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# Can Combined Microfinance Boost Economic Results? An Empirical Cross-sectional Analysis

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***A*bstract:** Worldwide, microcredit organizations are gradually transforming to multi-servicing organizations offering additional financial services. This paper examines whether combining microcredit with insurance and/or savings enhances their economic performance measured by their efficiency, productivity, sustainability or portfolio quality indicators. Using cross-sectional data from 250 microfinance institutions (MFIs) from Latin America and the Caribbean, it compares MFIs offering credit only with those combining credit with respectively savings and/or insurance. A cross-sectional multiple regression analysis shows positive effects of both savings and insurance on the efficiency and productivity of MFIs. Taking into account various risks, this can be attributed to economies of scope, especially in a context of large and mature MFIs which exhibit organisational readiness. Surprisingly, the research didn't observe significant results relating to possible effects on the sustainability and portfolio quality of MFIs.

**JEL Classifications:** C3, G21, G22
**Keywords:** Performance, Combined microfinance, Micro-insurance, Micro-savings

## 1. Introduction

### 1.1 Background

Over three decades after its starting days in many low and middle-income countries, microfinance figures today at the forefront of numerous poverty alleviation plans and strategies and is being implemented worldwide as a decentralized tool to ensure enhanced access to various financial products such as microcredit, microsavings and microinsurance.

Microcredit can be defined as the extension of very small loans (microloans) to the unemployed, to poor entrepreneurs and to other unbankable populations. Microsavings services go hand in hand with the supply of deposit and payment products such as current accounts, small-scale investment funds, money transfer services including remittances and various bill payment services. Microinsurance is the protection of low income people against specific perils in exchange for regular monetary payments (premiums) proportionate to the likelihood and the cost of the risk involved (Wipf and Garand, 2008).

The majority of the microfinance institutions (MFIs) in Latin America and the Caribbean have evolved from delivering loans only to simultaneously delivering financial products of different nature. The combination in the supply of at least two of these product areas can be referred as combined microfinance (CMF; Rossel-Cambier, 2010). Both practitioners (Caplan, 2008), promoters (ILO STEP, 2007; Churchill, 2006) and academics (Labie, 2009; Morduch, 1999) describe this trend as a core part of the growing product diversification of MFIs.

Practice shows that, while new initiatives continue to mushroom, many of them –credit, insurance or savings oriented- are vulnerable in terms of economic sustainability (Servet, 2005;

Westley, 2005; Lashley, 2004; Baeza, 2002). Therefore, adding services can lead to additional risks and complexity (Rossel-Cambier, 2009). Consequently, there is a need to explore whether the combination of credit with savings or insurance either strengthens the economic performance of MFIs or makes them even more vulnerable. This Article explores the possible effects of CMF on the economic performance of MFIs.

This paper takes the point of view of a microcredit organisation which may simultaneously offer savings and/or insurance. It builds on existing research and on information provided by over 300 websites describing the activities of MFIs and their promoters. This research undertakes a cross-sectional analysis involving 54 binary, logged or numerical variables from 250 observed MFIs from Latin-America and the Caribbean representing a total of 13,500 data records (source: Mixmarket[1]).

The Article is organized as follows. The second section reviews existing literature and projects hypotheses. Section 3 explains the proposed model and the following section describes the dataset. Section 5 summarizes the findings, while the final section seven draws conclusions on the results for future action and research.

### 1.2 Measuring Sustainability and Economic Performance: Scope and Limitations

Various sources in literature (Cull *et al.*, 2007; Depret and Hamdouch, 2005; Neely, 2005) identify a set of performance measures to monitor the objectives of MFIs. However, the provision of services, such as high or low-risk insurance, long- or short-term loans, or savings arrangements, involves different managerial and organisational responses in terms of risk management, client relationships, liquidity and solvency forecasting or cash-flow management.

Microcredit, microinsurance and microsavings schemes have their respective performance measurement tools and instruments. Specific performance assessment tools for practitioners in the microcredit sector include: ACCION's "camel"[2], WOCCU's "pearls"[3], PlaNet Rating's "girafe"[4], and the methodologies of MicroRate[5] and M-CRIL[6]. In the microinsurance sector, performance measurement indicators have been proposed by ILO STEP (2007) and Wipf and Garand (2008). Specific instruments dealing with the evaluation of the performance of microinsurance are the GTZ InfoSure software[7], ILO STEP's MAS Pilote[8] and the effectiveness benchmarking studies undertaken by the Insurance Industry Association for Benchmarking (IIAB)[9]. With regards to the performance of microsavings, one can distinguish three stages over time: putting in, keeping in, and taking out monies (Hirschland, 2005). Therefore, specific indicators are considered such as own deposits per month, participant accumulation per month, the dollar-months saved ratio and the savings rate and savings consistency (Schreiner, 2001).

The MFIs surveyed in this Article all deliver loans as main products. Therefore, economic performance is analyzed from the point of view of a microcredit organisation. In this sector, the financial ratios are often considered by practitioners and literature (Bruett, 2006; The SEEP

[1] See: http://www.mixmarket.org
[2] See: http://helpendpoverty.com/camel.asp
[3] See: http://www.woccu.org/bestpractices/pearls
[4] See: http://www.planetrating.com/EN/rating-girafe.php
[5] See: http://microrate.com/
[6] See: http://www.m-cril.com/
[7] See: http://www.infosure.org
[8] See: http://www.ilo.org/public/english/protection/secsoc/step/activities/afrique_ouest/mas_pilote.htm
[9] See: http://www.iiab.org

Network, 2005; CGAP, 2003) in four different categories: efficiency/productivity, financial performance (sustainability), asset/liability management, and portfolio quality. They enable comparability and access to compatible data but do not reflect the specificities of insurance and savings products. Acknowledging the limits in viewing performance as defined by rating agencies, this Article refers to this performance framework in order to remain coherent with the most commonly agreed definitions in the sector.

One potential weakness of the used econometric estimation approach is the possible endogenous relation among the regressors, which may bias the OLS estimates. While the MFIs' efficiency and productivity may improve when providing insurance and savings activities, it can also be that once a microcredit organisation has achieved a certain level of efficiency and productivity, it starts offering combined microfinance products. This is possible, as there may be a cyclical effect of both elements mutually strengthening (or weakening) each other.

This Article analyses empirical evidence from Latin America and the Caribbean. While this could be considered as a limit to generalise the results on a larger scale, one should recognise the role and value of the control variables, which capture possible elements which may compensate largely region-specific differences. Therefore, the estimation of a significant coefficient amongst the variables of interest on a performance variable may not always be attributed to CMF.

## 2. Possible Effects of Combined Microfinance on the Sustainability of MFIS: literature review and Hypotheses

Existing research has explored the factors that may influence the economic performance of microcredit organisations such as governance (Mersland and Strøm, 2009; Qureshi, 2006), loan delivery (Cull *et al.*, 2007), outreach (Hermes *et al*., 2007), the age of the scheme (Stephens, 2005), financial regulation (Hatarska and Nadolnyak, 2007), the organisational structure (Tucker, 2001), the internal management skills (Hudon, 2007), the macroeconomic context (Ahlin, Lin and Maio, 2010) and product delivery mechanisms (McCord, Buczkowski and Saksena, 2006).

Product diversification can entail a number of possible economies of scope, but can also be accompanied by new challenges to the often vulnerable financial schemes. CMF can influence existing vulnerabilities, which can be defined as broad measures of the susceptibility to suffer loss or damage. This study analyses product-specific economies of scope, which refer to economies that arise from the joint delivery of a particular product with other products. If performance can be enhanced by adding a product to a given product mix, then product-specific economies of scope exist (Clark, 1988).

### 2.1 The Delivery of Savings Enhances the Economic Performance of Microcredit Organisations

The combination credit-savings may generate a number of economic vulnerabilities. It may involve additional costs and risks linked to the different nature of the two financial product groups. Assessing the advantages and challenges of combining loans with savings can be compared with a two-edged sword. Many organisations may feel the demand for savings without having the necessary resources to respond to it (Robinson, 2004). Guérin, Palier and Prevost (2009) report for example that in India voluntary savings do not reach full development because of lack of organisational capacity. The collection of savings also involves additional costs which need to be taken into account. Often national legislation stipulates conditions for a MFI to deliver savings products (Hatarska and Nadolnyak, 2007). This reflects the highly sensitive dimension of microsavings as it should enable poor persons to make safe deposits (Hirschland, 2005). Also, reimbursement rates should be kept high enough to not threaten the credibility of the savings function (Armendáriz and Morduch, 2005). Savings and loans products entail different financial

dynamics to achieve break-even and develop economics of scale and scope (Robinson, 2004). For credit-based institutions, reaching scale can mean making a profit without relying heavily on high spread and fee yields and hence achieving economies of scale on cost reductions. For savings-based institutions, the dynamics may work in the opposite direction, with profitability often maintained by investing efforts in quality small-scale lending services (Peachey, 2007).

Alternatively, literature underscores possible economies of scope when combining credit with savings. Pulley and Humphrey (1993), when reviewing the financial sector in the US, suggest that economies of scope can arise from two sources: the spreading of fixed costs over an expanded product mix and cost complementarities among product categories in production. These are mostly linked to the spreading of fixed costs over shared outputs, specialised labour, capital as well as information technology and communication. Reviewing thirteen studies involving statistical cost functions on depository institutions, Clark (1988) suggests that there is evidence of cost complementarities in production when combining loans with savings in financial institutions. Historical literature on informal savings stressed the importance of savings for the organisational sustainability purposes (Low, 1995; Von Pischke, 1981; Bouman, 1977). More recently, Ahlin and Jiang (2008) suggest that the lasting effects of microcredit may partially depend on its simultaneous facilitation of microsavings. While savings have a social mission to safeguard clients' monies, they also include various advantages for the MFI itself. As a complement to credit, savings can yield cost-effectiveness in loan delivery and reduced transaction costs (Hirschland, 2005). CMF can facilitate joint client registration, increased information on the client's financial status, and enhanced communication channels for marketing and product delivery purposes (Churchill, 2005). Liquidity and credit management for example are strongly interlinked as deposits are traditionally the primary source of funding for loans (Bald, 2007). For the sustainability of the MFI, savings allow to be less dependent of external loans (Armendáriz and Morduch, 2005). Therefore combining credit and savings are encouraged when referring to long term economic sustainability (Robinson, 2004). Wisniwsky (1999) claims that equity is the most expensive funding source. Non-interest bearing deposits would constitute the cheapest source. Caudill *et al.* (2009) observe that larger MFIs offering deposits operate more cost effectively over time.

In summary, many sources in literature from both the microfinance and the formal banking sectors have underlined the possible product-specific economies of scope when combining credit with savings. These can help achieve lower financial costs and eventually compensate for the increased operational costs and risks. Economies of scope should especially enable MFIs to achieve efficiency and productivity advantages when combining credit with savings. Therefore, this research, as a first hypothesis, argues that the delivery of savings may have a stimulating effect on the economic performance of microcredit organisations.

### 2.2 Microinsurance May Have a Stimulating Effect on the Economic Performance of Microcredit Organisations

When combining loan delivery with insurance, both economic vulnerabilities and economies of scope may develop. CMF may lead to new economic vulnerabilities for MFIs such as reduced transparency, management challenges or increased complex performance oversight (Rossel-Cambier, 2001). Both loan and insurance delivery depend on sound liquidity management, but both functions are not identical. Thus, one has to ensure that ailing liquidity management of one financial function doesn't harm the delivery of other products (Copestake, 2007). The presence of insurance policies can lead to new forms of moral hazard, as insured clients may change behaviour. Ioannidou and Penas (2010) illustrate this in Bolivia, where the introduction of deposit insurance has lead to riskier behaviour for loan delivery. Moreover, risks affecting loan repayment can also result in insurance claims. When these risks strike borrowers at the same time, portfolio quality can plummet while claims skyrocket (Churchill *et al.*, 2003). In this case, the combined effect could be most adverse for a MFI. Also, one financial product can suffer because of client dissatisfaction

linked to the other function (Labie *et al*., 2007). Finally, there is a risk of hidden subsidisation as various financial products can attract a labyrinth of direct and indirect external funding. MFIs may also lack the capacity to deliver insurance, especially if they intend to deliver it themselves. (Guérin, Palier and Prevost, 2009).

Despite these risks, most literature references stress the various economies of scope which insurance can have on loan delivery. Combined microfinance institutions (CMFIs) can benefit from reduced average overhead costs when delivering both loans and insurance products. The supply of these services to the same group of clients can lead to advantages such as integrated client administration, outreach and lower transaction costs (Morduch, 2004). Having an already existing base of clients enables the organisation to reach easier potential customers with new products and can strengthen client fidelity (ILO STEP, 2007). To this extent, there may be advantages related to marketing and transaction costs (Labie *et al*., 2007). Loan repayments may be hampered by negative externalities such as ill health, death, accident or business-related issues. When combining microcredit with insurance, many of these insurance products may contribute not only to the client's wellbeing, but also indirectly to the MFI's financial performance. CMF can for example protect the client against accident or health risks and hence enhance business continuity or middle-term productivity (Churchill *et al*., 2003). Therefore, one can consider complementary insurance as a way to limit risks such as external shocks, moral hazard and adverse selection and ultimately enhance loan repayment (Bond and Rai, 2009).

In conclusion, while there is limited specific quantitative research available on the issue, similar to the combination credit-savings, one can expect that economies of scope can compensate for the additional costs and vulnerabilities. Therefore, this study proposes that the combination of credit with insurance may be stimulating for organisational performance (hypothesis 2).

## 3. The Model

As reflected in hypotheses, this research is looking for evidence on the possible changes in economic performance when combining microcredit with microsavings and/or microinsurance. This question can be expressed by comparing the expected performances, expressed by $E[O_c|W]$ and $E[O_m|W]$, where $E[O_.|W]$ is the expected (average) economic performance of either a mono-product ($O_m$) or a combined ($O_c$) MFI measured by the same indicator - given (or conditional on) the information set W. If the combining of microfinance products improves, respectively weakens, its performance compared to mono-product microfinance, then the relation is:

$$E[O_c|W] - E[O_m|W] > (\text{resp.} <) 0$$

To address the two hypotheses, the combined microfinance dimension (c) refers to savings and insurance dimensions. There are different possible ways to appreciate the insurance function involving eight different variables in a number of ways. This study considers three possible situations[10]:

(i) Credit insurance only ("lc" combination);
(ii) Multiple insurance services ("li" combination);
(iii) Savings services ("ls" combination).

[10] This study makes a distinction between credit insurance only and multiple insurance services for a number of reasons. Credit insurance only is generally mandatory in nature, subcontracted to an external organisation and has relatively low transaction costs. Other forms of insurance –such as life, property or health insurance- may be more complex to manage and are generally voluntary in nature.

Hence, three potential differences in performance between combined and monoproduct MFIs may be found:

$$E[O_{lc}|W]- E[O_m|W], E[O_{li}|W] - E[O_m|W], \text{ and } E[O_{ls}|W] - E[O_m|W]$$

In order to estimate these potential differences, one can specify the following relation for the MFI *i*:

$$O._i = \beta_0 + \beta_1.DCI_i + \beta_2.DI_i + \beta_3.S_i + w_{ik}.b_k + u_i \qquad (1)$$

In the relation (1), $O._i$ is the performance indicator of MFI i; $DCI_i$ is a dummy variable for credit insurance only, which takes the value 1 if the MFI i combines loans with credit insurance only, 0 if not. In this way, the associated coefficient $\beta 1$ estimates the impact of $E[O_{lc}|W] - E[O_m|W]$. Similarly $DI_i$ and $S_i$ are dummy variables for the presence of respectively multiple insurance services and savings which are the explaining variables of interest. Their respective associated coefficients are presented as well. The equation also includes $w_{ik}$ which is a vector of k independent control variables explaining MFI i performance, to be specified later on; $b_k$ is the vector of the k associated coefficients measuring the effect of each control variable and $u_i$ is the error term associated to MFI i performance.

# 4. The Dataset

## 4.1 Dependent Variables (*O*.i)

In order to analyse economic performances, this research refers to the CGAP/SEEP performance framework (The SEEP Network, 2005; CGAP, 2003)[11] and a selection of its key indicators. The ratios are calculated by the Mixmarket from income statements and balance sheet items. The figures are converted to USD using exchange rates at the end of the period. The commonly agreed definitions of these variables are available in The SEEP Network (2005).

In the literature review and the hypotheses, much focus is put on economies of scope and hence on the possible changes in efficiency and productivity. With relation to efficiency, three indicators are assessed: the operating expense ratio (*OER*), the operating expense by loan portfolio (*OEPL*) and the cost per borrower (*CPB*). The respectively borrowers (*BORSTAFF*) and savers per staff (*SAVESTAFF*) member ratios are considered as the productivity indicators.

Economic performance can also be appreciated by means of financial performance and portfolio quality indicators. Financial performance can be defined as the extent to which the full cost of providing services is directly paid for by service users (Copestake, 2007).

This research reviews three indicators which reflect the sustainability and to a large degree[12] "profitability" of MFIs: Return on Assets (*ROA*), Return on Equity (*ROE*) and Operational self-sufficiency (*OSS*). Two indicators reflect portfolio quality: the portfolio at risk at 30 days (*PAR30*) ratio and the risk coverage ratio (*RCR*).

## 4.2 Independent Control Variables ($w_{ik}$)

This research includes independent control variables which refer to the respective organisational structure of MFIs. This may be a relevant indicator as the organisational structure reflects the general mission and objectives of the MFI as well as its possible legal status. This research makes a distinction between non-bank financial institutions (*NONBANK*), banks (*BANK*),

[11] The issue of asset liability management (ALM) is not reviewed in this study.

[12] Some of the organisations, especially linked to NGO and cooperative structures, have a non-profit mandate.

nongovernmental organisations (*NGO*), cooperative credit unions (*COOP*) and other organisations (*OTHER*). The agreed definitions of these categories are available in the online Mixmarket glossary[13]. The nature of the organisations is expressed by dummy variables which take the value 1 if the MFI i is the organisation in question, 0 if not.

Other explaining control variables used are:

- $C_i$ = Clients or MFI i size defined by the number of active borrowers[14];
- $AGE_i$ = Maturity of the scheme expressed by the number of years that the MFI i existed in 2006.
- $COUNTRY_i$ = The country in which the MFI is operating. Dummy variables are included for the countries concerned.

The country variables allow this research to control the estimations with country-specific elements which can influence economic performance such as legislation, business environment, income level, communication infrastructure, financial market, competition, education levels or inflation.

### 4.3 Descriptive Statistics

56% of the MFIs from the database are combined in nature. Table 1 provides descriptive statistics, successively for the explanatory variables, the performance variables and the control variables. The first part of Table 1 highlights that out of the 250 schemes, 37.6% offer also savings, 21.6% credit insurance and 17.2% multiple insurance.

An important dispersion exists between the financial performances of the MFIs. For example, the variable *ROA* has a mean value of 2.45, a standard deviation of 9.60 and has a wide range in minimum and maximum values of respectively -55.41 and 24.53, suggesting an important heterogeneity in the sample. Similar patterns are observed for the other variables.

The third part of Table 1 indicates that the majority of the MFIs are NGOs (53.6%), followed by non-bank financial institutions (20%) and cooperatives (16.8%). A minority are formal banking institutions (6.8%) and "other" organisations (2.8%). There are large differences in outreach as the number of borrowers range from 123 to 643,659 clients with a mean of 36,298 and a median of 10,117 clients. The database covers 16 Latin American and 2 Caribbean countries. The most represented countries are Ecuador, Mexico and Peru with respectively 15.2%, 14.8% and 11.6% representation. Least represented are Haiti and Argentina (both respectively 2% of database) and Venezuela (only one observation).

The maturity of the MFIs also ranges widely, from one to 51 years of existence with a median value of 13 years.

A correlation analysis indicates that there MFIs offering multiple insurance and savings tend to have a higher level of efficiency. Moreover, there is a possible positive correlation between the delivery of multiple insurance and productivity. The financial performance variables suggest little difference between mono or combined microinsurance schemes. Still, the correlation analysis suggests that MFIs offering only credit insurance tend to have a lower average profitability (*ROA*) than others. The analysis also suggests that there is no significant difference in portfolio quality between mono and combined MFIs.

[13] See: http://www.mixmarket.org/en/glossary

[14] The number of borrowers -as a proxy for the size of the MFI- is used in this context as all the MFIs of the database have a credit function allowing comparability between the variables. The variable "number of clients" can also be measured in function of the number of persons insured or the number of savings accounts.

**Table 1.** Descriptive statistics of the variables used for the economic performance analysis[15]

| | Variable | | Acronym | Obs | Mean | Median | S. D. | Min | Max |
|---|---|---|---|---|---|---|---|---|---|
| **Independent explanatory variables** | Credit insurance | | *DCI* | 250 | 0.216 | 0 | 0.412 | 0 | 1 |
| | Multiple insurance | | *DI* | 250 | 0.172 | 0 | 0.378 | 0 | 1 |
| | No insurance | | *NI* | 250 | 0.612 | 1 | 0.488 | 0 | 1 |
| | Savings | | *S* | 250 | 0.376 | 0 | 0 .485 | 0 | 1 |
| ---------- | | | | | | | | | |
| **Dependent variables** | Efficiency | Operational Expenses Ratio | *OER* | 248 | 21.443 | 15.775 | 15.194 | 2.32 | 92.79 |
| | | Operational Expenses per Loan Portfolio | *OEPL* | 249 | 28.899 | 19.89 | 23.196 | 3.73 | 134.04 |
| | | Cost per Borrower | *CPB* | 247 | 183.857 | 141.3 | 167.219 | 16.4 | 1862 |
| | Productivity | Number of Borrowers per Staff member | *BORSTAFF* | 244 | 133.307 | 117 | 68.033 | 12 | 402 |
| | | Number of Savers per Staff member | *SAVESTAFF* | 247 | 74.215 | 0 | 138.328 | 0 | 867 |
| | Financial performance | Return on Assets | *ROA* | 249 | 2.445 | 3.6 | 9.599 | -55.41 | 24.53 |
| | | Return on Equity | *ROE* | 249 | 13.549 | 11.71 | 53.047 | -268.12 | 666.09 |
| | | Operational Self Sufficiency | *OSS* | 250 | 117.501 | 115.385 | 26.005 | 34.07 | 277.3 |
| ---------- | Portfolio Quality | Portfolio at risk 30 days | *PAR30* | 250 | 5.719 | 3.99 | 6.743 | 0 | 43.33 |
| **Independent control variables** | | Risk Coverage ratio | *RCR* | 246 | 257.503 | 109.29 | 1158.01 | 0 | 16426.25 |
| | | | | | | | | | |
| | Non-bank financial institution | | *NONBANK* | 250 | 0.2 | 0 | 0.401 | 0 | 1 |
| | Cooperative | | *COOP* | 250 | 0.168 | 0 | 0.375 | 0 | 1 |
| | Bank | | *BANK* | 250 | 0.068 | 0 | 0.252 | 0 | 1 |
| | Nongovernmental organisation | | *NGO* | 250 | 0.536 | 1 | 0 .499 | 0 | 1 |
| | Other organisations | | *OTHER* | 250 | 0.028 | 0 | 0.165 | 0 | 1 |
| | Number of clients in 1000 persons | | C | 245 | 36.298 | 10.117 | 91.408 | 0.123 | 643.659 |
| | Maturity of scheme | | *AGE* | 249 | 14.992 | 13 | 9.802 | 1 | 51 |

## 5. Estimation Results

Building on the model (1) and including the vector of control variables described in section 3, the model to be estimated can be presented as following:

$$O._i = \beta_0 + \beta_1.DCI_i + \beta_2.DI_i + \beta_3.S_i + \beta_4.NGO_i + \beta_5.COOP_i + \beta_6.BANK_i$$

$$+ \beta_7.NONBANK_i + \beta_8.C_i + \beta_9.AGE_i + \beta_{10}.\sum_{p=1}^{P} COUNTRY_{pi} + u_i \qquad (2)$$

As an alternative and whereas possible, variables are specified in logarithms. The following model is also estimated:

$$\lambda\nu O._\iota = \gamma_0 + \gamma_1.\Delta XI_\iota + \gamma_2.\Delta I_\iota + \gamma_3.\Sigma_\iota + \gamma_4.N\Gamma O_\iota + \gamma_5.XOO\Pi_\iota + \gamma_6.BANK_\iota +$$

[15] Section 3 gives an overview of the meaning of the various acronyms for the selected variables.

$$\gamma_7.NONBANK_{\iota} + \gamma_8.\lambda\nu X_{\iota} + \gamma_9.\lambda\nu AGE_{\iota} + \gamma_{10}.\sum_{p=1}^{P} COUNTRY_{p_i} + \nu_i \qquad (3)$$

Both models (2) and (3) are estimated by means of Ordinary Least Squares (OLS) regression[16] to explore whether adding insurance or savings products to microcredit organisations enhances or challenges economic performance.

The tables the OLS regression results with relation to respectively efficiency and productivity (Table 2) and financial performance and portfolio quality (Table 3).

As a methodology to appreciate the estimation results, this research applies the Hendry/LSE approach[17] to build from larger models simplified models by including the most significant variables. This research first selects the models with the highest (Adjusted) R-squared value (comparison between results from regression from nominal values and logged values). Following, it applies the Fisher test to explore if the test statistic has an F-distribution under the null hypothesis with a probability of less than 5%. In case of significant results for the *F*-test, this research simplifies the equation by discarding those variables which have t-stats of less than 1. In the simplified econometric model, it only keeps those variables having a $P > |t|$ lower than 10%.

The following two sections present the equations of those dependent variables with the most significant results.

### 5.1 Efficiency and Productivity

Table 2 reflects the significant results of the regression of the efficiency variables *OER*, *OEPL*, *CPB* and their logged values towards the independent variables. The results of the original variables which are all significant at 1% in their F-stats probability have been selected over the results of the estimations involving the logged values, due to a higher level of R-squared values.

With relation to efficiency, the highest level of R-squared can be observed for the *OER* variable (0.446). Applying the methodology mentioned above, the re-estimated regression of *OER* gives the following simplified equation:

$$\begin{aligned} OER = {} & 32.812^{***} - 3.957\ DI^{**} - 11.573\ S^{***} - 0.180\ AGE^{*} - 10.489\ BOLIVIA^{***} \\ & (2.438) \quad (1.564) \quad (1.929) \quad (0.092) \quad (2.443) \\ & - 8.681 COLOMBIA^{**} - 17.791 COSTARICA^{***} - 5.749 ECUADOR^{***} - 9.160\ GUATEMALA^{**} \\ & (3.605) \quad (3.431) \quad (3.605) \quad (3.431) \\ & - 9.953\ ELSALVADOR^{***} + 9.777\ MEXICO^{**} - 9.200\ NICARAGUA^{***} \qquad (4) \\ & (3.070) \quad (3.970) \quad (2.756) \end{aligned}$$

[16] Robust standard errors are estimated in case of 5% significant heteroscedasticity following the Breusch-Pagan / Cook-Weisberg specification test.

[17] The estimation results -applying the Hendry/SLE approach- have been reviewed against possible bias when including the country dummy variables. The significance of a binary country variable is dependent on the reference country and hence the simplification exercise of the binary variables is linked with country specific elements. As the inclusion of a variable (marginally) influences the different coefficients, the result of the selection of the binary country variables may not be fully neutral in the final simplified equation. For this purpose, the results have been compared with in one hand the findings before simplification (see table 3) and in the other hand the simplified estimations when not including the country dummy variables. For the equations (4) and (5), one can observe findings which do not contradict the presented results for the variables of interest, but indicate different levels of significance.

In this regression model N=248; F-stat=10.02; prob>F=0.000 and $R^2$=0.374. Standard errors are presented under brackets and the asterix is indicating probability after the t-test. The coefficients remain robust after simplification.

**Table 2.** Regression results of the efficiency and productivity dependent variables[18]

| Independent variable | Dependent variables – Productivity | | Dependent variables – efficiency | | |
|---|---|---|---|---|---|
| | **Borrowers per Staff member *BORSTAFF*** [19] | **Savers per Staff member *SAVESTAFF*** [20] | **Operational Expenses Ratio *OER*** [21] | **Operational Expenses Per Loan Portfolio *OEPL*** [22] | **Cost per Borrower *CPB*** |
| **Credit insurance – *DCI*** | 25.745** | 10.248 | -1.957 | 3.737 | -25.767 |
| | (12.348) | (16.348) | (2.297) | (3.824) | (28.749) |
| **Multiple insurance -*DI*** | 34.237** | 11.397 | -2.727 | -2.364 | -21.919 |
| | (15.348) | (20.553) | (1.803) | (3.217) | (30.641) |
| **Savings – *S*** | -15.801 | 137.976*** | -11.440*** | -14.413* | 14.793 |
| | (20.477) | (22.952) | (3.888) | (7.500) | (44.303) |
| **Non-bank financial institution - *NONBANK*** | -28.789 | 0.210 | -7.830 | -12.962 | 54.993 |
| | (30.862) | (25.412) | (17.904) | (22.131) | (51.872) |
| **Cooperative -*COOP*** | -26.723 | 123.064*** | -8.774 | -13.515 | 2.939 |
| | (32.870) | (40.375) | (11.811) | (22.177) | (53.865) |
| **Bank - *BANK*** | -9.494 | 3.167 | -8.908 | -16.503 | 25.707 |
| | (35.471) | (33.930) | (11.878) | (22.330) | (65.722) |
| **Nongovernmental organisation - *NGO*** | -7.689 | 9.475 | -8.316 | -13.143 | -53.352 |
| | (28.711) | (23.023) | (11.923) | (22.312) | (37.728) |
| **Number of clients - *C*** in 1000 persons | -0.015 | -0.029 | 0.007 | 0.011 | 0.013 |
| | (0.042) | (0.043) | (0.009) | (0.015) | (0.148) |
| **Maturity of scheme – *AGE*** | 0.123 | 1.625 | -0.111 | -0.131 | 0.335 |
| | (0.515) | (0.152) | (0.094) | (0.168) | (1.176) |
| **Constant** | 261.774*** | 1.625 | 37.383*** | 46.236** | 85.445 |
| | (99.542) | (0.152) | (12.770) | (22.743) | (113.858) |
| **(Adjusted) R-Squared** | 0.177 | 0.638 | 0.446 | 0.429 | 0.221 |
| **F-stat** | 4.13*** | 27.79*** | 7.86*** | 4.64*** | 3.17*** |
| **Number of obs. (N)** | 239 | 241 | 242 | 242 | 241 |

One can observe that the presence of multiple insurance and/or savings contributes to a decrease in value of the dependent variable and hence an improvement of efficiency. This is in line with both hypotheses H1 and H2 which suggest that savings and insurance contribute to higher economic performance (here: efficiency). These findings can be explained by the relation between efficiency and the various dimensions of economies of scope which were documented in the literature. The spreading of fixed costs and cost complementarities can lead to cost-effectiveness in loan delivery (Caudill *et al.*, 2009), reduced transaction costs (Hirschland, 2005) and enhanced communication channels (Churchill, 2005).

[18] Robust standard errors are between parentheses; country dummy variables not reported; ***, ** and * imply significant at the 1%, 5% and 10% level, respectively.

[19] Corrected for heteroscedasticity after Breusch-Pagan / Cook-Weisberg test gave a Prob > chi2 = 0.018.

[20] Idem with Prob > chi2 = 0.000

[21] Idem with Prob > chi2 = 0.000

[22] Idem with Prob > chi2 = 0.000

The equation also highlights that the age of the scheme can contribute to more efficiency. It also suggests that country-specific characteristics may influence efficiency elements. This can be linked to elements such as regulation, general economic climate, and transaction costs of communication or transport. Similar results can be found when regressing the *OEPL* variable and the logged values.

With relation to productivity, one can find the most significant results for *BORSTAFF*, as in Table 2 (F-stat significant at 1% probability and R-squared value of 0.177). The results highlight possible significance towards the insurance related variables *DI* and *DCI*. Simplifying the model, one can find the following equation:

$$\begin{aligned} BORSTAFF = {} & 132.796^{***} + 18.930^{*}\, DCI + 24.979^{**}\, DI - 35.219\, BOLIVIA^{**} \\ & (5.803) \quad (11.224) \quad (12.386) \quad (16.229) \\ & - 57.861\, ELSALVADOR^{***} - 63.396\, HAITI^{***} - 25.702\, HONDURAS^{**} \\ & (15.735) \quad (11.369) \quad (10.506) \end{aligned} \tag{5}$$

Equation (5) suggests significant effects of insurance services (both credit insurance and multiple insurance) on the number of borrowers. Here F is significant suggesting that insurance has a stimulating effect on the productivity of MFIs. The coefficients remain robust after simplification. As indicated in the model, an opposite effect (reduction *BORSTAFF*) may also be generated if the MFI is based in Bolivia, El Salvador, Haiti or Honduras. The simplified estimation allows one to observe the most significant variables for the productivity variable. Still, as the R-squared value is relatively low (value of 0.085), the explanatory value of the regression remains limited.

These results are in line with the second hypothesis (H2) which suggests that microinsurance has a stimulating effect on the economic performance (here: productivity) of microcredit organisations. As highlighted in section 4, a number of economies of scope related with the delivery of insurance may contribute to a higher productivity of staff, expressed by the number of loan takers per staff member. Possible causes are integrated client administration, outreach or lower transaction costs (Morduch, 2004). The delivery of both loans and insurance may allow MFIs to reach easier customers and strengthen client fidelity. The availability of insurance may also have stimulating indirect effects on the financial stability of the clients and hence enhance productivity.

### 5.2 Other Performance Variables: Financial Performance and Portfolio Quality

The regression findings suggest that the presence of savings or insurance does not have a significant effect on the financial performance of microcredit organisations, expressed by *ROA*, *ROE* and *OSS* (see Table 3). The F-test presents values of respectively 1.14; 1.49 and 1.29. As none of the estimations of these variables qualify at a probability of less than 5%, one can describe them of limited significance. When estimating results for the logged value of *OSS*, one can observe an F-value of 1.67 with a probability of less than 5%.

Still, no variables of interest show a possible significant effect within a probability of 10% (t-test). For these reasons, one can suggest that our database doesn't observe significant differences in financial performance between combined and mono-product MFIs.

With reference to portfolio quality, the estimations of *RCR* and *PAR30* give F-stats of respectively 1.43 and 0.45 which don't meet the 5% probability threshold. The estimations of the logged values of *PAR30* and *RCR* give F-stats of respectively 2.01 and 2.82 with both a probability >F of less than 1%. Still, after the t-test which offers a 10% probability, these don't offer any significant results with relation to the variables of interest (*DCI*, *DI* or *S*). On the other hand, other control variables such as ln*C*, ln*AGE* and the organisational variables (*NONBANK*, *COOP*, *BANK* and *NGO*) tend to have more significant effects on one or both of these portfolio quality

dependent variables. None of the country-specific control variables have a significant effect (10% probability in t-test) in the estimation.

**Table 3.** Regression of the financial performance and portfolio quality variables

| Independent variables[23] | Dependent variables | | | | |
|---|---|---|---|---|---|
| | Financial performance | | | Portfolio Quality | |
| | ***ROA***[24] | ***ROE***[25] | ***OSS*** | ***PAR30***[26] | ***RCR***[27] |
| **Credit insurance - *DCI*** | -2.435 | 8.928 | -7.473 | 0.872 | -212.585 |
| | (1.876) | (13.405) | (4.978) | (1.116) | (226.009) |
| **Multiple insurance - *DI*** | 0.546 | 4.867 | -0.977 | 0.075 | -73.812 |
| | (1.885) | (6.090) | (4.649) | (1.271) | (159.950) |
| **Savings - *S*** | 0.754 | 5.852 | 6.335 | -1.535 | -147.691 |
| | (4.192) | (31.979) | (8.865) | (2.200) | (131.529) |
| **Non-bank financial institution - *NONBANK*** | 15.290 | -95.311 | 10.955 | 5.019** | -584.443 |
| | (13.537) | (185.574) | (28.080) | (2.201) | (383.786) |
| **Cooperative -*COOP*** | 11.917 | -106.773 | -2.091 | 9.060*** | -353.542 |
| | (13.381) | (181.095) | (28.425) | (3.151) | (339.464) |
| **Bank - *BANK*** | 19.277 | -90.738 | 10.319 | 5.143** | -445.978 |
| | (13.865) | (182.633) | (29.887) | (2.520) | (372.548) |
| **Non governmental organisation - *NGO*** | 16.756 | -92.669 | 14.019 | 6.302*** | -319.111 |
| | (13.497) | (175.772) | (27.383) | (2.357) | (351.034) |
| **Number of clients – *C*** in 1000 persons | -0.007 | -0.003 | 0.021 | 0.003 | -0.445 |
| | (0.009) | (0.041) | (0.019) | (0.003) | (0.569) |
| **Maturity of scheme - *AGE*** | 0.051 | -0.034 | 0.042 | 0.067 | -7.475 |
| | (0.108) | (0.309) | (0.182) | (0.047) | (6.150) |
| **Constant** | -16.622 | 101.197 | 0.042 | -4.108 | 970.626** |
| | (15.039) | (173.174) | (0.182) | (3.989) | (533.079) |
| **Adjusted $R^2$** | 0.091 | 0.144 | 0.159 | 0.125 | -0.078 |
| **F-stat** | 1.14 | 1.49* | 1.29 | 1.43* | 0.45 |
| **Number of observations (N)** | 242 | 242 | 243 | 242 | 238 |

The only relevant information was obtained during the descriptive statistical analysis. Here, when disaggregating credit and multiple insurance, one can observe possible adverse effects of combined insurance. Contrary to the risk mitigation argument, one can observe a lower average financial performance (*ROA*) for MFIs offering credit insurance (still – not confirmed with regression analysis). If other ways of disaggregating insurance (and savings) delivery were applied, it may possible that other adverse effects of insurance may be found on economic performance.

In summary, the regression estimations of this empirical study do not allow one to provide with confidence evidence of possible significant effects of savings (H1) or insurance (H2) on the financial performance or portfolio quality of microcredit organisations. This may be explained by the multiple other factors which may influence these performance indicators. For portfolio quality, the findings bring forward the possible effects of other control variables, linked to size, age and organisational structure which may be more influential on the economic performance of MFIs than the delivery of savings or insurance.

[23] Robust standard errors in parentheses; country dummy variables not reported; ***, ** and * imply significant at the 1%, 5% and 10% level, respectively.

[24] Corrected for heteroscedasticity after Breusch-Pagan / Cook-Weisberg test gave a Prob > chi2 = 0.0105

[25] Idem with Prob > chi2 = 0.000

[26] Idem with Prob > chi2 = 0.000

[27] Idem with Prob > chi2 = 0.000

## 6. Conclusions

Most reputable MFIs strive for high levels of economic performance, regardless of their non-profit or for-profit status. This Article has examined the extent to which economic performance may be influenced by combining microcredit with savings or insurance products. A unique dataset building on 13,500 data records reflecting observations of 250 MFIs of Latin America and the Caribbean was analyzed and compared with existing literature on combined microfinance.

This study suggests that both savings and multiple insurance can contribute to higher efficiency of microcredit organisations. The delivery of credit and multiple insurance can have significant possible effects on the productivity of MFIs. This is most likely due to the economies of scope which can be achieved in various fields when combining credit with savings or insurance. The spreading of fixed costs and cost complementarities can lead to cost-effectiveness in loan delivery, reduced transaction costs and enhanced communication channels.

Still, surprisingly, no significant empirical evidence was found relating to sustainability or portfolio-quality indicators. Hence, one could wonder why the increased efficiency and productivity do not allow the MFIs to achieve greater overall sustainability results or manage its risks (portfolio quality). This research provides limited support to the statement that combined microfinance may not always be a winning option. It is important to recognise the diversity of insurance and savings products which can be provided. Combining microfinance products also involves various risks ranging from management complexity, increased subsidy dependency and lack of transparency to the effects of covariance risks on economic performance.

This research has brought forward selected associations that can help illuminate and frame further debates, while bearing in mind that many other variables may explain the economic performance of MFIs. Many of the estimations of this research suggest for example that the maturity of the MFIs can be a significant vector for economic performance. As MFIs offering deposits operate more cost effectively over time, CMF may be more appropriate in a context of more mature organisations which have already a certain level of organisational readiness and can rely on the necessary human, financial and organisational resources to deal with the complexity of delivering multiple financial services.

Limited effects were found of the organisational structure variables on the economic performance. Elements such as macro-economic climate, inflation, infrastructure, competition, education and legislation may influence the overall economic performance of MFIs in a given country (Rossel-Cambier, 2011).

This research has explored the possible effects of CMF on the economic performance of MFIs. Still, too much focus on this type of performance can lead to adverse effects on the overall performance of a MFI. At the end of the day, with the explicit social mission of MFIs, economic performance doesn't make much sense without simultaneously ensuring bold social outcomes.

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