

Bank Size, Mutuality and Market Success of German Co-operative Banks

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Problem

Few other areas of German banking, have seen the structural transformations as significant as within the co-operative bank sector in recent years. Besides a dynamic and organic growth, a number of mergers increasingly contributed to the fact that the average German credit co-operative increased its total assets by 51.6 per cent to DM 417.4 million from 1993 to the end of 1999 alone. At least, the business success achieved in this growth process seems not to put into question the strategy in general and thus a great number of additional mergers has already been announced.

Particularly with regard to the specific structures of co-operative banks, however, it can be doubted whether the organisational frame and the mutual spirit by statute of today's co-operative banks are still appropriate for the current bank sizes and thus, whether the growth strategy does not also carry negative concomitants. From this background, we will briefly outline the market success of German co-operative banks in recent years and contrast the findings with the latest discussion about member orientation as the statutory main goal. Within the framework of a simple empirical analysis, we will finally investigate whether an increasing bank size also has negative consequences for the members of German credit co-operatives.

Market success and optimal bank size

German co-operative banks are a comparatively successful banking association. In 1998, they generated a market result¹ of 0.77 per cent of the business volume which is lower than the result of the community banking sector but considerably above the total banking industry average of 0.55 per cent.

The return on equity of the co-operative banks was also outstandingly high between the years 1994 and 1997, even though it shows a downward trend as displayed in Figure 1. In 1998, however, the return of the co-operative banks was clearly below average which was considerably influenced by the extraordinary development of the private commercial banks.²

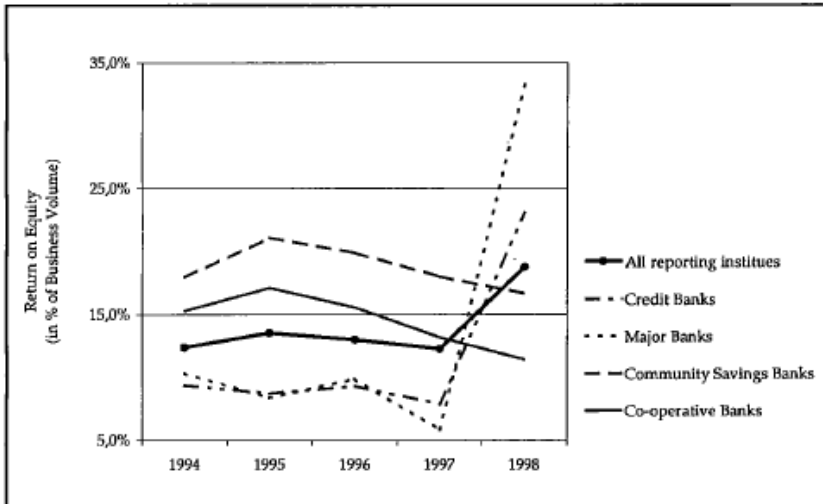


Figure 1: Return on equity for the years 1994-1998 (source: Deutsche Bundesbank)

Additionally, the high market shares can also be interpreted as an indicator of business success. Measured by the volume of deposits in Germany's universal banking business, the co-operative banks were able to extend their market share continually over the past 25 years. In 1998, this was about 23 per cent. For the bank loan business, the market share was kept on a nearly constant level for the past 15 years. In 1998, it was about 17 per cent. One important basis for this market success is the extensive network of bank branches. With 18,471 branches by the end of 1998, the co-operative banking sector, has one of the largest networks in the world. On the one hand, this is considered to be a competitive advantage because of its almost unique proximity to the client. On the other hand, however, it is connected with comparably high administrative costs³ which at 2.34 per cent of total assets in 1998, are positioned far above the overall banking industry of 1.16 per cent. With increasing competition, not least from direct banking alternatives, and incremental market transparency, this cost disadvantage becomes ever more difficult.

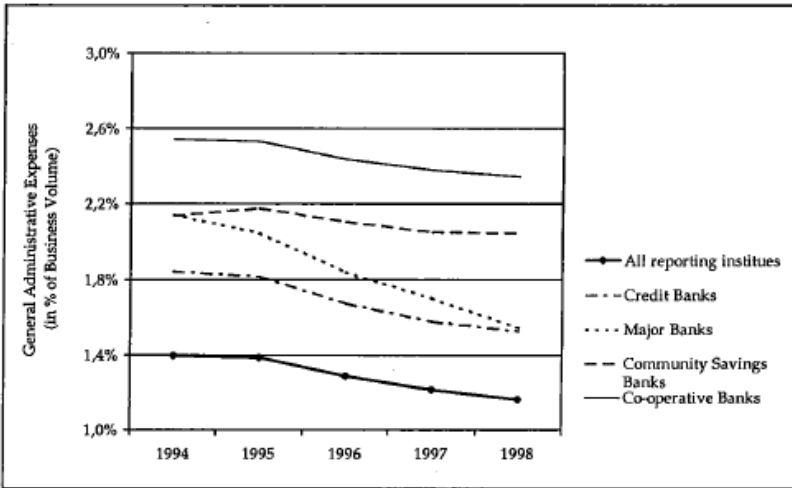


Figure 2: Administrative costs (in % of business volume) in 1994-1998 (source: Deutsche Bundesbank)

Numerous co-operative banks are trying to achieve growth by concentration, in particular to improve this disadvantageous structure.⁴ According to the former president of the Bundesverband der Deutschen Volksbanken und Raiffeisenbanken (BVR - the federal association of German co-operative banks), Wolfgang Grueger, nearly 1,200 of today's 2,000 co-operative banks will lose their independence. With this forecast, he refers to a study by the management consultancy AT Kearney, commissioned on behalf of the BVR, about the future of German co-operative banks. These predictions are supported by several recent scientific findings concerning the optimal, cost efficient bank size. Various studies analysing size efficiency and economies of scale of US banks are leading to relatively conforming results. According to them, the average costs in dependency of the bank size can be pictured by a flat U- or L-shaped curve.⁵ Thus, smaller institutes can achieve scale economies. Ohlmeyer and Phillipowski consider a volume of total assets of nearly DM 100 million as economic minimum operating size for German banks, at the same time not excluding regional variations and expecting an upward trend over the course of time.⁶ According to other statements, the set up of a separate loan department for commercial clients pays only with total assets starting at DM 300 million.⁷ Concerning the cost structure of 1,490 German universal banks, Lang and Welzel found, that economies of

scale can be expected for banks with total assets of between DM 2 and 5 billion.⁸

As the above mentioned studies have already indicated, most analyses judge the ideal operating size by cost structures. It is questionable, however, whether this procedure guarantees the recording of all factors of influence on an ideal banking size, since a considerable deviation results from a number of different factors.⁹ The smallest regional German association of co-operative banks, "Weser Ems e.V.", for instance, currently advises 113 co-operative banks with a business volume of about DM 22 billion at present. Most of these banks have a volume of total assets that is less than DM 150 million and thus belong to the smallest co-operative banks in Germany. Still, these institutes have been at the forefront of co-operative banks concerning their profitability and equity position for years. It is thus not possible to derive an indisputable superiority of any growth strategy for German co-operative banks from empirical findings about the ideal bank size alone. If so far the superiority of focusing on a dynamic growth has not finally been empirically proved, this strategy should at least be compatible with general co-operative goals. Whether there is a conformity of goals in this respect will be analysed in the following paragraph.

Mutuality

Since supply gaps in the sector of financial agency have ceased to exist and the equal treatment of members and non-members has increased, the content of the mission to act in the interest of the members of co-operative banks repeatedly has had to be adjusted to the market surroundings.

Section one of the German Co-operatives Act (Genossenschaftsgesetz, "GenG") stipulates that the purpose of a co-operative bank must be "activities supporting its members' acquisitions or economic activities by the means of mutual business operations." Pragmatically seen, co-operative banks should therefore offer services to their members which otherwise they could not, or only at higher costs, obtain from other institutions, or which are of a higher quality. As far as such standards are still of importance is questionable considering today's market situation. However, the modern co-operative bank can differentiate itself from its competitors by meta-economic services as well, and thus fulfil its task to carry out member oriented activities. This is the case if the strong regional orientation, which encompasses municipal, cultural, and social organisations as well, and at the same time the form of codetermination, which strongly differs from all other companies

typical for banking, contribute to establish close personal relations between members and managers.

Now the question arises, whether growth strategies may lead to a conflict with meta-economic services in particular. Especially as a consequence of mergers, the decrease of the regional bond of the co-operative bank and of the social relations among its members can not be ruled out.¹⁰ If elements are included in member oriented activities, which are neither focused on the achievement of savings nor giving the chance to raise new income for its members, growth must be analysed in this context as well.

With increasing bank size and therefore a growing number of members, the single voice counts less and the individual's power to influence diminishes. In this context, it has been noticeable for some time that there has been a declining willingness to participate by the members of co-operative banks. A positive explanation for this development says that co-operative banks are fully meeting the expectations of their members, who therefore do not see any reason to actively get involved. In this case, the lack of participation could be interpreted as an approval of the management's activities. However, there are other approaches critically judging the declining participation of members.

Participation and corporate governance

In the past, an advantage of co-operative banks was seen particularly in the control of both borrowers and management. This is at risk as a consequence of the dynamic growth of the banks and the increasing complexity of the banking business. The early co-operative banks were subject to a direct social control. All associates knew one another¹¹ and were thus able to assess their individual abilities as well. This means of monitoring resulted in very low costs and was reliable to both bank management and the members.¹² The business operations were simple and therefore easily understandable for all members. The members could actively participate in the processing of the operations. In this way, the early co-operative banks had a competitive advantage over banks and creditors through effective selection of borrowers and credit surveillance.¹³

With the growing size of the operation field, increasing complexity of the business operations, and a far-reaching break with the parity principle of co-operative banks, coupled with a growing anonymity among the members, the instrument of social control is losing its significance. At the same time, it became necessary to transfer the management to professional bank managers. That way,

more power to act was granted to the management. The management could at least theoretically abuse it in order to consummate non-pecuniary additional benefits by reducing its work commitment, doing without disciplining employees,¹⁴ decreasing its efforts to gain new and profitable operations¹⁵ and thus indirectly diminishing the success of the company. If the management is not successfully tied by incentive contracts¹⁶ or if it is not always and effectively under surveillance, this can lead to abuse. Uncontrolled bank management can keep the members "quiet" by occasional pecuniary and non-pecuniary allocations and can consume perquisites without a need to justify. If one considers the free-rider problem, which will be referred to later, the issue is exacerbated as the size of the organisation increases. This fact is particularly important in the merger trend within the co-operative sector.

The specific voting rules of co-operative banks causes a loss of significance of the single member with an increasing number of members. According to the "property rights idea", though, the value of a good decreases for the individual as the number of competing rights in the hand of other individuals rises. As a consequence the individual member will loose interest in protecting his rights with increasing bank size. Apart from the problem caused by the principle of democracy transaction costs are an additional argument for the decreasing willingness of the members to participate. Rationally, the members will only be willing to actively get involved with the co-operative bank, if the expected benefits exceed the participation costs. A member should be able to influence the organisation by his activities in a way that earns him ongoing advantages as compensation for his efforts. Such a member's compensation is unlikely for a number of reasons.

Firstly, the knowledge most members have about the economic scheme and problems a co-operative bank is confronted with, is becoming more and more complex in a way that the opportunity costs of an effective control and influence are prohibitively high.¹⁷ In many cases, the members cannot cope with this fact and might therefore not get involved anymore. Secondly, it is important to consider a "free-rider problem" suggesting a compensation for the control activities of a third party. For an individual member, it seems to be rational to renounce the adjustment of control mechanisms in order to economise the according transaction costs and to trust in other members to carry out an effective control. If, however, most of the members strategically act that way, a control deficit could easily emerge that carries negative consequences for all members and can be misused by the bank management. These studies suggest an optimum bank size. They claim that scale efficiencies can be achieved by many banks, but this improvement is comparably minor

in relation to the consequences of optimising x-efficiencies.¹⁸ Thirdly, a regulatory body, as exists for listed banks, is not present for co-operative banks.

At many private commercial exchange listed banks corporate control also takes place because of mechanisms triggered by the capital market. The idea of such a "market for corporate control" refers back to Manne¹⁹ He argues that if the executive board does not act to the satisfaction of the shareholders, this will usually lead to declining stock market prices. The management then has to take into account that other investors will take advantage of this situation which can result in a take-over of the company and a restructuring of the board. This mechanism does not apply to co-operative banks. In practice, co-operative shares can only be traded with the bank itself, and then only at face value (§ 72 II GenG). Legally, it is possible to transfer shares among co-operative members. However, these transactions require consent of the co-operative's management (§ 76 1,2 GenG). Considering the extremely high reserves as compared to the face capital, the threat of a withdrawal of capital by returning shares usually can not be a considerable sanction. All arguments referred to considered, it would appear that the management of co-operative banks is insufficiently regulated. This causes a "control vacuum" leading to so-called "internal co-operatives". At the same time, the problems arising for corporate control should aggravate with increasing bank size. How far these phenomena have consequences for the profit situation of co-operative banks, can be analysed empirically.

Empirical evidence concerning bank size and profitability

Considering the controversial discussion about the future structure of the co-operative banking sector and a stronger concentration by mergers demanded in this context, it is surprising that changes in profitability by rising bank size has not been analysed empirically in Germany yet. It is true that, particularly for the US and Canada, there is considerable evidence of cost advantages with increasing bank size also for co-operative banks²⁰, as was mentioned before. However, this evidence reveals no information about the profitability of these institutes. At any rate, provisional findings for Austria reveal reductions and thus the importance of weakening control with increasing bank size as evident for co-operative banks.

Based on 73 co-operative banks during the period 1987-1990, Gorton and Schmid²¹ investigate whether the profitability of a bank (measured by the return on total assets) decreases with a declining number of members. The results support the hypothesis that there

indeed exists a negative correlation. Gorton and Schmid find a deterioration of the return on total assets by 6.3 per cent with a doubling of the number of members. To sum up there is at least for Austria some empirical evidence that the prevailing control structures of co-operative banks are not ideal, and that the management is misusing its power to act which results in a lower return for co-operative banks with a large number of members.

In order to find out whether there is a negative relation between bank size and profitability in Germany as well, a random sample of 300 German co-operative banks was carried out on the basis of the annual accounts of 1998 published at the "Bundesanzeiger"²² Table 1 gives a survey about the structure of this random sample.

	Total assets (DM)	Loans (DM)	Deposits (DM)	Number of members
Minimum	301,318,707	122,520,644	171,644,618	1,032
Maximum	4,858,460,545	3,773,115,830	3,259,644,863	61,766
Average	788,805,629 (450,571,808)	507,830,141 (270,955,673)	572,809,685 (328,622,340)	11,781 (6,463)
Median	593,710,652	376,633,910	430,948,345	9,002
Standard deviation	601,249,073	412,496,077	418,230,263	8,950

Table 1: Random characteristics (data in parentheses display the according number for the totality of co-operative banks reporting to Deutsche Bundesbank)

Obviously, the co-operative banks in our sample are on average considerably larger than the overall average of the co-operative banking sector. This fact is a consequence of the limited obligation of smaller co-operative banks to report their annual accounts. They do not have to publish them at the "Bundesanzeiger".

To examine to what extent there is a connection between bank size and business success we measure size by the logarithm of the total assets (logTA) and the logarithm of the number of a co-operative bank members (logNM). Performance is measured by the residuum of interest result, commission result and general administrative expenditures, in the following called "market result" (MR). At the same time, according to Gorton and Schmid, we analyse the wage expenditures (PE), which is the sum of the yearly income statement

position "wages and salaries" and "expenditures statutory social contributions and compulsory contributions" and in addition the operating result as difference of MR and PE is also taken into consideration. For a further analysis, all three numbers will be related to the total assets (TA) We consider a dummy variable (E/W) in order to determine the origin of the co-operative bank, which takes the value 0 (1), if the registered office of the co-operative bank is in the former West German (East German) states. Specific characteristics which may be rooted in the different development of the two groups after the German reunification, can thus be controlled. Regression analyses are used as an instrument to estimate the functional form between the variables. The analysed 12 model equations are summarized in the following:

(I)	MR/TA	$=\beta_0 + \beta_1 \log TA + \beta_2 E/W + \varepsilon$
(II)	MR/TA	$=\beta_0 + \beta_1 \log NM + \beta_2 E/W + \varepsilon$
(III)	PE/TA	$=\beta_0 + \beta_1 \log TA + \beta_2 E/W + \varepsilon$
(IV)	PE/TA	$=\beta_0 + \beta_1 \log NM + \beta_2 E/W + \varepsilon$
(V)	(MR-PE)/TA	$=\beta_0 + \beta_1 \log TA + \beta_2 E/W + \varepsilon$
(VI)	(MR-PE)/TA	$=\beta_0 + \beta_1 \log NM + \beta_2 E/W + \varepsilon$
(VII)	MR/TA	$=\beta_0 + \beta_1 \log TA + \varepsilon$
(VIII)	MR/TA	$=\beta_0 + \beta_1 \log NM + \varepsilon$
(IX)	PE/TA	$=\beta_0 + \beta_1 \log TA + \varepsilon$
(X)	PE/TA	$=\beta_0 + \beta_1 \log NM + \varepsilon$
(XI)	(MR-PE)/TA	$=\beta_0 + \beta_1 \log TA + \varepsilon$
(XII)	(MR-PE)/TA	$=\beta_0 + \beta_1 \log NM + \varepsilon$

The first six regressions analyse the relation between bank size and bank success including the dummy variable for the East German co-operative banks, the latter 6 do exclude this variable. The regression results are summarised in Table 2.

Case	Performance measure	Determination coefficient R2	logTA	logNM	East/West
I	MR/TA	0.12347	-0.00525 -6.35818 ***		-0.00162 -2.01014 *
II	MR/TA	0.04313		-0.00266 -3.47800 ***	-0.00188 -2.14637 *
III	PE/TA	0.047255	-0.00214 -3.73891 ***		0.000206 0.369566
IV	PE/TA	0.003391		-0.00028 -0.54057	0.000381 0.641475
V	(MR-PE)/TA	0.052621	-0.00312 -3.67028 ***		-0.00182 -2.20526 *
VI	(MR-PE)/TAA	0.041592		-0.00238 -3.14614 ***	-0.00226 -2.60928 **
VII	MR/TA	0.111545	-0.00503 -6.11669 ***		
VIII	MR/TA	0.028291		-0.00216 -2.94551 ***	
IX	PE/TA	0.046817	-0.00216 -3.82580 ***		
X	PE/TA	0.002011		-0.00038 -0.77482	
XI	(MR-PE)/TA	0.037108	-0.00287 -3.38886 ***		
XII	(MR-PE)/TA	0.019622		-0.00178 -2.44219 **	
Notes:	Stated are in each case the standardised regression coefficient in the first row and the t-factors in the second as well as the error likelihood p with:				

Table 2: Bank profitability and bank size: regression results

First of all, it is noticeable that the explanatory power of the regressions evoked by the values of the determination coefficients have to be considered as relatively weak. Most values for R^2 remain below 0.05 and only two reach 0.1. Nevertheless, there are obviously some highly significant relations to be seen. In accordance with Lang and Welzel,²³ our results show, for instance, returns of scale for wage expenditures with increasing bank size. These economies of scale, however, do not go in line with the operating result as the sum of interest result, commission result, general administrative expenses and wage expenditures. The link between market result and bank size is rather negative (as Figure 3 shows).

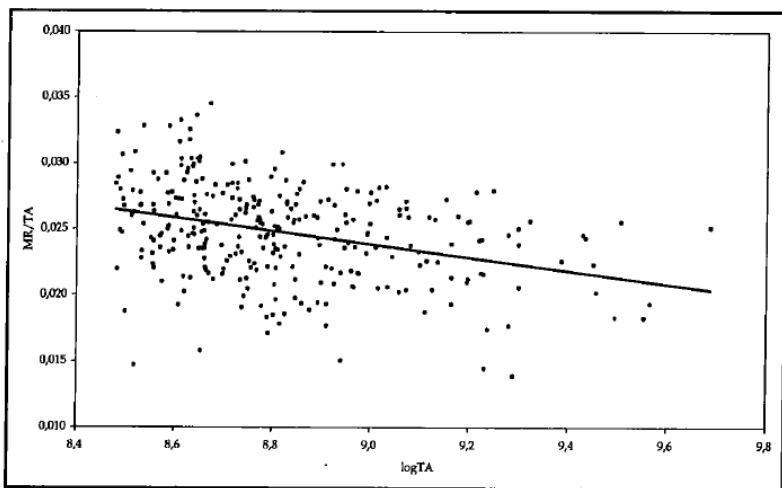


Figure 3: Correlation between market result and bank size

The results show also, that East German banks seem to be less successful than those in Western German states.

According to the results for Austrian co-operative banks, the number of members has a significant negative influence on profitability. Different to the results for Austrian co-operative banks but in accordance with the confirmed returns to scale for market result (MR), the relative staff costs are not accumulating with increasing bank size. On the contrary, a considerable decline in the staff costs quote is noticeable here. As to be seen in regression III and IV, this does not apply for the co-operative banks with registered offices in the former East-German states, which is surprising against the background of a generally lower wage level in this region.

The economies of scale to be found in the staff cost quote do not correlate with the operating profit. Obviously, positive scale effects

are not significant enough to compensate the better market results of smaller banks, as regressions XI and XII show.

All in all, the regression results have to be judged from different points of view. In accordance with various empirical analyses, on the one hand, there is a decrease of the staff cost position with increasing bank size, which can be seen as an argument supporting the growth strategy of German co-operative banks. But this growth effect does not cause increasing returns with increasing bank size. The striving for growth thus seems not to generate higher profits for the members, the co-operative banks are not succeeding in earning higher market results with increasing bank size. Our results rather indicate a negative correlation in the market area. This leads us to the conclusion that negative consequences of a control deficit with increasing bank size, as discussed in paragraph III, can, at least for the earnings numbers, not be ruled out. There is often argued that growth strategies open the opportunity to exploit additional profitable business segments with increasing size. We find no coinciding evidence in our sample. A next research step should therefore analyse whether business structure changes within the co-operative banks themselves, can be observed with increasing bank size. This could further clarify the correlations.

Summary and prospects

In spite of a comparably good economic viability position, co-operative banks are confronted with extremely high administration costs compared to their competitors. In part response, they are trying to reduce the competitive disadvantage by merging with each other. In this context, the question arises, whether such mergers only cause an image change and not the propagated economies of scale and scope.

Especially in view of corporate control, it can be stated, that the prevailing organisation structures of co-operative banks fulfil their functions only on a limited base considering today's institution sizes. In spite of several new laws in recent decades, the mechanisms are still orientating too much according to the roots of co-operative banks. The "GenG", the German Co-operatives Act, in this area is not developing as dynamically as its environment. The question arises, whether these democracy costs specific for co-operative banks have negative consequences for the performance of co-operative banks, as at least the theoretic analysis suggests.

In contrast to the results for Austria, our empirical analysis shows that, in Germany, there undoubtedly are positive scale effects for the personnel expenses quote. Apart from that, there is evidence for a negative connection between the number of members and the

success of co-operative banks. Furthermore, there are indications for a negative correlation of the balance sheet as measure for the company size and market success. The reason for these findings may be seen more in the company structure than in the company size. Therefore, additional research should be concentrated on this aspect. First of all, as research stands up till now, it must be stated that in all, the growth strategies of "Yolks- und Raiffeisenbanken" did not lead to a positive result. An obvious conflict between growth strategy and member interests is possible but not evident.

Notes

1. The market result is calculated as interest result plus commission result minus general administrative expenses.
2. In 1998, the main reason for the outstanding development of this figure for private commercial and big banks were, according to the Deutsche Bundesbank special yields in the "extraordinary account" as well as group internal transfers and connected with it, revelations of hidden reserves.
3. See Schmidhuber, H, (1996): Die Notwendigkeit eines kreditwirtschaftlichen Leistungsangebots und Wettbewerbs in der Fläche: Genossenschaftsverband Bayern e.V. (ed): Genossenschaften, Leitbilder und Perspektiven, München, 126-147 esp p134.
4. See especially for the East-German co-operative banking sector Mayer, M, Schiereck D: Germany's Alien Mutuals - Some stylised Facts about the Merger Wave of East German Co-operative Banks. Journal of Co-operative Studies 32, 1999, 220-230.
5. See Hartmann-Wendels, T, Pfingsten, A, Weber, M (2000): Bankbetriebslehre. 2. Edition, Berlin, p80. An overview over the results of different studies in the US-market give Berger, A, Hunter, W, Timme, P (1993): The Efficiency of Financial Institutions. A Review and Preview of Research Past, Present, and Future. Journal of Banking and Finance, 17, 221-249.
6. See Ohlmeyer, D, Philipowski, R (1990): Verschmelzung von Genossenschaften, insbesondere von Kreditgenossenschaften. Wiesbaden, p14.
7. See Anon (1999): Doppelpräsenzen vermeiden und für Mindestbetriebsgrößen sorgen. Handelsblatt, 93, 32.
8. See Lang, G, Welzel, P (1997): Größe und Kosteneffizienz im deutschen Bankensektor. Zeitschrift für Betriebswirtschaft, 67/3, 269-283.
9. Remmers, J (1980): Genossenschaftliche Optimale Betriebsgröße. Mändle, E, Winter, H (ed) Handwörterbuch des Genossenschaftswesens. Wiesbaden, Col. 1326-1334 designates some of such factors that are of particular importance for co-operative banks. See also O'Brien, D, Wagenvoort, R (2000): Some Empirical Findings of the Characteristics of Cost-Efficient Credit Institutions. European Investment Bank. Report 2000/01. Luxembourg who address this aspect in a more general content.

10. See Swoboda, W (1980): Fusion/Konzentration im Genossenschaftswesen. Mändle, E, Winter, H (ed): Handwörterbuch des Genossenschaftswesens. Wiesbaden, Col. 532-552 esp col. 538.
11. Bonus, H, Das Selbstverständnis moderner Genossenschaften, Tübingen, 1994, p73.
12. See Gorton, G, Schmid, F (1999): Corporate Governance, ownership dispersion and efficiency: Empirical Evidence from Austrian cooperative banking. *Journal of Corporate Finance*, 5, 127.
13. Bonus, H (1986): The Cooperative Association as a Business Enterprise: A Study in the Economics of Transactions. *Zeitschrift für die gesamte Staatswissenschaft*, 142, 310-339, esp p318.
14. See Schmid, H (1997): Eigentümerstruktur, Agency-Kosten und Unternehmenserfolg. ifo-Studien - Zeitschrift für empirische Wirtschaftsforschung, 491-519, esp p501.
15. See Jensen, M., Meckling, W. (1976): Theory of the Firm: Managerial Behavior, Agency Costs and Ownership Structure. *Journal of Financial Economics*, 3, 305-360, esp p313
16. For the characteristics of such agreements see Grossman, S, Hart, O (1983): An Analysis of the Principal-Agent-Problem. *Econometrica*, 51, No.1, 7-45, esp pp18ff.
17. This problem is by far no new experience, it is already addressed by Black, H, Dugger, R H (1981): Credit Union structure, Growth and Regulatory Problems, *Journal of Finance*, 36, 529-538.
18. See Lang, G (1997): Kostensenkung in deutschen Banken: Wie hoch ist das Potential?. *Zeitschrift für das gesamte Kreditwesen*, 49, 17-19 and Lang, G, Welzel, P (1997): Größe und Kosteneffizienz im deutschen Bankensektor. *Zeitschrift für Betriebswirtschaft*, 67/3, 269-283 and Lang, G, Welzel, P (1995): Strukturschwäche oder X-Ineffizienz? Cost-Frontier-Analyse der bayerischen Genossenschaftsbanken. *Kredit und Kapital*, 28, p429.
19. See Manne, H (1965): Mergers and the Market for Corporate Control. *Journal of Political Economy*, 73, 110- 20.
20. In particular for Canadian co-operative banks see Chan, L, Mountain, D C (1986): Measuring Returns to Scale and Technological Change in Co-operative Banks: A Provincial Analysis of Canadian Credit Unions and Casses Populaires. *Empirical Economics*, 11, 207-222 and Murray, J D, White, R W (1983): Economies of Scale and Economies of Scope in Multiproduct Financial Institutions: A Study of British Columbia Credit Unions. *Journal of Finance*, 38, 887-902.
21. See Gorton, G, Schmid, F (1999): Corporate Governance, ownership dispersion and efficiency: Empirical Evidence from Austrian cooperative banking. *Journal of Corporate Finance*, 5, 119-140.
22. The "Bundesanzeiger" is the official gazette of the Federal Republic of Germany.
23. See Lang, G, Welzel, P (1995): Strukturschwäche oder X-Ineffizienz? Cost-Frontier-Analyse der bayerischen Genossenschaftsbanken. *Kredit und Kapital*, 28, 403-430.