

# The impact of staff incentives on the financial performance of Microfinance Institutions

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## Abstract

This research provides evidence of the effect of different kinds of staff incentives on the financial performance of microfinance institutions. By testing the effect of different staff incentives on different financial performance measures, I find that the total number of clients' incentive and quality of interaction based on client feedback mechanism incentive show a positive effect on the financial performance, while the new number of clients' incentive shows a negative effect on the financial performance. These findings are robust to numerous controls for the legal form, size, age, profit status and leverage level of a microfinance institution. These findings suggest that microfinance institutions could improve their financial performance by using / neglecting these staff incentives.

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## 1. Introduction

A company in the microfinance industry is called a microfinance institution. A microfinance institution delivers financial products to people with a low-income, a limited access to financial products and mostly live in poverty. These financial products can be savings, loans, insurances and other products (Microfinance Gateway, 2016). The Mixmarket website claims that the industry has grown from 88 million clients in 2011 to 100 million clients in 2014, which shows that the microfinance industry is in a growth phase.

Microfinance institutions make use of staff incentives to motivate employees to achieve a higher performance and to align the interest of management with the interests of the employees in order to prevent information asymmetries. There are different staff incentives to motivate employees. An example of a staff incentive for an employee is a staff incentive to motivate an employee to get more clients or to get a better portfolio quality, which can also lead to a higher financial performance. Frye (2004) finds evidence that compensation of employees can have a significant effect on the financial performance of a company.

However, the research of Frye (2004) and no other research has shown evidence of the effect of individual staff incentives on the financial performance of microfinance institutions. Pistelli (2011) is the only researcher, which claims that microfinance institutions that make use of staff incentives also have a higher staff productivity and better portfolio quality, but he does not show, which specific incentive leads to a better financial performance and to what significant extent. This gives me the opportunity to research the following question at first: *Do staff incentives all have a positive effect on the financial performance of a microfinance institution?*

McKim and Hughart (2005) describe that employees in a microfinance institution are mostly credit officers and form 50 % of all costs in terms of salaries of a microfinance institution. The credit officers are responsible for almost 100 % of the production. Haerdle et al. (2011) and Rosenberg (2009) describe that it is very time consuming and thereby costly to monitor all credit officers, because credit officers can work up to 75% of their time outside their office.

Therefore, management makes use of staff incentives, monetary and non-monetary rewards to motivate employees and align their interests with the goals of the microfinance institution. Hereby, it could be helpful which kind of staff incentive or reward is best to align the credit officers with the microfinance institution goals and can increase the credit officers' productivity in order to improve the financial performance of a microfinance institution. This knowledge could be interesting for the microfinance directors, investors and other stakeholders who are affected by the financial performance of the microfinance institution.

The purpose of this paper is to show the effect of the individual staff incentives on the financial performance of a microfinance institution, by making use of linear regressions. The staff incentives are also summed up to see what the effect is between microfinance institutions who use zero staff incentives in comparison to microfinance institutions who use one or more staff incentives. To measure the effect of staff incentives on the financial performance of a microfinance institution, I have used panel data of microfinance institutions from 2010-2014 and retrieved the data from the Mixmarket database. More information about this database can be found in the extra chapter after the conclusion: The Mixmarket Database.

The findings show that the total number of clients' staff incentive and quality of interaction based on client feedback mechanism staff incentive increase the financial performance and the new number of clients' incentive decreases the financial performance. The other staff incentives show mixed effects on the financial performance and there is no difference in microfinance institutions, which are making use of zero, one or more staff incentives. These findings are robust by a quantity of controls for the legal form, size, age, profit status and leverage level of a microfinance institution.

As there has no research been done before about the effect of individual staff incentives and sum of staff incentives on the financial performance of microfinance institutions, this research contributes what the effect of the individual staff incentives and sum of staff incentives is on the financial performance of a microfinance institution. Microfinance institutions, investors and other stakeholders can make use of these findings to improve the staff incentive strategy and thereby the financial performance of a microfinance institution.

In the following parts of this research, the theoretical background is described in section two, the hypothesis development in section three, the research design in section four, the results in section five, the conclusion with final remarks in section six and the information about the Mixmarket database in the extra chapter.

## **2. Theoretical Background**

The use of staff incentives by a microfinance institution is a part of corporate governance. Corporate governance is about how investors make sure that management gives their money back (Schleifer and Vishny, 1997). More broadly defined: Corporate governance is about how suppliers of capital get managers to return profits, make sure managers do not misuse the capital by investing in bad projects and how shareholders and creditors monitor managers (American Management association, 2016).

Leonard (1990), Abowd (1990) and Frye (2004) find evidence that compensation of executives / managers / employees can have a significant effect on the financial performance of a company. Leonard (1990) finds evidence that a long-term incentive plan for executives have a significantly positive effect on the return on equity. This research is based on 439 large U.S. corporations between 1981 and 1985. Abowd (1990) finds evidence that pay for performance for managers increase the total shareholder return and after tax gross economic return. This finding is based on data of CEO compensation of 12 OECD countries. Frye (2004) finds a positive relationship between equity based compensation of employees and the financial performance measured by Tobin's Q, which is based on a selection of all companies of the Compustat database. These findings suggest that giving staff incentives to employees of a microfinance institution could lead to a better financial performance.

To research the effect of the staff incentives on the financial performance of microfinance institutions, I identify at first how the financial performance of a microfinance institution can be measured. Later on, I describe which staff incentives microfinance institutions are using to stimulate their employees to achieve a better certain performance. Thereafter I describe, which staff incentive schemes microfinance institutions use to reward employees for their performance.

At last, I show what the gap in the literature is of the effect of staff incentives on the financial performance.

### *2.1 Financial performance*

SEEP and CGAP are two renowned organizations. SEEP is a global network of microenterprise development practitioners, with 120 institutional members, which are active in 180 countries and reach more than 35 million micro entrepreneurs and their families. Seep acts as a platform wherein members are able to share their experiences and learn from each other in order to strengthen the efforts of their members, so they can improve the lives of the most vulnerable people. CGAP is a global partnership, situated at the World Bank, which stimulates everyone in the world to get access to financial services (CGAP, 2016).

Both organizations have described a guide, wherein the financial performance of microfinance institutions are measured by different financial performance indicators. These financial performance indicators on itself are measured by different financial performance measures. Their way of measuring the financial performance indicators is different and how they have designed the financial performance indicators is different. The guide of CGAP, which is written by Rosenberg (2009), is the only guide which mentions that its financial performance indicators are based on the cooperation with retail microfinance institutions over a long term and that “there is a widespread consensus on these indicators” (p.1).

Therefore, I assume that the report of Rosenberg (2009) is a better report to measure the financial performance, because the guide of Rosenberg (2009) is based on the cooperation with retail microfinance institutions. The cooperation with the retail microfinance institutions show that these indicators are also used in practice and gives in my opinion a better way to measure the financial performance of a microfinance institution than a report, which does not mention that its financial performance indicators are based on the cooperation with microfinance institutions.

Rosenberg (2009) transforms the financial performance of microfinance institutions into three financial performance indicators. These three financial performance indicators are portfolio

quality, financial sustainability and efficiency and are measured by financial performance measures.

### *2.1.1 Financial sustainability*

Financial sustainability is a profit factor. To measure financial sustainability, the return on assets and the return on equity are used to measure the profitability of a microfinance institution. The return on assets show that the microfinance institution is able to make a profit on its assets, while the return on equity shows the return on the investment by the owner of the microfinance institution.

### *2.1.2 Portfolio quality: Portfolio at risk*

Portfolio at risk is a cost factor. To measure portfolio quality, portfolio at risk, which measures how many percent of the balance of the portfolio is still not paid back after a certain period, can be used. A period of thirty days is the common measure for microfinance institutions. It is an important indicator, because it shows the ability of the collection of loans and thereby the managerial competence of a microfinance institution.

### *2.1.3 Portfolio quality: Write-off ratio*

Next to portfolio at risk, the write-off ratio can be used as well to measure portfolio quality. The write-off ratio shows how much of the total loans is written-off. Some loans need to be written off, because the insecurity is too high that they will be repaid (von Stauffenberg et al., 2003). The write-off ratio could have a direct effect on portfolio at risk, because the more is written-off of the portfolio at risk over a certain period, the better the portfolio at risk over a certain period looks like (von Stauffenberg et al., 2003).

### *2.1.4 Efficiency*

The efficiency is also a cost factor. The efficiency is measured by the operating expense divided by the loan portfolio and cost per borrower. These financial performance measures show if the microfinance institution is able to keep its costs low. The operating expense, which consists of the personal and administrative expense and is divided over the loan portfolio shows how much the microfinance institution spends to make and monitor its loan portfolio, but this ratio could be

easily manipulated. For example, eight loans of \$100 with the same operating expense per loan have in total more operating expenses than one loan of \$800, if the operating expense of the loan of \$800 is the same as the operating expense of the loan of \$100. By simply dropping the small loans, microfinance institutions could look more efficient.

Therefore, the cost per borrower is also used to measure the efficiency of a microfinance institution, because by simply dropping the loans does not improve this ratio. This indicator is calculated by dividing the operating expense by the average number of active borrowers. (Rosenberg, 2009)

## 2.2 *Staff Incentives*

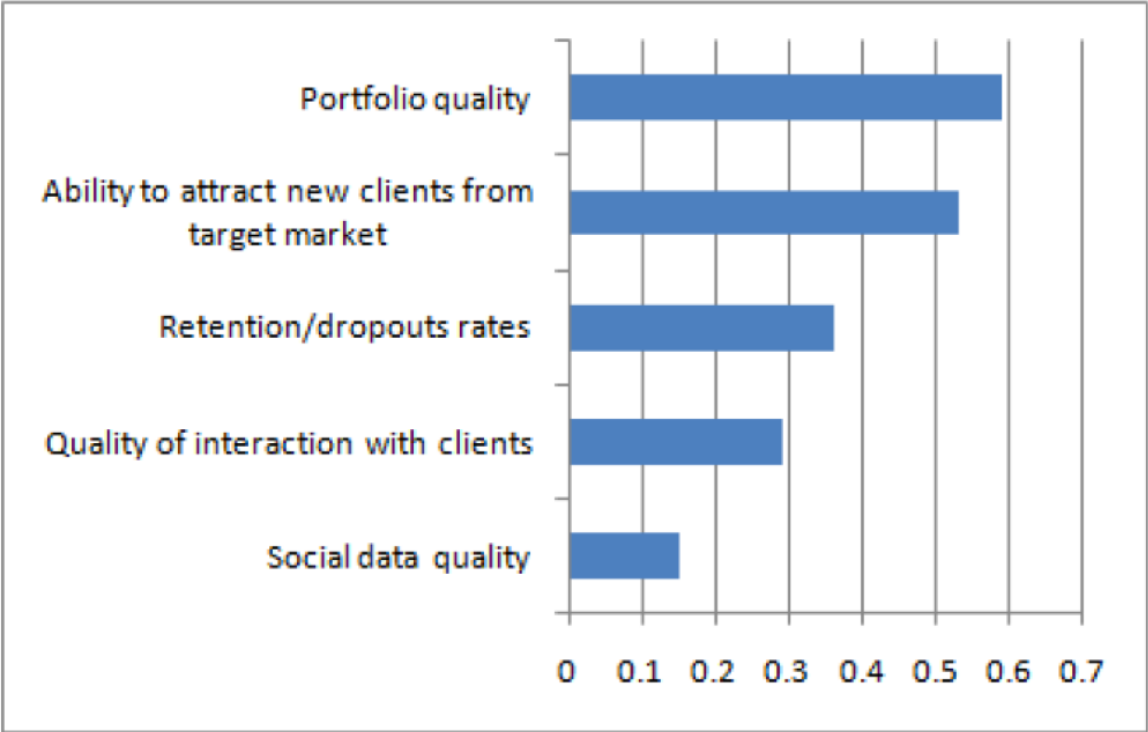
According to Pistelli (2011), staff incentives are officially used to increase the social performance of a microfinance institution. The social performance of a microfinance institution is about all the processes which are implemented by a microfinance institutions to create positive results for its clients and the communities where it is active. Microfinance institutions can reward employees by using staff incentives for a good *portfolio quality* and the *ability to attract new clients*. These staff incentives are shown in figure 1.

The staff incentive *Client retention* is used to motivate employees to keep clients and the staff incentive *quality of interaction with clients* is focused on having a good interaction with clients. These staff incentives can be used as proxies for client satisfaction. The staff incentive *Portfolio quality* is used to motivate an employee for a good portfolio quality and can be used as a proxy to measure client satisfaction as well. Hereby, it is important to note that a policy of zero tolerance for portfolio quality could lead to unethical practices in the collection of debts.

The staff incentive *quality of social data* is also a staff incentive, because the consumer protection is one of the most relevant topics, when the social performance of a microfinance institution is measured. The consumer protection has the potential to have an effect on trust, brand value and financial sustainability of a microfinance institution.

Of all microfinance institutions, 15% in the survey of Pistelli (2011) make use of six smart campaign consumer protection principles which focus on the concerns of high costs and transparency about the price, terms and conditions of all financial products. The focus of the concerns of high costs and transparency is needed to not lend more money to customers what they cannot repay and to not offer products, which they do not need. (The smart campaign, 2016) These microfinance institutions work also with certificates, which have to increase the reliability of the data. To conclude, the staff incentive of *social data quality* is an important staff incentive, because the quality of social data can help to increase the consumer protection of a microfinance institution.

**Figure 1: Adoption of staff incentives by microfinance institutions**

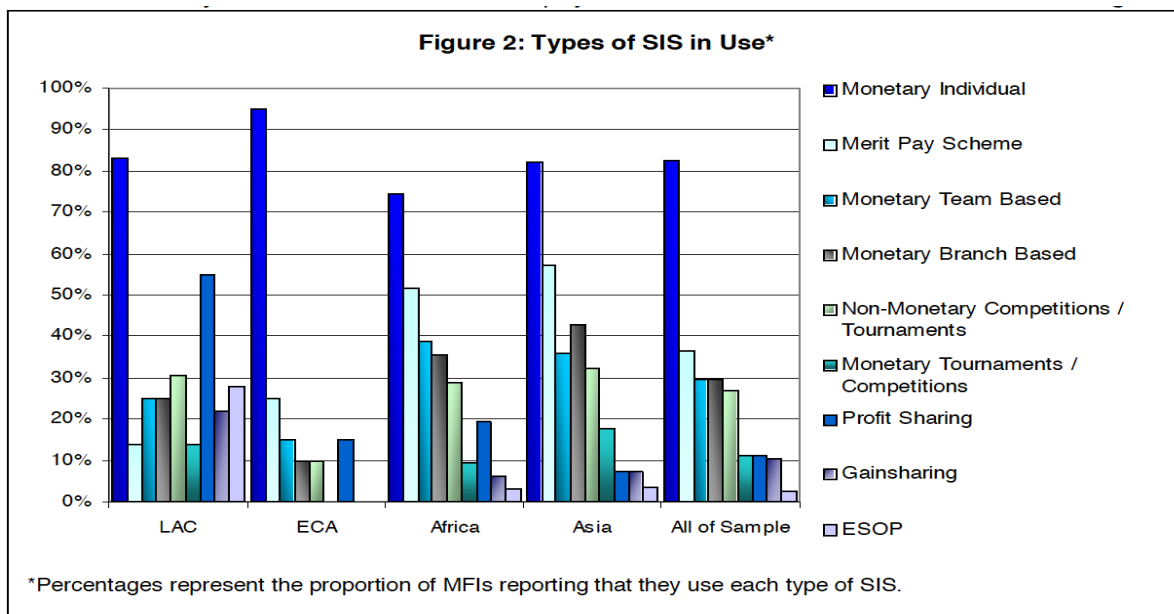




### 2.3 Staff incentive schemes

McKim and Hughart (2005) find that 72% of 147 microfinance institutions make use of staff incentive schemes, according to their global survey. A staff incentive scheme is the staff incentive system microfinance institutions use to motivate employees to achieve higher performance levels (Haerdle, 2011; Holtmann and Grammling, 2005) This system focuses on the reward employees get when they achieve a certain higher performance. The rewards of the staff incentive schemes are shown in figure 2.

**Figure 2: Adoption of staff incentive schemes by microfinance institutions**



In the past, the credit officers of microfinance institutions did get a fixed salary contract with small non-monetary incentives for good performance, like awards, trainings and public recognition. Between 1995-2005, it became more common that microfinance institutions make more use of staff incentive schemes, whereby employees of microfinance institutions get more financial/non-financial awards for their performance. This trend did happen at the same time, that the industry became more commercialized and competitive, whereby microfinance institutions did get a greater focus on sustainability and profitability. (McKim and Hughart, 2005)

A survey of the Microfinance network, CGAP and Microsave shows that 86% of 86 microfinance institutions make use of an individual monetary scheme for credit officers (Holtmann and Grammling, 2005). This percentage is close to the percentage of the survey of McKim and Hughart (2005). According to their survey, around 83% of the microfinance institutions make use of an individual monetary scheme to reward an employee for its performance. This means that an employee gets a monetary reward based on their individual performance. The staff incentive schemes have a high impact on the salary, because the average incentive payment has a weight around 28% of the credit officer's total salary. (McKim and Hughart, 2005)

#### *2.4 The effect of staff incentives and staff incentive schemes on the financial performance*

As I already mentioned in the introduction, Pistelli (2011) claims that microfinance institutions that make use of staff incentives, also have a higher staff productivity and better portfolio quality, but he does not show, which specific incentive leads to a better financial performance and to what significant extent.

McKim and Hughart (2005) measure the effect of staff incentive schemes on the financial performance, by surveying managers of microfinance institutions how they perceive the use staff incentive schemes. The management of microfinance institutions have perceived that staff incentive schemes, have a high or very high positive effect on the overall financial performance and productivity of the credit officers. To add on that, the survey of the Microfinance network, CGAP and Microsave also shows that staff incentives schemes have a medium to a very high effect on improving the financial performance (Holtmann and Grammling, 2005). So, both research suggest that staff incentives schemes are able improve to the financial performance as well, regarding the response of the managers and respondents.

Gonzalez (2010) researches more specifically the effect of staff incentive schemes on the financial performance of microfinance institutions. He finds a positive significant relationship between a microfinance institution which is using staff incentives schemes and two financial performance measures, namely: the operating expense as percentage of loan portfolio and cost per borrower as percentage of GNIPC (Gross national income per capita). What is only important

to note is that the findings in his study should be taken carefully, because he mentions that his sample size is relatively small and only based on microfinance institutions of 2008.

### *2.5 Gap in the literature*

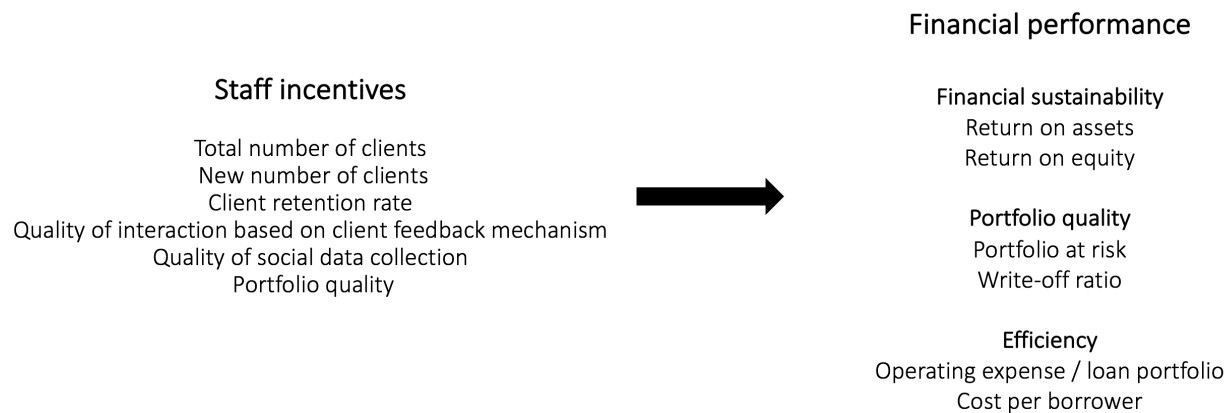
Based on current research, there is a gap in the literature about the specific effect of a reward of a staff incentive scheme reward and an individual staff incentive on the financial performance, because what only has been currently researched is the general effect of the use of staff incentive schemes (Gonzalez, 2010; McKim and Hughart, 2005; Holtmann and Grammling, 2005) on the financial performance and staff incentives on the portfolio quality and productivity of the employees (Pistelli, 2011). This gives me an opportunity to be the first researcher in this field to research the effect of the individual staff incentive schemes and individual staff incentives on the financial performance of a microfinance institution.

## **3. Hypothesis Development**

To develop the hypothesis, I have used the Mixmarket database to get data about microfinance institutions. The Mixmarket database is a database, which contains all kinds of data about microfinance institutions. The website where this database can be used claims that all the microfinance institutions in their database serves more than 80% of all microfinance clients in the world and thereby is the largest database in the world. In their database, there is data about staff incentives, multiple financial performance measures, firm related characteristics and other related information about microfinance institutions what is needed to execute this research.

All financial performance measures, which are described by Rosenberg (2009) and staff incentives, which are described by Pistelli (2011) are retrievable from the Mixmarket database. Next to these five staff incentives, the Mixmarket database contains an extra staff incentive, which is focused on the total number of clients. The rewards of the staff incentive schemes are not retrievable from the Mixmarket database; therefore, I focus in this research only on the relationship between the staff incentives and the financial performance measures, which is shown in figure 3 on the next page.

**Figure 3: The effect of staff incentives on the financial performance**



It can be expected that a staff incentive, which is focused on the total number of clients, has another effect on the portfolio quality of a microfinance institution, in comparison to the quality of social data collection staff incentive, because both staff incentives have a focus on another kind of performance. Therefore, the first hypothesis is:

1. Every staff incentive has a different impact on the financial performance indicators.

Next to the research of the effect of the staff incentives individually, this research also gives an insight if there is a difference between microfinance institutions using a small amount of staff incentives versus microfinance institutions, which use a large amount of staff incentives. If a microfinance institution makes use of three staff incentives, it could have a stronger effect on the financial performance of a microfinance institution, than a microfinance institution, which makes use of one staff incentive. As the use of staff incentives in general, has increased staff productivity and improved the portfolio quality, which is described by Pistelli (2011), I expect that a microfinance institution, which makes use of multiple staff incentives, will have a greater positive effect on the financial performance than a microfinance institution, which makes use of one staff incentive. Therefore, the second hypothesis is:

2. The more staff incentives a microfinance institution uses, the greater the positive effect is on the financial performance indicators.

What is important to note, is that on the one side, when a staff incentive has a negative significant effect on the financial performance measures of portfolio quality and efficiency, that it means that the portfolio quality or efficiency increases, because these financial performance measures are cost factors. On the other side, when there is a positive significant effect on the financial performance measures of financial sustainability, it means that the financial sustainability increases, because these financial performance measures are profit factors.

#### **4. Research Design**

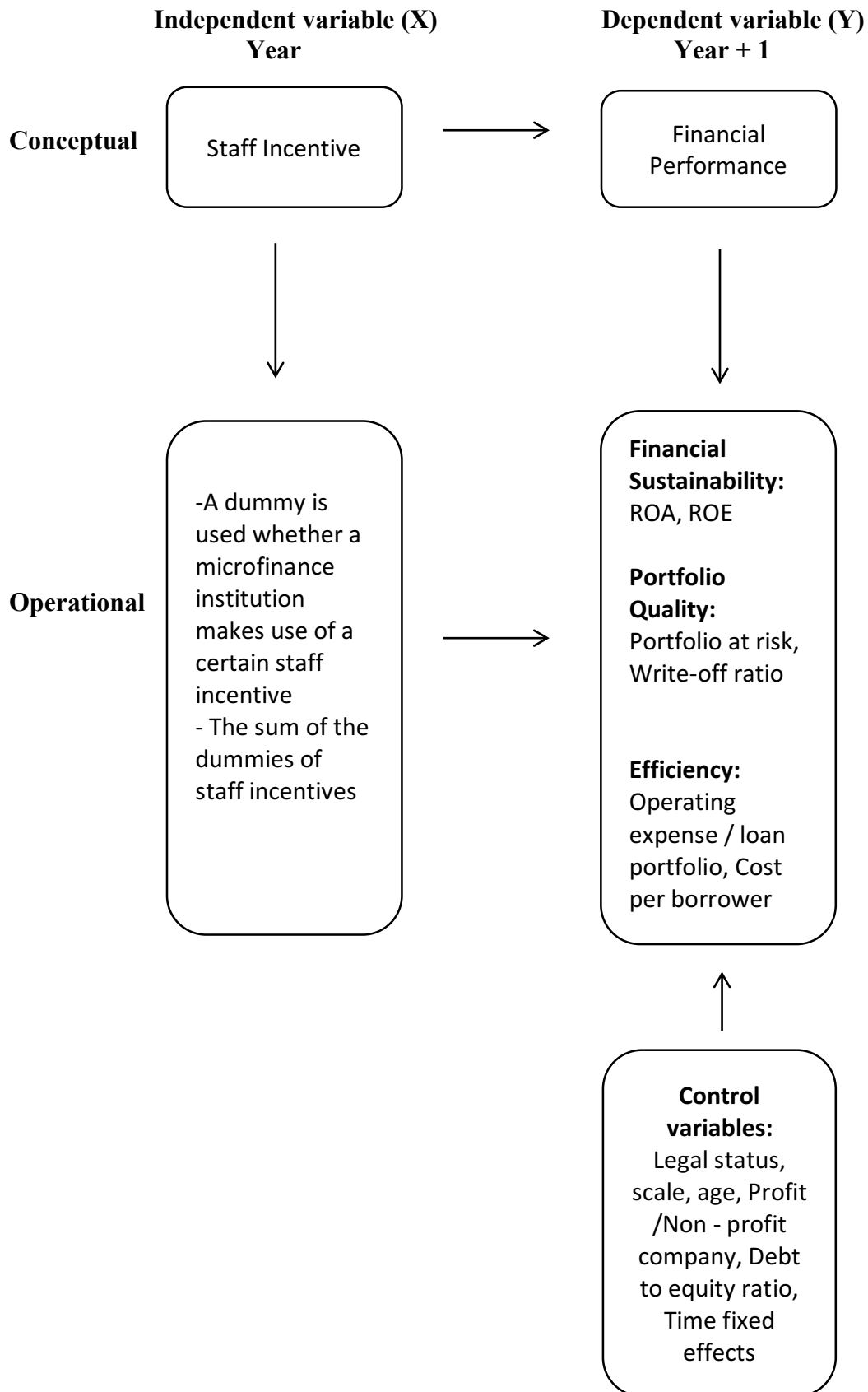
The sample of this research consists of all registered microfinance institutions at Mixmarket from 2010-2014. The amount of data available of microfinance institutions on Mixmarket has grown over the last years. 2014 is the last year, that data of microfinance institutions was retrievable from Mixmarket. To make sure that data is most recent and comparable in terms of the effect of staff incentives on the financial performance of a microfinance institution, a period of five years is chosen.

##### *4.1 The predictive validity framework*

An overview of the theoretical relations between staff incentives, financial performance indicators, control variables and staff incentives is shown in the predictive validity framework in figure 4. In the above part of the predictive validity framework the concept of the main relationship between the staff incentives and the financial performance is given. Thereunder, a description is given how the staff incentives and financial performance measures are operationalized. Lastly, the control variables with the time fixed effects are given, which controls for the relationship between the staff incentives and the financial performance measures.

The effect of every staff incentive on a financial performance measure of a year later is tested, because I assume that the effect of an incentive on the financial performance is smaller if it is implemented at the end of the year, than in the beginning of the year. Therefore, I expect that a period of one year makes the effect of the incentive on the financial performance better visible.

**Figure 4: Predictive Validity Framework**



An overview of the definitions of all variables can be found in table 1. The dependent variables, independent variables and control variables are described in more detail in section 4.2 and 4.3. After the description of the variables, I describe how the hypotheses are operationalized is, how irrelevant and redundant data is deleted and how the regressions are controlled for assumptions. At last, I give a description of the formulas of the regression models.

#### *4.2 Dependent Variables: Financial Performance*

I use the financial performance indicators of Rosenberg (2009) as the dependent variables, because these financial performance indicators are based on the cooperation with microfinance institutions. In the report, other measures are also given to measure portfolio quality and the financial sustainability, only those measures are not retrievable from the Mixmarket database.

Therefore, I use the financial performance measures, which are also described in the theoretical background. To measure portfolio quality, portfolio at risk, which is not paid back in 30 days and the write-off ratio are used. The period of 30 days is chosen, because that is the common measure of microfinance institutions (Rosenberg, 2009). The financial sustainability is measured by the return on assets and return on equity. Efficiency is measured by the operating expense divided over the loan portfolio ratio and operating expense per borrower, which is referred as the cost per borrower. All these financial performance measures are measured on a continuous level.

#### *4.3 Independent Variables: Staff incentives*

I use the staff incentives from the Mixmarket database as well, which are total number of clients, number of new clients, client retention, quality of interaction based on client feedback mechanism, quality of social data collection and portfolio quality. In theory, microfinance institutions could make use of other staff incentives as well, but these staff incentives are not given in the literature nor can they be retrieved from the database of Mixmarket. Therefore, I choose to focus on these six staff incentives, which are all dummy variables.

**Table 1 Variable definitions**

This table reports the definitions of the financial performance measure, incentives and firm characteristics. Section 4 describes the variables in detail.

<b>Variables</b>	<b>Definition</b>
<b>Dependent variables</b>	
Return on assets	Net operating income, less taxes divided over the average assets
Return on equity	Net operating income, less taxes divided over the average equity
Portfolio at risk	The value of loans, which is not paid back in 30 days divided by the gross loan portfolio
Write-off ratio	The value of loans, which are written off over the average gross loan portfolio
Operating expense / loan portfolio	Expenses of operations over the gross loan portfolio
Cost per borrower	Expenses of operations over the average number of active borrowers
Sum of staff incentives	All staff incentives of a microfinance institution together
<b>Independent variables</b>	
Total number of clients	Staff incentive with a focus on the total number of clients
New number of clients	Staff incentive with a focus on the new number of clients
Client retention	Staff incentive with a focus on the retention of clients
Quality of interaction	Staff incentive with a focus on the quality of interaction with clients based on client feedback mechanism
Quality of social data collection	Staff incentive with a focus on the social data collection
Portfolio quality	Staff incentive with a focus on the portfolio quality
<b>Control variables</b>	
Bank	A licensed financial intermediary which is regulated by a state banking agency
Rural bank	A banking institution, which is focused on clients in non-urban areas and works generally in the agricultural sector
Credit union / cooperative	A non-profit financial intermediary, which is based on members
Non-governmental organization	A non-profit organization
Non-bank financial institution	An institution, which provides the same kind of services as a bank, but is licensed in another category
Other	Other kind of organization
Small	Gross loan portfolio value < \$2 million in all regions, except Latin America and the Caribbean - Latin America and the Caribbean < \$4 million
Medium	Gross loan portfolio value \$2 <math>\leq</math> \$ 8 million in all regions, except Latin America and the Caribbean - Latin America and the Caribbean \$ 4 <math>\leq</math> \$ 15 million
Large	Gross loan portfolio value > \$ 8 million in all regions, except Latin America and the Caribbean - Latin America and the Caribbean > \$ 15 million
Profit Status	A microfinance institution with a profit status
Non-profit status	A microfinance institution with a non-profit status.
New	A microfinance institution in operation less than five years
Young	A microfinance institution in operation between five and eight years
Mature	A microfinance institution in operation longer than eight years
Debt / Equity	Leverage level of a microfinance institution



#### *4.4.1 Control Variables: Firm characteristics and time fixed effects*

The financial performance measures are controlled by firm characteristics and time fixed effects. The control variables, which are used are the legal form, scale, age, status, leverage and profit status. Legal status as a control variable is used, because I expect that some legal forms, like banks could have a greater focus on staff incentives than other legal forms, because they are more profit oriented, than for example a NGO. Scale as a control variable is used, because microfinance institutions with a greater scale might have more demand to control the loan officers than microfinance institutions with a smaller scale and therefore could make more use of staff incentives to control the loan officers. Age as a control variable is used, because older microfinance institutions might get better structured over time and will align more staff incentives to their structure to capture more profits than younger firms. Also, the debt to equity ratio could be an important factor, because microfinance institutions, which are debt funded, might make more use of a portfolio quality staff incentive to face less risk than a microfinance institution with a low debt to equity ratio. The last control variable: profit status, which shows the difference between a profit-oriented firm and a non-profit oriented firm, is also used as a control variable, because profit oriented microfinance institutions might be more focused to use staff incentives to increase their performance than non-profit microfinance institutions.

#### *4.4.2 Control variables: Measurement of control variables and time fixed effects*

Profit status is a dummy variable, whereby a microfinance institution with a profit status gets a value of 1 and a microfinance institution with a non-profit status gets a value of 0. The debt to equity is a continuous variable. The legal status is a categorical variable and consists out of: Bank, Rural bank, Credit union / cooperative, NBFI, NGO and Other. Scale and age are measured on an ordinal level. Scale consist of out small, medium and large and age consists out of new, young and mature. Mixmarket has given every legal status, scale and age another number to categorize these variables. For example, to compare the sizes of microfinance institutions, a small microfinance institution got a value of one, a medium sized microfinance institution got a value of two and a large microfinance institution got a value of three.

As the control variable legal status is categorical and scale and age are ordinal, these variables are transformed into dummy variables. The legal status variable is a variable with six values for

each legal form and is transformed into six dummy variables: bank, rural bank, credit union / cooperative, NBFI, NGO and other. The scale variable consists out of small, medium and large, with a value of 1, 2 and 3 respectively. This variable is transformed into a small dummy variable, a medium dummy variable and a large dummy variable. The same process has been done for the age variables, which are transformed into three dummy variables: new, young and mature.

#### *4.5.1 Operation of hypothesis 1: The effect of staff incentives on financial performance*

The financial performance measures are the dependent variables and are regressed on the staff incentives of a year before, which are the independent variables. In this way, it becomes visible how the staff incentives relate to each dependent financial performance measure. When there is a positive significant effect on the profit factors: return on assets and return on equity and a negative effect on the cost factors: portfolio at risk, write-off ratio, operating expense / loan portfolio and cost per borrower, it shows that the individual staff incentive has a positive effect on the financial performance of a microfinance institution.

#### *4.5.2 Operation of hypothesis 2: The effect of the sum of staff incentives on financial performance*

For hypothesis two, the number of the staff incentives, which are used by a microfinance institution are summed up. In this way, a range becomes visible, between microfinance institutions who use zero and all the staff incentives. The variable of the sum of staff incentives is called sum incentives and is the independent variable. The financial performance measures are regressed on the sum of incentives variable to see how the sum of incentives relates to a financial performance measure of a year later. When there is a positive significant effect on the profit factors: return on assets and return on equity and a negative effect on the cost factors: portfolio at risk, write-off ratio, operating expense / loan portfolio and cost per borrower, it shows that the more staff incentives a microfinance institution uses, the better the financial performance in terms of the financial performance indicators is.

#### *4.6 Cleaning of data set*

The data set of the Mixmarket database has shown that some companies do not contain any financial information regarding the financial performance measures at all. These companies are

deleted from the data set. Some companies have also shown a similar name, which could mean that these companies are related as a mother-daughter company. To prevent that companies with a possible daughter-mother relationship are taken into this research, all microfinance institutions with a similar name and the same kind of name or a similar logo on their website are deleted from the data set, which are in total 827 microfinance institutions.

#### *4.7 Linear regression Assumptions*

After the creation of dummy variables of the control variables, all the variables are measurable on a continuous scale, whereby they could be used in a linear regression. Before the regression models are made, the data set is checked on five regression assumptions of linear regression, which are used to measure the accuracy of the results.

At first, there should be a linear relationship between the dependent and independent variables. At second, it is important that all variables in a linear regression should be multivariate normal, so that the right p-value can be calculated. Thirdly it is important that there is no or little multicollinearity, which means that the independent variables do not influence each other. Fourthly there should not be any auto-correlation in the data, which means that the result of Y at time 1, should not have a positive or negative effect on the result on Y at time 2. These outcomes should be independent from each other. At last, it is important that there is no heteroscedasticity in the data, which means that the standard error is stable over time and does not increase / decrease.

##### *4.7.1 Linear relationship assumption*

The relationship between an independent dummy variable and a dependent continuous variable is already linear on itself, because there are only two values of the dummy variable, where the effect is checked on the dependent variable. So, it can be concluded that the first assumption is not violated, because the staff incentive variables are all dummy variables and the financial performance measures are continuous variables.

#### *4.7.2. Multivariate normal*

According to the Central Limit Theorem, when the sample size is larger than 200, the error term will approximate normality. As the sample size of this research is larger than 200, this assumption is not violated as well.

#### *4.7.3 Multicollinearity*

To prevent multicollinearity, one dummy variable of each nominal/ordinal category has to be excluded and is used as a reference category. So, one dummy variable of a legal form, scale, and age and year period has to be excluded. Otherwise, when all dummy variables of a control variable and time fixed effects are being put in a regression model, the values would be perfectly correlated. Multicollinearity can be checked by looking at the VIF value. A maximum value of 10 is recommended by Hair et al. (1995), Kennedy (1992), Marquardt (1970), Neter et al. (1989), while a maximum value of 5 is recommended by Rogerson (2001). Even a maximum value of 4 is recommended by Pan and Jackson (2008). In the regression, all dummy variables of legal status, age, scale and year of time fixed effects, which scored a VIF value higher than 4 points are excluded, so NBFI, mature, large and 2011-2012 are excluded to prevent multicollinearity.

#### *4.7.4 Autocorrelation assumption*

The fourth assumption of autocorrelation is also not violated. Auto-correlation can be detected with the Durbin-Watson test. When the Durbin Watson value is between 1.5-2.5, there is no autocorrelation in the data. All regressions models, which are used in this research show a value between 1.5-2.5, which means that there is no autocorrelation detected in this research.

#### *4.7.5 Heteroscedasticity assumption*

Heteroscedasticity exists, when the standard errors are not constant. An example of a heteroscedasticity situation is when a microfinance institution with a low profit is compared with a microfinance institution with a high profit and their expenses. It can be assumed that the expenses will be higher and with greater variability, when the profit of the microfinance institution rises, which gives heteroscedasticity. As a consequence of heteroscedasticity, the standard error, due to variability will be more difficult to specify.

For the fifth assumption, the White's test is used to check for heteroscedasticity, because this is a test that allows the incentives, which are dummy variables to have a nonlinear and interactive effect on the error variance. Two new variables have to be created, to make use of the white's test. The first variable what needs to be created is calculated by taking the square of the unstandardized predicted values of a regression model, like the portfolio at risk model, which is called, for example PrePAR. Next to the unstandardized predicted values, the unstandardized residuals have to be calculated, which is called, for example ResPAR.

To calculate the white's test, the square of the unstandardized residuals (ResPAR) of a regression model have to be regressed by the square of the unstandardized predicted values (PREPAR) and the unstandardized residuals (ResPAR) of the regression model. To see if there is heteroscedasticity in the data, the significance value should be below 5%

The White's test shows heteroscedasticity in the regression model of portfolio at risk regressed by staff incentives and control variables. Heteroscedasticity can be solved with a log transformation of variables. When a staff incentive is significant after a log transformation, it means that a staff incentive increases the financial performance by an x percentage instead of x points. The log transformation only works for the financial performance measures, which have an absolute value. So, only the cost per borrower could be transformed, because all the other financial performance measures are ratios.

Next to the log transformation, data can also be winsorized in order to decrease heteroscedasticity. The data can be winsorized by giving every outlier above the positive or negative third standard deviation a value of the third stand deviation + or - 0.001. So, for example, if the portfolio at risk shows a value with a standard deviation of four, five and six, the value of four gets the standard deviation value of three, the standard deviation of five gets a value of the third standard deviation + 0.001, which results in 3.001 and the standard deviation value of six gets the value of 3.002. On the negative standard deviation side, the standard deviation with a value of -4 gets a standard deviation value of -3, a value with a standard deviation of -5 gets a value of -3.001 and a standard deviation with a value of -6 gets a value of -3.002.

By winsorizing the data, the data is more normalized. All financial performance variables are first winsorized and the cost per borrower is later on transformed into a log variable to decrease heteroscedasticity. Unfortunately, according to the White's test, all regression models, except for the write-off ratio still show heteroscedasticity. This would mean that all the results of the regression models, except the write-off regression model, have to be interpreted with extra care.

#### *4.8 Linear regression models*

To measure the effect of the staff incentives and sum of staff incentives on the financial performance indicators, twelve models are made. An overview of the formulas of the models is given on the next page.

##### *4.8.1. Regression of financial performance measures regressed on the staff incentives*

In the first model, the financial performance measures, which cannot be log transformed are regressed on the staff incentives. In the second model, the cost per borrower is log transformed and regressed on the staff incentives as well. In the third model, the firm characteristics are added to model 1 and model 2 and in the fifth and sixth model, the time fixed effects are added to model 3 and model 4.

##### *4.8.2. Regression of financial performance measured regressed on the sum of staff incentives*

In the seventh model, the financial performance measures are regressed on the sum of staff incentives. In the eighth model, the cost per borrower is log transformed and regressed on the sum of staff incentives as well. In the ninth and tenth model, the firm characteristics are added to model 7 and model 8 and in the eleventh and twelfth model, the time fixed effects are added to model 9 and model 10.

### **The formulas of the models of the effect of the individual staff incentives on the financial performance measures**

Model 1 Financial performance measure:  $(t) = \alpha + \beta_1$  Total number of clients  $t-1 + \beta_2$  New number of clients  $t-1 + \beta_3$  Client retention  $t-1 + \beta_4$  Quality of interaction based on client feedback mechanism  $t-1 + \beta_5$  Quality of social data collection  $t-1 + \beta_6$  Portfolio quality  $t-1 + \epsilon_t$

Model 2 Log cost per borrower:  $(t) = \alpha + \beta_1$  Total number of clients  $t-1 + \beta_2$  New number of clients  $t-1 + \beta_3$  Client retention  $t-1 + \beta_4$  Quality of interaction based on client feedback mechanism  $t-1 + \beta_5$  Quality of social data collection  $t-1 + \beta_6$  Portfolio quality  $t-1 + \epsilon_t$

### **The formulas of the models of the effect of the individual staff incentives on the financial performance measures with control variables**

Model 3 Financial performance measure:  $(t) = \alpha + \beta_1$  Total number of clients  $t-1 + \beta_2$  New number of clients  $t-1 + \beta_3$  Client retention  $t-1 + \beta_4$  Quality of interaction based on client feedback mechanism  $t-1 + \beta_5$  Quality of social data collection  $t-1 + \beta_6$  Portfolio quality  $t-1 + \beta_7$  Bank  $t + \beta_8$  Rural bank  $t + \beta_9$  Credit union / cooperative  $t + \beta_{10}$  Non-governmental organization  $t + \beta_{11}$  Other  $t + \beta_{12}$  Small  $t + \beta_{13}$  Medium  $t + \beta_{14}$  Profit status  $t + \beta_{15}$  New  $t + \beta_{16}$  Young  $t + \beta_{17}$  Debt/equity  $t + \epsilon_t$

Model 4 Log cost per borrower:  $(t) = \alpha + \beta_1$  Total number of clients  $t-1 + \beta_2$  New number of clients  $t-1 + \beta_3$  Client retention  $t-1 + \beta_4$  Quality of interaction based on client feedback mechanism  $t-1 + \beta_5$  Quality of social data collection  $t-1 + \beta_6$  Portfolio quality  $t-1 + \beta_7$  Bank  $t + \beta_8$  Rural Bank  $t + \beta_9$  Credit union / cooperative  $t + \beta_{10}$  Non-governmental-organization  $t + \beta_{11}$  Other  $t + \beta_{12}$  Small  $t + \beta_{13}$  Medium  $t + \beta_{14}$  Profit status  $t + \beta_{15}$  New  $t + \beta_{16}$  Young  $t + \beta_{17}$  Debt/equity  $t + \epsilon_t$

### **The formulas of the models of the effect of the individual staff incentives on the financial performance measures with control variables and time fixed effects**

Model 5 Financial performance measure:  $(t) = \alpha + \beta_1$  Total number of clients  $t-1 + \beta_2$  New number of clients  $t-1 + \beta_3$  Client retention  $t-1 + \beta_4$  Quality of interaction based on client feedback mechanism  $t-1 + \beta_5$  Quality of social data collection  $t-1 + \beta_6$  Portfolio quality  $t-1 + \beta_7$  Bank  $t +$

$\beta_8$  Rural bank  $t + \beta_9$  Credit union / cooperative  $t + \beta_{10}$  Non-governmental organization  $t + \beta_{11}$  Other  $t + \beta_{12}$  Small  $t + \beta_{13}$  Medium  $t + \beta_{14}$  Profit status  $t + \beta_{15}$  New  $t + \beta_{16}$  Young  $t + \beta_{17}$  Debt/equity  $t +$  Time fixed effects  $+ \epsilon_t$

Model 6 Log cost per borrower:  $(t) = \alpha + \beta_1$  Total number of clients  $t-1 + \beta_2$  New number of clients  $t-1 + \beta_3$  Client retention  $t-1 + \beta_4$  Quality of interaction  $t-1 + \beta_5$  Quality of social data collection  $t-1 + \beta_6$  Portfolio quality  $t-1 + \beta_7$  Bank  $t + \beta_8$  Rural bank  $t + \beta_9$  Credit union / cooperative  $t + \beta_{10}$  Non-governmental organization  $t + \beta_{11}$  Other  $t + \beta_{12}$  Small  $t + \beta_{13}$  Medium  $t + \beta_{14}$  Profit status  $t + \beta_{15}$  New  $t + \beta_{16}$  Young  $t + \beta_{17}$  Debt/Equity  $t +$  Time fixed effects  $+ \epsilon_t$

### **The formulas of the models of the effect of the sum of staff incentives on the financial performance measures**

Model 7 Financial performance measure:  $(t) = \alpha +$  Sum of staff incentives  $t-1 + \epsilon_t$

Model 8 Log cost per borrower: measure  $(t) = \alpha +$  Sum of staff incentives  $t-1 + \epsilon_t$

### **The formulas of the models of the effect of the sum of staff incentives on the financial performance measures with control variables**

Model 9 Financial performance measure:  $(t) = \alpha +$  Sum of staff incentives  $t-1 + \beta_7$  Bank  $t + \beta_8$  Rural bank  $t + \beta_9$  Credit union/ cooperative  $t + \beta_{10}$  Non-governmental organization  $t + \beta_{11}$  Other  $t + \beta_{12}$  Small  $t + \beta_{13}$  Medium  $t + \beta_{14}$  Profit status  $t + \beta_{15}$  New  $t + \beta_{16}$  Young  $t + \beta_{17}$  Debt/equity  $t + \epsilon_t$

Model 10 Log cost per borrower:  $(t) = \alpha +$  Sum of staff incentives  $t-1 + \beta_7$  Bank  $t + \beta_8$  Rural bank  $t + \beta_9$  Credit union/ cooperative  $t + \beta_{10}$  Non-governmental organization  $t + \beta_{11}$  Other  $t + \beta_{12}$  Small  $t + \beta_{13}$  Medium  $t + \beta_{14}$  Profit status  $t + \beta_{15}$  New  $t + \beta_{16}$  Young  $t + \beta_{17}$  Debt/equity  $t + \epsilon_t$



## **The formulas of the models of the effect of the sum of staff incentives on the financial performance measures with control variables and time fixed effects**

Model 11 Financial performance measure:  $(t) = \alpha + \text{Sum of staff incentives } t-1 + \beta_7 \text{ Bank } t + \beta_8 \text{ Rural bank } t + \beta_9 \text{ Credit union / cooperative } t + \beta_{10} \text{ Non-governmental organization } t + \beta_{11} \text{ Other } t + \beta_{12} \text{ Small } t + \beta_{13} \text{ Medium } t + \beta_{14} \text{ Profit status } t + \beta_{15} \text{ New } t + \beta_{16} \text{ Young } t + \beta_{17} \text{ Debt/equity } t + \text{Time fixed effects } t + \varepsilon_t$

Model 12 Log cost per borrower:  $(t) = \alpha + \text{Sum of staff incentives } t-1 + \beta_7 \text{ Bank } t + \beta_8 \text{ Rural bank } t + \beta_9 \text{ Credit union / cooperative } t + \beta_{10} \text{ Non-governmental organization } t + \beta_{11} \text{ Other } t + \beta_{12} \text{ Small } t + \beta_{13} \text{ Medium } t + \beta_{14} \text{ Profit status } t + \beta_{15} \text{ New } t + \beta_{16} \text{ Young } t + \beta_{17} \text{ Debt/equity } t + \text{Time fixed effects } t + \varepsilon_t$

## **5. Results**

In the results section, I describe the descriptives of table 2 in section 5.1, a summary of the correlations between financial performance measures of table 3 in section 5.2 and a summary of the regression models 1-12 of table 4-9 in section 5.3.

### *5.1.1 Descriptives: Financial performance indicators*

The descriptives show that on average, every microfinance institution over all the years has financial sustainability, regarding the average positive return on assets and return on equity. The mean and median of the return on assets show similar values, however the median of the return on equity is around 12% higher than the average return on equity, which means that return on equity for most microfinance institutions is higher than the average microfinance institution.

The portfolio at risk of a microfinance institution is around 5% on average as can be seen in table 2. Von Stauffenberg et al. (2003) claim that the leading microfinance institutions have a portfolio at risk between 1% and 6 % and have to watch out for a portfolio at risk of 10% or higher, because most microfinance institutions lend microcredit loans, which are not backed up by bankable collateral. As the median is around 3% and the mean around 5%, most microfinance institutions have a safe portfolio at risk.

**Table 2: Overview descriptives**

The sample is a panel data set collected from the Mixmarket database over the period 2010-2014. Section 5 describes the sample in detail. The table reports summary statistics from the financial performance measures, incentives and firm characteristics.

<b>Variables</b>	<b>N</b>	<b>Minimum</b>	<b>Maximum</b>	<b>Median</b>	<b>Mean</b>	<b>Standard Deviation</b>
Return on assets	1261	-0.299	0.3182	0.022	0.020294	0.0682796
Return on equity	1258	-15.8153	23.8105	0.173	0.05431	1.0640551
Portfolio at risk	1205	0	0.5022	0.034	0.057359	0.083588
Write-off ratio	1113	-0.011	0.1497	0.007	0.019946	0.0313327
Operating expense / loan portfolio	1259	0	1.0356	0.184494	0.229234	0.184494
Cost per borrower	1223	0	11265.7587	173.583	270.150736	533.0682314
Total number of clients	913	0	1	0	0.008	0.0873
New number of clients	913	0	1	1	0.926	0.2627
Client retention	913	0	1	1	0.634	0.4819
Quality of interaction	1016	0	1	0	0.302	0.4594
Quality of social data collection	1016	0	1	0	0.183	0.3869
Portfolio quality	1016	0	1	1	0.899	0.302
Sum of staff incentives	1284	0	5	2	2.21	1.6049
Bank	1284	0	1	0.1	0.1	0.305
Rural bank	1284	0	1	0	0.01	0.118
Credit union / cooperative	1284	0	1	0	0.14	0.344
Non-bank financial institution	1284	0	1	0	0.4	0.49
Non-governmental organization	1284	0	1	0	0.33	0.471
Other	1284	0	1	0	0.01	0.118
Small	1284	0	1	0	0.21	0.406
Medium	1284	0	1	0	0.24	0.427
Large	1284	0	1	1	0.55	0.498
New	1284	0	1	0	0.03	0.178
Young	1284	0	1	0	0.12	0.328
Mature	1284	0	1	1	0.84	0.371
Profit status	1246	0	1	1	0.506	0.5002
Debt / Equity	1270	-108.52	118.56	3.16	4.1388	8.65769

The average write-off ratio is around 2% and the median of the write-off ratio of 0.70% is lower than the average write-off ratio. Some microfinance institutions may write-off a large part of their portfolio to make the portfolio at risk look better (von Stauffenberg et al., 2003). As the median is around 0.70%, it means that the write-off ratio is relatively very low for most microfinance institutions and that most microfinance institutions have a safe portfolio quality regarding the portfolio at risk and write-off ratio.

The median of 18.45% of the operating expense / loan portfolio shows that most microfinance institutions perform better than the average microfinance institution, which has an operating expense / loan portfolio of 22.92%. In the microfinance industry, an urban microfinance institution with an operating expense ratio of 25% is acceptable (von Stauffenberg et al., 2003). As the mean and median of the operating expense / loan portfolio are below 25%, it seems that most microfinance institutions operate on an acceptable operating expense / loan portfolio level.

What is important to note, is that it is difficult to compare microfinance institutions on their operating expense / loan portfolio, because the operating expenses of microfinance institutions focusing on the rural area are divided over smaller loans due to customer difference, than microfinance institutions focusing on the urban area. That could be a reason, why the standard deviation value is 18.45, which shows that there can be a high difference in the operating expense / loan portfolio level of the microfinance institutions.

For the cost per borrower it is difficult to mention a healthy level. Some microfinance institutions are focusing on consumers with a very small loan and have to make sure that the cost per borrower will be under \$100 for example, while other microfinance institutions are focusing on consumers with a larger loan and could easily have costs over \$300 (von Stauffenberg et al., 2003).

All in all, the median of the financial performance measures shows better results, than the mean of the financial performance measures. The median of ROA and ROE is higher than the mean of these financial performance measures, while the portfolio at risk, write-off ratio, operating expense/ loan portfolio and cost per borrower show a lower median than the mean of these

financial performance measures. The fact that the median and mean are different shows that the data of the financial performance measures is skewed. It is better to use the median as a measure than the mean when the data is skewed, because the median shows a better central tendency of the data.

#### *5.1.2. Descriptives: Staff incentives and control variables*

Furthermore, table 2 shows that the total number of clients' staff incentive is the least used staff incentive, while the portfolio quality and the new number of clients' staff incentive are the most used staff incentives, so it seems that for a microfinance institution it is very important to attract new customers, while keeping a healthy portfolio quality. On average a microfinance institution makes use of 2.21 staff incentives and uses maximum five staff incentives, while the minimum is zero. The legal variable shows that the NBFi is the most common legal form of a microfinance institution. Thereafter, the NGO is the most common legal form of a microfinance institution. Furthermore, the descriptives show that most microfinance institutions are large (55%), are mostly in the mature phase (88%) and that the amount of profit status microfinance institution with (50.6%) is almost similar to the non-profit status microfinance institutions. Finally, most microfinance institutions have on average around four times relatively more debt than equity in their firm.

#### *5.2 Correlation matrix*

By testing the normality of the financial performance variables with the Shapiro-Wilk test, the results show that no financial performance measure is normally distributed. In this case, the Spearman's correlation coefficient is sufficient to check for the correlations between the financial performance measures, because the assumption for a normal distribution of the variables is not needed.

In the correlation matrix table, it is shown that all financial performance measures correlate to each other. The return on assets shows it is significantly positively correlated with the return on equity, which shows that higher values of the return on assets are related with higher values of the return on equity. However, a higher return on assets, is also negatively significantly correlated with the portfolio at risk, write-off ratio, operating expense / loan portfolio and cost per borrower. This shows that if the portfolio at risk, write-off ratio, operating expense / loan portfolio, cost per borrower show lower values, that the values of the return on assets increase.

The same counts for the return on equity, which is also significantly negatively correlated with the portfolio at risk, write-off ratio, operating expense / loan portfolio and cost per borrower. Furthermore, the portfolio at risk shows a significant positive correlation with the write-off ratio, operating expense / loan portfolio and cost per borrower, which means that when the value of the portfolio at risk is higher, the write-off ratio, operating expense / loan portfolio and cost per borrower is higher as well. Also, the write-off ratio is positively correlated with the operating expense/ loan portfolio and cost per borrower. Lastly, when the value of the operating expense / loan portfolio increases, it is shown that it is significantly correlated with higher values of the cost per borrower.

**Table 3 Correlation matrix**

The table displays Spearman's correlation coefficients below the diagonal for the financial performance measures. \*\*\*, \*\*, \* denote that the value is significantly different from zero at the 1%, 5%, and 10% levels, respectively.

<b>Variables</b>	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>	<b>6</b>
1. Return on assets	-					
2. Return on equity	0.821***	-				
3. Portfolio at risk	-0.273***	-0.311***	-			
4. Write-off ratio	-0.105***	-0.161***	0.374***	-		
5. Operating expense / loan portfolio	-0.095***	-0.188***	0.191**	0.396***	-	
6. Cost per borrower	-0.150***	-0.148***	0.382***	0.298***	0.233***	-

All in all, this correlation matrix shows that the financial performance measures of portfolio quality, financial sustainability and efficiency correlate with another financial performance measure of their own financial performance indicator, because the return on assets is correlated with the return on equity, the portfolio at risk with the write-off ratio and the operating expense / loan portfolio with the cost per borrower. Furthermore, it is shown, that at the moment the values of the portfolio at risk, write-off ratio, operating expense / loan portfolio and cost per borrower decrease the return on assets and return on equity increase in all cases. So, a better portfolio quality and better efficiency is correlated with higher values of financial sustainability. Lastly, a

higher portfolio at risk and write-off ratio is correlated with a higher operating expense / loan portfolio and cost per borrower, which shows that portfolio quality correlates with the efficiency.

### *5.3 Regression models' summary*

In the following section, a summary is given of the regression models. What is important to note, as is already mentioned in the section 3, is that on the one side, when a staff incentive has a negative significant effect on the financial performance measures of portfolio quality and efficiency, that it means that the portfolio quality or efficiency increase, because these financial performance measures are cost factors. On the other side, when there is a positive significant effect on the financial performance measures of financial sustainability, it means that the financial sustainability increases, because these financial performance measures are profit factors.

#### *5.3.1 Effect of staff incentives on the financial performance measures*

In model 1 and model 2, a regression is described of the financial performance measures that are regressed on all individual staff incentives. The R square and adjusted R square show that the regression models do not explain the variability around the mean of the financial performance measures very well, because all R squares and adjusted r squares have a lower value than 3.5%. Furthermore, as is expected in the first hypothesis and can be seen in table 3, every staff incentive shows another significant effect on the financial performance measures.

**Table 4**

The table report regressions of the financial performance measures on staff incentives. The sample is a panel data set collected from the Mixmarket database over the period 2010-2014. Section 5 describes the sample in detail. The dependent variables are the financial performance measures and are measured on a continuous scale. The cost per borrower is transformed into a log variable. The incentives are defined in table 1. P-values are reported in parentheses. \*\*\*, \*\*, \* denote that the value is significantly different from zero at the 1%, 5%, and 10% levels, respectively.

<b>Variables</b>	<b>Return on assets (1)</b>	<b>Return on equity (1)</b>	<b>Portfolio at risk (1)</b>	<b>Write-off ratio (1)</b>	<b>Operating expense / loan portfolio (1)</b>	<b>Log Cost per borrower (2)</b>
Total number of clients	0.008 (0.026)	0.034 (0.479)	-0.023 (0.036)	-0.009 (0.013)	-0.054 (0.068)	-0.467** (0.215)
New number of clients	-0.019** (0.009)	-0.162 (0.161)	-0.004 (0.011)	0.008* (0.004)	0.006 (0.023)	0.047 (0.073)
Client retention	0.003 (0.005)	-0.134 (0.092)	-0.021*** (0.006)	0.003 (0.002)	0.051*** (0.013)	-0.066 (0.042)
Quality of interaction	0.001 (0.005)	0.203** (0.099)	0.011 (0.007)	0.002 (0.003)	0.020 (0.014)	0.046 (0.045)
Quality of social data collection	-0.002 (0.006)	-0.211* (0.115)	-0.005 (0.008)	-0.010*** (0.003)	-0.057*** (0.016)	-0.132** (0.052)
Portfolio quality	0.022** (0.010)	0.103 (0.188)	-0.027 (0.013)	0 (0.005)	-0.012 (0.026)	0.0339*** (0.084)
Time fixed effects	No	No	No	No	No	No
R <sup>2</sup>	0.013	0.009	0.020	0.018	0.029	0.033
Adjusted R <sup>2</sup>	0.006	0.002	0.013	0.011	0.023	0.026

The total number of clients' staff incentive has a negative effect on the cost per borrower, so this means that this staff incentive makes the microfinance institution more efficient. The new number of clients' staff incentive has a negative effect on the return on assets, which lowers the financial sustainability of the microfinance institution. The client retention staff incentive has a negative effect on the portfolio at risk and a positive effect on the operating expense / loan portfolio, which means that this staff incentive improves the portfolio quality and decreases the efficiency at the same time. The quality of interaction based on client feedback mechanism staff incentive has a positive effect on the return on equity, which means it increases the financial sustainability. The quality of social data collection is a staff incentive with the most significant effects on the financial performance measures, with a significant negative effect on the return on equity, write-off ratio, operating expense / loan portfolio and cost per borrower, which means

that this staff incentive, decreases the financial sustainability, but also increases the portfolio quality and efficiency of a microfinance institution. Lastly, the portfolio quality staff incentive has a positive effect on the return on assets and a positive effect on the cost per borrower, which means that this staff incentive increases the financial sustainability and decreases the efficiency.

To conclude model 1 and model 2, on the one side the total number of clients' staff incentive and quality of interaction based on client feedback mechanism staff incentive, seem to be the best staff incentives the microfinance institution can implement because they increase the efficiency and financial sustainability, respectively. On the other side, the new number of clients' staff incentive seems to be the worst staff incentive to implement for a microfinance institution, because it decreases the financial sustainability. The other staff incentives increase and decrease the financial performance indicators at the same time of a microfinance institution.

In model 3 and model 4, the financial performance measures are regressed on all the individual staff incentives and control variables. The financial performance measures of portfolio quality and efficiency better fit the variance around the mean of the financial performance measures, because the R square and adjusted R square have significantly improved. Especially, the R square and adjusted R square of the financial performance measures have increased around 15%.

Also in model 3 and model 4, every staff incentive shows different positive and negative effects on the financial performance measures, which gives support for hypothesis 1. Almost every staff incentive shows the same positive and negative similar significant values as in model 1 and 2, except the portfolio quality, which has no significant effect anymore on the return on assets. Furthermore, the quality of social data collection has a stronger significant effect on the return on equity and cost per borrower and a weaker significant effect on the write-off ratio and operating expense / loan portfolio.



**Table 5**

The table report regressions of the financial performance measures on staff incentives, controlling for firm characteristics. The sample is a panel data set collected from the Mixmarket database over the period 2010-2014. Section 5 describes the sample in detail. The dependent variables are the financial performance measures and are measured on a continuous scale. The cost per borrower is transformed into a log variable. The incentives and firm characteristics are defined in table 1. P-values are reported in parentheses. \*\*\*, \*\*, \* denote that the value is significantly different from zero at the 1%, 5%, and 10% levels, respectively.

<b>Variables</b>	<b>Return on assets (3)</b>	<b>Return on equity (3)</b>	<b>Portfolio at risk (3)</b>	<b>Write-off ratio (3)</b>	<b>Operating expense / loan portfolio (3)</b>	<b>Log Cost per borrower (4)</b>
Total number of clients	0.008 (0.025)	-0.033 (0.482)	-0.003 (0.034)	-0.005 (0.013)	-.035 (0.060)	-0.392** (0.200)
New number of clients	-0.020** (0.008)	-0.226 (0.165)	-0.003 (0.011)	0.007 (0.004)	0.025 (0.021)	0.042 (0.069)
Client retention	0.003 (0.005)	-0.130 (0.095)	-0.017*** (0.006)	0.003 (0.002)	0.042*** (0.012)	-0.032 (0.040)
Quality of interaction	0.001 (0.005)	0.206** (0.100)	0.009 (0.007)	0.002 (0.003)	0.017 (0.013)	-0.007 (0.042)
Quality of social data collection	-0.003 (0.006)	-0.240** (0.118)	0.001 (0.008)	-0.008** (0.003)	-0.036** (0.015)	-0.132*** (0.049)
Portfolio quality	0.013 (0.010)	0.122 (0.193)	-0.019 (0.013)	0.003 (0.005)	-0.007 (0.024)	0.395*** (0.081)
Bank	0.003 (0.007)	-0.026 (0.145)	-0.019* (0.010)	-0.002 (0.004)	-0.025 (0.018)	0.297*** (0.061)
Rural bank	0.005 (0.018)	-0.002 (0.346)	0.052** (0.023)	-0.017** (0.009)	-0.107** (0.043)	-0.196 (0.143)
Credit union / cooperative	0 (0.007)	-0.028 (0.144)	-0.002 (0.010)	-0.013*** (0.004)	-0.144*** (0.018)	0.093 (0.061)
Non-governmental organization	0.003 (0.005)	-0.147 (0.104)	-0.010 (0.007)	-0.006** (0.003)	-0.052*** (0.013)	-0.145*** (0.043)
Other	-0.009 (0.022)	0.099 (0.419)	-0.011 (0.027)	-0.017 (0.010)	-0.062 (0.052)	0.236 (0.174)
Small	-0.015** (0.006)	0.098 (0.121)	0 (0.008)	-0.001 (0.003)	0.162*** (0.015)	0.099* (0.051)
Medium	-0.006 (0.005)	-0.134 (0.104)	0.009 (0.007)	0.006** (0.003)	0.089*** (0.013)	0.071 (0.043)
New	0.004 (0.019)	-0.010 (0.361)	-0.052** (0.025)	-0.010 (0.009)	-0.083* (0.045)	-0.456*** (0.149)
Young	0.002 (0.007)	0.028 (0.140)	-0.032*** (0.009)	-0.004 (0.004)	-0.038** (0.018)	-0.529*** (0.059)
Profit status	-0.004 (0.004)	0.005 (0.084)	0.008 (0.006)	-0.002 (0.002)	-0.005 (0.010)	0.015 (0.0335)
Debt / equity	0** (0)	0.008* (0.005)	-0.001*** (0)	0** (0)	0 (0.001)	0.002 (0.002)
Time fixed effects	No	No	No	No	No	No
R <sup>2</sup>	0.022	0.020	0.061	0.059	0.2028	0.176
Adjusted R <sup>2</sup>	0.003	0.001	0.042	0.039	0.187	0.160

The control variable legal status shows that a bank has a negative effect on the portfolio at risk and a positive effect on the cost per borrower, which means that the bank increases the portfolio quality and decreases the efficiency of a microfinance institution. The rural bank has a positive effect on the portfolio at risk and a negative effect on the write-off ratio and operating expense / loan portfolio, which means that it increases and decreases the portfolio quality at the same time and increases the efficiency. The credit union / cooperative has a negative effect on the write-off ratio and operating expense / loan portfolio, which means that it increases the portfolio quality and efficiency of a microfinance institution. The non-governmental organization has a negative effect on the write-off ratio, operating expense / loan portfolio and cost per borrower, which means that it increases the portfolio quality and efficiency of a microfinance institution as well. Lastly, the other microfinance institution has no significant effect at all on the financial performance measures.

The scale variable shows that a small sized microfinance institution has a negative effect on the return on assets and a positive effect on the operating expense / loan portfolio and cost per borrower, which means that a small sized microfinance institution decreases the financial sustainability and the efficiency. The medium-sized microfinance institution has a positive effect on the write-off ratio and a positive effect on the operating expense / loan portfolio, which means that a medium sized microfinance institution decreases the portfolio quality and efficiency. The age variable shows that a new microfinance institutions has a negative effect on the portfolio at risk and a negative effect on the operating expense / loan portfolio and cost per borrower, which means that a new microfinance institution increases the portfolio quality and efficiency. A young microfinance institution has a negative effect on the portfolio at risk and a negative effect on the operating expense / loan portfolio and cost per borrower as well, which means that a young microfinance institution also increases the portfolio quality and efficiency.

Furthermore, there is no difference shown between a profit status microfinance institution and a nonprofit status microfinance institution, because the profit status variable shows no significant effect at all. Lastly, the debt/equity ratio shows that it has a positive effect on the return on assets, return on equity, write-off ratio and a negative effect on the portfolio at risk, which means

that the higher the leverage, the better the financial sustainability is with mixed results on the portfolio quality.

In model 5 and model 6, the financial performance measures are regressed on all individual staff incentives, the control variables and time fixed effects. The R square and adjusted R square show similar values as in model 3 and model 4. Every staff incentive and all control variables show the same positive and negative effects as in model 3 and model 4, which gives support for hypothesis 1.

However, the significant effect of quality of interaction based on client feedback mechanism shows a weaker positive significant effect on the return on equity and the quality of social data interaction shows a weaker negative significant effect on return on equity. Lastly, the medium sized microfinance institution has an extra positive significant effect on the cost per borrower, which means that a medium sized microfinance institution decreases the efficiency to a greater extent in these models than in model 3 and 4.

To summarize all results of model 1 to model 6, all staff incentives of all models have different effects on the financial performance measures of a microfinance institution, which gives support for hypothesis 1. On the one side, the total number of clients' staff incentive and quality of interaction based on client feedback mechanism seem to be the best staff incentives a microfinance institution can implement, because these staff incentives increase the efficiency and financial sustainability, respectively. On the other side, the new number of clients' staff incentive in model 1, 3 and 5 and portfolio quality in model 4 and 6 staff incentive seem to be the worst staff incentives a microfinance institution can implement, because they decrease financial sustainability and efficiency, respectively. The other staff incentives increase and decrease the financial performance indicators at the same time.

**Table 6**

The table report regressions of the financial performance measures on staff incentives, controlling for firm characteristics and time fixed effects. The sample is a panel data set collected from the Mixmarket database over the period 2010-2014. Section 5 describes the sample in detail. The dependent variables are the financial performance measures and are measured on a continuous scale. The cost per borrower is transformed into a log variable. The incentives and firm characteristics are defined in table 1. P-values are reported in parentheses. \*\*\*, \*\*, \* denote that the value is significantly different from zero at the 1%, 5%, and 10% levels, respectively.

<b>Variables</b>	<b>Return on Assets (5)</b>	<b>Return on equity (5)</b>	<b>Portfolio at Risk (5)</b>	<b>Write-off ratio (5)</b>	<b>Operating expense / loan portfolio (5)</b>	<b>Log Cost per Borrower (6)</b>
Total number of clients	0.002 (0.025)	-0.046 (0.485)	0.003 (0.035)	-0.006 (0.013)	-0.036 (0.061)	-0.435** (0.201)
New number of clients	-0.021** (0.008)	-0.023 (0.165)	-0.003 (0.011)	0.007 (0.004)	0.025 (0.021)	0.041 (0.069)
Client retention	0.002 (0.005)	-0.125 (0.095)	-0.017*** (0.006)	0.003 (0.002)	0.042*** (0.012)	-0.034 (0.040)
Quality of interaction	0.002 (0.005)	0.189* (0.101)	0.008 (0.007)	0.002 (0.003)	0.016 (0.013)	0.006 (0.042)
Quality of social data collection	-0.003 (0.006)	-0.230* (0.118)	0.001 (0.008)	-0.007** (0.003)	-0.036** (0.015)	-0.134*** (0.049)
Portfolio quality	0.013 (0.010)	0.127 (0.193)	-0.019 (0.013)	0.003 (0.005)	-0.006 (0.024)	0.394*** (0.081)
Bank	0.002 (0.007)	-0.026 (0.146)	-0.018* (0.010)	-0.002 (0.004)	-0.025 (0.018)	0.294*** (0.061)
Rural bank	0.008 (0.018)	-0.041 (0.348)	0.048** (0.023)	-0.017** (0.009)	-0.109** (0.044)	-0.170 (0.144)
Credit Union / Cooperative	0 (0.007)	-0.021 (0.144)	-0.002 (0.010)	-0.013*** (0.0040)	-0.143*** (0.018)	0.090 (0.061)
Non-governmental organization	0.003 (0.005)	-0.155 (0.144)	-0.010 (0.007)	-0.007** (0.003)	-0.052*** (0.013)	-0.144*** (0.043)
Other	-0.010 (0.022)	0.107 (0.419)	-0.010 (0.027)	-0.017 (0.010)	-0.062 (0.052)	0.227 (0.173)
Small	-0.014** (0.006)	-0.095 (0.122)	0 (0.008)	-0.001 (0.003)	0.162*** (0.015)	0.099* (0.051)
Medium	-0.005 (0.005)	-0.134 (0.105)	0.008 (0.007)	0.006** (0.003)	0.090*** (0.013)	0.074* (0.044)
New	0.008 (0.019)	-0.059 (0.363)	-0.057** (0.025)	-0.010 (0.009)	-0.085* (0.045)	-0.419*** (0.150)
Young	0.003 (0.007)	0.018 (0.140)	-0.033*** (0.009)	-0.004 (0.004)	-0.038** (0.018)	-0.520*** (0.059)
Profit status	-0.005 (0.004)	0.010 (0.084)	0.008 (0.006)	-0.002 (0.002)	-0.005 (0.011)	0.011 (0.035)
Debt / equity	0** (0)	0.008* (0.005)	-0.001*** (0)	0** (0)	0 (0.001)	0.002 (0.002)
Time fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
R <sup>2</sup>	0.029	0.023	0.066	0.059	0.203	0.182
Adjusted R <sup>2</sup>	0.006	0	0.043	0.036	0.184	0.162

To conclude the effects of the control variables of model 3, 4, 5 and 6, a microfinance institution, which is a non-governmental organization or credit union/ cooperative has the best outcomes on the financial performance indicators, because both legal forms increase the portfolio quality and efficiency. The other organization does not show any influence at all on the financial performance indicators, while the bank has mixed outcomes on the financial performance indicators, because it increases the portfolio quality in model 3 and model 5 and decreases the cost per borrower in model 4 and 6. Lastly, the rural bank also has mixed outcomes on the financial performance indicators, because it increases and decreases the portfolio quality, as it has a positive effect on portfolio at risk and an negative effect on the write-off ratio and increases efficiency by having a negative effect on the operating expense / loan portfolio in model 3 and model 5.

Furthermore, the small and medium sized microfinance institution are the worst sizes of a microfinance institution in comparison to the large size microfinance institution, because the small microfinance institution decreases the financial sustainability and the efficiency and the medium sized microfinance institution decreases the portfolio quality and efficiency. To add, the new and young microfinance institution show better outcomes on the financial performance indicators than a mature microfinance institution, because the young and new microfinance institution increase the portfolio quality and efficiency. Furthermore, a profit-oriented microfinance institution does not show better results than a non-profit microfinance institution, because it does not show any significant effects at all on the financial performance indicators. At last, it is not so sure, which leverage level is best for the financial performance, because this control variable increases the financial sustainability and increases and decreases portfolio quality, as a consequence of a negative effect on portfolio at risk and a positive effect on the write-off ratio.

### *5.3.2 Effect of the sum of staff incentives on the financial performance measures*

In model 7 and model 8, the financial performance measures are regressed on the sum of staff incentives. The R square and adjusted R square show that these models are not able to explain the variability around the mean of the financial performance measures, because the R square and adjusted R square are around zero. The sum of staff incentives shows no significant effect at all

on the financial performance measures, which gives no support for hypothesis 2. As the staff incentives, individually have positive and negative effects on the financial performance measures, this could be the reason why there is no combined significant positive / negative effect of the sum of staff incentives on the financial performance measures.

**Table 7**

The table report regressions of the financial performance measures on the sum of staff incentives. The sample is a panel data set collected from the Mixmarket database over the period 2010-2014. Section 5 describes the sample in detail. The dependent variables are the financial performance measures and are measured on a continuous scale. The cost per borrower is transformed into a log variable. The sum of incentives is defined in table 1. P-values are reported in parentheses. \*\*\*, \*\*, \* denote that the value is significantly different from zero at the 1%, 5%, and 10% levels, respectively.

<b>Variables</b>	<b>Return on assets (7)</b>	<b>Return on equity (7)</b>	<b>Portfolio at risk (7)</b>	<b>Write-off ratio (7)</b>	<b>Operating expense / loan portfolio (7)</b>	<b>Log Cost per borrower (8)</b>
Sum of staff incentives	0.001 (0.001)	-0.015 (0.019)	-0.002 (0.002)	0 (0.001)	-0.001 (0.003)	-0.005 (0.010)
Time fixed effects	No	No	No	No	No	No
R <sup>2</sup>	0.001	0	0.002	0	0	0
Adjusted R <sup>2</sup>	0	0	0.001	-0.001	-0.001	-0.001

In model 9 and model 10, the financial performance measures are regressed on the sum of staff incentives and control variables. The R square and adjusted R square of the financial performance measures of these models show, that they are better to explain the variability around the mean of the financial performance measures. Also, these models, like model 3 and model 4, show that when the control variables are added that the R square and adjusted R square of operating expense / loan portfolio and cost per borrower increase with more than 10%.

Furthermore, model 9 and model 10 show that the sum of staff incentives does not have a significant effect as well on the financial performance measures, which gives no support for hypothesis 2.

The bank has a positive effect on the cost per borrower, so the bank decreases the efficiency of a microfinance institution. The rural bank has a positive effect on portfolio at risk and a negative

effect on the write-off ratio and operating expense / loan portfolio, which means that the rural bank increases and decreases the portfolio quality and increases the efficiency of a microfinance institution. The credit union / cooperative has a negative effect on the write-off ratio and operating expense / loan portfolio, which means that this legal form increases the portfolio quality and efficiency. The non-governmental organization has a negative effect as well on the write-off ratio and operating expense / loan portfolio and a negative effect on the portfolio at risk and cost per borrower, which means that the non-governmental organization also increases the portfolio quality and efficiency. The other microfinance institution has a positive effect on the return on equity and a negative effect on the write-off ratio, which means that the other microfinance institution increases the financial sustainability and portfolio quality.

Regarding the scale, the small microfinance institution has a negative effect on the return on assets and a positive effect on the portfolio at risk, operating expense / loan portfolio and cost per borrower, which means that the small microfinance institution decreases the financial sustainability, portfolio quality and efficiency. The medium sized microfinance institution has a positive effect on the portfolio at risk, write-off ratio, operating expense / loan portfolio and cost per borrower, which means that the medium sized microfinance institution decreases the portfolio quality and efficiency of a microfinance institution.

Regarding the age, a new microfinance institution has a negative effect on the portfolio at risk, write-off ratio and on the cost per borrower, which means that the new microfinance institution increases the portfolio quality and efficiency. The young microfinance institution has a negative effect on the portfolio at risk, operating expense / loan portfolio and cost per borrower, which means that the young microfinance institution increases the portfolio quality and efficiency as well.

Furthermore, there is no difference between a profit status microfinance institution and a non-profit microfinance institution, because the profit status shows no significant effect on the financial performance measures. At last, the debt / equity ratio has a negative effect on the return on assets and portfolio at risk and a positive effect on the write-off ratio, which means that the

debt / equity ratio decreases the financial sustainability and has a mixed effect on the portfolio quality of a microfinance institution.

**Table 8**

The table report regressions of the financial performance measures on the sum of staff incentives, controlling for firm characteristics. The sample is a panel data set collected from the Mixmarket database over the period 2010-2014. Section 5 describes the sample in detail. The dependent variables are the financial performance measures and are measured on a continuous scale. The cost per borrower is transformed into a log variable. The sum of incentives and firm characteristics are defined in table 1. P-values are reported in parentheses. \*\*\*, \*\*, \* denote that the value is significantly different from zero at the 1%, 5%, and 10% levels, respectively.

Variables	Return on assets (9)	Return on equity (9)	Portfolio at risk (9)	Write-off ratio (9)	Operating expense / loan portfolio (9)	Log Cost per borrower (10)
Sum of staff incentives	0 (0.001)	-0.014 (0.020)	-0.002 (0.002)	0 (0.001)	0.002 (0.003)	-0.009 (0.010)
Bank	0 (0.007)	-0.017 (0.110)	-0.009 (0.008)	-0.001 (0.003)	-0.023 (0.017)	0.288*** (0.057)
Rural bank	0.003 (0.017)	0.017 (0.273)	0.036* (0.019)	-0.016** (0.008)	-0.087** (0.042)	-0.067 (0.139)
Credit union / cooperative	-0.004 (0.006)	-0.022 (0.102)	0.007 (0.008)	-0.013*** (0.003)	-0.138*** (0.016)	0.024 (0.054)
Non-governmental organization	0.005 (0.005)	-0.123 (0.079)	-0.015** (0.006)	-0.007*** (0.002)	-0.051*** (0.012)	-0.228*** (0.041)
Other	-0.020 (0.018)	0.521* (0.294)	-0.005 (0.022)	-0.016* (0.009)	-0.034 (0.045)	0.226 (0.150)
Small	-0.020*** (0.005)	-0.083 (0.087)	0.014** (0.007)	0 (0.0030)	0.175*** (0.013)	0.15*** (0.045)
Medium	-0.005 (.005)	-0.121 (0.077)	0.011* (0.006)	0.006*** (0.002)	0.090*** (0.012)	0.077* (0.040)
New	-0.014 (0.012)	0.130 (0.200)	-0.031** (0.015)	-0.012** (0.006)	0.025 (0.031)	-0.294*** (0.102)
Young	0.002 (0.006)	-0.043 (0.099)	-0.028*** (0.008)	-0.004 (0.0030)	-0.032** (0.015)	-0.442*** (0.051)
Profit status	-0.004 (0.004)	0.018 (0.064)	0.007 (0.005)	-0.003 (0.002)	-0.004 (0.010)	-0.032 (0.033)
Debt / equity	-0.001*** (0)	0.004 (0.004)	-0.001*** (0)	0** (0)	-0.001 (0.001)	0 (0.002)
Time fixed effects	No	No	No	No	No	No
R <sup>2</sup>	0.025	0.011	0.038	0.043	0.183	0.117
Adjusted R <sup>2</sup>	0.015	0.001	0.028	0.033	0.175	0.107



In model 11 and model 12, the financial performance measures are regressed on the sum of staff incentives, control variables and time fixed effects. The R square and adjusted R square show similar values as in model 9 and model 10. The sum of staff incentives in these models also has no effect on the financial performance measures, which gives no support for hypothesis 2.

All control variables show similar significant values, except rural bank, the medium sized microfinance institution and the new microfinance institution. The rural bank does not have a positive effect anymore on the portfolio at risk, which means that the rural bank in this model only increases the portfolio quality instead of having mixed influences on the portfolio quality, and increases the efficiency as well. The medium sized microfinance institution in model 12 has a stronger effect on the cost per borrower, because the significance level is under 5% instead of under 10%. The new microfinance institution has a weaker negative effect on portfolio at risk and write-off ratio, because the significance level is changed from under 5% to under 10 %.

To conclude the legal form variables of model 9, 10, 11 and 12, The credit union / cooperative and non-governmental organization all increase the portfolio quality and efficiency, while the other microfinance institution only increases the financial sustainability and portfolio quality. The rural bank rural bank only increases the portfolio quality and efficiency in model 11 and has a mixed outcome on the portfolio quality in model 9, because it has a positive effect on the portfolio at risk and a negative effect on the write-off ratio. The bank is the only legal form that decreases a financial performance indicator in model 10 and 12, with a decrease on the efficiency.

Furthermore, the large size microfinance institution seems to be the best size for a microfinance institution, because the small and medium sized microfinance institution only decrease the financial performance indicators in model 9, 10, 11 and 12. The small sized microfinance institution decreases the financial sustainability, portfolio quality and efficiency, while the medium sized microfinance institution decreases the portfolio quality and efficiency.

To add, the new and young microfinance institution seem to be better than a mature microfinance institution because they only increase the portfolio quality and efficiency of a microfinance

institution. Lastly, there is no difference given between a profit status microfinance institution and non-profit microfinance institution and the debt to equity level decreases the financial sustainability and increases and decreases the portfolio quality, as a consequence of a positive effect on the write-off ratio and a negative effect on the portfolio at risk.

**Table 9**

The table report regressions of the financial performance measures on the sum of staff incentives, controlling for firm characteristics and time fixed effects. The sample is a panel data set collected from the Mixmarket database over the period 2010-2014. Section 5 describes the sample in detail. The dependent variables are the financial performance measures and are measured on a continuous scale. The cost per borrower is transformed into a log variable. The sum of incentives and firm characteristics are defined in table 1. P-values are reported in parentheses. \*\*\*, \*\*, \* denote that the value is significantly different from zero at the 1%, 5%, and 10% levels, respectively.

<b>Variables</b>	<b>Return on assets (11)</b>	<b>Return on equity (11)</b>	<b>Portfolio at risk (11)</b>	<b>Write-off ratio (11)</b>	<b>Operating expense / loan portfolio (11)</b>	<b>Log Cost per borrower (12)</b>
Sum of staff incentives	0 (0.001)	-0.018 (0.022)	-0.003 (0.002)	0 (0.001)	0.003 (0.0030)	-0.001 (0.011)
Bank	0 (0.007)	-0.017 (0.110)	-0.009 (0.008)	-0.001 (0.003)	-0.023 (0.017)	0.287*** (0.057)
Rural bank	0.005 (0.017)	-0.024 (0.274)	0.033 (0.019)	-0.016** (0.008)	-0.088** (0.042)	-0.044 (0.139)
Credit union / cooperative	-0.004 (0.006)	-0.020 (0.102)	0.007 (0.008)	-0.013*** (0.003)	-0.138*** (0.016)	-0.022 (0.054)
Non-governmental organization	0.005 (0.005)	-0.128 (0.079)	-0.015** (0.006)	-0.007*** (0.002)	-0.051*** (0.012)	-0.227*** (0.041)
Other	-0.021 (0.018)	0.528* (0.294)	-0.004 (0.022)	-0.015* (0.009)	-0.033 (0.045)	0.223 (0.150)
Small	-0.020*** (0.005)	-0.082 (0.087)	0.015** (0.007)	0.001 (0.003)	0.175*** (0.013)	0.149*** (0.045)
Medium	-0.005 (0.005)	-0.125 (0.077)	0.011* (0.006)	0.007*** (0.002)	0.090*** (0.012)	0.089** (0.040)
New	-0.012 (0.012)	0.099 (0.201)	-0.034* (0.015)	-0.011* (0.006)	0.026 (0.031)	-0.273*** (0.102)
Young	0.002 (0.006)	-0.051 (0.099)	-0.029*** (0.008)	-0.004 (0.003)	-0.032** (0.015)	-0.437*** (0.051)
Profit status	-0.004 (0.004)	0.025 (0.065)	0.008 (0.005)	-0.003 (0.002)	-0.004 (0.010)	-0.035 (0.033)
Debt / equity	-0.001*** (0)	0.004 (0.004)	-0.001*** (0)	0** (0)	-0.001 (0.001)	0 (0.002)
Time fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
R <sup>2</sup>	0.027	0.014	0.042	0.045	0.183	0.121
Adjusted R <sup>2</sup>	0.015	0.002	0.030	0.031	0.173	0.110

#### *5.4 Summary of all the models*

To summarize all the models, the individual incentives of model 1 to model 6 show that they have a different impact on the different financial performance indicators. This support hypothesis 1. The sum of incentives of model 7 – 12 did not show a significant effect on the financial performance measures, so this finding does not support hypothesis 2.

##### *5.4.1 Legal forms*

To summarize the control variables of model 3, 4, 5, 6, 9, 10, 11 and 12 a microfinance institution which acts as a credit union / cooperative has a negative effect on the write-off ratio and operating expense / loan portfolio, which means that this legal form increases the portfolio quality and efficiency of a microfinance institution. The non-governmental organization has the same negative effect on the write-off ratio, operating expense / loan portfolio and cost per borrower in model 3, 4, 5, 6, whereby in model 9 and 11 its negative effect on the write-off ratio becomes stronger and has a negative effect as well on the portfolio at risk. This means, that the non-governmental organization increases the portfolio quality and efficiency in all models, with an even stronger increase on the portfolio quality and efficiency in model 9 and 11.

The other microfinance institution shows an increase on the financial sustainability and portfolio quality only in model 9 and model 11, where this legal form has a positive effect on the return on equity and a negative effect on the write-off ratio.

The rural bank has a positive effect on the portfolio at risk and a negative effect on the write-off ratio and operating expense / loan portfolio in model 3, 5, and 9. The difference between model 2, 3 and 9, is that the significant effect on portfolio at risk becomes weaker in model 9. In model 11, the rural bank also has a negative effect on the write-off ratio and operating expense / loan portfolio and does not have a positive effect anymore on the portfolio at risk. This means that the rural bank increases and decreases the portfolio quality in model 2,3 and 9, because it increases the portfolio at risk and decreases the write-off ratio, whereby it increases the efficiency as well. Whereas, in model 11 the rural bank only increases the portfolio quality and the efficiency too.

The bank only has a negative effect on the portfolio at risk in model 3 and model 5 and a positive effect on the cost per borrower in model 4, 6, 10 and 12. This means that the bank increases the portfolio quality and decreases the efficiency in model 3, 4, 5, 6 and only decreases the efficiency in model 10 and 12.

#### *5.4.2 Scale*

Regarding the scale, the small sized microfinance institution has a negative effect on the return on assets and a positive effect on the operating expense / loan portfolio and cost per borrower in model 3, 4, 5 and 6. In model 9 and 11, the negative effect of the small sized microfinance institution on the return on assets becomes even stronger. The same counts for the positive effect on the cost per borrower, which becomes stronger in model 10 and model 12. Thereby, the small sized microfinance institution has also a positive effect on the portfolio at risk in model 9 and 11. This means that a small sized microfinance institution decreases the financial sustainability and efficiency in model, 3, 4, 5 and 6 and decreases the financial sustainability, portfolio quality and efficiency in model 9, 10, 11 and 12.

The medium sized microfinance institution has a positive effect on the write-off ratio and operating expense / loan portfolio in model 3 and an extra positive effect on the cost per borrower in model 6. The positive effect of the medium sized microfinance institution on the write-off ratio becomes even stronger in model 9, whereby the medium sized microfinance institution also has a positive effect on the portfolio at risk. In model 12, the positive effect on the cost per borrower becomes even stronger. This means that a medium sized microfinance institution decreases the portfolio quality and efficiency of a microfinance institution in all models and decreases these financial performance indicators to a greater extent in model 9 and model 12.

#### *5.4.3 Age and profit-status*

The new microfinance institution has similar negative effects on the portfolio at risk, operating expense / loan portfolio and cost per borrower in model 3, 4, 5 and 6. In model 9 the new microfinance institution does not have a significant effect anymore on the operating expense / loan portfolio, but on the write-off ratio. Whereby in model 11, the negative effect on the

portfolio at risk and write-off ratio, becomes weaker after the time fixed effects are added. These findings show that the new microfinance institution increases the portfolio quality and efficiency in model 3, 4, 5 and 6, whereby the new microfinance institution, increases the portfolio quality in model 9 to a greater extent and the efficiency to a lesser extent in model 10. To add on that, in model 11, the increase on the portfolio quality becomes weaker, after the time fixed effects are added.

Surprisingly, the young microfinance institution is the only control variable, who is keeping similar significant effects in all models, whereby the young microfinance institution increases the portfolio quality and efficiency. The profit-status also shows a constant non-significant effect on all the financial performance measures.

#### *5.4.4 Debt to equity*

Lastly, the debt to equity shows similar negative effects the portfolio at risk and a positive effect on the return on assets, return on equity and the write-off ratio in model 3 and 4. In model 9 and model 11, the debt to equity ratio does not have a significant positive effect anymore on the return on equity, instead it has a negative effect on the return on assets, while keeping a negative effect on the portfolio at risk and a positive effect on the write-off ratio. This means that the debt to equity increases the financial sustainability in model 3 and 4 and increases and decreases portfolio quality, because the debt / equity ratio has a negative effect on the portfolio at risk and a positive significant on the write-off ratio. In model 9 and 11, it decreases the financial sustainability as a consequence of a negative effect on the return on assets, while it keeps increasing and decreasing the portfolio quality as a consequence of the negative effect on portfolio at risk and a positive effect on the write-off ratio.

## **6. Conclusion and final remarks**

The purpose of this research is to give an answer on the research question to what extent the staff incentives have an effect on the financial performance. The contribution of this research to the literature is that this paper shows more specifically than the report of Pistelli (2011), to what extent an individual staff incentive has an effect on the financial performance. The total number of clients' staff incentive and quality of interaction based on client feedback mechanism staff

incentive increase the financial performance, while the new number of clients' staff incentive only decreases the financial performance. The other staff incentives show mixed positive and negative effects. The staff incentives, which have shown a constant positive effect and a constant negative effect on the financial performance indicators, could be the most interesting for investors, owners and all other stakeholders who are affected by the financial performance of a microfinance institution. These stakeholders can make the choice or influence their microfinance institution to implement only the staff incentives with a positive effect on the financial performance indicators, in order to increase the financial performance of their microfinance institution.

Surprisingly, the total number of clients is the least used staff incentive and the quality of interaction based on client feedback mechanism staff incentives is also not used by microfinance institutions to a great extent, as can be seen in Table 2, while it seems like that these staff incentive are the most successful incentives. Furthermore, the effect of the sum of staff incentives show that an increase in the use of staff incentives by a microfinance institution does not automatically lead to a better financial performance. The reason behind this finding could be that the individual staff incentives increase and decrease the financial performance indicators, so that in the end, when all these staff incentives are combined, there is no overall increase or decrease on the financial performance.

What is also surprising, is that the new and young microfinance institution have a better effect on the financial performance than a mature microfinance institution, while it can be expected that a microfinance institution over time is able to be more profitable, efficient, with a better portfolio quality than a microfinance institution, who has just started.

However, what needs to be taken into consideration is that the effects of the staff incentives and control variables are average effects, whereby some microfinance institutions individually could show positive effects of staff incentives, which are in this research on average negative. For example, the portfolio quality staff incentive, should improve the portfolio quality where the staff incentive is meant for. Instead, it increases the cost per borrower and did not increase the portfolio quality.

The reason why the total number of client staff incentive and quality of interaction based on client feedback mechanism staff incentive, are more successful than other staff incentives, could be that successful microfinance institutions make use this staff incentive to a greater extent than unsuccessful microfinance institutions, which could make this finding somewhat biased and could be a limitation for this research. For example, the total number of clients' staff incentive is used by 0.8% on average of the microfinance institutions, while the new number of client's staff incentives is used by an average of 92.6% of all microfinance institutions.

Furthermore, 84% of the microfinance institutions is a mature microfinance institution, while the rest is new or stated as young, so it could be that the less successful mature microfinance institutions have a negative effect on the average financial performance of a microfinance institution in the mature phase. This could be the reason why new and young microfinance institutions have a greater positive effect on the financial performance.

Another limitation of this research is that there is found heteroscedasticity in the data, except in the write-off ratio regression model. This could also make the findings of this research biased, whereby the findings should be interpreted carefully. To add on that, the effect of every staff incentive on a financial performance indicator of a year later is researched, while the effect of the implementation of the staff incentives could be on average visible sooner or later than a year.

In future research, what would be interesting to know is how staff incentives could be best implemented and how long it takes to make sure that the staff incentives have the best possible positive effect on the financial performance indicators. There might be a way to make sure that the staff incentives, which have positive and negative effects on the financial performance indicators, that they can be implemented in such a way that the staff incentives can only lead to a better financial performance. Also, it could be interesting to know if there are microfinance institutions, which make use of other type of staff incentives than the staff incentives, which can be found in the database of Mixmarket or literature. It could be that there exist some staff incentives, which are more successful than the staff incentives which can be retrieved from the Mixmarket database. Furthermore, an interesting research would also be to look at the effect of

the rewards of staff incentive schemes on the financial performance, because there has no research been done before in this field.

All in all, while the findings may be biased, this research gives microfinance institutions and its stakeholders an insight how the total number of clients and quality of interaction based on client feedback mechanism staff incentive could improve their financial performance of their microfinance institution, because it shows only positive effects on the financial performance .The other staff incentives, with combined positive and negative effects and only negative effects on the financial performance give an insight that they should be implemented more carefully, to make sure that these incentives will not affect the financial performance negatively.



### **Extra Chapter: The Mixmarket Database**

Mixmarket provides the largest data source on microfinance, which claims that it includes more than around 2000 microfinance institutions that provide a service to more than 80% of all microfinance clients in the world. The data source consists out of financial, social and operational information. Mixmarket updates its information continuously with interim and annual financial and social performance data, wherein experts review the data to make sure that the data submissions comply with the international financial reporting standards. To make sure that the data is accurate, the Mix database system conducts more than 135 quality checks.

The data, that is used for this research is found via the cross-market analysis system of the platform. With this system, different indicators can be added to a data set, wherein different microfinance institutions over different years can be measured. I was lucky enough that I could retrieve the data when the data was available for free. Nowadays users have to pay a subscription to make use of the data. The cheapest product, which is needed to get access to the data I used, is called Mix Essentials. The price of a 3-month description for a student is \$13 a month and a 12-month description is \$9 per month.

With Mix Essentials, the user gets access to a data set of financial service providers with more than 100 indicators, detailed profiles of financial service providers, funders, networks and supporting organizations, market overviews, cross-market analysis tool, financial service analysis tool, publications and a dashboard whereby reports can be saved. More information about this system can be found on their website.

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