

Efficiency and Profitability: An Inverse Relationship According to the Size of Austrian Firms?*

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ABSTRACT. This paper tries to shed some light on the Austrian situation of the efficiency of firms according to their size class. For total Austria we find that large firms seem to be more efficient with respect to value-added per employee, but small firms are more efficient with respect to the gross residual quota and to profitability ($= (\text{value added} - \text{wages}) / (\text{value added})$). On the other side a similar analysis for Upper Austria does not show this result. Here firms with the size of 500 employees or more seem to be the most efficient with respect to efficiency and profitability, and only the employment cost efficiency criteria reveals the picture, the smaller the firm, the more cost effective it seems to be. Hence, the result obtained from most studies in Europe, that at least the biggest firms are not the most efficient, can only be confirmed to a limited extent for (Upper) Austria.

1. Introduction

The advantages and disadvantages of large and/or small enterprises have been discussed over and over again in the industrialized western world. Nevertheless, the empirical results of most studies in industrial economics are far from being unequivocal. One reason may lie in the fact that the relative advantages of specific size classes of enterprises may change within time due to the given state of technology and the organisation as well as the nature of demand and supply. To the author's knowledge, an overall superiority of one class size of firms has not been clearly demonstrated so far. Moreover, a closer investigation of this question reveals that the different lines of

research and the different results need not automatically contradict each other. Most authors use different samples, different time horizons and different indicators. If the authors would try to pose identical questions and apply the same theoretical as well as empirical methodology they could come out with possibly consistent answers. However, one general result has been found quite often, that is that a general superiority of large firms has not been detected in this field of research.¹

In this paper an attempt is made to shed some light on the situation in Austria and to show, what the results are for the situation in Austria. In Part 2 a short review of the literature is given, from which six hypotheses are formulated. In Part 3 some empirical results for Austria as a whole are presented, which deal with efficiency and profitability of the manufacturing and non-manufacturing sector in Austria and the employment situation in the manufacturing sector. A first attempt is also made to empirically test these hypotheses with data for Upper Austria. In Part 5 a summary is given and some preliminary conclusions are drawn.

2. Some theoretical considerations about small versus large firms performance

2.1. Some short remarks on the literature

The literature on the performance of small firms has been booming since the late seventies. The majority of the studies conclude that small firms are superior according to particular performance measures. This result is more or less unique, but there are some differences according to the indicators, methods and countries, so that a fair

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conclusion seems to be that there is overwhelming evidence that smaller firms and enterprises are, in general, not inferior to larger units. Even this more modest result is a surprise for economists (e.g., Pratten (1988)), who believe that economies of scale and scope should exist.

Empirically the relative performance of firms according to class sizes are either measured with the indicator value-added per employee (efficiency measure) or value-added minus wages divided by value-added (profitability measure). The oldest measure of performance in industry studies has been defined as value-added per employee. The problem with this measure is, that output is only related to one input (labor) and moreover, that this input is only measured quantitatively. For example, Acs and Audretsch (1990), Schwalbach (1990), Kleijweg and Thurik (forthcoming) and Birch (1979) find out that the share of the value-added of small firms is increasing, and that of large firms is decreasing. This result is not only available for many manufacturing sectors but also for the total economy. One of the major problems, when comparing the value-added of firms according to their class sizes, is that such a comparison between two points of time quite often mixes up the development of existing groups of firms, the newcomers and bankrupt ones and on top of that the change of firms in the reference (size) group. Fortunately, there are some studies (Geraski and Schwalbach (1991), Reynolds (forthcoming)), which demonstrate that the increasing number of small firms (with a high value-added) cannot be seen as the result of the above mentioned problems. For example, König and Weißhuhn (1988, 1990), who investigate the employment in 38 branches of manufacturing and service industry in Germany, are able to divide gains and losses into new, abandoned and surviving firms. Again the authors reach the same result, i.e., that small firms seem to be more efficient.

An increasing number of employees working in small firms is another quite obvious indicator of the superiority of small firms. The studies of Acs and Audretsch (1990), Fritsch and Hull (1987), Gray (forthcoming), Storey (forthcoming) and Birch (1979) demonstrate the outstanding employment performance of small firms. Birch's study has been criticized (e.g., by Eckart, Von Einem and Stahl, 1987), but has also gained a lot

of support (e.g., by Armington and Odle, 1983). Similar results about the better performance of small firms are available for many European states.²

Another quite traditional and powerful measure is profitability, which — due to data reasons — is quite often defined as value-added minus wages divided by value-added. In the majority of recent studies for European countries it is indicated that profitability declines according to the size of the firm.³

Scherer (1980) shows that for the United States profits were slightly higher in large firms during the years 1975–77, but the average after tax return showed a greater difference than 1 percentage point between the largest and smallest firms. That means, that there is obviously no significant difference between the profit situation of small and large firms in the US over these two years. Gray (forthcoming) and Reynolds (forthcoming) reach similar results.

In general, this very short review of the literature shows, that the majority of studies conclude that small firms measured by performance and efficiency criteria, seem to be superior to larger ones, or, a bit more modestly formulated, that one cannot detect a systematic superiority of large firms over small firms.

2.2. *Six hypotheses about the relative superior performances of small firms*

In spite of the overwhelming empirical evidence on the superiority of small firms, Aiginger and Tichy (1991) quite rightly argue, that there is no comprehensive theory available to explain the high performance of smaller firms. They form six hypotheses in which they try to demonstrate that there may be also some theoretical justification for the superior performance of small firms. These hypotheses will be reported below, but it must be said that they do not come from a coherent theory or from a developed theoretical model and the authors admit that some of the hypotheses may only be valid in special circumstances and may not hold forever.

Hypothesis 1. The higher profitability of smaller firms is reflected in lower wages, social benefits, and less regulation (Aiginger and Tichy, 1991).

The authors argue, that wages per capita increase with the firm size. The reasons for this include the fact that large firms are usually located in agglomerations with higher wage brackets (also in large firms the attraction of higher qualified labor may be larger, etc.). One could start a long debate using the efficiency wage hypothesis, which tells us that if people are paid better in large firms, they should work harder. Moreover, large firms have an advantage in bargaining with the government for additional subsidies, so that the higher wage should be offset by other cheaper input factors and by higher productivity.⁴

Hypothesis 2. Small firms increase employment as demand shifts to sectors with low optimal sizes, service components determine competitiveness, and demand is more differentiated. This hypothesis mainly comes from the fact that demand has been shifted from manufacturing to the service sector, which may partly explain the overwhelming dominance of small firms in the business world.

Hypothesis 3. Small firms have to earn a higher average return, since their individual risk is larger. It has been demonstrated in the literature that the individual risk of smaller firms is much higher.⁵ Obviously risk-averse investors only invest in smaller firms if they are more profitable. This means that small firms have to reach a higher profit in order to survive, especially in the share market.

Hypothesis 4. Smaller firms are owner-managed firms aiming at profit maximization, larger firms are manager-controlled, aiming at maximizing the manager's utility function (amongst other things). The body of literature on this topic is large and will not be replicated here, especially as the well-known "principal agents problem" relating to this problem has attracted a considerable amount of attention among economists.⁶

Hypothesis 5. Smaller firms can react more rapidly to a changing demand. With this argument, Aiginger and Tichy put forward the idea that managers in smaller firms are closer to the market and therefore react more quickly to a likely change. As their income is even more directly linked to the firm's success (this holds also for the

other employees), they show more and bigger flexibility than large firms. In these large firms the information problem arises first of all and furthermore a change of the market structure is not felt as strongly as in small firms, which generally produce only one product or a small amount of different products.

Hypothesis 6. Technical development favored larger units in the sixties, and miniaturization of chips made electronic device attractive for smaller units. Aiginger (1988) argues that computer aided design, computer aided production and flexible automation may favor overproportionally smaller units since the very small batches are becoming more attractive.

As Aiginger and Tichy (1991) argued, these are some tentative hypotheses which could help to explain the surprising performance of smaller units in the seventies. They are open to empirical falsification. This will be attempted in the next section with data for Austria as a whole and more specifically with data for Upper Austria, one of the Austrian states.

3. Empirical results of small versus large firms' performance

3.1. Some descriptive results for overall Austria

As already stated, this question has also been analyzed in Austria and the pioneering work has been done by Aiginger and Tichy (1991 and 1984). In Tables I–V the most important results for Austria are reported.

Table I shows the efficiency and II the profitability in the non-manufacturing sectors and the total economy in Austria for the year 1983. The results of these two measures are not unique. If we consider efficiency first of all, we find, that the largest firms have the highest efficiency in the categories, all industries, retail trade and construction. If we go to profitability, we find precisely the opposite result; that in all three categories in the non-manufacturing sector the smallest firms have the highest profitability. One (ad-hoc) explanation may be that, *ceteris paribus*, we have more state-owned firms, as a result of the firm size (a

TABLE I
Efficiency and profitability in Austrian non-manufacturing
sectors and total economy, 1983

Firm size class (according to employment)	Efficiency (= value-added per employee) in 1,000 AS		
	Construction	Retail trade	All industries
0-99	275.3	235.8	287.3
100-499	323.0	310.7	416.5
500-999	307.0	283.4	404.3
1,000 and more	331.0	331.3	440.9
All sizes	291.2	254.6	384.5

Source: Aiginger and Tichy (1989) and Central Statistical Office, *Bereichszählung* (1983).

TABLE II
Efficiency and profitability in Austrian non-manufacturing
sectors and total economy, 1983

Firm size class (according to employment)	Profitability (= (value-added minus wages)/value-added) in %		
	Construction	Retail trade	All industries
0-99	32.6	47.7	41.8
100-499	21.3	40.0	37.4
500-999	6.6	31.9	29.5
1,000 and more	8.2	39.1	27.9
All sizes	26.7	44.8	36.6

Source: Aiginger and Tichy (1989) and Central Statistical Office, *Bereichszählung* (1983).

thousand and more). Due to various reasons these state-owned firms pay higher wages (compare Bartel and Schneider (1987), and Schneider and Bartel, 1989 and 1991) so that the profitability in this group may be lower simply because of this fact. In Tables III and IV the situation for the Austrian manufacturing sector for the year 1983 is shown. If we first turn again to the efficiency measure, we have, in principle, the same contradictory results as for the non-manufacturing

TABLE III
Efficiency and profitability in Austrian manufacturing sector,
1983

Firm size class (according to employment)	Efficiency (= value added per employee) in 1,000 AS		
	Enterprises		Firms without the very smallest ^a
	All	Without oil and tobacco	
0-99	252.4	249.6	349.1
100-499	341.4	336.4	430.1
500-999	372.0	372.0	375.9
1,000 and more	451.9	370.6	388.8
All sizes	335.1	309.1	—

Source: see Table I.

^a Selection according to industrial statistics 1983/II: including mining, excluding "Gewerbe" (= see service industries).

TABLE IV
Efficiency and profitability in Austrian manufacturing sector,
1983

Firm size class (according to employment)	Profitability (= (value-added wages)/value-added) in %		
	Enterprises		Firms without the very smallest ^a
	All	Without oil and tobacco	
0-99	34.0	33.6	35.0
100-499	26.6	25.9	39.4
500-999	27.8	27.8	27.3
1,000 and more	30.7	16.0	19.1
All sizes	30.5	25.9	—

Source: see Table I.

^a Selection according to industrial statistics 1983/II: including mining, excluding "Gewerbe" (= see service industries).

sector, but with two exceptions: The first is, that if one excludes the enterprises oil and tobacco, where value-added includes high indirect taxes, then the firm size of 500-999 has the value added per employee. The second one is, that if we exclude the very smallest plants and "Gewerbebetriebe" in the manufacturing sector, we see that the firm with between 100 and 499 employed persons has the highest value added per employee. If we turn again to the profitability measure, we

TABLE V
Employment trend in a sample of manufacturing firms
(Austria)

Size class of the firm (according to 1980) employment	Number of firms	Employees		
		Level 1976	Level 1984	Change 1984/76
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

Source: see Table I.

find the result (with the exception of the category "plants without the very smallest"), the similar result, i.e., that the smallest firms (0—99 employees) have the highest profitability. Only in the previously mentioned category, is the firm size (between 100 and 499 employees) somewhat

higher. Finally in Table V the employment trend in a sample of manufacturing firms in Austria is reported. The table clearly shows that employment increases by about 4.6% only in firms with less than 100 employees, and decreases by about 6.0, 8.0 and 13.0% in the remaining larger classes. Again, this is an indicator that performance of small industries seems to be superior to that of large firms.

The result, that the efficiency (= value added per employee) is considerably higher in large firms, and profitability lower in this group, may be explained in such a way that a considerable amount of large firms are state-owned or semi-state-owned (i.e. owned by state-owned banks). In Table VI the biggest industrial enterprises in Austria in the year 1987 are presented and this table clearly shows the overwhelming dominance of state-owned enterprises or enterprises which are state-owned through nationalized bank firms. These state-owned firms were specifically used to reach certain regional policy goals, for example

TABLE VI
Largest industrial enterprises of Austria 1987

Firm's name	Branch	Total sales in bill ASH	Total employment	Ownership ^a
VOEST-Alpine	Steel	56.7	59,005	S
ÖMV	Oil	47.6	9,270	S
Siemens Austria	Electr. Engineering	17.2	15,574	FM
Philips Austria	— " —	15.2	9,800	FM
Steyr-Daimler-Puch	Car	13.2	12,487	S/B
Chemie Holding	Chemicals	10.9	6,059	S
Constantia Holding	Paper, Woodproc.	10.9	6,100	P
General Motors Austria	Car	9.3	2,600	FM
Schärdinger	Food	8.8	1,527	P
AMAG	Aluminium	7.9	5,103	S
Elin	Electr. Engineering	7.9	8,120	S
Unilever Austria	Food	6.9	3,700	FM
Hoechst Austria	Chemicals	6.5	2,090	FM
Bau Holding	Construction	6.5	5,051	S/B
Leykam	Paper	5.8	2,825	S/B
Porr	Construction	5.2	3,601	S/B
Swarovski	Glass	5.1	4,877	P
Veitscher Magnesit	Stone	5.0	3,096	FM
Danubia	Chemicals	4.8	808	S
Lenzing	Chemicals	4.7	3,894	S/B

^a Ownership: S = state owned (directly); S/B = state owned through nationalized banks; FM = foreign multinational; P = private Austrian.

Source: Chaloupeck (1989).

the higher employment and high purchasing power of the employed persons to stabilize the local economy (in order to win elections). The overwhelming dominance of state-owned firms may be one possible explanation for the fact that the profitability result is the opposite to the efficiency one, as it is measured here. So far, these descriptive empirical results only partly confirm the six hypotheses, i.e., we only find a superiority of small firms with respect to profitability.

3.2. *A preliminary empirical test of the hypotheses in favor of the superiority of small firms*

3.2.1. Performance criteria measure. In this section a second attempt will be made to test the above stated hypotheses, which all more or less predict a higher profitability of smaller units. We shall now try to test these hypotheses by splitting up the efficiency and profitability measures into six different indicators. In Table VII three measures for rentability/profitability are shown: The gross and net residual quota (see Aiginger (1982)) which are used as proxies for profit shares in turnover, to make up for the lack of information about profits.⁷ The third measure is turnover-rentability, which puts the net production value minus wage cost into relation of turnover. The second criteria is labor efficiency, where two traditional measures (net output and turnover per capita) are used. The third one is efficiency of employment cost, where

labor cost per capita is used and where a low cost of labor means advanced efficiency and competitiveness.

3.2.2. Empirical results. The three different performance criteria which have been established are now used to test the hypotheses, using data from all industry sectors of the state of Upper Austria. The data are from 1976 to 1983, i.e., eight years are covered in order to avoid the problem of spurious results.⁸ The data consists of all industrial firms in Upper Austria, according to the classification of the Central Statistical Office. As it was not possible to classify these industries according to class sizes in employment, it was done here with respect to the gross production value. In Table VIII the Upper Austrian firms are shown according to class sizes (with respect to gross production value). If one compares the class sizes according to the production value with the category employment per firm, one sees that the four different classes are somewhat different to the ones, which were used for Austria. The biggest firm here now starts with 548 or more employees, whereas the smallest has only 10 employed per firm. Due to the statistical law in Austria, only these 4 categories could be formed.

In order to check now, whether we will see the same systematic differences as we have already discussed for the whole of Austria, an analysis of variance of the performance ratios of the different firm size enterprises in Upper Austria over the

TABLE VII
Performance criteria for comparing the firms according to their size class

Performance criteria	Definition ^a	Dimension
Rentability/profitability:		
Gross residual quota	$GRQ = (NPV-LC)/NPV$	Percent
Net residual quota	$NRQ = (NPV-LC-IN)/NPV$	Percent
Turnover rentability	$TUR = (NPV-LC)/PJ$	Percent
Labor efficiency:		
Net production per capita	$NPVC = NPV/EMP$	Mio. S
Turnover per capita	$TUC = TU/EMP$	Mio. S
Efficiency of employment cost:		
Labor cost per capita	$LACC = LC/EMP$	Mio. S

^a Symbols: EMP = employment; IN = gross investment expenditure; LC = total labor cost; NPV = net production value (= depreciation) + (indirect taxes - subsidies) + (payments for service inputs) + (profits (or losses)); TU = turnover.

period from 1976 to 1982, is undertaken in Table IX. The first result is, that for all 6 performance criteria measures we have significant differences over the 4 size classes of firms. But the most striking result is, that in the case of Upper Austria the result shows that the larger the firm, the better the performance. If we first consider the three rentability measures, the medium-sized and large firms clearly dominate. We get the same result using the labor efficiency criteria. However, a small deviation of this overall result emerges: when the measure turnover per capita is used the medium-sized firms clearly dominate over the large firms. Only for the criteria, employment cost efficiency, the very small firms have a clear superior employment cost efficiency compared to the large

firms. This is the only incident, in which we got our expected result, according to the stated hypotheses. Hence only in one out of five performance measures can we confirm our hypotheses. Finally, in Table X, the ranking of the different efficiency measures according to the firm size of the Upper Austrian industries are summarized. Once again we see that with the exception of employment cost efficiency, either the large or the medium-sized firms have the "best" efficiency, and small and very small firms ranked in third or fourth place.

In brief, these results are somewhat contrary to the results for the whole of Austria. Most of the stated hypotheses cannot be confirmed here, but in order to give a careful explanation, as to why we achieve this result, much more detailed empirical

TABLE VIII
Main characteristics of the Upper Austrian industrial firms according to their size class, period 1976 to 1983

Variable (mean over group and size)	Very small firms	Small firms	Medium-sized firms	Large firms
Size class according to gross production value (Mio. S.)	0 to 10.0	10.0 to 50.0	50.0 to 100.0	100.0 and over
Employment per firm	10	46	106	548
Net production value per firm (Mio. S.)	1,729	10,319	28,466	199,324
Number of firms	435	400	143	183
Employed persons	4,243	18,459	15,194	100,190

Source: Industrial statistics of the Central Statistical Office, Vienna, various years, and Bartel (1990).

TABLE IX
Analysis of variance of performance criteria of the different firm-size enterprises of the Upper-Austrian industrial firms over the period from 1976 to 1983

Performance criteria	Average				Level of significance (d.f. = 28)
	Very small firms	Small firms	Medium-sized firms	Large firms	
Rentability:					
Gross residual quota (%)	3.92	26.03	32.33	34.32	0.01
Net residual quota (%)	1.27	8.59	15.77	15.50	0.01
Turnover rentability (%)	1.50	10.70	12.42	10.59	0.01
Labor efficiency:					
Net production per capita (Mill. S.)	0.139	0.227	0.270	0.362	0.01
Turnover per capita (Mill. S.)	0.052	0.553	0.681	0.120	0.01
Employment cost efficiency:					
Labor cost per capita (Mill. S.)	0.115	0.169	0.187	0.244	0.01

Source: Bartel (1990).

research has to be undertaken. Moreover, one should mention a caveat here: First of all the grouping into firm sizes is not precisely the same as for the whole of Austria, especially as the very large firms have not been separated. Moreover, all industrial firms had to be used and could not be grouped into "manufacturing" and "non-manufacturing" construction, etc. But there may be another reason for this. Most Upper Austrian state subsidies are granted to bigger firms, either coming from the central government, generally going to the state-owned ones (big steel and chemical plants) or coming from the state government and then going to the bigger private ones, which settle in regions where there are not many industrial plants. Hence, there may be a systematic bias due to a "one-sided" state industrial policy program.

If we briefly consider the main elements of Austria's industrial policy we see that "investment promotion" has traditionally been the central focus point. A basic idea was, that the higher rate of investment (share of investment in GDP) is a necessary (hence not sufficient) condition to achieve a higher rate of economic growth. Since 1950 two kinds of investment incentives have been applied simultaneously: Indirect tax incentives and direct incentives (e.g., wage subsidies). Tax incentives have been used since the early fifties and an accelerated depreciation was the main tax incentive. Accelerated depreciation was later supplemented by alternative incentives, such as the allowance to deduct an additional (to normal depreciation) 20% of the cost of fixed

asset of taxable profits and the possibility to form a financial reserve of up to 25% of taxable profits to be used for investment in plant and equipment within the next five years. Direct incentives were used for almost as long, and there are various forms of interest subsidies loans and loan guarantees, which are guaranteed upon application to enterprises for investment projects. Such schemes were considerably expanded in the years following the recession of 1975. Especially with the latter instrument the government had quite a powerful tool to steer specific grants to either state-owned or bigger private firms. One reason for the government to act in such a manner was, that they believed that subsidising larger firms is a more effective way of reaching its selfish policy goals (compare e.g., Bartel and Schneider, 1987).

4. Summary and a final remark

This report tries to shed some light on the situation of the efficiency of firms according to their size class in Austria. On the whole we find that large firms in Austria seem to be more efficient with respect to value-added per employee, but small firms are more efficient with respect to the gross residual quota and to profitability (= (value added - wages)/value added). On the other hand a similar analysis for Upper Austria does not show this result. Here firms with 500 employees or more seem to be the most successful with respect to efficiency and profitability, and only the employment cost efficiency criteria reveals the pic-

TABLE X
Ranking of the Upper Austrian industrial firms according to the results of the efficiency comparisons

Performance criteria	(1) Ranking according to efficiency			
	1.	2.	3.	4.
Rentability/profitability:				
gross residual quota	large, medium-sized	—	small	very small
net residual quota	medium-sized, large	—	small	very small
turnover rentability	medium-sized	small	large	very small
Labor efficiency:				
net production per capita	medium-sized	small	large	very small
Employment cost efficiency:				
labor cost per capita	very small	small	medium-sized	large

Source: Bartel (1990).

ture; the smaller the firm, the more cost effective it seems to be. Hence, the result obtained from the majority of studies in Europe, that (at least) the biggest firms are not the most efficient, can only be confirmed to a limited extent for (Upper) Austria. But, at this stage, it must be said, that these are preliminary results, which have to be tested more carefully. The different types of industries (manufacturing, construction, service, industry, etc.) should be separately tested for Upper Austria, and an attempt should be made to group the firms into more classes. At least one preliminary conclusion can be drawn: that which was internationally found to be easily applicable, was not the case for Upper Austria. This at least gives the author of the report a strong incentive to continue with this research and to find out the reason for such a relatively different result for (Upper) Austria, compared to the findings of most other studies for western states.

Notes

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¹ Compare, e.g., the work by Acs and Audretsch (1990), Aiginger and Tichy (1989), Aiginger (1987a, 1987b, 1988), Auquier (1980), Bade (1987), Bock (1987), Burns, Dewhurst (1986), Hoffmann (1986), Dahremoeller (1985), König and Weißhuhn (1988, 1990), Pratten (1988), Reynolds (forthcoming), Schwalbach (forthcoming) and White (1982).

² For Austria, compare: Aiginger and Tichy (1989) and Bartel (1989, 1990); France, Schwalbach (forthcoming); Great Britain, Burns and Dewhurst (1986), Storey (forthcoming) and Hughes (forthcoming); for Germany, Irsch (1988), Bade (1987) and Fritsch (forthcoming); for Ireland, Gowen *et al.* (1986); Italy, Invernizzi and Revelli (forthcoming); Portugal, Mata (forthcoming); and for Switzerland, Pleitner (1986).

³ Quite a strong decline is shown by Irsch (1988) for Germany; by Burns and Dewhurst (1987) for France, Italy and Denmark. For further countries studies see Note 2.

⁴ This is partly true for Austria, compare the results in Table I and II.

⁵ Compare Irsch (1988) and Neumann, Böbel and Haid (1979).

⁶ A short summary of the main arguments is given by Bartel and Schneider (1989). For further literature see the same source.

⁷ The difference between the two measures is that one measure investment is in the calculation (gross residual

quotient) and the other is taken out in the calculation of the net residual quotient.

⁸ E.g., in a certain year a class size may have had an investment boom or a "bad" year for various reasons (losses in export, etc.).

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