The Missing Link in Microfinance
CDO (MCDO)

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The Missing Link in Microfinance Collateralized Debt Obligation (MCDO)

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Acknowledgement

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Executive Summary

In 2006 the first public Microcredit Collateralized Debt Obligation (MCDO), BOLD, was structured and issued. The structured product’s senior notes was sold to commercial investors and helped providing the microcredit industry with an additional source of funding. The purpose of this paper is to investigate whether the current microcredit CDO structure is commercially sustainable.

The agency problem theory is used to analyze the research problem. The agency theory is of assumed relevance, as the problem of asymmetric information is highly present in the credit markets. However, the microcredit market is distinctively different from more conventional credit markets. In microcredit lending the use of group-based mechanisms are often employed, as poor people do not have any collateral. By lending money to groups of two or more people, the members of a group function as a form of collateral for each other. The benefit from this group-lending structure is that it reduces the problem associated with moral hazard and adverse selection. Further, dynamic incentives, such as the ability to get additional funding once the first loan is repaid, gives the micro-borrower a strong incentive to repay. Several microfinance institutions (MFIs) and microcredit enthusiasts report that the provision of poor people with capital shows remarkable social and economic results, high repayment rates and that MFIs are able to operate financially sustainable in terms of profit.

In order to understand the use of MCDO, as a special commercial investment vehicle in microcredit investments, it is necessary that the benefit form a regular CDO must be properly understood. A CDO structure has the benefit of converting un-standardized assets, like credit, into standardized assets and is thus more attractive for outside investors. AN MCDO is a pool of several microcredit loans that is transferred to a separate legal entity and divided into subordinate and senior tranches. The investor is secured by a credit enhancement where the subordinate position takes the first loss. If the credit enhancement is of great magnitude, the more senior notes will benefit in form of reduced risk. However, according to economic and financial theory there is no “free lunch”. Hence, in order for the senior note holders to be secured, someone else must be willing to hold the majority of the risk. In most CDO structure the loan originator holds this equity position, meaning that the originator must take the first loss position. The fact that the originator of the loans share the risk with the investors, helps reduce the incentive for the originator to use its information advantage at the expense of the investors. Consequently, problems with moral hazard and adverse selection are reduced. This risk
sharing is of great importance, as problems with asymmetric information are significantly reduced.

This paper uses BOLD to understand how an MCDO is structured and how this structure distinguishes itself from more conventional CDOs. The deal does not differ from regular CDOs in its structural form, but there are some fundamental differences and severe weaknesses from an agency theory perspective. BOLD is secured by a 30% credit enhancement, which helps to secure the senior note holders. However, the major flaw is the lack of risk sharing of the originator. The MFIs, issuing loans used in the pool, do not hold any position in the structure. Instead a third-party credit enhancer is used to secure the senior notes, namely a Dutch development bank. Consequently, the MFIs have very weak economic incentive to ensure that the pool of loans is of good quality (adverse selection) as well as the use of sufficient effort to collect interests and principals to the loans in the MCDO structure (moral hazard). Further, the only incentive for the MFIs to transfer payments to the special purpose vehicle (SPV) and its investors is the incentive to receive more commercial funding in the future, and thus not jeopardize future business prospects. However, this incentive is reduced by the fact that MFIs always have the option to return to more traditional donor funding. Finally, in situations where the economic obligation to the MCDO and social mission diverge, the MFI might value their social obligation as more important. Hence, there is an additional problem of social hazard.

Although several scholars support the issue of MCDOs, there are problems highlighted in agency theory in which the structure has not taken serious measures to overcome. The conclusion of this paper highlights that an MCDO cannot be compared to a regular CDO, due to the fact that problems of moral hazard and information asymmetry seems to be underestimated. This conclusion is based on the analysis from the incentive mechanisms between the participants in the second stage – the transfer of payments from the MFI to the separate legal entity. The structure depends highly on trust, and currently the MFIs incentives to repay are too weak to properly handle moral hazard, social hazard, and adverse selection. In order to reduce the agency problem in an MCDO, we recommend that the MFIs must hold the first loss position in the structure and hence share the risk with the commercial investors holding the notes. First then, an MCDO can be considered a true commercial asset like any other.
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1. **Introduction**

Microfinance is an exceedingly debated topic in development economics and the concept challenges many conventional ways of thinking about development aid, the role of business, as well as financial and economic theory. According to economic theory, the provision of a well-functioning financial system for poor people without any collateral should be almost impossible, as the credit market suffers from imperfections such as asymmetric information and moral hazard. However, contrary to the economic intuition, several microcredit organizations report high repayment rates from its microcredit borrowers and some microfinance institutions are self-financing and some even make a profit. Consequently, scholars, policymakers, and market participants have started exploring the microfinance market in order to obtain a better understanding and perhaps re-evaluate previous ways of thinking with regards to economic theory, investment opportunities as well as development aid.

Like most interesting topics there is a lot of literature about the microfinance topic. Much of the literature seems to be very optimistic and perhaps a bit overenthusiastic when it comes to the future of what has been referred to as the *microfinance revolution*\(^1\). Others are more moderate, like the Norwegian professor Karl Ove Moene (2007), who emphasizes that microfinance is like any other social movement, and that people tend to be overly optimistic and positive which again avert more critical thinking\(^2\).

From the business school perspective, the increasing commercialization of the microfinance industry was something specific that immediately caught our curiosity. How attractive is actually commercial microfinance investments? This is a question yet to be answered, and where market participants and scholars differ in their opinion. Many argue that there are great opportunities for investors in this "new" and emerging market. The total demand for microcredit has until lately been ignored by the formal financial sector even though its estimated market value is between $150 and $250 billion (Kraus and Walter 2006). Nevertheless, there is a fundamental need for financial vehicle to facilitate commercial microcredit investments and ensure safe transactions. According to

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\(^1\) Robinson (2001), in the book; *The Microfinance Revolution – sustainable finance for the poor.*

\(^2\) Quoted by the authors from a seminar held by MICRO at BI on March 8\(^{th}\) 2007, where Karl Ove Moene had a session about the microfinance economics.
Versluyen (1999), policymakers are gradually recognizing that microfinance provides employment and contributes to the economy, and that its performance can be improved with the removal of legal and financial obstacles.

Although there is some literature on the economics of microfinance and the economic potential for commercial microfinance, much of the literature discusses microfinance institutions (MFIs). The literature focuses widely on how the industry should adapt and move away from the more traditional donor funding management strategy into a more business approach in order to attract funding from commercial investors. According to Goodman (2006) the microfinance industry needs to understand the traditional capital markets true concerns and requirements in order to increase its attractiveness. From a purely commercial investor’s perspective the main concern is the risk-adjusted return. The main risk in the credit market is defaults on loans, which is a source of risk that is difficult to identify due to problems with asymmetric information. Ex ante of the loan issuance there exist an adverse selection problem, and ex post a moral hazard problem.

Several international investment banks have started to engage in commercial microfinance. The banks have so far used different investment strategies and vehicles in order to finance the microfinance industry and today several microfinance investment opportunities are available in the market. The international investment bank Morgan Stanley, in cooperation with Blue Orchard, has issued one structural investment vehicle where commercial investors are given the opportunity to invest in microfinance through an investment vehicle called collateral debt obligation (CDO), namely BOLD1. Also a second issue, BOLD 2 is in the progress. The choice of CDO as an investment vehicle has become increasingly popular in many credit markets as different participants in the structure share the risk and hence the asymmetric information problem is reduced. Consequently, non-standardized loans can be structured into standardized assets making it more attractive for outside commercial investors.

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3 Morgan Stanley, Deutche Bank, Merill Lynch, JP Morgan, Citibank and HSBC are some of the biggest banks investing in microfinance.

4 The BOLD 1 ($99 million) and the BOLD 2 was issued in 2006 and 2007 ($110 million) respectively, BOLD 2 will be the first commercial microfinance investment to be rated by a major rating agency (Morgan Stanley 2007). The first ever microfinance CDO deal BOMS1, was issued by the Developing World Market in 2004 with a value of $40 million.
In this paper we want to explore the economic reasoning behind this specific choice of investment vehicle in order to find out what characterize microcredit loans as a suitable asset in a CDO deal. Further, the issue related to the pure commercial value of microcredit investments will be explored by analyzing the BOLD structure from an academic perspective by focusing on the issue related to reducing the asymmetric information problem, and thus adverse selection and moral hazard.

1.1. Purpose of the Paper

The prospect of microcredit as a commercial investment object is important for two main reasons. First, if there are implications that there is some positive or negative risk-return tradeoff in investing in microcredit, compared to other credit markets or other financial assets, there could be an arbitrage opportunity for the investor to be take advantage. Hence, it is crucial that this emerging new market is thoroughly analyzed and appropriately understood for the financial market to work efficiently. Second, the scarcity of capital available for poor people provides a moral responsibility of contributing to efficient funding for microfinance institutions (MFIs) through the commercial investment market. CGAP5, among others, believes that commercial foreign investors will play an important role in the future development and funding of microcredit. In order for the industry to scale and reach out to even more poor people with credit, right financial products and positions must be offered in the commercial investment market (Abrams and Ivatury 2005).

Governments and international institutions are increasingly recognizing the importance of commercial actors to participate in the fight against poverty. Byström (2006) argues that governments, locally as well as globally, have an important role to play in facilitating the lives of commercial MFIs. He has also raised the question of whether an MCDO can be “a modern Robin Hood”, where money is transferred from rich investors to poor microborrowers. In order to compare an MCDO to other asset classes it is important to identify whether the CDO investments in microcredit are undertaken due to pure philanthropy, political motivation or commercial reasons. The interference of governments and institutions in commercial markets to help meeting its development goals is a principle debate that provokes differing opinions.

5 Consultative Group to Assist the Poor - a consortium of 33 public and private development agencies working to create permanent financial services for the poor
With this paper we intend to contribute to enhance the understanding of how commercially sustainable the microcredit CDO structure actually is, in order to understand whether this new investment class could be treated as a financial asset like any other purely commercial asset. If microcredit investment should ever truly scale up and become purely commercially attractive, it is important that investors acquire a true and objective understanding of the concept of commercial microcredit. Hence, a critical analysis from a pure commercial perspective is needed.

We wanted to explore the proposed statements, that microcredit is a suitable emerging market with a potential for commercial investors through CDOs. As discussed, there are many promising voices for microfinance. The financial market in general, however, does not seem to follow up on the same promising prophecy. Hence, the classical statement of “putting your money where your mouth is” seems appropriate. With a critical sense we wanted to acquire more knowledge about which economic factors imply that MCDO investments creates an additional value as well as how financially sustainable the MCDO structure is for commercial investors. The fact that a huge international investment bank invest and engage in microfinance through CDOs might be more of a social responsible investment than a purely commercial one. Hence, our research problem can be summarized as follows:

“Investigating whether an MCDO structure is commercially sustainable”

1.2. Research Problem and Research Design

Due to the economic sustainability of microfinance is yet under researched; we focused on primary means of data collection to get insight and understanding. Currently data are difficult to obtain, and because there need to be a certain time length of existing commercial microfinance financial products for us to conclude whether the MCDOs are commercial sustainable or not, a quantitative and statistical approach to the research problem was not appropriate for our thesis. Consequently we use an explorative design as the research question is somewhat unclear and the knowledge about commercial MCDO is still vague. Explorativ design uses qualitative techniques and focuses more on understanding the problem rather than quantifying it. Further, explorative design is characterized with a great deal of flexibility in the data collection (Selnes 1999). We use primarily secondary sources from previous research and literature, and try to bring
theories together in a comprehensive and conclusive way. In addition we have collected some primary sources from telephone interviews, documentation and e-mail contacts in two major international investment banks and one Norwegian financial company, which are all involved and investing in commercial microcredit. The primary sources are mainly used in order to get some first hand experience and practical information related to the research problem.

Incentive mechanisms are crucial in order for a market to work efficient. The agency problem, with asymmetric information, is a severe problem in credit markets, including microfinance and consequently strong incentives must be present in order for the credit market to function. We have chosen to use agency theory as the foundation for our analysis in order to answer the research problem, and the theoretical hypothesis is:

“The MCDO structure helps reducing problems with asymmetric information, making MCDO a commercial asset class like any other financial asset”

### 1.3. Limitations and Assumptions

First, this paper focuses exclusively on the CDO structure and does not consider any alternative microfinance investment opportunities. Hence, there will be no comparison of alternative microfinance investments, although some will be mentioned briefly.

Second, there is some consensus of the positive effect of commercialization when it comes to improved operation efficiency. However, there is a concern that an increasing profit maximizing objective will have a negative effect on the social mission in which the MFIs was intended to serve (Drake and Ryhne 2002). The social impact of the commercialization in microcredit will not be discussed in this paper.

Third, we assume that the MFIs that are used to pool loans into the CDO structure have a good track record, are managed efficiently and that the interest rates charged to the microcredit borrowers are sufficient to cover all expenses of the MFI. Hence, we assume that there are profitable MFIs.

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6 Deutche Bank, Morgan Stanley (Microcredit CDO) and Storebrand ASA (commercial microcredit investment)
Fourth, although MFIs provide several financial services we focus only on the credit market of the microfinance industry. This is a reasonable limitation as only the credit loans are used in the CDO structure and that this is the main service provided by MFIs.

Fifth, we have chosen to exclude the analysis of the cash flow transfer from the special purpose vehicle (SPV) to the investors. The asset manager who ensures that the payments are made owns a small share of the subordinate tranche in addition to being the service provider. Consequently the asset manager has no incentive to use its information advantage to reduce the quality of the underlying portfolio, and thus this service does not distinguish itself from any other service markets. Hence, a credit market analysis of the asymmetric information problem of this stage between the asset manager and the investor will not be included.

1.4. Structure of the Paper

We have chosen to divide the paper into three main sections; an analytical-, a theoretical- and a descriptive section. In the first section we have chosen to start with our theoretical reasoning, to explain the different stages in an MCDO structure. The theoretical reasoning is based on the agency theory. Further, we will analyze the incentives of the different participants in the structure. In section two, theories of market failures in credit markets and international finance are described to build the foundation behind our theoretical analysis. In section three, a more descriptive presentation of microcredit and CDOs are presented, before we combine the two and describe how an MCDO structure works.

The literature of microcredit has emerged in recent years, but rarely combines theories from finance and economics with microcredit. By starting with the agency problems within an MCDO structure, and then provide our analysis and conclusion, we share our contribution to microfinance before providing the theory behind. An understanding of the theory will most likely be easier to obtain, as the analysis highlights important aspects covered by different academic subjects, such as credit market-, structured finance- and agency theory. Another advantage of this structure is that the well-informed reader can use the theoretical section as a reference to the theories that supports our conclusion.
Section 1
2. Agency Problems in MCDO

Loans can be considered as a non-standardized asset due to the intransparent nature of the lender-borrower transaction. Hence, information asymmetry makes it difficult to securitize loans and makes them marketable due to problems with both adverse selection and moral hazard. As investor insecurity reduces the value of any financial transaction, a premium must be given to compensate for the risk and illiquidity. The CDO is structured to overcome this problem, as it helps making credit a marketable asset which can be securitized and traded like any other financial asset. Consequently, banks can focus on their core business of loan origination, such as screening, servicing and monitoring the debtors, and simultaneously raise capital in the market to do so. The incentive mechanisms that reduce asymmetric information problems and moral hazard consequently enhance the aggregate market efficiency of the capital market (Jobst 2002).

This chapter explores the agency problem in the two first stages in the cash flow structure in an MCDO - the cash flow transfer from the microborrower to the MFI, and the transfer from the MFI to the separate entity in the structure. In order for the structure to work there need to be some bullet proof shields in each stage that ensures that each party in the structure have sufficient incentives to serve the others. Theories that explain the various stages in the MCDO structure in relation to the adverse selection- and the moral hazard problem will now be explained. This will be the foundation for our analysis in chapter 3, evaluating the incentives and concluding whether they are sufficient or not.

2.1. Stage 1 – The Microborrower

This part will provide an economic theory of microcredit, which explains the intuition behind the repayment mechanisms that exist in the first stage of the MCDO structure, namely the repayment from microborrowers to the MFIs. Several MFIs report higher repayment rates than many conventional lending institutions (Ghatak and Guinnane 1999). How the provision of capital to poor people are organized through microcredit differs to some extent from one MFI to another, however there are some common economic features that are quite universal and need to be explained in order to understand how incentives to repay the loans are created. An essential part of the economics of microcredit includes how the loans are organized and how innovative incentive
mechanisms are used to overcome market failures of asymmetric information in the credit market.

2.1.1. The Group-Lending Methodology

The credit market suffers from some distinctive market failures and consequently the market does not work efficiently. Some of the problems in credit markets are solved by use of collateral to increase the borrower’s incentive to repay the loan. The lenders lack of information about the borrower’s ability and willingness to repay the loan, as well as the fact that poor people are not able to come up with sufficient collateral, has made serving the credit market for poor people very difficult. Hence, the microcredit market is forced to use other techniques in order to provide incentives for the poor borrower to repay. According to Ghatak and Guinnane (1999), there are two main complementary reasons behind the apparent success of microcredit, namely the advantages of joint liability and monitoring which both are associated with the group lending methodology. The group-lending methodology is a methodology where a group of individuals come together and take up a loan collectively\(^7\). The group lending methodology takes advantage of the close ties and the local information that exists within the group, as the group as a whole is held responsible for repaying the loan. In the case where one of the borrowers within the group defaults on his or her share of the total group loan, the other group members will be punished, as they have to cover the loss. If the group does not cover the loss and repay its joint liability all the members will be excluded from the possibility to obtain further borrowing in the future (Aghion and Murdoch 2005). How the group-lending methodology helps reduce the problems with adverse selection and moral hazard will now be explained.

2.1.1.1. Adverse Selection

The adverse selection problem would be eliminated if the lender could distinguish between the “risky” and the “safe” borrower. Stiglitz and Weiss (1981) argue that when the lender cannot distinguish between the two groups the interest rate will become inefficiently high. A possible solution to the ex ante adverse selection problem has been to form a peer group formation system. In the peer group formation system the lender grants a loan to a group that have organized themselves and where the group as a whole take a joint responsibility to repay the loan (Aghion and Gollier 2000). The group

\(^7\) For more economic theory about the economics of group lending, see Ghatak and Guinnane (1999)
formation works as a “collateral effect” through the cross subsidization of each member, which acts as a collateral for each other. The fact that the members of a group organize the groups themselves is important as they often have more information about their peers than the lender. Consequently, safe borrowers want to form groups with other safe borrowers, leaving the risky borrowers with no choice but to join their own group. In economics this mechanism is often referred to as “assortative matching”\(^8\). As risky projects fail more often, risk is transferred from the lender to the risky group (Aghion and Murdoch 2005). Consequently, interest rates are lower and credit-rationing problem has diminished. Ghatak (1999) supports this reasoning and argues that a peer group has a higher repayment rate and works more efficient than a conventional individual loan contract.

Assume that the proportion of safe- and risky borrowers in the market is \(q\) and \((1 - q)\) respectively, and that \(q < 1\). The two types of borrowers earn \(\bar{y}\) and \(\bar{y}\) respectively. The risky borrower earns \(\bar{y}\) with probability \(p\), where \(p\bar{y} = \bar{y}\), and zero with probability \((1 - p)\). The fraction of safe borrowers will also be the fraction of safe groups. Lets assume that the gross repayment rate, which includes principals and interests, is equal to \(R\), that \(\bar{y} > 2R\), and that each group consists of two borrowers.

Hence, with probability \(q\) the group is safe and the bank gets repaid for sure, and with probability \((1-q)\) risky. Further, if risky the bank gets repaid if one of the borrowers in the risky group succeeds, which has a joint probability of \(g\), as the chance of both being unlucky is \((1-p)(1-p)\).

\[2.1 \quad g = 1 - (1 - p)^2\]

For any interest rate \(r\), the expected repayment can then be expressed as:

\[2.2 \quad [q + (1 - q)g]r\]

Further, the bank has some cost related to the operation of lending equal to \(k\), and in a competitive environment the bank sets interest rate according to:

\[^8\] Aghion and Christian Gollier (2000) argue that even when borrowers are not perfectly informed about others’ type of borrower (no assortative matching) peer group lending should improve efficiency.
\[ r = \frac{k}{q + (1-q)g} \]

Contrary, with individual loans the bank sets interest rate equal to:

\[ r = \frac{k}{q + (1-q)p} \]

Hence we can see that interest rate with group lending is lower than the individual interest rate as the condition \( g > p \) has to hold. In the case of peer group formation system, all borrowers have the same contract. However, due to the fact that some projects fail each risky borrower pay more than average. Consequently, with group contract the risky borrowers will have to pay more on average (Aghion and Murdoch 2005).

**2.1.1.2. Moral Hazard**

Group lending also has advantages after the loan has been granted, ex post. Much of the advantages of group lending ex post is related to the theory of peer monitoring. The fact that close proximity between the members in the group provides the members the ability to monitor each other’s behavior and impose counteractive measures if necessary. Counteractive measures can be both economical and social, and the benefits from peer monitoring is that better investments choices are made, with higher repayment rates and lower interest rate as a result. This group pressure phenomenon is often referred to as peer pressure (Ghatak and Guinnane 1999 and Aghion and Murdoch 2005)\(^9\).

The moral hazard problem can be divided into involuntary - (ex ante) and strategic default (ex post). Involuntary default refers to the effort of the borrower to realize the profit of the project, whereas strategic default refers to the unwillingness to repay in the case where the project has showed to be profitable.

In the case of involuntary default, group lending contributes to the possibility to raise interest rate without discouraging the incentive to give an effort (Aghion and Morduch 2000). For the borrower to show any effort, the following condition has to hold 
\[ y - R - c > p(y - R) \]. However, the borrower can choose to shirk and receive the revenue \( y \) with probability \( p \), and if he works he will get the revenue \( y \) with certainty.

\[^9\] For more information about peer pressure and moral hazard, see Stiglitz (1990), Aghion and Murdoch (2005), Ghatak and Guinnane (1999) and Varian (1990).
Consequently, interest rate is set according to $R < y - \frac{c}{(1 - p)}$. However, the condition is somewhat different under group lending. Continue to assume a two persons group, where both give an effort. Their total return is $2(y - R - c)$. However, if both shirk the return will be $2(y - R)p^2$. If this is the case and one of the projects succeeds, then the person who succeeds has to pay for both, and ends up with a profit equal to $y - 2R$. Hence, in order for the lender to give an effort the following condition has to hold $2(y - R) - 2c > 2(y - R)p^2$. Hence, the group lending gross repayment rate is set according to $R < y - \frac{c}{(1 - p^2)}$. Because $p^2 < p$ the gross repayments can be set higher with group lending without reducing the effort by the borrowers in a group lending setting (Aghion and Morduch 2005).

Peer monitoring also helps reduce the risk of strategic default, as the joint responsibility makes the members of a group monitor each other to make sure that the others repay their loans in the case where their projects are profitable. Assume that in the case of no peer monitoring the borrower will default on the loan with certainty. Further, each member of a group has a monitor cost equal to $k$, in order to observe the other member’s revenue with a probability of $q$. If caught “cheating” the other member of the peer group will impose a social sanction. The social sanction can be expressed as a social cost equal to $d$.

The borrower will then chose to repay if $y - R > y - q(d + R)$ or $R < \frac{q}{(1 - q)}d$. Hence, the size of gross repayment must be less than, or equal to, $\frac{q}{(1 - q)}d$ in order to ensure repayment from the other members. With no monitoring, $q=0$, and no collateral, there will be no lending in equilibrium, as both members in the group will default on their loans with certainty. As shown individual loans without collateral would result in no loan in equilibrium, as the borrower would have no incentive to repay its interests and principals. Consequently, the group lending mechanism of enforcing other members to repay their debt is regarded as a vital incentive mechanism in microcredit.

2.1.2. Dynamic Incentives

Although the group-lending methodology has many advantages when it comes to creating incentives, these are not the only incentives used in the microcredit market to reduce the moral hazard problem. Two dynamic incentive mechanisms, which are often used to secure and enforce repayments of debt, are the threat to stop refinancing loans and progressive lending. These mechanisms will now be explained by using a two-period
model to illustrate how these incentives can be used to ensure repayment in the first period. The intuition behind this two-period model is that if the model is extended to \textit{infinite} periods, the same reasoning will apply to all periods.

Suppose that the borrower has the option to default strategically on the loan. The lender can reduce the temptation of running off with the money by offering the borrower a second-period refinancing of the loan only if the first loan is fully recovered. Assume that the borrower can generate revenue equal to $y$ at the end of each period and that he needs refinancing in order to realize the second-period project. If the borrower decides to default the expected payoff will be $y + \delta uy$, where $\delta$ is the borrower’s discount factor and $u$ is the probability of getting a second loan although the borrower defaulted on the first. If the borrower repays ($u=1$) the payoff will be $y - R + \delta y$. In this two-stage game, the borrower will default on the second loan with certainty due to the finite number of periods.\(^{10}\) In order to see that the borrower will decide to repay in the first period the following equation has to hold $y + \delta uy < y - R + \delta y$. Hence, the lender must not set interest rate to high. If we then assume that the borrower is denied access to future loans, $u=0$, and in order for the lender to secure repayment $R \leq \delta y$. Progressive lending further reduce the incentive to default in the first period, as the borrower will be able to obtain a bigger loan if he or she does not default on the previous loan. If the lender increases the loan size with a fraction $\lambda > 1$ between the two periods, the incentive to repay the debt in period 1 is further enhanced. In this case the lender can increase the gross interest rate until $R \leq \lambda \delta y$ (Aghion and Murdoch 2005 and 2000).

If we further include the notion of social sanctions to the equation, we can show that the optimal effort will also increase as that the borrower faces and additional cost in forms of social sanctions equal to the social cost $d$. We can show that the social cost from social sanctions can influence the optimal ex ante effort of the borrower.

In addition the cost of effort is not fixed but a function of effort $c(p) = k \frac{p^2}{2}$, where $k$ is a fixed cost factor and the second $\frac{p^2}{2}$ is the increase in marginal effort.

\(^{10}\) In an infinite game the borrower will always be able to get a new loan in any sequential period, and consequently a contract can be created so that the lender always have the incentive to repay, while in the finite two-stage model there is no incentive to repay in the second as a third period is not included.
The borrower wants to maximize the expression:

\[
2.5. \quad \max p(y - R - \delta y) + (1 - p)(\delta vy - d) - c(p)
\]

F.O.C.

\[
2.6 \quad y - R + \delta y(1 - v) + d = pk
\]

and

\[
2.7 \quad p = \frac{y - R + (1 - v)\delta y + d}{k}
\]

From the optimal effort equation we can see that if the probability of getting a second loan in the case of default \(v\) is reduced the effort will increase. At the same time the additional social cost \(d\) will enhance effort (Aghion and Morduch 2000).

However, there are two limitations to the dynamic incentive mechanisms. First, the assumption that it is absolutely necessary for the borrower to obtain sequential loans might be too strong. If \(y\) is great enough, the second period investment might be self-financed by the borrower’s first period profit. In this case the incentive to stop lending, and even increasing lending in the second period, would not be enough to prevent strategic default in the first period. Second, competition in the lending market reduces the incentive to repay the loan, as it might be possible for the defaulting borrower to go to another lender and obtain a second loan. In this case, cooperation between different lenders can reduce the problem (Aghion and Morduch 2005).

### 2.1.3. Other Incentive Mechanisms

First, in addition to some forms of collateral, required saving has also been used to see whether the potential microfinance borrowers qualify for getting a loan or not. This way the lender can obtain information by observing the borrowers discipline and money management skills. Consequently the adverse selection problem is reduced and at the same time the MFI provides a safe form of saving in deposits, which again can be used as collateral. Second, making public repayments is argued to have some positive effects such as higher monitoring, directly obtain information about defaulting borrowers, lower transaction costs and the possibility to facilitate training and education. Third, targeting women is also regarded as a mean to increase repayment rates. However it is important to understand this in a broader context, which includes cultural and social as well as economic dimensions (Aghion and Murdoch 2005). A final point is that the poor borrower’s limited ability to find alternative sources of funding increase the repayment discipline (Robinson 2001).
2.2. Stage 2 – The MFI

This section pays attention to the repayment mechanisms in the second stage of the MCDO cash flow structure; hence the incentives for the MFIs to transfer money to the SPV will be determined based on the theories of adverse selection and moral hazard.

2.2.1. Adverse Selection

The adverse selection problem would be eliminated if the asset manager could distinguish between the risky and the safe borrowers in the MFIs’ portfolio. However, private information about the credit quality of the pool of loans gives the MFI an information advantage over the issuer.

There is an existing problem with asset selection ex ante of the issuance of the CDO. The originator (MFI) might be tempted to use its information advantage to withhold some of the preferred loans from the reference loan pool, and thus reduce the average quality of the pool used in the SPV. If the MFI has information about loans with a good track record, but with poor future prospects, the MFIs can be tempted to issue these loans to the SPV and withhold loans with better prospects. Consequently, the problem of adverse selection cannot be totally ignored, as historical performance is no a guarantee for future performance. Further, the originator’s effort level might be reduced, as enforcing the repayment of the bad loans is generally more costly to enforce, the MFI will ignore the bad loans and reduce the effort to collect.

A way of reducing the problem of asymmetric information, and more specifically adverse selection, is to involve independent third parties in initial credit assessment, subsequent credit monitoring, verification of credit events and assessment of the severity of losses (Rule 2001). AN MCDO structure can partly overcome the problem of adverse selection by selecting MFIs and their loans based on measured and documented financial performance. Thus, the SPV will only pool loans from MFIs who have a good track record, and where the management seem to operate the organization efficiently. In appendix 1, BlueOrchard’s selection criterions of MFIs are listed.

2.2.2. Moral Hazard

Moral hazard arises from any protection that provides an incentive for the protected party to change its behaviour in a way that increases the probability of a risk to occur. Delayed payments or defaults to the SPV can occur in two ways; defaults and delayed payments
from microborrowers, or from the MFIs. Hence, the moral hazard problem is present in two levels. The defaults and delayed payments can occur both ex-post and ex-ante, depending on whether the MFI receives payments from its microborrowers or not. Hence, the MFI can suffer from involuntary defaults (liquidity problems) or choose to strategically default (unwilling to pay). Involuntary defaults appears when the MFI does not receive the payments from its microborrowers, and can be a result of the MFIs’ effort to collect, or unexpected situations making microborrowers unable to repay. Further, when loans in a CDO mature, new loans need to be included in the structure. Moral hazard would in this situation imply asset sorting, as the MFI must replenish maturing loans in the reference loan pool. If many of the loans are prepaid, the average quality of the loans might be eroding if insufficient effort is made to replace loans that amortize before maturity with new loans of similar quality (Jobst 2002).

One obvious way of ensuring repayment is to continuously monitor the MFIs’ operations. Pouliot (2006) argue that MFI monitoring is especially important, as public sponsor and donors have created the impression that MFIs are “too nice to fail”. However, managers could collect payments from microborrowers and chose to put money in their own pockets. Further, strategic default can arise from the social mission of the MFI, choosing to serve the poor rather than transfer the money to the investors in the SPV. For monitoring to be truly efficient it is crucial that illegal acts can be sanctioned in order to ensure that the MFIs and its managers actually benefit from paying interest to the SPV in the case of both involuntary- and strategic defaults.

2.2.3. Social Hazard

The main purpose of most MFIs (including commercial MFIs), is to provide poor people with credit, as poor people are excluded from getting access to financial services through the conventional banking industry. As the social mission of the MFIs is fundamental, an additional problem called social hazard exists. Social hazard is created by a non-financial bias that is likely to affect the rational functioning of the market. The microcredit industry is subject to a wide rage of social hazard due to the social dimension of its activities and the social impact the provision of microcredit can have to a poor community or a country (Mätthaus-Mayer and Pischke 2006). An example of the social hazard issue can be seen where a Non-Govermental Organization (NGO) gives more importance to its mission than to its effectiveness. The MFIs’ unwillingness to pay (strategic default) can be linked to their social purpose. The incentives for the MFI to transfer payments to the SPV must
be compared to their incentive to use the money to issues new loans to an increasing number of poor borrowers instead. According to Mätthaus-Mayer and Pischke (2006) there are five critical sources of social hazards in the microfinance industry; *mission ownership, alignment of interest, lack of regulatory supervision, concessional funding* and *excess funding.*

*Mission ownership* can be related to the purpose of the corporation. In a MFI the financial incentives are weak as the managers who run the corporation have to balance the social and the financial mission which in some cases are diverging. *Alignment of interest* refers to an agency problem were it is difficult for an investor to align its interest with that of the executives of a MFI driven by social considerations. The financial incentives that would apply under normal business conditions that would induce MFI management to reach and even exceed their goals may not work properly. Another important feature of social hazard is lack of *regulatory supervision.* Most MFIs are not deposit-takers, and therefore they are not included in the safety net provided by local financial authorities. The lack of regulatory supervision by authorities will increase the social hazard, as disputes are difficult to solve legally. Most MFIs have access to, *concessional funding* or “soft lending conditions” and benefit from various “social supports” sponsored for instance by government institutions, non-profit organization or development banks. Such funding is generally provided at below market prices with low, or no, required financial return. Even though most MFIs have access to concessional funding, MFIs are currently in lack of capital. However, in the case of an opposite scenario, where access to additional capital and funding is unlimited, this might constitute an increasing social hazard problem. The expression *excess funding* can be used when too much money are chasing too few MFIs. With too much money available, the incentives for the MFIs profit performance will decrease (Mätthaus-Mayer and Pischke 2006).

Compared to the moral hazard problem, the social hazard is a more complex problem to deal with, as social hazard in some cases can be considered morally accepted. Hence, enforcing delayed payments due to social hazard can be very difficult both legally and in relation to the general public.
3. Analysis: The Missing Link

The microcredit industry suffers from lack of capital to enable them to scale up the provision of capital to poor borrowers around the globe. Hence attracting commercial interests to the microcredit industry is necessary in order for MFIs to get access to additional funding. For this reason the motivation for issuing an MCDO seems reasonable from the originators point of view, as it offers an opportunity to decrease credit risk in addition to attract commercial investors and increase funding.

Additionally, from the investors’ perspective, there are mechanisms in a CDO structure that further supports the issue of an MCDO. Home bias and statistical discrimination theory implies that investors will invest in markets with proximity to their home markets, and where information about risk and return is easy to observe and obtain. Further, conventional investors fear unknown risk, high transaction cost and have a concern for law enforcement. Consequently, investors in the microcredit market must be highly risk tolerant, patient, absorb high transaction cost, as well as being willing to take regulatory risk. Although the microcredit market is developing rapidly, the market still suffers from transparency and lack of information efficiency. Hence, investors investing directly in a MFI would have to cover the cost of collecting information as well as transaction costs. Therefore, it is reasonable to assume that these costs will be significant, and without simple, convenient investments offerings (such as MFIFs and MCDOs), few commercial investors will be encouraged to invest in microcredit.

The MCDO structure can encourage commercial investors to take the first step in to microcredit investing, as investors get access to top rated senior tranches, due to a significant third-party credit enhancement. Further, the use of independent rating can enhance the attractiveness of microcredit investments, as the risk-return potential of the asset can be evaluated on a relative value basis by comparing it to a benchmark of other asset classes. Additional features also add credibility to the BOLD structure, such as the fact that it is a SPV registrated in Switzerland under strict European law, that senior notes are listed on Dublin Stock Exchange as well as the presence of professional financial companies like Morgan Stanley, JP Morgan and BlueOrchard.

11 Microfinance Investment Funds (MFIFs)

12 BOLD 2007-1 will be the first ever publicly rated MCDO, with a AA rating on the most senior notes.
We have explored several motivations behind the issuance of an MCDO. The further part of this analysis will evaluate the incentive mechanisms in the two first stages in the MCDO structure. For contracts to work efficiently, sufficient sanctions must be established to enforce the different participants in to a behavior discouraging suboptimal behavior. Incentives are especially important in the microcredit market due to lack of regulatory authorities and suffers from problems with asymmetric information.

3.1. Stage 1 – Strong Incentives

3.1.1. Group-Lending Incentives
The group-lending methodology creates strong incentives for microborrowers to repay their loans, although they do not have any collateral. However, the MFIs use a peer group formation system, where each member of the group acts as security for each other through cross subsidization, which works as a collateral effect. As the members of a peer group have more information about each other than the respective MFI, the microcredit market deals with the adverse selection problems by using what is known as assertive matching. The joint liability and the proximity between the members in a group ensure that each member monitors the other members’ effort and behavior, and ensure repayments by using peer pressure mechanisms, such as economic and social sanctions. Several well-known economists emphasize the advantages of group lending.

3.1.2. Dynamic incentives
Progressive lending further enhances the incentive to repayment. The limited sources of alternative financing enhance the microborrowers’ repayment incentive, as defaulting on the loan would restrict the borrower for additional funding or refinancing. Microcredit exists due to the limited availability for poor people to obtain loan. In addition the possibility to gradually obtain greater loans works as the only ladder out of poverty for many microborrowers. Hence, repaying the loan might be seen as the only option. The progressive lending technique contributes to the fact that the risky borrowers will soon default on their loans. Hence, the loss for the MFI will probably be on smaller loans, as the borrowers have to “prove” themselves in order to get the bigger loans. Further, microborrowers invest the majority of the amount borrowed in small enterprises, which are projects that will generate income. If the projects are profitable, and the borrower has a long-term perspective, it is reasonable to assume that they would prefer to obtain a new
loan in order to expand their business in the future. As new loans are gradually increasing in size, repayments are necessary.

However, there is no sky without clouds. In the emerging market of microcredit worldwide more and more MFIs enter the market. Without considerable cooperation between the MFIs a borrower can default on a loan and then move on to the next MFI for a new loan. Consequently, the repayment incentive will be significantly reduced, if the probability of getting a second loan in another MFI in the case of default on the first loan. Hence, it is crucial that MFIs cooperate and share information about borrowers that do not repay.

3.1.3. Conclusion
The incentive mechanisms in the microcredit market are sufficiently strong and as long as interest rates are set properly by the MFIs, as the microborrowers have more to loose than gain from defaulting on the loans.

3.2. Stage 2 – Weak Incentives

3.2.1. Risk-Sharing Incentive
From the investor’s perspective the main concern is repayments, which are secured by the credit enhancement. The larger the shares of the first loss position in the structure, the more secured the superior notes are. A regular CDO structure can reduce some of the adverse selection problem as the structure ensures that the majority of the risk is kept in junior tranches, owned by the originator of the loans used in the pool.

A major weakness in the MCDO structure is that the MFIs do not hold any position in the SPV, and hence do not constitute to any credit enhancement. The SPV is bankruptcy remote to the loan originator (MFI), and consequently the MFIs do not share any risk with the investors. The MFI has a great information advantage of its loan portfolio due to the lack of transparency in the microcredit market, and thus the MFI can misinform about the loans true quality. Further, the microcredit industry is not necessarily required to undertake auditing and hence financial performance and information are likely to be biased. The MFIs have an incentive to misinform the asset manager, as it is difficult to for the asset manager to gather the correct information on their own. The result might be that the MFIs retain some of the “good” loans in its portfolio and only include “bad”
loans in the pool used in the MCDO structure. As the MFIs main purpose is to serve the poor, they will probably have a higher incentive to retain bad loans, as this will reduce the risk exposure of the institution. The fact that the MFIs do not hold any risk can result in problems with both adverse selection and moral hazard.

In the BOLD structure, a third party development bank holds the first loss position. It is questionable if any commercial investors would be willing to hold this position based on the current structure of the MCDO, where the MFIs are not exposed to any risk of the underlying portfolio. The third party credit enhancer makes the MCDO structure attractive for investors, as a development bank, holding this position, facilitates the commercial microcredit investments. From the latter perspective the CDO structure benefits both the MFIs and the microborrowers, as the credit enhancer function as insurance for the investors and therefore ensure the investors participation in the structure. Hence, the support from governments or development banks should not be considered as traditional aid in the manner of servicing poor people directly. If a “modern Robin Hood” refers to the aspect of transferring money from the rich world, and provide the poor people with funding, we agree. However, as the third party credit enhancer actually subsidizes the investors as well, a comparison to “Robin Hood” no longer seems appropriate.

The allocative mechanisms of tranches in the regular CDO structure are used as mechanisms to reduce the problem of moral hazard, as investors know that the issuer holds a more junior position and consequently has a commitment to enforce repayment as they share the credit risk with the investors. These same mechanisms do not apply in MCDO, as the position of the development banks, like MFO, works as a credit enhancement for the senior note holders. However, this does not reduce the problem of moral hazard as FMO is a third party and thus shares the risk with the commercial investors, but without any direct control of the reference portfolio of the loans in the SPV.

3.2.2. Dynamic incentives

Dynamic incentives are likely to create some incentives for MFIs. MFIs with a long-term perspective are more willing to share correct information with the asset manager as this will increase the possibility to receive commercial investments in the future. A MFI which is able to build a good reputation for timely payments, will have a greater potential for future commercial funding. Assuming that the MFIs have a long-time objective to
continue to serve an increasing number of microborrowers in the future, this will create a potential need for additional funding. Consequently, MFIs will be more likely to repay the interests, as defaulting on loans will jeopardize the ability to refinance or obtain new loans in the future. The probability to obtain additional financing in the case of default will have a direct impact on the power of the repayment incentive from the MFI to the SPV. If the purpose of the MFI is only to make services to the poor people in the short-run, the incentive to transfer payments to the SPV is weak. As a last resort, legal measures can be used to enforce payments from the MFI to the SPV in order to claim interests. As in the link between microborrowers and MFIs, it is important to distinguish between one period issuance of a CDO and the dynamic use of CDOs as a form of funding for MFIs.

However, if a MFI defaults involuntary or strategically it will probably still have the option to return to more traditional donor funding. If a MFI gets into financial trouble, the microborrowers will also suffer, making socially motivated donors likely to help them back on their feet financially. Hence, the possibility to get funding in the case of default reduces the dynamic incentive.

3.2.3. Social hazard
The importance of a sustainable monitoring system in a CDO structure is obvious. Monitoring the operation of the MFIs in the structure is vital, even though some sponsors and donors have created an image that these assets are “too nice to fail”. However, in the case of both strategic and involuntary defaults, the asset manager has no real sanction or punishment to enforce upon the MFI to compensate for the loss. If the defaults are motivated by social hazard from the MFI, it is reasonable to assume that the SPV could have problems claiming its rightful payments. In most countries where the MFIs are present the law enforcement is weak making legal actions difficult in the first place. Further, the social hazard problem of claiming payments from poor people and force an idealistic organization, like a MFI, to serve rich investors will probably make legal action a very difficult task.

3.2.4. Conclusion
In the second stage of the structure the “too nice to fail” syndrome seems highly evident. According to agency theory the MFIs (principal) is incentive incompatible in order to serve the SPV, serviced by BlueOrchard (agent), as they have no ownership. The flaws are presenting relation to both the adverse selection- and the moral hazard problem. The
MCDO structure seems to overemphasize the dynamic incentive of the MFIs long-term objective of attracting the capital market to the MFI industry. In addition the social hazard problem makes the structure fragile in terms of disputes, both legally and from the public opinion perspective. Hence, there is a *missing link* in the structure when it comes to creating sufficient incentives and to prevent a suboptimal MFI behavior.
Section II
4. The Market Failure of Credit Markets

In this section we will examine the concept of asymmetric information, which is a major market failure of credit markets. The concept is referred to as the “lemon market” as the seller can benefit from using its information advantage at the buyer’s expense. Akerlof (1970) was first to introduce the asymmetric information problem, however Stiglitz and Weiss (1981) adapted the asymmetry of information theory and applied it to the credit market\(^\text{13}\). Their theory is used to describe the problem of arranging contracts in credit markets due to the fact that the lender’s information about borrowers is imperfect. Problems emerging in these markets are called adverse selection and moral hazard, referring to the lenders limited ability to identify the risk of the borrower and the limited possibility to control the borrowers’ action respectively. These two problems will now be described by using the agency problem terminology.

4.1. The Agency Problem

The agency problem refers to the transaction between the lender and the borrower in a situation where the lender (agent) has insufficient information about the borrower (principal). The information problem creates market imperfection in forms of unidentifiable risk, as the lender cannot distinguish between a risky and safe investment project, or a reliable and unreliable borrower. The problem exists both ex-ante and ex-post of the contract agreement, referring to the ability and the incentive of the borrower to repay the loan respectively.

Ex-ante the lender has little information about the quality of the borrower, and thus their probability of repaying their loan. As the ability to repay obviously affects the lender’s profit, the lender wishes to identify the “safe” borrower from the “risky” borrower (Stiglitz and Weiss 1981). The different category of borrowers is expected to accept different interest rate according to their risk profile. “Risky” borrowers are more likely to accept a high interest rate, as they recognize that the likelihood of being able to repay the loan is limited. Hence, the dilemma seems obvious: the higher the interest rate the lender charges the lower profit. Ex-post, increasing interest rates reduces the number of potential

\(^{13}\) George A. Akerlof, Joseph E Stiglitz and Michael Spence received the Nobel Prize in Economics in 2001 for their analysis of markets with asymmetric information.
profitable investments, giving lenders the incentive to undertake projects where probability of success is lower but where the profit is higher if the project succeeds. Because the lender is unable to fully control the action of the borrower, the lender needs to design a contract that maximizes its return. The profit maximizing interest rate is shown in the figure 4.1;

Figure 4.1

Profit maximizing $r$

Further, both the demand and the supply of loans are a function of the interest rate $\hat{r}$, and consequently demand is expected to be higher than supply. Although there might be borrowers willing to pay an interest higher than $\hat{r}$, the lender will not lend them money as the perceived risk is expected higher than the average risk of outstanding loans at interest rate $\hat{r}$. Hence, $\hat{r}$ is the equilibrium interest rate (Stiglitz and Weiss 1981).

The agency problem can be divided into two stages. The first stage is the adverse selection where the lender cannot distinguish between risky and safe borrowers without taking considerable measures, which again will induce costs. Second stage is the moral hazard problem related to the fact that the lender has limited possibility to control the borrowers behavior once a loan has been granted. These two stages will now be described further.

4.1.1. Adverse Selection

In the credit market, finding information about the borrower ex-ante is often difficult, and even impossible. Only in the case of full information the lender minimizes risk by assuring that high-quality borrowers receive the loan instead of low-quality borrowers. In order to acquire sufficient information about borrowers, substantial effort is required from the lender, which again represents a cost that needs to be recovered. As a result lenders have limited ability to distinguish between the two types of borrowers and thus
interest rate becomes exceptionally high. Consequently, creditable borrowers, who only take moderate risk, will be unable to borrow, as they will be incapable to repay the interests (Aghion and Murdoch 2005).

The problem of adverse selection can be illustrated by an example given by Aghion and Murdoch (2005). The two types of borrowers need funding for their investment projects and need to borrow from the lender. The safe borrower, which is conservative, prudent and well insured, will be able to make profit $\bar{y}$ and the lender will be paid back the loan with certainty. On the other hand, the risky borrower, being risk loving and poorly disciplined, obtains profit $y$ with probability $p$ ($0 < p < 1$). We assume that $p\bar{y} = \underline{y}$. The risk neutral profit is the same for the two borrowers. Further we assume that the proportion of safe- and risky borrowers in the market is $q$ and $(1 - q)$ respectively.

Further, the bank has some cost related to the operation of lending equal to $k$. In a competitive environment the lender wants to recover its cost and set the interest rate $r$ according to the following formula:

$$4.1 \quad r = \frac{k}{q + (1 - q)p}$$

Assuming that the condition $p\bar{y} = \underline{y} > k$ also holds, investments by both types of borrowers will be profitable if realized. If the market consists of only safe borrowers ($q=1$), the interest rate form equation (5) is equal to $k$ and the profit for each borrower equal to $\underline{y} - k$.

If the lender knows the proportion of safe borrowers and $q < 1$, the interest rate will be above $k$ in order for $[q + (1 - q)p]r = k$ to hold and the lender to go break even. From the equation, we can see that in this case $r > k$, as $q + (1 - q)p < 1$. Actually $r$ will exceed $k$ with the amount $A$.

$$4.2 \quad A = \frac{k(1-q)(1-p)}{q + (1 - q)p}$$

Hence, the interest rate can simply be expressed as $r = k + A$. Consequently all borrowers must pay the same interest rate whether they are risky or safe due to the fact that the lender is not able to distinguish between the of lenders. If we assume that the lender’s
costs $k$, is covered, and that $y > k + A$, the market will be efficient without credit rationing. The profit of the lender can be illustrated in figure 4.2.

**Figure 4.2:**

![Graph showing the profit of the lender with the interest rate $r$ and the expected profit $E(\pi)$]

The result of the asymmetric information problem is that the safe borrowers must subsidize the risky borrowers by paying an interest rate $A$ higher than if all borrowers were safe. If $y < k + A$, safe borrowers will actually be discouraged from investing and the profit for the lender can then be showed in figure 4.3.

**Figure 4.3:**

![Graph showing the profit of the lender with the interest rate $r$ and the expected profit $E(\pi)$]

Hence, if serving only the risky borrowers the highest interest that the lender can charge is $\bar{y}/p$. In the case of perfect competition the two equilibrium interest rates will be $k + A$ and $k/p$ respectively.
4.1.2. Moral Hazard

Moral hazard refers to the fact that the lender cannot observe the action and the effort made by the borrower. The moral hazard problem exists ex-post of the issuance of the loan. However, according to Ray (1998) there are two distinctive and fundamental problems in this phase, namely the involuntary default (inability to repay) and strategic default (unwilling to repay). Hence, there is a problem both ex-ante and ex-post of the realization of the project respectively.

Ex-ante, the involuntary default might be the case where the borrower chooses less effort on the investment project than the effort level expected from the lender when the loan was granted. As a consequence there will be a lower probability that the borrower will be able to repay. Because the lender has little, or no control, over the effort of the borrower there exists an efficiency problem in the market.

Assume that the cost of effort for the borrower is equal to $c$, and that the gross repayment of interests and principals is equal to $R$. The borrower will choose to give an effort only if $y - R - c > p(y - R)$, where $p$ is the probability that the project will be profitable without any effort and $y$ is the profit if the project succeeds\(^{14}\). Solving the equation, $R < y - \left[\frac{c}{1 - p}\right]$ must hold in order for the borrower to be willing to give an effort to realize the project. Hence, increasing interest rates do not necessary increase profit for the lender, as it distorts effort. If we again assume that the cost of capital for the lender is equal to $k$. In a scenario with no moral hazard problem and where $k < y - c$, there should be no reason why the borrower should not be granted a loan. However, the problem is that the lender is unable to enforce effort from the borrower. So although $k < y - c$, it might be that $R > y - \left[\frac{c}{1 - p}\right]$, which will exclude any effort taken by the borrower. Therefore, the lender will not grant the loan to the borrower (Aghion and Murdoch 2005).

Ex-post, strategic default refers to the enforcement problem of collecting the money from the borrower although the investment is made and the profit from the project is realized. In the case of low legal law enforcement the lender has little possibility to get the money repaid. With weak law enforcement the incentive to default is further enhanced, as the chance of being caught and punished is limited (Ray 1998).

\(^{14}\) Here we do not distinguish between "risky" and "safe" projects, but only emphasize the effort made to realize the project.
4.2. The Use of Collateral

Collateral is used to reduce problems generated from the agency problems in the credit markets. In order to compensate for defaults, collaterals are widely used in order for the lender to secure the whole - or a share of the loan. Collaterals are used as an “insurance” against intentional and unintentional defaults from the borrower. The fact that the borrower will loose its collateral reduces the incentive to default. With collaterals the effort level increases and the incentive to strategically default on the loan is reduced.

Assume that the initial borrower has a wealth. The lender requires that the borrower use some of this wealth as a collateral \( w \) in order to be granted the loan, and that \( w < k \). If the project fails by the probability \((1-p)\), the borrower looses \( w \). By using the same constraint as before the borrower will give an effort only if \( y - R - c > p(y - R) + (1 - p)(-w) \).

Hence, the right hand side of the equation has decreased, making effort more attractive for the borrower. Now, the largest possible gross interest rate that the lender can charge is

\[
R < y + w - \frac{c}{(1 - p)},
\]

which is higher than the case of without collateral (Aghion and Murdoch 2005).

The borrower ex post payoff will be \( y + w - R \) if the borrower chooses to repay. In the case of strategic default the borrower will repay the loan as long as \( w > R \). If the borrower chose not to repay the payoff is equal to \((1 - s)(y + w) + sy\). The first term in the equation captures the chance of being caught \((1 - s)\) if the borrower strategically chooses to default, while the second term describes what happens if the bank catches the borrower and confiscate the collateral, which will happen with probability \( s \). Hence, the borrower would strategically default if \( y + w - R > (1 - s)(y + w) + sy \). A bit of algebra shows that if \( R < sw \) in order for the lender to prevent the borrower from running off with the money (Aghion and Murdoch 2005).

If the \( s = 0 \), or very small, the bank will refuse to grant any loans to borrowers even though the lender is willing use its collateral. Hence, well defined property rights and a well functioning legal system are decisive in order for rights to be enforced and repayments ensured.
5. Issues In International Investments

As discussed, microcredit investments are argued to be attractive for commercial investors. However, for the time being the international capital market does not seem willing to undertake major investments in this market. In this chapter we will present two theories that explain why investors might be reluctant to invest in countries and markets that are poor and where information is difficult to obtain.

5.1. Marginal Productivity and the Flow of Capital

This part will explain why capital is not naturally flowing from richer parts of the world to poorer regions. From the simplest neoclassical models, two countries with identical return to scale production functions, the level of production per worker in the two countries should then only depend on the level of capital per worker. By using the Cobb-Douglas production function with constant technology, there is a diminishing return on capital per worker:

\[ y = Ax^\beta \]

- \( y \) – income per worker
- \( x \) – capital per worker

Marginal productivity of capital can then be expressed as \( r = A \beta x^{\beta-1} \), and marginal capital per workers can be expressed as:

\[ r = \beta A x^{\beta-1} \]

Hence, in a well functioning market, the diminishing return on capital should imply that capital should flow from the country with most capital to one with the least.

However, this is clearly not the case, and the Nobel price winner in economics Robert Lucas (1990) has examined a theory why capital is not moving from rich to poor countries. From the Cobb-Douglas production function, Lucas estimated that the marginal productivity of India should be 58 times that of the US\(^{15}\). Hence, in a free and competitive world market investments should flow from the United States to India. Lucas pointed out three defaults in the neoclassical prediction model of capital flow, which explain the difference in productivity in India and the US, and consequently why capital
does not flood to poorer regions of the world, where the last point is of particular interest for this paper.

First, there is a difference in the level of human capital. In other words, the model ignores difference in labor productivity and quality. According to a study conducted by Krugger (1968, cited in Lucas 1990:93) relative human capital endowment varies from 0,2 to 1. Hence, an American worker is five times more productive than an Indian worker and \( y \) can then be reduced from fifteen to three, reducing the marginal production advantage of India from fifteen to five 16.

Second, technology also affects the productivity. This can be explained by difference in \( A \), which in many cases can eliminate the whole advantage. Knowledge the whole productivity advantage of India over USA is removed. However, Lucas presents the technology as a function of human capital raised to a power.

\[
y = A x^\beta h^\gamma
\]

Where \( h \) is human capital per worker, and \( h^\gamma \) is the external effect, and that the marginal productivity of capital is

\[
r = \beta A \beta y^\beta h^\gamma
\]

Hence, assuming the Americans are five times as productive as the Indians and that \( \gamma = 0,36 \)17, the predicted return differential is eliminated and the result is equal return on capital in both countries18.

Lucas’ final point is imperfections in the international capital market and the notion of political risk. In a perfect international market the rich country \( A \) will lend money to the poor country \( B \) until the two countries reach the same marginal production in equilibrium.

\[15\] \( \beta \) is on average 0,4 in both countries, and assumed production per person in the United States is fifteen times what is in India.

\[16\] Assuming same \( A \) and using formula 5.2, will give India a marginal production advantage of: \[1/(3^{0.4}) = 15^{1.5} = 58. \]

\[17\] 0,36 is based on data from United Stats from 1909-1959

\[18\] \( \left(\frac{1}{3^{0.4}} \times 5^{0.4}\right) = 3^{1.5}5^{-1} = 1 \)
However, in order for capital to flow freely and reach equilibrium, there need to be effective mechanisms that enforce the agreements between lenders and borrowers. If there are no repayment mechanisms in place, the poor country will not have an incentive to repay its debt. Because country $A$ knows this is the case, it will not lend country $B$ money in the first place.

5.2. The Home Bias Theory

As just described, a well functioning capital market is very important for economic efficiency. Allocation of capital makes it possible to realize projects, as investors will invest in the projects where the marginal productivity (return) is highest. In a global economy, theoretically, investors should invest in a region or industry that offers the highest return at any time. The theory of home bias recognizes that even though financial theory suggests that the optimal portfolio should consist of a majority invested in the international financial market, observations imply that investors do not invest as much as what would be optimal abroad. There are different attempts made to explain this form of inefficiency such as hedging home risk with home equity and that the gain form international diversification does not cover the cost (Lewis 1999). The theory of statistical discrimination can also be applied to the home bias theory as an explanation of why investors hesitate to invest in markets outside although they might be more profitable. Statistical discrimination is a theory mainly used in the labor market to explain why minority groups receive lower salary. Managers that have a typical background or culture (race, gender, age, education, religion) seem to favor applicants with similar background as themselves. The theory suggests that as managers are risk averse they tend to be willing to offer their matching applicants a higher salary than others where the culture and background is less attuned (Berk 2001). Arrow (1972) highlights some important reasons for discrimination such as the assumption that assessing the true quality of an applicant is costly and consequently the manager will look for low cost alternatives to identify qualities. For instance race and gender are easy to observe, and if the manager has prior beliefs in these two qualities, they will be used as hiring criterion. According to Berk (2001), Arrow’s approach to understand statistical discrimination has helped understanding its contributing factor in discriminatory practice. Consequently, as investors fear the unknown, have little experience investing in developing countries and limited knowledge about the culture they prefer to invest in their home market.
Section

III
6. Introduction to Microcredit

The philosophy behind microfinance is trying to create financial services for poor people around the globe, as the poor rarely access these services through the formal financial sector. Microfinance is often used as the broadest term of financial services to the poor, including the self-employed. These services generally include savings insurance and payment services in addition to credit. Marguerite S. Robinson’s (2001:9) definition of microfinance gives several examples of how the access of financial services helps poor people of making a sustainable income:

“Small-scale financial services for both credits and deposits that are provided to people who farm or fish or herd; operate small or micro-enterprises where goods are produced, recycled, repaired, or traded; provide services; work for wages on commission; gain income from renting out small amounts of land, vehicles, draft animals, or machinery and tools; and other individuals and local groups in developing countries, in both rural and urban areas”.

Most often a demand for microcredit comes from households and enterprises operating in the unregulated informal sector of the economy, which is characterized by scarcity of capital, family ownership, small-scale operations, non-legal status, lack of security of business location, operation in unregulated markets, relatively easy entry into markets, irregular work hours, small inventories, use of indigenous resources, and domestic sales of products (Robinson 2001).

6.1. Microfinance Institutions (MFIs)

Microfinance institutions (MFIs) include all institutions that provide microcredit services, including banks, state banks, non-profit organisations, financial intermediaries and credit unions (Drake and Ryhne 2002). Commercial MFIs, on the other hand, distinguish itself from other MFIs as they operate on a “business basis” and with a market approach. The transformation from a regular MFI into a commercial MFI implies principles such as financial sustainability and performance, professionalism and efficiency in the provision of credit.

6.2. Commercial Microcredit

The term commercialization refers to a movement in the microcredit industry where MFIs move from being heavily subsidized and donor-dependent, to MFIs that are
operated on a more business basis and as a part of a regulated financial system. The industry has gone through some distinctive phases since microcredit was first introduced in Bangladesh in the 1970s. Foreign commercial investments are becoming an important source of funds for promising MFIs with a growing potential (CGAP 2004). Financial and economic theories claim that the capital market provides MFIs with access provision of capital and enables them to make forward-looking investments in operations and enable them to grow and expand, serving increasing number of microcredit borrowers.

Standard & Poor (2007) highlights that lack of transparent and reliable data is an obstacle that must be overcome for commercial microcredit to really access the international capital market. Further, a more commercially driven microfinance industry is likely to be more transparent which again will force MFIs to operate more efficiently, be profitable and for that reason receive better funding (Holden and Holden 2004:3). Hence, the commercialization of the microfinance industry is likely to help push towards more long term self financing. Consequently, MFIs will be able to continue to serve the poor even after non-commercial donors move on to the next interest. Figure 6.1 gives an historic overview of how the microfinance industry has developed in recent decades:

![Figure 6.1](image)

Microcapital Institute 2004

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19 Actually the concept of capital for poor people is something that has been around for several hundred years in agricultural cooperatives and other forms of peer groups, however Mohammad Yunus and the Grameen Bank in Bangladesh are considered the founders of the microfinance industry. Grameen Bank was founded in 1976.
6.3. Microfinance Investment Funds (MFIF)

In addition to the recent CDO investment the majority of commercial investments in microcredit are made through microfinance investment funds (MFIFs). Traditional microfinance investment funds are funds that invest either directly in MFIs or through dedicated investment funds specialized in microfinance investments (Goodman 2006)\(^20\). These MFIFs are mainly targeting institutional investments, and although the start looks promising the progress has been slow. MFIFs can be divided into three categories, *commercial MFIF, quasi-commercial MFIF* and *microfinance development funds*. The latter is mainly commonly cooperatives or non-profit entities, whereas commercial- and quasi-commercial MFIFs are funds set up either as regular investment funds or investment companies, which intend to provide investors with a financial return. Whereas commercial MFIFs target mainly institutional and commercial investors through investments in debt, quasi-commercial MFIFs target private donors and developing agencies who mainly invest in equity (Goodman 2006).

\(^{20}\) 43 microfinance investment funds were identified in 2004. Examples are BOMS 1-2, AXA World Funds, Accion Getaway, GCMC (Deutche Bank), Oikocerdit and Kolibri Kapital (Norway).
7. Introduction to Collateralized Debt Obligation (CDO)

In this chapter we will give a theoretical introduction to structural finance and for which purposes this specific financial tool can be used. Most of the emphasis will be based on collateralized debt obligations, which is a special instrument within the structural finance family. In a later chapter we will describe the use of CDO in microcredit investment.

7.1. Structured Finance: An Overview

The four main components of the structured finance market include Asset-backed securities (ABS), Residential Mortgage-backed securities (RMBS), Commercial Mortgage-backed securities (CMBS) and Collateralized Debt Obligations (CDOs) (Fabozzi 2006). This theoretical part of structured finance will start out exploring literature of structured finance, before digging into theory of CDOs and determine how the CDO is structured.

Structured finance is invoked by financial and non-financial institutions in both banking and capital markets where established sources of external finance are either (1) unavailable for a particular financing need, or (2) traditional sources of funds are too expensive. The advantage of structured finance is that it is considered to offer the issuers flexibility in terms of maturity structure, security design and asset types. In an efficient market structured finance contributes to a more complete capital market by offering any mean-variance trade-off along the efficient frontier of optimal diversification at lower transaction cost (Jobst 2002).

One definition that determines structured finance is “a defined group of assets that can be structurally isolated and thus serves as the basis of a financing that is independent from the bankruptcy risks of the originator of the asset. By isolating the assets, an originator obtains easier access to the capital markets by generating note proceeds at a lower cost of fund that it otherwise might if it issued notes directly to investors” (Fabozzi 2006: 2)\(^{21}\).

\(^{21}\) The definition quoted in Fabozzi (2006:2), originates from the Committee on Bankruptcy and Corporate Reorganizations of the Association of the Bar of the City of New York.
The definition highlights the access to capital markets at a lower cost of fund, which is an important motivation behind structured finance. There exist several others definitions of structured finance, however, most definitions tend to focus on securitization (Fabozzi et al. 2006a).

Securitization is a financing system whereby banks or other financial institutions acquire capital by converting assets into tradable securities (Fabozzi and Modigliani 1992). Theory from Corporate Finance emphasizes that there can be considerable savings for corporations by choosing the right funding strategy. By securitizing, a company can “destructure” its balance sheet by separating highly liquid assets from the retaining risk associated with the company. In certain situations these assets can be used to raise funds in the capital markets at a lower cost than if the company had raised funds directly by issuing regular debt or equity. The company retains the savings generated by these lower costs, while investors in the securitized asset benefit by holding investment with lower risk (Schwarcz 2002). For total overview of risk transfer instruments, see appendix 2.

7.2. **Collateralized Debt Obligation (CDO)**

Collateralized debt obligations (CDOs) are securities backed by a diversified pool of one or more debt obligations like bank loans or corporate bonds (Fabozzi 2006). CDOs are the generic term used for credit portfolio securitization, and it entails re-packaging portfolios of credit, like loans, for sale to investors. CDO re-packages credit risk into multiple tranches of securities, which separates the risk of the underlying portfolio. The issue of the securities is designed to reduce or eliminate the credit risk to existing obligors (Das 2005).

The term CDO is used to cover all forms of credit securitization. In practice there are two main structures: a classical collateralized loan obligation (CLO) transaction and a synthetic securitization structure (Das 2005). In a synthetic CDO structure, the investor does not own the collateral assets physically. Instead the collateral absorbs the economic risk associated with specified assets, but does not have legal ownership of those assets (Fabozzi 2006). The motivation of such an issue is to transfer credit risk, not to access additional funding, hence synthetic securitization will not be explained in this paper. In the further part of this paper, we will refer to CDO as the classical CLO transaction.
7.2.1. The CDO Structure

This part will determine the CDO structure, and the different participants in a CDO structure. Literature describing the participants in a CDO structure uses various terminologies. The definition used in this part refers to the definitions of Fabozzi, which involves originator, asset manager, CDO issuer (Special Purpose Vehicle), investment bankers, investors, rating agencies, and trustee. Figure 7.1 summarizes how the structure is designed, and provides an intuitive understanding of how the participants are involved in the process.

Figure 7.1:

7.2.1.1. The Originator

The bank or corporation that owns the credit portfolio, and transfer the portfolio from its own balance sheet to another entity, is referred to as the originator. After the credit portfolio has been transferred, the originator still has the responsibility to collect the interest and principal of the underlying portfolio.

7.2.1.2. Sellers (Investment bankers and structurers)

The purpose of the investment bankers is to structure the CDO. The investment bank takes a pool of capital from the originator and structures the deal into tranches, which will be explained further in chapter 7.2.2. The pricing and structuring is completed by the investment bank and is subject to review from the rating agencies (i.e. Moody's, S&P, Fitch). Once the deal is placed with investors, the investment bank is no longer part of the transaction. However the investment bank is generally expected to provide some type of secondary liquidity in the senior classes of the deal (Fabozzi et al. 2006b).

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See appendix 3 for a more detailed overview of the structure.
7.2.1.3. The Asset Manager
An asset manager controls the underlying collateral and selects the initial portfolio of a CDO and manages it according to perceived guidelines contained in the CDO’s indenture. The asset manager often has broad discretion to purchase or trade collateral and plays a key role in each CDO transaction (Fabozzi et al. 2006b). Asset managers make money by collecting fees, including senior fee, subordinated fee and equity incentive fee, hence making this a business for any asset manager.

7.2.1.4. The Trustee
The trustee holds title to the assets of the CDO for the benefit of the debt and equity holders, enforces the terms of the CDO indenture, monitors and reports upon collateral performance, and disburses hash to debt and equity investors according to set rules (Fabozzi, et.al 2006b). The asset manager produces and distributes note holder reports, performs various compliance tests regarding the composition and liquidity of the asset portfolios in addition to constructing and executing the priority of payment waterfall models, which will be explained later on. The trustee is an independent third party in the structure.

7.2.1.5. Rating Agencies
Rating agencies approve the legal and credit structure of the CDO, perform due diligence on the asset manager and the trustee, and rate the various seniorities of debt issued by the CDO (Fabozzi, et.al 2006b). The rating agencies provide the structure with important information for the investors, and the rating of the tranches play an important role for investors when defining the risk of the investment.

7.2.1.6. Investor
In general, the investors are institutional as extensive volume investments are required, due to high transaction costs. However, there are opportunities for private investors when the bonds are traded in the secondary market, listed on a stock exchange. Commercial investors will always pay attention to the risk adjusted return of the asset, and require a well functioning monitoring system. The investors then use information from rating agencies to determine the risk of the bond.
7.2.1.7. Special Purpose Vehicle (SPV) (Issuer)

In a CDO deal, a stand-alone special purpose-issuing vehicle (SPV) has to be established. A SPV is a self-driven entity, and the underlying collateral is transferred into the SPV’s balance sheet. The SPV is bankruptcy remote to the loan originator, and purchases a portfolio of assets (bonds or loans) from the originator(s). The SPV funds the purchase through an issue of several tranches of securities and a residual equity portion. The securities are rated on the basis of the credit quality of the asset pool as well as the use of credit enhancement techniques (Das 2005).

7.2.2. Credit Enhancement

The Basle Committee on Banking Supervision defines credit enhancement as “a contractual arrangement in which the bank retains or assumes a securitisation exposure, and provides some degree of added protection to other parties to the transaction” (cited in Jobst 2002:18). Most important, credit enhancement adds an additional value to the structure that will benefit the investors by reducing their risk. One form of credit enhancement is overcollateralization, which is an overwriting of the face value of the underlying asset. A second form is the originator taking the first-loss position in the structure. All forms of credit enhancement will function as insurance for the investor, and consequently provide the senior tranches with a better rating.

Finally, some CDO structures also involve a third party credit enhancement. The basic idea is that a third party guarantees for the equity tranche, meaning that the most senior tranches in the structure will be more attractive to the investor. Credit enhancement is an important tool to achieve a good rating of the senior tranches.

7.2.3. Distribution of Cash Flow: “Waterfall”

The total debt obligation for a given CDO is generally divided into a variety of tranches, and each of these tranches has a different risk profile in order to suit the different investor’s risk preferences. The tranches are generally ranked by seniority in the following order; senior tranches, mezzanine tranches and equity tranches. This structure of a portfolio, allow the originator to separate the risk within the underlying portfolio. A high rating, usually AAA or AA, often attract investors as these investment are expected to have no or minor risk.
Payments of interest and principal to the various bond classes (tranches) issued by a CDO are generally made sequentially, such that payments are first made to the most senior class and then to other classes, in the order of their subordination. Further, these payments are made solely from the cash flows received from the underlying assets. The senior bonds have first claim on cash flows. The mezzanine and equity tranche have a subordinate claim on cash flows. The equity tranche, which occupies a first-loss position, is generally unrated and receives all, or most, of the residual interest proceeds of the collateral, depending on the structure of the CDO. The CDO equity represents a leveraged investment in the collateral; it has both a higher expected return (assuming that the expected return of the underlying return is positive, i.e. that expected losses are lower than coupon payments) and a higher volatility of return than the underlying assets (Fabozzi et al. 2006a).

A CDO structure distinguishes between the payments of the interest and the principal. The distribution of the cash flows is referred to as the “waterfall” (Fabozzi et al. 2006b). The technique is used to separate priority to the cash flow, and create a distinct risk of the invested classes. The principal payments follow a simple waterfall technique (see appendix 4), but the payments of interest require a further explanation. Figure 7.2 is a framework for distribution of interests.

**Figure 7.2**

![Diagram of waterfall distribution of interests](image)

Figure 7.2 shows that class B interest does not get paid before the commitment of class A payments are covered, as class A is superior to class B. The same goes from class B to equity. The different participants that collect fees and other expenses are paid before class A payments are made.
### 7.3. Risk

Rational investors are concerned about risk compared to expected value. Traditional bonds face several forms of risk like liquidity risk, exchange risk, political risk, tax risk, volatility risk, inflation risk, credit or default risk and interest rates risk.

Risk factors like political risk, inflation risk and interest rate risk are, like any other assets, factors that can influence the value of the asset. However, the main risk that is associated with the tranches of a CDO is credit risk, where the investors face the risk of not receiving timely payments of the correct amount. The risk of a loss due to a debtor’s non-payment of a loan is known as default risk. When dealing with consumer credit or bank loans this is especially important. Credit risk is a form of risk that appear from the non-performance of borrowers (Jobst 2002). The non-performance can be a result of both inability and unwillingness from the borrower to repay interests and principals (moral hazard). In a portfolio of loans the real credit risk is deviation of the actual performance of the loan pool from the expected value. Risk can be diversified, as the performance of the loan portfolio is exposed to both systematic and unsystematic risk. Much of the unsystematic risk (idiosyncratic risk) can be eliminated through diversification. However the interest rate risk proportion inherited in the systematic risk loan portfolio has more limited diversification possibilities and consequently cannot be totally eliminated (Jobst 2002).

Liquidity risk is an additional risk that the investor should pay attention to when investing in the tranches in a CDO structure. Liquidity risk occurs when an asset is not traded frequently, and this increases the risk for any investor that holds an asset since it affects their ability to trade. If the asset is traded in the secondary market, which is illiquid, the investor may be forced to sell the asset at a lower price than it would in a liquid market. This can be further explained through theories of supply and demand. That said, liquidity risk should especially be considered if the investor is short-term oriented, that is, the investor does not intend to hold the asset until maturity.
8. Microcredit CDO (MCDO)

The CDO structure offers an opportunity for structuring microcredit investments and increasing its attractiveness for commercial investors, as the investments can be regarded as safer than regular direct investments in MFIs due to the CDO’s subordinate tranches and credit enhancements discussed in section 3. According to Goodman (2006: 25) the return on these investments are generally equal to or above investment-grade debt securities and the fact that investment-grade debt securities are well publicized, offers commercial investors an opportunity to become more familiar with microfinance investments through CDOs. The Microcredit CDO (MCDO) offers the senior tranches to commercial investors whereas the subordinate tranches targeting development agencies and investors that are more familiar with microcredit (Goodman 2006). So far two MCDO deals have been issued, where one of the deals is listed and available for private investors. More MCDO offerings are currently in the process. According to Standard & Poor (2007) only 1-2% of the existing MFIs, about 100-200 MFIs world wide, are large and sophisticated enough to engage in a securitization.

The BlueOrchard Microfinance Investments (BOMS) was the first CDO structure ever to invest in microcredit in 2004/2005. The Swiss commercial microfinance investment and management company BlueOrchard Finance SA originated the structure together with Developing World Market. In addition the Grameen Foundation USA assisted in arranging the deal, which closed at $87 million. The senior tranches were guaranteed by the US government agency OPIC (Overseas Private Investment Cooperation) who offered to take the first loss position. Consequently the senior tranches were given an AAA rating which again was offered to the commercial investors (Goodman 2006).

In the next part the BlueOrchard Loans for Development (BOLD) deal will be presented. BOLD is the first public available MCDO and the largest single commercial microfinance investment ever made, and the deal is used in our analysis as an example of how an MCDOs is structured.

8.1. The BOLD deal

BOLD was issued in 2006 and closed at $99.1 million. The deal offers a 5 years fixed rate funding to 21 different MFIs in 13 countries (MIX Market 2007). BlueOrchard,
together with Morgan Stanley and JP Morgan, originated the deal. Morgan Stanley helped structuring the deal as well as ensured that all currency is fully hedged. Consequently the deal does not suffer from any exchange rate risk. JP Morgan was the trustee. The subordinate note “first loss” class position is taken entirely by the Dutch development bank FMO\textsuperscript{23} (The Netherlands Development Finance Company), which then operates as a credit enhancer. The senior notes were offered for institutional investors without any experience with microcredit investments. The tranches are divided into an asset class A and an asset class B, where class B is subordinate to class A. In total the deal is divided into 72 \% in class A and 28\% in class B. The most senior class A was placed by Morgan Stanley and offered to mostly commercial European banks with little experience in microcredit investments. The senior class A is currently listed on the Dublin Stock Exchange (MiX Market 2007). Morgan Stanley announced a second deal, BOLD 2007-1, in 31\textsuperscript{st} of May 2007, which will be the first public rated MCDO ever to be offered in the market (Morgan Stanley 2007). The different tranches are showed in figure 8.1.

Figure 8.1:

<table>
<thead>
<tr>
<th>Capital Structure</th>
</tr>
</thead>
<tbody>
<tr>
<td>Class</td>
</tr>
<tr>
<td>------</td>
</tr>
<tr>
<td>A1</td>
</tr>
<tr>
<td>A2</td>
</tr>
<tr>
<td>A3</td>
</tr>
<tr>
<td>E</td>
</tr>
<tr>
<td>Total</td>
</tr>
</tbody>
</table>

BlueOrchard (2006)

8.1.1. The BOLD Structure

The MFIs are the loan originators in the transaction, and although they transfer some of their loan portfolio to the SPV they still have the responsibility to collect the interest and principal from the underlying portfolio. The investment bank Morgan Stanley helped structure the CDO, divide it into different tranches and secure that the deal was put forward. The structural finance analysts adapted a standard CDO credit analysis with some additional factors for microcredit and emerging markets in structuring the deal\textsuperscript{24}

\textsuperscript{23} FMO is a development bank where the Dutch Government owns the majority (51\%).

\textsuperscript{24} Structure of the “BOLD 2” deal which is structured in the same way as BOLD 1.
BlueOrchard works as the asset manager, which includes selecting the underlying loans to be included in the CDO, as well as supervising the structure and ensuring that the payments are collected and distributed according the agreement. JP Morgan works as the trustee, which is the independent third-party, with the responsibility of monitoring the deal as a whole. BOLD is a self-driven entity SPV holding the underlying portfolio of microloans. The roles of the different participants in the structure are listed in appendix 5. The structure of the BOLD deal can be explained by figure 8.2, where the cash flow structure goes through three distinctive stages.

**Figure 8.2:**

![Cash Flow Diagram](image)

**Stage 1:**

The first cash flow transfer is from the microborrowers to the MFIs. In this stage the MFIs administers and collects interests and principals and interests from the borrowers. BlueOrchard monitors the MFIs to ensure that they are actually following up on their operations.

**Stage 2:**

As the MFIs have collected the payments, these payments are transferred from the MFIs to the SPV. This stage is also serviced by BlueOrchard to ensure that the MFIs actually transfers the money, as they have been collected.

**Stage 3:**

Final stage is when the payments are paid to the commercial investors holding the CDO assets, following a waterfall structure.
8.1.2. Waterfall

The waterfall explains in which order the payments are made in the MCDO structure. In the structure the payments of principals and interests are sequential, meaning that interest rates has to cover administrative and service costs. These costs must first be covered before class A notes receive any interests. Note A holders receives the first principal payments, and only after all the senior asset holders are paid, the subordinate class B receive their payments. In addition a reserve fund is senior to the B notes with 0,33 % until the point where the fund is fully funded at 2%. Consequently the senior note A features a 28% + 2% credit enhancement which reduces the senior notes risk considerably. In BOLD the waterfall is illustrated in the following figure 8.3:

Figure 8.3:
9. Summary and Conclusion

The MCDO structure can attract commercial investors with limited knowledge about microcredit to invest in microcredit through tranches and credit enhancement. Several MFIs report an impressive track record and financial performance in serving the microcredit market. However, commercial investors’ limited knowledge about the market seems to confirm the statistical discrimination and home bias theory making investors reluctant to invest in the market despite its promising financial performance. The CDO structure helps to overcome this obstacle as tranching of notes reduces the total risk of investing in microcredit. In addition, a CDO is tailored to meet the commercial investors need for a more observable risk adjusted return and reduce transaction costs in a market where investors otherwise would be reluctant to invest from a purely commercial perspective.

The group-lending methodology creates strong incentives, although the microborrowers suffer from lack of collateral. The peer group formation system and peer monitoring reduces the adverse selection problem and restricts the problem with moral hazard. Further, the dynamic incentives are strong as the borrowers have limited options for getting additional funding and thus jeopardize the possibility to get out of poverty by defaulting on the loans. Increasing the size of the loans gradually, making the microborrowers able to obtain higher loans in the future, creates a possibility to reach out of poverty. Hence we conclude that the incentives in the first stage of the MCDO cash flow structure are sufficient as the microborrowers have more to lose than gain in the case of default.

However, the structure suffers from severe problems with both adverse selection and moral hazard in the second stage of the cash flow structure. As the microcredit market is short of sufficient reporting standards, monitoring and is not well scrutinized, the asymmetric information problem seems to be ignored. Due to insufficient incentive mechanisms for the MFIs to transfer payments to the SPV, the structure can at least be claimed to be fragile. As the MFIs do not hold any position in the CDO structure they do not share the risk with either FMO or the investors, as the SPV is a separate legal entity. The MFIs maintain the customer-relationship to its microborrowers, but do not bear any risk of default of the pooled loans. Hence, the MFIs will not benefit from the collected amount. Further, they will be encouraged to withhold the superior loans and include loans
of poorer quality into the underlying pool. The only incentive is the dynamic incentive to be able to get sequential commercial funding. However, the MFIs still have the option to return to traditional donor funding, if they get into financial trouble and default. Consequently, the structure does not provide the MFIs with incentives strong enough to serve their financial obligations to the MCDO.

The social hazard problem further enhances the incentive to cheat, as strategic defaults on the obligation to transfer the payments from the MFI to the SPV in some cases could be considered morally accepted. The investor seems to believe that the moral and social objective of the MFIs to do well and serve credit, also applies to them. However, the obligation to serve rich investors is very different from serving additional poor microborrowers with affordable credit. In addition the lack of sufficient law enforcement that exists in many of the countries where microcredit investments are made the incentive for MFIs to cheat commercial investors seems even more obvious.

Nevertheless, the senior note holders do not suffer from extensive risk exposure due to the CDO structure. However, in a well functioning market there is no “free lunch”. In order for the MCDO to be commercial attractive, someone must be willing to take the first loss position. In the MCDO structure, investors with a social as well as a financial required return hold the subordinate position. Hence it is reasonable to assume that development banks, with a double bottom line objective, require a lower risk adjusted return than pure commercial investors. For microcredit investments to really follow up on its promises commercial investors or, even better, MFIs should hold the first loss position. Controversially the MFIs, which can be considered the major beneficiary in the structure, are exposed to no risk. Instead, the development banks are indirectly subsidizing the senior note holders by taking the majority of the total risk in the structure and thus the structure cannot be considered as market efficient.

Based on our agency problem analysis, we conclude that the structure is not commercially sustainable. We argue that there is a missing link in the structure when it comes to creating sufficient incentives that prevents the MFIs to behave suboptimal, and therefore an MCDO cannot be considered an asset class like any other asset.
Bibliography


## Appendix 1

### Due Diligence

<table>
<thead>
<tr>
<th>Stage 1 Identification and Sourcing</th>
</tr>
</thead>
<tbody>
<tr>
<td>Analyst conducts research to identify prospective new countries &amp; clients</td>
</tr>
<tr>
<td>Research includes examination of political and economic conditions, including rating reports, lending rates, demographics, poverty level, the nature of local microfinance and local industry</td>
</tr>
<tr>
<td>Other information: direct solicitations from MFIs, contacts made in field or at industry conferences, networks</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Stage 2 Data Collection and Verification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Once an MFI is identified, the analyst collects and reviews required documents for accuracy and acceptability</td>
</tr>
<tr>
<td>The analyst enters the income statement and balance sheet from the audited accounts into the BlueOrchard database and opens an account in the BO Internet database for the MFI</td>
</tr>
<tr>
<td>The MFIs are responsible for completing additional information reporting online while the analyst monitors both the timeliness and accuracy of the information submitted by cross referencing other sources and research</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Stage 3 On-Site Due Diligence</th>
</tr>
</thead>
<tbody>
<tr>
<td>Once a prospective client is identified, a BO analyst team conducts an on-site visit with the MFI to interview the management team and credit officers, interview clients and conduct site visits</td>
</tr>
<tr>
<td>Discussion covers: governance, vision/strategy, management, corporate culture, staff, liquidity, asset quality &amp; control, liability quality &amp; control, operations, products, internal control, financial performance, and social performance</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Stage 4 Credit Scoring</th>
</tr>
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<tbody>
<tr>
<td>With the information collected from field interviews and documents, the analyst completes a comprehensive due diligence report encompassing the economic/political environment of the region as well as MFI specific credit characteristics</td>
</tr>
<tr>
<td>An overall credit grade is assigned based on quantitative grades generated by the reports and audited accounts as well as qualitative items highlighted in the analyst’s due diligence report</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Stage 5 Credit Committee Report</th>
</tr>
</thead>
<tbody>
<tr>
<td>Once all the required documents are received (and verified by the Back-office Manager) and the on-line reports are completed, a Credit Committee report is prepared by the analyst</td>
</tr>
</tbody>
</table>
Appendix 2

Overview of risk transfer instruments (Jobst, 2005:4)

Risk Transfer Instruments

Traditional Products
- Credit insurance
- Syndicated Loans

Capital Market Products

Structured Finance Products
- Securitization
  - Asset-backed Securities (ABS)
  - Mortgage-backed Securities (MBS)
  - Collateralized Debt Obligations (CDO)
    - collateralized loan obligations (CLO)
    - collateralized bond obligations (CBO)

Other Instruments
- "Pure" Credit Derivatives
  - Credit Default Swaps (CDS)
  - Total Return Swaps
  - Credit Spread Options
  - Recovery Swaps
- Loan Sales
- Bond Trading
- Asset Swaps

Hybrid Products

Regular Hybrids
- Credit-linked Notes (CLN)
- Synthetic CDOs

Indexed Hybrids
- iTraxx/Credit Default Swap (CDS)

"Pools of Pools" & Leveraged Hybrid
- CDOs with structured finance collateral, e.g., CDOs of CDOs, CDOs of ABS, ABS, RMBS, CMBS, CMK, and other securities/structured products
- CDS on specific CDO tranches
Appendix 3
Appendix 4

Principal cash flow “waterfall”

Principal Proceed of Portfolio

Class A principal (senior)

Class B principal (Mezzanine)

Class C principal (junior)

Equity tranche

Principal cash flow “waterfall” (Fabozzi, et al 2006b:19)
## Appendix 5

<table>
<thead>
<tr>
<th>Issuer:</th>
<th>BlueOrchard Loans for Development 2006-1 S.A.</th>
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<tbody>
<tr>
<td><strong>Sponsor:</strong></td>
<td>BlueOrchard Finance S.A.</td>
</tr>
<tr>
<td><strong>Servicer:</strong></td>
<td>BlueOrchard Finance S.A.</td>
</tr>
<tr>
<td><strong>Trustee:</strong></td>
<td>J.P. Morgan Corporate Trustee Services Limited</td>
</tr>
<tr>
<td><strong>Principal Paying Agent:</strong></td>
<td>JPMorgan Chase Bank N.A.</td>
</tr>
<tr>
<td><strong>Paying Agent:</strong></td>
<td>J.P. Morgan Bank Luxembourg S.A.</td>
</tr>
<tr>
<td><strong>Arranger and Class A Notes Placement Agent:</strong></td>
<td>Morgan Stanley &amp; Co. International Limited</td>
</tr>
<tr>
<td><strong>Class B Notes Co-Arranger and Underwriter:</strong></td>
<td>The Netherlands Development Finance Company</td>
</tr>
<tr>
<td><strong>Swap Counterparty:</strong></td>
<td>Morgan Stanley Capital Services Inc.</td>
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<tr>
<td><strong>Issuer Currency Exchange Provider:</strong></td>
<td>OOO Morgan Stanley Bank (Moscow)</td>
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<td><strong>Corporate Services Provider:</strong></td>
<td>Structured Finance Management (Luxembourg) S.A.</td>
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<tr>
<td><strong>Account Bank:</strong></td>
<td>JPMorgan Chase Bank N.A.</td>
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<td><strong>Euro Account Bank:</strong></td>
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<tr>
<td><strong>Sterling Account Bank:</strong></td>
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</tr>
<tr>
<td><strong>Registrar:</strong></td>
<td>J.P. Morgan Bank Luxembourg S.A.</td>
</tr>
<tr>
<td><strong>Cash Manager:</strong></td>
<td>JPMorgan Chase Bank N.A.</td>
</tr>
<tr>
<td><strong>Counsel to the Placement Agent:</strong></td>
<td>Allen &amp; Overy LLP</td>
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</tbody>
</table>
Centre for Development Studies and Microfinance (MICRO)

Centre for Development Studies and Microfinance was established in 2007. MICRO is a research centre within the fields of corporate directed development aid, development economics, regular development aid, education and microfinance. The scope of the Centre covers essential economical and cultural dimensions of development studies.

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1. Development assistance (aid)
2. Private investments in developing countries
3. Private remittances
4. Financial institutions
5. International regulations and organisations

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