Financial and Social Performance of Rural Credit Cooperatives in Bulgaria

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Abstract

Bulgaria’s cooperative system dates back to the beginning of the 20th century but severely suffered from 40 years of dissolution under the communist regime. After 1990, the recovery started and 32 credit cooperatives were established within an EU PHARE project. Out of them, 15 successfully carry out relationship-based lending with about 300 members each.

A comprehensive data collection campaign was conducted in 2009/10 to establish a database uniting financial and social performance indicators. Concerning the financial indicators, we can rely on a perennial data set of the 15 credit cooperatives from 2000-09. The social performance measurement was conducted in 2009, following the internationally renowned methodology of CERISE (Comité d’Echange de Réflexion et de l’Information sur les Systèmes d’Epargne-crédit).

Based on prior models for assessing efficiency of microfinance institutions, we include the CERISE system of social performance indicators in a new analytical model for the Bulgarian credit cooperatives and develop a social output. Using Data Envelopment Analysis (DEA) we analyse efficiencies in two specifications, with and without a social output. Taking into account the twofold output (financial and social) in microfinance, leads to a realistic ranking of the involved institutions. Additionally we analyse the development over time and calculate distance functions to employ them in a Malmquist index approach developed by Färe et al. (1994). Changes in efficiency, technology and total factor productivity go in line with expected results. We observe that the agricultural credit cooperatives operate in decreasing returns to scale conditions but detect an increase of the optimal scale over time by growth in share capital. Severe impacts on the frontier are caused by a shift from almost pure equity finance to external refinance incurring capital costs.
1. Introduction

Bulgaria’s cooperative system dates back to the beginning of the 20th century but severely suffered from 40 years of dissolution under the communist regime. After 1990, the recovery started. Within an EU PHARE project in 1996, 32 credit cooperatives were established top down in rural areas of Bulgaria. However, due to non-repayments and corruption, 17 of them failed and are not anymore represented by the Bulgarian Cooperative Union ‘Evrostart’ (NCU). Despite the contradiction that cooperative movement historically relies on a bottom-up development, 15 of those originally top-down created cooperatives successfully carry out relationship-based lending as rural financial institutions with about 300 members each.

In this paper, we will analyze the factors which determine the success in terms of financial and social efficiency of Bulgarian credit cooperatives. We will discuss which factors, and to what extent, determine the efficiency of achieving economic and social outputs in looking at both, financial and social performance in an efficiency analysis. In addition, we will discuss the impact of the financial and economic crisis of 2009 on credit repayment performance. In our analysis we rely on panel data of 15 agricultural credit cooperatives covering the period of 2000-2009. This dataset, combining financial and social performance indicators, as well as socioeconomic data at the regional level, facilitates an output-oriented Data Envelopment efficiency (DEA) analysis. As the cooperatives are by law not allowed to take deposits, the inputs can be characterized by the usage of external funds (interest expenses), and expenses for personnel and physical assets (non-interest expenses). We derive from qualitative findings that the cooperatives try to maximize clients and loan volume. Additionally, due to the dependency on socially oriented external investors (mainly Oikocredit International), the cooperatives are required to implement the social performance measurement system and to integrate social performance into their management objectives. The non-parametric DEA approach allows coping with this double bottom line and to calculate efficiency scores which can be disentangled to technical and scale inefficiencies. Thus, this research contributes to the literature on efficiency-assessment of microfinance institutions. We analyse how efficient the ACCs produce a twofold output, i.e. the “share capital” and “volume of loans” and, as the second bottom line item, a cardinal score of social performance. Given the targeted outputs, we focus on the crucial “raw material”, reflected in “total expenses”, which is needed to achieve this production goal (Fare, Grosskopf, & Lovell, 2008).

This paper is structured as follows. After a brief outline of the development of credit cooperatives in Bulgaria (Chapter 2), we review the literature on efficiency assessment of microfinance institutions (Chapter 3) and develop our analytical model (Chapter 4). Subsequently, we give a short description of the data (Chapter 5) and methodology (Chapter 6) and finally present the results in Chapter 7.

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1 PHARE = Poland and Hungary: Aid for Restructuring of the Economies.
2 For more information refer to http://www.oikocredit.org/en/home.
2. Brief historical outline of the Bulgarian credit cooperative movement

Financial cooperatives have a long history in Bulgaria. Before the communist period, rural savings and credit cooperatives provided financial services to agricultural and other rural enterprises. Their basic function was to generate loanable funds by collecting deposits and to invest them in loans to productive entities in a certain region. Historical documents, which we found during the data survey, seem to suggest a well functioning village-based mutual lending system. Its basic organizational principles followed the German model of Raiffeisen (1818-1888) and dated back to 1907. Later, during communism, private farming was replaced by collective farming in so called “Agro Industry Complexes”. Not surprisingly, the regional rural financial system was integrated in the mono-bank system under central planning (Hanisch, 2007; Rochlin, 1962, pp. 201–226; Eisen & Hagedorn, 1998). The political and socio-economic transition process started in 1990 in Bulgaria. However, financial system reforms started with a delay and were thrown back by the crisis in 1997. Since then, the Bulgarian Lev is coupled to the Deutsche Mark (now Euro) by a currency board and a more stable development of the financial system began (Andronova-Vincelete, 2001). However, until today the rural financial sector is still underserved and especially micro and small enterprises do hardly have access to financial services, especially commercial banking services (Batchev, 2004, p. 1).

Credit rationing led to the natural solution of local stand-alone mutual aid associations, or as they are sometimes called, not-for profit organizations\(^3\). They re-emerged in the post-transition time in Bulgaria. Especially farmers are found to be integrated into a tight social network of their rural community. Within such social networks and based on personal ties and mutual trust, "relatives and friends" often serve as (informal) suppliers of loans. (Batchev, 2004, p. 9) Such informal networks, geographically bound to small rural communities, are a fundamental component of the ACCs which we describe now.

In 1996, the EU-PHARE project “Agricultural Capital Funds Scheme” started to support cooperatively organized agricultural finance in Bulgarian rural regions. The incentive was a subsidy for the share capital of each credit cooperative. The subsidy was made up by a certain multiple of the share capital collected from natural persons, i.e. the members of the respective credit cooperative. The potentially available credit fund of each cooperative was then built up by one lev (BGN after the financial crisis in 1996/97) of collected share capital which was subsidised with 5 leva from the EU-PHARE project and 2 leva from funds of the Bulgarian Government. Those funds were allocated in the cooperative as loanable funds, either defined as “grant capital” or as equity. Since the focus of the EU-PHARE project was on agricultural finance, at least 50% of the cooperative members had to be active private farmers. Local key persons as majors or other influential functionaries, gathered groups of potential members in their region and applied for the EU-PHARE project. Under the supervision of the Ministry of Agriculture, the agricultural credit cooperatives (ACCs) were registered according to the Cooperative Act, according to the Memorandum of Understanding between

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\(^3\) Two types of theories have been proposed to explain why nonprofit organizations exist. One type is traditionally designated as market failure theories and accordingly regards nonprofit organization as a particular solution to market failures. The other type, traditionally labelled as supply-side theory, views nonprofit organization as an outlet for altruism, ideological entrepreneurship, and practicing of social values (Jegers, 2008; Steinberg, 2006; Buchenrieder. G. et al., 2001)

The major obstacles for the development of the ACCs were already laid at that time: First, financial services were restricted to lending, only. Deposit taking was explicitly prohibited. Second, as often observed with regard to early formation phases of rural credit cooperatives, their regulation and supervision were assigned to the Ministry of Agriculture. However, it became quickly evident that the Ministry was not well suited for this task. Third, technical support, e.g. by the German Cooperative and Raiffeisen Foundation (DGRV), was limited to training of key persons of the cooperatives, i.e. managers and staff members. The DGRV could have assisted in establishing a supportive legal framework for cooperative financial intermediation but did not receive appropriate support by the Ministry of Agriculture or other authorities. These shortcomings led to the failure of a number of ACCs. They deviated from their initial mission or/and accumulated bad loans. Nevertheless, 15 ACCs joined forces in setting up the National Cooperative Union ‘Evrostart’ (NCU) which operates until today. The NCU organizes external audits, trainings and is active in lobbying, but is not assigned a supervisory function. Since 2011 all cooperatives of NCU are registered as “financial institutions” within the registry of the Bulgarian National Bank. The operation of the ACCs is regulated by Ordinance No. 26 (Bulgarian National Bank) and the Law on Credit Institutions (Bulgarian National Bank).

Most of the ACCs are located in remote rural areas but also in semi-urban provincial towns. Nevertheless, their clientele mainly consists of small private farmers. As the cooperatives, compared to microfinance institutions in other parts of the world, serve only a small number of members, all operations, i.e. screening, monitoring and enforcement of repayment are based on personal relationships within the social networks of rural communities which were mentioned before. Although the lending strategy does not support the well-known group lending approaches, similar processes can be observed. For instance, the functioning of the credit cooperative relies heavily on informal information flows in the social network of the cooperative members and on social pressure (in case of delayed loan repayment).

One of the biggest growth impediments for the ACCs is the limited funding base as they are not allowed to collect savings and can hardly refinance them in the Bulgarian financial system. Since 2002 however, Oikocredit International, a socially responsible investor started to refinance some of the ACCs. However, such socially oriented investors, which themselves depend on attracting funds from donors or private investors, are motivated to document the positive and so called “social” impact of their investments. They strongly engage in the application of Social Performance Measurement (SPM) by educating their clients, i.e. operating microfinance institutions as the ACCs, and requiring them to conduct SPM as a self assessment or external audit. To implement a SPM, Social Performance Indicators (SPI) ought to be included in the management.

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4 Bulgarian National Bank: www.bnb.bg
5 Group lending approaches refer to shared liability within a group of borrowers, individual lending concerns only one person as liable borrower.
3. Review on efficiency analysis in microfinance

When regarding efficiency in cooperative financial institutions, it is crucial to rethink the underlying Industrial Organization Approach of this subsector of the financial service industry. Cooperatives are non-profit organizations which have the mission to maximize their members’ benefits. Hence we refrain from the assumption of profit maximization but assume a cost minimizing strategy of cooperatives. Additionally the cooperative organizations in our sample are referred to as microfinance institutions. This is because they serve a type of clientele that is frequently excluded from the commercial banking sector due to its dispersion in remote rural areas and demand for small loans with few physical assets as collateral. By acting as microfinance institutions, the cooperatives produce a twofold output, which is financial services on the one hand and positive social effects on the other.

Following the topical literature, the first step in selecting the appropriate variables for efficiency analysis is to decide whether the financial institution operates according to the so-called intermediation or production approach. Both approaches are inherent to the financial service industry as pointed out by Sealey and Lindley (1977, pp. 1252–1254). On the one hand, deposits are acquired and transformed to loanable funds, which are invested as loans. This process inquires deposits as an input in combination with physical capital and labour and focuses on the intermediation function. On the other hand, financial services can be seen as a value added (or production) approach which refers to the production of services as loans and deposits by incurring costs of capital, labour and physical capital. In their comprehensive survey of efficiency analysis on financial institutions, Berger and Humphrey (1997, p. 197) discuss both approaches and state that for calculating the efficiencies of individual branches (that is limited decision making units) of financial institutions, the production approach is more suitable, as branches mainly process customer documents but have little influence over funding and investment decisions. In a rather similar way as bank branches the ACCs deal with restricted inputs but can be assumed to maximize their outputs.

Both approaches have been tested in a DEA efficiency study on 30 Latin American microfinance institutions by Gutierrez-Nieto et al. (2007, pp. 11–17). They tried 21 possible combinations of inputs and outputs in their calculation of DEA efficiencies. The study is closely linked to the one of Cinca and Molinero (2004) on the selection of DEA specifications via a Principal Component Analysis. Gutierrez-Nieto et al. (2007) obtain different results for the intermediation respectively the production approach, but also for different input-output combinations within the approaches. In summary, they find four principal components of efficiency. The first is an overall efficiency which ranks microfinance institutions under different specifications in the same order. Hence, efficiency can be reached through various paths with different underlying patterns of behaviour. Second, the organizational type matters as, in comparison to other types, non-governmental organizations (NGOs) are found to minimize the costs by involving voluntary staff members while maximizing the number and volume of loans. Finally, the specification of inputs and outputs highly influences whether or not a microfinance institution turns out efficient or not. Some are highly efficient when the number of loan officers is used as an input, others when concentrating on operating expenses. Among the outputs “interest and fee income”, “number of loans outstanding”, and “gross loan portfolio”, the inclusion or exclusion of the latter in the model leads to different outcomes.
A second crucial step in developing an appropriate specification for the twofold production goal of microfinance institutions is the extension of financial output to measures that capture the social performance. Financial sustainability refers to a return on equity above opportunity costs of funds. Operational expenses and financial costs should be covered by income so that equity of the microfinance institution grows independently of ongoing or initial subsidies. Simultaneously, the microfinance institution is supposed to achieve substantial outreach in terms of value and number of loans (and savings, where the financial market regulations allow the provision of this service), asset growth, offered product diversity, number of branches, percentage of covered population in rural areas, and participation of woman as clients (Yaron, 1994, pp. 50–51).

Ngheim et al. (2006, pp. 72–76) analyse the efficiency of 46 microfinance institutions in Vietnam by following the production approach with labour cost as single input and number of savers, borrowers, and group loans as outputs. The authors state that the first two outputs reflect both, the financial and social target of microfinance whereas the number of group loans stands for the social objective. They suppose that in Vietnam lending to groups is a strategy to cope with a dispersed and poor clientele in remote mountainous areas. However, they do not further elaborate on the appropriateness of their specification except that the efficiency ranking among the microfinance institutions is consistent when applying different, i.e. parametric and nonparametric, estimation techniques.

Hermes et al. (2008) investigate the question whether there is a trade-off or compatibility between financial efficiency and outreach by employing a Stochastic Frontier analysis (SFA) on 1300 observations of microfinance institutions (pooled data of different countries of the years 1997-2007). Their model is specified such that the inefficiency value is the dependent variable and various measures of outreach from the MixMarket (a global web-based information platform) are the explanatory variables. They find a negative relation between outreach and financial performance and contribute to a broad discussion on whether there is a trade off or a synergy (see also Balkenhol, 2007; Morduch, 2000). This emphasizes the importance of the appropriate definition of production technology and production goals in the model for analysing efficiency in microfinance.

Following the framework of Yaron (1994), Gutiérrez-Nieto et al. (Gutiérrez-Nieto et al., 2007, p. 11) emphasise that microfinance institutions have a specific double bottom line in their output. First, microfinance institutions are assessed by means of their financial sustainability, reflected in the input “operating expenses”, and by operational sustainability, reflected by the output “interest and fee income”. Second, microfinance institutions are assessed in their social efficiency by regarding outreach represented by the output variables “number of outstanding loans” and “volume of loans”. In a more recent paper on social efficiency of microfinance institutions, the abovementioned authors (Gutiérrez-Nieto, Serrano-Cinca, & Mar Molinero, 2009) extend their concept of social performance in a specification which includes the standard variables “assets”, “operating cost”, and “number of employees” as inputs and “loan portfolio” and “revenues” on the output side. To measure social efficiency, they add the “number of women borrowers” and an indicator that measures the extent to which the activities of the microfinance institutions can benefit the poorest. The mentioned indicator is derived from a ratio of “average loan balance per borrower” and “per capita income”. The obtained value $K$ of the ratio is

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7 For more information on this web-based information platform see: http://www.mixmarket.org/.
standardized to the 0,1 range by removing the minimum value of \( K \) and dividing by the range of \( K \), which results in a measure between 0 and 1. This value is multiplied by the number of loans to create a cardinal measure of a social output for each MFI. Further, the authors also refer to more detailed assessment methodologies as the SPI system of CERISE. We remark that the number of woman borrowers is a possible output of microfinance institutions, but does not fit all microfinance institutions, i.e. only those which have the objective to target especially women clients. Indicators which involve the “per capita gross national income” might be appropriate on a cross country level but does not take into account that often MFIs concentrate on specific clients with a substantially lower income than the average of a geographic region or country.

The measurement of social performance is a discipline of its own. Depending on country of origin and the focus of specific microfinance institutions, various systems and tools for assessment, guidelines for application and implementation as well as recommendations for improvement of social performance emerged. The SPI tool proposed by Zeller, Lapenu and Greenly (2003) is one of the most comprehensive collections of indicators related to social performance on the institutional level (evaluation of process and the capacity of achieving social performance), and on the side of impact – the clients and other affected stakeholders in the vicinity of the microfinance institution. According to CGAP (Consultative Group to assist the poor)\(^8\) the SPI methodology, which is promoted by CERISE\(^9\), exists parallel to the MFC\(^{10}\) Quality Audit Tool for Managing Performance (QAT) and the sustainability orientated “Global Reporting Initiative (GRI)\(^{11}\).

Further we find numerous single case studies of microfinance institutions which assess their social impact. Rating agencies, who formerly concentrated on financial performance, also started assessing social performance, often with their own system or collection of indicators. Insights and discussions on this broad literature are given in (Copestake, 2007), (Copestake, Greeley, Johnson, Kabeer, & Simanowitz, 2005), (Goldberg, 2005), (Lapenu, Zeller, Greely, Chao-Béroff, & Verhagen, 2004).

### 4. Analytical Model

In this paper we analyse how efficient the ACCs produce a twofold output, i.e. the “share capital” and “volume of loans” and, as the second bottom line item, a cardinal score of social performance. Given the targeted outputs, we focus on the crucial “raw material", reflected in “total expenses", which is needed to achieve this production goal (Fare et al., 2008).

Based on the discussion above, we will employ in our analysis on the output side the total loan volume as a measure for the extent of earning assets which generate the income of the ACCs. Total loan volume is a common measure for the activity of microfinance institutions (Gutiérrez-Nieto et al., 2007), (Gutiérrez-
Nieto et al., 2009). Employing the income from interest and fees as done by Gutierrez Nieto (2007) would imply an underlying maximization of profits and thus cannot be considered to be appropriate. Instead the cooperatives have the strategic goal of providing a maximum amount of loans to their members. Hence is reasonable to include also the number of loans as an output (Ngheim et al., 2006) but we do not include “outreach” in the measures of financial performance because it will be reflected in the score of social performance.

As a second financial goal we consider the “share capital” accumulated by the cooperatives. It reflects the objective of growth in terms of membership and capital which a meaningful goal of financial cooperatives. Additionally, as the cooperatives do not distribute dividends but allocate any surplus as share capital, a positive return on equity is regarded in the financial outputs. The before mentioned grant capital is administered separately from the share capital and does not influence this variable. However, the grant capital, used as loanable funds, will affect the volume of loans. Comparable to “share capital” would be deposits or total assets as variables. Deposits can be considered as an input (intermediation approach) or as an output (production approach) (Berger & Humphrey, 1997). In our model we follow the production approach and assume that the “share capital” reflects best (1) the activity in terms of active members (who pay share capital) and (2) financial performance as part of the yearly surplus is allocated to the members share capital. As mentioned, “total assets” is a common variable on the input side (Berger & Humphrey, 1997), (Gutiérrez-Nieto et al., 2009). This specification would provoke the question of “How efficient does a firm use total assets to maximize certain outputs?”. Regarding the imposed minimization assumption on the input side, we would like to consider only “fixed assets” as a necessary input, but due to the lacking availability of data do not consider this variable. Furthermore, as fixed assets are more or less constant over time, we suppose a high colliniarity with “total volume of loans”.

As a measure for input we use “total expenses”. They reflect the use of labour in quantity and quality as well as administrative expenses and, if present, expenses for additional financial capital. The number of staff members (Haq, Skully, & Pathan, 2010) is also available but would not reflect the quality of labour. For example a credit inspector (loan officer) can either have a pure administrative function with lower responsibility and lower payment, or can be highly involved in the relation towards clients. The labour input depends on the strategic focus which may vary in terms of targeted loan size, intensity of client screening and monitoring, and additional non-financial services provided to clients, such as consulting.

Given the availability of data, for measuring social performance, we employ the SPI tool, which was developed in a project by Zeller, Lapenu and Greenly (2003). In a participatory approach with practitioners from the microfinance sector, a questionnaire with 70 SPIs was developed. It has already been applied in various countries and is improved in an ongoing process (Bédécarrats, Angora, & Lapenu, 2009). The assessment system is based on four dimensions of social performance (Dolgiz & Lapenu, 2007), namely (1) targeting and outreach, (2) adaptation and quality of services, (3) economic benefits, and (4) social responsibility:

**Targeting and Outreach** refers to the clients of the microfinance institution and evaluates whether clients are normally excluded from the commercial banking sector, whether they are poor or socially marginalized or in how far clients are
situated in remote areas. Three sub-dimensions contain questions on geographic targeting, individual targeting and pro poor methodology of the microfinance institution.

The second dimension treats the adaption and quality of services. On the one hand, the range of traditional services as loans, deposits and whether the conditions are appropriate for the target group, i.e. their quality are covered. On the other hand, the activity of the microfinance institution in innovative and non-financial services is evaluated.

The third dimension considers economic benefits such as tracking the economic status of clients or cost efficient operation of the microfinance institution. This dimension includes also whether clients are participating in operational and strategic decision making of the microfinance institution and other forms of empowerment of specific clientele groups.

The fourth dimension refers to the social responsibility of the microfinance institution towards its staff members, its clients and towards social community and environment. The indicators concerning the clients include topics as protection from over-indebtedness\textsuperscript{12} or the appropriateness of collection practices.

Each dimension accounts for 25 points which results in a possible total score of 100 points. For obtaining a cardinal measure of social performance as an output including time and scale effects, we multiply the SPI score by the number of loans for each cooperative. A similar strategy was applied by Gutierrez Nieto et al. (2009).

We will use this specification to calculate a Multi-Stage DEA and a Malmquist DEA. The Multi stage DEA will reveal technical and scale inefficiencies which allows establishing a ranking among the 15 ACCs. In the Malmquist DEA we make use of the panel data and analyse the development over time. Further details will be given in the chapter on methodology and results.

5. Database for financial and social efficiency analysis of Bulgarian credit cooperatives

The sample contains observations of 15 Agricultural Credit Cooperatives (ACCs) from Bulgaria in the years 2000-2009. The surveyed cooperatives are all members of NCU. The membership requires them to be externally audited and to adhere to sound business practices in their operation.

The database reflects financial data for the years 2000-2009. The data was derived from the books of the ACCs by the respective book keeping officer and the principal author of this paper. We discussed the data with the management

\textsuperscript{12} India was home to the fastest microcredit expansion the world has seen. Between 2003 and 2009, the number of micro-loans shot from 1 million to 26.7 million. Unlike to most other countries, for-profit companies do most of the micro-lending in India. However, the quest to grow fast resulted in piling up more loans, often in the same region, leading sometimes to unintended higher individual indebtedness, loan default, and in some cases it led to suicides. This catapulted the microfinance movement into the mass media as exploiting the poor through expensive microcredit at the risk of them committing suicide if they cannot repay.
level of each ACC and documented qualitative background information. In-depth, semi-structured interviews with the manager and other staff of the ACC gave insights into the genesis of each cooperative, its strategic focus and its daily operations. This background information was crucial to construct a model for benchmarking the ACCs and for the interpretation of results.

The assessment of social performance comprised the application of the SPI tool, originally developed by Zeller, Lapenu and Greenly (2003) and adapted for the purpose of this study following recommendations of CERISE. The adaptation took place during two seminars in Bulgaria. Apart from the principal author of this paper, representatives of CERISE (C. Lapenu), experts of SDC (H. Ramm) and several representatives of Oikocredit Bulgaria, as well as the managers of the ACCs engaged in group discussions to discuss and adapt SPIs for the social performance analysis of the Bulgarian ACCs.

The data for the SPI-score were collected in 2009 and serve as a static benchmark in all years. To include scale and time effects for each cooperative, we multiply the SPI score with the number of loans and obtain a “social performance output” for the efficiency analysis.

We compiled the financial data and corrected for inflation by using the harmonized consumer price index (CPI) provided by the National Statistical Institute Bulgaria. Descriptive statistics of the compiled data are shown in Table 1. Maximum and minimum values are determined by the different size of the cooperatives. Because the Bulgarian legislation prohibits deposits, positive changes in the production volume occur only due to acquisition of external capital or by the accumulation of share capital. Negative changes are mainly caused by loan losses or excessive operating expenses. As DEA does not regard a random error and is sensitive to statistical outliers, we use original financial data and ratios to give a meaningful explanation of the results.

Table 1  Descriptive Statistics of ACCs inputs and outputs (2000-2009) by indicator

<table>
<thead>
<tr>
<th></th>
<th>Unit</th>
<th>Mean</th>
<th>Maximum</th>
<th>Minimum</th>
<th>Standard deviation</th>
</tr>
</thead>
<tbody>
<tr>
<td>input</td>
<td>Total operating expenses</td>
<td>BGN</td>
<td>78458</td>
<td>464448</td>
<td>24000</td>
</tr>
<tr>
<td>output1</td>
<td>Volume of loans</td>
<td>BGN</td>
<td>692009</td>
<td>2408160</td>
<td>269352</td>
</tr>
<tr>
<td>output2</td>
<td>Share capital</td>
<td>BGN</td>
<td>147522</td>
<td>420168</td>
<td>50000</td>
</tr>
<tr>
<td>output3</td>
<td>SPI – score</td>
<td>Points</td>
<td>14785</td>
<td>34128</td>
<td>5840</td>
</tr>
</tbody>
</table>

Source: Own calculations
Notes: Values refer to pooled data of all cooperatives and years, BGN = Bulgarian leva

6. Methodological approach for financial and social efficiency analysis

With the objective of including social performance as an output in the efficiency analysis, we do not rely on an economic production function but analyse a production relationship between input and output quantities. Following the argumentation of Haq et al. (2010, p. 70), this setting, combined with the small
number of observations gives reason to employ a non-parametric Data Envelopment Analysis (DEA).

In contrast, parametric methods such as Stochastic Frontier Analysis have the advantage of allowing for noise error in the data but imply a certain functional form of the production frontier and hence a production function of the financial service industry. Further, parametric methods require data in comparable units but also allow statistical testing of the results. Non-parametric methods such as the DEA construct a piecewise linear curve on the base by assuming that the best firms operate efficiently and thus using them as peer institutions (Berger & Humphrey, 1997).

Efficiency analysis through DEA is based on an input or output orientation of production. Either a given quantity of output is produced with incurring a minimum amount of inputs, or, given a certain quantity of input, a maximum amount of output is produced (Fare et al., 2008). Under the assumption of constant returns to scale (CRS) the efficiency values will be equal in both orientations. The precondition for assuming CRS is only appropriate when all institutions are operating at an optimal scale (Coelli, 2005, p. 172).

The ACCs of the sample have a rather similar production technique but differ considerably in size (total loan volume). This gives reason to assume variable returns to scale (VRS) and to account for scale efficiencies in the model. Regarding the ACCs as decision making units we find them producing a financial and social output by using relatively restricted resources as inputs. Hence we choose an output orientation. We calculate technical and scale efficiencies in a specification with and without SPI as an output by employing a multi stage DEA (see Section 6.1). We use a Malmquist DEA (see Section 6.2) to calculate the annual changes of total factor productivity, technology and technical efficiency.

6.1. Multi Stage DEA

According to Farrell (1957) output efficiency can be understood as a radial measure of the distance between the level of production of a unit and the production possibility surface. The production possibility set is bounded by the frontier which is determined by fully efficient peer institutions. As we have a comparably small sample size and given the piece-wise construction of the frontier, the occurrence of so-called slacks is inevitable. Slacks can be interpreted as the possible amount of increase of one output without changing the input use or reducing other outputs. Consequently slacks can also be found on the input side and will show possible input reductions without a decrease in outputs.

Given our data with $K=1$ inputs and $M=3$ outputs for $A=15$ firms we obtain a 3x15 input matrix and a 3x15 output matrix. We start with technical efficiency ($TE$) of firm $A$ defined as

$$TE_A = \sum y_{Ai}u_{Ai}/x_{Ai}v_A$$

where $y$ denotes the $i$-th output of firm $A$, multiplied by the corresponding $i$-th vector of output weights $Mx1=u$. The single input is $x$ and $v$ is the $Kx1=1$ vector of input weight, which is 1.
Coelli (2005) provides a DEA solver (DEAP 2.1), based on the envelopment form of linear programming, and describes the model for an output oriented DEA with variable returns to scale (VRS) as follows:

\[
\begin{align*}
\max_{\varphi} \varphi, \\
\text{subject to} \\
- \varphi y_A + Y \lambda &\geq 0, \\
x_A - X \lambda &\geq 0, \\
A' \lambda &= 1, \\
\lambda &\geq 0,
\end{align*}
\]

with \( 1 \leq \varphi \leq \infty \) indicating a possible proportional increase in outputs that can be realized by firm \( A \). The corresponding score of technical efficiency between zero and one is \( 1/\varphi \). \( \lambda \) is a \( A \times 1 \) vector of constants and \( A1 \) is a \( A \times 1 \) vector of ones. \( A' \lambda = 1 \) imposes a convexity constraint to ensure that firms are benchmarked against others of a similar size. Inefficiencies under CRS can be calculated by omitting this constraint. If there is a difference between the VRS efficiency and the CRS efficiency we can obtain a measure for scale efficiency by \( \frac{\text{CRS}_\text{TE}}{\text{VRS}_\text{TE}} \). Hence the occurrence of pure technical efficiency (under VRS) as well as scale efficiencies will be discussed.

Further, by replacing the \( A' \lambda = 1 \) constraint by \( A' \lambda \leq 1 \), the VRS model is restricted to non-increasing returns to scale (NIRS). If technical efficiency under VRS is lower than with NIRS, we can derive that firms are operating with increasing returns to scale. A firm obtaining the same efficiency scores under CRS and VRS indicates operation with CRS. As soon as VRS and NIRS efficiencies are equal, but higher than CRS values, we observe firms operating scale inefficient but with decreasing returns to scale.

The last issue on the multi stage DEA is the treatment of slacks. Coelli (2005, pp. 164–165) states that slacks should not be overestimated as they stem from the piecewise character of the DEA frontier derived from a sample with a finite number of firms. He argues that an infinite sample would allow to construct a smoother frontier curve and to solve the problem of slacks.

A solution by identifying the projected efficient points for each firm is provided by the multi stage DEA (Coelli, 1998). It ensures that firms with slacks are benchmarked against their closest peer and hence that slacks are minimized. Ferrier and Lovell (1990) compare a parametric cost frontier with a linear programming production frontier and argue that slacks can be interpreted as allocative inefficiencies.

In the results we will compare the annual values of efficiency of each firm. This will allow an insight in how the firms are ranked according to their efficiency, which are the peer institutions among the ACCs and to which extent the results change when a score for social performance is included as an output in the model.
6.2. **Malmquist DEA**

For analysing panel data of input and output quantities without information on prices, Färe et al. (1994) suggest the calculation of Malmquist indexes as the ratio of distance functions. Following this approach we use our quantities in input vector $x$ and output vector $y$ of firm $A$ to define a production technology $S$ in year $t$:

$$S^t_A = \{ (x^t_A, y^t_A) : x^t_A \text{ can produce } y^t_A \}$$

The technology $S$ covers all feasible input and output vectors $x$ and $y$. The distance function $D^t_0(x^t, y^t)$ is defined as

$$D^t_0(x^t, y^t) = \inf \{ \theta : (x^t_A, \theta y^t_A) \in S^t_A \} \text{ or }$$

$$= \sup \{ \theta : (x^t_A, \theta y^t_A) \in S^t_A \}$$

where the first denotes the first the maximum proportional contraction of inputs (infimum) and second the reciprocal of the maximum (supremum) proportional expansion of the output vector $y$. Both are the same under CRS conditions. This equals the concept of Farrell’s (1957) definition of input and output oriented technical efficiency, respectively.

$D^t_0(x^t, y^t) = 1$ indicates a combination of $x$ and $y$ which is efficient, i.e. is located on the frontier of the production possibility set. For inefficient combinations $D^t_0(x^t, y^t) \leq 1$ is valid.

Now we use the input and output vector of the following year $t+1$ to define a distance function with the technology of year $t$:

$$D^t_0(x^{t+1}, y^{t+1})$$

which in the case of a positive technology change (upward shift of the frontier) will be larger than 1. In the following, we formulate a first Malmquist index with the reference technology of year $t$:

$$M^t = \frac{D^t_0(x^t, y^t)}{D^t_0(x^{t+1}, y^{t+1})}$$

Similarly we can define the distance functions referring to technology of year $t+1$, respectively the Malmquist index referring to year $t+1$:

$$M^{t+1} = \frac{D^{t+1}_o(x^{t+1}, y^{t+1})}{D^{t+1}_o(x^t, y^t)}$$

To avoid the selection of an arbitrary benchmark we calculate the geometric mean of both indexes and obtain the output-based Malmquist productivity change index as specified by Färe et al. (1994).

$$M_o(x^{t+1}, y^{t+1}, x^t, y^t) = \sqrt{\frac{D^t_0(x^t, y^t)}{D^t_0(x^t, y^t)} \frac{D^{t+1}_o(x^{t+1}, y^{t+1})}{D^{t+1}_o(x^{t+1}, y^{t+1})}}$$

This term can be rewritten as:
\[ M_{o}(x^{t+1}, y^{t+1}, x', y') = \frac{D_{o}^{t+1}(x^{t+1}, y^{t+1})}{D_{o}(x', y')} \times \left[ \left( \frac{D_{o}^{t+1}(x^{t+1}, y^{t+1})}{D_{o}(x', y')} \right) \left( \frac{D_{o}^{t}(x', y')}{D_{o}^{t+1}(x^{t+1}, y^{t+1})} \right) \right]^{\frac{1}{2}} \]

The term outside the brackets contains the distance function of technology in year \( t+1 \) over the corresponding distance function for technology in year \( t \), which is a measure for the change of technical efficiency under CRS.

\[ \text{Efficiency change} = \frac{D_{o}^{t+1}(x^{t+1}, y^{t+1})}{D_{o}(x', y')} \]

The remaining term with the geometric mean of to distance functions describes the technical change between year \( t \) and year \( t+1 \).

\[ \text{Technical change} = \left[ \left( \frac{D_{o}^{t+1}(x^{t+1}, y^{t+1})}{D_{o}(x', y')} \right) \left( \frac{D_{o}^{t}(x', y')}{D_{o}^{t+1}(x^{t+1}, y^{t+1})} \right) \right]^{\frac{1}{2}} \]

By imposing an additional convexity restriction in the linear optimization process when calculating the distance functions, we arrive at a VRS setting and can dissolve the change of technical efficiency under CRS (CRSTE) into a change of VRS technical efficiency (or "pure efficiency") and a change in scale efficiency (Färe et al., 1994), (Coelli, 2005, pp. 291–300).

Coelli (1996), (2005, pp. 291–300) implemented a Multi Stage DEA as well as Malmqist DEA with DEAP 2.1 software. This gave rise for use to employ DEAP 2.1 for the calculations in this paper. In the results we will trace back productivity changes and explain them with qualitative information.

### 7. Results

We calculated a Multistage DEA to obtain information on the annual efficiency values of each ACC in a specification without and with a social output.

For both specifications we calculate two frontiers, one assuming constant returns to scale (CRS) and a second one assuming variable returns to scale (VRS). Consequently we obtain technical efficiencies related to the CRS frontier (CRS TE) and related to the VRS frontier (VRS TE). In both specifications we found all institutions operating under decreasing returns to scale. Section 7.1 presents the results on to financial performance and Section 7.2 on social performance.

#### 7.1. Financial Performance

First we analyse the results of the first specification regarding financial performance. Thereby we concentrate on two crucial outcomes of the efficiency analysis which are scale efficiencies and VRS technical efficiencies. We find high VRS TE values larger than 90% for the ACCs Perel, Ayto, Mist, Smili, Pomo, and Momda.

Table 2 denotes calculated average scale and TE scores for each ACC from 2000 to 2009. The DEA results suggest that two ACCs Smili and Pomo have high scale efficiencies and are technically efficient, i.e. they produce close to the VRS and CRS frontier. The five largest ACCs by total assets, (Mist, Ayto, Dori, Perel and
Solida) have lower scale efficiencies. Taking a closer look at the data reveals that Solida has excessive total expenses of 29% of total loans, followed by Mist with 14%. Both ACCs incur costs for external capital which explains the high expenses for Mist, but for Solida, after subtracting financial expenses, we find operating costs (non-interest expenses) of about 20% of total loans. This circumstance reflects in VRS TE values, which acknowledge a high technical efficiency for Mist but a lower value for Solida. Among the other large but more scale efficient cooperatives Dori also seems to suffer from high expenses whereas Perel and Ayto are highly efficient.

The smallest three cooperatives in terms of size (total assets) obtain scale efficiencies of above 90%, which supports the indication of presence of decreasing returns to scale. When tracing back the sources of scale differences in total assets, we find differences in equity but also, to a large extent, in liabilities, i.e. external capital. Hence the decrease in returns to scale is likely to be attributed to rising expenses when increasing the loan portfolio by borrowing external funds.

### Table 2: Means of total assets, costs to loan ratio and efficiency values by cooperative

<table>
<thead>
<tr>
<th>Inst</th>
<th>Total assets</th>
<th>Total expenses as % of total loans</th>
<th>Scale</th>
<th>VRS TE</th>
<th>CRS TE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mist</td>
<td>1402024</td>
<td>14.9</td>
<td>0.536</td>
<td>0.964</td>
<td>0.517</td>
</tr>
<tr>
<td>Ayto</td>
<td>1159967</td>
<td>7.9</td>
<td>0.843</td>
<td>0.986</td>
<td>0.831</td>
</tr>
<tr>
<td>Dori</td>
<td>1149256</td>
<td>10.0</td>
<td>0.752</td>
<td>0.861</td>
<td>0.629</td>
</tr>
<tr>
<td>Perel</td>
<td>1096197</td>
<td>8.0</td>
<td>0.850</td>
<td>1.000</td>
<td>0.794</td>
</tr>
<tr>
<td>Solida</td>
<td>1019679</td>
<td>29.7</td>
<td>0.449</td>
<td>0.621</td>
<td>0.276</td>
</tr>
<tr>
<td>Momda</td>
<td>936874</td>
<td>10.1</td>
<td>0.818</td>
<td>0.905</td>
<td>0.752</td>
</tr>
<tr>
<td>Plisak</td>
<td>935634</td>
<td>12.0</td>
<td>0.772</td>
<td>0.737</td>
<td>0.566</td>
</tr>
<tr>
<td>Pomo</td>
<td>905102</td>
<td>7.2</td>
<td>0.950</td>
<td>0.951</td>
<td>0.900</td>
</tr>
<tr>
<td>Getov</td>
<td>902909</td>
<td>8.4</td>
<td>0.909</td>
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<td>0.774</td>
</tr>
<tr>
<td>Agrom</td>
<td>811522</td>
<td>12.3</td>
<td>0.676</td>
<td>0.774</td>
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<tr>
<td>Kainad</td>
<td>656099</td>
<td>13.5</td>
<td>0.834</td>
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<td>0.465</td>
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<tr>
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<td>629426</td>
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<td>0.982</td>
<td>0.952</td>
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<tr>
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<td>0.914</td>
<td>0.575</td>
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</tr>
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<td>0.647</td>
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<td>14.0</td>
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<td>0.492</td>
<td>0.452</td>
</tr>
</tbody>
</table>

### 7.2. Social Performance Assessment

Following the Social Performance Indicators (SPI) questionnaire by CERISE, we discuss the scorings for all indicators within the four dimensions “targeting and outreach”, “products and services”, “benefits for clients”, and “social responsibility”. To reference the exact wording of the numbered questions from 1.1 to 4.18 and associated scores, please refer to the SPI questionnaire version 3.2 (http://www.cerise-microfinance.org/-tools-). A summary by dimension is given in Table 3 below.

**Targeting and Outreach** refers first to the geographic location of the clientele. The ACCs do select their operating area by acquiring new clients through the social network of the cooperative. Members recommend new clients who then apply for membership. This process is normally initiated by the demand for a loan of a farmer or rural entrepreneur and facilitated by the social network of the
cooperative. Hence, when considering the cooperative as a decision making unit, a targeting strategy can be observed. Poverty and exclusion is not the major criteria underlying the process of client selection (1.1, 1 of 2 points), except for Smili and Momda (1.1 2 of 2 points). Both cooperatives and their social networks are situated in comparably remote and economically weak regions with prevalence of subsistence farming, weak infrastructure and no representative of a bank or other financial services. All cooperatives except Solida and Mist have more than 50% of their clientele located in regions marked by poverty and exclusion (1.2, 2 of 2 points). Both cooperatives operate in the vicinity of Plovdiv, which is a relatively strong region profiting from good climate conditions, mainly for horticulture, a close market, and a good infrastructure (1.2, 1 of 1 point).

All ACCs target rural areas and have more than 30% of their clients living in rural villages (1.4, 1 of 1 point). Verification of the clients’ situation is done informally by feedbacks of the staff members and information flows through the social network (1.3, 1 of 2 points). Further, the cooperatives operate in areas with no other competitor or, from the clients’ viewpoint, alternative provider of financial services (1.5, 2 of 2 points).

When assessing individual targeting in further questions, the SPI questionnaire explicitly refers to "poor" clients. Additional information given in the questionnaire suggests a participatory wealth ranking in which the community members rank themselves according to their own definition of wealth and poverty. According to Eurostat (2008) the national poverty line in Bulgaria is 276 BGN (142 EUR) monthly income. Depending on the location of the cooperative, the interviewed staff members and clients acknowledged that some clients or a considerable share of the clients rely on incomes below the poverty line. However, given the objective of serving small farmers, the questions are aiming to assess the implementation of the predefined goal for targeting.

To a large extent targeting is implemented through the social network of the members. Secondly the cooperatives focus on agricultural entrepreneurs and, by offering loans of a restricted size, targets micro and small enterprises. In the questionnaire the percentage of clients which has been selected according to the “targeting tool” is used to indicate the implementation of the targeting specifications. Smili, Plisak, Dori, Perel, and Momda are actively promoting their target clients (1.6, 2 of 2 points) whereas other cooperatives also serve large farms (who use the largest possible loan sum to finance working capital), or even extend their services to consumer loans.

In practice the loan officer and often the manager visit new clients on the spot and verify whether the client’s business plan is in compliance with the cooperatives preferences (1.7, 1 of 1 point). By assessing the clients’ economic situation and constantly tracking their development through the social network, the staff members are aware of the character of their target group (1.8, 1 of 1 point).

The ACCS serve also poor clients within their target group, i.e. people in rural areas with an income below the national poverty line. Especially cooperatives in economically weak regions report a share of more than 10% of new clients below the poverty line (1.9 1 of 1 point). Among them are Smili and Momda in the mountainous area of the Rodopian mountains, Pomo, Samok, and Hakov with small farmers who “rely on potato farming or sheep husbandry in very small
scales”\textsuperscript{13}, or “wine production with intensive labour input but low profits”\textsuperscript{14}. A large share of the clients of ACC Kainad and Dori represents the phenomenon of structural change. They did not keep pace with growth in terms of farm size and now suffer from high input costs, low productivity, and the fading out of local markets for their produce.

The final questions concerning individual targeting refer to the share of women borrowers and to clients from socially marginalized groups. In all cooperatives we found a share of more than 10\% of the active clients (1.10, 1 of 1 point). Agriculture often involves a high labour input and hence cheap external workforce is used even by small farms during labour intensive times as e.g. harvest. Agricultural workers in Bulgaria often stem from ethnic minority groups or other socially marginalized people. We traced back several cases in which the employer was a member of the cooperative and, by functioning as a guarantor, introduced his employee to the cooperative as a new client. In all cooperatives we observed the awareness about this process among the staff members and considerable shares of clients from marginalized groups of up to 30\% (1.11, 1 of 2 points).

The third element of targeting in microfinance institutions is the application of a pro poor methodology. To reduce entry barriers and transaction costs the cooperatives rely on the social networks in rural community to collateralize their loans. One or two other persons guarantee for a client and take over full liability in case of repayment problems. This allows lending without pledging physical collateral up to a loan size of 10.000 BGN (5130 EUR) (1.12, 2 of 2 points). Alternative forms of collateral as machinery or livestock are also common practice (1.13, 1 of 1 point). Concerning the loan size, the cooperatives are flexible and adjust loans to individual needs. This includes also the provision of very small loans (e.g. 500 BGN or 256 EUR working capital loan to buy fodder or seeds, etc.). The SPI questionnaire proposes a benchmark of 30\% of per capita income, which roughly amounts to 2500 BGN (1282 EUR). The largest share (larger than 50\%) of such small loans in the total number of loans was observed in the cooperatives Smili and Momda which both operate in remote villages in mountainous regions (1.14, 2 of 2 points). Other cooperatives also provide small loans but do not exceed a 50\% share (1.15, 1 of 2 points). Beyond loans, microfinance also includes small scale deposit services, but due to legal restrictions, only few cooperatives offer their members to take loans from them. Although deposit services would be desirable, this solution, based on mutual trust, is not viable for large amounts of deposits (1.16, 0 or 1 of 1 point). As the cooperatives offer loans of different amounts and risk, a sort of solidarity among the products exists. This becomes obvious during the yearly general assemblies when the trade of between large loans to more wealthy farmers (if present) and small loans to small farmers (without physical collateral) is discussed among the members –who each have one vote, independently of their economic status (1.17, 1 of 1 point).

Products and Services are covered by the second dimension in the SPI questionnaire. The range of services of the cooperatives comprises all types of loans demanded by the mainly agricultural, or in a wider sense rural, clientele. The organizational form of the cooperatives, which inherits a member based approach and the orientation towards creating benefits for members, highly contributes to the accurate adaption of services to clients’ needs. Long term

\textsuperscript{13} Manager of ACC Samok

\textsuperscript{14} Manager of ACC Pomo and interviewed clients
investment loans as well as short term working capital loans and special services as emergency loans are available (2.1 1 of 1 point; 2.2 1 of 1 point). Emergency loans are fast disbursed loans in case of unforeseen events, as e.g. the destruction of a greening house by storm, etc. Such loans require clients to have a good credit history and future repayment capacity. Usually the loan officer and the manager carefully review loan applications as well as the underlying business plan and economic situation of a client, respectively a client’s household. Each cooperative also has a “control committee” consisting of 5 to 7 key persons (local experienced farmers, experts in finance and law, members of public authorities, etc.) which decides about the disbursement of a loan (2.3 – 2.7, 1 of 1 point). The quality of services is defined by parameters as decentralization, which refers to the local presence of the microfinance institution. Although the cooperatives have only one office, the social networks reach out to rural communities in the surrounding villages (2.8, 1 of 1 point). Timely delivery of loans depends on the monthly or bimonthly meeting of the “control committee”, but exceptions are do occur. Managers reported urgent cases which required a fast disbursement and made it necessary to discuss single cases by telephone (2.9, 1 of 1 point).

When assessing the appropriateness of interest rates, the SPI questionnaire refers to certain levels above the costs for funds. Hence we use the current interest for refinance that the cooperatives incur when taking loans Oikocredit. We observe some cooperatives which kept stable and relatively low interest rates since their foundation of 10 to 12% (Smili, Agrom, Rusl, Plisak, Dori, Perel, Hakov, Pomo, and Momda) (2.10, 2 of 2 points). Other managers raised the rates to 14% or more in combination with offering short term loans at even higher rates (2.10, 1 of 2 points). We have to mention that in each cooperative we also interviewed clients who partly complained about high interest rates but stated that there is no alternative access to funds. Furthermore, banks do either offer loans at even higher rates or refrain from lending to rural population. For the prevention of excessive interest rates there is a well working feed-back mechanism in the cooperative structure as the members can communicate their degree of satisfaction every year in the general assembly, or by cancelling their membership in the cooperative. Hence the staff members are interested in obtaining informal feedback during the operation when interacting with clients (2.11, 1 of 2 points). This also explains a very low drop out rate in all cooperatives (2.12, 2 of 2 points). In case members drop out, i.e. decide to leave the cooperative, they are asked to state the reasons (2.13, 1 of 1 point). This feedback mechanism is appreciated by the staff members of the cooperatives as a tool for improvement of clients’ benefits.

In all cooperatives we found a remarkable activity concerning innovative and non-financial services. The social network around each cooperative is a crucial source of information, e.g. about technical questions in agriculture, state support programs or opportunities to access markets. Additionally the cooperatives engage in contracting insurance companies to provide to their clients services as consulting or insurance of produce, life etc. at preferable rates (2.14, 2 of 2 points; 2.16 1 of 1 point, 2.17, 1 of 1 point, 2.19, 2 of 2 points). So called “innovations”, as banking by using “new information technologies”, are neither established nor demanded. Personal contacts are a precondition of the social network and hence staff members regularly visit clients on the spot. In remote areas, such visits are sometimes also used to conduct transactions, etc. (2.15, 1 of 2 points). The cooperatives Smili, Pomo, and Momda (2.18, 1 of 1 point) established a fund to alleviate extreme events of members and to prevent them from sudden economic problems.
**Benefits for clients** are measured in the third dimension. The cooperative as a member based organization usually is established to solve a common problem of the members, or beyond this, to create a benefit. The required communication between the implementing managers and the active members is done in formally and to a large extent through the social network (3.1, 1 of 1 point; 3.2, 1 of 2 points). The degree of employing information from clients for improving the management varies among the cooperatives and mainly depends on the quality of clients’ involvement, i.e. on whether proposals are constructive, and on openness and readiness to implement changes of the side of the managers. In general we found more staff – clients – interaction in smaller cooperatives with a tighter social network (Smili, Momda, Pomo) (3.3, 1 of 1 point). On of the efforts to improve the economic benefit of clients is the reduction of operating costs (3.4, 1o f 1 point). We found strategies that reach from investment in efficient technology as computer hard and software or a new car for travels to clients (Mist, Getov), but also outdated technology and inefficient office equipment (Example: no internet connection in Kainad). Whereas most cooperative invest appropriately in their physical assets, some seem to run in problems due to excessive operating costs (Solida). Further economic profits for clients, arising from the cooperatives revenues, are not bailed out as dividends but allocated to members’ share capital and to the cooperatives reserves (3.6, 2 of 2 points; 3.7, 1 of 1 point). Such decisions on the strategic management of the cooperative are discussed and taken in the elections during the general assembly once per year (3.8 2 of 2 points; 3.9 1 of 1 point; 3.10, 1 of 1 point; 3.13, 2 of 2 points). Elections also comprise the bodies of the cooperative as “control committee” and “administrative committee” (comparable to supervisory board). In all cooperatives we observed that more than 20% of elected representatives are women (3.11, 1 of 1 point). Members of the cooperative bodies mostly are experienced people and have a key function in the local rural community or social network. The questionnaire evaluates whether members of participatory bodies are provided further trainings or seminars. We observed capacity building measures only on an irregular basis (3.12, 1 of 2 points).

A very important criteria in assessing social performance of the ACCs is their function in building social capital and enhancing empowerment of specific clientele. Due to their specialization on agricultural finance we observe a high involvement in their clients’ business. Examples are managers who themselves have expertise in agriculture or their engagement in consulting or forming producer groups. (Example: The cooperative in Smili achieved to register a regional brand for the locally produced sorts of beans. This enables producers from Smili to sell their beans under a common brand and to achieve higher prices on the market.) (3.14, 2 of 2 points)

Whereas in some countries the empowerment of women plays an important role in the activity of microfinance institutions, we do not observe specially designed products or the demand for such effort in Bulgaria (3.14, 0 of 2 points). A far more meaningful issue is the transparency of the cooperatives towards its clients. Again the cooperative structures with participation of members and yearly disclosure of operational data contribute to a high standard of transparency (3.15, 2 of 2 points). As mentioned before, the cooperative provides a broad range of non-financial services as consulting and networking. This also includes the support of clients influence with local government bodies as observed in Smili, Agrom, Plisak, Perel, and Momda (3.16 2 of 2 points). For example Perel engages in rural development projects to extend its services.
The fourth dimension assesses **social responsibility**. Appropriate salaries, working contracts, health coverage and possibilities for participation and training are indicators for social responsibility towards staff (4.1, 1 of 1 point; 4.2, 2 of 2 points; 4.3, 1 of 1 point; 4.4, 1 of 2 points; 4.5, 1 of 1 point). Special policies towards women staff members are not observed (4.6, 0 of 1 point). Employee satisfaction to a large extent reflects in the percentage of staff members who leave, which is zero percent in most cases and below 5% in all cooperatives (4.7, 2 of 2 points).

Social responsibility towards clients can be seen as an essential soft component of financial services. The prevention of over indebtedness requires appropriate procedures to assess a client’s economic potential, possible risks, repayment capacity and personal factors. Beyond a detailed analysis of loan applicants on the spot, the managers and loan officers rely on informal information from the social network in their rural communities (4.8, 2 of 2 points). From the clients’ viewpoint, loan products should be cost transparent, i.e. easily comprehensible and without hidden financial costs that might exceed repayment capacity. Generally the cooperatives offer only flat interest rates and invest efforts in educating their clients enough to understand the proceedings and requirements when taking a loan (4.9, 1 of 1 point). Using mutual guarantees among persons within a social network naturally involves social pressure in case of repayment problems. It also has to be admitted that pledging property as land or the clients’ house of living can endanger the social status of a whole household. Hence a prior appraisal of default probability is essential for both, the client and the cooperative. We traced some cases of defaults and found extreme delays in enforcement, caused by malfunctioning public authorities. According to managers who are in place since the foundation of the cooperatives, the “fast and frivolous” disbursement of loans in the first years caused severe defaults in the later years but also more cautious policies after 2002/2003. However, the lending activities based on social network relationships with a fast information exchange within the network have a self regulating process inherited. It supports repayment behaviour among clients but also appropriate collection practices and ethnical behaviour of the cooperative staff (4.10, 2 of 2 points; 4.11, 1 of 1 point).

Further issues are client confidentiality and complaint handling, which both are done appropriately by the cooperatives (4.12, 1 of 1 point; 4.13, 1 of 1 point).

The last group of indicators treats the responsibility of the cooperatives towards the community, the promotion of economic development and environmental policies concerning clients and the cooperatives operations. As the cooperative is solely based on a social network of local people it is in line with local culture and values (4.14, 1 of 1 point). The promotion of local economic and social development is more prevalent in small rural communities where the cooperative plays a focal role in the social network or in case the manager is involved in public authorities, e.g. the manager of Smili is also the major og the village. We observed a high engagement in the ACCs Perel, Smili, Agrom, Plisak, Dori and Momda (4.15; 4.16, 1 of 1 point). Concerning environmental policies and their implementation we found room for improvement in all cooperatives (4.17; 4.18, 1 of 2 points).
### Table 3: Social Performance of the ACCs in four dimensions of SPI measurement

<table>
<thead>
<tr>
<th></th>
<th>SPI total</th>
<th>Targeting &amp; outreach</th>
<th>Adaptation of services</th>
<th>Benefits for clients</th>
<th>Social responsibility</th>
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<td>72</td>
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<td>Plisak</td>
<td>80</td>
<td>19</td>
<td>19</td>
<td>20</td>
<td>22</td>
</tr>
<tr>
<td>Mist</td>
<td>73</td>
<td>17</td>
<td>19</td>
<td>18</td>
<td>19</td>
</tr>
<tr>
<td>Getov</td>
<td>74</td>
<td>17</td>
<td>18</td>
<td>19</td>
<td>20</td>
</tr>
<tr>
<td>Ayto</td>
<td>77</td>
<td>17</td>
<td>19</td>
<td>20</td>
<td>21</td>
</tr>
<tr>
<td>Dori</td>
<td>82</td>
<td>20</td>
<td>20</td>
<td>21</td>
<td>21</td>
</tr>
<tr>
<td>Perel</td>
<td>79</td>
<td>18</td>
<td>20</td>
<td>20</td>
<td>21</td>
</tr>
<tr>
<td>Hakov</td>
<td>80</td>
<td>20</td>
<td>19</td>
<td>21</td>
<td>20</td>
</tr>
<tr>
<td>Pomo</td>
<td>79</td>
<td>18</td>
<td>20</td>
<td>21</td>
<td>20</td>
</tr>
<tr>
<td>Kainad</td>
<td>76</td>
<td>19</td>
<td>19</td>
<td>20</td>
<td>20</td>
</tr>
<tr>
<td>Momda</td>
<td>86</td>
<td>22</td>
<td>20</td>
<td>22</td>
<td>22</td>
</tr>
<tr>
<td>Solida</td>
<td>75</td>
<td>17</td>
<td>19</td>
<td>20</td>
<td>19</td>
</tr>
<tr>
<td><strong>MAX</strong></td>
<td><strong>100</strong></td>
<td><strong>25</strong></td>
<td><strong>25</strong></td>
<td><strong>25</strong></td>
<td><strong>25</strong></td>
</tr>
</tbody>
</table>

### 7.3. Financial and Social Performance

The SPI scores which were explained in the last chapter are now transformed in an output that can be used in the DEA efficiency analysis.

When including social performance in the calculation of VRS technical efficiency we find Smili and Perel as 100% efficient. They are followed by Ayto, Mist, Pomo, and Momda. Whereas Perel had been the firm with most peer counts in the specification for financial performance, now, when including the SPI output, Smili is the benchmark for most of the other cooperatives. Ayto and Mist with lower scores in the SPI measurement fall back behind the new peers.

### Table 4: Ranking of the ACCs by annual by firm means of VRS TE

<table>
<thead>
<tr>
<th>Ranking without SPI</th>
<th>VRS TE</th>
<th>Ranking with SPI</th>
<th>VRS TE</th>
<th>SPI x number of loans</th>
<th>SPI score</th>
</tr>
</thead>
<tbody>
<tr>
<td>Perel</td>
<td>1.000</td>
<td>Smili</td>
<td>1.000</td>
<td>21289</td>
<td>87</td>
</tr>
<tr>
<td>Ayto</td>
<td>0.986</td>
<td>Perel</td>
<td>1.000</td>
<td>31632</td>
<td>79</td>
</tr>
<tr>
<td>Mist</td>
<td>0.964</td>
<td>Ayto</td>
<td>0.986</td>
<td>13190</td>
<td>77</td>
</tr>
<tr>
<td>Smili</td>
<td>0.952</td>
<td>Mist</td>
<td>0.964</td>
<td>17527</td>
<td>73</td>
</tr>
<tr>
<td>Pomo</td>
<td>0.951</td>
<td>Pomo</td>
<td>0.956</td>
<td>19568</td>
<td>79</td>
</tr>
<tr>
<td>Momda</td>
<td>0.905</td>
<td>Momda</td>
<td>0.923</td>
<td>20253</td>
<td>86</td>
</tr>
<tr>
<td>Dori</td>
<td>0.861</td>
<td>Dori</td>
<td>0.864</td>
<td>16047</td>
<td>82</td>
</tr>
<tr>
<td>Getov</td>
<td>0.842</td>
<td>Getov</td>
<td>0.842</td>
<td>8769</td>
<td>74</td>
</tr>
<tr>
<td>Agrom</td>
<td>0.774</td>
<td>Agrom</td>
<td>0.775</td>
<td>12608</td>
<td>76</td>
</tr>
<tr>
<td>Plisak</td>
<td>0.737</td>
<td>Plisak</td>
<td>0.737</td>
<td>8456</td>
<td>80</td>
</tr>
<tr>
<td>Hakov</td>
<td>0.647</td>
<td>Hakov</td>
<td>0.655</td>
<td>9976</td>
<td>80</td>
</tr>
<tr>
<td>Solida</td>
<td>0.621</td>
<td>Solida</td>
<td>0.623</td>
<td>11077</td>
<td>75</td>
</tr>
<tr>
<td>Samok</td>
<td>0.575</td>
<td>Samok</td>
<td>0.586</td>
<td>10843</td>
<td>72</td>
</tr>
<tr>
<td>Kainad</td>
<td>0.566</td>
<td>Kainad</td>
<td>0.578</td>
<td>13627</td>
<td>76</td>
</tr>
<tr>
<td>Rusl</td>
<td>0.492</td>
<td>Rusl</td>
<td>0.497</td>
<td>6913</td>
<td>73</td>
</tr>
</tbody>
</table>
Following the quantitative results and qualitative information on the Agricultural Credit Cooperatives (ACCs) we can group them as follows:

**Group 1, High financial and social efficiencies:**

In the first group we find Perel, Smili, Momda, Pomo with efficiencies above 90% in both specifications.

Perel, Smili and Momda are located in remote areas which are geographically isolated. Many clients live in villages which can only be reached by unpaved roads. Micro and small farms in those areas often produce a niche product as seed potatoes (Momda) or beans (Smili), which are sold through producer groups. The cooperatives are highly engaged in non-financial services and play an important role in the rural community. Often, the manager of the cooperative is also engaged in public services (e.g. as a major). Extremely tight social networks facilitate an easy and less costly screening and monitoring of clients, and also support a healthy repayment culture among the clients. Perel is the largest cooperative in the group but has low total expenses combined with a high and steady financial performance. Although scoring 8 points less than Smili in the SPI assessment, it achieves a high social output by number of loans. Pomo follows the same path as Perel and achieves a high social output. In this group Pomo is the only cooperative which never used external capital but achieved growth by a constant high financial performance.

Perel, Smili and Momda moderately used external capital but kept low total expenses over the years. Only Momda suffered from defaulting loans in 2005 but recovered and is among the peer institutions from 2008 onwards.

**Group 2, High financial but moderate social efficiency:**

In group 2 we find Ayto and Mist as large cooperatives with mean efficiencies of above 90% percent. Both achieve a high financial performance but, mainly due to their reduced engagement in non-financial services (relative to group 1), have a lower social output. While Ayto has a high and steady financial performance on all years, Mist suffered from high total expenses in 2000 until 2004 due to high default rates and in 2009 due to high costs of external refinance and increased loan defaults.

Dori, Getov, Plisak, and Agrom all have moderate efficiencies. Dori started to use external refinance in 2002 with relatively low efficiency values but moderate total expenses. Although located in a semi urban area, Dori mainly serves clients from villages around the provincial town and we found a very tight social network among the clients and staff members. We observed this as a reason for low default rates. Dori operates at a large scale combined with a high social performance and hence achieves a high social output. Getov increased its portfolio size in 2008 and started to lend also to clients from the provincial town in which the office is located. In 2009 we observe a sharp increase in total expenses, which originates from loan defaults.

Agrom and Plisak are both cooperatives that are located in strong agricultural regions. While Agrom constantly operates at relatively high costs, Plisak has a new manager since 2004 and improved financial performance since then. Although Plisak achieved a high score in social performance indicators, the social output value is low due to a small number of loans. This can be explained with the large scale structure of agriculture (mainly market crop production) in the region.
Comparable to Plisak but at a smaller scale, Hakov (first external capital in 2009) and Samok also operate without external refinance but have a high level of total expenses (above 10% of the loan volume).

**Group 3, Low performers:**

In group 3 we allocate only two cooperatives, which are Solida and Rusl. Rusl did not achieve to increase the share capital over the 10 years and, due to a high level of operating costs, has only a slight growth of equity.

Solida as one of the larger cooperatives suffers from excessive operating expenses in all years. Total expenses as a share of total loan volume is above 16% and exceeds 50% in 2005. Technical and scale efficiencies are constantly low in both specifications. The management change in 2005 but there is only a slight improvement in terms of operating costs. As further data for explanation is not available, we have no detailed explanation for the low performance.

### 7.4. Malmquist DEA

The Malmquist DEA results contain yearly changes of efficiency, technology and total factor productivity (TFP). As explained in the methodology we can decompose the efficiency change into a pure efficiency change and scale efficiency change.

On the first glance the yearly means of all cooperatives in Table 5 show high annual volatilities. The positive overall means of changes only indicate that the average changes of all cooperatives from year to year are slightly positive.

<table>
<thead>
<tr>
<th>Year</th>
<th>efficiency change</th>
<th>technical change</th>
<th>pure efficiency change</th>
<th>scale efficiency change</th>
<th>TFP change</th>
</tr>
</thead>
<tbody>
<tr>
<td>2001</td>
<td>1.098</td>
<td>0.839</td>
<td>0.973</td>
<td>1.132</td>
<td>0.923</td>
</tr>
<tr>
<td>2002</td>
<td>0.773</td>
<td>1.409</td>
<td>1.032</td>
<td>0.749</td>
<td>1.078</td>
</tr>
<tr>
<td>2003</td>
<td>1.380</td>
<td>0.695</td>
<td>0.989</td>
<td>1.400</td>
<td>0.962</td>
</tr>
<tr>
<td>2004</td>
<td>0.927</td>
<td>1.057</td>
<td>0.985</td>
<td>0.943</td>
<td>0.979</td>
</tr>
<tr>
<td>2005</td>
<td>1.008</td>
<td>1.091</td>
<td>1.082</td>
<td>0.928</td>
<td>1.102</td>
</tr>
<tr>
<td>2006</td>
<td>1.073</td>
<td>1.009</td>
<td>0.993</td>
<td>1.070</td>
<td>1.076</td>
</tr>
<tr>
<td>2007</td>
<td>0.964</td>
<td>1.107</td>
<td>1.002</td>
<td>0.965</td>
<td>1.067</td>
</tr>
<tr>
<td>2008</td>
<td>1.161</td>
<td>0.832</td>
<td>1.016</td>
<td>1.158</td>
<td>0.967</td>
</tr>
<tr>
<td>2009</td>
<td>0.830</td>
<td>1.209</td>
<td>0.953</td>
<td>0.869</td>
<td>0.991</td>
</tr>
<tr>
<td>Mean</td>
<td>1.024</td>
<td>1.028</td>
<td>1.003</td>
<td>1.024</td>
<td>1.016</td>
</tr>
</tbody>
</table>

To understand the changes in the values of Table 5, we rely on qualitative information combined with the original data. As already mentioned above, we found a negative impact of the use of external capital on scale efficiency. This makes sense as the only effective possibility of expansion is external refinance inducing interest expenses and hence higher total expenses. Now we find a cooperative working with a certain amount of loanable funds in year t-1. In the following year t the same cooperative uses external capital and inflates its loan volume. The share capital will rise because more clients enter the cooperative, pay in a share and receive a loan. Total expenses will rise due to the first interest
expenses and due to (moderately) higher operating costs. As denoted in Figure 1, from year t-1 to year t we will observe a positive technical change in case that the peer cooperatives also inflate their outputs and cause an upward shift of the frontier. With only a small change in pure (or VRS) technical efficiency and given the “decreasing returns to scale conditions” calculating the technical change relative to technology in year t-1 with an even smaller optimal scale must result in a negative scale efficiency change. Due to the frontier shift, the effect of changing scale efficiencies is amplified for all cooperatives operating above the optimal scale.

In the next year t+1 we enter a situation with a new frontier with only slightly higher output targets. Relative to period t the cooperatives which expanded their total loan volume by external funds now have to deal with high operating costs, raised interest expenses and additionally with higher amounts of defaulting loans (also included in total expenses). Increased inputs in the peer cooperatives will cause a relative downward shift of the frontier. All cooperatives, except the CRS efficient peers will profit from a less sharp decrease to returns to scale. This causes positive changes of scale efficiency coming along with negative technical change.
Regarding our results we find such drastic changes in the years 2001 to 2002 in a upward shift of the frontier, followed by the downward shift in 2003. The peer cooperatives of those periods are Smili, Perel, Mist, Ayto, Momda, and Pomo. In 2002 we find a strong increase of total loan volume in Ayto, Dori, and Momda (2001). The cooperative Ayto doubles its total volume of loans in 2002 but achieves to keep total expenses low enough to be a peer institution operating under optimal returns to scale (CRS) in 2001 and after the inflation in 2003. Hence Ayto causes an increase of the optimal scale in 2003, which leads to the relative improvement in overall scale efficiencies in the same year. In the later years Ayto falls back in the efficiency ranking, probably due to increased defaults. By constantly decreasing its volume of loans until 2008, it achieves to be scale efficient in 2009 again.

Over the years we discover an increasing size of the institutions which are operating with optimal returns to scale. This causes an increase in CRS efficiencies and hence in scale efficiencies, especially of group 2 cooperatives with stable VRS efficiencies. In 2008 a second impact with a downward frontier shift is induced by Dori, Getov, Mist, Solida, and Smili. Interestingly Ayto and Momda become the peer institutions of 2009 and operate with constant returns to scale, which shows that now larger cooperatives can realize scale efficient production. This gives reason to assume that the other outputs, which steadily grow over time, cause a long term growth effect. We find this steady increase in the share capital of the members, which together with growth of the cooperative’s equity makes up the source of a more healthy growth than by excessive use of external funds.
The social performance score appears to have only a small but reasonable effect on the overall efficiency values of the cooperatives. It is important to keep in mind that social performance was assessed in 2009 only and included in the DEA by multiplication with the number of loans. If, in the future, the cooperatives will employ the assessment as a management tool, they might improve their score and increase their social output not only by raising the number of loans.

Concerning the financial crisis in 2009, we do not observe a clear impact in the results of the efficiency analysis. In the data we find raised total expenses in group 2 cooperatives Getov, Plisak and Dori, but also in Mist of group 1. All 4 cooperatives are located in the vicinity of larger provincial towns and we found out that many households depend on non-farm income. Managers stated that loan repayment was not really affected by the raising financial crisis in the first half of 2009 but rather by the subsequent economic crisis from the second half of 2009 onwards. The interviews with the clients of the cooperatives revealed that especially the reduced non-farm income as a consequence of the economic crisis had a severe negative impact on loan repayment capacity, which showed in the higher default rates in the cooperatives’ loan portfolio. On the contrary, the more remote and isolated cooperatives as Smili and Momda did not report loan losses but admitted that more loan applicants are in worse economic situations as in the years before.

8. Conclusion

Based on the comprehensive assessment of social performance with the SPI tool, we created a social output which was employed in the DEA efficiency analysis. Among the financially efficient cooperatives we find a change in the ranking when including the social output in the analytical model. The change is in line with qualitative background information and still ranks the cooperatives in a meaningful order with respect to financial performance.

When analysing the results we observed high costs for external capital as a severe impediment for growth. Using external funds at high costs to reach the objective of serving as many clients as possible and to maximize share capital and social impact is reasonable. However, the maximum expansion will be reached when operating income is equal to total expenses, i.e. when financial sustainability is still given. The return on capital investment is absorbed by external investors instead of contributing to equity growth of the cooperatives. Acquiring loanable funds from savings mobilization could improve the situation of the cooperatives, and would retain the returns of capital investments in regional financial cycles. Although financial services provided by cooperatives with a high social performance have social impact, the importance of regional financial cycles should be considered in future assessments.
Reference List


