# Small Firms and the Merger Mania

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ABSTRACT. Empirical research has found an average or even superior performance of small firms. This seems to be at variance with the secular concentration process and the recurrent merger waves. This paper tries to integrate size and merger research. Higher profitability of small firms is explained by their incentive structure and shorter decision lags but also by lower wages and higher individual risk (premia). Their faster growth in the eighties was, in addition, fostered by diversification of demand, miniaturization of technology, and a need for flexibility under uncertainty. The merger wave on the other hand does not necessarily prove that large firms are superior. Managers and shareholders may be seduced by stockmarket optimism, a sizeable industry of banks, agents and lawyers have their own interests in mergers, mergers may be important in declining markets and for the acquisition of technology. On average, mergers do not improve efficiency, profits or internal growth. Small and large firms serve different purposes. Performance depends on the market, incentives and technology. The establishment, growth and closure of small firms as well as mergers are attempts to find the optimal organization for utility maximization in a world of severe uncertainty and diverse needs.

The relative advantages and disadvantages of small and large firms are a topic discussed over and over again in Industrial Economics. The results, nevertheless, are far from unequivocal. This may be due to the fact that the relative advantages of specific classes change over time, due to the given state of technology and organization as well as to the nature of demand. By no means a general superiority of large firms has been detected in this field of research, rather the contrary. Therefore the prevalent merger mania,

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originating in the U.S. but increasingly spreading out to Europe and Japan, fundamentally challenges the results of traditional size class research: By way of takeovers the market itself apparently demonstrates the superiority of large firms. Managers and politicians quickly (and frequently gladly) receive this message and act accordingly. Research on mergers and acquisitions, however, produced markedly diverse results: An enthusiastically positive evaluation of takeovers in event studies of share prices, a very sceptic stance in outcome studies of merging firms' performance. A closer investigation suggests that these different lines of research and their differential results need not contradict each other. They use different samples (size class research, e.g., deliberately exludes growth by merger), different time horizons and different indicators. Posing identical questions and applying the same methodology gives a chance of consistent answers. Trying to do this job, this paper first reviews size class research, then event and outcome studies of takeovers. Several hypotheses summarizing the respective results are proposed. Thereupon it is investigated how these hypotheses fit together.

## 1. Superior performance of small firms in size class research

### 1.1 Survey on small versus large firm performance

Since the late seventies articles and books on the performance of small firms have been booming. An overview on the more recent studies is given in the appendix, for older reviews see Böbel, 1984; Jacquemin and de Jong, 1977; Kaufer, 1980; Irsch, 1988. The majority of the studies conclude that small firms are superior according to some performance measure ("strong mainstream result"). However, there are some differences according to indicators, methods and countries so that we prefer the "softer" version of the hypothesis,

namely that there is overwhelming evidence that smaller units in general are not inferior to larger units. Even the softer version is a surprise for economists trained to believe in economies of scale and scope, for technicians who supply engineering estimates of economies of scale (Pratten, 1988) and for politicians and laymen reading day after day about the necessity for large firms to grow even larger in order to remain competitive (see the discussion about the Common European Market) and the merger mania happening as a proof of this notion.

The relative performance of firms according to size classes refers either to "shares", to "efficiency" or to "profitability".

1.1.1 *Shares.* The share concept whose advantages and disadvantages are discussed in the industrial organization literature under the heading of survivor concepts, compares the share of a given size class at different points of time. Employment, value added or sales are most commonly used as indicators.

The increasing share of *employees* working in small units is the single most powerful "proof" for the superiority of small firms. The study of Birch (1979) which demonstrated (using a Dun & Bradford sample) the outstanding employment performance of firms with less than 20 employees in the U.S. stands at the beginning of the booming literature. The study had many followers (Armington and Odle, 1982) and critics (Eckart, Einem and Stahl, 1987). Questions remained as to the extent and the reasons for the employment gains, not as to the tendency. Similar results are available for Great Britain (Burns and Dewhurst, 1986),

Germany (Irsch, 1988; Bade, 1987), Denmark (Madsen, 1986), Italy (Agenzia Industriale, 1986), Ireland (Gowan *et al.*, 1986), Switzerland (Pleitner, 1986), Europe (Storey and Johnson, 1987a) and the U.S. (Brock and Evans, 1989). Instead of adding more studies let us reverse the argument. The authors know of no single study which arrived at the result that in any industrialized country the share of employees working in small firms decreased in the seventies or eigthies.[1]

A similar result usually holds for *value added*: The share of small firms is increasing, that of large firms decreasing, in the manufacturing sector as well as in the total economy (Birch, 1979). The trend is more pronounced in the latter case and slightly less general than the parallel result for employment (see Table I). In some studies the share of the very large firms is reported separately. For decades the share of the very largest firms had increased from census to census. For Germany the share of the largest 100 firms — measured by value added — however, fell from 19.1% to 18.8% between 1982 and 1986 (Wirtschaftswoche, 1988).

Studies reporting an increasing share of large firms as measured by *sales* are partly due to a statistical fallacy, partly they point to an important facette of the picture. Papers reporting that the proportion of firms with sales higher than a fixed nominal value (1 million of some currency) has increased over time forget about price increases as well as real growth and are thus worthless. On the other hand the development of large firms looks relatively best when sales are used as an indicator (Bade, 1987). This could have two explanations. The first is the hypothesis that larger firms are manager oriented and put greater emphasis on

TABLE I

Employment trend in a sample of manufacturing firms (Austria)

| Size class 1980 | Number of firms | Employees | | |
|---|---|---|---|---|
| | | 1976 | 1984 | 1984—1976 |
| 0—99 | 56 | 3,386 | 3,564 | 5.3 |
| 100—499 | 224 | 55,201 | 51,878 | −6.0 |
| 500—999 | 66 | 46,071 | 42,394 | −8.0 |
| 1,000 and more | 55 | 210,804 | 183,457 | −13.0 |
| All sizes | 401 | 315,462 | 281,293 | −10.8 |

growth of sales, employment, size, etc. (at the expense of profits). The other would be that large firms rely on external growth by mergers, acquisitions, etc.

One of the major problems with "shares" is that the comparison of shares between two points of time mixes up the development of existing groups of firms (cohorts) with births and deaths, and on top of it with firms changing the reference group. Storey and Johnson (1987a, 1987b) criticize all "share studies" which cannot hold constant the firms in different points of time. Flows are necessary to make correct statements about the dynamics of smaller versus larger firms (see Storey (1988) for a model of the job generation process, where net job change is the outcome of births, in-moves, expansions, etc.). Fortunately some of the studies prove that the increasing share of small firms is not

only due to this problem. König and Weißhuhn (1988), investigating employment in 38 branches of manufacturing and services in Germany were able to divide gains and losses into new, abandoned and surviving firms (see Tables II and III). Within the survivors small firms increased employment and large ones lost. Aiginger and Bayer (1987) investigated employment and value added for a constant sample of Austrian firms between 1976 and 1983. Employment increased by 4.6% in firms with less than 100 employees, and decreased by 5.4%, 10.7% and 5.6% in the larger size classes (the same hierarchy held for a constant cohort of manufacturing firms) and for other indicators as value added or sales. Table I, extending the period up to 1984 shows this tendency even more pronounced. Johnson (1989) breaks down data on UK establishments into

TABLE II
Employment gains and losses in "survivor" enterprises

| Size of enterprise by 1980 employment | In thousand employees | In relation to total employment change | In % of 1980 of 38 industries | |
|---|---|---|---|---|
| | | | Mean | Median |
| 1—19 | +234.7 | 0.55 | +1.57 | +0.92 |
| 20—49 | −58.8 | 0.14 | −0.22 | −0.27 |
| 50—499 | −260.7 | 0.61 | −1.57 | −1.09 |
| >499 | −343.9 | 0.80 | −2.88 | −1.75 |
| Total change in all sizes | −428.7 | 1.00 | −3.11 | −2.11 |
| Employment 1980 | 16,662.7 | | | |

*Source*: Own calculations using König and Weißhuhn (1988); Tables IV and V.

TABLE III
Employment gains in new and losses in terminated enterprises

| Size of enterprise by 1980 employment | Gains in new divided by total gains in new enterprises | | Losses in abandoned divided by total losses in abandoned | | Net of the mean (1)—(3) |
|---|---|---|---|---|---|
| | Mean | Median | Mean | Median | |
| 1—19 | 47.96 | 53.0 | 41.97 | 39.4 | +5.99 |
| 20—49 | 13.49 | 14.1 | 15.66 | 15.8 | −2.17 |
| 50—499 | 26.98 | 25.8 | 32.52 | 30.3 | −5.54 |
| >499 | 11.54 | 3.5 | 9.85 | 2.7 | +1.69 |

*Source*: Own calculations using König and Weißhuhn (1988); Table VI.

those remaining in the same category, leaving it, becoming untracable or entering and again ends up with an increasing employment (number and shares) for small firms and decreasing for larger ones (sample period 1979—1983).

1.1.2 *Efficiency.* The "oldest" measure of performance in macroeconomic industry studies is value added per employee. It is assumed to measure technical efficiency (as opposed to economic efficiency which will be represented by the profitability measures). The problem with this measure is that it confronts total output with only one input and the input is measured quantitatively (without consideration of quality or pay differences). The usual result is that value added per employee increases with the size of firms, though the main acceleration occurs in the lower size classes. We found for Austria in the seventies that value added reached its maximum in firms (on the plant level) with 100—500 employees, for EC countries also for the second largest category.

There seems to be an interesting structure of the results over time and across units: It looks as if there were little evidence of a slight relative decrease in value added for the very large firms in the late sixties. This tendency increased in the seventies, pushing down maximum value added per employee to relatively small "medium sized" firms (100—499 employees). In the eighties the

decline in efficiency of the very large firms evaporates. For Austria (1983) value added per employee reaches its maximum on the plant level in the category of 100—499 employees (the decline from here to the largest becomes relatively flat), on the company level the largest companies were the most "efficient" (see Table IV).

The statistics for firms and plants had shown a diverse development already in the seventies (Aiginger and Tichy, 1984). For firms there was no decline in efficiency for the largest group, for plants it existed. We interpreted this to be due to high synergies for firms consisting of decentralized plants. A similar trend was found by Armington and Odle (1983) and Fothergill and Gudgin (1979). However, this difference raises the question: Which is the best unit for the performance race, plants, firms, or holding companies? If large companies consisting of small production units represented the optimal organization pattern, the puzzle between profitability of small firms and the merger mania would have an easy rational solution, at least in the absence of control losses.

1.1.3 *Profitability.* Studies working with data collected by a central statistical office have to use crude profit measures like value added minus wages as percentage of value added. Papers using accounting data can use pre- or after tax profits or cash flow in relation to total assets or equity. Even

TABLE IV
Efficiency and profitability in Austrian manufacturing (1983)

| | Efficiency (= value added per employee) | | | | Profitability (= (va-wages)/va) | | | |
|---|---|---|---|---|---|---|---|---|
| | Plants | Enterprises | | Plants without the very smallest[a] | Plants | Enterprises | | Plants without the very smallest[a] |
| | | All | Without oil & tabacco | | | All | Without oil & tabacco | |
| | In 1,000 AS | | | | In % | | | |
| 0—99 | 264.8 | 252.4 | 249.6 | 349.1 | 33.4 | 34.0 | 33.6 | 35.0 |
| 100—499 | 411.6 | 341.4 | 336.4 | 430.1 | 36.5 | 26.6 | 25.9 | 39.4 |
| 500—999 | 366.9 | 372.0 | 372.0 | 375.9 | 26.0 | 27.8 | 27.8 | 27.3 |
| 1,000 and more | 275.8 | 451.9 | 370.6 | 388.8 | 14.9 | 30.7 | 16.0 | 19.1 |
| All sizes | 333.2 | 335.1 | 309.1 | | 39.5 | 30.5 | 25.9 | |

*Source:* Central Statistical Office; Bereichszählung, 1983.
va = value added; in oil & tabacco incl. indirect tax.
[a] Industriestatistik 1983/II: incl. mining, excl. "Gewerbe".

if they may come closer to a profit concept used by firms, however, valuation techniques and differences between owner companies and manager lead firms may still lead to misleading interpretations (see Scherer, 1980).

The majority of recent studies for European countries show that profitability declines with firm size. A strong decline is reported by Irsch (1988) for Germany using a sample of 14,600 firms (balance sheets 1984—1985). Aiginger and Tichy (1984) — using census data — show that profitability is highest for the smallest firms, in manufacturing as well as in the total economy. This holds also for 1983 (see Table IV) if we adjust for two branches (oil and tabacco), where measured value added includes high indirect taxes. A similar

picture is revealed by the relation of profits to sales for the sample of the Austrian National Bank (see Table VI), though there are some years in which large firms have above average profit rates. Contrary to expectations the dispersion of profits appears to be higher in the larger size classes. Burns and Dewhurst (1986, p. 195) report profits to be larger in small firms in France, Italy and Denmark, while in Great Britain they are marginally smaller for this group. Uhlmann and Berger (1985) report a cash flow/sales ratio of 6.5 resp. 6.4% for German manufacturing firms (census data, 1982) with less than 49 employees, resp. 50—99 employees, in contrast to only 3.8% for firms with more than 1,000 employees. Scherer (1980) using data from the Federal Trade Com-

TABLE V

Efficiency and profitability in non-manufacturing sectors and total economy (Austria, 1983)

| | Efficiency | | | Profitability | | |
|---|---|---|---|---|---|---|
| | Construction | Retail trade in 1,000 AS | All industries | Construction | Retail trade in % | All industries |
| 0—99 | 275.3 | 235.8 | 287.3 | 32.6 | 47.7 | 41.8 |
| 100—499 | 323.0 | 310.7 | 416.5 | 21.3 | 40.0 | 37.4 |
| 500—999 | 307.0 | 283.4 | 404.3 | 6.6 | 31.9 | 29.5 |
| 1,000 and more | 331.0 | 331.3 | 440.9 | 8.2 | 39.1 | 27.9 |
| All sizes | 291.2 | 254.6 | 348.5 | 26.7 | 44.8 | 36.6 |

Efficiency: value added per employee.
Profitability: (value added minus wages) 100/value added.

TABLE VI

Cash flow and profits in manufacturing firms (1976—1984)

| | Cash-flow in % of sales | | | | Profit in % of sales | | | |
|---|---|---|---|---|---|---|---|---|
| | AM | Median | LQ | UQ | AM | Median | LQ | UQ |
| 0—99 | 6.52 | 6.59 | 3.57 | 10.15 | 3.47 | 3.63 | 1.20 | 6.31 |
| 100—499 | 5.42 | 5.78 | 2.93 | 9.67 | 2.15 | 2.44 | 0.51 | 4.98 |
| 500—999 | 6.22 | 6.46 | 3.47 | 9.39 | 3.30 | 2.94 | 0.64 | 5.58 |
| 1,000 and more | 4.44 | 4.78 | 2.44 | 7.83 | 0.11 | 1.42 | −0.66 | 3.41 |
| All sizes | 4.93 | 5.81 | 3.12 | 9.16 | 1.03 | 2.47 | 0.50 | 4.99 |

*Source:* Balances of firms, Austrian National Bank.
AM = arithmetic mean.
LQ = lower quartile.
UQ = upper quartile.

mission in the USA shows that profits are slightly higher for large firms in 1975—1977, but average after tax return is within the range of one percentage point between the largest and the smallest asset size classes (13.2% and 12.4%). He argues that for small firms this rate could be underestimated since probably generous salaries to the owner-manager are included and profits of the large firms contain an element due to monopoly power. The spread of profits had been much larger in 1963—1965 and in 1969—71.[2]

Since firm size is not the only determinant of profits (and probably not the most important one), the question arises which determinants should be controlled for when comparing profitability. Most studies refer to the manufacturing sector, some to total industry. In the latter case the positive result for small firms is partly due to the shift from manufacturing to services. But it is stronger than that, and furthermore it remains intact if the manufacturing sector is split into industries (Aiginger and Tichy, 1984). Studies working with data on the firm level have tried to hold many other determinants constant. Hall and Weiss (1967) used data from Fortune's list of large firms and found profits to rise with size, though they really focussed on a comparison of large versus very large firms. Neumann, Böbel and Haid (1979) calculate the influence of size on profitability for 334 German firms holding concentration rate, risk, exports, imports, growth and product differentiation constant and find a negative influence of size on profits. Reports based on MIT's PIMS data base stress the importance of market shares as determining profits. Size itself is not considered an important determinant.

## 1.2 Reasons for the non-existence of scale and scope economies

There is no comprehensive theory available to explain the good performance of smaller firms. Technical blueprints always suggest declining average costs. Internationalization, research & development competition, entry costs all underline the importance of larger units. Nevertheless, larger units lose shares (in employment, to some extent in value added), are less profitable, efficiency gains are minor even if only compared to labor input.

So we tentatively propose six hypotheses which could explain the favourable development of smaller firms. They are partly related, most are tentative and should be investigated further. Some of them (H1, H2, H3) imply that the higher profitability of small firms can be explained, but does not imply better performance. H4 explains the good profitability (but not the employment gains) by differences in the objective function, Hypotheses 5 and 6 can explain the good profitability of small firms under specific circumstances (typical for the eighties) but infer that it may not hold forever.

### Hypothesis 1: Sweatshop argument

*The higher profitability of smaller firms mirrors lower wages, lower social benefits, less regulation.* It is an empirical fact that wages per head increase with firm size. Since large firms are usually located in agglomerations with higher wage levels, attract formally qualified labor, are led by a cast of managers and employ high-wage headquarters, this tendency evaporates if we correct for location, qualification, management, though some differences remain. But is this cost difference not a voluntary strategy aimed at maximizing profits? There is no law that large firms have to pay more. On the contrary, considering the higher individual stability of employment, large firms could pay less. The efficiency wage hypothesis maintains that the firm pays more to increase efficiency, the human capital hypothesis explains that firms invest in qualification and pay more to insure against quits. The higher payment is an investment whose returns should be higher than costs and therefore a profit increasing strategy, not a disadvantage of larger firms.

In a similar way it is argued that large firms are more closely monitored to meet restrictions in working time, emission standards, social standards. On the other side we could argue that large firms have advantages in negotiating with banks and government (over subsidies and orders), obtain cheaper energy, can effectively threaten to dismiss workers if government does not follow their lobbying. A complete balance of "non-economic" or "unjustified" advantages and disadvantages of sizes for hiring, negotiating etc. is not

possible. We know from direct surveys that there is no clear preference of employees to work in a certain size class (at least employees seem weakly to prefer medium firms to large firms despite higher wages in the latter; see Aiginger and Tichy, 1984).

## Hypothesis 2: Heterogenity of demand

*Small firms increase employment as demand shifts to sectors with low optimal sizes, service components determine the competitiveness, and demand is more differentiated today.* Demand has shifted from manufacturing to service. This explains part of the overwhelming dominance of small firms among *new business*. However, the increasing share and profit results hold also within the manufacturing sector. Here many sectors with decreasing unit cost (like steel, non-ferrous metals, oil industry) lost shares especially in the late seventies and early eighties. However, declining profits and decreasing employment with size hold also for a given sectoral structure (see Aiginger and Tichy, 1984; König and Weißhuhn, 1988).

The increasing importance of services and content of services does hold even within many industrial sectors. For example in the computer industry value added of hardware decreases, software, services and maintainance increase. Production related services (engineering, finance, marketing, research, promotion, after-sales service) nowadays are a major factor of competitive performance. Most of these service components exhibit minor or no economies of scale. This may have counterbalanced economies of scale in the hardware sector.

## Hypothesis 3: Financial risk hypothesis

*Smaller firms have to earn higher average return, since their individual risk is larger.* Risk-averse investors would not invest in smaller firms, if they were not more profitable. The higher individual risk of smaller firms is well documented (Irsch, 1988; Neumann, Böbel and Haid, 1979). The question is how large these profitability differences have to be, especially since investors can invest in a mix of small firms reducing the variance

of the returns. The largest risk difference is given for small and young firms, the difference in risk and the variance of profits is smaller for existing firms. For large firms fixed cost and capital intensity are responsible for a considerable variance of profits.

Irsch (1988) tried to calculate risk adjusted profits, but he applied a method which implied weights for the adjustment which use actual profit differences as yardstick for the adjustment. The fact that the total profit difference is explained by the risk difference therefore is a logical result. Using an off-hand evaluation we would believe that profit differences of 2:1 or 3:1 as reported by Irsch are larger than any sensible risk premium. But we want to keep adequate risk adjustment on the research agenda: Profits should be adjusted only for that part of the risk which cannot be eliminated by portfolio diversification (beta risk).

Two remarks should limit the potential power of this hypothesis. First it cannot explain the profit differences when investors are risk neutral or can diversify their portfolio. And secondly, the macroeconomic importance of small firms is not impaired by the arguments if the aggregate small firm sector increases its employment and output share, is more profitable, and in the aggregate is also less volatile than the large firm sector. Rather the volatility on the firm level could be used as an argument for subsidization (external benefits parallel to the argument for R & D subsidies).

## Hypothesis 4: Profitability incentive

*Smaller firms are owner managed firms, aiming at profit maximization, larger firms are manager controlled, aiming at maximizing the managers utility function, which includes other elements as well.* The body of literature on this topic is large and cannot be replicated. It discusses whether in a competitive world deviation from profit maximization is feasible, whether managers can be effectively monitored and whether profit differences empirically depend on the owner management relation. Deviations from profit maximization may be arguments for takeover and acquisition. Difficulties in assessing the potential profits are discussed in relation with the differences between expected and actual profits after mergers.

However, again differences in the objective functions cannot explain all features of our picture. They can explain why large firms have lower profits, but not why smaller firms increase employment faster.

### Hypothesis 5: Flexibility under uncertainty

*Smaller firms can react more rapidly to changing demand.* Stochastic arguments were always stressed as a source of economies of scale insofar as larger firms can pool risks. On the other hand large firms have to invest long before they know demand, and they often have to produce before demand is specified. Small firms can wait longer and fulfill demand with less lead time in production, they can switch between related products and specifications. Let us assume that uncertainty of demand (as represented by the flatness of a probability function) is an increasing function of the lead time, then large firms have to plan production according to an expectation of demand, e.g., four quarters ahead and smaller firms one or two quarters ahead. Effective uncertainty of demand will then be lower for small firms. Many implications of this model are fulfilled by empirical data (higher capacity utilization for small firms, less cyclical variation of utilization rates, attempts to shift to production on order, just-in-time strategies etc.; see Aiginger, 1987). The larger costs of idle capacity decrease profits for large firms especially in periods of high uncertainty (late seventies).

### Hypothesis 6: Miniaturization of technology

*Technical development favored larger units in the sixties (computers were feasible only for them).* *Miniaturization of chips, multipurpose machines, etc., made electronical devices attractive for smaller units in the seventies and eighties.* Computer aided design, computer aided production and flexible automation may favor smaller units above average, since small batches become attractive (Shepherd, 1982; Solo, 1985). On the other hand original outlays are large and human capital becomes very important, so that automation may combine decreasing economies of scale with increasing economies of scope (Aiginger, 1988).

These are some tentative hypotheses which could help to explain the surprising performance of smaller units in the seventies. Many of them are open to empirical falsification. They also show that the higher profitability of smaller units is no eternal law: Firstly technical trends can change exogenously, maybe next time again favoring larger units (upsurge of telecommunication, unification of standards in the Common Market, decrease in transport cost). Secondly large firms can react by reforming organization and strategy to fight their problem areas. Actually they have already started to reorganize, divisionalize, increase flexibility, etc. They have also tried to become even larger through acquisitions and mergers, trying to squeeze out remaining technical economies of scale. The trends of the last decades are summarized in Table VII.

## 2. Conflicting evidence of takeover research[3]

According to the size-class research reported above the relative superiority of large or small firms depends on the indicator, the choice of the unit (establishment, firm, holding company) and probably on the period of investigation. No general superiority of large units can be detected, but the indicators for a marked superiority of

TABLE VII
A simple summary

|  | 1960—1969 | 1970—1979 | 1980—1989 |
|---|---|---|---|
| Economic objective | efficiency | quality | flexibility |
| Important resource | capital | energy | human capital |
| Firm size | large | small | consensus |
| Firm organisation | functional | divisional | problem oriented |

small ones are feeble as well. Large and small firms most likely are designed to fulfill different tasks. So a mix of size classes with a good chance of transition and no barriers neither to entry nor to exit may be optimal. This, however, does not appear to be a view shared by the business community or by politicians. Large firms increasingly acquire large and small ones to become even larger. American managers and politicians are convinced that this is their only chance to compete with Japanese firms and European managers and politicians consider increasing size as the appropriate strategy to survive in the Common Market and against American and Japanese competition (Geroski and Jacquemin, 1985, p. 171). (American) economic policy considers takeovers as an efficiency-enhancing threat to inefficient managements.

The excessive merger waves of the sixties and of the eighties underline the market's view of the superiority of large firms, and so apparently contradict the results of size class research. Merger research, however, does not explicitly deal with the question of efficiency differences between size classes. Due to the availability of statistics most research concentrates on takeovers among the largest size classes. It is, however, well-established that the likelihood to be taken over decreases with size, and large firms acquire more small than large firms.[4] This is not easy to understand when small firms are rather more efficient than less efficient. But as merger-research is occupied with the question whether takeovers can be used as an instrument of corporate control by increasing the efficiency of the target it necessarily gives an answer to the question whether the combination of two firms to a larger one increases efficiency and profits. This is subject to several surveys (Hughes and Singh, 1987; Hughes, 1989; Tichy, 1990a) and they agree that two different lines of research — event studies and outcome studies — appear to give divergent answers.

## 2.1 *Gains from takeovers in event studies*

Gains from takeover are the typical result of event studies which have spread out epidemically since the seminal work of Mandelker (1974). They hold that in efficient capital markets share prices fully reflect the evaluation of the firm given the available information set. The increase of share prices following the announcement of a takeover therefore reflects how positive the market (the shareholders) evaluates the effects of the merger on the profitability of the firm.

The vast majority of event studies agrees that takeovers primarily effect the *share prices of the targets*: They had been rising (relative to a control group) for a while in most cases (Mueller, 1986, p. 184), but start to soar by up to 50% in the — say — 3 weeks around the announcement (Jensen and Ruback, 1983, p. 10; Ravenscraft and Scherer, 1987, p. 4; and Jarrell *et al.*, 1988, p. 53). They increase even more when the takeover is motivated by a plan to reorganize the target (Office, 1987) or when a wellknown corporate raider pushes the takeover (Holderness and Sheehan, 1985). The premia paid by the acquirer average around a quarter to a third (Ravenscraft and Scherer, 1987, p. 205; and Jensen, 1988, p. 22) with a tendency to increase over time (Mueller, 1989, p. 5), and they are considerably above the price that the usual earnings forecasts propose (Alberts and Varaiya, 1989, p. 141). The *share prices of the acquirer* show little abnormal movements.[5] Given efficient markets and full information this implies that the acquirers' management is expected to earn the premia it has to pay by more efficient management of the target and by exploiting synergies.

Takeovers are efficient as target shareholders win and acquirers' shareholders do not lose — that is the conclusion of the proponents of the theory of corporate control.[6] Researchers less convinced about the effectiveness of the visible hand of corporate control point to several flaws in this apparently perfect mechanism:

— Event studies investigating the longer run find abnormal negative returns on acquirers' shares: — 6% over 1 year (Jensen and Ruback, 1983) and — 42% over three years after the takeover (Magenheim and Mueller, 1988, p. 177). Similar losses are estimated by Borg *et al.* (1989, p. 127) for the 1920s.

— Outcome studies generally cannot find gains from takeovers but frequently slight to substantial losses (see Section 2.2).

— Only a very small part of all takeovers are hostile ones (1986 40 out of 3300; see Jensen, 1988, p. 22) and only one fifth of all takeovers

causes an abnormal change in the management. It is not easy to see where the restructuring of the target should result from.

— The managers of the acquiring firms do not appear to have any clear concepts for the reorganization of the target (Newbould, 1970) and no systematic relation could be detected between takeover premia and the improvement of corporate performance after the takeover (Kuehn, 1975).

— If the targets of takeovers are underperformers at all, the differences are only slight relative to their market (Scherer, 1988; and Cosh et al., 1989), so that the potential for additional gains via takeover and reorganisation is at least not obvious.

Believers in the steering potential of the market for corporate control consider all this as weak evidence confronting the hard facts of short term share price movements. They consider longer term projections as hazardous, comparisons as inadequate as the mere existence of a market for corporate control disciplines managers. According to event studies the existence of takeovers increases the efficiency not necessarily the size of the firms. So event studies are not very helpful for our problem.

## 2.2  Losses from takeovers in outcome studies

Outcome studies deal with the changes in performance of the merging firms. They are more laborious, suffer frequently from the lack of adequate data, and the ceteris paribus problem is much more serious: How would firms have developed without merging?

Sceptical about the (short term) event studies' conclusion that mergers raise the combined value of the merged firms, outcome studies concentrate on the profit performance. They find that prior to takeover the profits of acquiring as well as of the acquired firms had not deviated strongly from those of their control group. Acquirers' profits, however, on average had been a little higher than the ones of acquirees (Singh, 1971; Mueller, 1986; and Hughes, 1989). After the takeover profits decrease or at least remain unchanged according to almost all studies for very different countries (Mueller, 1986; Ravenscraft and Scherer, 1987;

and Odagiri and Hase, 1989). Evidently the potential for rationalization had been overestimated by the acquiring managers, the premia had been too high,[7] scale economies and synergies had not been realized as envisaged. Similar results are reported for bank-mergers (Tichy, 1990b).

Similar to profits the efficiency of firms had been effected negatively by mergers: Mueller (1986, p. 202) cites some positive examples and Newbould (1970) finds productivity gains for half of his sample of horizontal mergers. The (larger) rest of the studies however reveals negative effects: Ravenscraft and Scherer (1987, p. 202), for example, estimate a relative loss of total factor productivity of 0.1%. Conglomerate control delayed or distorted reactions to emerging problems (Ravenscraft and Scherer, 1987, p. 157). A case study of 12 very large British takeovers found only 5 cases of above-average productivity increase (Cowling et al., 1980). Similar results hold for the non-manufacturing sectors as well, as Barnes' (1985) study of British building societies revealed. So, far from increasing efficiency as planned, takeover did not lower it in the best cases.

Some theories of the firm maintain that it is neither profit nor efficiency but growth managers are interested in. But the effects of takeovers on growth are not impressive either, even if some evidence exists that merging firms grow faster than the relevant control group (McGovan, 1965; and Mueller, 1986). Positive effects of takeovers on international competitiveness could not be revealed until now (Caves, 1989, p. 171). Even spreading of risks appears not to have been achieved by (conglomerate) mergers: Mueller (1986, pp. 185 and 197) could not find such effects, and Thompson (1983) surprisingly found even risk increasing effects of diversifying mergers; only a large minority could lower risks.

The failure of the average takeover to attain its targets concerning profits, efficiency, growth or risk spreading gains importance since merging firms invest more than the control group (Hughes, 1989, p. 83). On the other hand takeovers have a negative impact on outlays for R&D: Acquirers frequently buy research-intensive firms, but soon cut back R&D expenditures (Ravenscraft and Scherer, 1987, pp. 102 and 203), probably forced by short-term profit maximization in general or as a result of the lack of success of the merger. One

must not forget, however, the large differences between takeovers, revealed by the deviations from the respective means: In Kumar's (1984) sample acquirers who increased investment increased profitability as well, and in Crowling's (1980) case studies productivity increased in firms which increased the amount and/or the quality of investment after the takeover.

## 2.3 *Hypotheses integrating the results of takeover research*

The two lines of research on takeovers, event studies and outcome studies appear to lead to different conclusions. Do they really contradict each other? Section 2.1 has already demonstrated that the gap shrinks when event studies pursue the same long time horizon as outcome studies. This solution, however, is not easily acceptable for adherents of the theory of efficient capital markets and of rational expectations, as it implies for booms *systematically* overoptimistic expectations in the short run (which, however, may not be implausible outside the theory of efficient markets — see Hypothesis 8 below). In addition it does not solve the question why managers and shareholders of the acquiring firm engage in takeovers as these *reduce* wealth and tie up management capacity. Attempts to provide an explanation can lay aside all arguments of neoclassical economics (economies of scale, of scope, risk spreading, tax or finance advantages) as all these arguments would have to *increase* efficiency and profits. But the managerial theories of takeovers are not convincing either. They emphasize that managers propagate takeovers as they are in their own interest (growth of the firm, empire building, insider capital gains) or result from their hubris (Roll, 1986), their conviction that just they are able to beat the odds.[8] The belief is not completely unreasonable, however, as acquiring firms earned above-average profits before merger (Scherer, 1988; and Odagiri and Hase, 1989, p. 67) and the performance of their shares was excellent. But these theories confront the problem that it is hard to explain why shareholders of acquiring firms do not expel managers pursuing their own interests at a disadvantage to the owners. According to Cosh *et al.* (1989) this does not happen even in companies where institutional shareholders dominate.

At least shareholders could sell their shares, making acquiring corporations underperformers on the stock market and so could quickly stop any further takeover activities. Even the most recent literature has not given due account to the fact that it is very hard to subscribe to theories claiming that managers *systematically* and *in the long run* act against the (conscious) interests of owners.

The two lines of research on takeovers can be made consistent, however, if one introduces uncertainty on the side of the managers as well as on the side of shareholders, risk loving behavior (for a small part of the portfolio) and faith of shareholders in the managements' abilities. The following hypotheses try to do this job.

### *Hypothesis 7: Roulette character of takeovers*

*Every takeover is an independent event, averages therefore don't tell much. Most mergers fail (relative to expectations) but a few are highly successful.* The whole discussion on takeovers has not paid enough attention to the individualistic character of mergers as revealed by the large dispersion of results (in all studies which report more than averages) and by the small coefficients of determination in Ravenscraft and Scherer's (1987) explanatory equations. *Shareholders* of acquiring companies probably know the risks involved, but hold the shares deliberately as a small, highly risk part of their portfolio. Reasons why *managers* engage in takeover transactions are proposed in hypotheses 9, 11 and 12. In addition one should not forget the managers' insider gains mentioned above.

### *Hypothesis 8: Optimism as the basis of takeovers*

*Takeovers are offsprings of optimism, they cluster in stock market booms. Takeovers require a management successful in their mainline operations, confident of being able to deal with additional problems successfully, and shareholders faithfully believing in the management's talents.* These preconditions may appear rare, but one should not forget that acquisitions are in fact rare events for an average corporation. As shareholders are free to buy and sell shares in the

market their portfolios primarily contain shares of companies with managers they consider outstanding. Shareholders will sell the shares if the management engages in activities they consider overly risky (such as takeovers). So in general one can assume harmony between acquiring managers and risk loving, confident shareholders. Both may be minorities in their relevant groups, but they find to each other by the more or less visible hand of the market. The mood of general optimism is assured as takeovers cluster in periods of stock market boom (Geroski, 1984) when stock prices generally represent overoptimism regarding future profits (Shiller, 1981; and Summers, 1986).

### Hypothesis 9: Free cash flow hypothesis

*Managers and shareholders agree that managers can find better investment projects than shareholders.* The free cash flow hypothesis (Mueller, 1969; and Grabowski and Mueller, 1975) revitalized by Jensen (1988) holds that the acquirers are firms with good profits and a high cash flow but with a limited number of profitable investment projects. So it is wealth increasing for shareholders as well as for society if they acquire firms — even those with average returns — at a premium and so disburse the free cash. This is probably true, but it is not the main part of the story, as it would make even more sense for profitable firms with limited investment possibilities to pay higher dividends, giving the shareholders a better chance to use the money according to their own preferences. Therefore one has to add to traditional free cash-flow arguments the conviction of managers and especially of shareholders, that managers can find better investment projects than shareholders, or that takeovers save transaction costs or taxes[9] (compared to investments by shareholders themselves). Given Hypothesis 8 this does not appear implausible.

### Hypothesis 10: Equilibrium-takeover hypothesis

*If professional takeover specialists continually search for matches and if scale and scope economies are rather small, the takeover premium will equal expected profit so that on average takeovers*

*are necessarily unprofitable.* Mueller (1989, p. 5) found an increasing trend of premia from 15—25% in the sixties up to 50—60% in the eighties. Parallel to increasing premia the profitability of takeovers vanished, a trend noticed by other studies as well. This can be explained by the increasing professionalization of takeovers. Innumerable banks, advisers and specialists continually search for targets to offer them to possible acquirers. So competition in the market for acquisitions quickly consumes all possible extra profits by equating premia with discounted extra earnings.

### Hypothesis 11: Mergers feed upon themselves

*When merger activity has reached a certain level it is most likely to continue for a good while.* Managers actively engaged in acquisitions usually have a good press and they are considered as innovative progressive, active and so on. Their market value rises. So managers less convinced about the benefits of acquisitions have to keep up with their colleagues hurrying ahead. They must try to keep up for several reasons: For personal reasons concerning reputation and pay, for business reasons and for risk considerations: Managers considered as hesitant, apparently not trusting their own abilities, may have problems to get bank loans or additional risk capital, customers and distributers may prefer to deal with firms appearing more dynamic. And it may be risky to stay small in a world of increasing concentration. The probability of becoming a takeover-target increases for small firms (Cosh et al., 1989, p. 79) — especially when the firm is profitable — and a small firm may suffer from the market power of the giants — even if these giants are less profitable. So some firms may engage in takeovers, not because they think them to be a highly profitable business, but to avoid disadvantages — defensive instead of offensive takeovers.

### Hypothesis 12: Management hubris hypothesis

*Takeovers frequently fail as management talent is a scarce resource and managers overestimate their talent.* The takeover of another firm is a very difficult task for managers as at least two different

business styles have to be integrated. Whenever a takeover implies further diversification, additional problems with new products, new production processes, new markets, new customers and new suppliers are put on top of it. Managers, however, are more likely to see the mistakes occuring in the target company before takeover than the problems involved in integrating the new firm into the old one. In addition managers believe to be able to learn from past mistakes: See the Wall-Street man in Mueller (1989, p. 2) emphasizing the mistakes of "unstrategic" diversification of the sixties compared to the benefits of "strategic" diversification of the late seventies. Ex post studies, however, reveal that the "unstrategic" mergers of the sixties were much more profitable than the "strategic" ones of the early eighties (Caves, 1989, p. 153). Management hubris, however must not be seen as an explanation in itself, it works solely in combination with the optimism of the shareholders and their trust in "their" good and active management (Hypothesis 8).

## 3. The integration of size class and takeover research

Two strands of literature have been brought together in this study. They use different data sets: The subset of firms which did not change their size, organization and width of diversification in the performance-and-size-class literature, the subset of firms which underwent mergers and acquisitions in the takeover literature. But the economic problem addressed is the same: potential economies of scale and scope by increasing production or adding new production lines. And the empirical evidence is also the same, at least after some adaptations: that it is very hard to realize the economies of scale, the prospect of which engineering studies hold out in practical life.[10] Materializing economies of scale and scope is surrounded by uncertainty. Some firms can realize them, some not. On average the second group is larger. As Table VIII reveals internal growth is more probable to be successful than takeovers in general as it

TABLE VIII
Expected gains and losses from increasing size

| | Gains | Probability | Losses | Probability |
|---|---|---|---|---|
| *Due to growth and takeover* | | | | |
| | Economies to scale | Limited by minimum optimal size | Control loss | Depends on the quality of management |
| A | | Increasing market power | Increasing bureaucracy | Depends on form of organization |
| B | Economies to scope, synergy | | Increasing debt | Depends on profitability and speed of expansion relative to profits |
| C | Better use of free cash flow | High in declining industries | Control loss | |
| *Due to takeover only* | | | | Very likely |
| D | Improved management | More likely in related business | Differing management styles | |
| E | No | | Premia | Certain |
| F | No | | Transaction costs | Certain |

A, B, C and D have a certain probability with a positive expected value, E and F are outlays, which have to be paid with certainty.

avoids transaction costs and premia and the necessity to harmonize different management styles. The interesting issue for economists, however, is under which conditions, for which branches and according to which indicators the probability of success is larger.

Size class research suggests that small firms perform best in creating additional *employment*; their relative advantage is probably smaller in *profits*, while in efficiency (level) and sales-growth large firms apparently take the leading position. This is consistent with takeover research if Hypotheses 7 to 12 are accepted: In the majority of cases takeovers neither increase profits nor growth nor efficiency, they rather push down all these indicators. After the takeover the whole proves to be no greater than the sum of the parts, sometimes it comes out even inferior. So both lines of research are consistent with the hypothesis that economies of scale and economies of scope are smaller in the real world than engineering and marketing studies suggest and control losses are considerably larger. Further evidence in favor of this hypothesis is the mediocre performance of conglomerate mergers where the control problems are especially large. This is the reason for a new trend: back to basics, leading to sell-offs of non-related former acquisitions, usually at a loss (Ravenscraft and Scherer, 1987, p. 164). Some recent mergers — bust-up takeovers — do not even intend to increase the firm size but to divide unrelated conglomerates into homogeneous parts (Scherer, 1988, p. 76). These takeovers often counteract the results of the preceding conglomerate mergers.

The hypothesis of the dominance of control losses over synergies is consistent with the suspicion of size class research that large firms outperform smaller ones with respect to *sales* and *labour productivity* rather than to *profits*. Casual evidence suggests that control losses manifest themselves in overinvestment, in overpaid staff or in products not perfectly meeting the demand of the customers rather than in inadequate output per worker. In addition the capital intensity of large firms appears to be higher and small firms may be credit rationed so that they cannot invest up to the point where cost of the capital equals the marginal efficiency of capital. Lastly: Due to the stronger influence of the owner in small firms they are more profit oriented than the manager dominated large firms with their emphasis on growth.

It is less clear why *employment* grows faster in small (manufacturing) firms, a trend obvious in almost all industrialized countries. One reason of a more statistical character is the recent concentration of large firms on their core activities. So they lay off personnel and employ more (small) subcontractors, some of which may be sell-offs or spin-offs of the large firm. Some of these small firms may not have splintered off deliberately. In recent years it has become not unusual to fire servicemen or personnel in the delivery department and to offer them an existence as self-employed contractor, probably with leased tools or trucks. Similarly, several of the management buy-outs were defensive rather than offensive. Another reason may be that smaller firms produce goods in an earlier product cycle phase where rationalization is less likely and more costly. Further arguments, however, are seriously needed on this point.

The most important reason for the somewhat inconclusive results is the *high dispersion* of all the indicators around their means: Some large firms are very profitable, others not at all, some small ones employ additional workers, some stagnate, some takeovers improve efficiency radically, others fail completely. The success of a firm or a merger depends on the quality of the management or the owner, the type of the product, the efficiency of R&D, the business-cycle stage, especially on the way the several constituent elements match to each other, on good luck etc. *Small and large firms fit different purposes*: The advantages of smaller firms may be found in their flexibility and their creativity, the advantages of larger firms in their R&D capacity, their longer planning horizon or their risk spreading capacity (see Table IX). In contrast the disadvantages of small firms may be found in problems with R&D, marketing, internationalization or training of personnel, while large firms have to fight with their inflexibility, the danger of ossification and with control losses. These advantages and disadvantages of different size groups of firms are of larger or minor importance in the production and distribution of different goods and services. Small firms, e.g., have a competitive edge in branches where they produce to order, where they deliver to a limited number of

### TABLE IX
Advantages and disadvantages of large resp. small units

| Large units | Small units |
| --- | --- |
| +Technical efficiency | +Flexibility |
| +Long term planning | +New ideas |
| +Long term horizon | +Innovativeness |
| +Research horizon | +Flat hierarchies |
| +Cooperation with government | +Commitment |
| −Organisational slacks | −Formal training |
| −Alienation | −Great variance ("sweaty jobs") |
| −Monitoring problem | −Employee's rights |
| −Inflexibility | −Wages |
| −Bureaucracy | −Marketing, internationalisation |
| −Merger problems | |

customers, the quality of goods can be proved by inspection, or where output fluctuates considerably (Ungern-Sternberg, 1988). Large firms are better designed to produce and distribute mass goods, especially those whose quality can only be detected by use (where the branch is important[11]) or supply the non-fluctuating part of the demand in all industries. If the advantages of large firms are scale economies and the advantages of small firms are flexibility, takeovers cannot improve profitability in most cases. Acs and Audretsch (1988) hint that a mixture of a large number of hungry small firms chasing a few large ones may be optimal for R&D. That may be true for other areas as well. Small and large firms may profit from each other by subcontracting and by offering diversified supply, large firms may profit from small firms as windows on technology and test marketing. So a combination of large and small firms, each group serving different purposes, may prove optimal for a healthy economy. Large and small is no alternative, large and small firms are complimentary in most cases. This, however, is a very tentative result which has to be supported by further research.

### Notes

[1] In the fifties and sixties, however, 3 out of 4 U.S. jobs were created by big business or government. This was the era of conglomeration while Birch's study already reflects the phase of deglomeration.

[2] For additional studies and critics on the use of accounting profits see Reinganum and Smith (1983) and Goldschmid, Mann and Weston (1974).

[3] Takeovers are defined to comprise mergers and acquisitions.

[4] One branch in which takeovers are known for all size classes — not just the largest — are banks. In Austria in the two decades from 1969 to 1988 the number of banks decreased from 2067 to 1253 (−39%), that is by 40 banks per year. This was solely due to the takeover of small banks by medium and large ones which converted them into branches. (The number of branches increased steeply from 1077 to 4294). This is the more surprising as little evidence exists for economies of scale in banks — according to most studies they are negative or at least very small (Tichy, 1990b).

[5] There exists a declining tendency, however, from slight positive abnormal returns in the sixties to slight negative ones in the eighties (Jarrell *et al.*, 1988, p. 53).

[6] Some argue, however, that takeovers may be gainful primarily for insiders: The rise of share prices before the announcement of the takeover can result only from informed managers' purchases (Mueller, 1986, p. 208). Jarrell *et al.* (1988, p. 53) oppose that the relevant information could have been extracted from the financial press: There exists an "active market for information" concerning future takeovers.

[7] To justify the premia paid in the period 1976—1984 in the U.S., the performance would have to be lifted from average to top decile (Alberts and Varaiya, 1989, p. 143).The high premia do not result from overoptimism and manager hubris only. Systematically always the very one manager will win the takeover competition who is the most optimistic one and therefore prepared to pay the highest premium (Giliberto and Varaiya, 1989).

[8] "Successful in their main line operations and perhaps in early diversification mergers, they overestimated their ability to manage a sizeable portfolio of acquisitions, large and small, related and unrelated. By the time they learned that they had erred, they had already overextended themselves and were unable to cope with the problems emerging from the accumulated acquisitions" (Ravenscraft and Scherer, 1987, p. 212).

[9] According to Caves (1988, p. 165) tax savings are of minor importance.

[10] Geroski (1989) presented the washing machine industry as a most interesting exaple: Even if the minimum optimal size is rather large (around 1 mill. machines/year) the industry is less concentrated as one would expect, and no truly international market exists. Multinational enterprises producing in plants spread all over Europe earn a profit rate of 7—8%, exporters with one national plant and Europe-wide distribution earn 13—14%, while firms concentrating on national markets earn as much as 20—35%.

[11] Rodrik (1989) was able to demonstrate that Korean shipments to U.S. had a higher unit value than Taiwanese ones (+27%), because the larger Korean conglomerates were able to build reputation and branch loyalty.

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# Appendix

Summary table on size and performance

| Autor | Country time | Data | Sector | Indicator | Result for small firms | Qualifications |
|---|---|---|---|---|---|---|
| Sasaki 1981 | Japan 1966—1974 | Aggregate data establishments | Manufacturing | Employment, value added per employee | Employment share increases, productivity lower, productivity growth faster | |
| Reinganum, Smith 1983 | U.S.A. 1964—1978 | Accounting data grouped | Manufacturing | After tax returns | Larger in small firms | Small firms' returns are higher even after risk adjustment |
| Aiginger, Tichy 1984 | Austria 1976—1983 EC 1975 | Macro data also: accounting data | Manufacturing other sectors total economy | Employment, value added, profits | Employment share increases, profits higher, productivity decreases with size of firms (not plants) | Breakdown in sectors supports better performance of small firms |
| Burns, Dewhurst 1986 | U.K. 1975—1980 | Macro data | Manufacturing | Employment, profits | Employment share increases, return on net assets independent of size, on total assets and on equity increases with size | |
| Madsen 1986 | Denmark 1973—1982 | Aggregate data establishments, enterprises | Manufacturing | Employment, profits | Share of firms, establishments and employees increases, profits higher | |
| Pleitner 1986 | Switzerland 1965—1975 | Aggregate data | Total economy | Employment | Employment share increases | |
| Italy 1986 | Italy 1971—1981 | Aggregate data | Manufacturing | Employment, value added | Employment share increases, value added per employee lower convergence over time | |
| Vickery 1986 | France 1973—1980 | Aggregate data, establishments | Total economy | Employment | Share of employment increases | |
| Aiginger, Bayer 1987 | Austria 1976—1984 | Constant sample | Manufacturing | Employment | Share of smaller firms increase | |
| Bade 1987 | F.R.G. 1970—1983 | Aggregate data | Manufacturing total economy | Employment, sales | Employment share increases, sales decreases, sales per employee higher in larger firms | Size classes partly grouped according to nominal sales |

*Appendix (Continued)*

| Autor | Country time | Data | Sector | Indicator | Result for small firms | Qualifications |
|---|---|---|---|---|---|---|
| Storey D. J. *et al.* 1987 | U.K. 1971—1980 | Sample of 600 firms, fixed sample | | Profit (before tax) to total assets | Lower for small firms | Job generation process is more important than shifts of cross shares |
| Irsch 1988 | F.R.G. 1979—1985 | Aggregate data, firms | All industries | Profits (before tax) to assets (or sales) | Larger for small firms | 12,000—14,000 firms (different across years) |
| Irsch 1988 | F.R.G. | Aggregate data, firms, branches | All industries | Profits to assets, resp. to sales | Larger for small firms | Tendency evaporates after (problematic) adjustment for risk |
| Johnson 1989 | U.K. 1975—1985 | Micro data cohorts | Manufacturing | Employment | Share of small firms increase | Breakdown into classes does not change tendency |
| König, Weißhuhn 1989 | F.R.G. 1980—1986 | Micro data 38 sectors | Total economy | Employment | Employment share of small firms increase | 38 sectors entry and exits can be separated |
| OECD 1989(A) | Canada 1981—1986 | Shares aggregate data | Manufacturing | Employment | Employment share increases | |
| OECD 1989(B) | Italy 1978—1985 | Shares aggregate data | Manufacturing | Employment, profits, value added | Employment shares increases, profitability is higher, value added per employee smaller in small firms | |
| Uhlmann 1989 | F.R.G. 1977—1987 | Aggregate data, firms (20 and more employees) | Manufacturing and mining | Profit (before tax) to gross output value | Larger for small firms | Holds in each year, also after adjusting for owner's salary |
| Acs, Audretsch 1990 | U.S.A. 1976—1982 | Micro data | Manufacturing | Productivity increase | Larger in small firms in 13 out of 19 sectors (small = less than 500 employees) | Determinants of small firms growth is objective of the paper |