other hand, the election of a market from among all the possible ones, could darken the analysis of the problem, not being good enough for obtaining general results. To achieve this, the calibration of the model has been carried out using theoretically acceptable values obtained from the literature on the topic, not seeking to be a faithful image of any specific market.

To study the effect of the policies promoting the entry of new firms, seven markets scenarios were developed: the first of them was used as the basis and the others six for analyzing policies. One hundred simulations were carried out for each one of them.

With respect to the existent technology, it was considered that scale economies were significant.

In all the scenarios it was considered that the incoming companies were, on average, smaller in dimension and efficiency than those already established (20 percent smaller in size and with the total productivity of the factors 10 percent inferior). This supposition about the smaller dimension and efficiency of the incoming firms is supported by a wide range of evidence.

Once carried out, the simulations, the averages and the standard deviations of the main variables were calculated in order to compare the results.

4. Main results

The main results obtained in the simulations are presented in Graphs 1 to 6. In the first two graphs, the rates of entry and exit of the analyzed policies are compared with the control scenario. In the other four graphs, the effectiveness of the policies is studied, which is defined as the difference between the control situation and the production by the respective application of the policies.

The only effective ones from the point of view of the entries increasing the gross rate of entries in the long term were policies 1 and 3. However, its effect on the net rate of entries is small because they produce an increase in the rate of exits. The final result is a major market rotation.

Policy 2, which increases the answer of the incoming ones with respect to the observed margins, produces a small increase of entries in the short term but is followed by an earlier start of the exits. In general, it could be said that with this, market maturity is reached earlier.

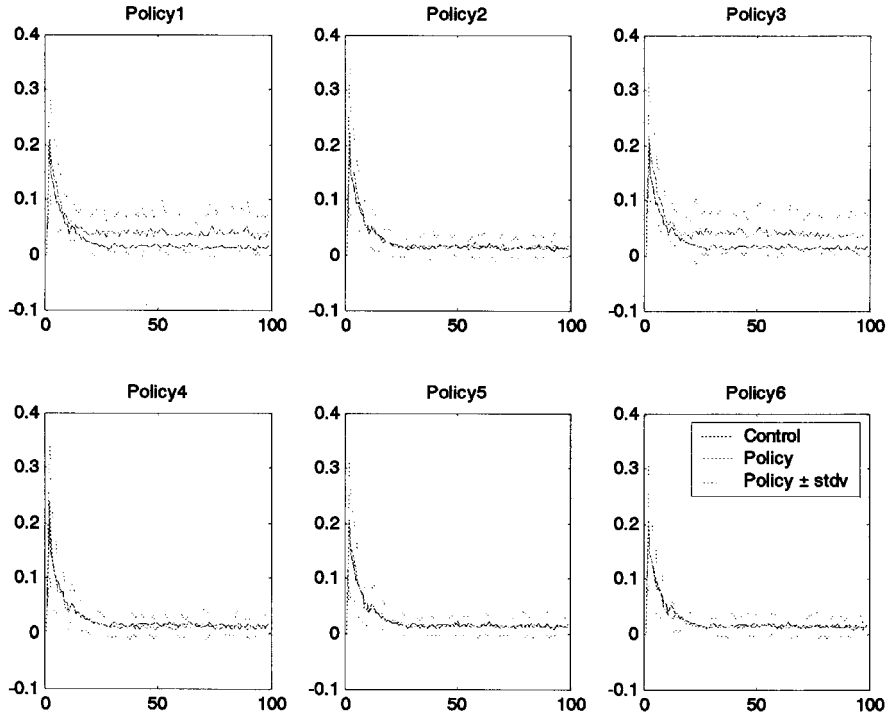
The help to companies in crisis (policy 4) produces a reduction of the exits and consequently new companies have difficulty in settling down in the market. The final result is less rotation.

An increase in imports also favors a slower rotation because they restrain the process of market saturation. The smaller profitability motivated by the imports reduces the entries and, indirectly, the exits.

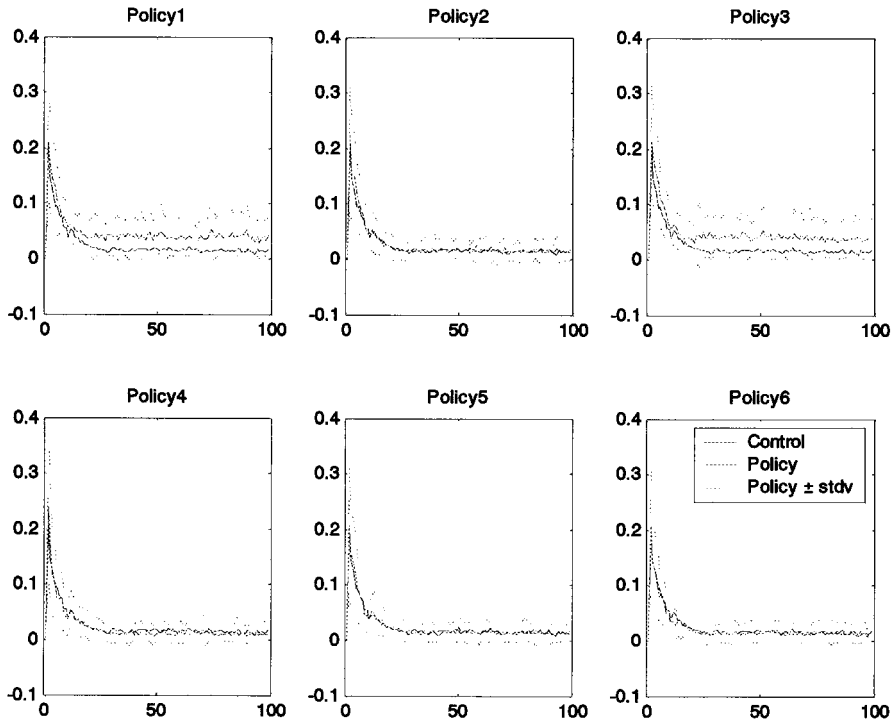
Although all the policies pretend to increase employment and productivity, the results of the simulations show that their effects are different, especially in the long term.

Policies 1, 2, 3 and 6 produce a fast increase in employment although of transitory a character. After a short time, the employment is the same as it would have been without the introduction of the measures.

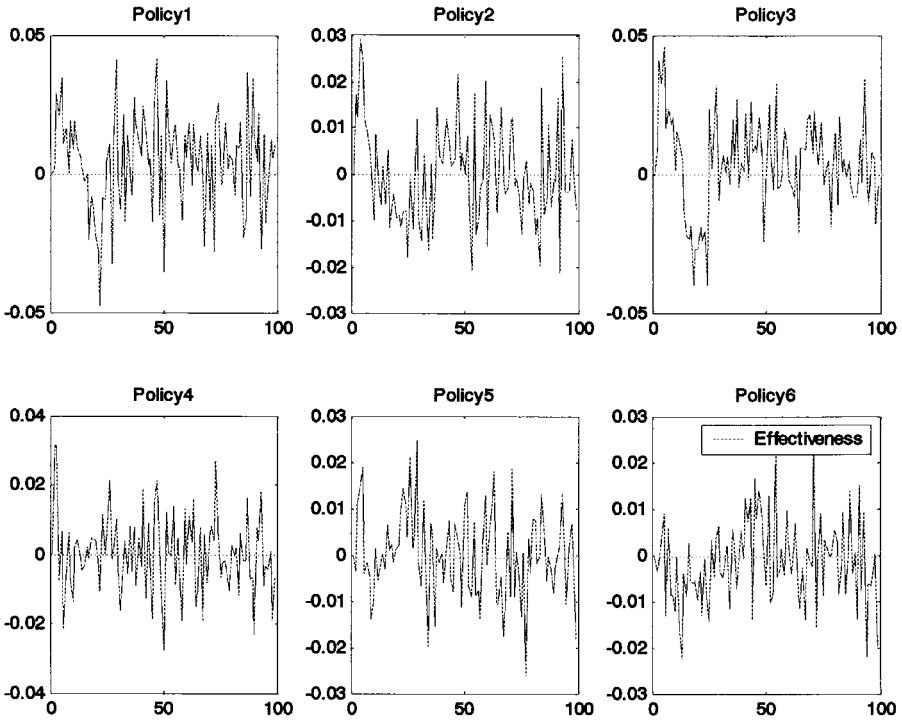
The effect on the productivity is also positive and more permanent. In policies 1 and 3, where



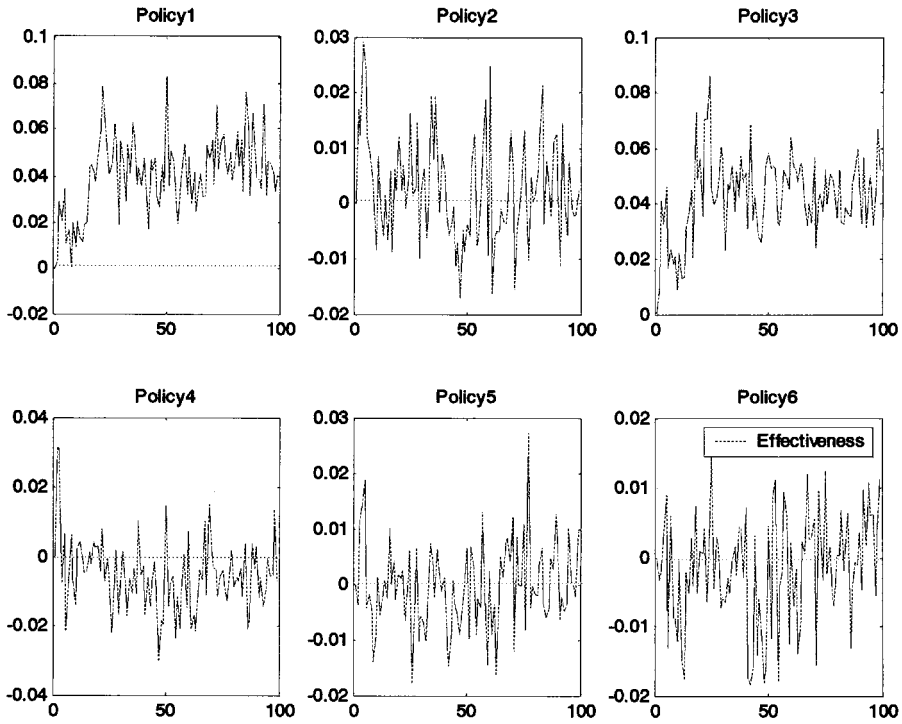
Graph 1. Gross rates of entries.



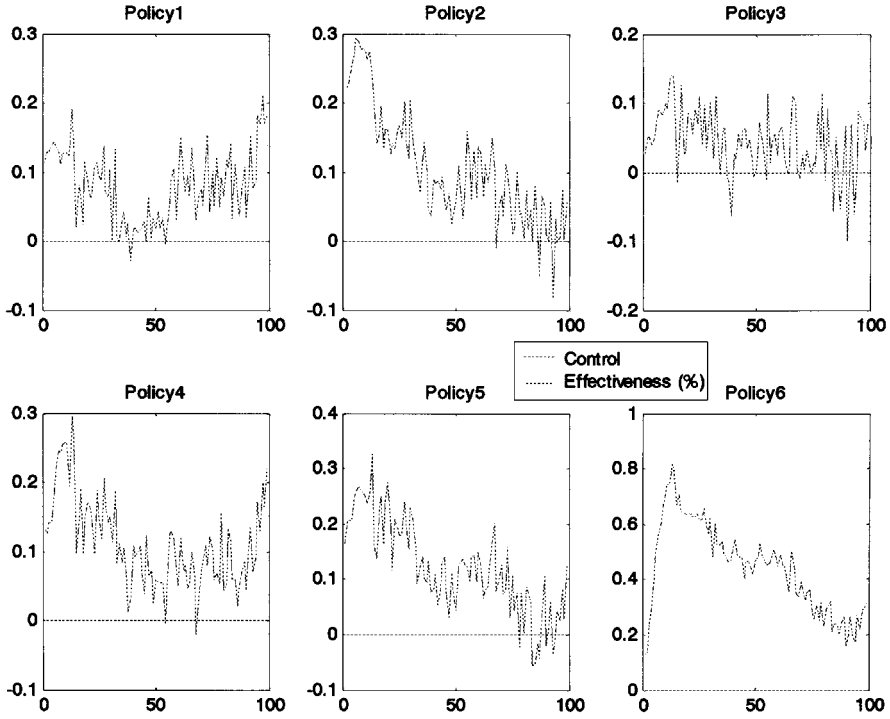
Graph 2. Gross rates of exits.



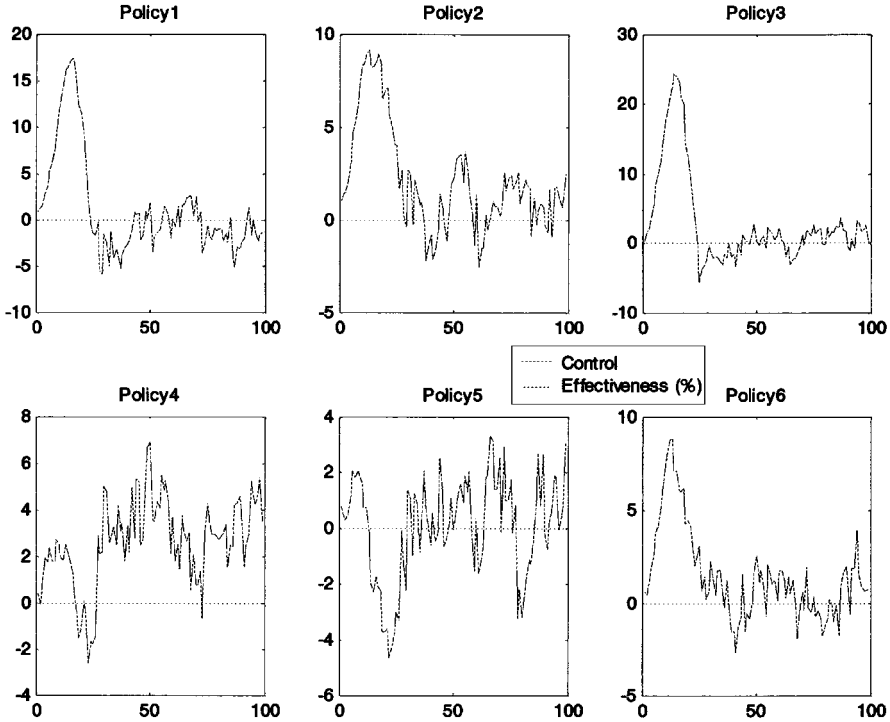
Graph 3. Net rates of entries.



Graph 4. Rates of rotation.



Graph 5. Employment.



Graph 6. Productivity of labour (incumbents).

the entries increase exogenously, a sustained increase in productivity takes place due to the maintenance of the intense rotation process. Policy 2, when making the entries more sensitive to the conditions of profitability of the market, a strong increase in productivity is produced in the first phases of development of the market when the margins are still high and their effects decrease gradually as the market matures. The measures directed to favor the firm growth, policy 6, produce a quick increase in productivity because they elevate the average size of the companies although the productivity converges in the long term with the control situation.

The process of firm mobility fomented by these four policies makes that the demand absorbs a bigger production due to the reduction of prices allowed by the improvement of efficiency as a consequence of the increase of the average size and, therefore, of the use of the scale economies. The result is that employment remains stable although productivity is higher.

Financial help to companies in crisis (policy 4) has a more positive effect on employment in the long term. On the other hand, although it reduces the rotation, it has positive effects on the productivity when giving more time to the companies to adapt to the market. This result is especially interesting as it indicates that these measures can be valid to reduce the perverse effect that produces firm mobility when, instead of substituting the less efficient companies, it produces the substitution of young companies established in the market but with a good potential of development for other new ones with the same problems.

The reduction in trade protection (policy 5) produces a reduction of employment in the short term but is partially compensated in the long term by an increase in the efficiency of the national companies and an increase in demand derived from the reduction of the prices.

In Table II the main obtained results are schematically presented.

5. Conclusions

The long term effects of the analyzed policies on the total population of companies are quite small. This seems to indicate that the number of companies in the market is determined to a great extent by technological and demand aspects. The measures directed to favor an increase in the number of companies are strongly limited by the pressure that the new companies place on the established ones. However, they impact on the intensity of a firm's mobility. While the policies that reduce the entry barriers increase the rotation in the markets, the policies that favor the survival of the companies reduce it. The increase of imports also diminishes the rotation when reducing the margins, which could be a partial diffusion of the firm's mobility abroad.

TABLE II
Main results of the simulations

Policies	Gross entries	Gross exits	Net entries	Rotation	Employment	Productivity
Policy 1	++	++	++ (with overshooting)	+++	++ EARLY = LATER	++
Policy 2	=	=	+ (with overshotting	+	++ EARLY = LATER	++ FALLING
Policy 3	++	++	++ (with overshooting)	+++	++ EARLY = LATER	+
Policy 4	--	––	=	--	–– EARLY ++ LATER	++
Policy 5	=	=	=	=	–– EARLY ++ LATER	++ FALLING
Policy 6	=	=	=	--	++ EARLY = LATER	+++ FALLING

(+) positive, (++) very positive, (+++) extremely positive, (–) negative, (––) very negative.

Although all the studied policies favor an increase in productivity, they make it in a different way depending on whether they favor the rotation or not. They first improve the productivity by means of the selection process that supposes the exit of less efficient companies, generally the younger and smaller ones. The others, on the contrary, improve the productivity favoring the growth and adaptation of the less competitive companies.

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