

ABSTRACT

The Trade-Off between Outreach and Efficiency in Microfinance Institutions

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Microfinance institutions (MFIs) aim to increase the standard of living in poor communities through small-scale lending. Because many people lack collateral in these impoverished areas, obtaining loans from banks is difficult if not impossible. Small-scale lending allows individuals to start or expand their business. However, many microfinance institutions are heavily subsidized. Recent interest in the commercialization of microfinance institutions has begun a spark in the interest of creating sustainable MFIs. This study examines existing microfinance institutions throughout the world to determine the trade-offs associated with outreach and sustainability. Data is used from the Microfinance Information Exchange, which is a non-profit organization that collects self-reported data and is an information provider in the microfinance sector. Over 16,000 data points were used spanning about 20 years time. Analysis of the data indicates that tradeoffs include percent of female borrowers and amount of assets.

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THE TRADE-OFF BETWEEN OUTREACH AND EFFICIENCY IN MICROFINANCE
INSTITUTIONS

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TABLE OF CONTENTS

Chapter One: Background on Microfinance Institutions	1
Chapter Two: Literature Review	13
Chapter Three: Materials and Methods	17
Chapter Four: Results	30
Chapter Five: Discussion and Conclusions	34
Appendices	36
Appendix A: Descriptive Statistics	37
Appendix B: All Data Correlation	43
Appendix C: Trends over Time	45
Appendix D: Regression Analysis Results	81
Bibliography	88

CHAPTER ONE

Background on Microfinance Institutions

Microfinance is a continuing topic of study for many economists. Many questions remain unanswered and there is still much research to be conducted. Generally, microfinance is defined as the small-scale lending of money to low-income people, usually in developing countries. The providers of these loans are microfinance institutions, or hereafter referred to as MFIs. This new idea has started a worldwide initiative to help improve the standard of living by loaning money to provide opportunities for economic advancement. The loans are often used as capital in small-scale start-up businesses. Equipment and larger capital assets can be purchased with these loans that the entrepreneurs would otherwise be unable to pay for. Some businessmen even use loans to expand already existing businesses, often through purchases of more equipment or livestock. Microfinance has already had a huge impact on the world: “Under the World Bank millennial goals, microloans and other financial services have been provided to 100 million poor people in the world by 2006. Further, MFIs have become distinguished by their impressive low level of default rates on the averages and return on equity ranging from 20 to 40 percent.”¹ Microfinance can be a solid investment, but it also has the power to transform lives.

¹ Monzurul Hoque Muhammad Chisty Rashin Halloway, “Commercialization and changes in capital structure in microfinance institutions,” in *Managerial Finance*, Vol. 37 Iss 5 pp 414-425, 2011.

History

One of the earliest forms of microfinance is the Grameen bank in Bangladesh. It began with professor Muhammad Yunus, who experimented with designing a credit system for a poor population. The bank was started fairly recently in 1976. The mission of Grameen bank is to create opportunities through employment, loans, banking facilities and savings. Proven to be rather successful, the bank continues to grow and expand its influence worldwide. Grameen bank is monumental in that it was the first microfinance lending organization, which started a new era to banking for the poor. Many institutions have risen after Grameen and many are successful as well.²

There is a lot of controversy in regard to research of microfinance institutions. The majority of data collected on MFIs is from within the 21st century. However, according to Bos, microfinance can be quite complicated as well. “As the microfinance sector evolves, it has become an example of a sector in which firms with different business models coexist. Next to pure for-profit microfinance institutions, the sector has room for non-profit organizations, and includes “social” for-profit firms that aim to maximize a double bottom line and do well while doing good.”³ For-profit MFIs have an aim at generating profit, while non-profit firms may be more likely to focus on the social factor of improving the standard of living. This

² “Grameen Bank in Bangladesh,” History of Grameen Bank, last modified 2012, accessed February 13, 2015, <http://grameenresearch.org/history-of-grameen-bank/>

³ Jaap W.B. Bos and Matteo Millone, *Practice What You Preach: Microfinance Business Models and Operational Efficiency* (2014).

creates an interesting question: can institutions focus both on social implications and sustainability?

The Problem

For microfinance institutions, the social aspect is the premise for which the institution is built around. Since in most cases the primary goal is to help low-income individuals, the MFIs must adapt their business plan to be accommodating to this. Generally, raising interest rates would combat high costs of doing business, but higher interest rates are not beneficial to the party whom the institutions aim to help. Many of the costs associated with MFIs must be reduced or subsidized in order to be most favorable for low-income individuals. As an MFI increases their outreach to reach more people, do they sacrifice factors of efficiency with it?

Importance of Microfinance

Microfinance institutions are extremely important to economic development for areas in poverty. Most low-income individuals lack the capital to expand their businesses or even start them. Banks often reject their requests for loans because they lack the collateral to sign a loan. In fact, a significant number of these people do not have any assets to claim as their own, including the land they live on. Without assets or a steady income, obtaining loans is extremely difficult, if not impossible. Microfinance has been the solution to this obstacle; it acts as a financial intermediary that gives these individuals a chance to change their economic position. According to Hartarska, "Microfinance institutions are important,

particularly in developing countries, because they expand the frontier of financial intermediation by providing loans to those traditionally excluded from the formal financial markets.”⁴ Recently, researchers have seen the impact of MFIs on poverty alleviation. “For example, the United Nations declared 2005 to be the International Year of Microcredit. Although usually small, MFIs control significant resources and serve significant numbers of borrowers.”⁵ Microfinance has already proven to make a difference in the lives of many individuals.

Many MFIs have a focus on the local community, in making small improvements that are impactful for the future. These institutions “are not only interested in profit but also on the creation of jobs, women’s employment, development, and green issues.”⁶ This demonstrates the multiple purposes microfinance can serve on a community, and just how it attempts to raise the standard of living in an area. By approaching microfinance with a social lens, significant change can happen in a community. By empowering individuals they are able to begin to improve upon their communities.

One of the greatest advantages of MFIs is that they can help reduce poverty by increasing the standard of living. As explained by Hermes, there are many additional advantages of MFIs that contribute to poverty alleviation and provide additional benefits to the community.

⁴ Valentina Hartarska, Steven B Caudill and Daniel M. Groupper, *The Cost Structure of Microfinance Institutions in Eastern Europe and Central Asia* (William Davidson Institute, 2006).

⁵ Hartarska, Caudill and Groupper, *The Cost Structure of Microfinance Institutions in Eastern Europe and Central Asia*.

⁶ Begoña Gutiérrez-Nieto, Carlos Serrano-Cinca, Cecilio Mar Molinero, *Microfinance institutions and efficiency* (2005).

“Access to finance may contribute to a long-lasting increase in income by means of a rise in investments in income generating activities and to a possible diversification of sources of income; it may contribute to an accumulation of assets; it may smooth consumption; it may reduce the vulnerability due to illness, drought and crop failures, and it may contribute to better education, health and housing of the borrower. In addition, access to finance may contribute to an improvement of the social and economic situation of women. Finally, microfinance may have positive spill-over effects such that its impact surpasses the economic and social improvement of the borrower. The positive assessment of the contribution microfinance can make to reducing poverty has convinced many governments, NGOs, and individuals to put efforts in supporting MFIs and their activities” (Microfinance- Its impact, outreach, and sustainability- Hermes).⁷

In order to improve living standards of the poor, financing is needed to help in the development of productive activities within the community.

Critics of microfinance have also analyzed some disadvantages associated with providing loans. Some doubt whether or not access to finance will create a substantial enough reduction in poverty. These critics are concerned more with the outreach of institutions- are they actually reaching the poorest of the poor? Other critics look at the impact of microfinance on women. Women are typically thought of as more reliable and having higher payback ratios than men involved in microfinance. However, the majority of women use a significant portion of their wealth on bettering the household in terms of health and education for children. In many countries, women are the main providers of income in their households making them a target for microfinance institutions.

The importance of microfinance is profound in developing communities because it gives the opportunity for economic change. Initial financial support helps to establish institutions that can build the community in the future. Studies have

⁷ Niels Hermes and Robert Lensink, *Microfinance: Its Impact, Outreach, and Sustainability* (2011).

shown that microfinance has evidence in increasing the standard of living in many areas. Microfinance is also useful on a small-scale, as individual families can greatly benefit from financial support.

Profitability

The question then rises, are microfinance institutions profitable? Hermes provides insight on some shocking statistics.

“According to rough estimations, only 1-2% of all MFIs in the world (i.e. some 150 organizations) are financially sustainable. In most cases, these are larger, mature, regulated, and relatively well-known MFIs. Some 8% of all MFIs are close to being profitable... the remaining group of MFIs (70% of all organizations) consist of smaller, start-up organizations, which are still far from being financially sustainable and are, therefore, (heavily) dependent on subsidies.”⁸

According to these statistics, there is still much work to be done in making such institutions sustainable in the long run. Most of these are non-profit organizations, which are more focused on social aspects rather than profitability. Most researchers can agree that the majority of microfinance institutions are unprofitable. They are developed mostly on the thought of societal improvement instead of financial gains.

Subsidies are very common in MFIs. Governments or other organizations usually grant subsidies in order to help an industry or business. As Hartarska states, “although the ultimate goal of microfinance institutions is to become financially self-sustainable, in practice all receive direct and indirect subsidies.”⁹ Many microfinance institutions are heavily subsidized and unable to function on their own. However, if monitored properly, subsidies do not have to compromise

⁸ Hermes and Lensink, *Microfinance: Its Impact, Outreach, and Sustainability*.

⁹ Hartarska, Caudill and Groupper, *The Cost Structure of Microfinance Institutions in Eastern Europe and Central Asia*.

efficiency of MFIs. Recently there is said to be an increased trend on the focus of financial sustainability within microfinance. Recent developments such as increased competition, commercialization of microfinance, technological change and government regulation have all changed the dynamics of sustainability and profitability in microfinance.

There is a difference in the way non-profit and for-profit firms function in the marketplace. With increased focus on sustainability and microfinance being a relatively new industry, it is constantly changing. “For-profit and non-profit firms coexist, and increasingly in the same (regional) market. The coexistence of these firms has shaped and will continue to shape the evolution of the microfinance industry.”¹⁰

One of the difficulties microfinance institutions have come across is the different cost associated with lending. Mostly microfinance is a costly business due to high transaction and information costs. Because of the high costs, many institutions are dependent on subsidies to cover them. Therefore, these institutions are not financially sustainable. However, costs can be monitored and changed. According to Bos, “all MFIs can gain by being more selective in their lending, offering education programs and more carefully weighing the risk, background, and indebtedness of their borrowers”¹¹ There is room for improvement in recognizing and monitoring costs associated with lending which can help increase sustainability.

¹⁰ Bos and Millone, *Practice What You Preach: Microfinance Business Models and Operational Efficiency*.

¹¹ Bos and Millone, *Practice What You Preach: Microfinance Business Models and Operational Efficiency*.

With the increasing emphasis on creating financially sustainable MFIs though is the concern of making microfinancing costlier for the clients.

Other difficulties microfinance institutions face include overregulation and difficulty in measuring effects. There is no specific measurement to find out how much a community has decreased their level of poverty so it can be difficult to truly measure the effects of microfinance. Also the commercialization of institutions has the possibility to increase the cost of capital associated with lending. This in turn raises costs for clients, which can decrease outreach. Overregulation has also reduced outreach because of rising costs and decreasing desire to meet federal regulations.

MFIs must focus on being able to cover costs of lending and to reduce costs as much as possible. The introduction of more commercial banking in developing countries has encouraged the transition in increasing sustainability of MFIs. Larger banks have also reached out to developing countries as risky opportunities to earn returns. These banks must take both sides into consideration. “On the one hand, MFIs fulfill an outreach mission by providing financial services to the poor. On the other hand, MFIs must operate like other financial institutions, lending to credit worthy clients and earning positive returns on their loan portfolios in order to sustain and expand their operations (sustainability).”¹² In order for the banks to be successful, regardless of if they are non-profit or for-profit, they do have to consider

¹² Hartarska, Caudill and Groupper, *The Cost Structure of Microfinance Institutions in Eastern Europe and Central Asia*.

financial management. “It is difficult to think of a sustainable MFI with poor financial management. Sustainability has two levels: operational and financial.”¹³

An ongoing debate is between two approaches: the financial systems approach focusing on sustainability and the poverty lending approach focusing on providing subsidized credit to help poverty. In order to be sustainable, institutions have the opportunity to increase interest rates, which is not in favor of the poor community they aim to help. This is known as the trade-off between outreach and sustainability. An interesting example of financial sustainability for MFIs is Grameen Bank. Though reported as being very successful, according to Morduch’s research, Grameen has been constantly subsidized and is not actually as successful as it claims to be.¹⁴

Tradeoffs

A tradeoff is the sacrifice of one thing in trade for another. Microfinance has multiple trade-offs involved. According to research by Bos, “there are significant trade-offs between social and financial performance in microfinance. These trade-offs do not necessarily affect all MFIs in the same manner and can be reduced by highly efficient institutions.”¹⁵ His research hints at a question discussed earlier- can an institution strive for both sustainability and social improvements? Also, Bos points out that certain trade-offs can be controlled and reduced in MFIs to mitigate

¹³ Gutiérrez-Nieto, Serrano-Cinca and Mar Molinero, *Microfinance institutions and efficiency*.

¹⁴ Bos and Millone, *Practice What You Preach: Microfinance Business Models and Operational Efficiency*.

¹⁵ Bos and Millone, *Practice What You Preach: Microfinance Business Models and Operational Efficiency*.

this trade-off. Microfinance institutions are faced with the conflict of increasing outreach and maintaining financial stability.

Additional research by Bos suggests that if MFIs rely on subsidies, they are therefore limited in both outreach and impact. Two contrasting views continue to be in place: views that support financial sustainability and those that support social performance. Costs of microfinance can be controlled, so MFIs should be using innovative ways to acquire new low-cost clientele. Any reduction in costs helps MFIs reach more people but not jeopardize their financial position. Different trade-offs in firms should be embraced because “these output mixes can result from their attempts at maximizing social and/or financial performance.”¹⁶ Each firm should be able to determine their position and make cost and output adjustments relevant to their own position. A huge tradeoff for MFIs is that between financial sustainability and social responsibility.

Outreach

Outreach is the effort a microfinance institution goes through to extend financial services to the people who are underserved by financial institutions” (MIX-overview of the outreach and financial performance of microfinance institutions in Africa). The Microfinance Information Exchange, which is the provider of data in this research, sorts outreach into three categories: small, medium and large. Generally, outreach is measured in terms of breadth, the number of clients served and the volume of services and depth, the socioeconomic level of clients that MFIs reach. It is

¹⁶ Bos and Millone, *Practice What You Preach: Microfinance Business Models and Operational Efficiency*.

often indicated by the number of borrowers, the gross loan portfolio, percentage of women borrowers, average loan balance per borrower and amount of savers and savings.

For the purpose of this discussion, outreach is important in that it distinguishes the level of effort and institution goes through to find new clients and extend their services. The classifications (small, medium, large) give a general idea of the lending efforts made by each institution. A large outreach can indicate a larger number of clients, with larger loans, spread through a larger area. The MIX market defines large outreach as having over 30,000 borrowers; medium outreach as having 10,000 to 30,000 borrowers; and small outreach as having less than 10,000 borrowers.

CHAPTER TWO

Literature Review

The study of microfinance is a relatively new field of study with most research being done within the last twenty years. Much of the research in this area is still being conducted, and there is a huge variety in results. According to current research, most MFIs are actually unprofitable. Most researchers agree on this; there are very few institutions that are able to cover all of their costs. However, there is much debate as to why this is the case and whether or not this needs to be solved.

According to a study done by Gonzales¹⁷ 44 percent of all micro-borrowers are being served by profitable institutions. Through his studies, he determined two main causes in a profitability gap between the private and public providers of microfinance. The first reason is that the profitable administrations are more likely to screen borrowers to find the ones unlikely to repay loans. They may also charge higher interest rates to cover these additional costs, which provides one of the largest problems found in the microfinance industry. There is much controversy over this issue, as microfinance loans are intended to the poor communities. These loans are there to aid them, and high interest rates is counterproductive as they are hurting the people they want to help. The second issues is that many government institutions are likely to gain funding from outside sources, even if they are unprofitable. These subsidies decrease the need for the institution to work towards profitability and there is a dependency on funding from outside sources. Gonzales'

¹⁷ Adrian Gonzalez and Richard Rosenberg, *The State of Microfinance- Outreach, Profitability, and Poverty*.

study indicates that there is relatively little conflict between improving sustainability and reaching poorer clients. In the first few years there is improvement in profitability, which is due to the “learning effect” of settling into the business. His study does indicate though, that non-profit MFIs are generally more profitable than for-profits. This irony is explained by the lack of a competitive environment the non-profit organizations face.

A study by Hudon¹⁸ finds that as the amount of subsidies increases, the profitability of the MFI decreases. This shows how subsidies can hurt these institutions because it does not create incentives for creating an efficient business. Contrary to the study by Gonzales which states that lending to the poor does not effect profitability, Hudon states that institutions receiving the most subsidies are actually lending to the poorest people, and thus have higher costs with less returns leading to a less profitable practice. Many experts argue that subsidies are necessary for microfinance. “Subsidies lower the cost of funds and help cover administrative costs, hence increasing the outreach of an MFI among the poor, less able to pay.”¹⁹ Subsidies appear to have a good intention, but the lack of incentives for developing a profitable business creates downfalls. For example, administrative costs may be higher because there is not as much pressure to cut costs and stick to a strict budget based on operating profits. The research by Hudon suggests that subsidies allow lower interest rates to be charged. This is important because the poorest clients can now be served by these MFIs. We again see the problem of profitability with regards

¹⁸ Marek Hudon and Daniel Traca, *Subsidies and Sustainability in Microfinance* (2010).

¹⁹ Hudon and Traca, *Subsidies and Sustainability in Microfinance*.

to the social aspect of the institution. Usually, the poor clients take out smaller loans, which indicates that the cost per loan is greater than for wealthier individuals. The administrative costs add up quickly, and subsidies help to eliminate the extra costs associated with lending to those who need it most. Hudon concludes that MFIs should continue to rely on subsidies in order to meet the social goals of microfinance.

A study done by Anne-Lucie Lafourcade²⁰ states that MFIs in Africa tend to report lower levels of profitability than in other regions of the world. However, there are a growing number of institutions that are becoming profitable indicating a trend towards more productive institutions. There are several problems with microfinance in Africa. Many of these intuitions are in rural areas with weak infrastructure and low population density. This means that operating expenses generally run very high for MFIs, but the clients are still in deep poverty. To combat these challenges, microfinance institutions are forced to find ways to innovate and increase efficiency through better communication, improved lending products or new technologies.

In Gutiérrez-Nieto's²¹ study, Latin American MFIs were observed. The outreach variables studied were the number of loans outstanding and the gross loan portfolio. Interest and fee income was a variable for financial sustainability. Their

²⁰ Anne-Lucie Lafourcade, Jennifer Isern, Patricia Mwangi, and Matthew Brown, *Overview of the Outreach and Financial Performance of Microfinance Institutions in Africa* (2005).

²¹ Gutiérrez-Nieto, Serrano-Cinca and Mar Molinero, *Microfinance institutions and efficiency*.

findings showed that Data Envelopment Analysis could prove to be very useful in analysis of MFIs.

A study by Cull²² states that there are indeed many trade-offs in meeting social goals and maximizing financial performance simultaneously. His study looks at tradeoffs in specific context- those in contracting mechanisms, level of commercialization, rigor of regulation, and extent of competition. They find that “greater competition, as indicated by greater bank penetration in the overall economy, is associated with deeper outreach by the microfinance institutions, suggesting that competition pushes micro banks toward poorer markets, as reflected by smaller average loans sizes and greater outreach to women.”

In a study by Anthony Kyereboah-Coleman²³, capital structure of microfinance institutions is studied. He brings up an interesting point that capital structure has not been studied much, or implemented, with MFIs. By studying different institutions in Ghana, Kyereboah-Coleman discovered that most institutions are highly leveraged which allows them to increase performance and accommodate risk better. He recommends that MFIs should consider using long-term debt to finance their operations.

²² Robert Cull, Asli Demirguc-Kunt, and Jonathan Morduch, *Microfinance Tradeoffs: Regulation, Competition, and Financing* (The World Bank Development Research Group, 2009).

²³ Anthony Kyereboah-Coleman, *The impact of capital structure on the performance of microfinance intuitions* (The Journal of Risk Finance, Vol 8 Iss 1 pp 56-71, 2007).

CHAPTER 3

Materials and Methods

Source of Data

The data used for this project was through the Microfinance Information Exchange, which is a non-profit organization that acts as a business information provider in the microfinance sector. This organization is one of the main providers and lead source of information for research within this field. They have been collecting and tracking the microfinance industry since the 1990s. Data is self-reported to MIX and is analyzed by the MIX staff. “The MIX dataset collects self-reported balance sheet information and is widely used in the literature.”²⁴The MIX Market contains data about financial and social performance for over 2000 microfinance institutions covering 94 million borrowers. MIX strives to create transparency in the microfinance industry through data collection and analysis.

The data used for this research is a global data set, which consists of over 16,000 data points. Since the data is voluntarily self-reported by the institutions themselves, there are several pieces of missing information. MIX does specify guidelines for the submission of data to ensure quality and reliability. The MIX market states that they perform over 135 quality checks on submitted data. Data collection is based on the reporting standards set by the microfinance industry and aligned with those of the International Financial Reporting Standards (IFRS).

²⁴ Bos and Millone, *Practice What You Preach: Microfinance Business Models and Operational Efficiency*.

Calculations are conducted by MIX for information such as return on assets or return on equity; these are not self-reported by the microfinance institutions.

The MIX Market makes some adjustments to reported financial data. These adjustments are made in order to have comparable results. There is an adjustment for inflation effects on the real value of monetary balances. A subsidized cost of funds adjustment removes the impact of subsidization on MFIs. Also, an in-kind subsidy adjustment removes the impact of in-kind donations or subsidies that the MFI may have received. Also, loans overdue for more than one year are written off.

For this research, the information was organized according to geographic area. Six regions make up this organization system: East Asia, Middle East, Africa, Europe, South Asia and Latin America. These are the regions the MIX Market organizes their data into. The data was sorted this way to easily compare between different regions worldwide. A secondary form of organization was through stated outreach. These categories were small, medium and large outreach for each geographic area. By comparing outreach we are able to better distinguish tradeoffs related to outreach.

Variable Definitions

To compare tradeoffs between efficiency and outreach, several indicators were compared. Indicators of financial efficiency include return on assets, return on equity, profit margin, and operational self-sufficiency. Indicators of outreach include borrowers, percent of female borrowers, average loan balance per borrower, average balance per depositor, and borrowers per staff.

Return on assets is a financial indicator of profitability in comparison to total assets. Essentially, the figure shows how efficient an organization is at using its assets to generate profits. The generally accepted formula is to divide total assets by net income. The higher the return on assets, the better the financial standing of the institution. It is an important financial indicator because it shows how good management is at turning an investment into profit. In a field concentrating in investments on people, the return on assets can be a beneficial indicator of financial standing.

Return on equity is similar to return on assets in this way. Return on equity measures profitability based on the amount of profit on money invested by a third party. To calculate return on equity, net income is divided by shareholder equity. Typically, a high return on equity indicates a firm experiencing growth. However, with microfinance institutions return on equity is more difficult to establish a comparable result since each institution has a different rate of growth.

Profit margin is the net operating income divided by financial revenue. The profit margin is a measure of how much of each dollar made is kept as earnings. A higher profit margin indicates a more profitable institution in comparison to others in the industry. This calculation is not very useful with institutions with no profits or companies losing money.

Operational self-sufficiency is calculated using the following formula:
$$\text{Financial Revenue} / (\text{Financial expense} + \text{impairment loss} + \text{operating expense}).$$
Essentially, the formula is an indicator of whether or not an institution has made enough money to cover the costs of operation. For institutions that are not

operationally self-sufficient losses are usually taken out of equity, decreasing the ability to make more loans to borrowers.

Indicators for outreach are more complex. For this study, assets, borrowers, percent of female borrowers, average loan balance per borrower, average deposit balance per depositor, and borrowers per staff were used as indicators. The MIX market also assigns an outreach for qualifying institutions according to the number of borrowers. The following is how the MIX Market defines each of these variables.²⁵

Assets indicate the total of all net asset accounts. This includes cash, buildings and land among others. Generally, the more assets a MFI has, the more people it can reach or has reached. Therefore, a large amount of assets usually indicates an institution with greater outreach.

Borrowers are the number of people who currently have loans from the MFI. This should be a direct correlation to the outreach of the institution, since the MIX market indicates outreach level based on the number of borrowers. A larger number of borrowers denote a larger level of outreach.

Percent of female borrowers is calculated as the number of active female borrowers divided by the number of active borrowers. Females have a significant role in microfinance because in some countries they are the main providers for the family. Because of a significant portion of female entrepreneurs in developing countries, the outreach to them is indicative of outreach in general.

The average loan balance per borrower is calculated as the gross loan portfolio divided by the number of active borrowers. This measure is indicative of

²⁵ "Glossary," MIX Market FAQs, last modified 2012, accessed November 7, 2014, <http://www.mixmarket.org/about/faqs/glossary>.

the size of the loans the institution is making to its clients.

Average deposit balance per depositor is calculated as deposits divided by the total number of depositors. This figure shows how much each depositor is contributing to his or her deposit.

Borrowers per staff is calculated as the number of active borrowers divided by the number of personnel. This figure identifies how large the staff of the MFI is in comparison to the amount of clients they are reaching.

Methods

The specific region of focus is on Africa; however, since this is a comparative study other regions had to be examined as well. First, all data was examined in order to see worldwide trends compared to those of individual regions. In order to do regression statistics, the program Stata was used. Stata is a data analysis and statistical software. Through this regression analysis, the relationship between variables can be validated as statistically significant or not. The following formula was entertained: $\ln(\text{efficiency}) = \beta + \delta(\ln(\text{outreach})) + \lambda(X) + \varepsilon$. In this formula, variables of efficiency include return on assets, return on equity, operational self-sufficiency and profit margin. β stands for the intercept. Variables of outreach include assets, borrowers, percent of female borrowers, average loan balance per borrower and average deposit balance per depositor. X includes variables that were controlled for, including the type of institution (Bank, NGO, Rural Bank, Cooperative/Credit Union and NBF). ε is the amount of error in the calculation. The size of outreach (small, medium, large) was also controlled for, but

these results had to be omitted because there were no statistically significant results. Because the majority of the data is large numbers, the natural log was taken in order to better measure for percent changes.

Also, analysis through Excel was conducted. Several calculations and graphs were done through the excel software. These calculations include some descriptive statistics as well as graphs over time.

Descriptive Statistics

To begin analysis, first descriptive statistics for all data was done. The results are indicated below. The data used for this graph takes into account the MFIs without a specified outreach as well.

Table 1

All Data					
Variable	Observations	Mean	Standard Deviation	Minimum	Maximum
Operational Self Sufficiency	13,768	117.37%	136.29%	-4784.50%	8121.90%
Return on Assets	11,655	0.05%	17.72%	-746.00%	101.00%
Return on Equity	11,608	20.19%	3277.50%	-165100.00%	272667.00%
Profit Margin	13,501	65477.53%	7586544.00%	-3549563.00%	881472500.00%
Assets	15,275	625,000,000	70,400,000,000	0	8,700,000,000,000
Borrowers	14,713	62,846	367,041	0	8,166,287
Percent Female Borrowers	11,437	64.820%	28.080%	0.000%	668.900%
Average Loan Balance per Borrower	14,555	115,147	13,500,000	0	1,630,000,000
Average Balance per Depositor	5,450	4,673	88,160	0	3,510,193
Portfolio Risk	12,333	8.12%	120.06%	0.00%	13227.60%
Borrowers per Staff	13,974	130	204	0	13,709

This table is descriptive for the world standing for each of the indicators of outreach as well as efficiency. Standard deviations for some of these variables are huge- indicating that there is large diversity between types of institutions and their outreach and efficiency. These results are then compared to those of each geographic region. These results can be viewed in Appendix A.

Descriptive statistics for Africa revealed that while average operational self-sufficiency is about the same as for the worldwide average, return on assets is much less and so is profit margin. The number of borrowers and the average loan balance per borrower is much less than worldwide averages as well.

The descriptive statistics for outreach for each geographic area revealed information about the countries microfinance institution in comparison to worldwide averages. The table below demonstrates descriptive statistics for efficiency indicators. The columns represent the worldwide average for each outreach category. Only data with a listed outreach was used for this table. The last column is the average of all the data for each efficiency indicator. This graph shows trends in efficiency for growing outreach.

Table 2

	Small Outreach	Medium Outreach	Large Outreach	Averages
Return on Assets	-1.88%	1.48%	3.33%	0.97%
Median	1.40%	2.10%	3.12%	2.20%
Standard Deviation	19.20%	8.60%	5.61%	11.13%
Minimum	-245.31%	-76.47%	-34.56%	-118.78%
Maximum	55.22%	29.87%	30.62%	38.57%
Return on Equity	2.92%	50.77%	23.21%	25.63%
Median	5.46%	7.84%	13.84%	9.05%
Standard Deviation	1931.84%	932.46%	255.77%	1040.02%
Minimum	-30917.47%	-1179.77%	-528.77%	10875.34%
Maximum	50486.01%	17603.62%	6330.90%	24806.84%
Operational Self Sufficiency	120.81%	120.64%	123.30%	121.58%
Median	108.00%	112.43%	119.09%	113.17%
Standard Deviation	189.28%	87.55%	33.63%	103.48%
Minimum	-926.34%	24.39%	25.00%	-292.31%
Maximum	3834.67%	1183.85%	422.76%	1813.76%
Profit Margin	622.90%	4.65%	-119.87%	1.69
Median	7.21%	10.69%	15.72%	0.11
Standard Deviation	28262.07%	78.99%	5324.28%	112.22
Minimum	-6553.27%	-757.40%	-152780.25%	-533.64
Maximum	1206938.66%	504.80%	6697.00%	4047.13

These results indicate that return on assets increases with outreach, return on equity has no clear pattern, operational self-sufficiency is relatively stable regardless of outreach, and profit margin actually decreases with larger outreach. The following table indicates the amount of data for each outreach. For Africa, 65% of all MFIs were classified as Small outreach, 20% as medium, and 15% as large outreach. 17% of all data points were unclassified for outreach. Africa has the second largest number of small MFIs, and they have the highest number of unclassified MFIs. This is important because it gives information as to the nature of microfinance institutions in the geographic region. Understanding how the data is spread out is important in making conclusions as well.

Percentage of Data for Outreach			
	Small	Medium	Large
Africa	65.09%	20.35%	14.57%
East Asia and the Pacific	61.24%	19.65%	19.11%
Eastern Europe	78.16%	13.60%	8.23%
Latin America	55.13%	22.78%	22.10%
Middle East	50.41%	26.70%	22.89%
South Asia	34.93%	21.58%	43.49%
Percent Unidentified			
	Total Data Points	Percent	
Africa	3623	17.39%	
East Asia and the Pacific	1961	15.15%	
Eastern Europe	2927	14.11%	
Latin America	4444	9.99%	
Middle East	676	10.80%	
South Asia	2647	10.88%	

Correlation

Using Stata, correlations were computed between the variables of outreach and efficiency. These are displayed in Appendix B. Positive correlations occur when the data is statistically significant (as indicated by *) and when there is appositive value. Negative correlations are indicated by a statistically significant negative figure, which indicates a tradeoff. Some notable negative correlations are that between assets and borrowers, and percent female borrowers and operational self-sufficiency and return on assets.

Trends Over Time

To gain an understanding of trends over time, several graphs were made. These graphs took the fiscal year the data was reported in and a dependent variable. The dependent variables used were return on assets, return on equity, operational self-sufficiency and profit margin. Again, data was grouped by geographic region as well as by outreach. These graphs show trends of the data over time to help demonstrate how the dependent variables have developed. The time span is about 20 years, the earliest data beginning around 1994. These graphs lay the foundation for the history of growth in these variable areas over time. The graphs can be viewed in Appendix B, but the generalized results from the graphs are as follows.

Table 3

	Africa	East Asia	Europe	Middle East	South Asia	Latin America
Return on Assets vs. Time- Small	Positive	Positive	Positive	Positive	Positive	Positive
Return on Assets vs. Time - Medium	Positive	Positive	Negative	Positive	Positive	Negative
Return on Assets vs. Time - Large	Negative	Negative	Positive	Positive	Negative	Negative
Return on Equity vs. Time - Small	Negative	Positive	Negative	Negative	Positive	Negative
Return on Equity vs. Time - Medium	Negative	Positive	Negative	Positive	Negative	Negative
Return on Equity vs. Time - Large	Negative	Positive	Negative	Positive	Positive	Negative
Operational Self Sufficiency vs. Time - Small	Positive	Positive	Positive	Positive	Negative	Negative
Operational Self Sufficiency vs. Time - Medium	Negative	Positive	Negative	Positive	Negative	Negative
Operational Self Sufficiency vs. Time - Large	Negative	Positive	Negative	Positive	Negative	Negative
Profit Margin vs. Time - Small	Positive	Positive	Positive	Positive	Positive	Positive
Profit Margin vs. Time -Medium	Positive	Positive	Negative	Positive	Negative	Negative
Profit Margin vs. Time -Large	Negative	Positive	Positive	Negative	Negative	Positive

This table organizes the correlations of each of the graphs into a simple document that shows trends of each variable over time for each outreach. Graphs demonstrating these correlations can be seen in Appendix C.

For return on assets over time, there is a positive correlation for each region with small outreach. For medium outreach, Europe and Latin America are the only ones with a negative correlation. For large outreach, only Europe and the Middle

East have a positive correlation. Overall, the trend is that return on assets increases over time, but as outreach increases, return on assets decreases. The exception is Europe with a negative correlation for medium outreach.

Return on equity shows no clear patterns. Correlation for each outreach level in Africa, Latin America and Europe is negative, but in East Asia it is positive. The Middle East and South Asia have no apparent pattern.

Operational self-sufficiency over time appears to have a negative correlation. There is a positive correlation in East Asia and the Middle East. However, the graphs show a decreasing correlation with increased outreach in the Middle East. South Asia and Latin America both have a negative correlation, and Africa and South Asia have a negative correlation with increasing outreach size.

The profit margin has a positive correlation for small outreach in each geographic area. The correlations are mixed for both medium and large outreach, so it is difficult to draw solid conclusions from this.

CHAPTER FOUR

Results

To determine tradeoffs, regression analysis was performed. Regression on all data was conducted in order to understand the data as a whole. The results can be seen in Appendix D. From all data, the only statistically significant results occur with return on assets. Return on assets tends to increase as assets increases. The number of borrowers and average loan balance per borrower has a positive relationship with return on assets. Return on assets decreases with portfolio risk. Return on assets is neutral in relationship to borrowers per staff. Of the different kinds of institutions (bank, NBFI, rural bank, NGO and Cooperative/Credit Union) all of them have a negative relationship with return on assets.

In Africa, return on equity is the only column with no statistically significant results. Variables that have a positive relationship with operational self-sufficiency include borrowers, average loan balance per borrower and borrowers per staff. Variables that decrease operational self-sufficiency include assets, percent female borrowers, and portfolio risk. The data shows no statistically significant relationships regarding the type of institution, other than rural banks, which have a positive relationship with operational self-sufficiency. Return on assets increases as borrowers and average loan balance per borrower increase. Efficiency variables are neutral in terms of borrowers per staff. Variables that decrease operational self-sufficiency and return on assets include assets, percent female borrowers and portfolio risk. As the number of borrowers, average loan balance per borrower and

borrowers per staff increase the profit margin also increases. There is a large decrease in profit margin with portfolio risk, and a slighter one with percent of female borrowers. Overall for the efficiency variables, assets, percent of female borrowers and portfolio risk tend to have a negative relationship while borrowers, average loan balance per borrower, and borrowers per staff have a positive relationship.

Results from East Asia indicate that for operational self-sufficiency, negative relationships occur with assets, percent female borrowers and portfolio risk. Positive relationships include average balance per depositor and borrowers per staff. Return on assets decreases with assets, percent female borrowers and portfolio risk. There is an increase in return on assets with borrowers and average loan balance per borrower. Return on equity shows that positive relationships occur with average loan balance per borrower as well as the number of borrowers. There is a negative relationship with assets. Profit margin indicates positive results with borrowers and average loan balance per borrower. Negative relationships occur with assets, percent female borrowers and portfolio risk. Statistically significant data for the kind of institution indicates a negative relationship with return on assets as well as profit margin for both the banks and NBFIs.

For Europe, there is only statistically significant data for return on assets. Like with other regions, as portfolio risk increases the return on assets decreases. Also, there is a negative relationship with banks and cooperative/credit unions.

In Latin America, with increasing operational self-sufficiency, there is a positive relationship with borrowers, average loan balance per borrower and

borrowers per staff. There is a negative relationship with assets and portfolio risk. Return on assets has a positive relationship with the average loan balance per borrower and borrowers per staff and a negative relationship with the average balance per depositor. For return on equity, there is a positive relationship with the average loan balance per borrower and borrowers per staff. Profit margin has a positive relationship with borrowers, average loan balance per borrower and borrowers per staff. There is a negative relationship with assets, percent female borrowers, average balance per depositor and portfolio risk. Statistically significant results for the kind of institution include a positive relationship only with return on assets for NBFIs and cooperative/credit unions. There is a negative relationship with return on equity for NGOs and cooperative/credit unions.

There was no statistically significant data for the Middle East, which is probably due to the low number of observations.

Results for South Asia indicate that there is a negative relationship between operational self-sufficiency and assets and portfolio risk. There is a positive relationship between borrowers, percent of female borrowers, average loan balance per borrower, average balance per depositor and borrowers per staff for operational self-sufficiency. There is a positive relationship with return on assets for borrowers, percent of female borrowers, average loan balance per borrower, average balance per depositor and slightly for borrowers per staff. There is a negative relationship with portfolio risk. The only statistically significant data is for return on equity is a negative relationship with the average balance per depositor. The profit margin has a positive relationship with borrowers, percent female

borrowers, average loan balance per borrower, average balance per depositor, and borrowers per staff. There is a negative relationship with assets. There is no statistically significant data for the type of institution.

CHAPTER FIVE

Discussion and Conclusions

The results show that in Africa, a tradeoff in efficiency is the percent of female borrowers. This is also evident in other regions such as East Asia and Latin America. This tradeoff could be because while in Africa women can be the main providers of income for their families. Generally, they form small businesses to maintain a steady income. An important note that Hermes makes is that “research shows that women are more reliable and have higher pay-back ratios. Moreover, women use a more substantial part of their income for health and education of their children. Thus, women play a very important role in reducing poverty within households.”²⁶ More importantly, the controversy with this issue could explain the tradeoff with lending to women. Hermes also states “women are forced to hand over the loan to men, who subsequently use the loan for their own purposes.” If women are held accountable for this, it could drastically affect the statistics regarding to repayment by women. Also, often women have smaller loan sizes, which can be easier to repay, but it increases the cost per loan.

The amount of assets is also a tradeoff for efficiency. In Africa, there was statistical significance to prove that assets had a negative relationship with operational self-sufficiency as well as return on assets. East Asia, Latin America and South Asia also had assets as a tradeoff. However, assets had a positive relationship with return on assets when calculated with all data. With Africa, this could be a

²⁶ Hermes and Lensink, *Microfinance: Its Impact, Outreach, and Sustainability*.

tradeoff because without receiving proper returns, acquiring assets is not productive for the institution. MFIs may not receive the proper returns because of the nature of the business, which stems from the fundamental social versus profitability dilemma. Since MFIs may not be able to charge higher interest rates, the institution may not receive the returns needed to fund all sources. Expanding assets is not beneficial if there is no return on them.

However, there is a large discrepancy in this data. Based on r-squared values, data may not be as relevant as we assume it to be. If this research was to be done again, perhaps a more specific selection of data is necessary. There is still further research to be done to further explain the results as well. It can be concluded that microfinance institutions have a huge variability between regions. Therefore, generalizations about microfinance institutions as a whole are probably irrelevant.

APPENDICIES

APPENDIX A: DESCRIPTIVE STATISTICS

Sub-Saharan Africa					
Variable	Observations	Mean	Standard Deviation	Minimum	Maximum
Operational Self Sufficiency	2,926	106.34%	102.50%	-9202.00%	3196.37%
Return on Assets	2,251	-131.50%	1732.20%	-246.68%	100.89%
Return on Equity	2,240	55.00%	7103.06%	-165100.00%	272667.00%
Profit Margin	2,833	-1301.20%	66688.00%	-3549563.00%	355.51%
Assets	3,303	27,500,000	181,000,000	0	4,550,000,000
Borrowers	3,098	24,210	80,023	0	1,584,540
Percent Female Borrowers					
Average Loan Balance per Borrower	3,035	850	7,997	0	344,731
Average Balance per Depositor	1,634	278	2,950	0	105,066
Portfolio Risk	2,270	1028.00%	2066.66%	0.00%	684.31%
Borrowers per Staff	2,945	132.99	189	0	5,067

East Asia and the Pacific					
Variable	Observations	Mean	Standard Deviation	Minimum	Maximum
Operational Self Sufficiency	1,679	123.20%	7648.00%	-127.60%	1503.80%
Return on Assets	1,409	149.80%	1183.41%	-180.00%	3200.00%
Return on Equity	1,397	1850.70%	291.03%	-798.00%	10705.00%
Profit Margin	1,647	-341.20%	214.39%	-	3488.00%
Assets	1,866	96,000,000	1,340,000,000	0	42,300,000,000
Borrowers	1,764	78,960	524,660	0	8,166,287
Percent Female Borrowers	1,158	74.496%	28.540%	0.000%	1.310%
Average Loan Balance per Borrower	1,748	4,861	59,902	0	1,531,625
Average Balance per Depositor	1,098	3,047	81,722	0	2,700,421
Portfolio Risk	1,291	718.00%	1047.00%	0.00%	100.00%
Borrowers per Staff	1,664	129.39	132	0	1,916

Eastern Europe					
Variable	Observations	Mean	Standard Deviation	Minimum	Maximum
Operational Self Sufficiency	2,538	134.33%	187.07%	-505.40%	7759.40%
Return on Assets	2,110	317.90%	1372.50%	-259.00%	7990.00%
Return on Equity	2,106	1780.20%	401.28%	-4984.80%	16931.00%
Profit Margin	2,519	192.36%	723.47%	-15215.90%	27051.60%
Assets	2,724	3,240,000,000	167,000,000,000	0	8,700,000,000,000
Borrowers	2,562	10,550	26,704	0	356,791
Percent Female Borrowers	2,133	48.947%	23.206%	0.000%	1.083%
Average Loan Balance per Borrower	2,553	648,229	32,400,000	0	1,630,000,000
Average Balance per Depositor	560	8,171	30,262	0	428,466
Portfolio Risk	2,317	1061.70%	275.05%	0.00%	13227.60%
Borrowers per Staff	2,468	68.066	61	0	875

Latin America & The Caribbean					
Variable	Observations	Mean	Standard Deviation	Minimum	Maximum
Operational Self Sufficiency	3,769	112.05%	9520.60%	-4785.00%	834.00%
Return on Assets	3,449	38.00%	1985.88%	-746.00%	5300.00%
Return on Equity	3,450	2.01%	117.88%	-4411.00%	2302.00%
Profit Margin	3,734	237992.40%	14425640.00%	-	881472500.00%
Assets	4,231	81,100,000	764,000,000	0	46,700,000,000
Borrowers	4,141	38,977	133,509	0	2,557,418
Percent Female Borrowers	3,223	62.470%	21.349%	0.000%	1.000%
Average Loan Balance per Borrower	4,108	2,148	39,678	0	2,534,071
Average Balance per Depositor	1,294	12,833	162,705	0	3,510,193
Portfolio Risk	3,760	687.43%	875.94%	0.00%	100.00%
Borrowers per Staff	3,880	128.582	275	0	13,709

Middle East & North Africa					
Variable	Observations	Mean	Standard Deviation	Minimum	Maximum
Operational Self Sufficiency	587	145.67%	369.00%	- 4330.00%	8112.90%
Return on Assets	532	275.60%	1102.00%	- 8800.00%	8990.00%
Return on Equity	532	-780.11%	292.10%	- 6355.80%	693.50%
Profit Margin	586	4714.86%	1240.40%	- 1456.80%	29828.70%
Assets	625	22,900,000	48,500,000	0	391,000,000
Borrowers	635	35,100	67,503	0	472,961
Percent Female Borrowers	552	60.845%	29.162%	0.000%	1.000%
Average Loan Balance per Borrower	629	804	1,143	33	14,152
Average Balance per Depositor	78	782	3,957	0	32,912
Portfolio Risk	560	558.10%	1062.00%	0.00%	8210.00%
Borrowers per Staff	604	121.12	67	0	407

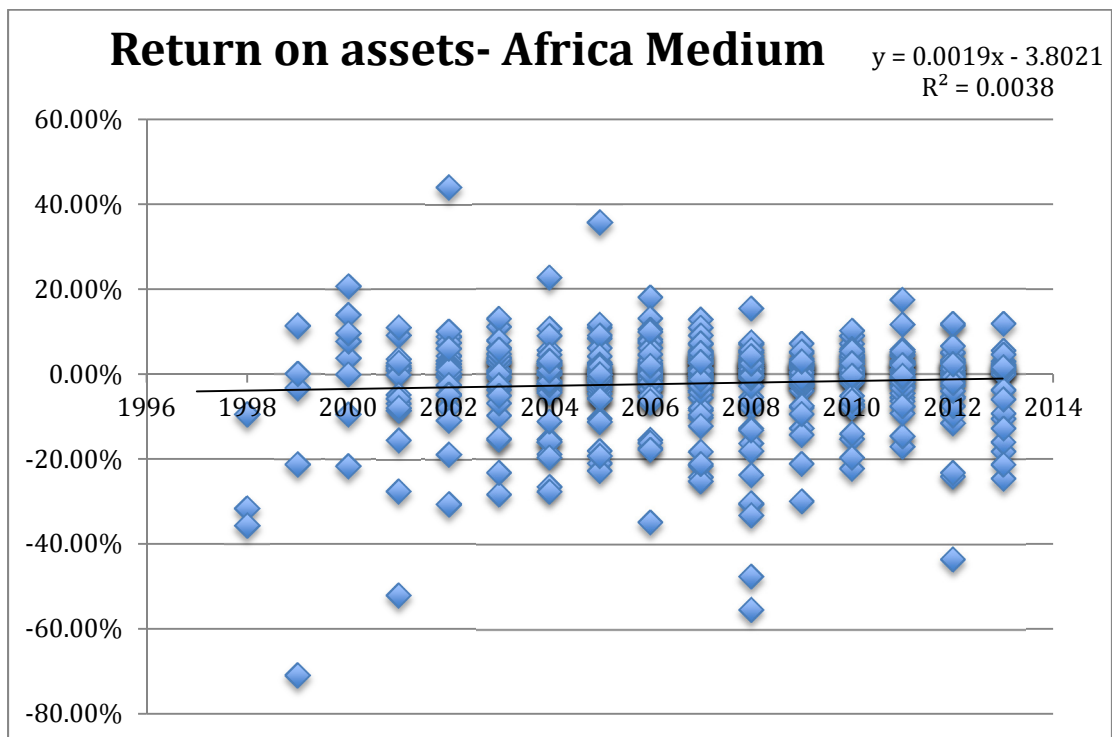
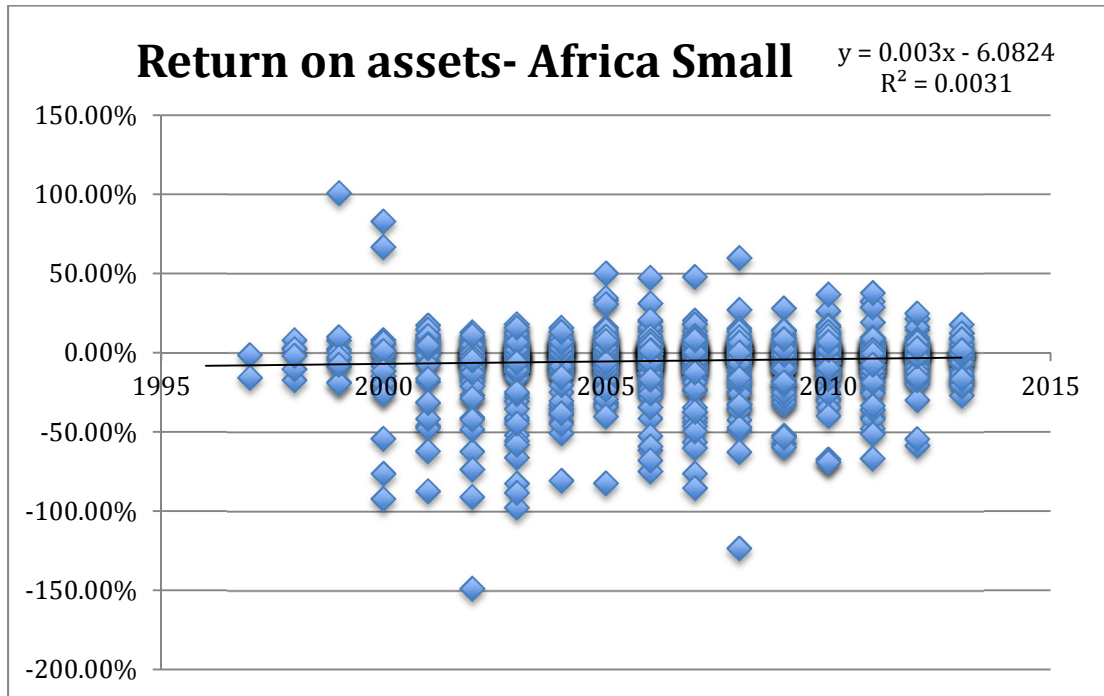
South Asia					
Variable	Observations	Mean	Standard Deviation	Minimum	Maximum
Operational Self Sufficiency	2,265	109.94%	6815.30%	-6800.00%	1844.00%
Return on Assets	1,901	-203.90%	2182.01%	-532.00%	6400.00%
Return on Equity	1,879	8860.90%	2437.17%	-3855.00%	100957.00%
Profit Margin	2,178	-455.30%	19632.43%	-916010.00%	1434.00%
Assets	2,525	32,800,000	126,000,000	0	2,210,000,000
Borrowers	2,510	199,061	729,939	0	6,740,000
Percent Female Borrowers	2,094	85.348%	25.774%	0.000%	1.230%
Average Loan Balance per Borrower	2,482	252	2,410	0	117,488
Average Balance per Depositor	786	543	12,654	0	354,779
Portfolio Risk	2,135	651.50%	2192.40%	0.00%	711.00%
Borrowers per Staff	2,412	197.195	224	0	6,721

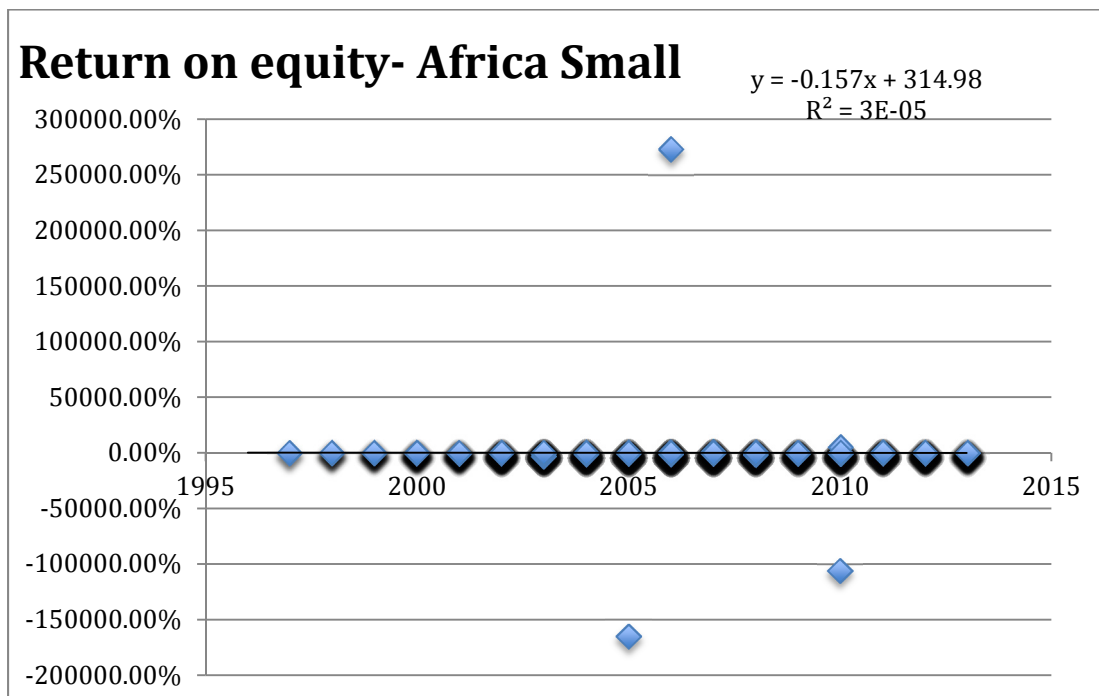
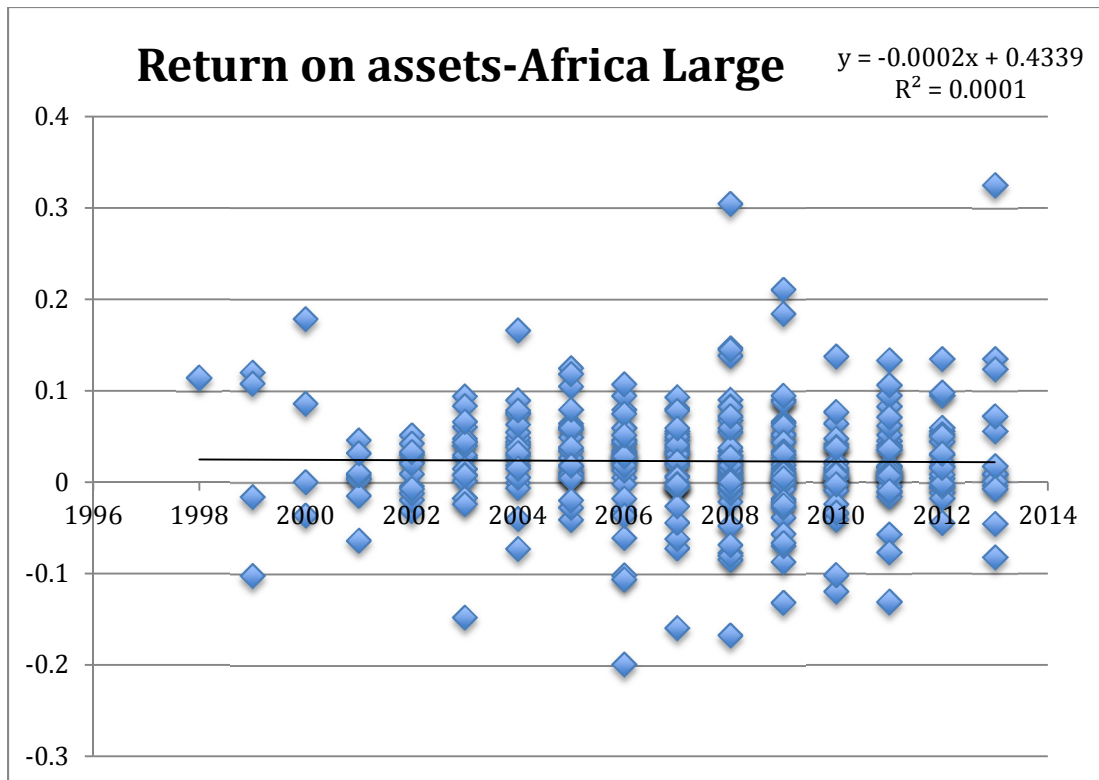
APPENDIX B: ALL DATA CORRELATION

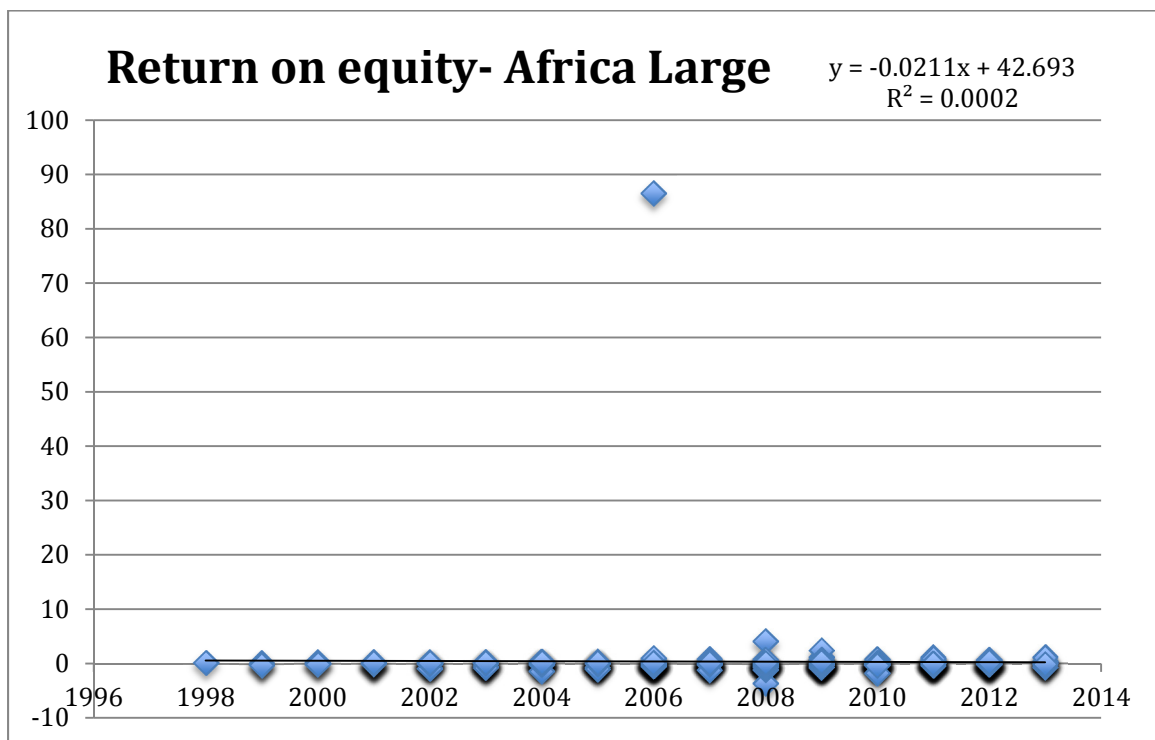
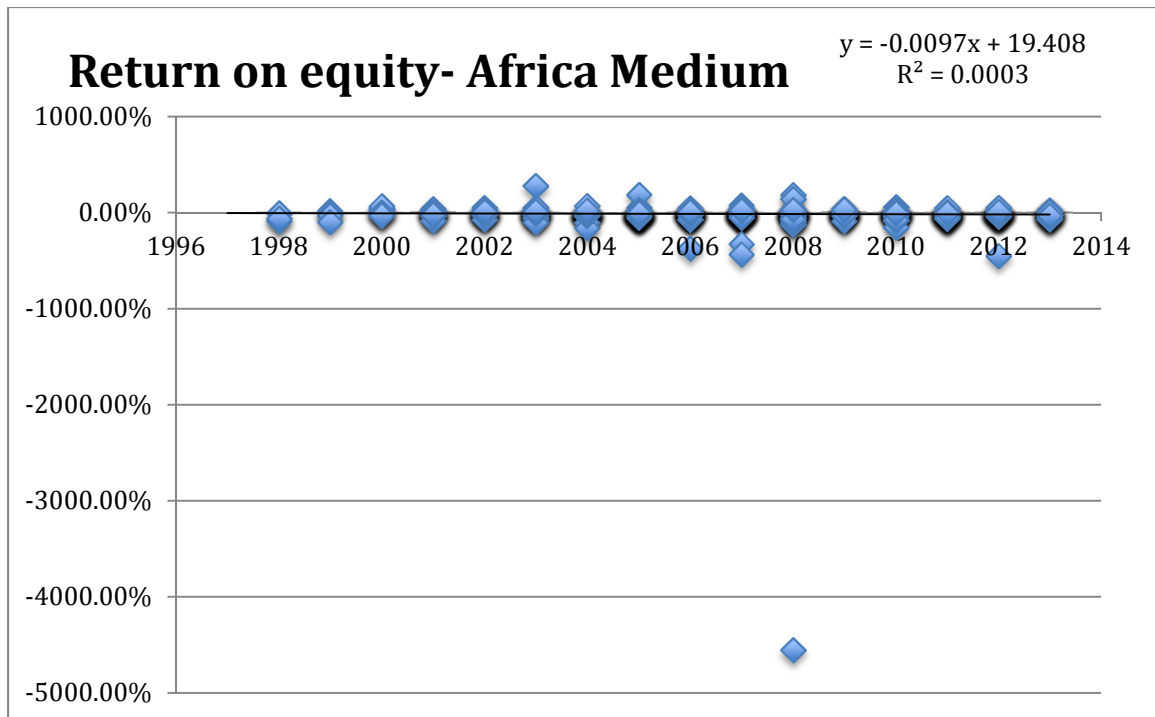
All Data Correlation	OSS	ROA	ROE	Profit Margin	Ln Assets	Ln Borrowers	Percent Female Borrowers	Ln Average loan balance per borrower	Ln average balance per depositor
OSS	1.000								
ROA	0.241 *** (0.000)	1.0000							
ROE	0.008 (0.406)	0.0318 *** (0.0006)	1.0000						
Profit Margin	0.0019 (0.8246)	0.1534 *** (0.0000)	0.0082 (0.3804)	1.0000					
Ln Assets	0.0386 ** (0.0072)	0.0961 *** (0.0000)	0.0166 (0.2698)	0.0296 (0.0394)	1.0000				
Ln Borrowers	-0.0067 0.4491	0.2030 *** (0.000)	0.0034 (0.7189)	0.0099 (0.2686)	-0.0629 *** (0.0000)	1.0000			
Percent female borrowers	-0.0156 (0.1064)	-0.0434 *** (0.0000)	-0.0060 (0.5605)	0.0005 (0.9605)	-0.5130 *** (0.0000)	0.2460 *** (0.0000)	1.0000		
Ln Average loan balance per borrower	0.0551 *** (0.0000)	0.1301 *** (0.0000)	0.0102 (0.2832)	0.0042 (0.6429)	0.7835 *** (0.0000)	-0.2658 *** (0.0000)	-0.5688 *** (0.0000)	1.0000	
Ln average balance per depositor	0.0386 ** (0.0072)	0.0961 *** (0.0000)	0.0166 0.2698	0.0296 (0.0394)	1.0000 *** (0.0000)	-0.0629 *** (0.0000)	-0.5130 *** (0.0000)	0.7835 *** (0.0000)	1.0000
portfolio risk	-0.0027 0.7726	-0.0105 (0.2913)	-0.0002 (0.9850)	-0.0005 (0.9594)	-0.0335 ** (0.0220)	-0.0035 (0.7025)	-0.0213 ** (0.0303)	0.0185 ** (0.0431)	-0.0335 ** (0.0220)
borrowers per staff	0.0098 (0.2761)	0.0490 *** (0.0000)	0.0002 (0.9803)	0.0006 (0.9455)	-0.2662 *** (0.0000)	-0.2911 *** (0.0000)	0.1608 *** (0.0000)	-0.2606 *** (0.0000)	-0.2662 *** (0.0000)
Bank	-0.0096 (0.2592)	0.0224 ** (0.0158)	-0.0008 (0.9349)	-0.0030 (0.7300)	0.2298 *** (0.0000)	0.1770 *** (0.0000)	-0.1258 *** (0.0000)	0.1776 *** (0.0000)	0.2298 *** (0.0000)
NBFI	-0.0031 (0.7185)	0.0235 ** (0.0111)	-0.0014 (0.8772)	-0.0057 (0.5048)	0.0390 ** (0.0043)	0.0403 *** (0.0000)	-0.0810 *** (0.0000)	0.0967 *** (0.0000)	0.0390 ** (0.0043)
Rural Bank	0.0111 (0.1918)	0.0364 *** (0.0001)	-0.0002 (0.9823)	-0.0020 (0.8144)	0.0131 (0.3382)	-0.0205 ** (0.0131)	-0.0661 *** (0.0000)	-0.0037 (0.6528)	0.0131 (0.3382)
NGO	-0.0135 (0.1140)	-0.0612 *** (0.0000)	0.0015 (0.8683)	0.0117 (0.1753)	-0.4610 *** (0.0000)	0.0606 *** (0.0000)	0.3225 *** (0.0000)	-0.3433 *** (0.0000)	-0.4610 *** (0.0000)
Cooperative / Credit Union	0.0232 *** (0.0064)	0.0225 ** (0.0153)	0.0005 (0.9606)	-0.0038 (0.6586)	0.2273 *** (0.0000)	-0.2378 *** (0.0000)	-0.2006 *** (0.0000)	0.1797 *** (0.0000)	0.2273 *** (0.0000)

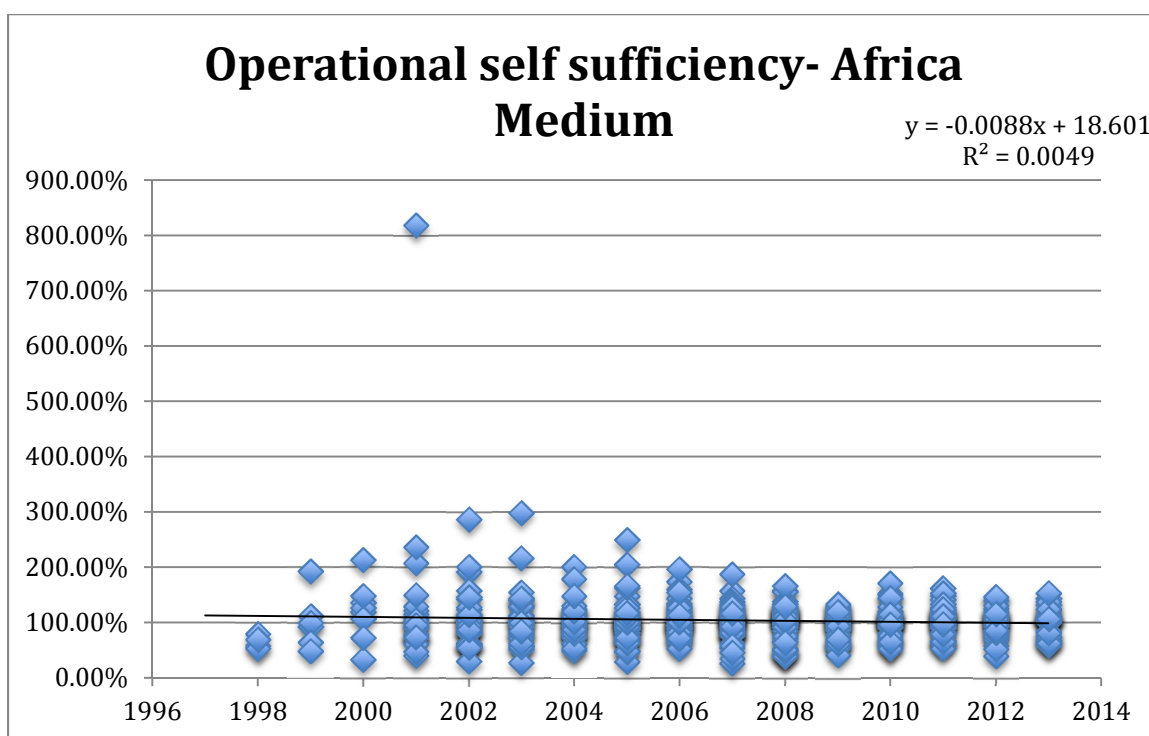
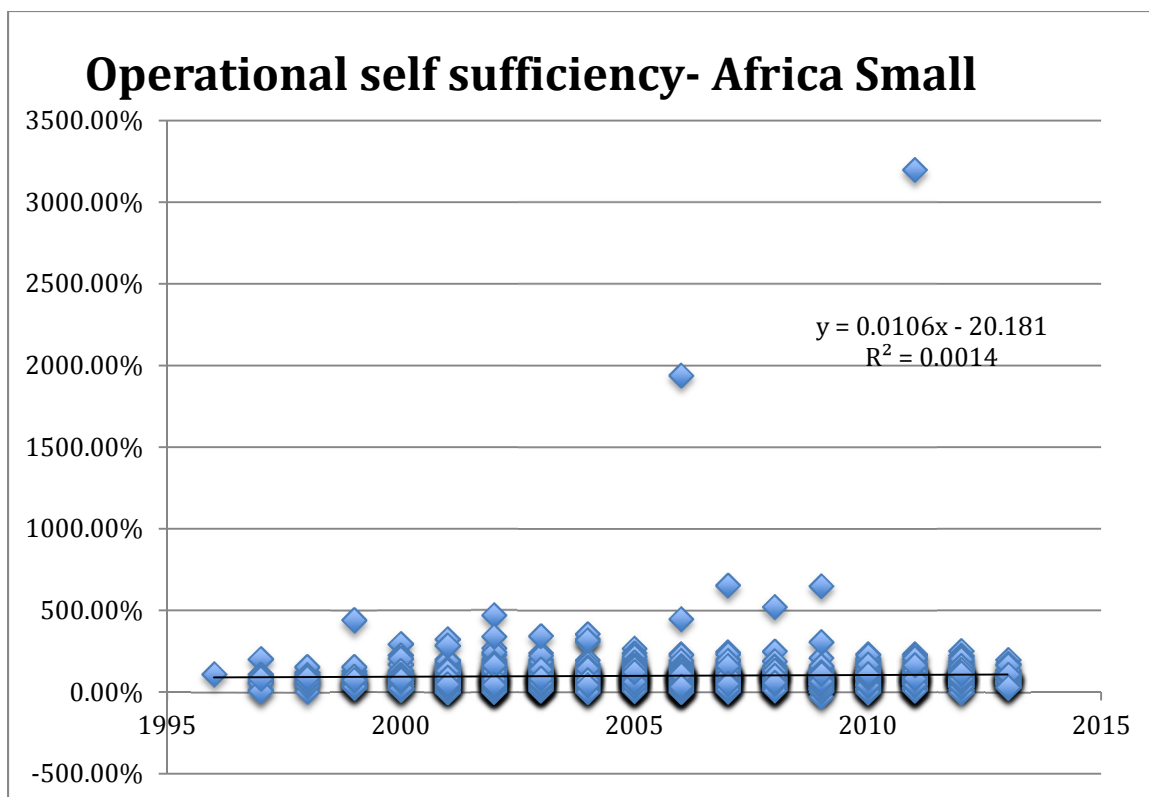
All Data Correlation (Continued)	Portfolio risk	Borrowers per staff	Bank	NBFI	Rural Bank	NGO	Cooperative / Credit Union
Portfolio risk	1.0000						
Borrowers per staff	-0.0024 (0.7950)	1.0000					
Bank	-0.0041 (0.6464)	-0.0083 (0.3263)	1.0000				
NBFI	0.0078 (0.3892)	-0.0118 (0.1635)	-0.2254 *** (0.0000)	1.0000			
Rural Bank	0.0042 (0.6447)	-0.0227 ** (0.0073)	-0.0734 *** (0.0000)	-0.1550 *** (0.0000)	1.0000		
NGO	-0.0093 (0.3015)	0.0769 *** (0.0000)	-0.2371 *** (0.0000)	-0.5005 *** (0.0000)	-0.1630 *** (0.0000)	1.0000	
Cooperative / Credit Union	0.0019 (0.8307)	-0.0568 *** (0.0000)	-0.1449 *** (0.0000)	-0.3059 *** (0.0000)	-0.0996 *** (0.0000)	-0.3216 *** (0.0000)	1.0000

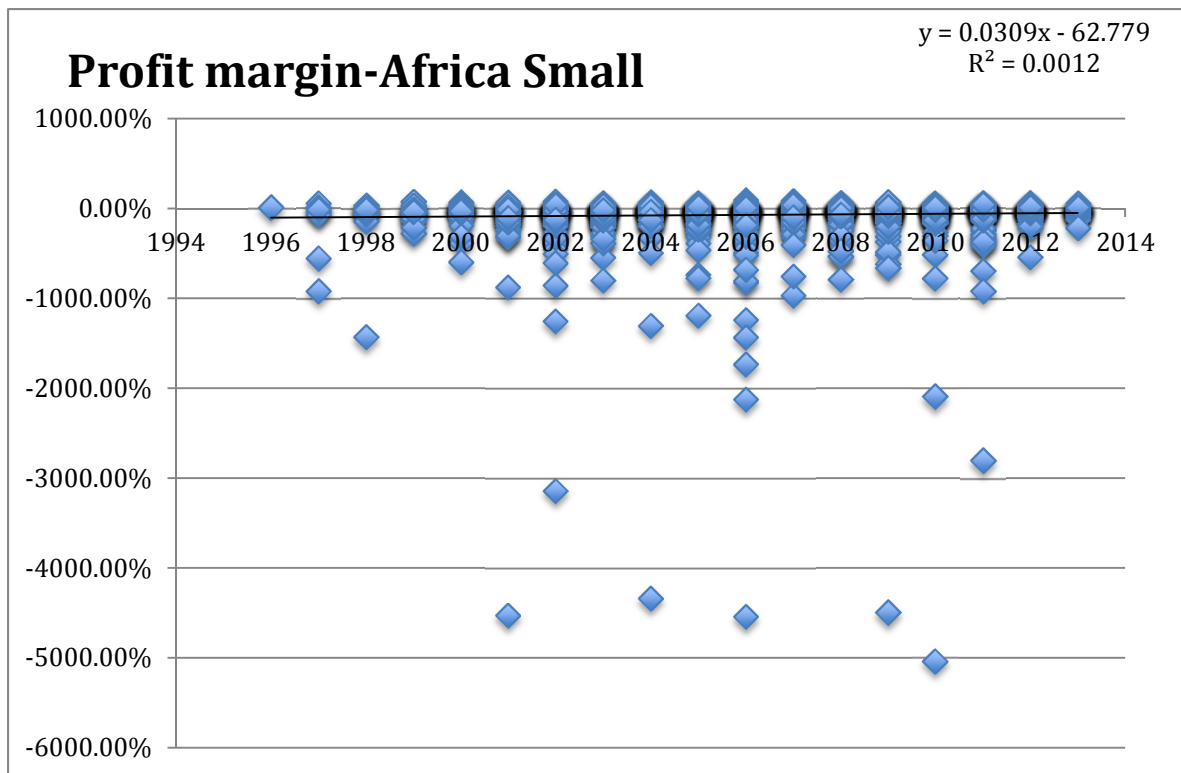
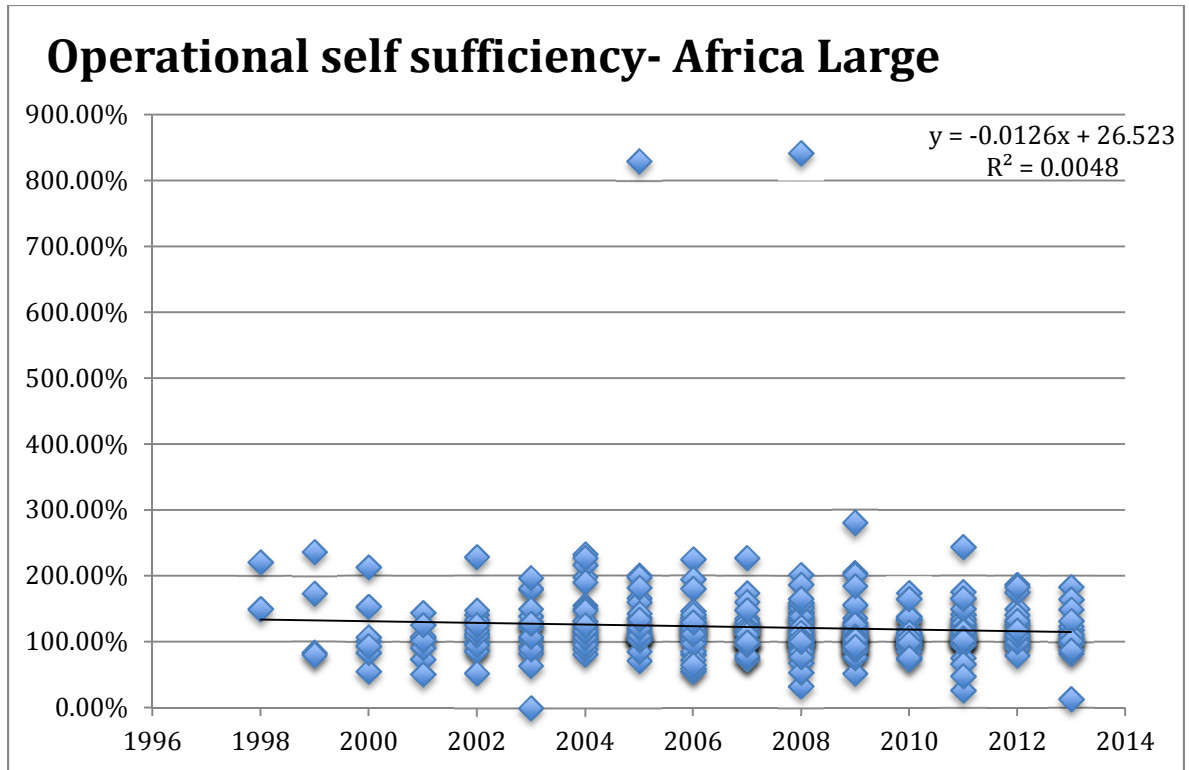
APPENDIX C: TRENDS OVER TIME

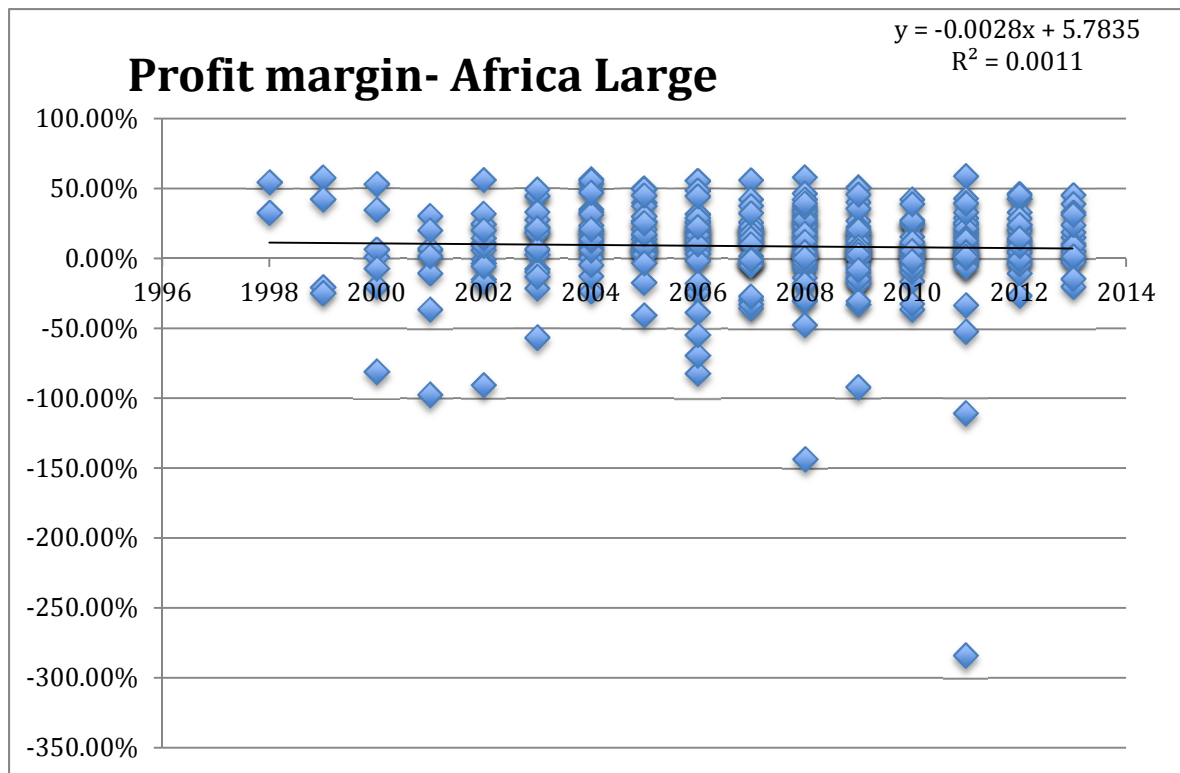
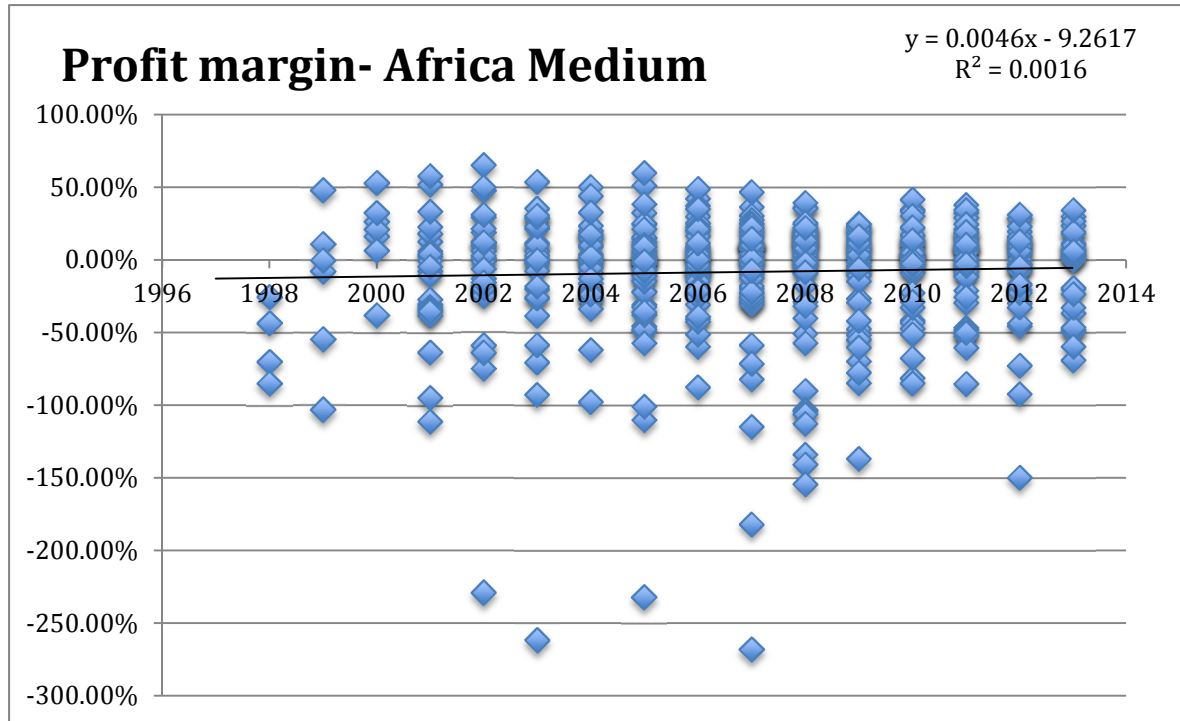


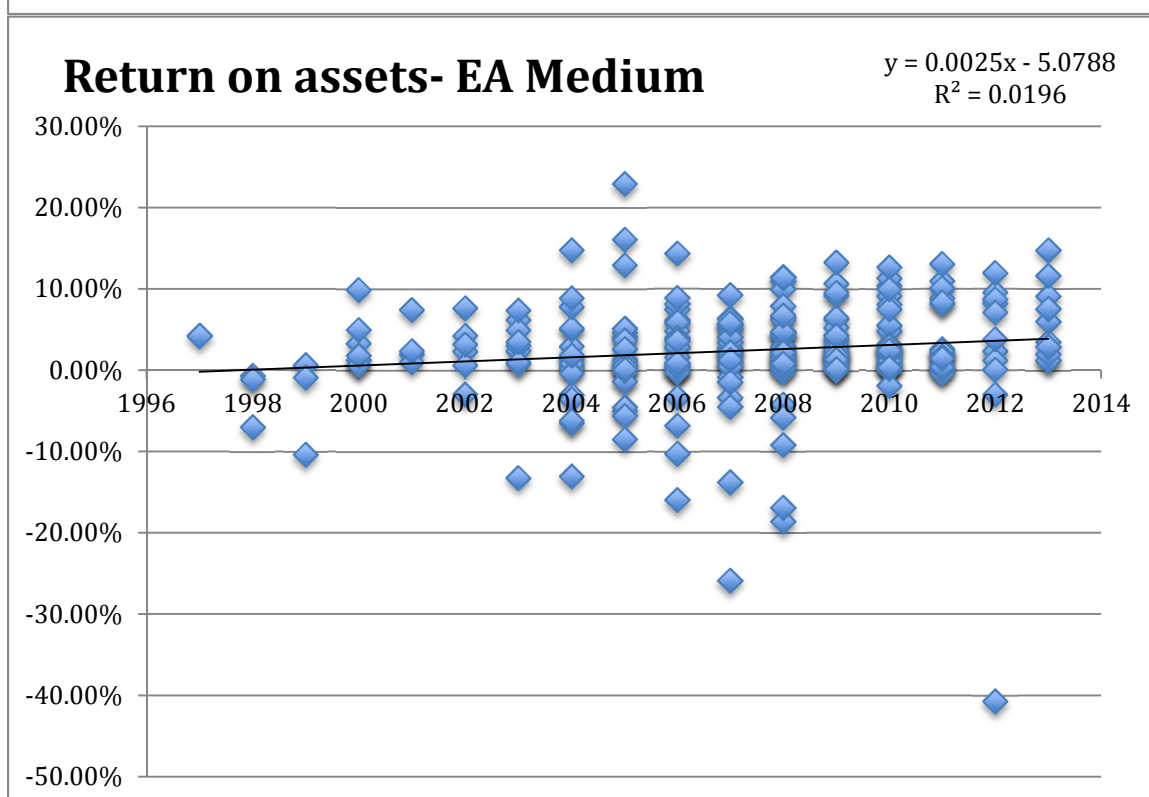
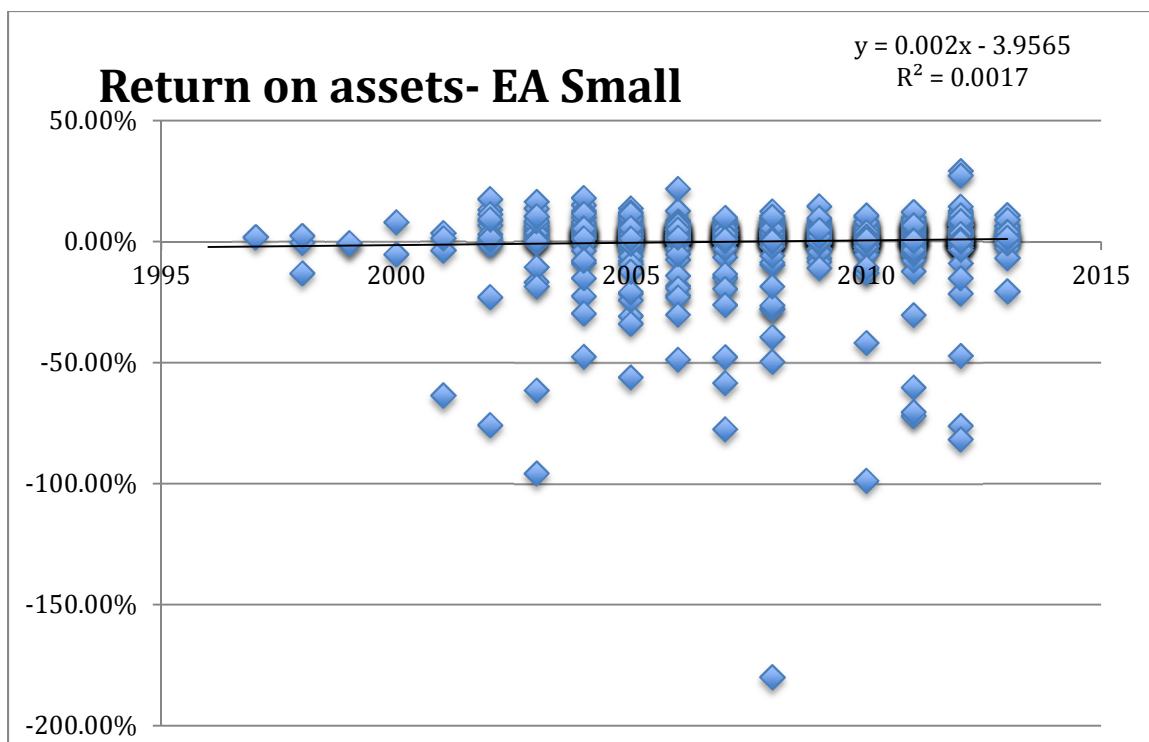


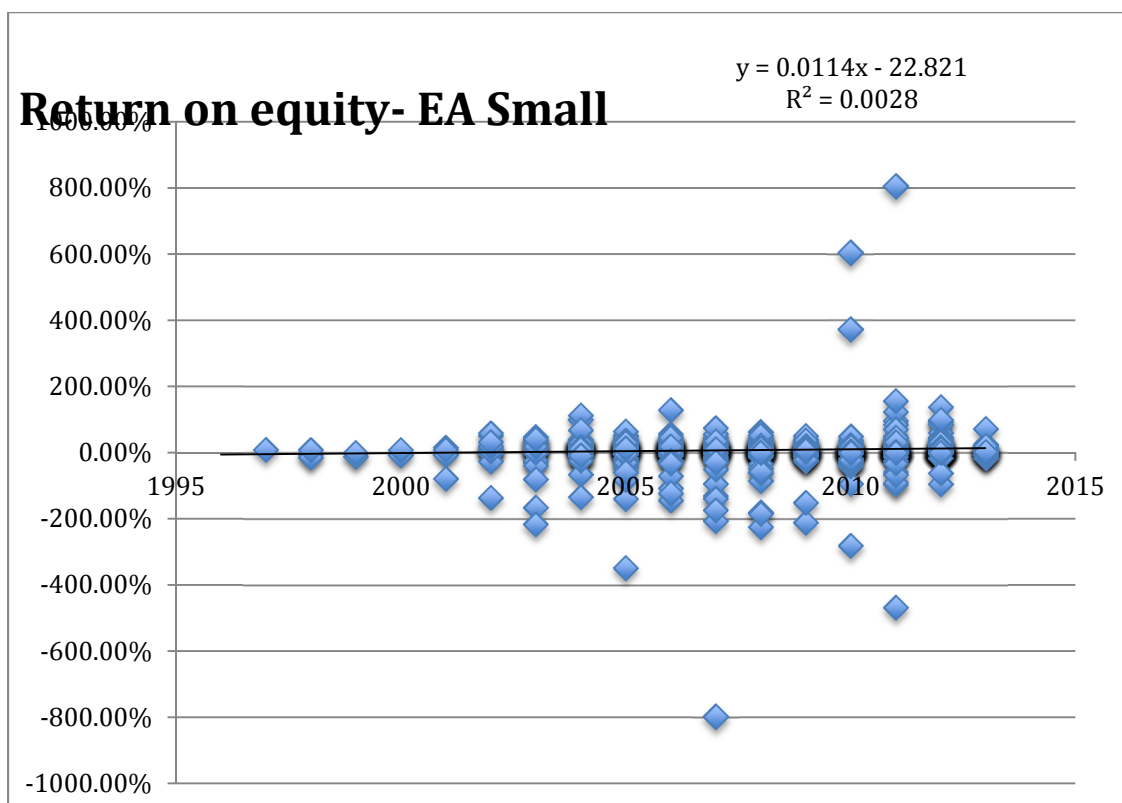
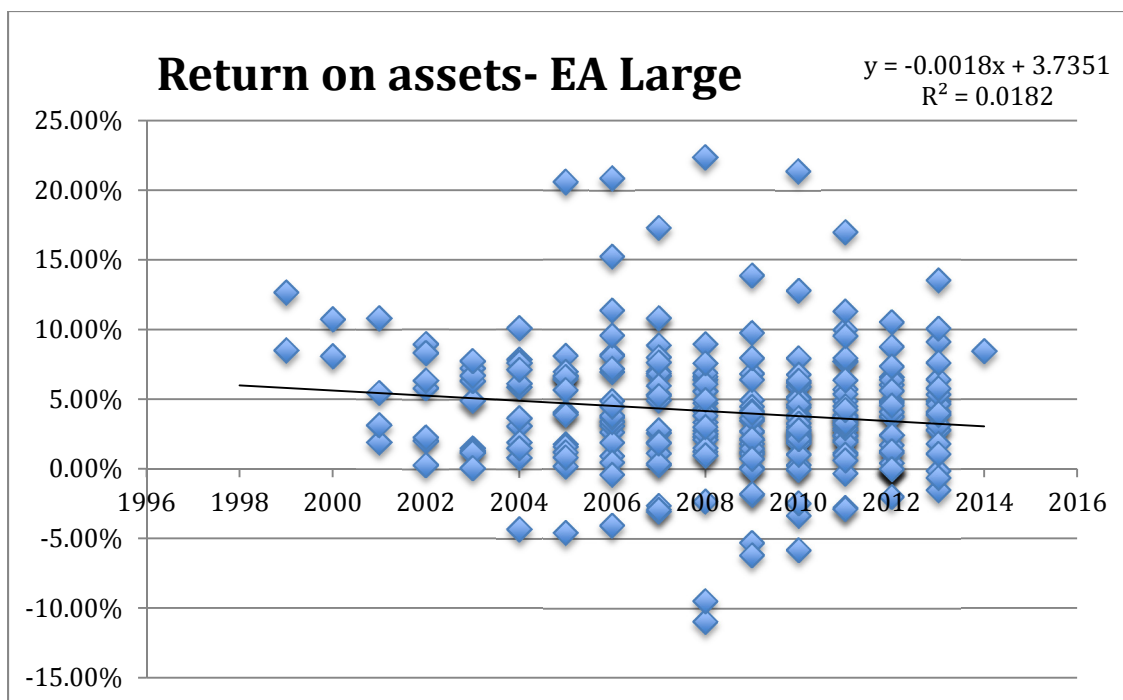


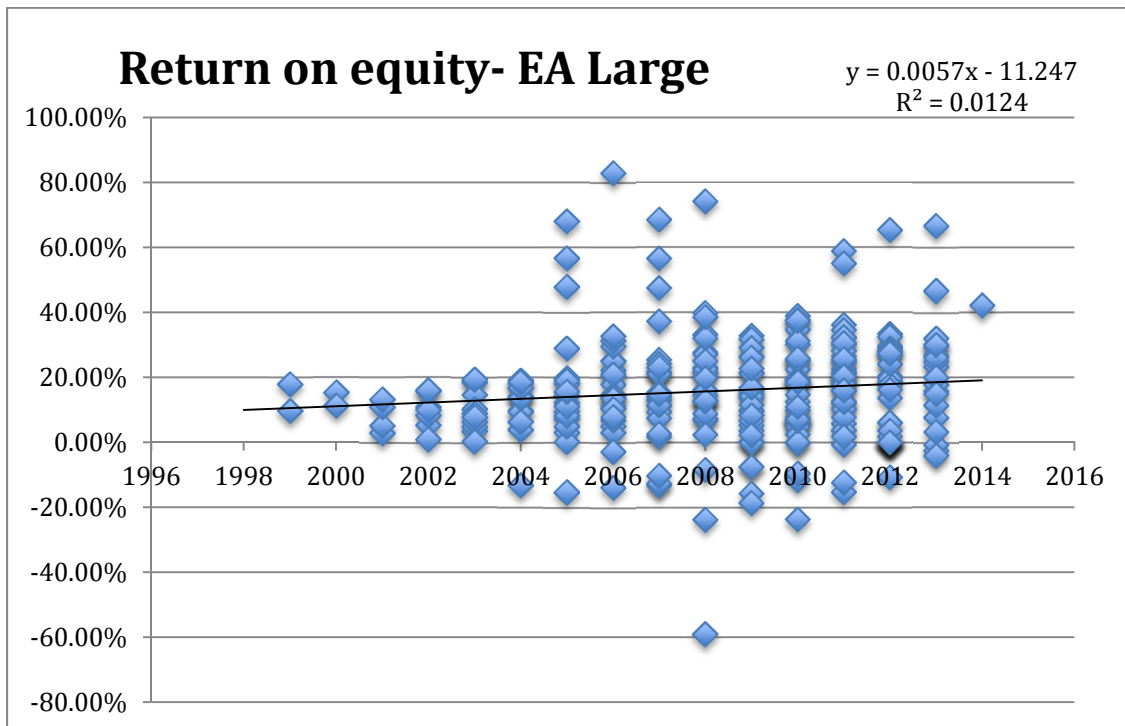
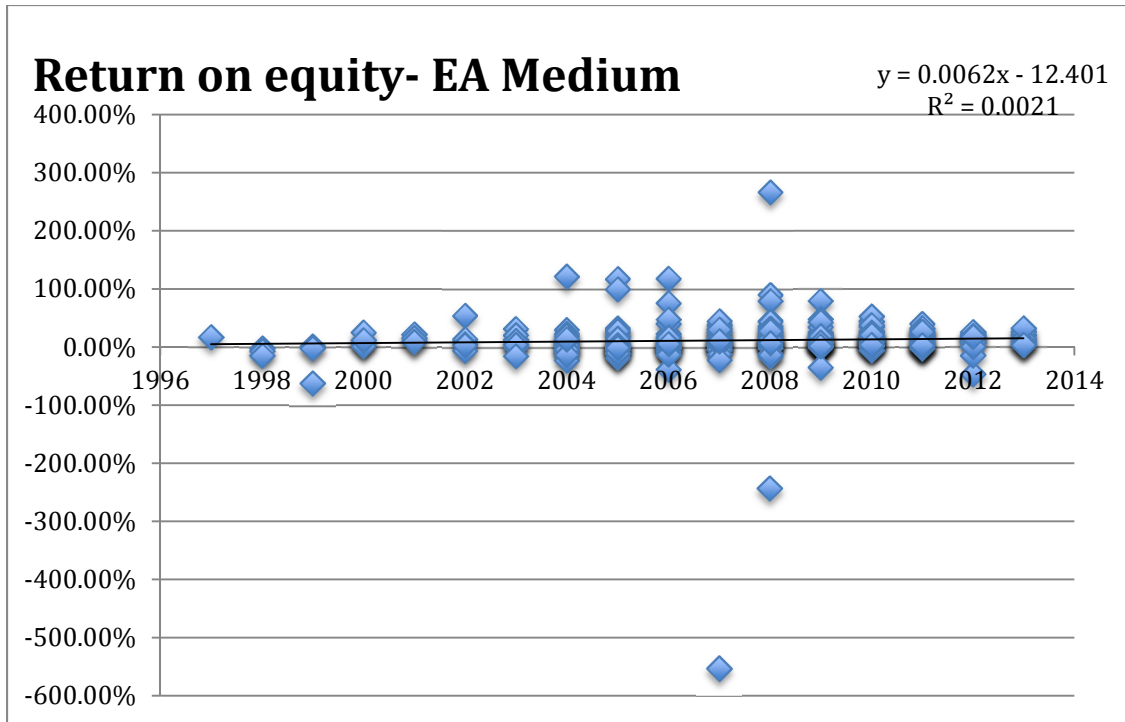




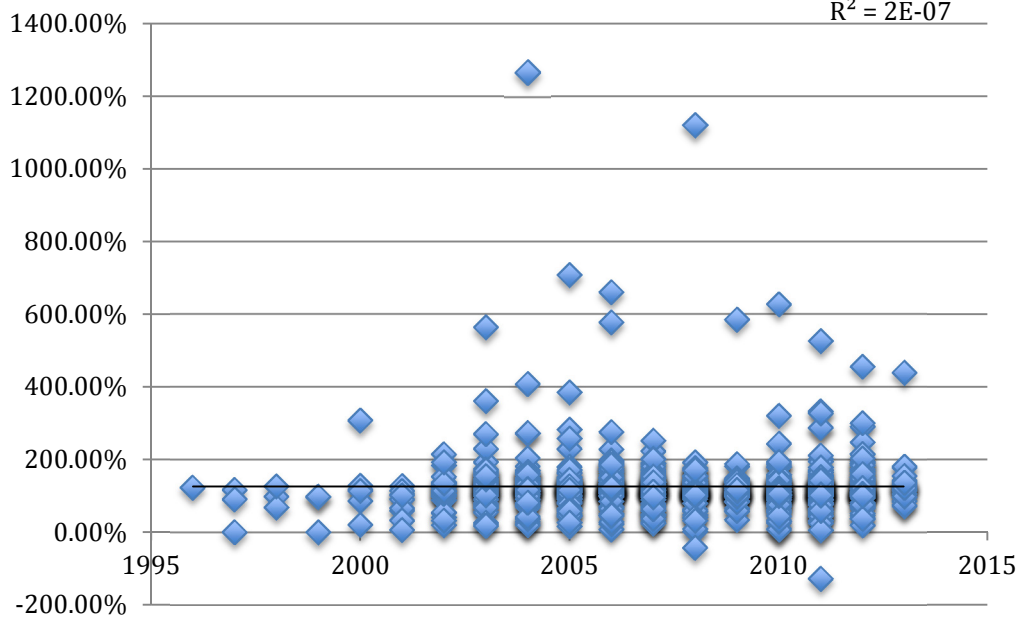




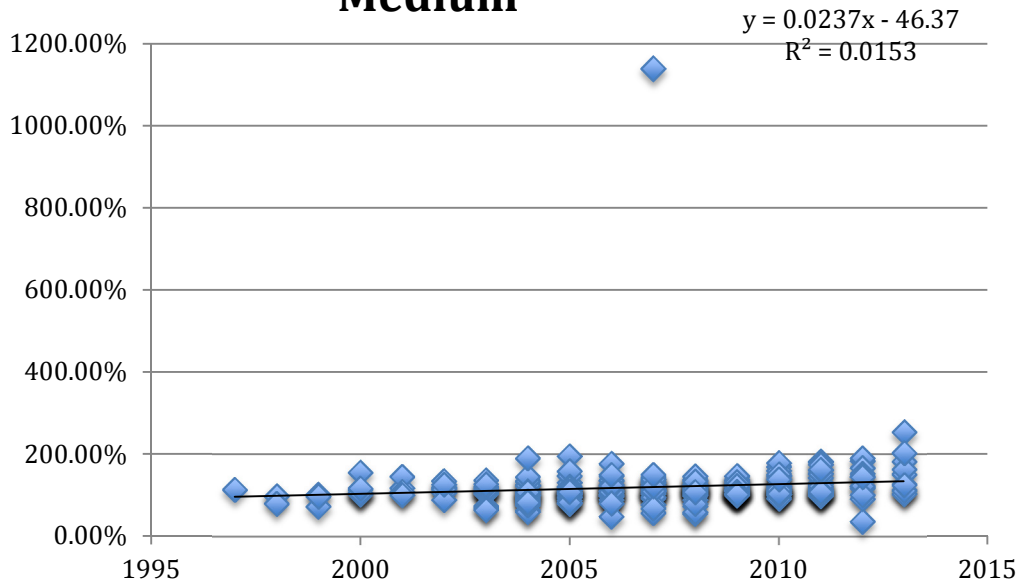


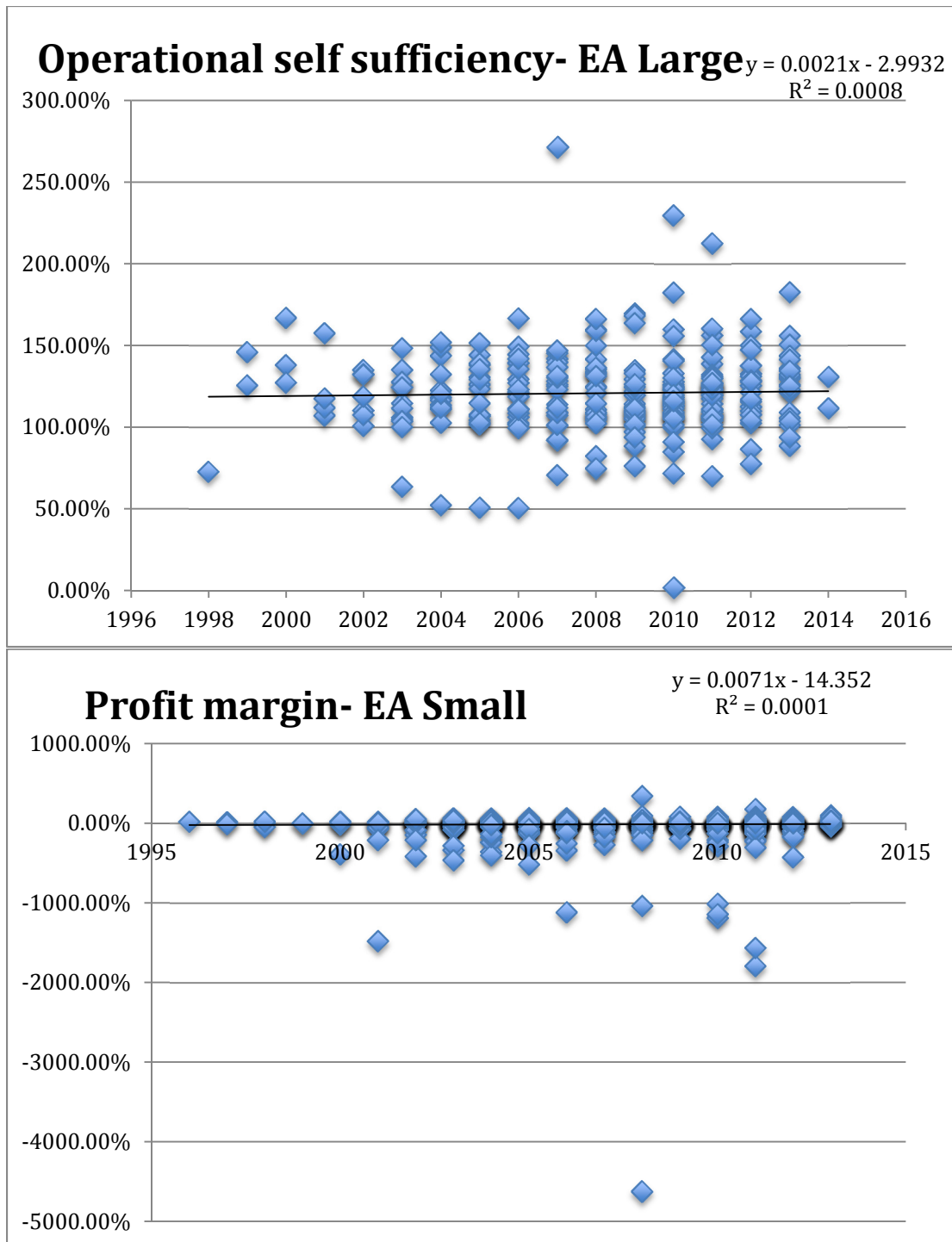


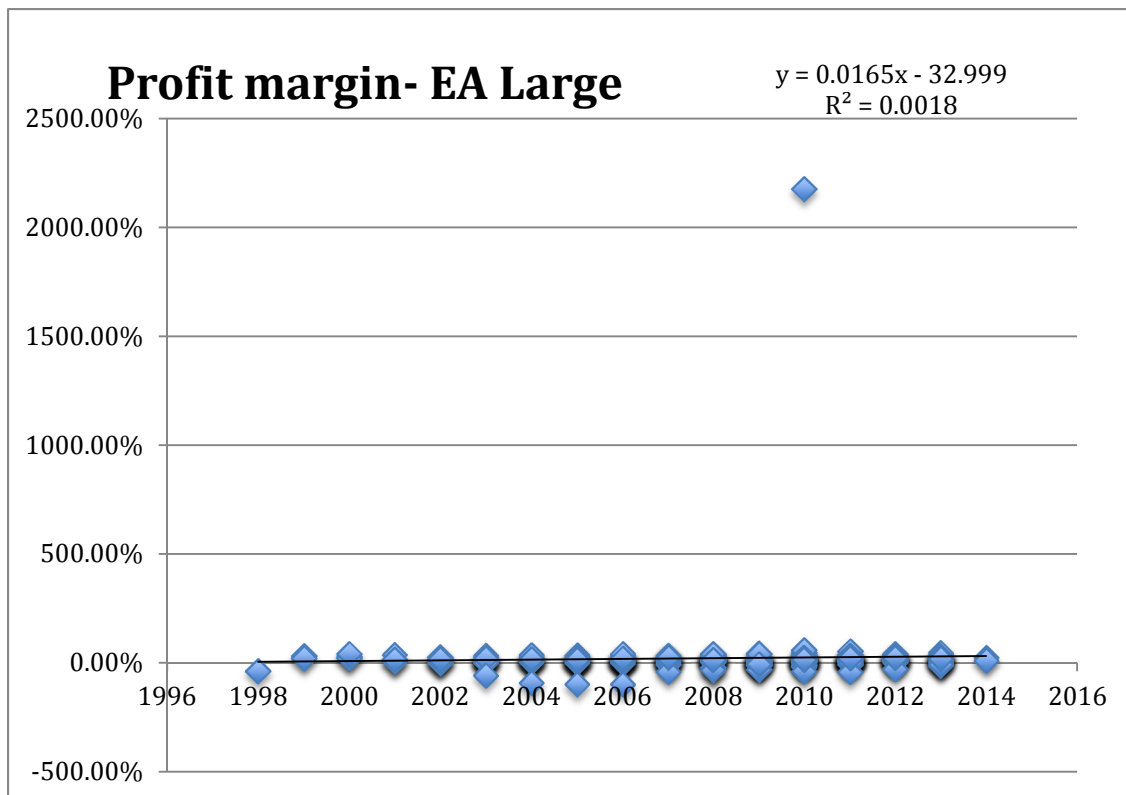
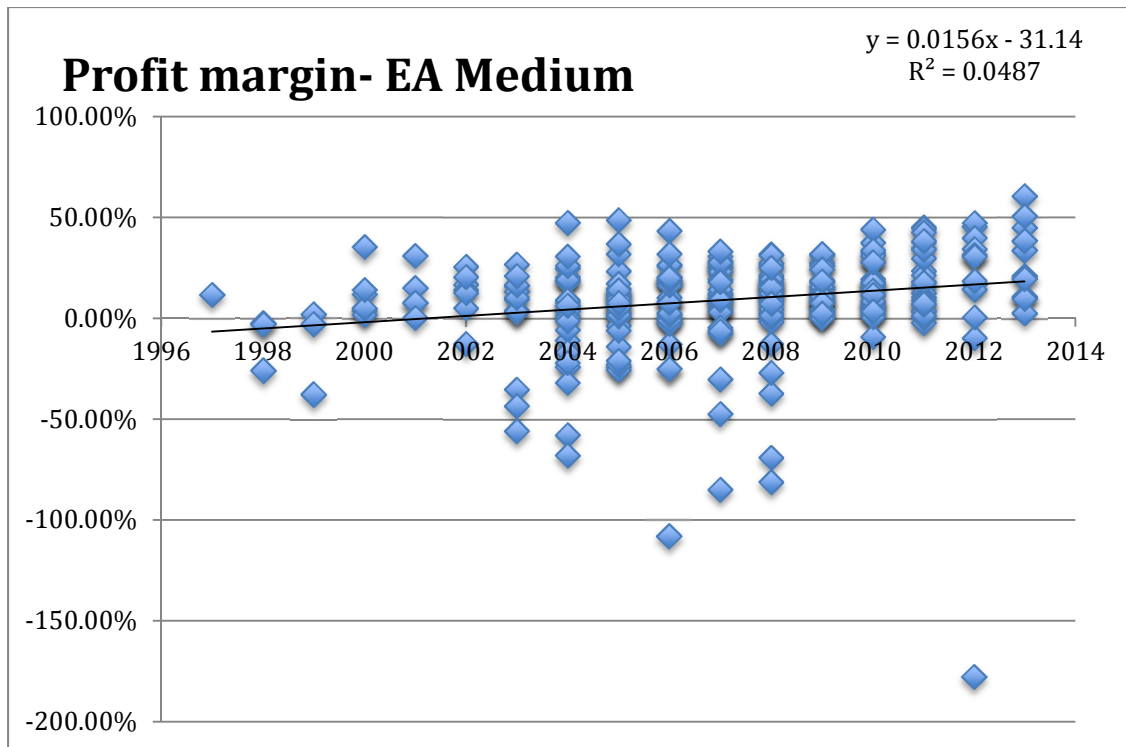
Operational self sufficiency- EA Small



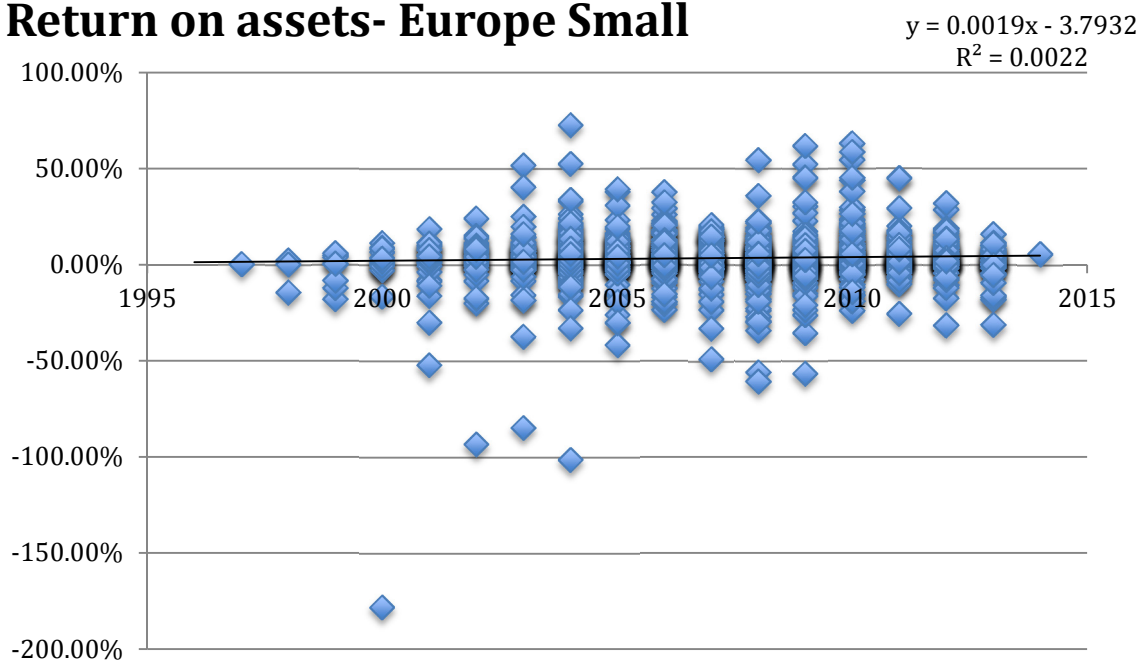
Operational self sufficiency- EA Medium



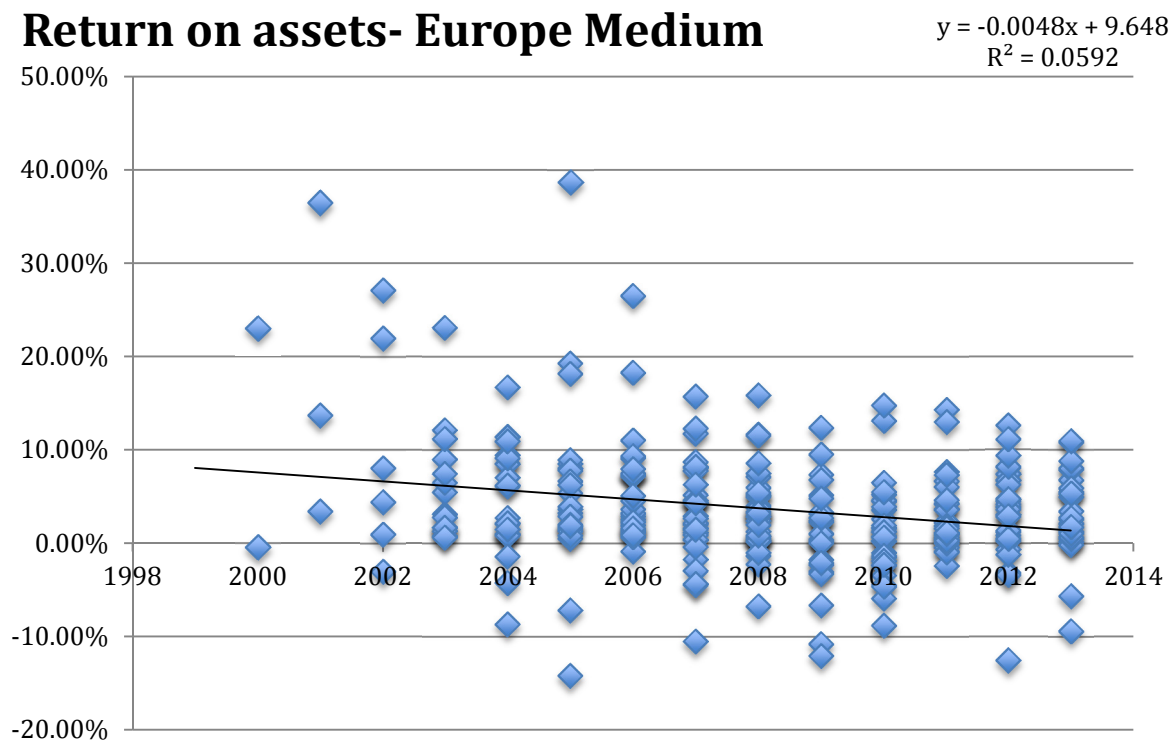


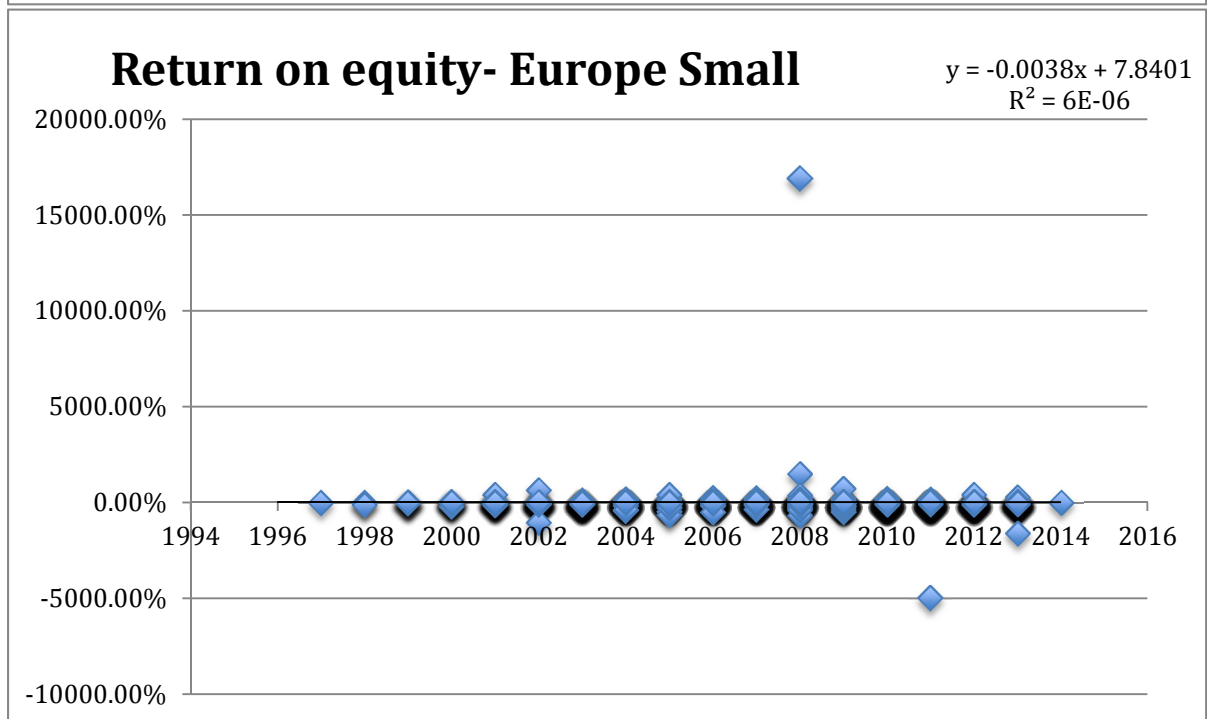
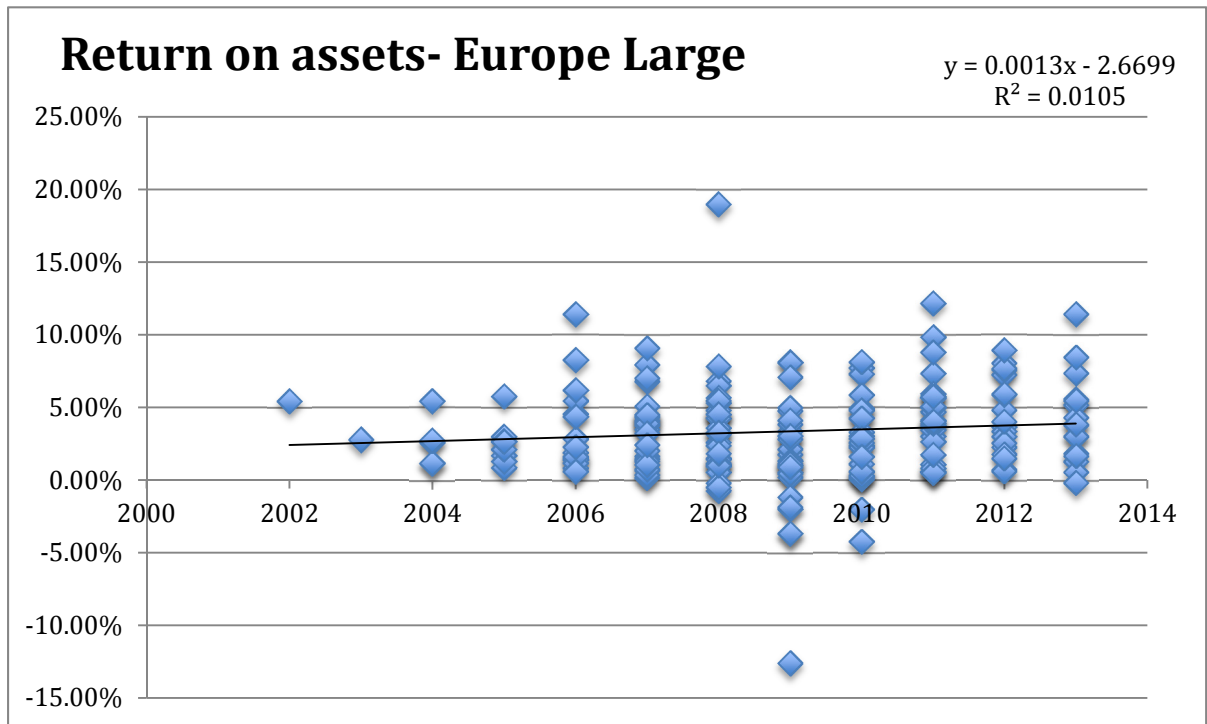


Return on assets- Europe Small

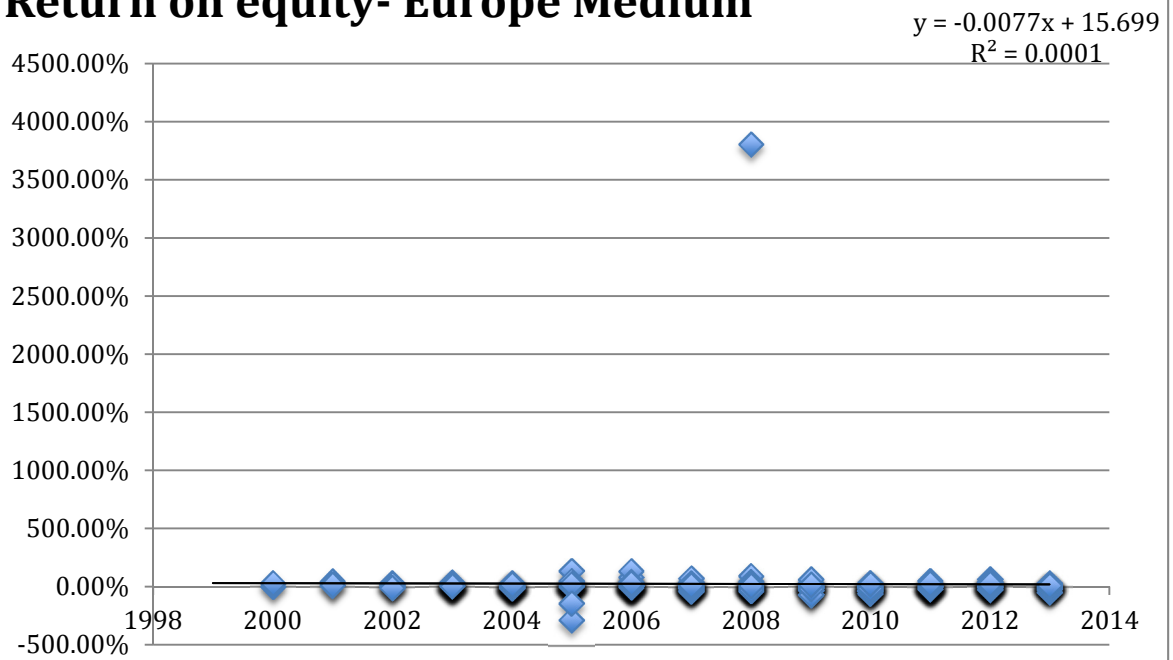


Return on assets- Europe Medium

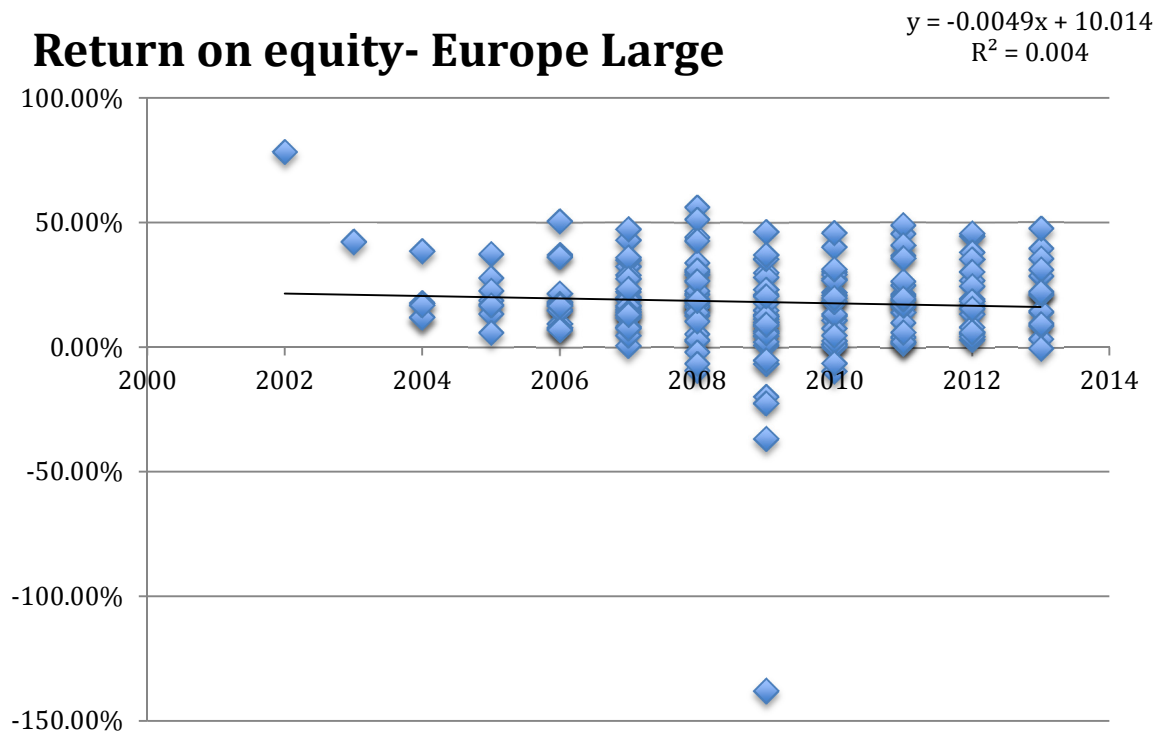




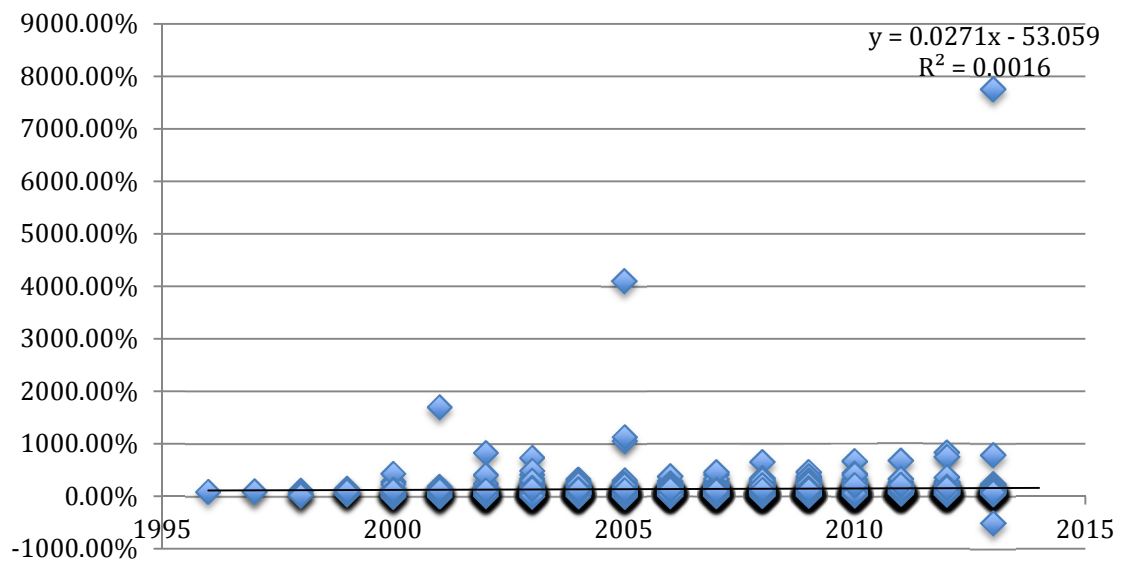
Return on equity- Europe Medium



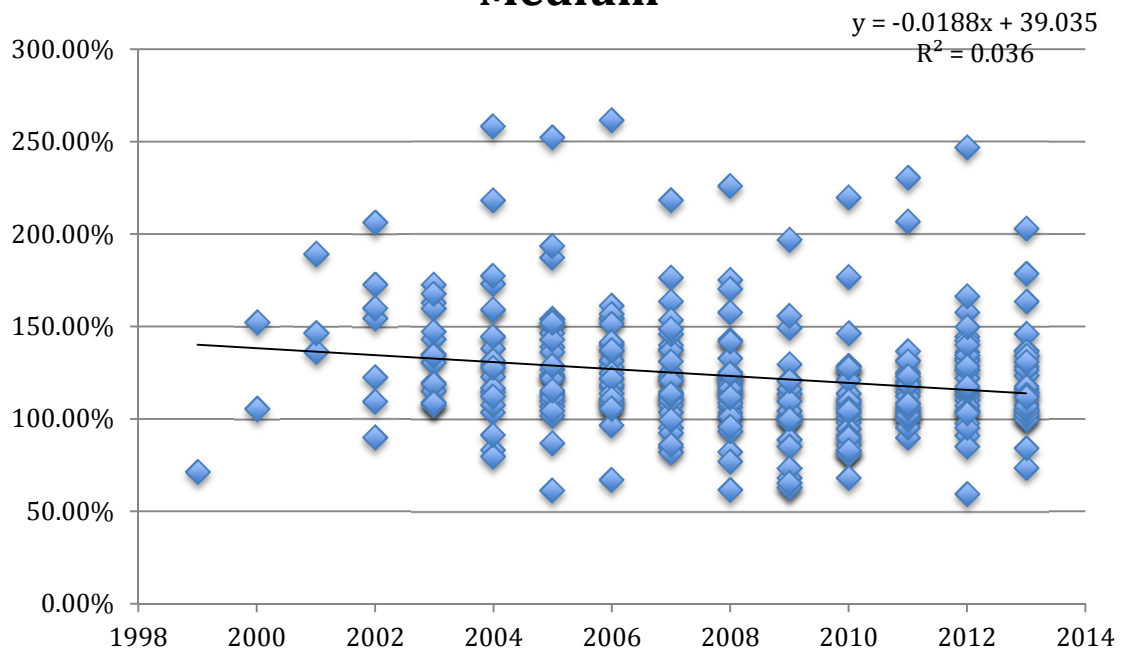
Return on equity- Europe Large



Operational self sufficiency- Europe Small



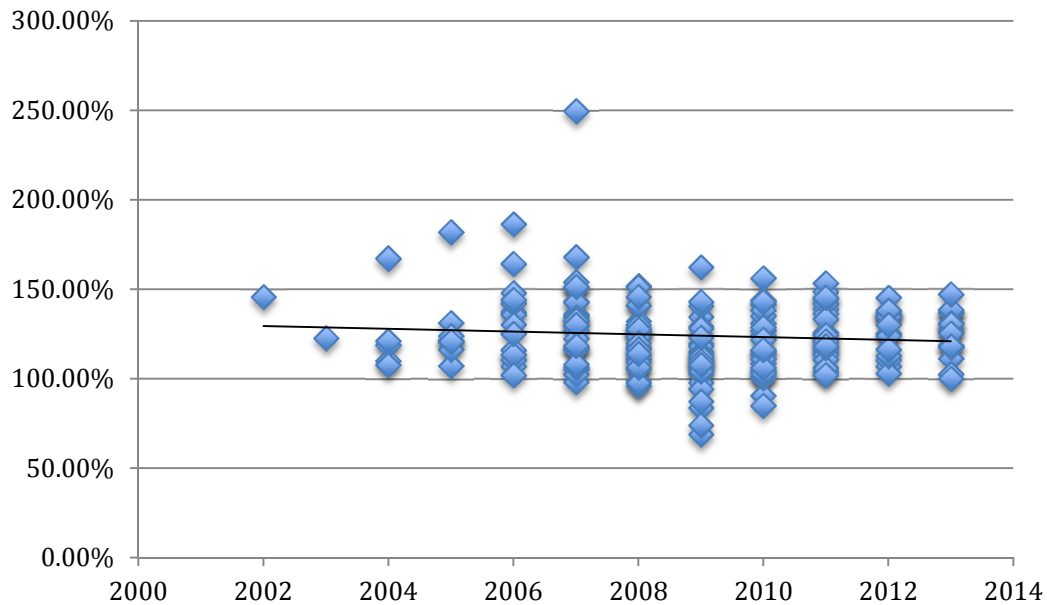
Operational self sufficiency- Europe Medium



Operational self sufficiency- Europe Large

$$y = -0.0077x + 16.696$$

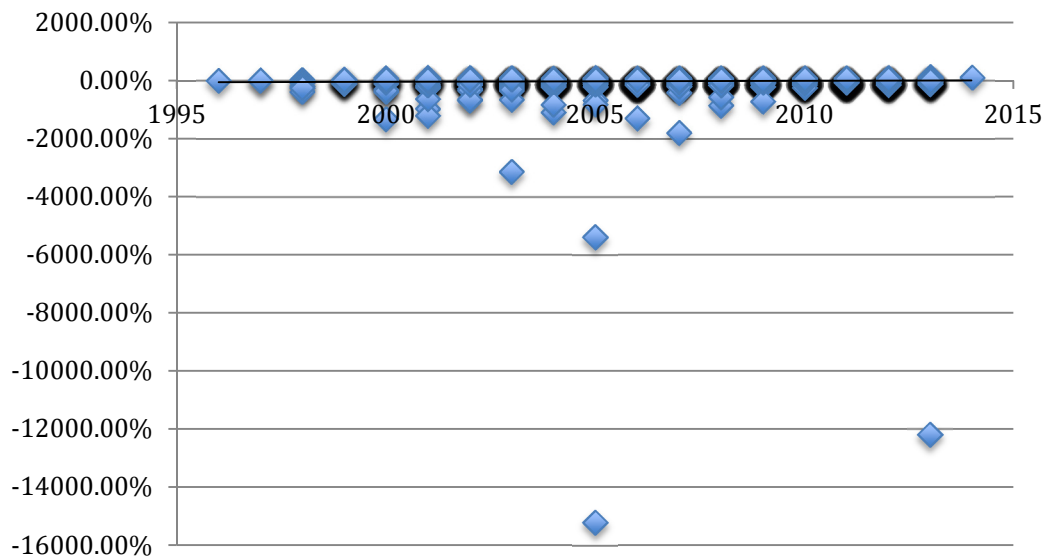
$$R^2 = 0.0087$$

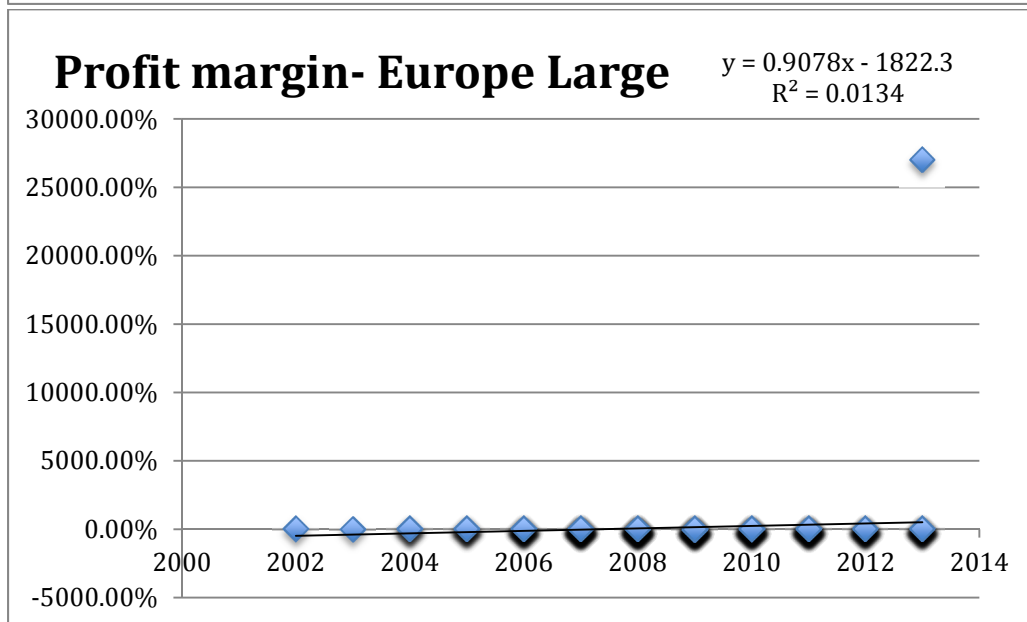
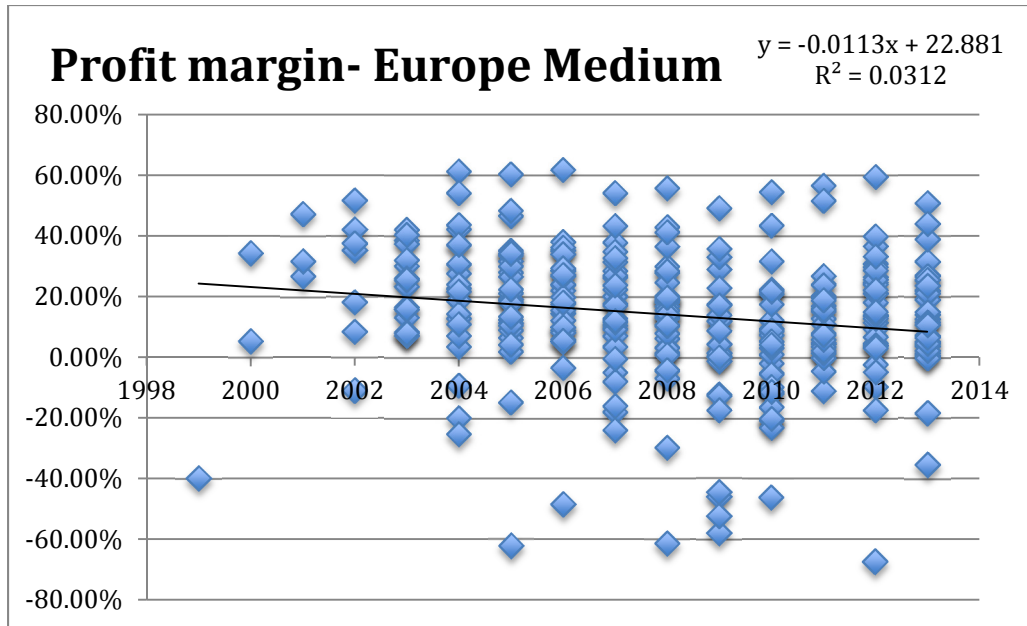


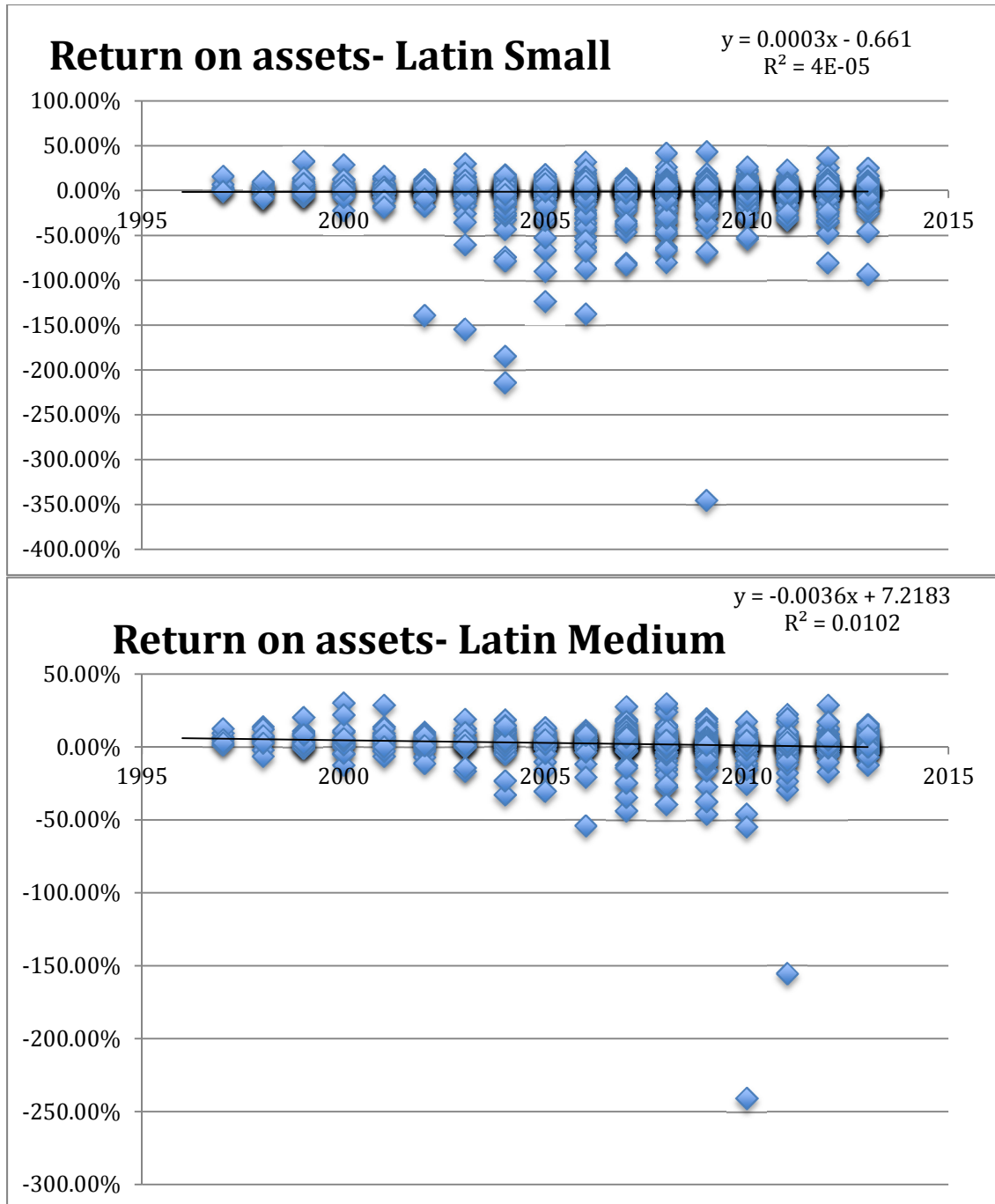
Profit margin- Europe Small

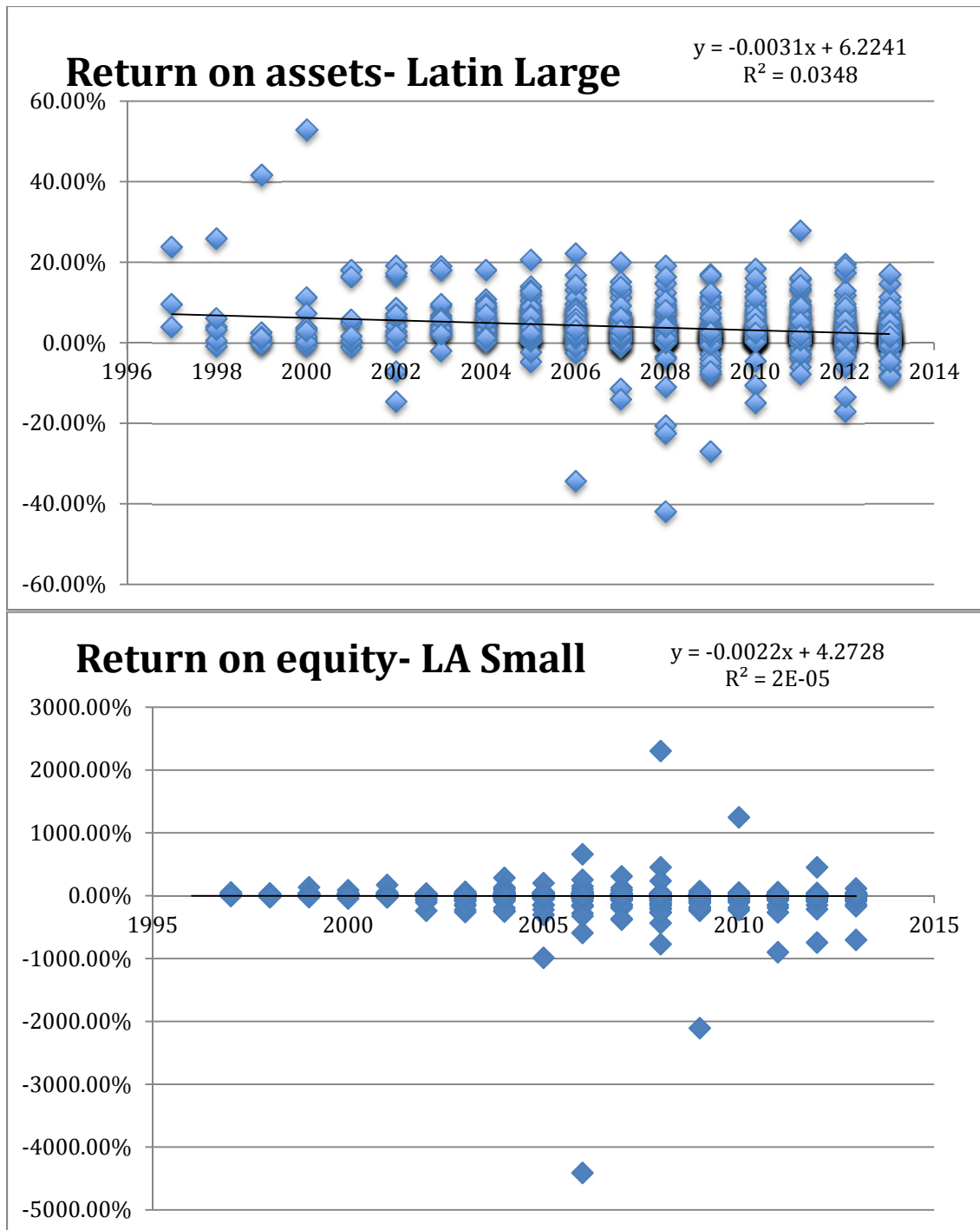
$$y = 0.0311x - 62.671$$

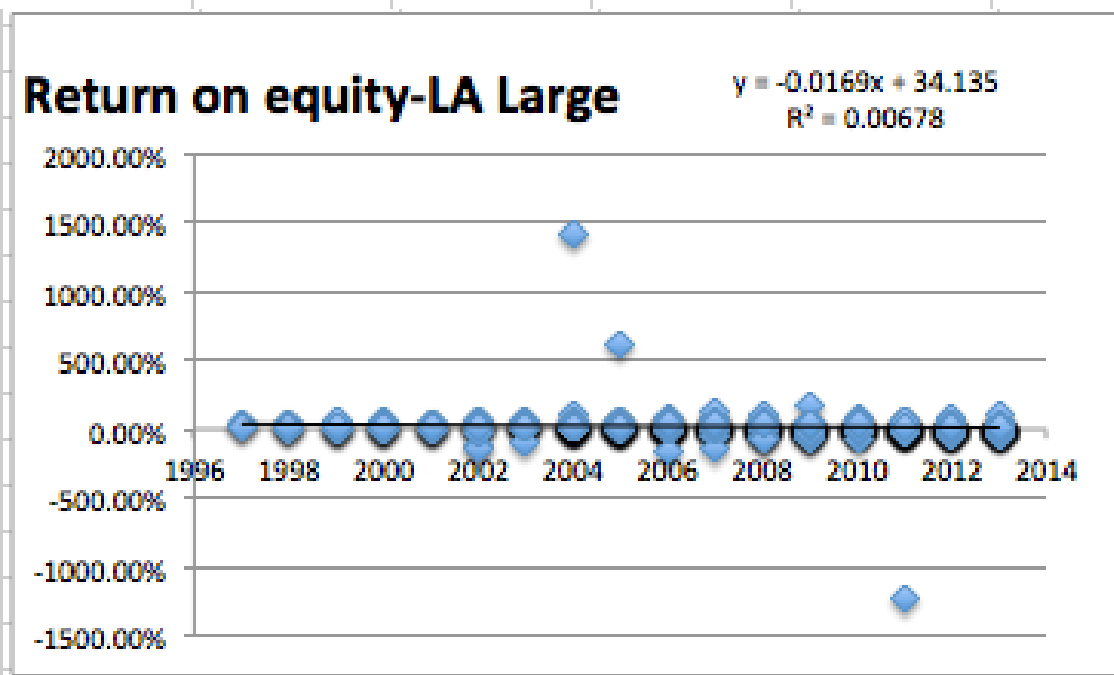
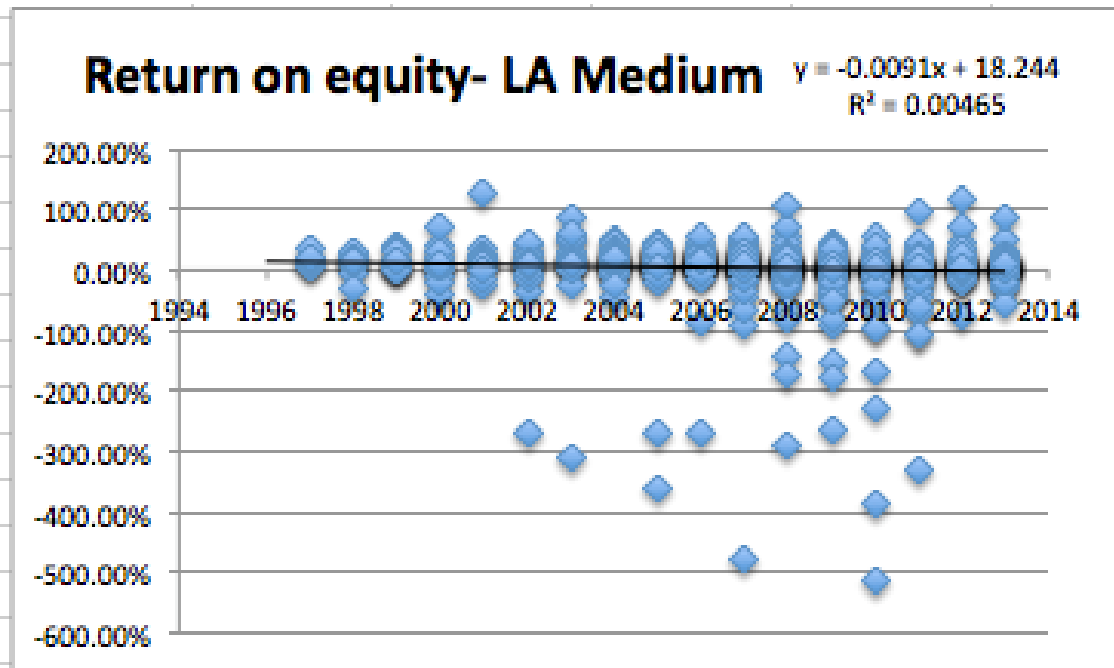
$$R^2 = 0.0004$$







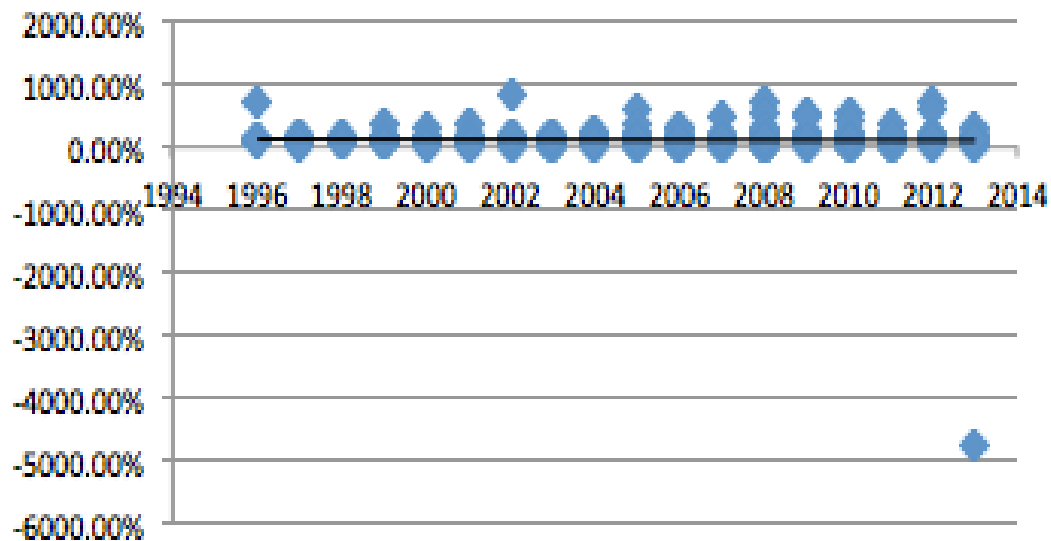




Operational self sufficiency- LA Small

$$y = -0.0138x + 28.752$$

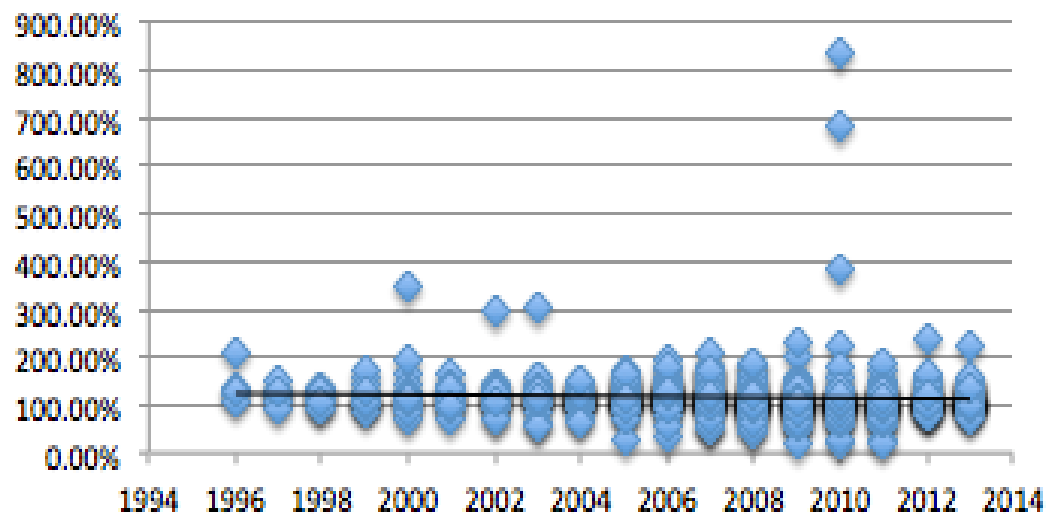
$$R^2 = 0.0017$$

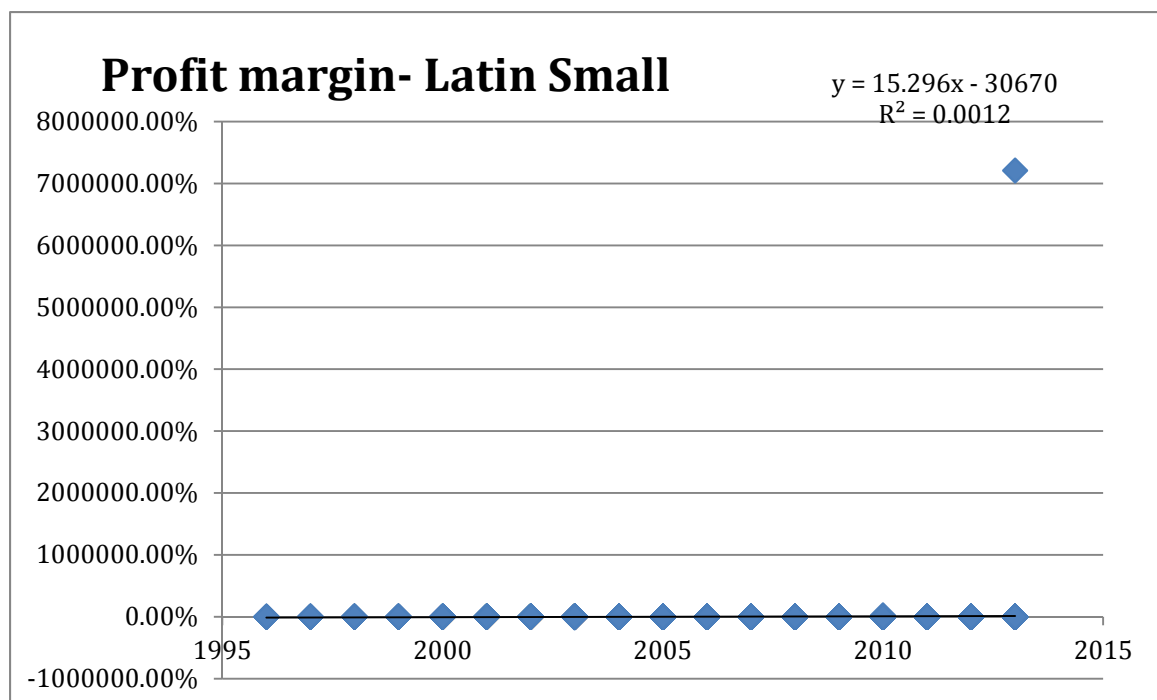
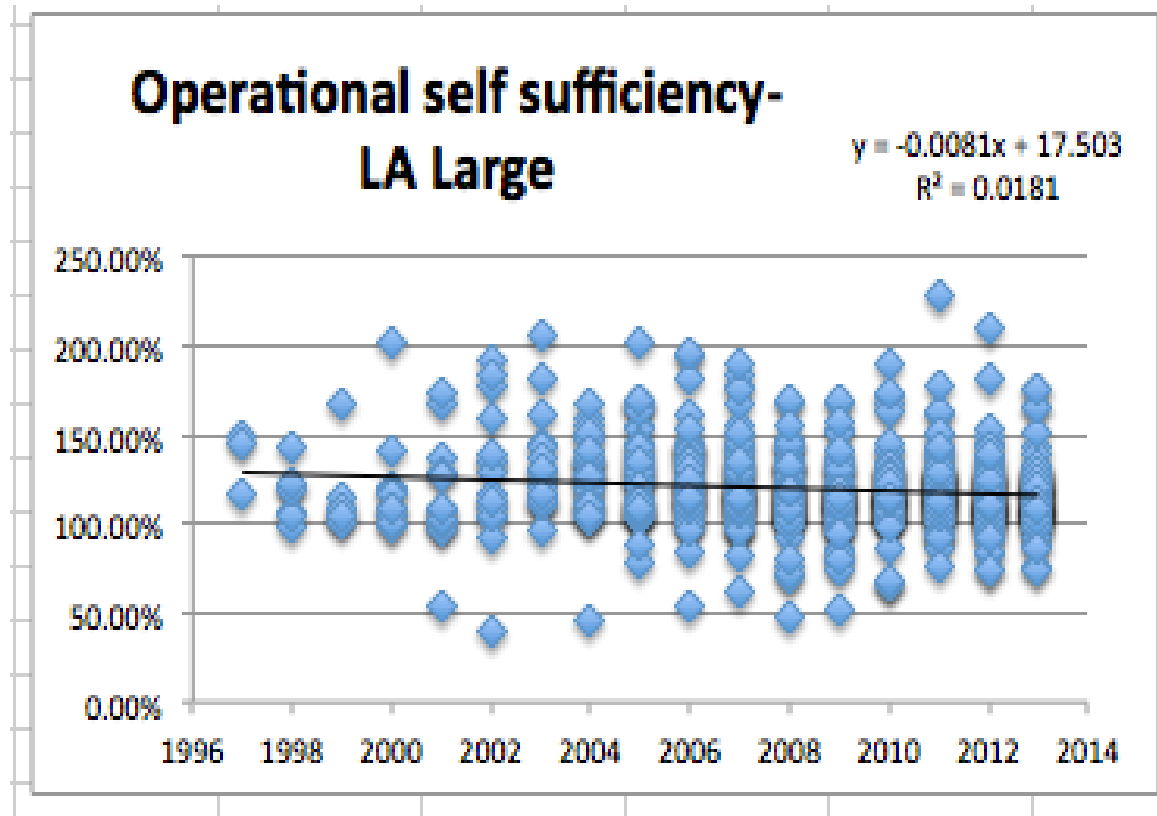


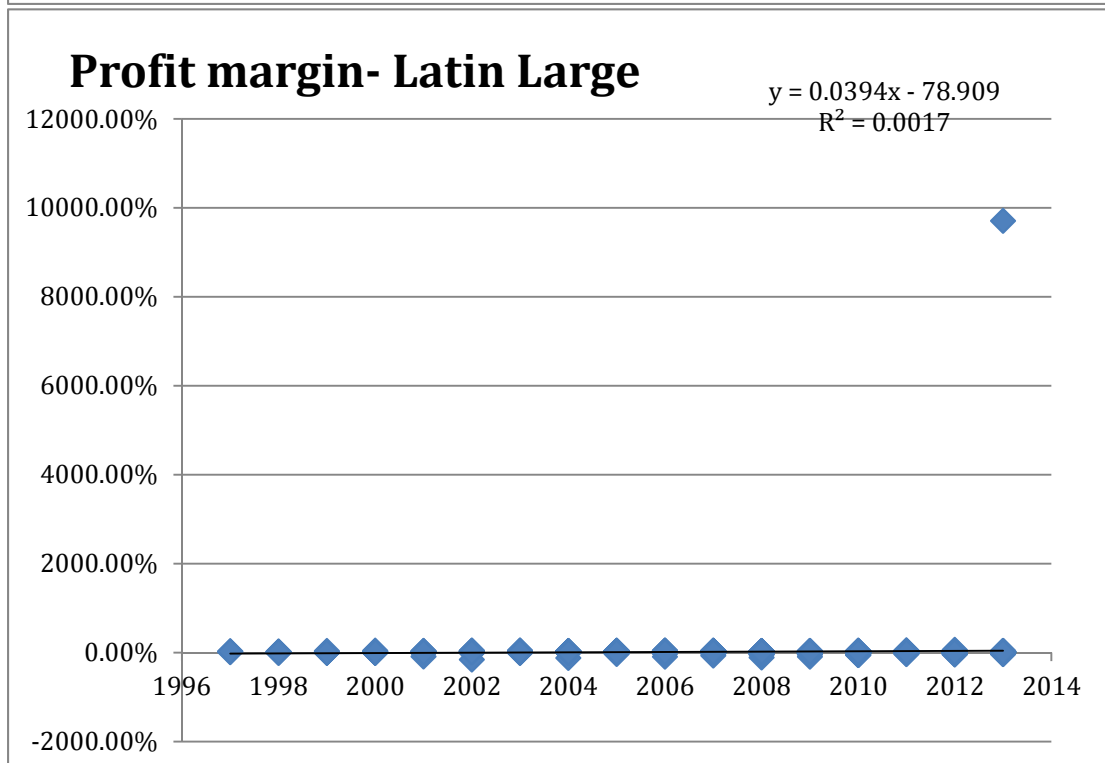
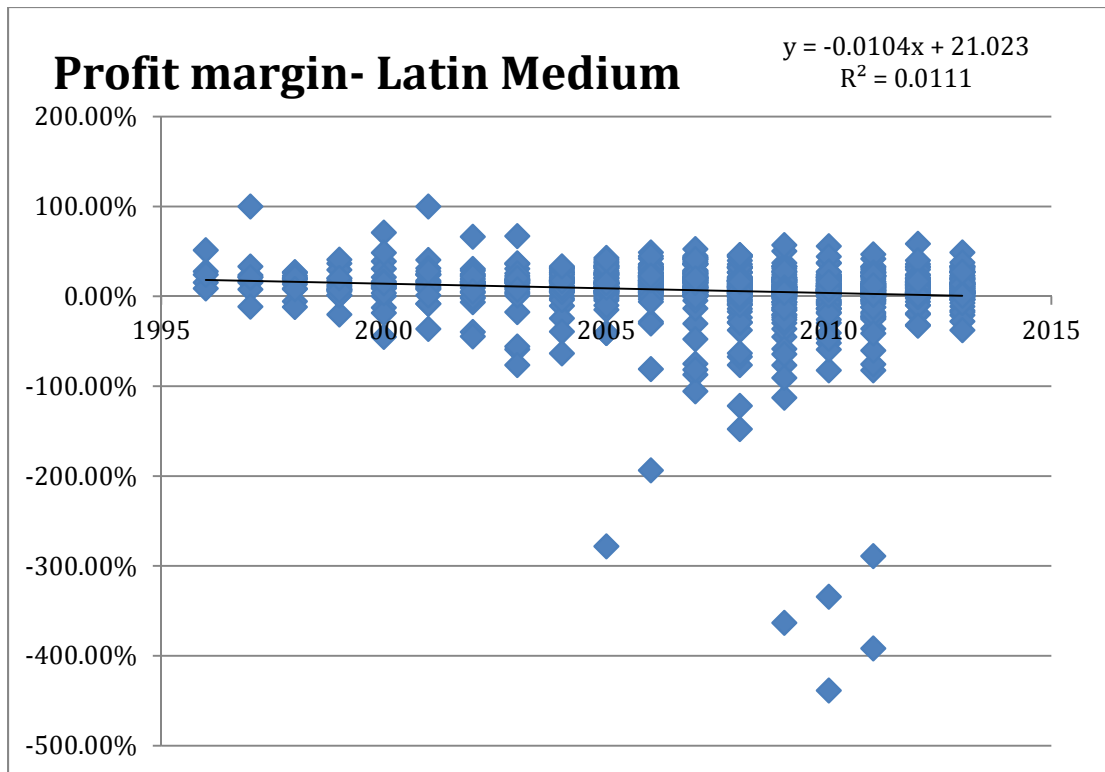
Operational self sufficiency- LA Medium

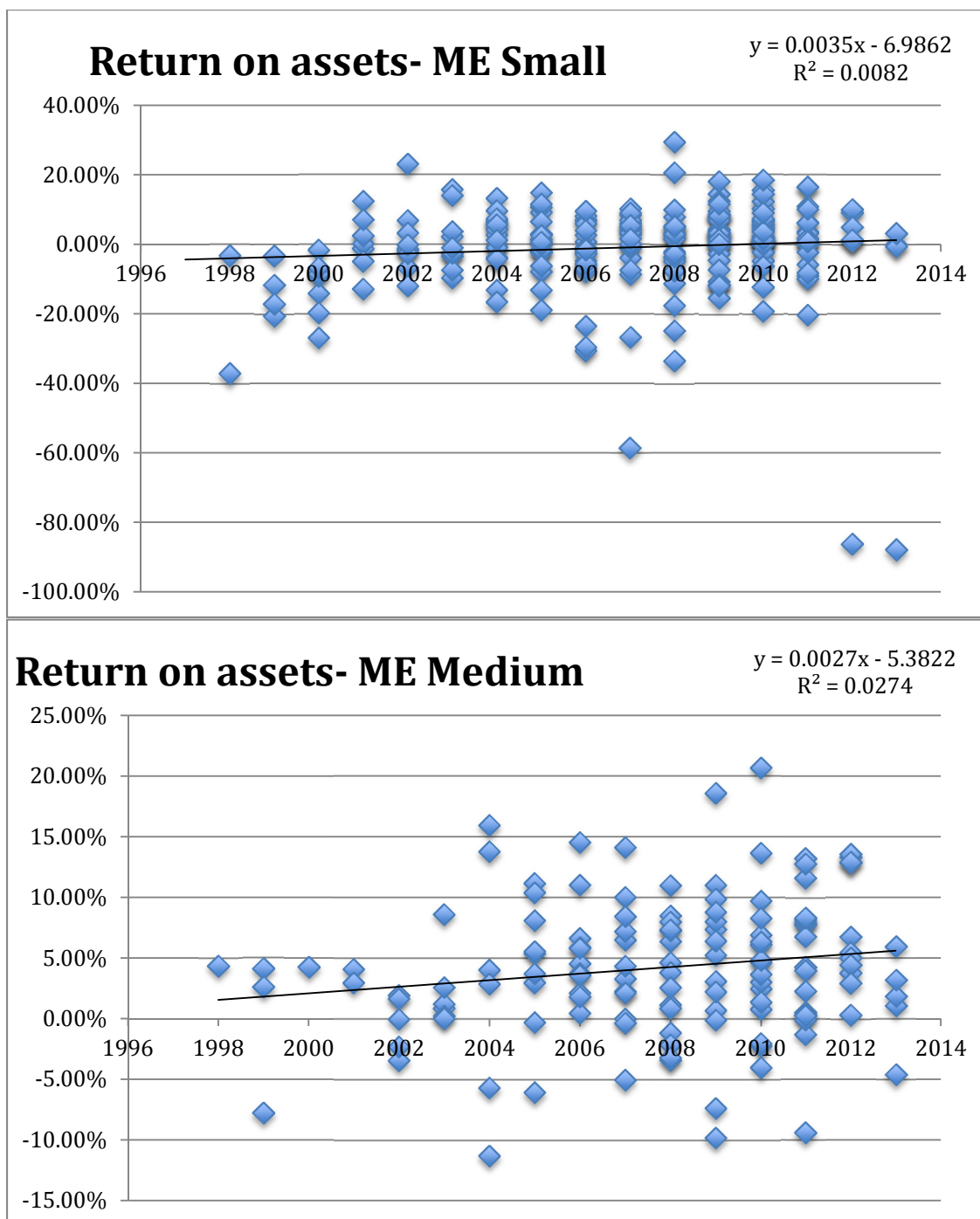
$$y = -0.0071x + 15.454$$

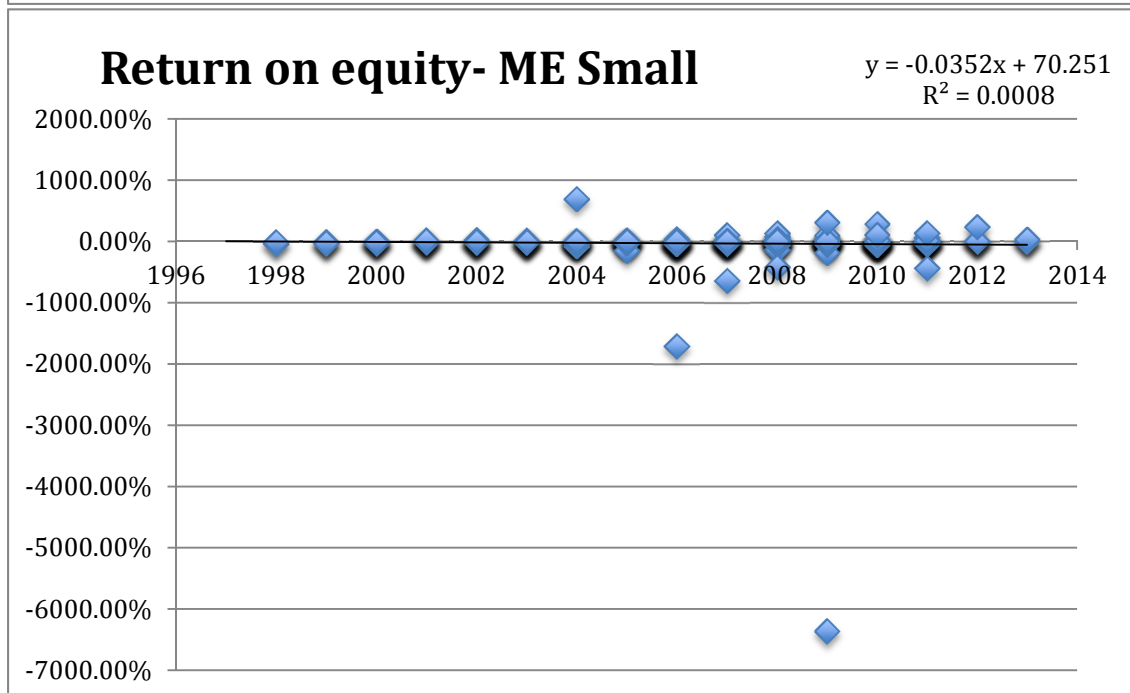
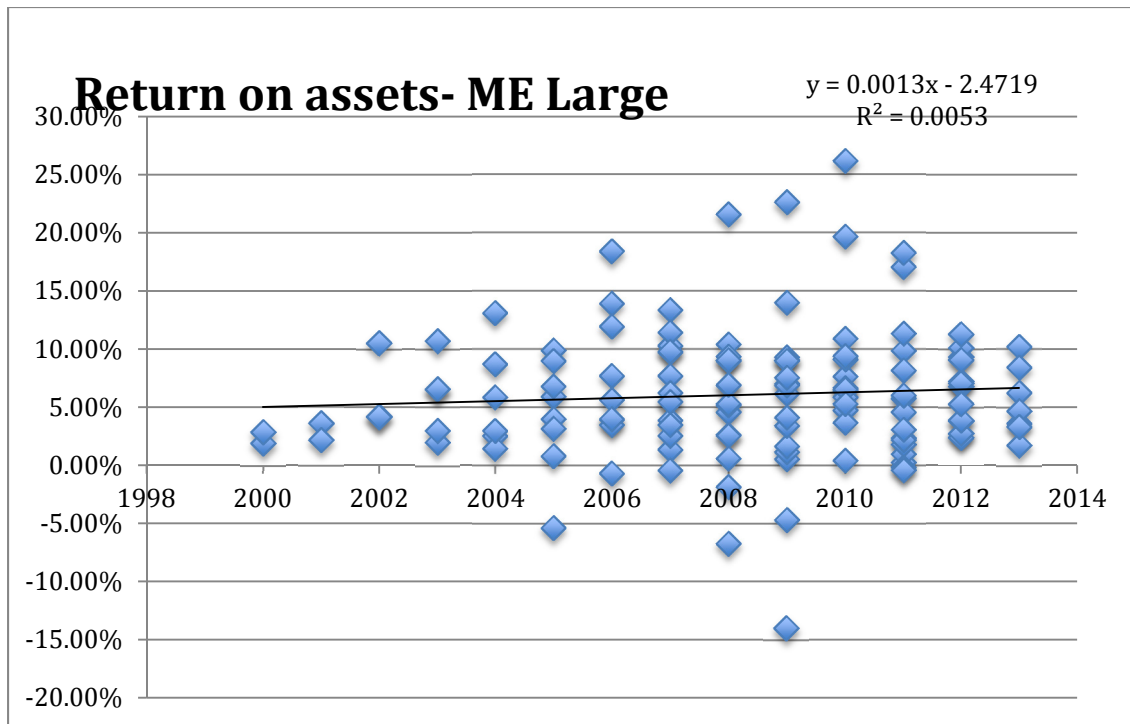
$$R^2 = 0.00408$$

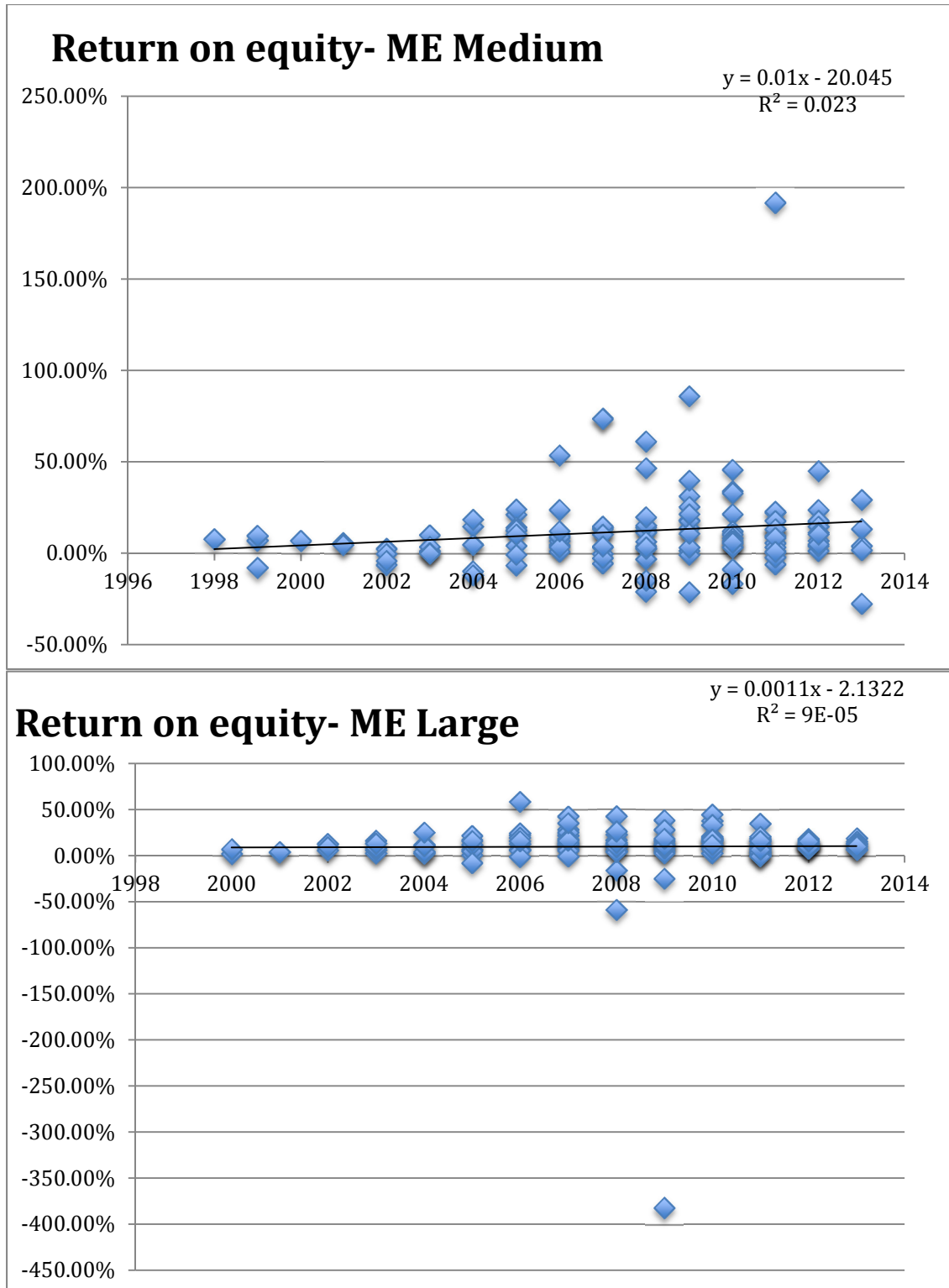




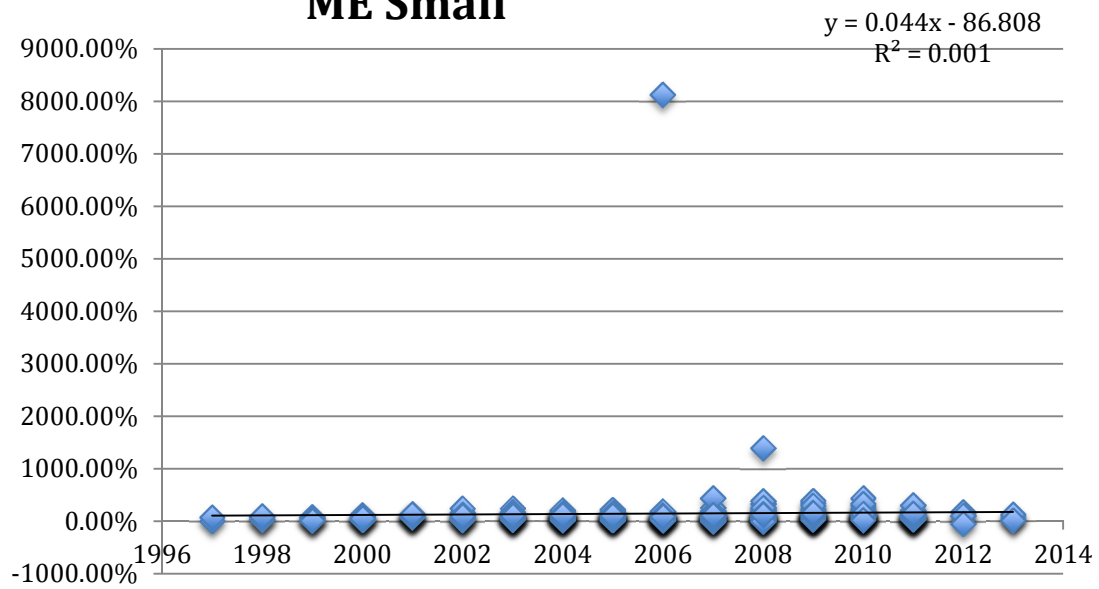




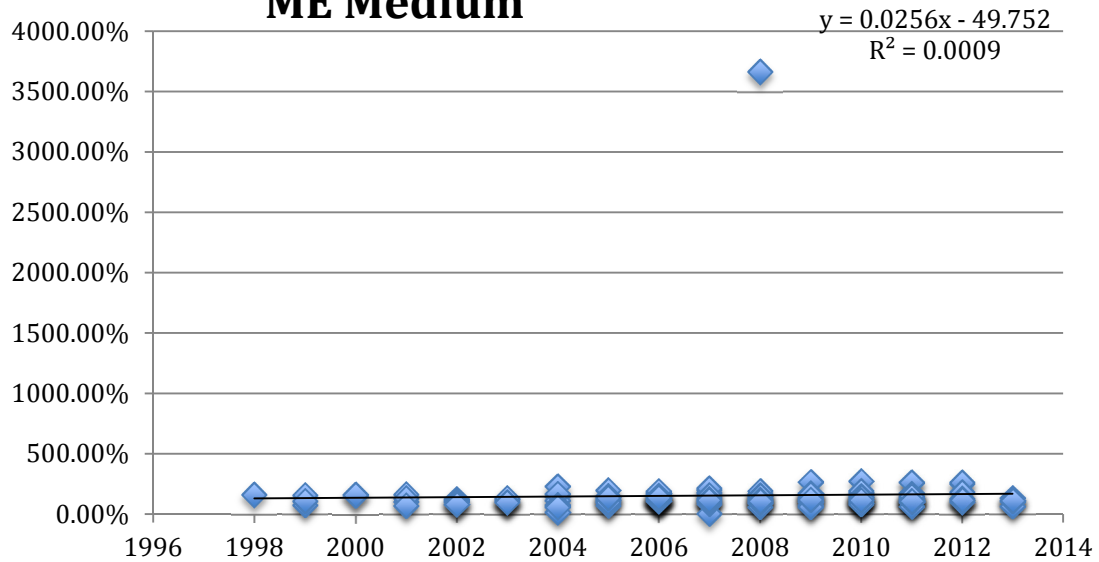


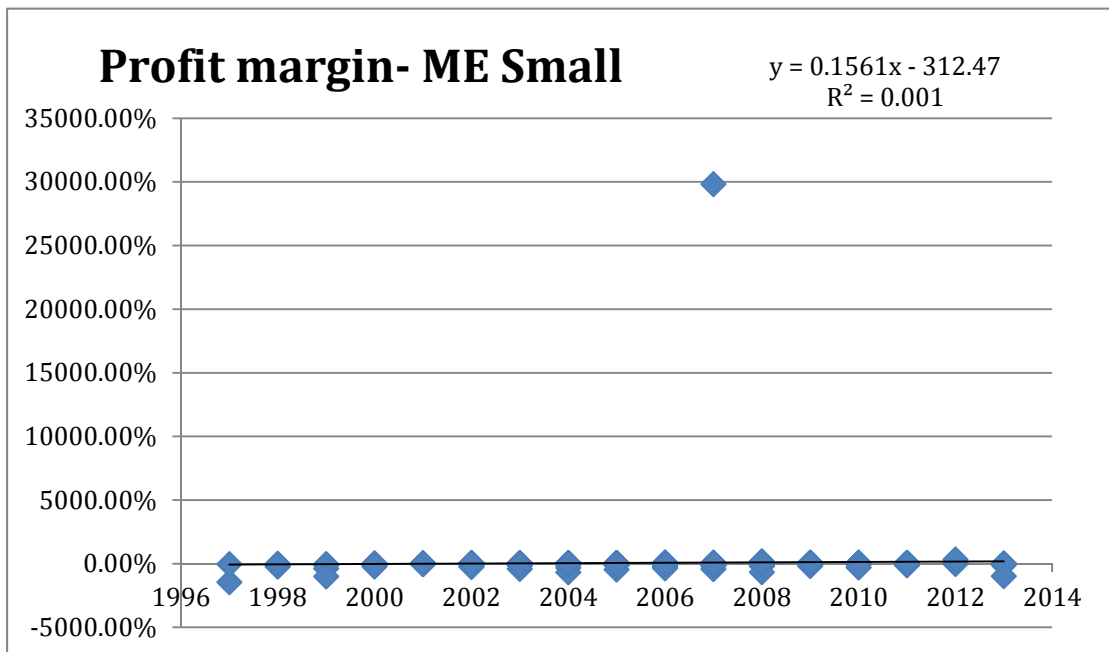
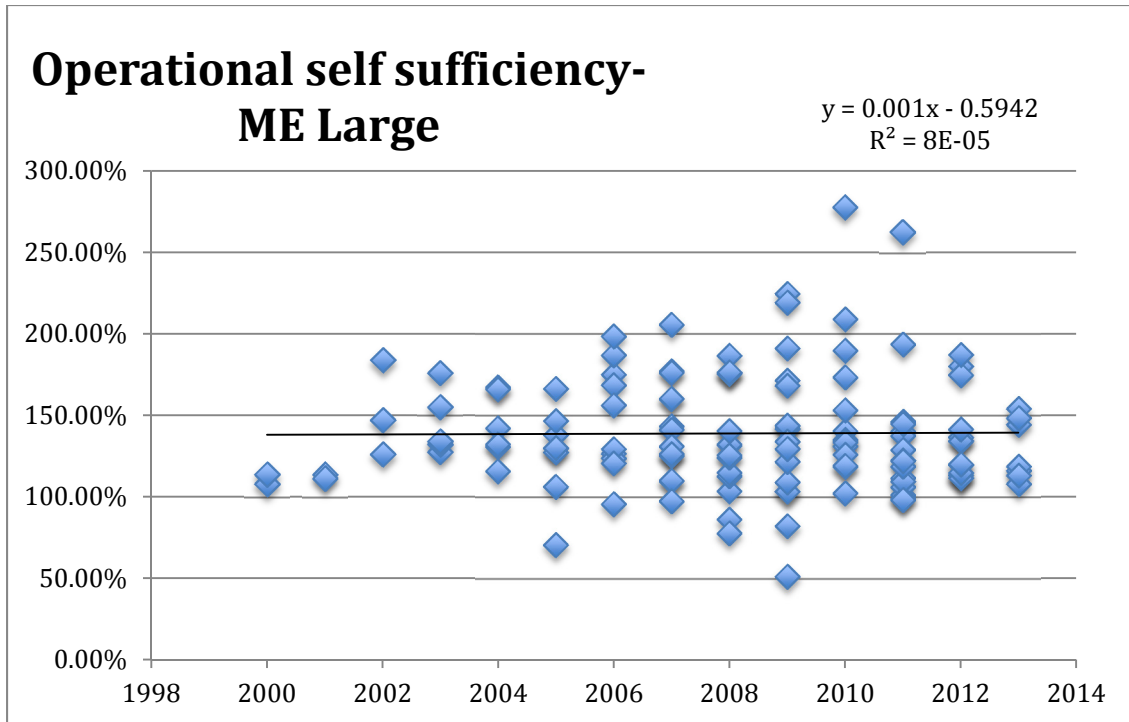


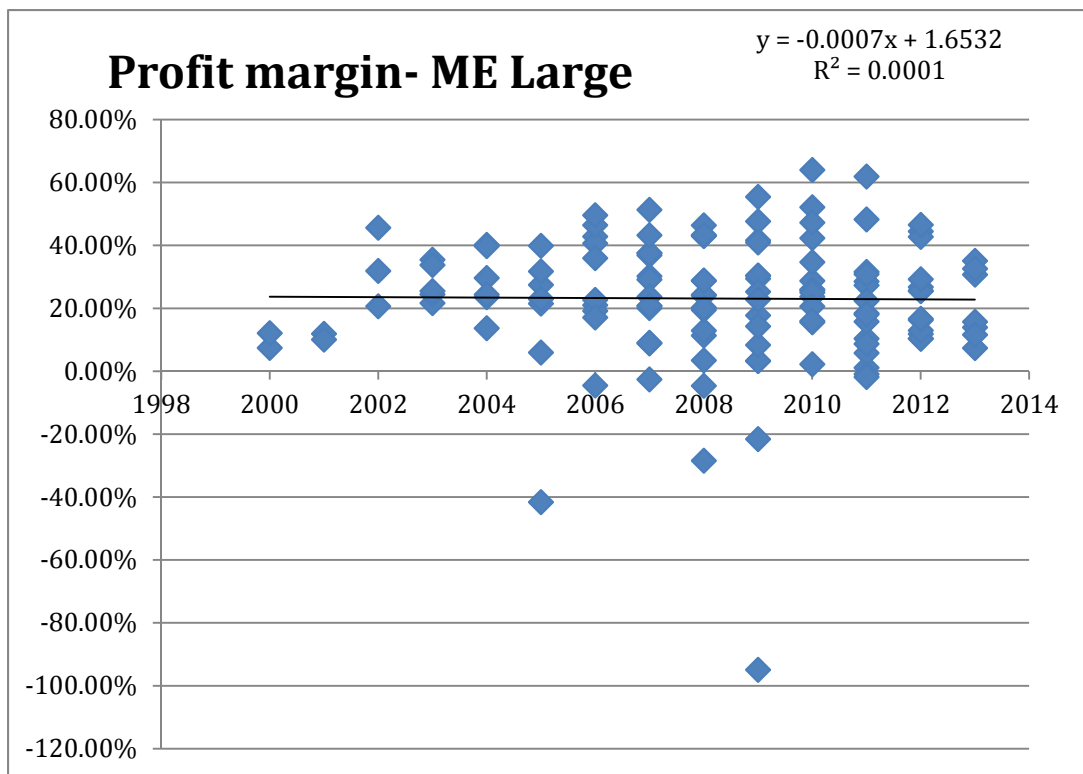
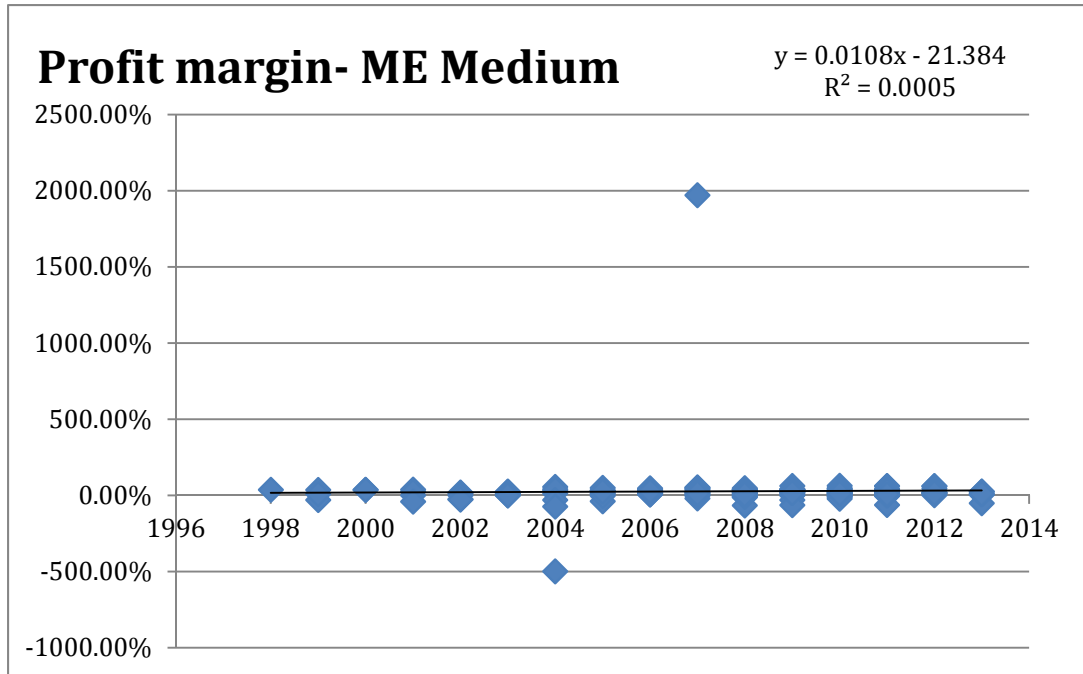
Operational self sufficiency- ME Small

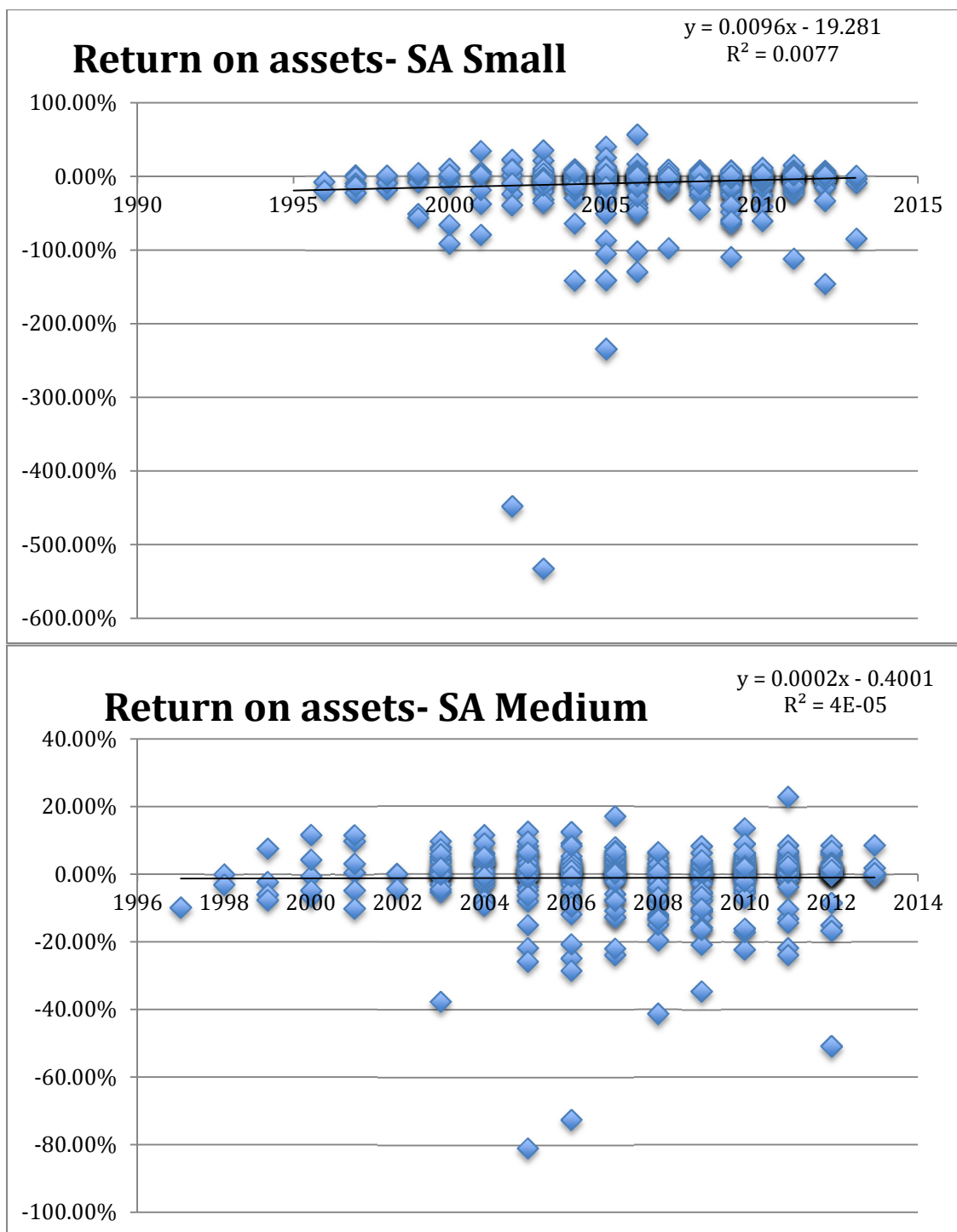


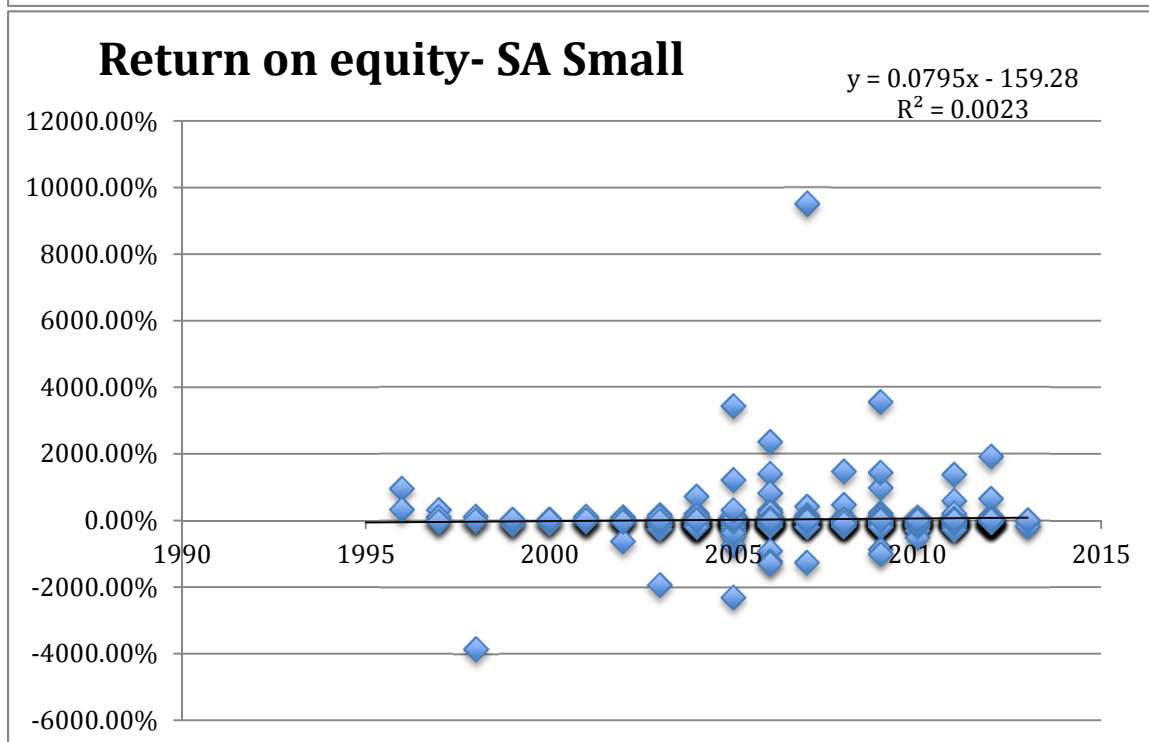
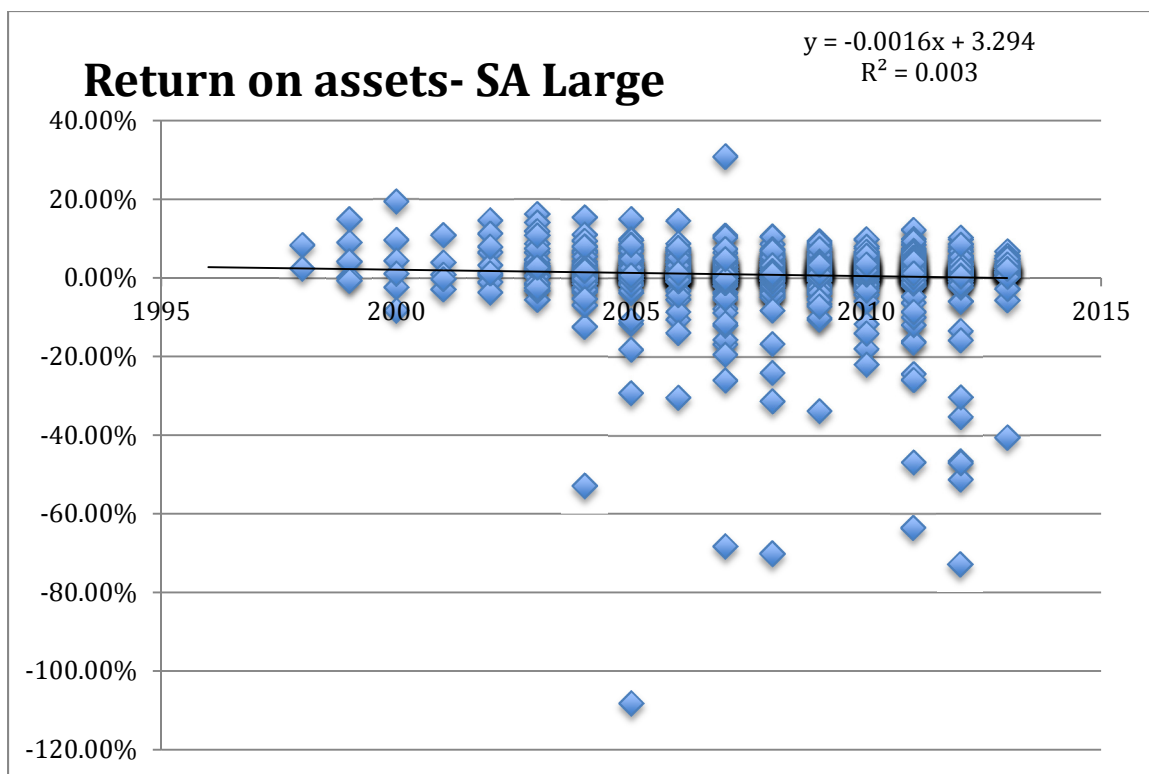
Operational self sufficiency- ME Medium

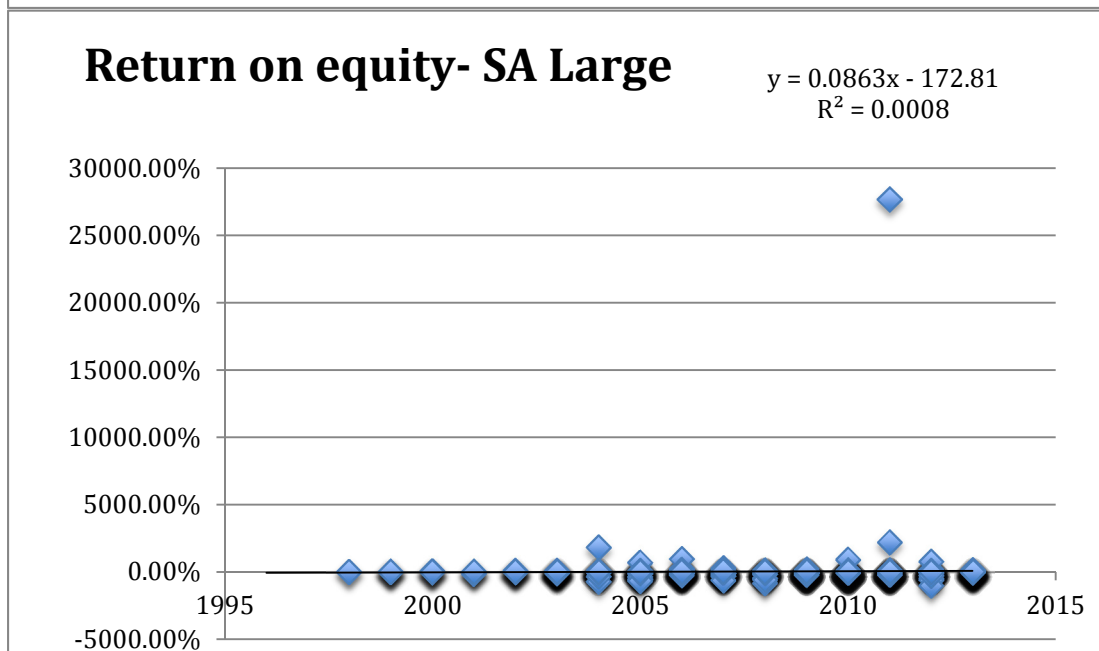
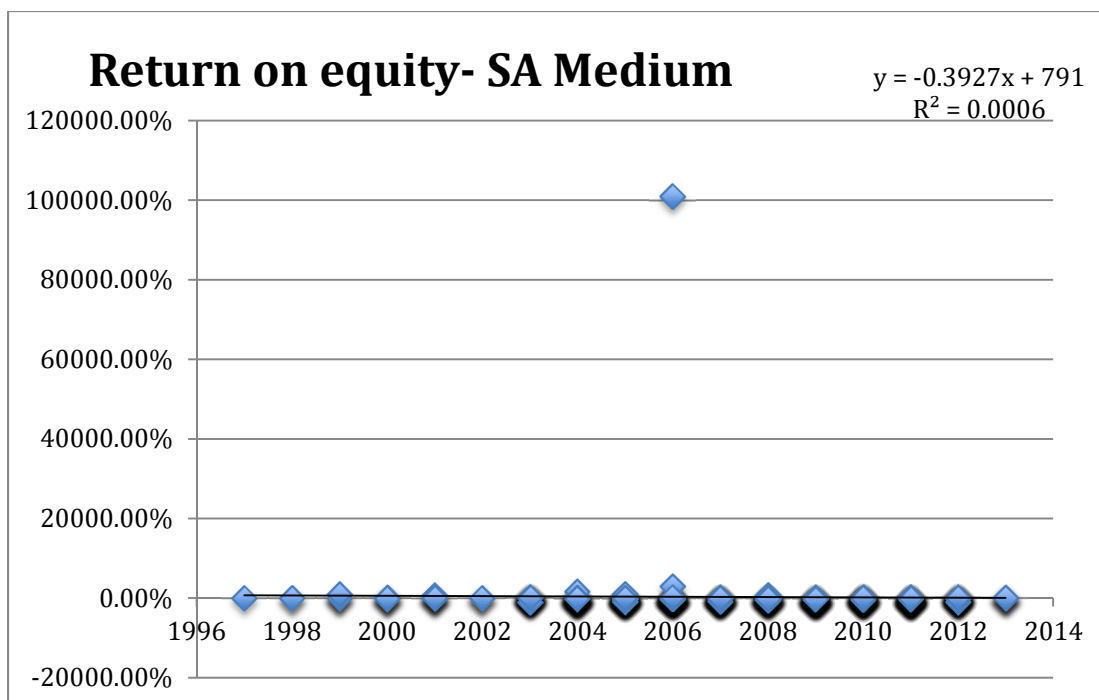


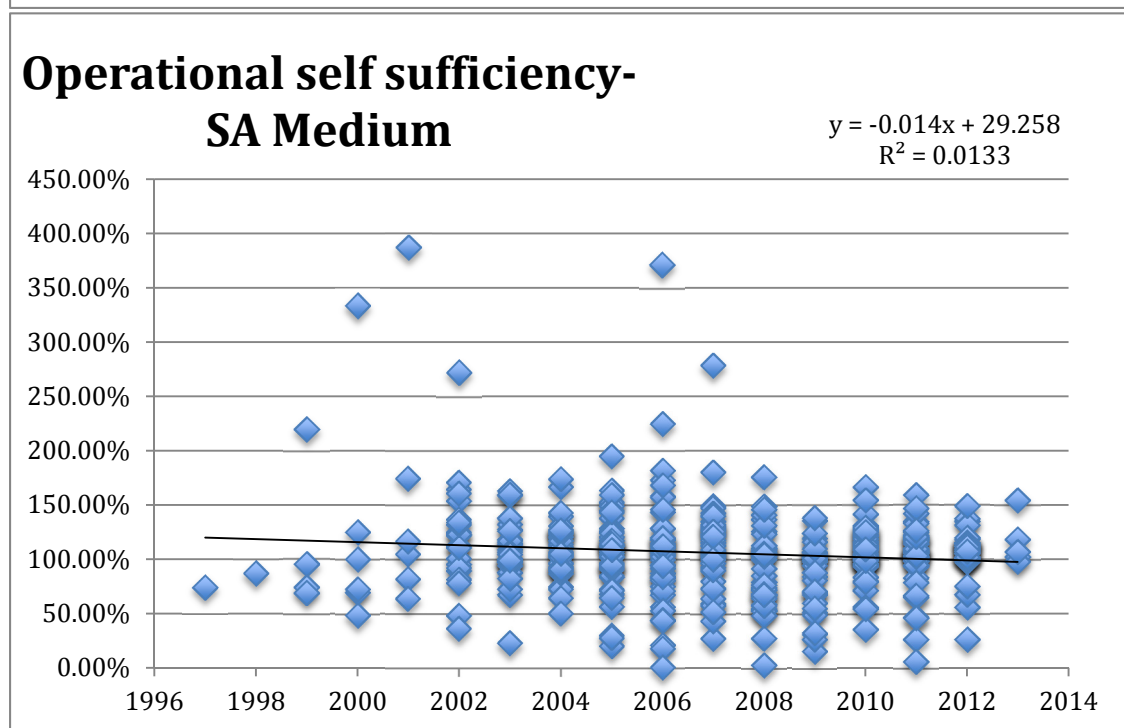
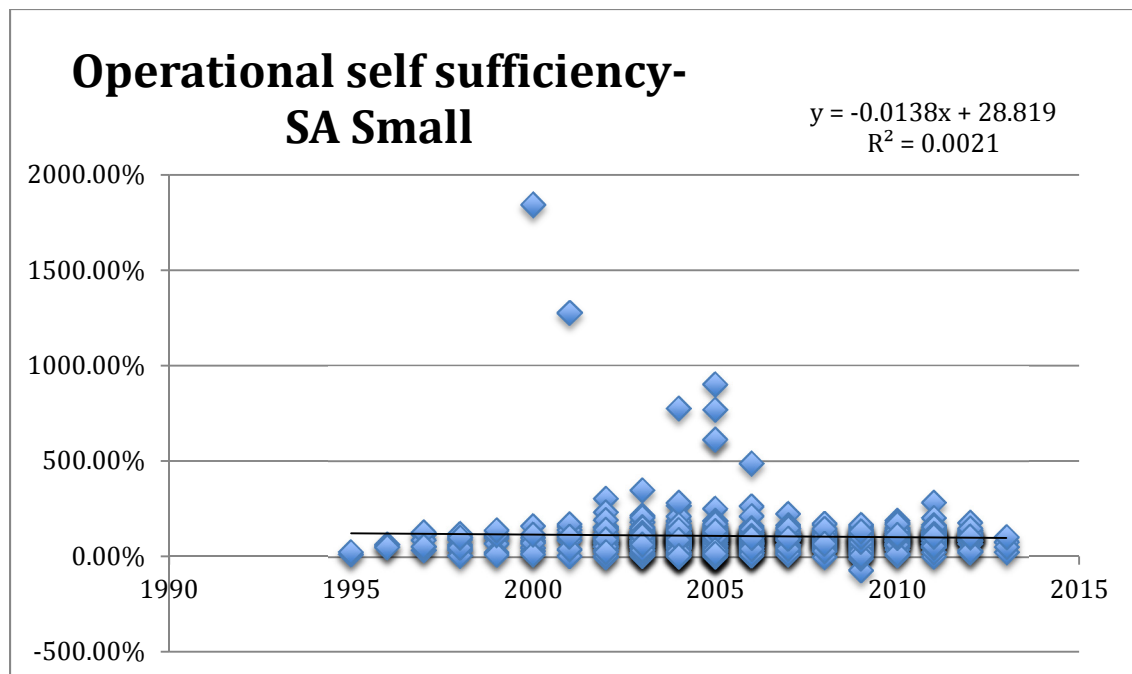




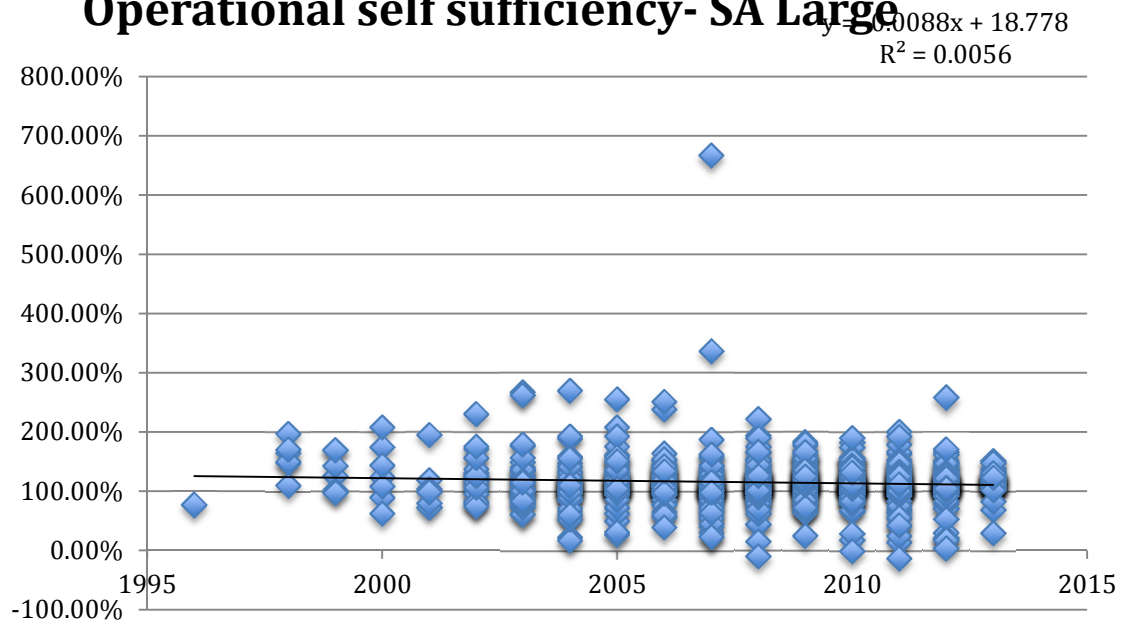




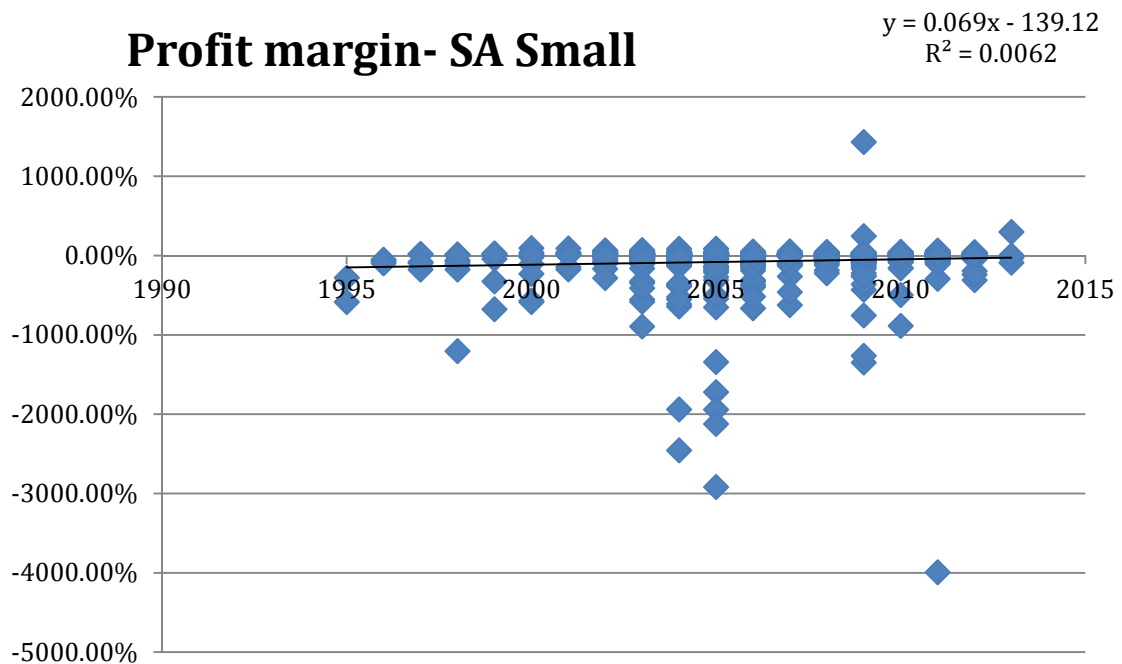


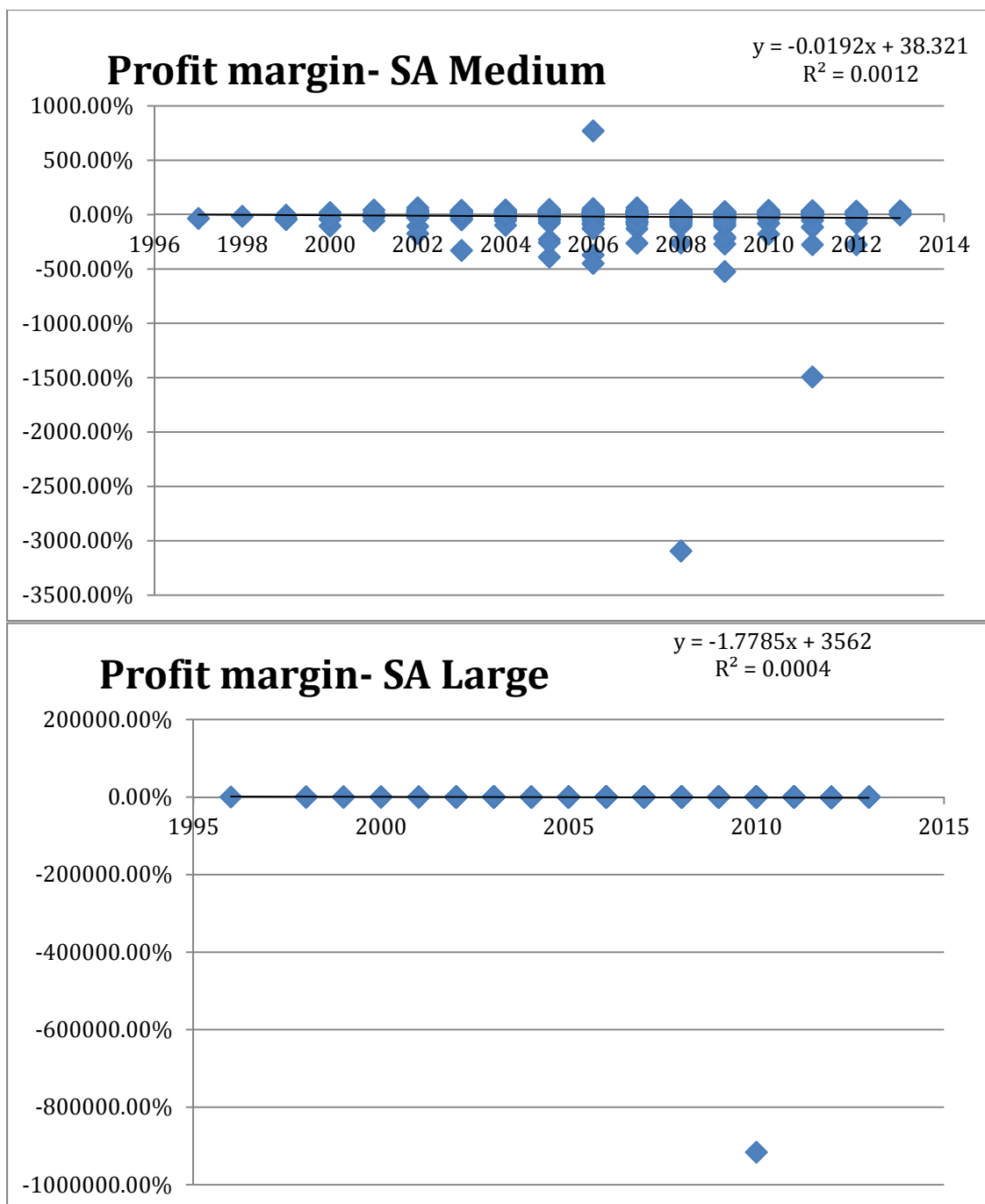


Operational self sufficiency- SA Large



Profit margin- SA Small





APPENDIX D: REGRESSION ANALYSIS RESULTS

All Data	Operational Self- Sufficiency	Return on Assets	Return on Equity	Profit Margin
Ln Assets	0.0253 (0.197)	0.0034 * (0.051)	-0.0680 (0.808)	-0.0112 (0.866)
Ln Borrowers	0.0170 (0.238)	0.0099 *** (0.000)	0.2210 (0.293)	0.1095 * (0.024)
Percent female borrowers	0.1858 * (0.088)	0.0085 (0.395)	-0.0901 (0.955)	-0.1277 (0.728)
Ln Average loan balance per borrower	0.0789 (0.011)	0.0136 *** (0.000)	0.2793 (0.536)	0.1527 (0.145)
Ln average balance per depositor				
Portfolio risk	-0.1934 (0.175)	-0.0669 *** (0.000)	0.2475 (0.905)	-0.4964 (0.302)
Borrowers per staff	0.0005 (0.015)	0.0001 *** (0.000)	0.0011 (0.725)	0.0002 (0.738)
Bank	-0.2246 (0.256)	-0.0750 *** (0.000)	-0.6987 (0.813)	-0.0367 (0.956)
NBFI	-0.1175 (0.535)	-0.0667 *** (0.000)	-0.3882 (0.892)	-0.4227 (0.508)
Rural Bank	0.2485 (0.901)	-0.0270 (0.153)	-0.1285 (0.966)	-0.1006 (0.881)
NGO	-0.0858 (0.649)	-0.0633 *** (0.000)	-1.4276 (0.613)	-0.3168 (0.618)
Cooperative / Credit Union	-0.1183 (0.534)	-0.0551 *** (0.002)	0.1375 (0.962)	-0.3128 (0.626)
Cons	0.3276 (0.263)	-0.1477 *** (0.000)	-3.1718 (0.467)	-1.480 (0.134)
Observations	3617	3374	3377	3617
Adjusted R Squared	0.0054	0.0599	-0.0017	0.0018

Sub-Saharan Africa	Operational Self Sufficiency	Return on Assets	Return on Equity	Profit Margin
Ln Assets	-0.1558 *** (0.000)	-0.0222 * (0.055)	1.8132 0.611	
Ln Borrowers	0.1917 *** (0.000)	0.0330 *** (0.003)	-1.204 0.729	0.1295 *** (0.000)
Percent female borrowers	-0.1221 ** (0.032)	-0.0389 (0.041) **	-4.367 0.462	-0.2567 (0.113)
Ln Average loan balance per borrower	0.1683 *** (0.000)	0.0334 *** (0.003)	-0.2313 0.948	0.1352 *** (0.007)
Ln average balance per depositor	0.0195 (0.202)	0.0031 (0.533)	-0.7727 0.625	-0.0617 (0.149)
Portfolio risk	-0.1785 ** (0.034)	-0.1603 *** (0.000)	0.2033 0.985	-0.8189 *** (0.001)
Borrowers per staff	0.0002 ** (0.015)	0.0001 *** (0.000)	0.0080 0.434	0.0008 *** (0.005)
Bank	0.0412 (0.780)	-0.0380 (0.581)	-1.3290 0.951	-0.3051 (0.471)
NBFI	-0.0132 (0.927)	-0.0699 (0.304)	-0.7609 0.972	-0.3244 (0.433)
Rural Bank	0.2905 * (0.052)	0.0209 (0.765)	-0.5687 0.979	0.2111 (0.622)
NGO	-0.0787 (0.587)	-0.0720 (0.292)	-4.5799 0.831	-0.4521 (0.276)
Cooperative / Credit Union	-0.0045 (0.975)	-0.0532 (0.435)	-0.6908 0.974	-0.1927 (0.642)
Cons	0.7224 (0.000)	-0.1065 (0.176)	-10.4161 0.673	-1.4285 *** (0.004)
Observations	967	856	860	972
Adjusted R Squared	0.1245	0.1147	-0.0076	0.0753

East Asia & The Pacific	Operational Self Sufficiency	Return on Assets	Return on Equity	Profit Margin
Ln Assets	-0.1788 ** (0.077)	-0.0589 *** (0.000)	-0.2807 ** (0.031)	-0.5503 *** (0.000)
Ln Borrowers	0.1367 (0.177)	0.07189 *** (0.000)	0.3104 ** (0.018)	0.6414 *** (0.000)
Percent female borrowers	-0.1989 * (0.100)	-0.0505 *** (0.008)	-0.1941 (0.203)	-0.3089 ** (0.031)
Ln Average loan balance per borrower	0.1337 (0.191)	0.0670 *** (0.000)	0.3178 ** (0.016)	0.6680 *** (0.000)
Ln average balance per depositor	0.1205 *** (0.000)	0.0041 (0.220)	-0.0020 (0.941)	0.0259 (0.308)
Portfolio risk	-0.5801 ** (0.016)	-0.2201 *** (0.000)	-0.3683 (0.215)	-0.5097 ** (0.072)
borrowers per staff	0.0007 *** (0.008)	0.0000 (0.242)	-0.0002 (0.572)	0.0004 (0.154)
Bank	-0.2710 (0.121)	-0.0796 *** (0.003)	-0.1737 (0.413)	-0.4540 ** (0.028)
NBFI	0.0419 (0.727)	-0.0713 *** (0.000)	-0.0725 (0.623)	-0.4961 *** (0.001)
Rural Bank	-0.1396 (0.276)	-0.0250 (0.196)	-0.0777 (0.618)	-0.1855 (0.221)
NGO	-0.0338 (0.764)	-0.0253 (0.138)	-0.0520 (0.706)	-0.1420 (0.286)
Cooperative / Credit Union	-0.0802 (0.571)	-0.0095 (0.658)	-0.0923 (0.594)	-0.1510 (0.368)
Cons	1.5676 *** (0.000)	-0.0629 (0.165)	-0.0065 (0.986)	-0.9504 *** (0.005)
Observations	652	613	612	652
Adjusted R Squared	0.0793	0.1481	0.0027	0.1162

Eastern Europe	Operational Self Sufficiency	Return on Assets	Return on Equity	Profit Margin
In Assets	0.1099 (0.921)	-0.0172 (0.423)	-1.4499 (0.588)	-0.0501 (0.990)
In Borrowers	0.0981 (0.930)	0.0130 (0.547)	1.8534 (0.491)	0.5011 (0.899)
Percent female borrowers	1.5573 (0.213)	-0.0163 (.505)	1.1652 (0.702)	-0.1465 (0.973)
In Average loan balance per borrower	0.3257 (0.772)	0.0095 (0.661)	1.0521 (0.698)	-0.0440 (0.991)
In average balance per depositer	-0.0570 (0.689)	-0.0008 (0.782)	0.2366 (0.492)	-0.1320 (0.792)
portfolio risk	-1.5716 (0.445)	-0.1638 *** (0.000)	0.1614 (0.974)	-1.4421 (0.842)
borrowers per staff	0.0005 (0.849)	-0.000 (0.824)	-0.0053 (0.428)	-0.0078 (0.436)
Bank	-0.9377 (0.693)	-0.0929 ** (0.039)	-0.4382 (0.937)	0.6247 (0.940)
NBFI	0.0406 (0.986)	-0.0579 (0.200)	-0.0965 (0.986)	-0.7731 (0.926)
Rural Bank				
NGO	-0.7934 0.755	-0.0723 (0.132)	-1.0146 (0.865)	-1.2736 (0.887)
Cooperative / Credit Union	-0.0249 0.991	-0.1017 ** (0.019)	1.1525 (0.830)	-0.1737 (0.983)
Cons	-3.6588 (0.356)	0.2417 *** (0.002)	-1.5274 (0.872)	-0.1994 (0.989)
Observations	393	375	374	394
Adjusted R Squared	-0.0157	0.0736	-0.0208	-0.0189

Latin America & The Caribbean	Operational Self Sufficiency	Return on Assets	Return on Equity	Profit Margin
Ln Assets	-0.2038 *** (0.000)	-0.0254 (0.373)	-0.2258 (0.156)	-0.5728 *** (0.000)
Ln Borrowers	0.2126 *** (0.000)	0.0237 (0.402)	0.1938 (0.219)	0.5915 *** (0.000)
Percent female borrowers	-0.0233 (0.748)	-0.0180 (0.663)	-0.2343 (0.310)	-0.4287 *** (0.001)
Ln Average loan balance per borrower	0.2836 *** (0.000)	0.0713 ** (0.012)	0.4128 ** (0.009)	0.7003 *** (0.000)
Ln average balance per depositor	-0.0066 (0.450)	-0.0101 ** (0.041)	-0.0258 (0.349)	-0.0420 ** (0.006)
portfolio risk	-0.8132 *** (0.000)	0.1511 (0.200)	0.4501 (0.492)	-0.3572 (0.317)
Borrowers per staff	0.0012 *** (0.000)	0.0006 *** (0.000)	0.0026 *** (0.000)	0.0019 *** (0.000)
Bank	-0.0062 (0.971)	0.0937 *** (0.000)		0.0447 (0.878)
NBFI	0.1160 (0.491)	0.1228 *** (0.000)	0.0854 (0.342)	0.2070 (0.474)
Rural Bank				
NGO	0.0859 (0.616)		-0.3862 ** (0.008)	-0.2503 (0.395)
Cooperative / Credit Union	-0.0279 (0.867)	0.0687 ** (0.003)	-0.1896 * (0.078)	0.0229 (0.395)
Cons	0.4592 ** (0.050)	-0.2877 *** (0.000)	-0.8953 (0.103)	-0.6675 * (0.097)
Observations	897	863	864	897
Adjusted R Squared	0.1360	0.0958	0.0605	0.2371

Middle East & North Africa	Operational Self Sufficiency	Return on Assets	Return on Equity	Profit Margin
Ln Assets	-0.4712 (0.749)	0.0080 (0.914)	2.2984 (0.291)	-0.4676 (0.837)
Ln Borrowers	0.4025 (0.789)	0.0150 (0.842)	-1.9098 (0.391)	1.2412 (0.594)
Percent female borrowers	1.8231 (0.154)	0.0605 (0.360)	-0.2289 (0.906)	3.2114 (0.106)
Ln Average loan balance per borrower	1.0757 (0.428)	0.0169 (0.801)	-1.6961 (0.392)	0.9125 (0.663)
Ln average balance per depositor	0.1136 (0.642)	-0.0025 (0.856)	-0.0786 (0.846)	-0.0852 (0.822)
portfolio risk	0.4589 (0.823)	-0.1872 * (0.074)	1.2089 (0.690)	-2.2113 (0.488)
Borrowers per staff	0.0057 (0.389)	0.0006 (0.112)	0.0078 (0.442)	-0.0010 (0.924)
Bank	-0.9055 (0.784)	-0.0383 (0.814)	-4.2442 (0.379)	0.3478 (0.946)
NBFI	-2.6982 (0.249)	-0.1183 (0.306)	-1.6445 (0.627)	-2.6370 (0.465)
Rural Bank				
NGO	-0.9952 (0.611)	-0.0788 (0.413)	-0.8245 (0.770)	-0.8916 (0.768)
Cooperative / Credit Union				
Cons	-2.6994 (0.507)	-0.3428 * (0.092)	-7.4999 (0.208)	-9.799 (0.124)
Observations	58	53	53	58
Adjusted R Squared	-0.0074	0.1613	-0.1366	-0.0142

South Asia	Operational Self Sufficiency	Return on Assets	Return on Equity	Profit Margin
Ln Assets	-0.0971 ** (0.032)	-0.0129 (0.152)	0.3296 (0.534)	-0.1609 ** (0.010)
Ln Borrowers	0.1413 *** (0.001)	0.2352 ** (0.006)	-0.3352 (0.510)	0.2315 *** (0.000)
Percent female borrowers	0.2166 ** (0.007)	0.0530 *** (0.001)	1.7710 * (0.063)	0.4043 *** (0.000)
Ln Average loan balance per borrower	0.1740 *** (0.001)	0.0260 ** (0.013)	0.4637 (0.451)	0.2312 *** (0.001)
Ln average balance per depositor	0.0330 * (0.069)	0.0119 *** (0.001)	-0.4002 * (0.063)	0.0821 *** (0.001)
Portfolio risk	-0.0786 (0.144)	-0.0187 ** (0.076)	0.1923 (0.757)	-0.1205 (0.105)
Borrowers per staff	0.0004 *** (0.002)	0.0001 *** (0.000)	-0.0008 (0.613)	0.0006 *** (0.000)
Bank	-0.0669 (0.605)	-0.0245 (0.355)	1.2356 (0.429)	-0.2147 (0.230)
NBFI	-0.0600 (0.631)	-0.0381 (0.136)	1.7311 (0.249)	-0.2589 (0.134)
Rural Bank	0.0141 (0.911)	-0.0166 (0.516)	0.6398 (0.670)	-0.1387 (0.425)
NGO	0.0489 (0.688)	-0.0107 (0.667)	1.0010 (0.493)	-0.1770 (0.293)
Cooperative / Credit Union	0.0767 (0.543)	0.0022 (0.930)	0.7968 (0.599)	0.0040 (0.982)
Cons	-0.0686 (0.806)	-0.2624 *** (0.000)	-4.7449 (0.160)	-1.6204 *** (0.000)
Observations	640	610	608	640
Adjusted R Squared	0.1188	0.1645	-0.0002	0.1581

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