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**MÁSTER INTERNACIONAL EN MICROFINANZAS PARA EL EMPRENDIMIENTO**

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# **Are Microfinance Investment Funds Attractive for Private Investors?**

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# Chapter 1

## Introduction

Since its origin in the 1970s the concept of microcredit - and more generally microfinance - has spread rapidly around the globe, with microfinance institutions (MFIs) extending loans to more than 200 million clients by the end of 2010 ([Reed (2011)]). Through various socio-economic ties of the beneficiaries and their families, microfinance has impacted upon the lives of almost one billion people in developing countries and emerging markets. While historically most MFIs were NGOs and financed through donations and cheap debt capital from development organizations and the public sector, more and more MFIs are now structured as non-banking financial institutions or banks and access new sources of funding, such as deposits (called micro-savings) as well as equity capital and debt financing from commercial investors. According to [Forster, Reille (2008)] approximately 50% of the funds flowing into the microfinance sector from developed countries are channeled through so-called Microfinance Investment Vehicles (MIVs). Those MIVs are specialized financial intermediaries which invest in a portfolio of several carefully selected MFIs and target either retail, institutional or public investors.

Though private investors (including small retail investors and high net worth individuals) represent only 16% of the total stock of cross-border investment, their demand for microfinance investments is strong. Not only are they attracted by outstanding historic financial returns of MIVs but they are also increasingly looking for investment opportunities that allow them to "do good" and yield social returns ([Forster, Reille, Rozas (2011)]).

This thesis focuses on Microfinance as an investment opportunity for portfolio growth and diversification from the perspective of private investors. It is based on a number of previous studies that analyze the financial and social performances of MFIs and MIVs in order to allow investors to choose the right investment, both within the range of microfinance investments as well as in comparison to standard market instruments.

[Kraus, Walter (2008)] focus on the impact of microfinance on portfolio volatility examining the correlation of the performance of MFIs to international as well as respective local markets. Based on a data set of 325 leading MFIs covering the period from 1998-2006 they perform a regression analysis of some of the MFIs' key performance indicators (ROE, profit margin, asset growth, loan portfolio at risk) against benchmarks representing the global stock market and emerging markets equity as well as the corresponding country's GDP as a proxy for domestic market risk. While their study concludes that MFIs do not show any correlation to global capital markets some of the correlations with respect to the

domestic economy are significant. They thus argue that "MFIs may have useful diversification value for international portfolio investors able to diversify away from country risk exposures. For emerging market domestic investors, who may have this ability to a much more limited extent, domestic microfinance investments do not seem to provide significant portfolio diversification advantages" [Kraus, Walter (2008)].

A similar study is performed by [Galema, Lensink, Spierdijk (2008)] who investigate the effect of adding investments into MFIs to a portfolio of international stock and bond market instruments. As common in portfolio theory they follow the mean-variance approach, assuming that investors base their investment decisions solely on the mean return (as measured by an MFI's annual ROE and ROA) and variance characteristics of an asset. As benchmarks they use the MSCI World and Emerging Markets indices (equity) as well as the J.P. Morgan Global and Emerging Markets indices (debt).

The analysis of [Galema, Lensink, Spierdijk (2008)] which is based on data until 2007 suggests that in general microfinance may be attractive for investors seeking a better risk-return profile and that an investment into MFIs may be valuable as an addition to the debt part of a globally diversified portfolio.

The two just mentioned studies analyze the performance of MFIs. Focusing on retail investors, however, who cannot invest directly in the capital of MFIs the focus of this thesis will be on the attractiveness and performance of MIVs directed at private investors. Two recent research papers followed the same approach and are hence highly relevant for this study.

[Janda, Svárovská (2009)] investigate the performance of various currency share classes of five microfinance investment funds (a sub-class of MIVs directed at private investors) based on their monthly returns over the relatively short time period from January 2006 to March 2009. After a brief look at some indicators concerning the funds' social performance, they analyze their annual and mean monthly returns in comparison to both stock and bond market benchmarks. Further measures considered in their study are the standard deviation of returns in order to evaluate the associated risk; the beta coefficient, the R-Squared and Jensen's Alpha in order to assess the effect of adding the funds to a portfolio; as well as two common performance measures, the Sharpe Ratio and the Treynor Ratio.

The analysis of [Janda, Svárovská (2009)] reveals that the examined funds recorded lower total risk than global stocks and bonds with moderate but stable returns. They further conclude that investment in microfinance investment funds that focus especially on debt instruments represents an attractive opportunity for the portfolio diversification as this asset class does not show any positive correlation with global or emerging capital markets. At the same time, it provides adequate risk-adjusted returns and may be therefore attractive not only for investors seeking social returns ([Janda, Svárovská (2009)]). In other words, the additional social return of those funds comes with no "cost" with respect to the financial return.

Exploring the economic impact of microfinance investment funds [Fausch, Oehri (2008)] examine their return/risk profiles and consequences for portfolio management and derive recommendations to investors on how to consider microfinance in their asset allocations. Their methodology is to construct a variety of hypothetical portfolios containing stocks, bonds, hedge funds and money market instruments and to then analyze the effect of replacing a portion of any of those asset classes by a microfinance investment fund. Hereby

they consider the three funds with the longest data history and compare portfolio returns, standard deviations and Sharpe Ratios based on monthly data. Furthermore, they analyze whether the current market situation (bull/bear) has an impact on the results.

All funds analyzed by [Fausch, Oehri (2008)] show low volatility as well as low correlation to the asset classes analyzed. The study results underline that those funds are a meaningful tool for portfolio diversification and that fund substitution can be considered a favorable investment independent of the current market situation. In general the results obtained are extremely dependent on the observation period, since the correlations between the individual investment categories vary with time and cannot be regarded as fixed ([Fausch, Oehri (2008)]).

Most studies analyzing the performance of MFIs and MIVs were conducted before 2010 and include only data until 2008 or 2009. In the following years, however, the microfinance sector was confronted with several crises in key markets - partly caused by the sector's rapid growth and the resulting risk of client over-indebtedness - that lead to the deterioration in MFI performance and tarnished the sector's reputation ([Forster, Reille, Rozas (2011)]).

The main purpose of this study hence is to reassess the attractiveness of microfinance investment funds for private investors taking into account the recent developments. Moreover, the use of longer data series, the separate analysis of the USD and the EUR currency zones as well as the detailed assessment of boom versus crisis market phases allows for more sophisticated results.

Recalling the rather limited number of funds included by [Janda, Svárovská (2009)] and [Fausch, Oehri (2008)] we aim to select a more complete sample of funds which is representative of the microfinance investment market for private investors.

We start by giving a brief overview of the MIV universe and by defining appropriate criteria for the selection of the funds to be analyzed in the following (Chapter 2).

In Chapter 3 we then present and explain the results of the empirical study. Throughout the entire chapter we will refer to a set of benchmark indices representing the local (USD currency zone and Eurozone), global and emerging markets equity and bond markets. After calculating and comparing the historical rates of return of the funds and the corresponding benchmarks in Section 3.1, we focus on risk-return criteria including the mean monthly return, its standard deviation and the Sharpe Ratio (Section 3.2). In Section 3.3 we extend the analysis of the previous section by separating the respective time period according to the current market situation into bull market phases (booming economy) and bear market phases (declining economy, recession). While the first three sections of Chapter 3 focus on the performance of microfinance investment funds versus other assets seen individually, Section 3.4 assesses the impact of adding the funds to a portfolio of common equity and bond market instruments taking into account both the portfolio risk (measured by the beta and R-Squared coefficients) and the portfolio performance (measured by the Jensen's Alpha).

Finally, in Chapter 4 we will summarize the findings of the analytical study, particularly comparing them to the results presented in previous studies, and derive recommendations for private investors.

## Chapter 2

# Selection & Description of MFIFs

A first overview of the universe of Microfinance Investment Vehicles can be obtained from various databases such as MIX Market, the Luminis initiative by Microrate or the Syminvest platform. While MIX Market is the main source of information on MFIs, it provides only limited resources on MIVs. Luminis is a newly established impact investment platform offering very detailed information, but unfortunately only for qualified investors and subject to rather high fees. Though the Syminvest platform, which is administrated by Symbiotics Investment Management S.A., also requires registration, it is free of charge and provides researchers as well as investors with up-to-date information concerning the main characteristics of all MIVs and the development of the sector as a whole. It therefore serves this thesis as one of the main sources of information.

The aim of this thesis is to analyze the attractiveness of an investment into microfinance from the perspective of private and rather commercially oriented investors. The MIV universe in total comprises more than 100 MIVs (see [Symbiotics (2011)]) of different investment structure worldwide. Besides the very limited offer of publicly traded stocks of MFIs<sup>1</sup>, retail investors channel their investments through mutual funds. MIVs structured differently are either directed at large institutional or public investors. We will hence only consider the sub-category of Microfinance Investment Funds (MFIFs). According to the Syminvest platform in August 2012 there currently exist 89 such funds. On the one hand, the studied sample of funds should be representative of the sub-category of MFIFs suitable for private investors and thus include the most extensive range of such products possible. On the other hand, however, in order to yield reliable and comparable results we need to establish certain criteria for the selected funds.

### *Price Setting*

During the past financial turbulences liquidity has become a crucial issue, particularly for private investors who want to be able to withdraw their money from any investment in their portfolio at any time. Since the financing of MFIs by Microfinance Investment Vehicles such as MFIFs is - in most cases - based on a fixed maturity of several years<sup>2</sup>

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<sup>1</sup>Only five MFIs are publicly listed and traded, namely Bank Rakyat Indonesia, Equity Bank (Kenya), Banco Comportamos (Mexico), Brac Bank Limited (Bangladesh) and SKS Microfinance (India). (Source: [www.syminvest.com](http://www.syminvest.com))

<sup>2</sup>MIVs' debt investments showed an average remaining maturity of 24 months in 2010



and since their investments are concentrated in a few MFIs, they cannot provide daily liquidity to investors. There are, however, a number of MFIFs that set prices at least once a month allowing investors to in- or divest on a previously specified day each month. We will hence restrict our analysis to those so-called open end funds with monthly liquidity. Moreover, the availability of monthly fund data, gives our study a much broader database than if we would just be able to analyze yearly performances.

### *Currency*

Most MFIFs are denominated in EUR and/or USD while only very few have CHF share classes. In this thesis we will focus on the two first mentioned and prevailing currencies. Taking into account the volatility of the EUR/USD exchange rate, however, we will analyze MFIFs for either currency separately. By this means the study addresses the specific investment options of most investors in Europe and North America, providing valuable results for the USD and EUR currency zones.

### *Microfinance Investment Quota*

Focusing on Microfinance Investments we will include only funds that invest at least 70% of their total assets under management in MFIs. While the remaining portion not tied to Microfinance is mainly invested in liquid assets such as money market instruments or cash and derivatives in order to hedge currency risk, some funds do also place small portions of their assets in other asset classes such as Fair Trade. Note that funds with monthly liquidity must keep part of their assets in cash or liquid assets in order to be prepared for the possible redemption of shares by investors each month.

In contrast to previous research papers that restrict their analysis to the time period of the newest fund included (see e.g. [Janda, Svárovská (2009)] who analyze data from January 2006 until March 2009), we will consider each fund's monthly value from its inception until June 2012. Using much longer data series makes our results more reliable and allows us to track the performance of MFIFs over more than a decade.

Neither do we make any restrictions regarding the total assets under management. As can be seen below, this study includes small funds with a total volume of just 2 million USD as well as several funds with more than 100 million USD under management. Since this thesis primarily focuses on private rather than on institutional investors, the minimum amount needed for an initial investment is the more critical issue. In this regard, the funds' characteristics vary significantly. In general, a lower minimum investment is reflected in lower fees for the investor. The monthly returns in the data set underlying our study are calculated based on so-called net asset values per share, i.e. the monthly price of a fund share corrected for management and performance fees. Thus, the fee structure is already implicitly included in the calculation of the monthly performance, high fees eating up much of the gross performance.

According to [Forster, Reille, Rozas (2011)] 85% of MIVs' investments are debt investments. The studied sample of funds reflects this very well with ten out of 16 MFIFs

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([Symbiotics (2011)]) and the number of equity transactions is still very low due to the limited offer of publicly traded stocks of MFIs.

channeling their financing through debt only and just four funds investing a small portion (4% to 24%) in the equity of MFIs. (For the remaining two funds no equity/debt quota is available.)

Based on the Syminvest platform we could identify 17 funds that fulfill the above mentioned criteria. Of those 17 investment vehicles monthly data for 16 funds was either publicly available or provided to us confidentially by the management. Taking into account that some funds have both USD and EUR share classes and that the two currency zones are to be analyzed separately, the studied sample consists of nine funds for USD investors as well as twelve funds for EUR investors.

Table 2.1 summarizes the most important information on each fund including the principal investment advisor or manager, its legal structure, all available currency share classes, the fund's inception date, the minimum amount required for an initial investment in the fund as well as the total assets under management, the microfinance investment portfolio as % of total assets under management and the extent to which each fund is exposed to Microfinance debt and/or equity. A list of the sources used for compiling monthly data for each fund in Table 2.1 can be found in Table A.1 in the appendix.

Three of the four largest funds are advised by responsAbility Social Investments AG, a Swiss-based social investment company. With total assets under management of 585.6 million USD in August 2012, **responsAbility Global Microfinance Fund** is the largest of its kind and the first MFIF launched by responsAbility in November 2003. Investors are offered USD, EUR and CHF shares of the Luxembourg FCP (Fonds Commun de Placement (French), mutual investment fund) and can participate with a minimum investment of 1,000 USD/EUR/CHF. Three years later in November 2006, responsAbility introduced its second fund, the Luxembourg SICAV (Société d'Investissement à Capital Variable (French), open-ended collective investment scheme) **responsAbility Microfinance Leaders** which is also available in three currencies - USD, EUR and CHF - and manages total assets of 140.4 million USD. This fund, however, requires a minimum contribution of 1 million USD/EUR/CHF per investor, which might exclude a large number of private investors. Due to its size, we will include it in the following analysis anyways, but must be careful when comparing the net performance of different funds with greatly varying minimum thresholds (which - as mentioned above - reflect the fund's fee structure).

The third fund of the same investment advisor is **responsAbility Microfinanz-Fonds**, a Luxembourg SICAV only available in EUR that was launched in May 2007 and is easily accessible to retail investors with initial investments starting at 1,000 EUR. In August 2012 its assets under management totaled 198 million USD.

The pioneer among all MFIFs and at the same time the second largest fund is **BlueOrchard Microfinance Fund** (until July 2012 called Deixa Micro-Credit Fund) managing a total of 319 million USD divided into three share classes (USD, EUR and CHF). It is advised by BlueOrchard, a Swiss investment manager specialized in Microfinance. Its USD share class was launched in 1998 at that time being the first collective investment fund (Luxembourg SIVAV) offering private investors the opportunity to combine financially attractive investments in Microfinance with social returns. The minimum investment is currently set at 10,000 USD/EUR or 15,000 CHF.

<b>Fund name</b> <i>Investment Advisor / Manager</i>	<b>Legal Structure</b> <i>Currency</i>	<b>Inception Date</b> <i>Minimum Investment</i>	<b>TA under Management</b> <i>MF Investment Portfolio</i>	<b>Exposure</b> <i>as of</i>
Azure Global Microfinance Fund <i>Azure Partners SA (CH)</i>	Luxembourg SICAV - SIF (Fund of Funds) <i>USD</i>	07 Oct 11 <i>125,000 EUR</i>	4.6 million USD <i>84.78% (of Total Assets)</i>	96% Debt 4% Equity Aug 12
BBVA Codespa Microfinanzas <i>BBVA Asset Management, S.A., S.G.I.I.C. (SP)</i>	Fondo de Inversión Libre (Hedge Fund Spain) <i>EUR</i>	30 Oct 06 <i>50,000 EUR</i>	in liquidation <i>95.88%</i>	N/A Sep 11
BlueOrchard Microfinance Fund <i>BlueOrchard Finance S.A. (CH)</i>	Luxembourg SICAV - Part II <i>USD, EUR, CHF</i>	Sep 98 (USD), Apr 03 (EUR) <i>10,000 USD/EUR 15,000 CHF</i>	319 million USD <i>86.00%</i>	100% Debt Aug 12
Dual Return - Vision Microfinance Fund <i>Symbiotics Investment Management S.A. (CH)</i>	Luxembourg SICAV - Part II <i>USD, EUR</i>	25 Apr 06 (EUR), 25 May 06 (USD) <i>25,000 USD, 1,000 EUR<sup>a</sup></i>	99.3 million USD <i>84.08%</i>	100% Debt Aug 12
Dual Return - Vision MF Fund Local Currency <i>Symbiotics Investment Management S.A. (CH)</i>	Luxembourg SICAV - Part II <i>USD, EUR</i>	25 Oct 10 (EUR), 25 Feb 12 (USD) <i>125,000 USD/EUR<sup>b</sup></i>	29.3 million USD <i>79.04%</i>	100% Debt Aug 12
Dutch Microfund N.V. <i>Anneerum Beheer B.V. (NL)</i>	Luxembourg SICAV - SIF (Fund of Funds) <i>EUR</i>	29 Sep 08 <i>1,000 EUR</i>	2 million USD <sup>c</sup> <i>77.76%</i>	N/A Jan 12
EMF Microfinance Fund AGmVW <i>Symbiotics Investment Management S.A. (CH)</i>	Lichtenstein investment undertaking <i>USD</i>	29 Oct 08 <i>250,000 CHF in USD<sup>d</sup></i>	47.7 million USD <i>75.90%</i>	100% Debt Aug 12
ETIMOS Fund Global MicroFinance Debt <i>Consortio Etimos S.c. (I)</i>	Luxembourg SICAV - SIF <i>EUR</i>	29 Apr 11 <i>125,000 EUR</i>	4.9 million USD <i>95.49%</i>	100% Debt Sep 11
Finethic SCA SICAR <i>Symbiotics Investment Management S.A. (CH)</i>	Luxembourg SICAR <i>USD, CHF</i>	15 Oct 06 <i>N/A</i>	N/A <i>N/A</i>	100% Debt
IC Fund - Asia Women Microfinance <i>Symbiotics Investment Management S.A. (CH)</i>	Luxembourg SICAV - Part II <i>USD</i>	21 Jul 10 <i>25,000 USD</i>	5.6 million USD <i>88.51%</i>	100% Debt Aug 12
responsAbility Global Microfinance Fund <i>responsAbility Social Investments AG (CH)</i>	Luxembourg FCP - Part II <i>USD, EUR, CHF</i>	Nov 03 (USD, CHF), Jan 05 (EUR) <i>1,000 USD/EUR/CHF</i>	585.6 million USD <i>90.00%</i>	92% Debt 8% Equity Aug 12
responsAbility Microfinance Leaders <i>responsAbility Social Investments AG (CH)</i>	Luxembourg SICAV <i>USD, EUR, CHF</i>	Nov 06 (USD), Aug 10 (EUR, CHF) <i>1,000,000 USD/EUR/CHF</i>	140.4 million USD <i>92.00%</i>	78% Debt 22% Equity Aug 12
responsAbility Microfinanz-Fonds <i>responsAbility Social Investments AG (CH)</i>	Luxembourg SICAV <i>EUR</i>	29 May 07 <i>1,000 EUR</i>	198 million USD <i>87.00%</i>	100% Debt Aug 12
St. Honoré Microfinance Fund <i>BlueOrchard Finance S.A. (CH)</i>	Luxembourg SICAV <i>EUR</i>	28 Nov 05 <i>5,000 EUR</i>	liquidated	100% Debt
Triodos Microfinance Fund <i>Triodos Investment Management BV (NL)</i>	sub-fund of Triodos Luxembourg SICAV - II <i>EUR, GBP</i>	02 Mar 09 <i>50,000 EUR<sup>e</sup></i>	132 million USD <i>70.42%</i>	76% Debt 24% Equity Aug 12
Wallberg Global Microfinance Fund - I <i>Symbiotics Investment Management S.A. (CH)</i>	Luxembourg FCP - Part II <i>EUR</i>	31 Oct 08 <i>90,000 EUR</i>	27.9 million USD <i>93.62%</i>	100% Debt Aug 12

Table 2.1: List of Microfinance Investment Funds included in this study.

<sup>a</sup>This study uses monthly performance data of the retail share class. There also exists an institutional share class with more restrictive minimum investments of 125,000 EUR/USD.

<sup>b</sup>For each currency there exists a retail and an institutional share class. This study uses monthly data of the institutional share class since those have a longer data history than the retail classes (minimum investment: 1,000 USD/EUR) which were initiated in November 2010 (EUR) and June 2012 (USD), respectively.

<sup>c</sup>1.5 million EUR at 1.31 USD/EUR (Jan 2012)

<sup>d</sup>This study uses monthly performance data of the retail share class with accrued interest. There also exists an institutional share class with a more restrictive minimum investment of 1,000,000 CHF in USD.

<sup>e</sup>There are three share classes with varying fee structures and minimum investments (in parentheses): institutional (100,000 EUR), B (50,000 EUR), retail (0 EUR). The following study uses monthly data of the B share class as this share class does neither have the highest fee structure (retail) nor the most restrictive minimum investment (institutional).

With the **St. Honoré Microfinance Fund** BlueOrchard initiated a second MFIF in cooperation with Edmond de Rothschild Investment Managers in November 2005. However, it was liquidated in October 2011. While no official explanation for this decision by the fund's managers was published, a possible reason might be that the fund did not manage to reach a broad enough base of investors. In November 2010 for example, it managed just five million EUR.

Further six MFIFs included in our analysis are advised by Swiss-based Symbiotics Asset Management S.A., a specialized multi-fund advisor and servicer with expertise in Micro and SME finance as well as impact investment. Among Symbiotics' flagship mandates are the two **Dual Return Funds Vision Microfinance** (total assets under management of 99.3 million USD) and **Vision Microfinance Local Currency** (29.3 million USD), which were launched in April 2006 and October 2010, respectively. Both funds are structured as Luxembourg SICAVs and offer a USD as well as a EUR share class. In addition, there exist different share classes for private and institutional investors with corresponding minimum investment requirements. In case of the Vision Microfinance Fund private investors can participate with an initial amount of just 1,000 EUR or 25,000 USD. Though there also exist similar retail share classes for the Local Currency Fund, our analysis in the following will be based on data from the institutional share classes with a more restrictive minimum investment of 125,000 EUR because the latter provide a longer data history. Note again that due to the difference in required minimum investments and thus also in the fee structure, one should be cautious when comparing the results from analyzing either fund.

Also advised by Symbiotics and promoted by Enabling Microfinance AG, **EMF Microfinance Fund AGmvK** is the only MFIF registered in Lichtenstein (as Lichtenstein investment undertaking for qualified investors). The fund is denominated in USD and requires an initial contribution of the equivalent of 250,000 CHF in USD. Initiated in October 2008 it now manages 47.7 million USD.

**Wallberg Global Microfinance Fund - I**, a cooperation of Symbiotics with Wallberg Invest S.A., is a Luxembourg FCP for EUR investors. Since its inception in October 2008 they can participate in the fund's performance starting from 90,000 EUR. Its assets under management today total 27.9 million USD.

The newest member of the Symbiotics fund family is the **IC Fund - Asia Women Microfinance** launched in July 2010. Offering a USD share class (with a minimum investment of 25,000 USD), it is also the smallest in size of Symbiotics' funds with total assets under management of just 5.6 million USD. This might be partly due to its niche strategy, focusing primarily on impact investment themes in Asia which are directed at women.

The sixth open-ended MFIF advised by Symbiotics is the Luxembourg fund **Finethic SCA SICAR**. It was registered in October 2006 and is split in a USD and a CHF share class. Unfortunately no information is available publicly regarding the assets under management or minimum investment restrictions.

As part of its extensive range of sustainable investment products Netherlands-based Triodos Bank, a pioneer in ethical banking, together with its Investment Management subsidiary launched **Triodos Microfinance Fund** in March 2009. As sub-fund of a Triodos Luxembourg SICAV it offers EUR and GBP share classes and - in spite of its rather short history - already manages 132 million USD. With three different EUR sub-share classes,

the fund allows each investor to choose an appropriate cost model. In the following study we will analyze monthly data of the B share class which requires a minimum investment of 50,000 EUR.

Though of rather small size we also include Consorzio Etimos' **ETIMOS Fund Global MicroFinance Debt**. Launched in April 2011 it is still in its initial phase, having reached a total of 4.9 million USD assets under management in September 2011. The fund currency is EUR and investors must place at least 125,000 EUR.

A unique investment concept is Spain's first hedge fund **BBVA Codespa Microfinanzas**, which was open for investment with a minimum of 50,000 EUR from its launch in October 2006 until the announcement of its liquidation at the end of 2011. It was not able to reach its return targets, which might be due to its small size and small number of investors as well as the very limited number of investments providing only little portfolio diversification when one of the investments failed. Though the fund is in liquidation, two investors remain in the fund and the share price is still calculated on a monthly basis.

Last but not least, the studied fund sample includes two funds of funds registered as Luxembourg SICAV-SIFs: **Azure Global Microfinance Fund** (USD) launched by Swiss-based Azure Partners SA in October 2011 and **Dutch Microfund N.V.** (EUR) launched by the Dutch investment company Annexum Beheer B.V. The funds require initial commitments of 125,000 EUR and 1,000 EUR, respectively, and are both very small in size. In June 2012 Azure Global Microfinance fund participated in only four MIVs (ASN-Novib Microkrediet Fund, Dual Return - Vision Microfinance Fund, MicroVest Short Duration Fund and Dual Return - Vision MicroFinance Fund Local Currency) and managed a total of 4.6 million USD. Even smaller Dutch Microfund invests its 2 million USD under management in seven MIVs (responsAbility Global Microfinance Fund, BlueOrchard Microfinance Fund, Goodwell Microfinance I and II, responsAbility BOP Investments SCA SICAR as well as Finca Microfinanca Fund I and II)<sup>3</sup>. In theory, both funds could also invest directly in the debt or equity of MFIs.

Though all studied MFIFs have clearly defined financial as well as social objectives, only its financial performance can be actually measured. Some funds also publish proxies that according to the common opinion indicate social impact, such as the number of borrowers reached, the average size of a microloan, the percentage of women borrowers, or the share of clients living in rural areas.

As can be derived from Table 2.1 most funds invest in debt instruments only. This might include loan agreements, corporate bonds or certificates, typically with short maturities of no more than five years (see [Glisovic, Reille (2010)]). Except for the two mentioned funds of funds, the MFIFs in our sample invest either directly in debt instruments issued by MFIs in emerging or developing economies or indirectly through collateral debt obligations. Depending on their investment policies some of the funds might theoretically also be allowed to place part of their assets under management in other MIVs.

Apart from debt investments, responsAbility Global Microfinance Fund, responsAbility Microfinance Leaders and Triodos Microfinance Fund also participate in the equity of selected MFIs with a share varying between 8% and 24% of their total Microfinance investment portfolio. In most cases these equity participations are not common shares traded at public stock exchanges but private equity transactions providing initial risk

<sup>3</sup>according to its yearly report published in January 2012

capital or follow-up investments. They must thus be considered as more risky than standard debt investments. Since the two funds of funds both invest in MIVs that participate in the equity of MFIs, they themselves are also exposed to equity risk.

In total our selection of funds in Table 2.1 manages approximately 1.6 billion USD. Considering that the total MIV market is estimated at 6.8 billion USD (see [Symbiotics (2011)]) but that many MIVs are not accessible for private investors, our sample of MFIFs can be considered representative of the sub-category of Microfinance funds suitable for private investors.

In the following we will now study each of the MFIFs in detail in order to identify general trends, fund specific differences and to finally evaluate their attractiveness from the perspective of private investors.



# Chapter 3

## Analytical Study

In order to be able to evaluate the attractiveness of MFIFs for investors in the context of the local and global financial market as well as emerging markets, we will compare them to several public indices representing both the stock market and the bond market in the USD/EUR currency zone. Since we will consider USD- and EUR-denominated MFIFs separately in the upcoming study, appropriate market indices for either currency zone should be identified. As representatives of the stock market we choose the EURO STOXX 50 and the S&P 500 (local equity), the MSCI World (global equity), as well as the MSCI EM (emerging markets equity). Both MSCI indices are available in USD and in EUR.

The EURO STOXX 50 is the leading Blue-chip index for the Eurozone. It was introduced in 1998 and covers 50 stocks of supersector leaders from 12 Eurozone countries.<sup>1</sup> Reflecting the common stock prices of 500 top publicly traded American companies, the Standard & Poor's 500 (S&P 500) is one of the most important equity indices for the U.S. economy. It has a history of more than 50 years.<sup>2</sup>

The MSCI (Morgan Stanley Capital International) World index was launched in 1969 and today covers over 6,000 securities in 24 developed markets countries, including large, mid, small and micro cap securities. Its sister index for emerging markets exists since 1988, currently covering approximately 2,700 securities in 21 markets that are classified as EM countries.<sup>3</sup>

Within the bond market we distinguish between government and corporate bonds. As proxies for the evolution of the local government bond market in each currency zone we choose the JPM GBI EMU and the iBOXX USD Treasuries Total Return index. The global and emerging markets government bond markets are represented by the JPM GBI Global and the JPM EMBI Global. Note that unfortunately these two indices are only available in USD. We shall hence be cautious when comparing them to MFIFs denoted in EUR, always keeping in mind the volatility of the USD/EUR exchange rate.

Technically, MFIFs can be considered as specialized funds pooling corporate loans (and, to a small extent, equity) in emerging markets. It thus seems reasonable to also include an index representing the general performance of the EM corporate bond market. The most commonly used benchmark for this purpose is the JPM CEMBI. As in case of the

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<sup>1</sup> [www.stoxx.com/indices](http://www.stoxx.com/indices)

<sup>2</sup> [www.spindices.com/indices/equity/sp-500](http://www.spindices.com/indices/equity/sp-500)

<sup>3</sup> [www.msci.com/products/indices](http://www.msci.com/products/indices)

JPM GBI Global and the JPM EMBI the value of the corporate bond index is given in USD and is not available in EUR. Hence, the same restrictions as mentioned above apply when using this benchmark to evaluate the performance of MFIFs' EUR share classes.

J.P. Morgan offers a broad range of index products, of which we use four for the upcoming analytical analysis. The JPM EMU Government Bond Index tracks fixed rate debt issuances from high-income countries that are part of the European Monetary Union (EMU). Since its launch in 1998 the index has been broadly recognized as one of the flagship benchmarks for the European fixed income market. The JPM Government Bond Index Global (hedged in USD) has been a proxy for the performance of government bond instruments in high-income countries spanning the globe since it was first calculated in 1989. The J.P. Morgan Emerging Market Bond Index (EMBI) is the most widely used and comprehensive emerging market sovereign debt benchmark. Historical information is available since 1993. Developed in 2001 the JPM Corporate Emerging Markets Bond Index (CEMBI) tracks USD denominated debt issued by emerging market corporations.<sup>4</sup> The Markit iBOXX Treasuries Index reflects the prices of treasuries of all maturities issued by the US government. Data is available since December 1998.<sup>5</sup>

The Euro Interbank Offered Rate (EURIBOR) reflects the average interest rate at which banks offer to lend unsecured funds to other banks in the EMU and will be the "risk-free" interest rate for EUR investments throughout this study. Since the Euro was not introduced until 1999 the EURIBOR did not exist before 1999.

The respective USD equivalent is the London Interbank Offered Rate (LIBOR USD). Since our focus is on private investors, we consider one year to be an appropriate investment horizon and choose the commonly used 12months versions of both rates.

A table detailing the data source for each benchmark index can be found in the appendix. Though daily data is available, for the purpose of this study it suffices to extract the index value on the last day of each month in analogy to the monthly Net Asset Values (NAVs) of the MFIFs. The monthly returns  $r_{i,t}$  of fund  $i$  and  $r_{j,t}$  of index  $j$  during month  $t$  are then calculated as

$$r_{i,t} = \frac{NAV_{i,t} - NAV_{i,t-1}}{NAV_{i,t-1}} \text{ and } r_{j,t} = \frac{index_{j,t} - index_{j,t-1}}{index_{j,t-1}}, \text{ respectively.}$$

For those funds paying dividends the monthly NAVs must first be dividend-adjusted.

Before examining various statistical measures we will first have a look at each fund's yearly performance from its individual year of inception until June 2012 and compare those values with the corresponding performances of the benchmark indices. This will give us an idea of general trends - globally and in the Microfinance investment market in particular - and can result in first hypotheses regarding the MFIFs' performance during bear and bull market years.



	first	last	currency	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012/1
<b>FUNDS</b>																	
Azure	Oct 11	Jun 12	USD														
BOMF	Aug 98	Jun 12	USD	<b>1.84%</b>	<b>8.34%</b>	<b>6.50%</b>	<b>4.10%</b>	<b>3.26%</b>	<b>3.95%</b>	<b>4.70%</b>	<b>6.56%</b>	6.21%	5.31%	2.33%	1.43%	3.19%	-0.16%
DR Vision	Jul 06	Feb 09	USD								1.51%	5.03%	4.58%	0.72%		0.32%	1.37%
DR Vision Loc	Mar 11	Jun 12	USD														
EMF	Nov 08	Jun 12	USD								0.77%	6.20%	6.17%	<b>6.24%</b>	2.80%	<b>4.49%</b>	<b>3.82%</b>
Finethic	Nov 06	Jun 12	USD										0.03%	4.37%	2.90%	1.11%	1.76%
IC Fund	Aug 10	Jun 12	USD												-1.25%	1.78%	1.11%
rA Global	Dec 03	Jun 12	USD								5.07%	<b>7.70%</b>	6.44%	1.16%	2.46%	3.30%	1.72%
rA Leaders	Dec 06	Jun 12	USD	1.84%	8.34%	6.50%	4.10%	3.26%	2.75%	4.30%	5.81%	5.81%	<b>7.51%</b>	1.74%	<b>2.98%</b>	2.88%	2.65%
AVERAGE											5.82%	5.81%	5.36%	4.31%	2.38%	1.92%	2.02%
<b>BENCHMARKS</b>																	
S&P 500	Jan 99	Jun 12	USD	19.53%	-10.14%	-13.04%	-23.37%	26.38%	8.99%	3.00%	13.62%	3.53%	-38.49%	23.45%	12.78%	0.00%	<b>8.31%</b>
MSCI World	Jan 99	Jun 12	USD	23.56%	-14.05%	-17.83%	-21.06%	30.81%	12.84%	7.56%	17.95%	7.09%	-42.08%	26.98%	9.55%	-7.61%	4.49%
MSCI EM	Jan 99	Jun 12	USD	<b>63.70%</b>	-31.80%	-4.91%	-7.97%	<b>51.59%</b>	<b>22.45%</b>	<b>30.31%</b>	<b>29.18%</b>	<b>36.46%</b>	-54.47%	<b>74.50%</b>	<b>16.36%</b>	-20.41%	2.29%
iBOXX Treasuries	Jan 99	Jun 12	USD	-2.40%	13.33%	6.83%	11.54%	2.26%	3.48%	2.81%	3.11%	8.96%	<b>14.05%</b>	-3.82%	5.82%	<b>9.91%</b>	1.68%
JPM GBI Global	Jan 99	Jun 12	USD	0.68%	10.80%	6.15%	8.40%	2.09%	4.88%	4.97%	3.09%	5.99%	9.42%	0.72%	4.24%	6.17%	2.08%
JPM EMBI Global	Feb 00	Jun 12	USD								9.88%	6.28%	-10.91%	28.17%	12.04%	8.46%	7.45%
JPM CEMBI	Jan 02	Jun 12	USD								6.51%	3.93%	-16.81%	37.49%	12.46%	2.96%	6.78%
iBOXX Overall	Jan 99	Jun 12	USD	-2.17%	12.48%	<b>8.19%</b>	11.09%	4.07%	3.93%	2.54%	3.70%	7.54%	6.53%	3.04%	6.43%	8.47%	2.69%
LIBOR 12M	Jan 99	Jun 12	USD	5.79%	6.85%	3.74%	2.17%	1.37%	2.19%	4.09%	5.35%	5.13%	3.08%	1.57%	0.92%	0.83%	1.06%

Table 3.1: Net returns per calendar year of each USD-denominated MFIF share class since its inception until June 2012 as well as yearly performance of the benchmark indices for USD investors from January 1999 until June 2012. Values in grey font indicate newly initiated funds and relate only to part of the respective calendar year. The average is based on all funds which present a rate of return for the complete 12-months period (i.e. only the values in black font).

	first	last	currency	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012/1
<b>FUNDS</b>													
BBVA	Nov 06	Jun 12	EUR				0.39%	2.17%	5.11%	-1.68%	3.47%	1.33%	0.27%
BOMF	Mar 03	Jun 12	EUR	1.65%	<b>4.40%</b>	<b>3.60%</b>	<b>4.38%</b>	4.77%	5.67%	2.46%	1.34%	0.68%	1.27%
DR Vision	May 06	Jun 12	EUR			0.45%		3.11%	5.60%	3.27%	2.72%	2.51%	1.95%
DR Vision Loc	Nov 10	Jun 12	EUR							5.77%	-2.71%	-2.71%	3.82%
Dutch	Oct 08	Jun 12	EUR						2.64%	2.98%	<b>7.90%</b>	-17.49%	-2.39%
ETIMOS	May 11	Jun 12	EUR									2.73%	1.29%
rA Global	Feb 05	Jun 12	EUR			2.60%	2.70%	<b>6.31%</b>	<b>6.88%</b>	1.09%	2.07%	3.29%	1.55%
rA Leaders	Dec 10	Jun 12	EUR						0.20%		0.20%	2.81%	2.47%
rA Mikro	Jun 07	Jun 12	EUR				2.04%	2.15%	5.60%	2.20%	2.38%	4.44%	1.58%
St. Honoré	Oct 07	Sep 11	EUR					2.27%	3.85%	2.70%	0.86%	0.85%	
Triodos	Aug 09	Jun 12	EUR						-0.16%	0.40%	3.86%	<b>5.32%</b>	<b>4.51%</b>
Wallberg	Nov 08	Jun 12	EUR		4.40%	3.60%	3.04%	3.73%	5.45%	2.20%	3.09%	3.07%	1.96%
AVERAGE													1.66%
<b>BENCHMARKS</b>													
EURO STOXX	Mar 03	Jun 12	EUR	28.96%	6.90%	21.28%	15.12%	6.79%	-44.37%	21.14%	-5.81%	-17.05%	-2.24%
MSCI World	Jan 99	Jun 12	EUR	8.83%	4.71%	23.95%	5.51%	-3.41%	-39.08%	23.02%	17.16%	-4.53%	6.89%
MSCI EM	Jan 99	Jun 12	EUR	<b>26.12%</b>	<b>13.63%</b>	<b>50.16%</b>	<b>15.56%</b>	<b>23.08%</b>	-52.11%	<b>69.06%</b>	<b>24.45%</b>	-17.75%	4.63%
JPM GBI EMU	Jan 99	Jun 12	EUR	3.98%	7.74%	5.28%	-0.25%	1.78%	9.37%	4.32%	1.17%	1.78%	4.04%
JPM GBI Global	Jan 99	Jun 12	USD	2.09%	4.88%	4.97%	3.09%	5.99%	<b>9.42%</b>	0.72%	4.24%	6.17%	2.08%
JPM EMBI Global	Feb 00	Jun 12	USD	25.66%	11.73%	10.73%	9.88%	6.28%	-10.91%	28.17%	12.04%	<b>8.46%</b>	<b>7.45%</b>
JPM CEMBI	Jan 02	Jun 12	USD	15.67%	10.26%	6.35%	6.51%	3.93%	-16.81%	37.49%	12.46%	2.96%	6.78%
EURIBOR 12M	Jan 99	Jun 12	EUR	2.34%	2.27%	2.33%	3.44%	4.45%	4.81%	1.62%	1.35%	2.01%	1.48%

Table 3.2: Net returns per calendar year of each EUR-denominated MFIF share class since its inception until June 2012 as well as yearly performance of the benchmark indices for Eurozone investors from January 2003 until June 2012. Values in grey font indicate newly initiated funds and relate only to part of the respective calendar year. The average is based on all funds which present a rate of return for the complete 12-months period (i.e. only the values in black font).

## 3.1 Historical Performance (p.a.)

Tables 3.1 and 3.2 show the net returns per calendar year of each MFIF since its inception until June 2012 for USD and EUR shares, respectively, as well as the yearly performance of the corresponding benchmark indices. Let us now analyze the historical performance p.a. for USD and EUR investors separately before deriving more general conclusions and common trends.

### *USD Investors*

First focusing on the returns of all funds denoted in USD (Table 3.1), we can observe that no single fund outperforms all other funds based on calendar year returns. For each year the highest return is marked in bold. Except for the small and still very young IC and Azure Global MF funds as well as the DR Vision MF and the EMF funds, all other USD funds are "best-in-class" during at least one of the years since their inception.

The maximum is reached in 2000 by the BlueOrchard MF fund, yielding a very attractive annual return of 8.34%. Moreover, it can be seen that only three funds lost value during any of the analyzed years: While the responsAbility Global MF fund showed only a slightly negative return in its initial year (December 2003), the IC fund ended its initial year 2010 with a negative result of -1.25% and the Azure Global MF fund of funds yielded a negative return of -0.16% during the first half of 2012. Again note that whenever comparing the net returns of individual funds one has to keep in mind that the net values are influenced by the fund's fee structure which varies for different share classes with higher or lower minimum investment requirements.

In comparison to the benchmark indices it can be observed that in each calendar year there is one asset class that yields higher returns than even the best performing MFIF. This is, however, not surprising since especially EM equity but also local and global stocks are highly volatile market instruments, generating very high returns in bull market years (such as 1999, 2003 or 2009) but significantly negative returns in bear market years as for example during the burst of the dotcom bubble in 2001 or the financial crises in 2008 and 2011.

### *EUR Investors*

Performing the same analysis for EUR investors yields the results presented in Table 3.2. Here again it holds that no fund outperforms all other funds based on calendar year returns. While the two oldest and largest funds - the responsAbility Global MF fund and the BlueOrchard MF fund - are the top performers in the five years up to 2008, this position is taken by the Wallberg Global MF fund in 2009, the Dutch Microfund in 2010 and the Triodos MF fund in 2011 and 2012.

The small Dutch Microfund yielded both the best and the worst overall yearly net return with 7.90% in 2010 and -17.49% in 2011. The dramatic loss in value occurred during the months of April and September 2011 when the fund lost 4.8% and 10.9% of its value, respectively. According to the annual report for 2011 the negative performance was mainly caused by a depreciation in the portfolio due to the Microcredit crisis in India.

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<sup>4</sup>[www.jpmorgan.com](http://www.jpmorgan.com)

<sup>5</sup>[www.markit.com](http://www.markit.com)

In the first semester of 2012 the fund's net asset value was still decreasing. Apart from the Dutch Microfund the only MFIFs denoted in EUR yielding negative yearly returns are the BBVA Codespa MF fund (-1.68% in 2009), the DR Vision Local Currency fund (-2.71% in 2011) and the Wallberg Global MF fund (-0.16% in its initial year 2008).

### *General trends*



Figure 3.1: 12months-rolling average of the mean return yielded by all MFIFs included in this study.

After studying the data in Table 3.1 and 3.2 we can already derive a trend in the average annual rate of return of MFIFs. While the mean return increased from 2004 to 2008, there was a sharp drop in 2009. This hypothesis is supported by Figure 3.1 which illustrates the 12months-rolling average of the mean return yielded by all MFIFs which are included in this study. Note that the trend line until 2003 is produced by only one fund, namely the BlueOrchard MF fund. When interpreting results based on such a small sample one should be very cautious since other fund-specific factors can influence the results and distort the trend. Neglecting the values before 2003, the rolling average rate of return reached its maximum of 6.1% in January 2009 after a steady increase of just under 1 percentage point per year. During 2009 we can observe a sharp drop in the yearly returns. Since the beginning of 2010 the rolling average varies around 2% with no clear trend for the upcoming years. In their paper "Microfinance Investors Adjust Strategy in Tougher Market Conditions" [Glisovic, Reille (2010)] discuss possible reasons for this decline. The unquestioned rise of the Microfinance sector came to an end in 2009 when it was suddenly confronted with a number of crises in key markets such as Nicaragua and India which consequently led to bad press both in the developed and the developing world. Besides a number of debt defaults in the portfolios of MFIFs, which hit funds with little portfolio diversification especially hard, the demand from MFIs for

commercial debt funding (as provided by most MIVs) slowed down. The combination of three factors - the rising competition among MIVs, the transformation of many MFIs into regulated institutions and their increased financing through deposits, as well as the appearance of commercial and public banks as second tier Microfinance investors offering cheap financing - pushed the interest rates down and left only little attractive investment opportunities.

So far we have only considered the funds' returns, neglecting the risk involved. The following two sections will be dedicated to a detailed risk-return assessment, first in general over the whole period from 1998 to 2012 (Section 3.2) and later for bear and bull markets separately (Section 3.3). Hereby we will concentrate on independent investment decisions, i.e. in which single asset to invest, before later analyzing the portfolio effect of adding MFIFs to a mix of other assets.

## 3.2 Risk-Return Comparison

In this section we will first analyze the return and risk characteristics of MFIFs - as measured by the average monthly rate of return and the standard deviation of the returns, respectively - in detail before combining those two measures into one statistical ratio, the so-called Sharpe Ratio. The main objective is to identify funds that outperform other asset classes (based on a risk-return comparison) and to evaluate the performance of the class of MFIFs as a whole.

### 3.2.1 Mean Rate of Return and Standard Deviation

Table 3.3 gives the average monthly rate of return and the corresponding standard deviation for all MFIFs and the benchmark indices over the period from 1998 till 2012 as well as the minimum and maximum monthly returns.

Note that the monthly returns are to some extent influenced by the fund's valuation policies as regulated funds must create provisions in accordance to the riskiness of their portfolio. While this dampens the MFIF's return in the short run, the effect disappears in the long run (write-off versus default).

First of all, it is outstanding that three of the studied MFIFs yielded positive returns in each month since their inception. These funds are the USD share class of the DR Vision MF Fund, the Finethic SCA SICAR as well as the ETIMOS fund for EUR investors.

Recall from Section 3.1 that comparisons should be considered with caution, since the funds' data series are of different length and are greatly influenced by general trends.

Regarding the mean monthly returns only, the best result for USD investors was achieved by the DR Vision Local Currency fund. However, it also shows the highest standard deviation among all nine funds of its category. For EUR investors the Triodos MF fund yielded the highest average return in combination with a moderate volatility, closely followed by the EUR version of the DR Vision MF Local Currency fund, which again has one of the highest standard deviations among all twelve EUR funds. While most USD funds offered

	N	min	max	mean	st. dev.	Sharpe Ratio
<b>Funds USD</b>						
Azure	9	-0.10%	3.04%	0.36%	1.01%	27.00%
BOMF	167	-1.00%	1.23%	0.34%	0.29%	21.67%
DR Vision	32	0.00%	1.20%	0.36%	0.20%	10.04%
DR Vision Loc	17	-2.80%	1.99%	0.53%	1.26%	45.58%
EMF	45	-1.00%	0.52%	0.23%	0.23%	56.86%
Finethic	69	0.06%	0.80%	0.41%	0.18%	128.10%
IC Fund	24	-0.50%	0.33%	0.09%	0.22%	5.44%
rA Global	104	-0.30%	2.57%	0.32%	0.32%	29.04%
rA Leaders	66	-0.80%	2.14%	0.36%	0.45%	40.44%
<b>Funds EUR</b>						
BBVA	68	-2.28%	1.89%	0.16%	0.65%	-10.23%
BOMF	112	-1.14%	2.05%	0.27%	0.31%	14.68%
DR Vision	73	-0.51%	0.74%	0.26%	0.20%	13.69%
DR Vision Loc	21	-3.83%	3.67%	0.39%	1.77%	13.76%
Dutch	46	-10.88%	4.99%	-0.17%	2.21%	-14.34%
ETIMOS	12	0.21%	0.54%	0.31%	0.09%	164.52%
rA Global	90	-1.62%	2.37%	0.29%	0.42%	15.72%
rA Leaders	20	-0.77%	1.44%	0.29%	0.49%	28.96%
rA Mikro	62	-0.20%	0.60%	0.29%	0.15%	53.71%
St. Honore	48	-0.46%	0.68%	0.17%	0.22%	-19.18%
Triodos	36	-0.92%	1.63%	0.41%	0.63%	44.82%
Wallberg	44	-1.06%	0.68%	0.28%	0.28%	49.11%
<b>Benchmark Indices USD</b>						
S&P500	168	-16.94%	10.77%	0.24%	4.79%	-0.60%
MSCI World USD	168	-19.05%	10.91%	0.21%	4.92%	-1.23%
MSCI EM USD	168	-29.29%	16.66%	0.90%	7.42%	8.51%
iBOXX Treasuries	163	-4.23%	5.48%	0.47%	1.36%	15.05%
JPM GBI Global	174	-1.99%	3.03%	0.45%	0.88%	19.96%
JPM EMBI	150	-14.89%	7.77%	0.92%	2.76%	24.55%
JPM CEMBI	128	-18.65%	6.32%	0.74%	2.65%	19.76%
LIBOR 12M*	176	0.06%	0.60%	0.28%	0.16%	
<b>Benchmark Indices EUR</b>						
EURO STOXX	113	-14.69%	14.69%	0.21%	5.27%	-0.11%
MSCI World EUR	163	-11.80%	11.12%	0.12%	4.45%	-2.82%
MSCI EM EUR	163	-19.69%	16.50%	0.90%	6.55%	9.94%
JPM GBI EMU	174	-2.82%	4.02%	0.41%	1.10%	14.48%
EURIBOR 12M*	163	0.09%	0.44%	0.25%	0.10%	

Table 3.3: Minimum, maximum and average monthly rate of return, corresponding standard deviation as well as Sharpe Ratio for all MFIFs and benchmark indices over the period from 1998 until 2012. \*The 12months LIBOR/EURIBOR is expressed as risk-free rate per month.

the investor average monthly returns of around 0.35%, the EUR shares of MFIFs provided only around 0.28% on average per month. As can be seen in Table 3.3 the only fund with a negative mean rate of return is the Dutch Microfund. Recalling from the previous section that this fund suffered from severe depreciation of its portfolio in September 2011 (-10.88%) this result is not surprising.

Measured by the standard deviation of the monthly returns, the most stable funds are the Finethic fund for USD investors and the ETIMOS fund for EUR investors. Besides their low variances, they are also among the three best performing funds in their corresponding currency groups regarding the average return. Investments in USD shares involve standard deviations below 0.5%, except in case of the Azure Global MF fund of funds and the DR Vision MF Local Currency fund. Besides the Dutch Microfund, the DR Vision MF Local Currency fund is also the second riskiest MFIF for EUR investors with a standard deviation above 1.7% while the volatility of the remaining ten funds lies more than one percent point below this threshold.

The previous observations regarding the mean and standard deviation of USD and EUR funds suggest that in the past investors in USD shares received on average higher and more stable returns than Eurozone investors. One could hence suspect that the USD funds were better managed than the EUR funds but since the funds' performances are greatly influenced by the USD/EUR currency rate, no independent hypothesis can be derived.

When considering the benchmark indices, one can first observe that all indices - except for the LIBOR and EURIBOR rates as proxies for the risk-free rate - passed periods with negative returns. Note that, as most of the benchmarks used in this study have already been calculated for several centuries, they provide longer data series than the MFIFs. The values in Table 3.3 are based on their monthly performances since January 1998. During this period they provided average monthly returns between 0.12% (MSCI World EUR) and 0.92% (JPM EMBI). As expected, the volatility is highest in equity markets varying between 4.5% and 7.4% while the standard deviation of debt market returns is significantly lower. Among all bond investments, those composed of emerging markets corporate and government bonds present the highest volatilities (around 2.7%). The best diversification and consequently the lowest risk are achieved by global government bonds which include debt issuances all over the world.

Figure 3.2 illustrates the risk-return comparison graphically. When interpreting our observations we should again be careful since the return and risk calculations are based on time series of different lengths for each fund and benchmark index. Nevertheless Figure 3.2 gives us a good idea of general trends and allows us to derive a first hypothesis which can then be tested by means of a more detailed comparison. An ideal investment would yield a high average rate of return in combination with a low standard deviation and should thus be found in the lower right corner of Figure 3.2. A first look at the figure suggests that almost all MFIFs perform better than global and local equity markets regarding the risk-return criteria. In comparison to emerging markets debt the analyzed funds seem to be less risky but on average also provide lower returns. Recalling from the introduction of Chapter 3 that MFIFs can be to some extent considered as a sub-class of corporate emerging markets debt, they constitute a less volatile but also less profitable sub-class. Considering the MFIFs individually, the differences between the data points representing the funds are too small as to derive reliable results, because the influence of

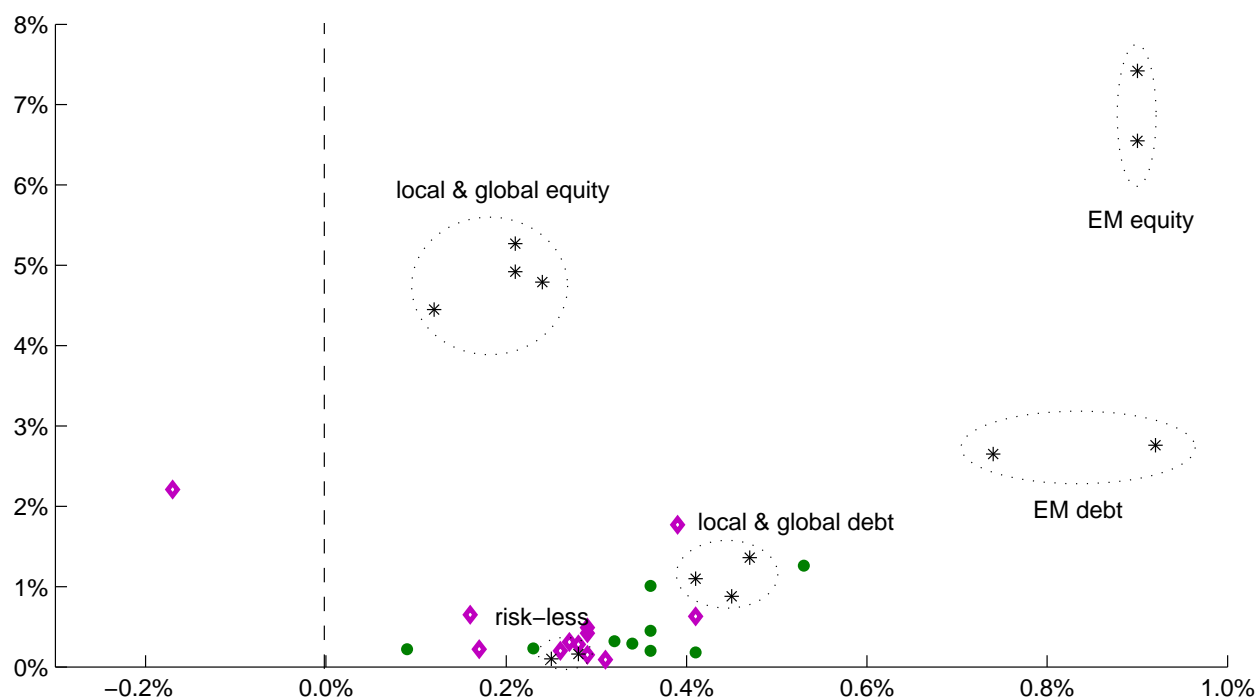


Figure 3.2: Average rate of return versus standard deviation of returns for all USD (green) and EUR (purple) fund share classes and benchmark indices (black).

time-dependent trends and prevailing crises is probably too strong.

Due to the mentioned restrictions of Table 3.3 and Figure 3.2 we will now perform a more sophisticated comparison of single fund versus benchmark returns. For all funds Table A.2 in the appendix presents the average return of each corresponding index during the fund's period of existence.

Since the local equity markets as represented by the S&P 500 and the EURO STOXX 50 yielded negative mean returns during the different time periods since the inception of each fund, it is not surprising that they were outperformed by 80% of the MFIFs. In case of the world and emerging markets stock market, this is only true for ten and nine out of the 21 fund share classes, respectively.

For the bond market the picture is significantly different: Only four/three of the funds provided the investors higher average returns during the corresponding period than local/world debt, respectively. Considering emerging markets debt, we observe that only one fund performed better than the benchmark indices JPM EMBI and JPM CEMBI. These findings are in line with [Forster, Reille, Rozas (2011)] who state that MIV returns in 2010 were more than 350 basis points below the J.P. Morgan corporate bond benchmark in emerging markets, despite the higher country risk and counterparty risks attached to microfinance investments.

As its name suggests the risk-free rate - in our study represented by the 12months LIBOR and EURIBOR expressed on a monthly basis - is associated with no or very little risk and should thus be outperformed by each fund. In fact, this proves to be true with three



exceptions: The two funds that have been liquidated (BBVA Codespa Microfinanzas and St. Honoré MF fund) as well as the Dutch Microfund whose underperformance has already been discussed earlier.

Finally, one can also derive from Table A.2 that the number of funds outperforming each benchmark is rather equally distributed between the USD and the EUR share classes.

While some of the results are congruent with the more simple comparison in Table 3.3, others indeed greatly differ (see e.g. the number of funds outperforming world equity). The more sophisticated analysis, however, so far neglects the risk of the particular asset. We will therefore now combine the performance values with the standard deviations from Table 3.3 into a single measure which allows for easier risk-return comparisons.

### 3.2.2 Sharpe Ratio

Another common statistical measure is the Sharpe Ratio of an investment that puts its rate of return in relation to the standard deviation. It is calculated by subtracting the risk-free rate (LIBOR/EURIBOR) from the investment's rate of return and dividing the result by the standard deviation of its return. The Sharpe Ratio is very useful because even if an investment in one asset yields higher returns than its peers, it is only a good investment if those higher returns do not come with too much additional risk. The greater an investment's Sharpe Ratio, the better its risk-adjusted performance. Readers not familiar with the financial basics and statistical measures used throughout this thesis may be referred to [Elton, Gruber, Brown, Goetzman (2003)].

The last column of Table 3.3 displays the Sharpe Ratio for each MFIF and each benchmark index. The three above mentioned funds that underperform the risk-free rate subsequently generate a negative Sharpe Ratio of up to -19.18% in the worst case (St. Honoré MF fund). Recall that those three funds are experiencing trouble: While the St. Honoré MF and the BBVA funds are already liquidated or currently in liquidation, the Dutch Microfund suffered from significant depreciation in its portfolio during 2011. With Sharpe Ratios far above 100% the USD-denominated Finethic SCA SICAR and the EUR-denominated ETIMOS fund are by far the winners among all MFIFs and outperform all stock and bond market indices. The latter is also true for another four USD and four EUR funds with ratios between 27.00% and 56.86%. With a mean Sharpe Ratio of 29.04% for USD investors and 22.34% for EUR investors most MFIFs outperform the corresponding benchmarks, including emerging market debt. On average USD-denominated funds perform better than their EUR-denominated peers. This observation is due to the negative ratios of three EUR funds.

In summary, the results presented in this section show that on average MFIFs outperform most corresponding local, global and EM stock and bond markets as represented by the selected benchmarks. The performances of single funds, however, vary greatly. While some MFIFs yield very good values, others generated negative returns, even underperforming the risk-free rate. The investor should hence select the fund in which to invest carefully, taking into account the quality of the management, its track record, and other fund specific factors. Alternatively, depending on the amount he is willing to invest in microfinance, it would be possible to spread the risk by investing into various funds.

### 3.3 Regime-Dependent Risk-Return Comparison

Until now we have analyzed mean monthly performance data over the entire period from 1998 to 2012. When analyzing the performance of global and regional stock markets during those 15 years, one can identify several bull markets, during which the global economy boomed and stock yielded good returns, as well as bear markets with dropping stock prices and many nations falling into recession.

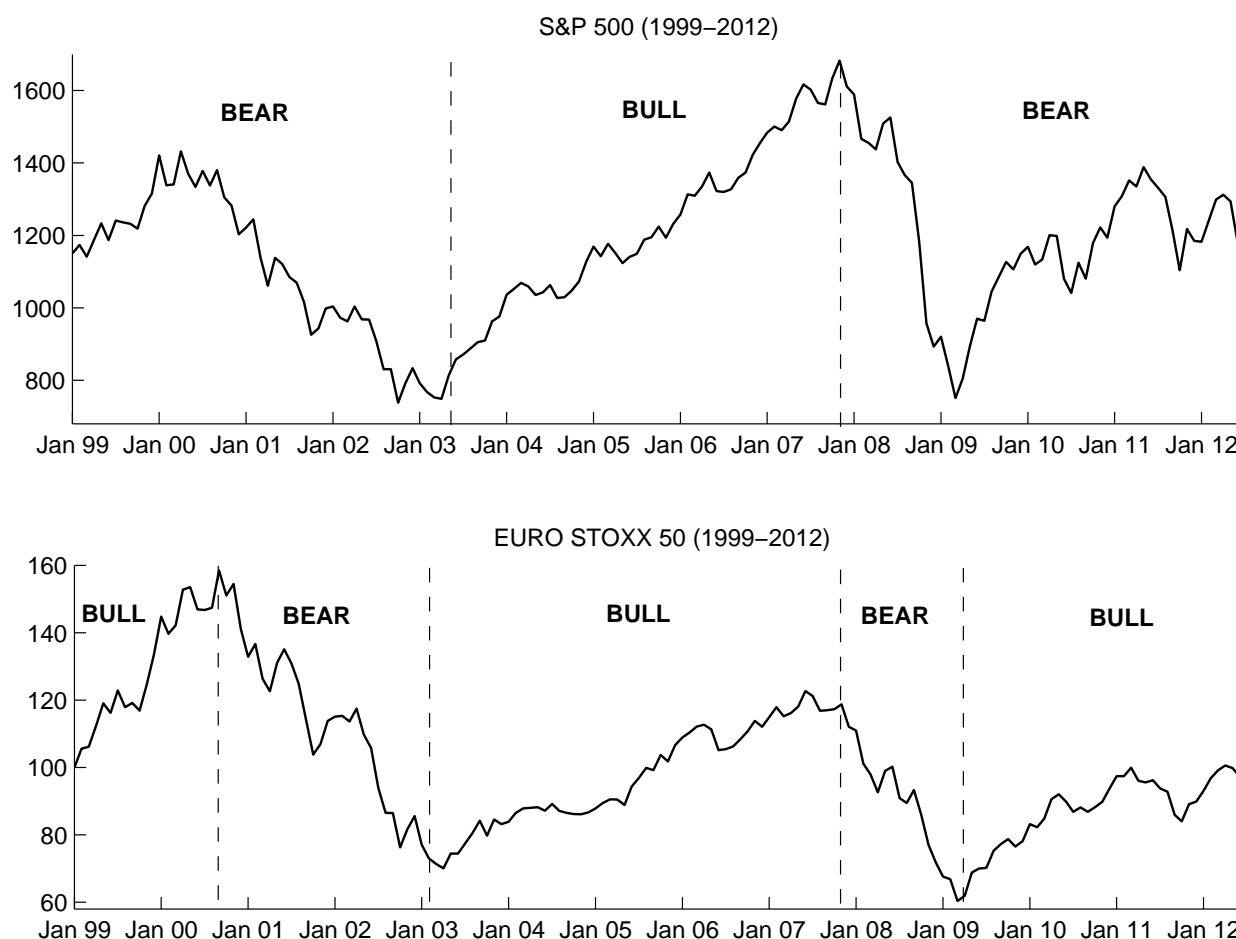


Figure 3.3: Index value of the S&P 500 and the EURO STOXX 50 from 1999 to 2012 as well as corresponding regime (bear/bull market) estimation by the Viterbi algorithm.

In portfolio modeling it is common to divide long time series into two data sets - a bull market and a bear market regime - and to analyze returns, variances, correlations, etc. of each data set separately. We will adopt this approach by splitting the previous risk-return analysis in two parts for booming and recession markets. Since equity is generally more volatile, it reflects bullish or bearish markets much faster and stronger than bond markets. Taking the current debt crisis in Europe as an example, a regional or global recession can hit investors in different currency zones more or less severe. A change in the exchange rate could either worsen or cushion the effects of a crisis overseas. We will thus base the regime-split on the performance of local equity markets, i.e. the S&P 500

for USD investors and the EURO STOXX 50 for EUR investors.

The most common method to estimate the current regime for each point in time (here: each month) when only being able to observe the current and past returns, is the so-called Viterbi algorithm. It was developed by [Viterbi (1967)] and is a dynamic programming algorithm for determining the most likely realizations of an underlying "hidden" regime process (i.e. whether we are in a bull or a bear market) on which the observed returns depend.

Figure 3.3 shows the performance of the two benchmark indices for local equity from 1998 to 2012 and the corresponding Viterbi estimates indicating whether the market is currently experiencing a boom phase or a recession. In general the results suggest that the US economy spend more months in the worse market regime than this occurred in the more diverse Eurozone. More important, however, in both cases the main crises over the past 15 years - the Russian financial crisis in 1998, the burst of the dot-com bubble in 2000, the impacts of September 11 and the financial crisis in 2008 - are reflected in the estimations.

Performing an F-test in order to test the significance of the hypothesis of splitting the stock market time series into a bearish and a bullish regime by the Viterbi algorithm yields p-values of the order of  $10^{-11}$  and  $10^{-8}$  for the S&P 500 and the EURO STOXX 50, respectively. The hypothesis of structural breaks in the data sets is hence significant.

	BEAR MARKET			BULL MARKET		
	N	mean	st. dev.	N	mean	st. dev.
<b>Funds USD</b>						
Azure	9	0.34%	1.02%	0		
rA Global	56	0.28%	<b>0.28%</b>	47	<b>0.36%</b>	0.36%
rA Leaders	56	0.33%	0.49%	9	<b>0.53%</b>	<b>0.21%</b>
BOMF	114	0.30%	0.34%	53	<b>0.41%</b>	<b>0.14%</b>
DR Vision	16	<b>0.37%</b>	<b>0.14%</b>	16	0.35%	0.24%
DR Vision Loc	16	0.48%	1.31%	0		
EMF	44	0.23%	0.25%	0		
Finethic	56	0.40%	0.19%	12	<b>0.47%</b>	<b>0.09%</b>
IC Fund	23	0.07%	0.23%	0		
<b>Benchmarks USD</b>						
S&P 500	114	-0.09%	5.61%	53	<b>0.92%</b>	<b>2.16%</b>
MSCI World	114	-0.31%	5.70%	53	<b>1.30%</b>	<b>2.29%</b>
MSCI EM	114	-0.02%	8.24%	53	<b>2.88%</b>	<b>4.82%</b>
iBOXX Treasuries	109	<b>0.57%</b>	1.42%	53	0.25%	<b>1.24%</b>
JPM GBI Global	114	<b>0.51%</b>	0.93%	53	0.29%	<b>0.82%</b>
JPM EMBI	96	<b>0.94%</b>	3.16%	53	0.84%	<b>1.85%</b>
JPM CEMBI	73	<b>0.82%</b>	3.33%	53	0.58%	<b>1.30%</b>
LIBOR 12M*	114	0.25%	0.17%	53	<b>0.31%</b>	<b>0.13%</b>

Table 3.4: Mean monthly rate of return and standard deviation of USD-denominated MFIF shares and corresponding benchmarks during bear and bull market phases.

Based on the Viterbi estimates indicating "good" and "bad" months we can now divide the data series of each fund into the two regimes and perform separate risk-return com-

comparisons for the two data sets. The results are presented in Tables 3.4 and 3.5. Note that some MFIFs have only a short data history and that hence no data for either bearish or bullish markets is available (e.g. in case of the DR Vision Local Currency fund). Bold type indicates whether funds performed better (i.e. higher returns and lower standard deviations) in the bear or the bull market. In this regard one can observe rather different results for the USD and the EUR investor. While most USD-denoted fund shares performed better when the local stock market was also booming, the opposite is the case for investors in the Eurozone. This behavior is of course influenced by the different split of the data set for either currency based on the S&P 500 and the EURO STOXX 50, respectively.

	BEAR MARKET			BULL MARKET		
	N	mean	st. dev.	N	mean	st. dev.
<b>Funds EUR</b>						
BBVA	18	<b>0.39%</b>	0.84%	50	0.08%	<b>0.55%</b>
BOMF	18	<b>0.42%</b>	<b>0.13%</b>	94	0.24%	0.33%
DR Vision	18	<b>0.42%</b>	<b>0.11%</b>	54	0.21%	0.20%
DR Vision Loc	0			20	0.35%	1.81%
Dutch	7	<b>1.04%</b>	2.49%	38	-0.38%	<b>2.12%</b>
ETIMOS	0			12	0.31%	0.09%
rA Global	18	<b>0.43%</b>	<b>0.34%</b>	71	0.26%	0.44%
rA Leaders	0			19	0.29%	0.51%
rA Mikro	18	<b>0.40%</b>	<b>0.14%</b>	43	0.25%	0.14%
St. Honore	18	<b>0.32%</b>	<b>0.19%</b>	30	0.08%	0.19%
Triodos	0			35	0.40%	0.63%
Wallberg	6	-0.24%	0.30%	38	<b>0.29%</b>	<b>0.29%</b>
<b>Benchmarks EUR</b>						
EURO STOXX	18	-3.20%	7.58%	94	<b>0.84%</b>	<b>4.49%</b>
MSCI World	48	-2.60%	5.77%	114	<b>1.23%</b>	<b>3.16%</b>
MSCI EM	48	-2.16%	8.30%	114	<b>2.15%</b>	<b>5.21%</b>
JPM GBI EMU	48	<b>0.68%</b>	1.11%	114	0.23%	<b>1.09%</b>
JPM GBI Global	48	<b>0.63%</b>	1.02%	114	0.33%	<b>0.81%</b>
JPM EMBI	48	0.42%	3.84%	101	<b>1.13%</b>	<b>2.04%</b>
JPM CEMBI	32	0.28%	4.44%	94	<b>0.87%</b>	<b>1.70%</b>
EURIBOR 12M*	48	<b>0.33%</b>	<b>0.08%</b>	114	0.21%	0.09%

Table 3.5: Mean monthly rate of return and standard deviation of EUR-denominated MFIF shares and corresponding benchmarks during bear and bull market phases.

As in the case of Table 3.3 in Section 3.2 the direct comparison of average monthly returns in Tables 3.4 and 3.5, particularly between MFIFs and benchmark indices, is to some extent distorted by the fact that the number of data points varies from fund to fund and is in most cases significantly smaller than that of the indices. Splitting the time period from 1998 to 2012 in a "good" and a "bad" regime, however, should somewhat reduce this influence.

Focusing on the bear market first, we observe that all funds produced higher average rates of returns and significantly lower standard deviations than each of the three stock market

indices. The debt benchmarks in contrast provided higher returns than all funds but, with few exceptions (Azure Global MF fund and DR Vision Local Currency fund versus JPM GBI Global; Dutch Microfund), involve higher risk as measured by the standard deviation in the monthly rate of return.

In the bull market both equity (local, global and EM) and emerging markets debt yield higher returns than all funds but also incur more volatile returns (with the exception of the underperforming Dutch Microfund and the high standard deviation of the DR Vision Local Currency EUR share class). For local and global bond markets as represented by the iBOXX Treasuries, the JPM GBI EMU and the JPM GBI Global the results are more diverging. While for USD investors MFIFs outperform local and global debt markets having higher mean rates of return in combination with lower standard deviations, no clear conclusion can be drawn for EUR investors. On average the EUR fund shares tend to be less risky than local and global debt instruments but yield slightly lower returns.

Besides the comparison to stock and bond markets, it is crucial to analyze the MFIFs' returns in relation to the corresponding risk-free rate because most funds set their return goals as risk-free rate (LIBOR, EURIBOR or equivalent) plus a certain extra reflecting the additional return that is to be achieved by good fund management and portfolio selection. Again we observe different results for the USD and the EUR currency zones. The 12months LIBOR USD is on average higher and less volatile in bull markets, whereas the exact opposite is the case for the EURIBOR 12months. These differences might be due to the different underlying split in bear and bull markets but are possibly also influenced by the particular currency policies in the United States and the European Monetary Union. During bear markets the MFIFs' USD fund shares are on average 0.06% above the LIBOR. However, two funds yielded lower mean monthly returns than the risk-free rate, namely the EMF MF fund and the IC fund. EUR funds on average achieved returns that were 0.13% above the EURIBOR but again two funds - the Wallberg Global MF fund and the St. Honoré MF fund - underperformed the EURIBOR.

In bull markets all USD funds generated average returns above the LIBOR, with an average outperformance of 0.12%. EUR funds' average rates of return in contrast were only 0.02% above the EURIBOR. This significantly different result is however strongly influenced by the negative performance of the Dutch Microfund and the small mean return of the BBVA fund.

Analyzing the MFIFs' risk and return characteristics in bear and bull markets separately, we again saw that the performances of single funds vary greatly. Though the risk-free rate was on average outperformed in both bear and bull markets, this is not the case for all funds, stressing the importance of the selection of the "right" MFIF. Moreover, investors should also consider when to invest. While during bear markets, the MFIFs outperformed all stock market indices (not surprisingly since bear markets are defined by declining stock prices), the latter yielded higher returns during bull markets. Vice versa, the benchmarks representing the bond market presented better rates of return than the funds during bear markets but were at least partly outperformed by the US-denominated MFIF fund classes in bullish markets.

By means of the previous analysis we already gained a quite detailed picture of the attractiveness of specific funds and MFIFs in general. While our considerations so far were concentrated on independent investment decisions, i.e. in which single asset to invest, we

will now analyze the effect of adding MFIFs to a diversified portfolio of assets.

## 3.4 MFIFs' Impact on Investment Portfolios

Focusing on private investors it is probable (and would be recommendable) that they do not invest all their savings into Microfinance funds. So far we have primarily looked at statistical measures indicating the attractiveness of an investment when having to decide between various assets independently (mean, standard deviation, Sharpe Ratio). Private investors, however, are not only concerned about the individual returns of each asset class but mainly interested in the total performance of their portfolio of assets. The latter is strongly influenced by the correlations between the portfolio assets. While negatively correlated assets provide diversification and reduce portfolio risk, positively correlated assets can highly increase the portfolio risk (see [Elton, Gruber, Brown, Goetzman (2003)]). We will thus now analyze the additional return and associated risk caused by MFIFs as part of an investor's portfolio of stock and/or bond market instruments (which will again be represented by the same benchmark indices).

### 3.4.1 Portfolio Risk (Beta and R-Squared Coefficients)

Let us first focus on portfolio risk. Two main indicators for investment risk in portfolio theory are the beta and the R-squared coefficients. Both are calculated via a linear least squares regression model with the particular asset being the dependent variable and the benchmark being the independent variable.

Beta can be interpreted as the systematic risk of an asset or a portfolio in comparison to a benchmark representing the market. It reflects the sensitivity of the asset's returns to the returns of the benchmark, thus indicating its correlation to the market.

R-Squared gives the percentage of the asset's movements that can be explained by movements in the benchmark index. ([Elton, Gruber, Brown, Goetzman (2003)])

[Janda, Svárovská (2009)] performed a similar analysis using data from January 2006 to March 2009 for the responsAbility Global MF fund, the responsAbility MF Leaders fund, the DR Vision MF fund, the BlueOrchard MF fund and the St. Honoré MF fund as well as the MSCI World, the MSCI EM, the iBOXX Overall and the JPM EMBI as benchmarks. They conclude that the MFIFs in their sample do not show any positive but rather slightly negative correlation to world equity markets. In case of the EM and bond market benchmarks the results were not statistically significant. Their results were somewhat limited by the small number of funds included and the short data series (three years and three months).

Table 3.6 presents the results of our study. For each combination of one MFIF and one benchmark index and both currencies the R-Squared, the beta coefficient and its level of significance (the so-called p-value) are given. Results that are statistically significant at a level of at least 90% (i.e. p-value < 10%) are marked in bold. Typical thresholds for the p-value are 1%, 5% or 10%. Positive and statistically significant betas can be easily identified by the green font color. Negative betas are marked in red. A first look at the font colors in Table 3.6 suggests that there is no general rule regarding the algebraic sign

	USD Funds										EUR Funds										
	Azure	BOMF	Vision	V. Loc	EMF	Fin.	IC	rA Gl.	rA Le.	BBVA	BOMF	Vision	V. Loc	Dutch	ETIMOS	rA Gl.	rA Le.	rA Mi.	Honore	Triodos	Wallb.
S&P 500/	48.8%	0.3%	0.3%	55.5%	0.1%	0.0%	12.9%	4.5%	0.0%	4.9%	0.5%	8.0%	1.3%	0.6%	35.1%	0.5%	7.8%	13.4%	1.8%	25.5%	11.1%
EURO	15.2%	-0.4%	-0.2%	21.3%	-0.2%	0.0%	-1.8%	-1.5%	-0.1%	-2.4%	0.4%	-1.0%	3.4%	-2.6%	-0.8%	-0.6%	2.3%	-0.9%	-0.5%	-5.7%	1.5%
STOXX	3.6%	45.7%	75.3%	0.1%	80.2%	97.9%	8.4%	5.3%	89.1%	7.0%	44.9%	1.5%	62.4%	60.9%	4.3%	49.7%	23.2%	0.3%	36.1%	0.2%	2.7%
MSCI	37.7%	0.3%	0.3%	62.7%	0.3%	0.1%	17.6%	2.9%	0.0%	1.1%	0.3%	1.3%	37.4%	0.1%	39.3%	1.0%	0.7%	11.5%	1.0%	0.5%	10.4%
World	11.2%	-0.3%	-0.2%	19.5%	-0.2%	0.1%	-1.9%	-1.1%	0.1%	-1.6%	0.4%	-0.5%	32.9%	-2.0%	-1.6%	-1.0%	1.3%	-1.2%	-0.5%	-1.5%	2.3%
USD/EUR	7.9%	47.9%	76.9%	0.0%	71.6%	75.4%	4.1%	8.2%	90.9%	39.8%	59.4%	34.3%	0.3%	79.9%	2.9%	35.0%	72.6%	0.7%	50.4%	66.9%	3.3%
MSCI	34.3%	0.2%	0.0%	78.0%	0.2%	3.5%	20.2%	3.2%	0.0%	5.9%	1.0%	3.2%	45.3%	0.6%	17.6%	0.7%	7.6%	19.8%	0.4%	2.3%	4.9%
EM	7.3%	-0.2%	0.0%	15.1%	0.2%	0.4%	-1.5%	-0.8%	-0.1%	-2.4%	0.5%	-0.6%	23.6%	2.7%	-0.6%	-0.6%	2.7%	-1.0%	-0.2%	-2.1%	1.1%
USD/EUR	9.8%	57.2%	90.7%	0.0%	75.0%	12.4%	2.8%	6.9%	90.0%	4.6%	30.4%	12.8%	0.1%	61.0%	17.4%	42.3%	24.0%	0.0%	68.0%	37.9%	15.0%
iBOXX	9.7%	3.5%	1.8%	21.3%	0.2%	0.3%	3.5%	0.7%	1.0%	0.8%	0.1%	0.0%	0.0%	0.0%	0.9%	0.0%	7.2%	0.0%	0.0%	3.9%	0.0%
Tr./JPM	-30.8%	4.1%	1.7%	-53.2%	-2.2%	0.7%	3.7%	2.0%	-3.2%	4.4%	-0.9%	-0.1%	-1.1%	-0.2%	0.5%	0.1%	-8.5%	0.1%	-0.3%	8.9%	0.1%
GBI EMU	41.5%	1.8%	46.5%	6.3%	35.7%	64.5%	38.1%	40.6%	42.6%	47.4%	72.8%	94.4%	96.5%	99.4%	76.7%	98.1%	25.4%	94.2%	90.4%	24.9%	97.7%
JPM GBI	22.2%	3.7%	0.9%	13.0%	0.5%	0.1%	1.2%	0.4%	1.4%	0.3%	0.7%	0.2%	6.0%	2.3%	13.6%	0.2%	14.3%	0.4%	0.8%	6.0%	3.0%
Global	-54.3%	6.4%	1.8%	-56.8%	-1.8%	0.5%	2.7%	2.4%	-5.7%	-3.9%	-0.3%	-1.1%	-49.4%	-34.0%	3.7%	2.3%	-22.8%	1.0%	-2.1%	18.6%	-4.9%
JPM	20.0%	1.2%	61.2%	15.5%	64.3%	84.5%	61.1%	51.5%	34.9%	64.9%	36.5%	68.6%	28.4%	31.8%	23.9%	65.2%	10.0%	64.2%	53.5%	15.1%	26.4%
JPM	30.0%	0.0%	0.2%	68.7%	0.7%	1.3%	6.8%	3.8%	1.4%	15.7%	0.6%	9.2%	13.1%	0.2%	1.1%	0.3%	14.6%	15.9%	0.7%	11.4%	3.5%
EMBI	24.9%	0.0%	0.2%	47.7%	0.9%	0.7%	-2.8%	-2.4%	-1.9%	-8.8%	-1.0%	-2.1%	28.7%	3.0%	-0.4%	-0.9%	9.0%	-2.0%	-0.6%	-10.6%	2.4%
JPM	12.7%	99.1%	82.6%	0.0%	59.6%	35.8%	21.8%	4.6%	33.6%	0.1%	39.9%	0.9%	10.7%	76.5%	74.3%	58.6%	9.6%	0.1%	56.4%	4.4%	22.3%
JPM	53.4%	0.3%	0.0%	76.6%	0.4%	1.4%	8.3%	3.6%	1.8%	15.1%	0.0%	10.4%	26.9%	2.5%	4.9%	0.6%	7.6%	14.0%	0.1%	19.7%	1.9%
CEMBI	35.3%	-0.5%	0.1%	48.2%	0.6%	0.6%	-3.3%	-2.2%	-1.8%	-7.6%	-0.1%	-2.0%	43.6%	9.2%	-0.8%	-1.1%	6.4%	-1.6%	-0.2%	-15.1%	1.7%
JPM	2.5%	51.9%	93.7%	0.0%	69.3%	34.1%	17.2%	5.5%	28.2%	0.1%	93.2%	0.5%	1.6%	29.6%	49.0%	46.9%	23.9%	0.3%	85.3%	0.7%	37.8%

Table 3.6: R-Squared (first value), beta coefficient (second value) and corresponding p-value (third value) for each MFIF/benchmark combination. Betas which are statistically significant at a level of at least 90% are marked in green if positive and red if negative.

of the beta coefficients of all funds. Let us, however, analyze the statistically significant results more in detail.

Starting with the stock market as benchmark, two of the USD-denominated MFIFs - the Azure Global MF fund and the DR Vision Local Currency fund - show positive betas indicating a systematic risk in combination with local, world and EM equity. Those betas vary between 7.3% (Azure Global MF fund / EM equity) and 21.3% (DR Vision Local Currency fund / local equity), whereby the latter is even significant at a level of 99%. In contrast, two other funds - the IC fund and the responsAbility MF Leaders fund - yield negative betas for all stock market benchmarks with a mean statistically significant beta of -1.4%. For EUR investors the picture is similar if maybe not as clear: While the DR Vision Local Currency fund and the Wallberg Global MF fund present positive betas for world and EM/local stock markets (varying between 1.5% and 32.9%), we observe negative betas for the BBVA fund, the DR Vision MF fund, the ETIMOS fund, the responsAbility Mikrofinanz-Fonds and the Triodos SCA SICAR in combination with at least one of the equity benchmarks ranging from -0.8% to -5.7%.

In relation to local and world debt, the USD share class of the BlueOrchard MF fund is the only MFIF share class with a statistically significant positive beta coefficient of 4.1% and 6.4%, respectively. A significantly negative beta at a confidence level of 90% is shown by the USD shares of the DR Vision Local Currency fund (-53.2% in combination with the iBOXX Treasuries). For emerging markets debt our analysis yields positive betas for the Azure Global MF fund (35.3%), both share classes of the DR Vision Local Currency fund (USD: 47.7% and 48.2%; EUR: 43.6%) and the EUR shares of the responsAbility MF Leaders fund (9.0%) but negative values for the USD shares of the responsAbility Global MF fund, the BBVA fund, the DR Vision MF fund, the responsAbility Mikrofinanz-Fonds and the Triodos SCA SICAR ranging from -1.6% to -15.1%.

In general, only few of the presented beta coefficients are statistically significant at a level of at least 90% and those which do generate a p-value below 10% are with few exceptions close to zero.

Summing up the findings from above, we observed that for each benchmark category some funds show positive betas while about the same number of funds show negative values. Unfortunately, no clear conclusion can be drawn. The different beta coefficients might be due to specific characteristics of the MFIFs, such as its geographic focus or whether loans are provided in hard or local currency. A detailed analysis of these characteristics should be the subject of a separate study.

The observed R-Squared values are rather low indicating that the main portion of the riskiness of MFIFs is not linked to our sample of benchmarks. In the case of local stock markets, on average 11.1% of the variability in the funds' returns can be attributed to the movements of the S&P 500 and the EURO STOXX 50. Similar R-squared values of 10.8% and 11.9% are reached in comparison to global equity (MSCI World) and emerging markets equity (MSCI EM). With respect to local and global debt, represented by the iBOXX Treasuries (for USD funds) / the JPM GBI EMU (for EUR funds) and the JPM GBI Global, the MFIFs show even lower R-Squared coefficients of just 2.6% and 4.3%. The values corresponding to emerging markets debt are at similar levels as those relating to equity markets: 9.5% for the JPM EMBI and 11.9% for the JPM CEMBI. Recall from the introductory section of Chapter 3 that MFIFs can be to some extent considered as



a sub-class of corporate emerging markets bonds. The regression analysis and resulting R-Squared values, however, suggest that the performance of the sub-class of MFIFs is in general not closely correlated to the performance of corporate EM debt.

Following the approach explained in Section 3.3 we repeated the regression analysis and the calculation of beta and R-Squared coefficients for the split data sets reflecting bear and bull markets. The results are presented in Tables A.3 and A.4 in the appendix. The statistical values are very similar to the above results indicating that the correlations between MFIFs and stock and bond market indices are rather stable and independent of whether the local stock market is booming or experiencing a recession. Both the number of statistically significant betas and their levels remain approximately the same in bear and bull markets. Average R-Squared values vary between 5.2% (local debt) and 16.2% (EM equity) during bearish markets as well as between 2.2% (local debt) and 9.6% (EM equity) during bullish markets.

### 3.4.2 Portfolio Performance (Jensen's Alpha)

The beta and R-Squared coefficients obtained by regression analysis are indicators of the MFIFs' risk in a portfolio, i.e. in combination with other asset classes, namely equity and debt. Since most investment decisions are risk- and return-driven we will now also present the corresponding statistical measure for the portfolio performance of MFIFs in combination with the benchmarks. The so-called Jensen's Alpha gives the excess return of an asset (here: the MFIF) over a given benchmark adjusted for systematic risk. In its most common form it is calculated using the Capital Asset Pricing Model (CAPM) according to which it is defined as

$$\alpha_{i,m} = r_i - [r_f + \beta_{i,m} \cdot (r_m - r_f)],$$

where  $i$  and  $m$  indicate the respective fund and equity/debt benchmark,  $\alpha_{i,m}$  the Jensen's Alpha,  $r_i$  and  $r_m$  the MFIF's and the benchmark's average rate of return (see Table A.2),  $r_f$  the risk-free rate and  $\beta_{i,m}$  the beta coefficient from above (see Table 3.6). ([Elton, Gruber, Brown, Goetzman (2003)])

Table 3.7 gives Jensen's Alpha coefficient for each MFIF compared to local, global and emerging markets stock and bond markets. Recall from Section 3.2 that three funds yielded lower average monthly returns than the risk-free rate during the period since their inception. Since Jensen's Alpha calculates the excess returns above the risk-free rate it is not surprising that negative values are obtained for those three funds, namely the BBVA fund, the Dutch Microfund and the St. Honoré MF fund. Further two funds show negative alphas: the USD/EUR shares of the DR Vision Local Currency fund against EM government/corporate debt and the Azure Global MF fund of funds in comparison to local equity as well as EM debt. All other MFIFs generate positive excess returns against all stock and bond market benchmarks. The average of the Jensen's Alpha of all MFIFs against each benchmark is positive and ranges from 0.06% for the JPM EMBI and the JPM CEMBI to 0.13% for the iBOXX Treasuries / JPM GBI EMU.

Since Jensen's Alpha is calculated based on the beta coefficients in Table 3.6 and since only few of the betas were statistically significant at a level of at least 90% one has to keep in mind that the corresponding Jensen's Alpha is subject to the same restriction.

	S&P 500/ EURO STOXX	MSCI World	MSCI EM	iBOXX Tr./JPM GBI EMU	JPM GBI Global	JPM EMBI	JPM CEMBI
<b>Funds USD</b>							
Azure	<b>-0.05%</b>	<b>0.13%</b>	<b>0.21%</b>	0.33%	0.40%	-0.05%	<b>-0.14%</b>
BOMF	0.04%	0.05%	0.04%	<b>0.09%</b>	<b>0.02%</b>	0.06%	0.07%
DR Vision	0.02%	0.02%	0.02%	0.01%	0.02%	0.02%	0.02%
DR Vision Loc	<b>0.40%</b>	<b>0.53%</b>	<b>0.55%</b>	<b>0.79%</b>	0.73%	<b>-0.07%</b>	<b>0.16%</b>
EMF	0.13%	0.13%	0.13%	0.14%	0.14%	0.12%	0.12%
Finethic	0.23%	0.23%	0.23%	0.22%	0.23%	0.22%	0.22%
IC Fund	<b>0.03%</b>	<b>0.02%</b>	<b>0.01%</b>	0.00%	0.00%	0.04%	0.03%
rA Global	<b>0.09%</b>	<b>0.09%</b>	<b>0.10%</b>	0.09%	0.09%	<b>0.11%</b>	<b>0.10%</b>
rA Leaders	0.18%	0.18%	0.18%	0.19%	0.20%	0.19%	0.19%
<b>Funds EUR</b>							
BBVA	<b>-0.09%</b>	-0.07%	<b>-0.06%</b>	-0.07%	-0.08%	<b>-0.05%</b>	<b>-0.03%</b>
BOMF	0.05%	0.05%	0.04%	0.05%	0.05%	0.05%	0.05%
DR Vision	<b>0.02%</b>	0.03%	0.03%	0.03%	0.02%	<b>0.03%</b>	<b>0.04%</b>
DR Vision Loc	0.28%	<b>0.05%</b>	<b>0.28%</b>	0.24%	0.17%	0.19%	<b>-0.03%</b>
Dutch	-0.33%	-0.31%	-0.34%	-0.32%	-0.37%	-0.33%	-0.41%
ETIMOS	<b>0.14%</b>	<b>0.16%</b>	0.15%	0.15%	0.16%	0.15%	0.16%
rA Global	0.06%	0.07%	0.07%	0.07%	0.07%	0.07%	0.07%
rA Leaders	0.16%	0.14%	0.15%	0.16%	0.11%	<b>0.12%</b>	0.09%
rA Mikro	0.07%	<b>0.08%</b>	<b>0.08%</b>	0.08%	0.08%	<b>0.09%</b>	<b>0.09%</b>
St. Honore	-0.05%	-0.05%	-0.04%	-0.04%	-0.05%	-0.04%	-0.04%
Triodos	<b>0.26%</b>	0.30%	0.30%	0.27%	0.31%	<b>0.31%</b>	<b>0.43%</b>
Wallberg	<b>0.14%</b>	<b>0.13%</b>	0.13%	0.14%	0.13%	0.13%	0.12%
<b>Average</b>	0.09%	0.09%	0.11%	0.13%	0.12%	0.06%	0.06%

Table 3.7: Jensen's Alpha for each MFIF in relation to local/global/EM equity and debt. Values marked in bold are statistically significant at a level of at least 90% (see Table 3.6).

In Table 3.7 those values with p-values  $< 10\%$  are marked in bold. In particular, most of the negative alphas are not statistically significant. As a consequence the average of all statistically significant alphas is with  $0.12\%$  even higher than the overall average.

The findings in this section indicate that adding Microfinance investments to a portfolio of equity or debt instruments has a positive impact on the portfolio's mean rate of return while the influence on the total portfolio risk is not as clear.

# Chapter 4

## Conclusion

This thesis reassesses the attractiveness of microfinance investment funds from the perspective of private investors taking into account the recent difficulties of the sector.

After defining appropriate criteria for the selection of the sample of MFIFs and presenting information on each of the funds in Chapter 2, in Chapter 3 we performed an empirical analysis comparing monthly return data of a representative set of MFIFs to common benchmarks as proxies for the local (USD currency zone/Eurozone), international and emerging markets stock as well as bond markets.

We started by calculating the annual returns of each MFIF since its inception and graphically presented the mean 12months rolling average rate of return of all funds (Section 3.1). Here we observed that while the mean return increased steadily until 2008 - the rolling average rate of return reaching a maximum of 6.1% in January 2009 - there was a sharp performance drop in 2009. Since the beginning of 2010 the rolling average varies around 2% with no clear trend for the upcoming years.

In the following risk-return comparison (Section 3.2) we then not only analyzed the mean monthly rates of return of each MFIF and benchmark index but also its riskiness as measured by the standard deviation of its returns, and finally presented the Sharpe Ratio which combines both measures into a single number. The results showed that on average MFIFs outperform most corresponding local, global and EM stock and bond markets as represented by the selected benchmarks. The performances of single funds, however, vary greatly. While some MFIFs yield very good values, others generated negative returns, even underperforming the risk-free rate. The selection of the "correct" fund(s) is thus of crucial importance for private investors.

In Section 3.3 we followed the common approach of splitting time series into up-market and down-market phases based on the current market situation. Analyzing the MFIFs' risk and return characteristics in bear and bull markets separately, we again saw that the performances of single funds vary greatly. Though the risk-free rate was on average outperformed in both bear and bull markets, this is not the case for all funds, stressing again the importance of the selection of the "best" MFIF. We furthermore discussed the crucial issue of when to invest.

While up to here focusing on the performance of microfinance investment funds versus other assets seen individually, in Section 3.4 we assessed the impact of adding the funds to a portfolio of common equity and bond market instruments taking into account both

the portfolio risk (measured by the beta and R-Squared coefficients) and the portfolio performance (measured by the Jensen's Alpha). Here our results indicated that adding Microfinance investments to a portfolio of equity or debt instruments has a positive impact on the portfolio's mean rate of return while the influence on the total portfolio risk is not as clear.

As mentioned above, one of the main objectives of this thesis was to test the results presented in previous studies on a broad and representative sample of funds and taking into account the sector's recent evolution. In summary our results show the same positive tendencies but to a lesser extent. While earlier studies focused on the biggest and best performing funds only, the results for our broad sample of MFIFs are not as uniform but vary significantly.

We finally conclude that our answer to the central question of this thesis "Are MFIFs attractive for private investors?" is 'Yes' but that one has to select the fund in which to invest carefully based on its track record, the investment currency and the current market situation (bear/bull). This certainly builds a starting point for further research.

Overall the MFIF market is still rather young with new products being introduced every year. Though the data series included in our study are of maximum length and significantly longer than in previous studies, a regular reassessment taking into account new developments in the sector would be recommendable in order to guarantee reliable recommendations. This is especially the case for the bear/bull market analysis where the monthly returns are split in two even shorter datasets.

# Appendix A

	DATA SOURCE
<b>Monthly NAVs of MFIFs</b>	
Azure Global Microfinance Fund	mail: @azure-partners.com
BBVA Codespa Microfinanzas	download: www.bbvafondos.com
BlueOrchard Microfinance Fund	mail: @blueorchard.com
DR - Vision Microfinance Fund	download: www.accion.de
DR - Vision Microfinance Fund Local Currency	download: www.accion.de
Dutch Microfund N.V.	download: www.annexum.nl quote.morningstar.com
EMF Microfinance Fund AGmvK	download: www.enabling.li
ETIMOS Fund Global MicroFinance Debt	download: www.finesti.com
Finethic SCA SICAR	mail: @fundo.ch
IC Fund - Asia Women Microfinance	mail: @independent-capital.com
responsAbility Global Microfinance Fund	download: www.responsability.com
responsAbility Microfinance Leaders	download: www.responsability.com
responsAbility Microfinanz-Fonds	download: www.responsability.com
St. Honoré Microfinance Fund	Bloomberg Market Data
Triodos Microfinance Fund	Bloomberg Market Data
Wallberg Global Microfinance Fund - I	download: www.wallberg.lu
<b>Monthy values of benchmark indices</b>	
S&P 500	download: finance.yahoo.com
EURO STOXX 50	download: www.stoxx.com
MSCI World	download: www.msci.com
MSCI Emerging Markets	download: www.msci.com
Markit iBOXX Treasuries	download: products.markit.com
J.P. Morgan Government Bond Index Global	Bloomberg Market Data
J.P. Morgan GBI European Monetary Union	Bloomberg Market Data
J.P. Morgan Emerging Markets Bond Index	Bloomberg Market Data
J.P. Morgan Corporate EM Bond Index	Bloomberg Market Data
LIBOR 12months	download: www.fedprimerate.com
EURIBOR 12months	download: www.euribor-info.com
<b>Additional information on MFIFs</b>	Syminvest (Symbiotics S.A.)

Table A.1: Sources of fund and index data.

	STOCK MARKETS				BOND MARKETS				RISK-FREE
	S&P 500/ EU.STOXX	MSCI World USD/EUR	MSCI EM USD/EUR	iBOXX Tr./ JPM GBI EMU	JPM GBI Global	JPM EMBI	JPM CEMBI	LIBOR/ EURIBOR*	
<b>Funds USD</b>	mean								
Azure	0.36%	2.18%	1.40%	0.99%	0.33%	1.38%	1.27%	0.09%	
BOMF	0.34%	-5.31%	-4.26%	-12.93%	0.90%	3.57%	1.91%	0.28%	
DR Vision	0.36%	-1.56%	-1.59%	-0.87%	0.56%	0.20%	-0.09%	0.34%	
DR Vision Loc	0.53%	0.32%	-0.33%	-0.62%	0.57%	1.18%	0.68%	0.08%	
EMF	0.23%	0.92%	0.76%	1.41%	0.44%	1.49%	1.51%	0.10%	
Finethic	0.41%	0.14%	-0.02%	0.57%	0.42%	0.80%	0.67%	0.19%	
IC Fund	0.09%	1.04%	0.57%	0.06%	0.36%	0.91%	0.65%	0.07%	
rA Global	0.32%	0.35%	0.36%	1.08%	0.41%	0.84%	0.67%	0.23%	
rA Leaders	0.36%	0.13%	-0.06%	0.51%	0.42%	0.79%	0.66%	0.18%	
<b>Funds EUR</b>									
BBVA	0.16%	-0.65%	-0.11%	0.42%	0.42%	0.75%	0.65%	0.23%	
BOMF	0.27%	0.19%	0.37%	1.11%	0.37%	0.89%	0.69%	0.22%	
DR Vision	0.26%	-0.49%	0.00%	0.47%	0.45%	0.83%	0.70%	0.23%	
DR Vision Loc	0.39%	-0.78%	0.74%	-0.01%	0.35%	0.77%	0.54%	0.15%	
Dutch	-0.17%	-0.37%	0.50%	0.89%	0.44%	1.13%	1.07%	0.15%	
ETIMOS	0.31%	-0.87%	0.67%	-0.08%	0.48%	1.20%	0.61%	0.16%	
rA Global	0.29%	-0.13%	0.24%	0.89%	0.40%	0.81%	0.63%	0.23%	
rA Leaders	0.29%	-0.48%	0.56%	-0.21%	0.43%	0.97%	0.63%	0.15%	
rA Mikro	0.29%	-0.87%	-0.17%	0.27%	0.46%	0.81%	0.68%	0.21%	
St. Honore	0.17%	-1.23%	-0.58%	-0.28%	0.45%	0.69%	0.58%	0.22%	
Triodos	0.41%	-0.20%	0.94%	0.83%	0.41%	1.10%	0.91%	0.13%	
Wallberg	0.28%	-0.11%	0.66%	1.28%	0.42%	1.43%	1.49%	0.14%	

Table A.2: Average monthly return of the corresponding benchmark indices during each fund's period of existence (month of inception until June 2012 or month of liquidation). The green font color indicates that the MFIF yielded a higher average monthly return than the respective benchmark. \*The 12months LIBOR/EURIBOR is expressed as risk-free rate per month.

	USD Funds						EUR Funds																			
	Azure	BOMF	Vision	V. Loc	EMF	Fin.	IC	rA	GL	rA	Le.	BBVA	BOMF	Vision	V. Loc	Dutch	ETIMOS	rA	GL	rA	Le.	rA	Mi.	Honore	Triodos	Wallb.
S&P 500/	<b>48.8%</b>	0.6%	4.4%	<b>55.5%</b>	0.1%	0.1%	<b>12.9%</b>	<b>8.3%</b>	0.1%	8.0%	0.3%	8.0%	0.3%	3.1%	N/A	37.9%	N/A	12.7%	N/A	20.6%	0.0%	0.0%	0.0%	0.0%	N/A	11.3%
EURO	<b>15.2%</b>	-0.5%	-0.5%	<b>21.3%</b>	-0.2%	-0.1%	<b>-1.8%</b>	<b>-1.4%</b>	-0.2%	-3.1%	-0.1%	-3.1%	-0.1%	-0.2%	N/A	-14.8%	-1.6%	-1.6%	<b>-0.8%</b>	0.0%	0.0%	0.0%	0.0%	N/A	1.0%	
STOXX	<b>3.6%</b>	40.2%	43.6%	<b>0.1%</b>	80.2%	78.1%	<b>8.4%</b>	<b>3.1%</b>	84.6%	25.6%	84.0%	25.6%	84.0%	48.7%	14.1%	14.7%	14.7%	14.7%	<b>5.9%</b>	94.4%	5.9%	94.4%	94.4%	51.5%	51.5%	
MSCI	<b>37.7%</b>	0.8%	7.2%	<b>62.7%</b>	0.3%	0.0%	<b>17.6%</b>	<b>7.2%</b>	0.0%	0.5%	0.3%	0.5%	0.3%	0.5%	8.4%	9.9%	9.9%	9.9%	15.5%	6.7%	15.5%	6.7%	6.7%	22.8%	22.8%	
World	<b>11.2%</b>	-0.5%	-0.6%	<b>19.5%</b>	-0.2%	0.0%	<b>-1.9%</b>	<b>-1.2%</b>	0.0%	1.0%	0.1%	1.0%	0.1%	-0.1%	-9.4%	-1.8%	-1.8%	-1.8%	-0.9%	0.8%	-0.9%	0.8%	0.8%	1.9%	1.9%	
USD/EUR	<b>7.9%</b>	35.7%	31.6%	<b>0.0%</b>	71.6%	98.1%	<b>4.1%</b>	<b>4.6%</b>	99.7%	77.7%	83.2%	77.7%	83.2%	78.5%	52.8%	20.3%	20.3%	20.3%	10.6%	30.0%	10.6%	30.0%	30.0%	33.8%	33.8%	
MSCI	<b>34.3%</b>	0.7%	12.9%	<b>78.0%</b>	0.2%	2.1%	<b>20.2%</b>	<b>10.5%</b>	0.3%	3.5%	0.1%	3.5%	0.1%	4.4%	13.3%	21.2%	21.2%	21.2%	26.0%	6.7%	26.0%	6.7%	6.7%	41.7%	41.7%	
EM	<b>7.3%</b>	-0.3%	-0.6%	<b>15.1%</b>	0.2%	0.3%	<b>-1.5%</b>	<b>-1.1%</b>	-0.3%	-1.7%	0.1%	-1.7%	0.1%	-0.2%	-7.7%	-1.7%	-1.7%	-1.7%	<b>-0.8%</b>	0.5%	<b>-0.8%</b>	0.5%	0.5%	2.1%	2.1%	
USD/EUR	<b>9.8%</b>	39.2%	17.2%	<b>0.0%</b>	75.0%	28.9%	<b>2.8%</b>	<b>1.5%</b>	69.8%	45.9%	87.9%	45.9%	87.9%	40.3%	42.1%	5.4%	5.4%	5.4%	<b>3.1%</b>	30.0%	<b>3.1%</b>	30.0%	30.0%	16.6%	16.6%	
iBOXX	9.7%	<b>4.6%</b>	7.6%	<b>21.3%</b>	0.2%	0.4%	3.5%	0.1%	1.2%	4.4%	2.0%	4.4%	2.0%	8.9%	1.9%	0.8%	0.8%	0.8%	0.1%	2.0%	0.1%	2.0%	2.0%	19.4%	19.4%	
Tr./JPM	-30.8%	<b>5.2%</b>	1.9%	<b>-53.2%</b>	-2.2%	0.8%	3.7%	0.4%	-3.5%	-12.9%	-1.3%	-12.9%	-1.3%	-2.3%	-23.1%	-2.3%	-2.3%	-2.3%	-0.2%	-2.0%	-0.2%	-2.0%	-2.0%	-8.0%	-8.0%	
GBI EMU	41.5%	<b>2.5%</b>	30.1%	<b>6.3%</b>	35.7%	65.6%	38.1%	86.0%	42.4%	40.5%	57.8%	40.5%	57.8%	23.0%	76.6%	72.2%	72.2%	72.2%	92.6%	57.1%	92.6%	57.1%	57.1%	38.2%	38.2%	
JPM GBI	22.2%	<b>4.9%</b>	7.7%	13.0%	0.5%	0.1%	1.2%	0.0%	1.7%	<b>22.0%</b>	2.9%	<b>22.0%</b>	2.9%	3.9%	11.5%	0.9%	0.9%	0.9%	0.1%	14.3%	0.1%	14.3%	14.3%	25.6%	25.6%	
Global	-54.3%	<b>8.1%</b>	3.1%	-56.8%	-1.8%	0.6%	2.7%	-0.1%	-6.5%	<b>-31.7%</b>	-1.8%	<b>-31.7%</b>	-1.8%	-1.7%	-52.2%	2.7%	2.7%	2.7%	0.4%	-5.7%	0.4%	-5.7%	-5.7%	-8.5%	-8.5%	
	20.0%	<b>1.8%</b>	29.7%	15.5%	64.3%	83.6%	61.1%	98.4%	33.6%	<b>4.9%</b>	50.2%	<b>4.9%</b>	50.2%	43.0%	45.6%	70.1%	70.1%	70.1%	88.8%	12.1%	88.8%	12.1%	12.1%	30.5%	30.5%	
JPM	30.0%	0.0%	0.0%	<b>68.7%</b>	0.7%	1.2%	6.8%	<b>14.1%</b>	1.6%	<b>42.7%</b>	5.4%	<b>42.7%</b>	5.4%	<b>25.2%</b>	12.1%	8.5%	8.5%	8.5%	<b>24.9%</b>	0.0%	<b>24.9%</b>	0.0%	0.0%	3.3%	3.3%	
EMBI	24.9%	0.0%	0.1%	<b>47.7%</b>	0.9%	0.7%	-2.8%	<b>-3.4%</b>	-1.9%	<b>-11.5%</b>	0.6%	<b>-11.5%</b>	0.6%	<b>-1.1%</b>	-11.6%	-2.1%	-2.1%	-2.1%	<b>-1.4%</b>	0.0%	<b>-1.4%</b>	0.0%	0.0%	-1.7%	-1.7%	
	12.7%	99.6%	93.7%	<b>0.0%</b>	59.6%	42.7%	21.8%	<b>0.4%</b>	35.5%	<b>0.3%</b>	35.3%	<b>0.3%</b>	35.3%	<b>3.4%</b>	44.5%	24.1%	24.1%	24.1%	<b>3.5%</b>	97.5%	<b>3.5%</b>	97.5%	97.5%	73.1%	73.1%	
JPM	<b>53.4%</b>	0.3%	0.2%	<b>76.6%</b>	0.4%	1.5%	8.3%	<b>10.8%</b>	1.7%	<b>32.9%</b>	11.0%	<b>32.9%</b>	11.0%	<b>29.6%</b>	1.0%	3.8%	3.8%	3.8%	13.3%	1.1%	13.3%	1.1%	1.1%	11.4%	11.4%	
CEMBI	<b>35.3%</b>	-0.4%	0.1%	<b>48.2%</b>	0.6%	0.6%	-3.3%	<b>-2.5%</b>	-1.8%	<b>-8.4%</b>	0.8%	<b>-8.4%</b>	0.8%	<b>-1.0%</b>	-2.9%	-1.2%	-1.2%	-1.2%	-0.9%	0.3%	-0.9%	0.3%	0.3%	-3.3%	-3.3%	
	<b>2.5%</b>	63.7%	86.6%	<b>0.0%</b>	69.3%	36.2%	17.2%	<b>1.3%</b>	33.4%	<b>1.3%</b>	17.8%	<b>1.3%</b>	17.8%	<b>2.0%</b>	82.7%	43.6%	43.6%	43.6%	13.6%	67.3%	13.6%	67.3%	67.3%	51.2%	51.2%	

Table A.3: R-Squared (first value), beta coefficient (second value) and corresponding p-value (third value) for each MFIF/benchmark combination during bear markets. Betas which are statistically significant at a level of at least 90% are marked in green if positive and red if negative.

	USD Funds				EUR Funds				Triodos	Wallb.										
	Azure	BOMF	Vision	V. Loc	IC	rA Gl.	rA Le.	BBVA			BOMF	Vision	V. Loc	Dutch	ETIMOS	rA Gl.	rA Le.	rA Mi.	Honore	
S&P 500/	N/A	0.3%	4.6%	N/A	N/A	35.7%	N/A	4.2%	3.6%	0.8%	3.5%	4.8%	1.3%	2.5%	0.6%	7.8%	4.8%	0.0%	25.5%	11.5%
EURO		-0.3%	2.5%			2.3%		-3.4%	-1.6%	-1.0%	1.4%	-0.9%	3.4%	6.0%	0.7%	2.3%	-0.6%	0.0%	-5.7%	1.7%
STOXX		71.4%	42.4%			4.0%		16.9%	62.7%	53.4%	7.3%	11.2%	62.4%	34.2%	4.3%	23.2%	15.8%	97.8%	0.2%	3.7%
MSCI		0.4%	15.4%			36.6%		1.5%	1.9%	1.7%	3.7%	1.8%	37.4%	3.9%	0.4%	0.7%	0.8%	0.0%	0.5%	8.6%
World		-0.4%	5.0%			2.6%		-1.9%	-1.2%	-2.4%	2.2%	0.9%	32.9%	13.3%	1.0%	1.3%	-0.4%	-0.1%	-1.5%	2.6%
USD/EUR		65.1%	13.2%			3.7%		41.7%	72.7%	36.8%	6.2%	33.0%	0.3%	23.3%	2.9%	59.2%	56.4%	92.6%	66.9%	7.4%
MSCI		0.6%	29.8%			28.1%		0.4%	0.0%	3.8%	5.2%	0.0%	45.3%	11.5%	17.6%	1.3%	7.6%	8.3%	0.1%	2.3%
EM		-0.2%	3.5%			1.1%		-0.5%	-0.1%	-2.3%	1.6%	0.0%	23.6%	15.0%	-0.6%	1.0%	2.7%	-0.8%	-0.1%	0.7%
USD/EUR		59.1%	2.9%			7.6%		66.1%	95.6%	17.8%	2.7%	96.0%	0.1%	3.7%	17.4%	34.9%	24.0%	6.1%	90.2%	37.9%
iBOXX		5.8%	0.0%			0.4%		4.0%	8.1%	4.5%	0.3%	0.2%	0.0%	0.1%	0.9%	0.0%	7.2%	0.2%	0.8%	0.8%
Tr./JPM		2.7%	0.0%			0.7%		7.1%	6.6%	9.1%	-1.6%	-0.7%	-1.1%	-4.8%	0.5%	-0.2%	-8.5%	-0.4%	-1.5%	1.9%
GBI EMU		8.2%	100.0%			84.2%		17.7%	45.8%	13.7%	60.2%	75.5%	96.5%	85.1%	76.7%	96.7%	25.4%	80.1%	63.3%	24.9%
JPM GBI		6.6%	0.5%			0.5%		2.7%	6.5%	5.6%	1.3%	0.7%	6.0%	2.2%	13.6%	0.0%	14.3%	0.2%	0.0%	0.6%
Global		4.3%	-2.3%			0.8%		8.2%	6.5%	16.0%	-4.5%	-2.1%	-49.4%	-37.8%	3.7%	0.9%	-22.8%	0.7%	18.6%	-2.5%
		6.3%	79.3%			82.6%		26.7%	50.9%	9.7%	27.6%	54.9%	28.4%	37.7%	23.9%	89.4%	10.0%	80.0%	91.3%	65.7%
JPM		0.0%	3.2%			22.6%		0.2%	0.7%	0.0%	1.2%	7.7%	13.1%	14.1%	1.1%	0.8%	14.6%	9.6%	0.1%	11.4%
EMBI		0.1%	3.2%			3.3%		1.0%	1.2%	-0.6%	-1.9%	-3.1%	28.7%	40.9%	-0.4%	2.2%	9.0%	-2.3%	0.4%	-10.6%
		93.7%	50.6%			11.8%		74.8%	83.2%	89.3%	28.5%	4.2%	10.7%	2.0%	74.3%	46.5%	9.6%	4.3%	85.6%	4.4%
JPM		0.1%	0.0%			3.5%		0.6%	0.7%	0.7%	0.1%	10.2%	26.9%	22.8%	4.9%	0.0%	7.6%	17.6%	0.2%	19.7%
CEMBI		0.4%	0.5%			2.3%		2.4%	-2.6%	-2.6%	-0.7%	-3.6%	43.6%	50.1%	-0.8%	0.4%	6.4%	-3.0%	0.5%	-15.1%
		80.1%	95.3%			56.2%		59.1%	83.2%	55.1%	73.5%	1.9%	1.6%	0.2%	49.0%	91.1%	23.9%	0.5%	79.5%	0.7%

Table A.4: R-Squared (first value), beta coefficient (second value) and corresponding p-value (third value) for each MFIF/benchmark combination during bull markets. Betas which are statistically significant at a level of at least 90% are marked in green if positive and red if negative.



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