Small Business Dynamics in Europe

Joachim Schwalbach

ABSTRACT. This paper examines how the firm-size distribution has shifted over the last two decades across a broad spectrum of European countries. The evidence suggests that a shift away from large firms and towards small business has taken place, particularly is the southern regions and in the high technology indutries.

I. Introduction

The majority of businesses are small. In the European Community, about 92 percent of all firms had less than 10 employees in 1988 and about 8 percent of all firms employed between 10 and 499 people. We therefore observe a highly skewed distribution of business sizes.

Despite the relatively high share of small business across industries and countries, their economic contribution to the welfare of its society has been and still is very controversial.[1] One strand of literature expects higher survival rates of large business due to cost and technological advantages over its smaller counterparts.[2] The opposite view emerged recently and put forward various facts to document the increasing role of small business in the economy. Caves, Fortunato and Ghemawat (1984) and Geroski (1986) for instance, showed that large firms were persistantly successful to protect their market position but did not grow as the traditional growth literature expected. This suggests that an inherent disadvantage of small business in exploiting scale economies might not exist.[3]

Recent empirical evidence suggests that the economic contribution by small business has been underestimated. Building upon the Schumpeterian hypotheses, Acs and Audretsch (1990) showed that in some industries small business outperformed large business in the process of technological change. Furthermore, it was shown that the contribution of small business to technological change is much higher if informal R&D activities are taken into consideration.[4]

The small versus large business controversy takes place at a period where significant change in industry and business structure can be observed. Within business, the change of organisational structure toward smaller and more flexible, customer oriented units is a direct result of increasing international competition which affects mainly large bureaucratic firms. The prime example is ABB which built hundreds of business units each of which is run as a separate small or medium-sized business. Within industries, outsourcing of functions by large business led to the creation of new business and a closer relationship between large and small business. The downsizing of business is therefore a direct result of technological change and market requirements.

The increasing rate of new business formation and the reorganisation of large business since about the late 1970s should reflect the industry size distribution across countries. One expects that the skewness of the size distribution increases over time in favour of small business. The purpose of this paper is to analyze the dynamics of the size distribution in Europe. It concentrates on the shift of the size distribution of businesses in the European manufacturing sector in the period from 1979 to 1986. The paper is organized as follows: the next section presents some empirical facts about the size distribution in Europe. The empirical model is presented in Section III. The following section describes the data and presents the empirical results. Conclusions are given in Section V.

Final version accepted on November 19, 1992

Professor of Marketing and International Business,
Humboldt University,
Spandauer Str. 1, D-10178 Berlin,
Germany.

Small Business Economics **6**: 21—25, 1994.

II. The size distribution in Europe

Although one expects that the size distribution of businesses (firms and plants) in European industries is skewed to the right, it is important to identify the extent to which this distribution varies across industries and countries. An overview of the size distribution in European industries in twelve EEC member countries in 1988 is provided in Table I. The information was gathered by EUROSTAT and divided into three groups of size classes which represent the common definition of micro (0—9), small/medium-sized (10—499), and large businesses (500+ employees). For most member countries, the information is available on the firm level. Specificities can be found in footnotes of Table I.

Referring first to the number of enterprises in Table I, we see that the share of the very small enterprises varied considerable across twelve countries, while in Portugal and Spain the very small enterprises had shares of about 95 percent. The shares of the small and medium-sized enterprises varied between 5 and 12 percent. Table I therefore reveals that over 99 percent of all European enterprises employ less than 500 people. In Italy, Portugal and Spain this share amounts to about 99.9 percent.[5] In contrast, large enterprises are more frequent in Denmark, Germany, Luxembourg, the Netherlands and the United Kingdom.[6]

Examining Table I based on the employment measure, one observes a similar picture as before. Spain and Italy employed more people in the very small and small/medium-sized businesses relative to other European businesses. Further calculations reveal that the Spanish, Irish and Greek large firms are the smallest compared to any other European country considered. At the other extreme, Italian, British, Danish, French and German firms are among the largest firms in Europe.

The size distribution varied to a great extent across industries in 1988.[7] In the metal industries, about 81 percent of all businesses are very small with the highest percentage in Portugal (91.8 percent) and Spain (90.3 percent), the lowest in Luxembourg (60.6 percent) and Italy/Denmark (63.8 percent each). In food industries, the very small business share was even higher — about 83 percent, but the variation was higher than in the metal industries, since food businesses in Denmark and the U.K. were larger than in any other member country. In the chemical, electrical engineering and textile industries, businesses were large. In the chemical industries, businesses were

TABLE I

Percentage of number of enterprises and of employment by employment size class for all industries in European member countries, 1988

Countries	Measure	Micro 0—9	SME 10—499	Large >500
EURO 12[a]	enterprises	92.04	7.86	0.10
	employees	29.39	40.84	29.77
Belgium[b]	employers	94.88	5.03	0.09
	employees	17.22	47.12	35.66
Denmark[c]	legal units	77.40	22.39	0.21
	employees	17.77	56.24	25.99
Germany	enterprises	87.33	12.51	0.16
	employees	17.30	46.70	36.00
Greece	establishments	n.a.	99.11	0.89
	employees	n.a.	79.98	20.02
Spain	enterprises	94.42	5.53	0.05
	employees	24.09	56.19	19.72
France	enterprises	93.20	6.70	0.10
	employees	28.22	38.94	32.84
Ireland[d]	establishments	38.05	58.10	0.81
	employees	4.99	72.12	14.82
Italy[e]	enterprises	92.04	7.91	0.05
	employees	47.49	33.78	18.73
Luxembourg[f]	enterprises	88.10	11.74	0.16
	employees	22.10	51.51	26.39
The Netherlands[g]	economic units	64.53	34.73	0.74
	employees	8.82	54.76	36.42
Portugal[b]	enterprises	95.07	4.87	0.06
	employees	24.43	52.25	23.32
U.K.[h]	enterprises	93.19	6.69	0.12
	employees	26.21	38.59	35.20

a: NACE 1—8
b: NACE 1—9
c: 1—9 empl., NACE 1—9, employees NACE 2—8
d: 3—9 empl., NACE 1—4 only
e: 1—9 empl.
f: NACE 1—9, 1987
g: 1—9 empl., NACE 1—4 only
h: number of VAT registered units (not always equal to enterprises) plus the self-employed not included in the VAT register, NACE 1—9

Source: Commission of the European Communities, Enterprises in Europe, Second Report, Brussels and Luxembourg, 1992.

in general larger than in other industries, but the very small business share varied between 49 percent in Denmark and 88 percent in Spain. The largest chemical business was in the Netherlands and Germany. In the electrical engineering industries, the very small business share was lowest in Italy (49 percent) and highest in Spain (88 percent). A greater deviation existed in the textile industries, where in Denmark only about 45 percent of all businesses were very small compared to the U.K. and Spain with 85 percent.

Finally, in the retail, wholesale and service industries businesses were traditionally very small with little variation across countries, lowest shares were observed in Denmark, Germany and France whereas the most southern countries reported shares up to 99 percent.

III. The empirical model

To analyze the dynamics of the size distribution, we adopt a model which is frequently used in size distribution studies and can be specified as follows:

$$p_{kt} = \lambda_k p_{kt-1} + u_{kt} \tag{1}$$

where p_{kt} represents the average size share of the k-th size class of the distribution at time t. The parameter $\lambda_k (\lambda_k \leqslant 0)$ measures the growth rate of size class k for the considered time period and is expected to be equal to one if the law of proportionate effect is in operation.[8]

Only a few studies about size distributions of firms and plants are aware of the fact that ordinary least squares estimates of λ_k may be inconsistent if serial correlation in the disturbances of equation (1) exist, which induces dependence between p_{kt-1} and u_{kt} (see Evans, 1987 and Chesher, 1979). These studies suggest a first order autocorrelation of the kind

$$u_{tk} = \rho_k u_{kt-1} + \varepsilon_{kt} \tag{2}$$

To ascertain consistent estimators both λ_k and ρ_k must be estimated. If $\rho_k \neq 0$, then the estimator of λ_k is inconsistent.

Chesher (1979) suggests that under the possibility that the u_{kt} are first order autoregressive, equation (1) may be examined by introducing p_{kt-2} as an additional regressor. Therefore, equation (1) becomes

$$p_{kt} = a_k p_{kt-1} + b_k p_{kt-2} + \eta_{kt} \tag{3}$$

where $a_k = \lambda_k + \rho_k$ and $b_k = -\lambda_k \rho_k$. The estimation of equation (3) may be expected to yield consistent estimators of the parameters a_k and b_k hence deviations of λ_k and ρ_k.

IV. Empirical results

The estimation relies on size distribution data provided by EUROSTAT. The data are related to four-digit NACE manufacturing industries in five EEC member countries (West Germany, France, Italy, the United Kingdom and Denmark). Information was made available for three size classes (20—99, 100—499 and over 499 employees) for the period of 1979 to 1986. The variables in each size class cover the number of firms (plants) and firms' (plants') turnover (for the U.K.). The number of observations for each variable in each size class and industries varies to some extent across countries. Table II shows that the least number of observations was available for West Germany.

TABLE II
Number of industries in size classes and countries

Countries	Size classes		
	20—99	100—499	500 and more employees
West Germany	15	3	9
France	144	144	144
Italy	136	136	136
U.K.	98	65	65
Denmark	82	82	82
Total	475	430	436

Direct estimates of equation (3) were derived. For an economic interpretation of the results, one is primarily interested in the values of λ_k across size classes and countries. Therefore and due to space limitation, Table III summarizes the estimates of λ_k only.[9]

One expects that values of λ_k are very close to one. If one concentrates first on the result for all industries in all countries, the values suggest that small businesses in Europe increased their percentage share over time by 0.345 and 1.33

TABLE III
Empirical results. Estimates of λ_k^*

Countries	Measure	Size class		
		20—99	100—499	>499
All	no. of business	1.00345	0.98160	0.97629
	sales	1.01330	1.00164	0.98535
France	no. of business	1.00254	0.98283	0.99049
	sales	1.00755	1.00736	0.99154
Italy	no. of business	1.00593	0.96667	0.96861
	sales	1.02480	0.98819	0.97737
U.K.	no. of business	1.00560	0.99219	0.95985
	sales	1.01174	1.01229	0.97818
Denmark	no. of business	0.99884	0.98492	0.96898
	sales	0.99474	0.99847	0.99623

* Are statistically significant at the 5 percent level.

percentage points per year in term of number and sales, respectively. Medium-sized and large businesses lost importance by 1.84 and 2.37 percentage points per year, respectively, measured in terms of number of businesses. Based on sales, only large business lost shares by 1.46 percentage points.

If we turn to the individual country results, a similar picture emerges. The result for West Germany should not be reported here since the degrees of freedom are not sufficient to undertake the analysis, as Table II indicates. In France, small firms increased their share by 0.25 and 0.75 percentage points but medium-sized firms did worse than large firms in terms of number of firms and lost their share by 1.72 compared to 0.95 percentage points. The opposite is observed with respect to sales shares which increased by 0.74 for medium-sized firms and dropped by 0.85 percentage points for large firms.

For Italy, the share of small firms grew more than in France and Denmark with respect to both measures, namely by 0.59 and 2.48 percentage points. Consequently, Italian medium-sized and large firms did worse than elsewhere. In the U.K., large plants lost their relative importance against small plants by more than four percentage points per year. And in Denmark, the small firms' share stagnated while more large firms dropped out than medium sized firms.

The message which comes out from the analysis is clear: small business increased and large business decreased steadily in number as well as in its sales contributions. The medium-sized business in between performed particularly bad in Italy.

The analysis would be incomplete if one could not select those industries in which small business did exceptionally better than medium-sized and large businesses. Table IV summarises some of these industries across all four countries. If one goes through the list of industries in Table IV, one detects industries which we can expect to be on the list like the modern technology industries. Others like the cotton industry are not a priori expected to be the domain of successful small business.

TABLE IV
European industries with greatest increase in the role of small business

Industry	λ_k-values		
	Small	Medium business	Large
4320 Cotton industry	1.0364	0.9516	0.9267
4710 Pulp, paper and board	1.0297	0.9730	0.9651
4810 Rubber product	1.0195	0.9525	0.9706
3450 Electronic equipment, radio and TV sets	1.0175	0.9832	0.9407
3400 Electrical engineering	1.0133	0.9828	0.9533
3440 Telecommunications equipment	1.0121	0.9820	n.a.

V. Conclusions

The analysis in this paper showed that small business is particularly important in the southern parts of Europe. During the period of 1979 to 1986, small business in Italy increased its share in number of firms and sales more than in France, the U.K. and Denmark. The growing importance of small business came about due to structural change in large and medium-sized businesses which is most clearly seen in Italy. The analysis furthermore showed that modern technology industries are among the most prosperous small business sectors. Further studies have to reveal whether the observed shift of the size distribution in Europe in favour of small business is caused primarily by the formation of small business or due to the downsizing of large and medium-sized business.

Notes

[1] See Acs and Audretsch (1993, Chapter 1).

[2] See Marx (1867, p. 654); Galbraith (1957) and Chandler (1990).

[3] See Acs, Audretsch and Carlsson (1990), Carlsson (1989) and Aiginger and Tichy (1991).

[4] See Kleinknecht and Reijnen (1991).

[5] Greece would be in this group, too, if more detailed measures were available.

[6] The data on Ireland and Greece are for establishments, therefore no result can be provided to which extend large enterprises are of any relative significance.

[7] Detailed industry statistics are not available for Greece.

[8] The law of proportionate effect requires that the probability that a business grows at a given proportionate rate during any time period be independent of its initial size (see Gibrat, 1931).

[9] All estimates will be sent upon request.

References

Acs, Zoltan J. and David B. Audretsch (eds.), 1993, *Small Firms and Entrepreneurship: An East-West Perspective*, Cambridge: Cambridge University Press.

Acs, Zoltan J. and David B. Audretsch, 1990, *Innovation and Small Firms*, Cambridge: MIT Press.

Acs, Zoltan J., David B. Audretsch and Bo Carlsson, 1990, 'Flexibility, Plant Size and Industrial Restructuring', in Z. J. Acs and D. B. Audretsch (eds.), *The Economics of Small Firms. A European Challenge*, Dordrecht: Kluwer, pp. 141–154.

Aiginger, Karl and Günter Tichy, 1991, 'Small Firms and the Merger Mania', *Small Business Economics* **3**(2), 83–101.

Carlsson, Bo, 1989, 'The Evolution of Manufacturing Technology and Its Impact on Industrial Structure: An International Study', *Small Business Economics* **1**(1), 21–38.

Caves, Richard, M. Fortunato and P. Ghemawat, 1984, 'The Decline of Dominant Firms', *Quarterly Journal of Economics* **99**(4), 527–546.

Chandler, Alfred D., 1990, *Scale and Scope. The Dynamics of Industrial Capitalism*, Cambridge: Harvard University Press.

Chesher, Andrew, 1979, 'Testing the Law of Proportionate Effect', *Journal of Industrial Economics* **27**(4), 403–411.

Evans, David S., 1987, 'Test of Alternative Theories of Firm Growth', *Journal of Political Economy* **95**(4), 657–674.

Galbraith, John K., 1957, *The New Industrial State*, Boston: Houghton Mifflin.

Geroski, Paul A., 1986, 'Do Dominant Firms Decline?', in D. Hay and J. Vickers (eds.), *The Economics of Market Dominance*, Oxford: Basil Blackwell.

Gibrat, Robert, 1931, *Les Inégalites Economiques*, Paris: Recueil Sirey.

Kleinknecht, Alfred and Jeroen O. N. Reijnen, 1991, 'More Evidence on the Undercounting of Small Firm R&D', *Research Policy* **20**(4), 579–587.

Marx, Karl, 1867, *Das Kapital*, Vol. 1, Berlin: Dietz Verlag.