

New Firm Formation in Italian Industry: 1985–89

Enrico Santarelli
Alessandro Sterlacchini

ABSTRACT. This paper deals with the process of new firm formation in Italian manufacturing industry during the second half of the 1980s. For this purpose we use the data base made available by the National Institute of Social Security, which provides information on both newly and already established firms with at least one employee. Two birth rates are computed and analysed for the relevant industries: the first one is the ratio between new enterprises and already established firms and the second is the share of new enterprises on industry employees. We show that Italian industries are characterized by marked differences in terms of birth rates but also that the ranking of industries is different by using the first or the second index of new firm formation. Looking at the determinants of this process, we found that industry growth affects positively both birth rates; small firm presence is effective only when the second index of new firm formation is used while inter-industry differences in profitability are always not significant. These results seem peculiar to the Italian case in which the size of newly established firms is very small in comparison with the size of previously existing firms.

I. Introduction

The strong presence of small firms in Italian industry has fostered, during the last two decades, several studies concerned with the role of entre-

preneurship and new firm formation in the economic growth of different regions, provinces, and local districts. Conversely, less attention has been paid to the sectoral characteristics and determinants of new firm formation. The aim of this paper is to investigate these aspects by following the main approaches to industrial entry.

For this purpose we use the data base recently made available by the Istituto Nazionale della Previdenza Sociale (National Institute of Social Security) that, for the second half of the 1980s, provides information on both newly and already established firms with at least one employee. Two birth rates are computed and analysed for twenty-two industries: the first one is the ratio between new enterprises and already established firms and the second is the share of new enterprises on industry employees.

We show that Italian industries are characterized by marked differences in terms of birth rates but also that the sectoral ranking is different by using the first or the second index of new firm formation. With regard to the determinants of this process, we found that industry growth has a positive effect on the birth rate; small firms presence (as a proxy of barriers to entry and market concentration) is effective only when the second index is used while inter-industry differences in labour earnings and profitability do not add very much to the analysis. These results seem peculiar to the Italian case in which entry rates are often very high even when the average size of newly established firms is very small as compared with the average size of existing firms. This suggests that some Italian industries are characterized by a dualistic market structure in which a small core of oligopolistic firms coexists with a large fringe of small firms subject to a strong competitive pressure.

Final version received September 3, 1993

Enrico Santarelli
Università di Bologna
Dipartimento di Scienze Economiche
Strada Maggiore, 45
I-40125 Bologna
Italy

and

Alessandro Sterlacchini
Università di Ancona
Dipartimento di Economia
Via Birarelli, 11
I-60121 Ancona
Italy

II. The birth of new enterprises in Italian industry: 1985–89

During the 1980s many empirical studies on the processes of industry entry and new firm formation have been carried out.¹ In the previous decades the most important obstacle for testing the main approaches concerned with entry, exit and survival of firms was the lack of reliable and systematic data collection.

In Italy a new source of data is currently available that allows one to compute the birth and the death rate of industrial firms with a high degree of reliability. This source is found in the files of Istituto Nazionale della Previdenza Sociale (INPS) that, for the period 1985–89, contain information about all Italian firms with a minimum payroll of one person a part from owner manager(s).

Such firms are compelled to transfer to INPS national security payments for their employees: therefore, when a new firm is inserted in INPS files a “birth” can be detected while a firm’s cancellation identifies a “death” (this happens when a firm ultimately stops paying national security fees).

INPS data on the birth and death of firms are more reliable than those published by the Chambers of Commerce of each province in which a new firm’s registration does not necessarily imply that a new firm actually starts its activity and, often, the cancellation of firms from such files is done many months after their closure. On the other hand, INPS data are available yearly while, in Italy, the Census of Production is carried out once every decade.

Besides, the INPS data base also contains other important information — such as wages, the number of employees in both newly and already established firms, and the annual change of employment (job creation minus job losses) — that is lacking in other statistical sources. Yet some shortcomings are still present in these data. The most important is that they do not account for firms without employees so that a large share of self-employment is completely neglected. Secondly, some changes in the firm name or in the ownership structure as well as some processes of diversification, merger and acquisition can be wrongly registered as births and deaths of firms. Thirdly, INPS data are less reliable in regional rather than sectoral studies since the unit considered is *the*

firm whose plants, however, can be located in regions or provinces other than that of the firm’s office that is responsible for national security payments.

INPS data refer to the whole economy and are broken down by sector (two digit SIC) and by employment size class of firms. Our study is concerned with twenty manufacturing industries plus two “mining and first transformation” industries.

Before analysing the industry rates of birth and death for Italian firms it is worth considering the figures in absolute values. Table I shows that in Italy, from 1985 to 1989, more than 150,000 industrial firms started their activity and about 127,000 firms closed down or exited. Thus, during the period considered, firms’ turnover in Italian industry has been very large and has determined a significant increase in the number of firms (more than 23,000 units).

Traditional Italian industries characterized by a strong presence of small firms (such as metal products, footwear & clothing, wood & furniture, and food) are the most effective in terms of new firm formation but they also show the largest shares of closures. Consequently, looking at the net change in the stock of firms, the contribution of some non-traditional industries (such as electrical & electronic engineering, office machinery & computers, and instruments) becomes important too.

By using INPS data we compute a first birth rate as the number of new firms formed in industry *i* during each year divided by the number of firms in existence in the same industry (mean of the values at the beginning and the end of the year).² Death rate and net change rate in the number of firms are computed in the same fashion.

Many empirical studies (see, among others, Highfield-Smiley, 1987; Acs and Audretsch, 1989b) have employed this kind of birth rate which emphasizes the relationship between new firm formation and an important dimension of market structure, that is the number of existing competitors. At the same time, however, this index neglects another structural dimension of the market, since already established firms are not distinguished in terms of pre-entry market or employment shares. This implies that, for instance, even in presence of a few firms starting their business,

TABLE I
Births, deaths and net change in the number of firms during 1985–89
(absolute and percentage values)

	Births		Deaths		Net change a.v.
	a.v.	p.v.	a.v.	p.v.	
Mining and transformation of metals	23	0.02	37	0.03	-14
Metal working	1170	0.78	1042	0.82	128
Mining and transformation of other minerals	927	0.62	1245	0.98	-318
Other mineral working	5285	3.52	5648	4.45	-363
Chemicals	1572	1.05	1527	1.20	45
Man-made fibres	24	0.02	25	0.02	-1
Fabricated metal products	27710	18.45	21954	17.29	5756
Mechanical engineering	7245	4.82	6593	5.19	652
Office machinery & computers	967	0.64	204	0.16	763
Electrical & electronic engineering	10358	6.90	7137	5.62	3221
Motor vehicles & parts	451	0.30	378	0.30	73
Other means of transport	688	0.46	529	0.42	159
Instruments	3151	2.10	2046	1.61	1105
Food	12467	8.30	11816	9.31	651
Sugar, beverages & tobacco	2049	1.36	1725	1.36	324
Textiles	10358	6.90	9418	7.42	940
Leather products	3746	2.49	3625	2.85	121
Footwear & clothing	26838	17.87	21645	17.05	5193
Wood & furniture	13457	8.96	14522	11.44	-1065
Paper & printing	7006	4.67	5100	4.02	1906
Rubber & plastics	4711	3.14	3828	3.01	883
Other manufacturing industries	9967	6.64	6935	5.46	3032
All industry	150170	100.00	126979	100.00	23191

Source: Our computations from INPS data

industries with a small number of large firms in existence will show a relatively high rate of entry.

In this connection, an alternative birth rate is the share of newly established firms on industry employees. The use of this second ratio is not without implications. First, it can be interpreted as the previous index of birth divided by the average employment size of already established firms. In effect:

$$\frac{\text{births}}{\text{employees}} = \frac{\text{births}}{\text{firms}} : \frac{\text{employees}}{\text{firms}}$$

As a consequence, this second index — *at a parity of the ratio between births and existing firms* — will be higher in industries characterized by a lower average size of already established firms.

Secondly, whilst the first index can be viewed as the ratio between the founders of new firms and existing entrepreneurs, the second can be read as the share of new entrepreneurs on those individ-

uals who, being already employed in a given industry, are more likely to become entrepreneurs. In fact, many empirical studies have shown³ that, in Italy, most new entrepreneurs previously had a dependent job in the same industry: their knowledge of production processes and market features facilitated their passage to independent work⁴. The use of this second birth rate is particularly appropriate when the process of new firm formation in a given industry is depicted as a decision process that depends upon the expected entrepreneurial income as compared to the earnings from employment (see Creedy and Johnson (1983) and the discussion developed in section IV of the present paper).

There are of course many other individuals who may start a new business (entrepreneurs who diversify their activity, entrepreneurs who move from one industry to another, individuals in their first job experience) but, taken together, they

account for a minority of the founders of new firms. It must be noted that the first birth index is likely to better emphasize the role of this second group of individuals in new business starts.

Table II shows, for the whole of the Italian industry, the rate of new firm formation over time. From 1985 to 1989 annual birth rates — no matter how they are computed — are always decreasing apart from a recovery in 1987. Since even death rates fall sharply in 1987, both net change rates show a peak in 1987 but suddenly decrease in 1988 and become negative in 1989. Before 1985 the process of new firm formation in Italian industry had been particularly strong: as Contini (1988) showed for the late 1970s and the early 1980s, annual birth rates were over 11 per cent. Conversely, this proliferation of firms has been less evident during the second half of the 1980s.

The sectoral analysis (cf. Table III) shows that by using the first birth rate (the ratio between births and existing firms) there are marked differences among industries. The prevailing industries are office machinery & computers, other manufacturing industries, footwear & clothing, electrical & electronic engineering, and instruments. The variance of the birth rates across industries is much higher than that of the death rates: consequently, industries with the largest birth rates are also very strong in terms of net change rates.

When the second index of new firm formation is applied (the ratio between births and employees of the existing enterprises) the picture is different in many respects. The variance of the birth rates is not much higher than that of the death rates.

Moreover, some traditional industries (such as leather products, wood & furniture, and fabricated metal products) gain the top positions in terms of birth rate. Simultaneously, their death rates are also very high so that the industrial ranking in terms of net change rate is not extremely different from the previous one. At the end, the two procedures for measuring birth and death rates generate similar results only if the net change rate in the number of firms is considered⁵. With respect to the rate of new firm formation there are instead remarkable disparities across Italian industries according to the procedure that is adopted.

III. The size of newly and already established firms

Since the late 1970s many empirical studies have found that, in the more industrialized countries, small firms⁶ account for the largest share of new business starts and are particularly effective in terms of job creation. As a consequence, the process of new firm formation cannot be analysed without making explicit reference to the size of newly established firms as compared with the size of existing firms.

Given the leading role of small firms, the birth of new enterprises is often examined in terms of "new firm formation" rather than "entry". The concept of entry, as in the Bain-Sylos-Modigliani tradition, implies that a new firm enters with a size sufficient to change the existing equilibrium of the market. New firm formation, instead, is a wider concept because it also includes the case in which the size of new firms is so small that oligoplastic

TABLE II
Birth, death and net change rates — all industrial firms

	Births, deaths and net change/Firms			Births, deaths and net change/Employees		
	Birth rate	Death rate	Net change rate	Birth rate	Death rate	Net change rate
1985	11.52	8.88	2.64	0.80	0.62	0.18
1986	8.96	7.78	1.18	0.64	0.55	0.08
1987	9.65	6.56	3.09	0.70	0.48	0.22
1988	9.04	7.99	1.05	0.67	0.59	0.08
1989	6.89	7.56	-0.67	0.51	0.57	-0.06

Source: Our computations from INPS data.

TABLE III
Birth, death and net change rates by industry (average annual rates 1985–89)

	Births, deaths and net change/Firms			Births, deaths and net change/Employees		
	Birth rate	Death rate	Net change rate	Birth rate	Death rate	Net change rate
Mining and transformation of metals	6.10	9.81	-3.71	0.14	0.23	-0.09
Metal working	6.75	6.01	0.75	0.13	0.12	0.01
Mining and transformation of other minerals	5.53	7.44	-1.90	0.55	0.74	-0.19
Other mineral working	6.30	6.73	-0.43	0.44	0.47	-0.03
Chemicals	6.59	6.40	0.19	0.13	0.12	0.00
Man-made fibres	8.47	8.84	-0.37	0.06	0.06	0.00
Fabricated metal products	8.68	6.86	1.82	0.88	0.70	0.18
Mechanical engineering	7.54	6.86	0.69	0.42	0.38	0.04
Office machinery & computers	23.38	4.61	18.76	0.33	0.07	0.26
Electrical & electronic engineering	10.65	7.32	3.34	0.53	0.36	0.16
Motor vehicles & parts	7.97	6.67	1.29	0.04	0.04	0.01
Other means of transport	9.35	7.17	2.18	0.13	0.10	0.03
Instruments	11.45	7.41	4.04	1.17	0.76	0.41
Food	8.30	7.85	0.45	1.15	1.09	0.06
Sugar, beverages & tobacco	8.28	6.96	1.32	0.39	0.33	0.06
Textiles	9.51	8.63	0.88	0.60	0.55	0.05
Leather products	9.93	9.60	0.33	1.06	1.03	0.03
Footwear & clothing	11.96	9.61	2.35	1.00	0.80	0.19
Wood & furniture	7.37	7.95	-0.58	1.10	1.19	-0.09
Paper & printing	8.61	6.25	2.36	0.65	0.48	0.18
Rubber & plastics	8.69	7.04	1.65	0.55	0.45	0.10
Other manufacturing industries	14.89	10.20	4.69	1.72	1.18	0.53
All industry	9.21	7.77	1.44	0.66	0.56	0.10
Variance	13.772	1.861	17.000	0.193	0.137	0.025

Source: Our computations from INPS data.

firms (incumbents) do not feel threatened by their entry while small firms already established are not able to react or retaliate. In other words, only the fringe of small firms is subject to the competitive pressure of potential and actual small entrants.

A high rate of small firm entry can be related, for instance, to the phenomenon of division of labour and specialization of firms within the same industry or to the fact that small firms tend to enter in particular market niches that larger firms do not find attractive or convenient. As many studies have shown, such an explanation seems particularly suitable for the Italian case (see, among others, Brusco, 1982; Contini and Revelli, 1986).

Table IV provides information on the distribution of the existing firms by employment size class in 1985 and 1989. Starting with the numbers of

firms, it emerges that more than 89 per cent of Italian industrial firms had less than 20 employees both in 1985 and 1989. Even in the other size classes there are not significant changes through time. With respect to the number of employees, it must be noted that firms having less than 20 and between 20 and 49 employees have increased their share on total employment during the period considered whereas the other classes (in particular that including firms with more than 1000 employees) have shown a substantial decline. The fall in the average size of Italian industrial firms (from 14.2 to 13.5 employees) can then be attributed to the behavior of the largest firms.

The net job losses determined by the contraction of the largest firms, however, have been more than compensated by the employment growth experienced by firms with fewer than 50

TABLE IV
Number of firms and employees by size class — all industry

Employment size classes	1—19	20—49	50—99	100—199	200—499	500—999	1000 and more	Total
1985								
Number of firms	285070	21710	6660	3059	1546	404	274	316723
Share	89.44	6.81	2.09	0.96	0.49	0.13	0.09	100.00
Cumulative share	89.44	96.25	98.34	99.30	99.79	99.91	100.00	
1989								
Number of firms	301148	23919	6607	3017	1553	367	255	336866
Share	89.40	7.10	1.96	0.90	0.46	0.11	0.08	100.00
Cumulative share	89.40	96.50	98.46	99.35	99.82	99.92	100.00	
1985								
Number of employees	1362882	646256	459519	420496	468034	276807	893377	4527371
Share	30.10	14.27	10.15	9.29	10.34	6.11	19.73	100.00
Cumulative share	30.10	44.38	54.53	63.82	74.15	80.27	100.00	
1989								
Number of employees	1476480	703814	455330	414711	466769	249374	775503	4541981
Share	32.51	15.50	10.02	9.13	10.28	5.49	17.07	100.00
Cumulative share	32.51	48.00	58.03	67.16	77.44	82.93	100.00	
Average firm size in 1985	4.78	29.77	69.00	137.46	302.74	685.17	3260.50	14.20
Average firm size in 1989	4.90	29.42	68.92	137.46	300.56	679.49	3041.19	13.48

Source: Our computations from INPS data.

employees. INPS data allow one to break down such employment growth into two major factors: the net job creation due to the processes of birth and death of firms and the net job creation generated by already established firms. In a previous work (Santarelli-Sterlacchini, 1993) we have shown that the second one is by far the most important factor in explaining the rising number of employees in Italian industry during 1985–89. This performance can be ascribed in particular to the employment growth experienced by already established firms having less than 50 employees.

Moving now to the size of firms that were born or exited during 1985–89, Table V shows that more than 96 per cent of the births and 95 per cent of the deaths refer to firms with fewer than 20 employees. This result supports the hypothesis that small firms in particular — it must be noted that firms having less than 6 employees account for almost 80 per cent of total births and more than 75 per cent of total closures — are, at the

same time, the carriers and the victims of market competition and selection.

Finally, Table VI points out that, apart from three exceptions (metal working, man-made fibres and motor vehicles), Italian industries do not exhibit significant deviation from the average employment size of new enterprises. Conversely, even if the above exceptions are ignored, there is a high variance among industries with respect to the

TABLE V
Births and deaths by employment size class — absolute values and cumulative shares (1985–89) — all industry

	Births		Deaths	
1–5	113824	79.8	95922	75.5
1–9	133509	88.9	108677	85.6
1–19	145385	96.8	120770	95.1
Total	150166	100.0	126979	100.0

Source: Our computations from INPS data

TABLE VI
Average employment size of newly and already established firms
(average values 1985–89)

	Already est. firms (a)	Newly est. firms (b)	Relative size (b/a)
Mining and transformation of metals	41.22	3.72	0.09
Metal working	48.87	28.38	0.58
Mining and transformation of other minerals	9.95	4.73	0.48
Other mineral working	14.18	5.32	0.38
Chemicals	52.27	10.27	0.20
Man-made fibres	138.24	81.79	0.59
Fabricated metal products	9.86	4.35	0.44
Mechanical engineering	17.99	5.30	0.29
Office machinery & computers	67.18	7.40	0.11
Electrical & electronic engineering	19.79	5.00	0.25
Motor vehicles & parts	177.25	35.88	0.20
Other means of transport	69.19	6.88	0.10
Instruments	9.38	2.88	0.30
Food	7.20	3.24	0.45
Sugar, beverages & tobacco	20.74	6.14	0.30
Textiles	15.45	5.62	0.36
Leather products	9.25	4.85	0.52
Footwear & clothing	11.73	6.13	0.52
Wood & furniture	6.66	3.24	0.49
Paper & printing	12.99	4.80	0.37
Rubber & plastics	15.49	4.93	0.32
Other manufacturing industries	8.50	5.85	0.69
All industry	13.74	5.23	0.38
Variance	1882.83	300.09	0.027

Source: Our computations from INPS data.

average size of already established firms. Moreover, the third column of Table VI shows the ratio between the average employment size of newly established firms and that of those already established. A low (high) relative size of entrants can be used to detect, although roughly, the presence of high (low) barriers to entry.

In many traditional consumer good industries the relative size of newly established firms is in effect largely above the average ratio (0.38). Chemicals and the group of industries producing capital or durable consumer goods show instead a lower relative size of entrants. As we have shown in the previous section (cf. in particular Table III), by using the standard birth rate even some of these latter industries, in which significant barriers to entry seem effective, have experienced a very intensive process of new firm formation during 1985–89 (this is especially the case of office

machinery & computers, electrical & electronic engineering, and instruments). This suggests that, in Italy, the process of industrial entry — *as it is usually measured* — is not confined to industries with low barriers to entry and low market concentration. For those industries characterized by both high rates of new firm formation and high barriers to entry, a reasonable explanation can be given by the presence of a dualistic market structure composed of a relatively stable share of a few large and medium sized firms and a large fringe of small firms subject to an intensive turnover (cf. Contini and Revelli, 1986).⁷

IV. Sectoral determinants of new firm formation

In this section we introduce an empirical model for estimating the main factors determining the

birth of new enterprises in Italian industry. Our starting assumption is that the process of new firm formation is fostered by the growth of demand for different products. This contrasts with the idea that to start a new business can be a way to "escape from unemployment". We do not follow this *unemployment-push* hypothesis (cf. Storey and Jones, 1987; Evans and Leighton, 1990) since, on the one hand, our data leave out a significant share of self-employment (see section II) and, on the other, this hypothesis can be better tested by regional rather than sectoral analysis.

The *demand-pull* hypothesis must be further specified by considering market structure and the behaviour of both actual entrepreneurs and would-by entrepreneurs. In this sense what is needed is an "eclectic" model, since the main theoretical approaches to industrial entry, taken one by one, do not contain an exhaustive framework.

In a perfect competition model potential entrants are basically attracted by above normal profits. Yet, such a hypothesis holds only if barriers to entry, sunk costs and mobility barriers for production factors are negligible. Moreover, the perfect competition model leaves out entirely the role of asymmetric information, the endowments of entrepreneurial capability and the impact of search costs.

With respect to the first shortcoming, the "structure-conduct-performance" approach to industrial entry introduces into the model two elements limiting the working of perfect competition: barriers to entry and market concentration.

Mansfield (1962) estimated a "carrot-stick" model of entry for some U.S. industries: the two determinants of entry rates were in effect the rate of return (with a positive coefficient) and the investment needed for establishing a firm of a minimum efficient size (with a negative coefficient). The first explanatory variable, being affected by the pre-entry performance of existing firms, is only a rough proxy of expected profits. With respect to the second variable, Orr (1974) introduced, along with the minimum efficient size, other indicators that help to better identify the role of market-structure, such as the level of concentration and the intensity of R&D and advertising expenditures.

Further theoretical considerations refer to the

seminal contribution of Frank Knight (1921) concerned with the uncertain nature of entrepreneurial income. This idea has been formalized by Kihlstrom and Laffont (1979). In their model, individuals can offer their labour as workers or, alternatively, use such capability to start a new business. This choice will depend upon the expected utility of wage (riskless) as compared with the expected utility of profit (risky): ultimately, individuals who are less risk averse tend to become entrepreneurs.⁸ An empirical analysis of the relationship between the rate of new firm formation and alternative income perspectives has been carried out by Creedy and Johnson (1983) in UK manufacturing: their regression results show that labour earnings have a negative impact upon industry birth rates (the ratios between new firms and employees) while profits have a positive coefficient.

Finally, in a *demand-pull* model inter-industry differences in terms of rate of new firm formation must be related to an index of industry growth: in this connection, many cross-industry studies have inserted, as a further explanatory variable, the growth of sales or value added (see Gorecki, 1975; Highfield and Smiley, 1987; Acs and Audretsch, 1989a, 1989b and 1990).

According to the above considerations, we introduce a model in which the birth rate of firms in industry i is associated to four independent variables: the rate of growth, the structure, the profitability and the labour earnings of the same industry.

The model to be estimated is then:

$$\begin{aligned} \text{BIR}_i &= f(\text{EMPEF}_i, \text{SFP}_i, \text{PROF}_i, \text{WAGE}_i) \\ &\text{with } f_1, f_2, f_3 > 0 \text{ e } f_4 < 0 \end{aligned} \quad (1)$$

With respect to the dependent variable the two indexes discussed in section II are alternatively employed — i.e., the ratio between new firms formed during a given year in industry i and the firms in existence at the beginning of the year (BIR/FIRM) and the number of new firms divided by the number of employees (BIR/EMPL). Both birth indexes are then expressed in terms of rate of change (BIR_i). This applies also to the variable EMPEF_i which is a proxy for industry growth (its expected coefficient is positive) and denotes the annual rate of change of employment in industry i

due exclusively to the behaviour of existing firms: net job creations jointly generated by newly established firms and firms that exited during the year are then neglected.

The employment of $EMPEF_i$ — as the “industry growth” variable — can be justified according to the following arguments. Firstly, this kind of variable is the most easily observed by would-be entrepreneurs since most of them have a dependent job in the same industry. Secondly, for the large majority of Italian industries, most new firms are very small and it is thus reasonable to assume that the potential founders of new firms will be particularly affected by the performance of existing small firms. As a consequence, an increasing number of employees in small firms⁹ can be detected as a clear signal of industry growth and can foster the establishment of new small firms within the same industry.

The “industry structure” variable is SFP_i which denotes small firm presence measured as the share of sales in industry i accounted for by firms having between 20 and 49 employees.¹⁰ Even this variable has a positive expected coefficient, since the higher the small firm presence in a given industry the lower the level of concentration¹¹ and the extent of barriers to entry. Moreover, a positive coefficient of SFP_i implies that the highest rates of new firm formation are likely to occur in industries already dominated by small firms, that is by the most effective *incubators* of new small enterprises (cf. note 4).

The “industry profitability” variable ($PROF_i$) has a positive expected coefficient and has been computed as the value added minus labour cost divided by the amount of sales.¹² $PROF_i$ refers only to firms having between 10 and 19 employees belonging to industry i (such data are taken from the sample survey mentioned in note 10) and is inserted as a standardized index of profitability, that is as $(PROF_i - \overline{PROF})/\sigma_p$, where $(\overline{PROF})$ is the profitability index for all Italian industry (weighted average of $PROF_i$) and σ_p is the standard deviation of profitability among industries.

Finally, $WAGE_i$ stands for the average wages and salaries (per employee) in industry i and this variable (taken from INPS data base) is also inserted as a standardized index of labour earnings — i.e., $(WAGE_i - \overline{WAGE})/\sigma_w$.

The estimated equation is then the following:

$$\begin{aligned} BIR_{it} = & \alpha + \beta EMPEF_{i,t-1} + \gamma SFP_{i,t-1} \\ & + \delta PROF_{i,t-1} - \lambda WAGE_{i,t-1} + u_{it} \quad (2) \end{aligned}$$

where u_{it} is the error term, $i = 1, 2, \dots, 21$ stands for the industry (since SFP_i and $PROF_i$ are not available for the “mining and transformation of metals” industry we lack one observation) and t is the relevant year. It must be noted that all the independent variables are inserted with one year lag with respect to the dependent variable: in this way new entrepreneurs are not assumed to react immediately to industry changes and, besides, the explanatory variables do not incorporate the performances of the new firms formed at time t .

By equation (2) it was then possible to estimate four annual cross-industry regressions, from 1986 to 1989 (birth rates in 1985 had to be excluded since the data for the independent variables in 1984 were not available). However, to obtain more efficient estimates, we tested the possibility of working with 84 observations by pooling cross-section and time series data. The hypothesis that both slope coefficients and the intercept of equation (2) are constant through time has been rejected by the F test. Conversely, the same test allowed us to employ a *least-squares-dummy-variables* (LSDV) model in which only slope coefficients are assumed to be constant while the intercept can be different through time (cf. Judge et al., 1980).

The LSDV model will be thus:

$$\begin{aligned} BIR_{it} = & \alpha + \alpha_1 D_{86} + \alpha_2 D_{87} \\ & + \alpha_3 D_{88} + \beta EMPEF_{i,t-1} + \gamma SFP_{i,t-1} \\ & + \delta PROF_{i,t-1} - \lambda WAGE_{i,t-1} + u_{it} \quad (3) \end{aligned}$$

where D_{86} , D_{87} and D_{88} are dummy variables that respectively are equal to one in 1986, 1987 and 1988, and zero otherwise.

Table VII summarizes the results of the pooled regressions carried out by using respectively the BIR/FIRM and BIR/EMPL index of new firm formation as the dependent variable. There are at least two reasons such findings should be taken as provisional. The first one refers to the low level of disaggregation of Italian industry allowed by INPS data, and the second is that, at this stage, we have been able to employ only a narrow set of proxies for the explanatory variables.

TABLE VII
Pooled cross-section, time series regressions*

DEP. VAR.	CONST.	D ₈₆	D ₈₇	D ₈₈	EMPEF	SFP	PROF	WAGE	R ²	F
BIR/FIRM	8.048 (7.83)	3.513 (2.98)	4.942 (4.06)	2.628 (2.29)	1.384 (6.14)	-9.353 (3.29)	0.410 (1.05)		0.36	8.89
	5.773 (7.25)	3.466 (3.15)	4.848 (4.27)	2.555 (2.39)	1.289 (6.16)		-0.126 (0.33)	1.726 (4.87)	0.45	12.09
BIR/EMPL	0.033 (0.47)	0.289 (3.54)	0.409 (4.86)	0.240 (3.02)	0.109 (6.99)	1.891 (9.59)	-0.136 (4.99)		0.68	29.78
	0.394 (5.49)	0.296 (2.98)	0.439 (4.30)	0.254 (2.64)	0.127 (6.75)		0.077 (2.21)	-0.196 (6.13)	0.52	16.06

* 21 industry observations for 1986, 1987, 1988 and 1989. All the independent variables are inserted with a one year lag. *t*-statistics are in brackets.

In the first place, it must be pointed out that the results arising from the two sets of regressions are different, and sometimes opposite. Secondly, both the high coefficient of simple correlation (-0.71 , that is higher than the obtained coefficients of determination) and Theil's multicollinearity effect suggest the presence of a partial multicollinearity between SFP and WAGE. Since industries with the strongest small firm presence are also characterized by lower labour earnings these two independent variables are not inserted together in the same regression in order to avoid errors in the estimates of their coefficients.

When the dependent variable is the ratio between newly established firms and existing firms only the coefficient of the "industry growth" variable (EMPEF) is both significant and has the "right" positive sign. SFP, instead, gets a negative coefficient suggesting that the formation of new firms is far from being confined to industries with a strong small firm presence. Even the coefficient of the labour earnings variable has a sign opposite to the expected one while industry profitability is not significant.

The picture changes sharply when the dependent variable is the share of newly established firms on industry employees. The positive sign of EMPEF is coupled with a positive and highly significant coefficient of the SFP variable: this means that industries with the higher rate of em-

ployment growth (generated by existing firms) and, above all, industries with the stronger presence of small firms are the most effective in terms of new formation. Labour earnings, according to the starting hypothesis, have a negative impact on the birth of new enterprises while the coefficient of the profitability variable gets the "wrong" sign. Finally, it should be noted that all pooled regressions carried out with BIR/EMPL as the dependent variable are more significant than the previous ones.

V. Final remarks

During the period 1985-89, the process of new firm formation in Italian industry has been particularly strong. High entry rates, however, have been often associated with high rates of exit so that, ultimately, only in few industries has the number of operating firms remarkably increased. For the large majority of industries new business starts were mostly due to small firms with fewer than 6 employees.

However, not only the industries already dominated by small firms experienced high rates of new firm formation. In effect, our regression results show that, in the case of Italian industry, the determinants of new firm formation are only partially consistent with those obtained by similar studies carried out for other industrialized coun-

tries. The rate of industry growth always fosters new business starts but the positive influence of small firm presence occurs only when the process of new firm formation is related to the number of employees. Labour earnings do not add very much to the analysis (they actually show a strong negative correlation with the presence of small firms) while inter-industry differences in profitability are either not significant or obtain a coefficient with a sign different from that expected.

In other words, when the birth rate is measured as the share of new enterprises on those already established, the structural variables that typically support high entry rates show an opposite effect. This could be related to the fact that some Italian industries are characterized by a dualistic market structure in which a few large firms coexist with many firms that are very small. Consequently, the process of new firm formation — rather than related to the search for above normal profits — is likely to be brought about by an increasing division of labour and specialization within the industries that show the most growth.

Acknowledgement

We thank for their comments Bruno Contini, Paolo Pettenati, Luca Papi, Riccardo Lucchetti, and the participants in the conference "Birth and Start-up of Small Firms" (held in Milano, Bocconi University, June 18–19, 1992) at which this paper was presented.

Notes

¹ See the contributions collected in the volume edited by Casson (1990) and the various issues of *Small Business Economics* published since 1989.

² We did not include in our computations firms that INPS classified as "suspended" — i.e., firms which had temporarily stopped paying national security fees for a few months or during the whole year.

³ Cf. Brusco (1982), Gallo-Lupo Berghini (1985) and Vivarelli (1991).

⁴ Johnson and Cathcart (1979) found that the propensity to be a new firm founder is higher for individuals previously employed in small firms. Small firms' employees get a better preparation to start a new business because of the wide range of tasks accomplished during their job experience, the close relationship with the manager(s) and the knowledge of the types of market that could be served by a new business. This phenomenon is supported by the results of the Italian studies quoted in the previous note.

⁵ The coefficient of simple correlation between the two rates of net change is 0.58, statistically significant at the 95% level of confidence.

⁶ In making international comparisons one must be aware of the different definitions of small firms. In the U.S., for instance, small firms are often defined as those with fewer than 500 employees. In Europe the upper threshold for small firms moves from 50 to 100 employees. In the case of Italy the upper threshold should be fixed to 50 employees since about 96% of Italian industrial firms do not have more than 49 employees (see Table IV below).

⁷ In addition, Contini and Revelli argue that, in many Italian industries, firms enter with a size lower than the minimum efficient one and this assertion is supported by the fact that, on the average, more than 30 per cent of small firms (with fewer than 20 employees) do not survive for more than three years after their birth.

⁸ It must be pointed out that Kihlstrom and Laffont reduce the notion of "true" uncertainty *à la* Knight to measurable risk.

⁹ In section III we have pointed out that the employment growth in Italian industry, during the period 1985–89, can be largely ascribed to the behaviour of small firms with less than 50 employees.

¹⁰ Official data on the sales of Italian industrial firms with fewer than 20 employees refer only to a sample of such firms so that they are not comparable with the sales of larger firms provided by the National Statistical Office.

¹¹ In 1985 the coefficient of simple correlation between SFP_i and the Herfindal index of concentration was equal to -0.65 and statistically significant at the 95% level of confidence.

¹² Our measure of profitability is biased by the presence of different capital/labour ratios in Italian industries. Unfortunately, a better proxy for industry profitability (such as a measure of profits after depreciation allowances) was not available at this stage.

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