

A PANEL ANALYSIS OF
MICROFINANCE'S RELEVANCE FOR
ACHIEVEMENT OF THE
MILLENNIUM DEVELOPMENT GOALS.
DOES GENDER MATTER?

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THESIS FOR THE DEGREE
MASTER OF ECONOMIC THEORY AND ECONOMETRICS

DEPARTMENT OF ECONOMICS
UNIVERSITY OF OSLO

MAY 2011

Preface

I would like to thank Marte Strøm for excellent supervision and for always being available to answer my questions. Additionally, I would like to thank ESOP - Centre for the study of equality, social organization, and performance- for granting me student scholarship and providing office space.

My thanks also go to my nearest family and friends who have supported me through all these years. My office mates also deserve a thank you for making the writing process more joyful.

I am grateful to Jacob G. Risgaard Knudsen for influencing me to write a thesis on this field, Andreas Lauritzen for proof reading and Cathrine B. Jacobsen for invaluable comments.

All remaining mistakes are mine and mine alone.

Summary

The relationship between women's development and microfinance has received growing attention from economists during the last two decades. Microfinance is often seen as a roadmap for poverty reduction and women's empowerment. United Nations also refer to microfinance as one of the pathways to reach Millenium Development Goals (MDGs) within 2015.

Extensive research has been done to assess the impact of microfinance on several development and welfare indicators at micro level. This paper examines whether microfinance is so substantial that the effects also show up in the aggregate. Using panel data on microfinance from over 79 countries covering the period 1995-2008, the impact of microfinance on several development indicators is investigated and microfinance's relevance for achieving MDGs is discussed. In order to do so, a standard fixed-effects approach is utilized to study the impacts on a number of variables e.g. fertility rate, child mortality, life expectancy at birth and children's schooling. The results indicate that microfinance explains 2 % of the decrease in fertility, 6 % of the increase in life expectancy and 3 % of the decrease in child mortality over the entire period. Further, no significant effects on children's schooling are found.

This thesis also evaluates whether lending to women rather than men has additional impact on development indicators. The study could not find any significant effect.

Contents

1	Introduction	1
2	Background	5
2.1	Millenium Development Goals	5
2.2	Microfinance	6
2.2.1	Why Target Women?	8
2.2.2	Services Beyond Credit	9
3	Review of Impact Studies	11
3.1	Methodology	11
3.2	Relevance of Microfinance on MDGs	12
3.2.1	Effect on Poverty	12
3.2.2	Effect on Health	14
3.2.3	Effect on Education	15
3.2.4	Effect on Women	15
4	Estimating Impact on the Aggregate	16
4.1	Data	16
4.1.1	Description of Data	17
4.2	Complications	18
4.3	Econometric Approach	20
5	Empirical Results	23
5.1	Impact on Fertility, Child Mortality and Life Expectancy	23
5.2	Impact on Schooling	26
5.3	Effects of the Borrower Being a Woman	28
5.4	Robustness Tests	30
6	Effects not Captured in the Model	32
7	Conclusions	34
A	Appendix	40

1 Introduction

“Women can be agents of change if given greater economic opportunity”.¹

Women are discriminated against in various ways, e.g. in health and schooling as well as in the labor market, which leads to reduced opportunities for women.

In countries where the agriculture sector dominates, unskilled women have limited opportunities outside the household and family owned farms where they usually are unpaid workers. In addition, women constitute a large proportion of the population in the informal sector, with little or no financial security and/or social benefits (Human Development Report 2010). Sen (1992) writes about skewed population sex ratios in developing countries and states that overall mortality for females is higher than for males in these countries. Human Development Report (2010) uses the same assumptions as Sen (1992) and reports that the number of missing² women in 2010 is more than 134 millions. One reason for this type of discrimination is that women are not considered an important source of income. They are rather viewed as a burden for the family, in part due to dowry obligations.

According to United Nations Development Programme (UNDP) six out of ten of the world’s poorest people are women. Haughton and Khandker (2009) define poverty as following: “Poverty is pronounced deprivation in well-being, and comprises many dimensions. It includes low incomes and the inability to acquire the basic goods and services necessary for survival with dignity. Poverty also encompasses low levels of health and education, poor access to clean water and sanitation, inadequate physical security, lack of voice, and insufficient capacity and opportunity to better one’s life”. Human Development report (2010) reports that 1.44 billion poor people are living on less than \$ 1.25 a day. Figure 1 shows the evolution of the percentage of the population living under \$ 1.25 a day in different regions of the world between 1981 to 2005. It illustrates that although extreme poverty rates have been declining across many regions of the world in recent decades, high poverty rates still exist, especially in South Asia and Sub Saharan Africa.

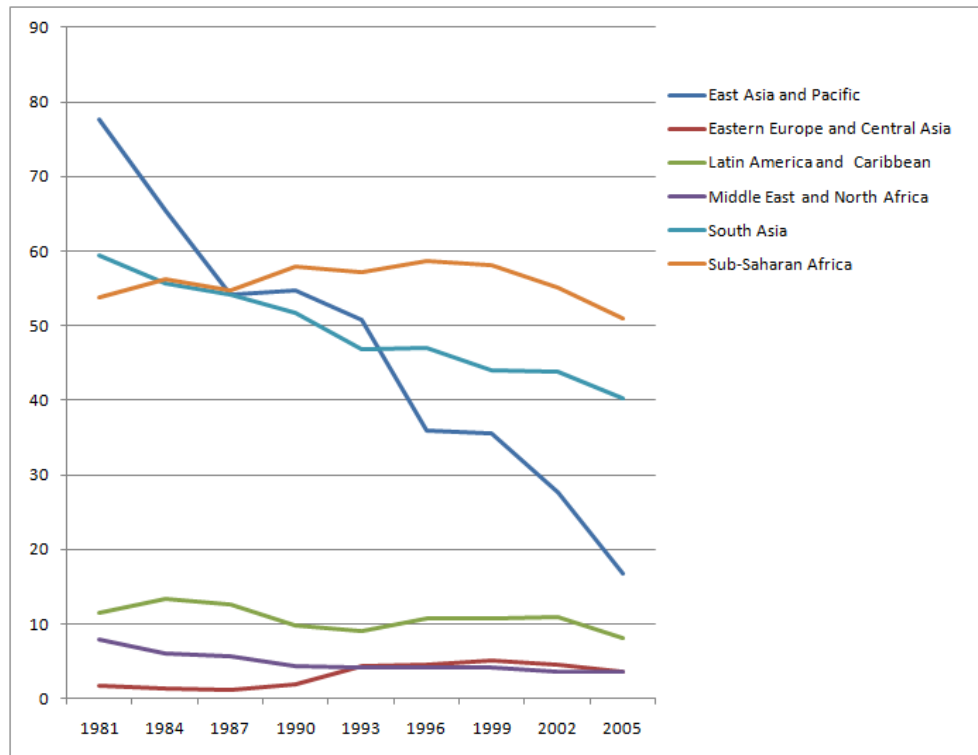
UNDP also reports that some 75 percent of the world’s women cannot get bank loans because they have vulnerable³ or insecure jobs as well as a lack of collateral to

¹UNDP (2010a), Human Development Report 2010, www.undp.org

²“those who died prematurely or who were selectively aborted”, Armendariz and Morduch (2005)

³“Vulnerable employment is unpaid family workers and own-account workers as a percentage of

Figure 1: Percentage living below \$1.25 a day, Source: Chen and Ravallion (2008)



offer as security to banks. See table 1 for an overview of the level of difficulty for a woman to access loans in different countries.⁴

UNDP consider women’s empowerment as an important part of sustainable development and reports that gender inequality in developing countries inhibits economic growth and development. Gender equality and empowerment of women plus eradicating poverty and hunger are two of the eight millenium development goals (MDGs) that United Nations adopted in 2000. At the MDG Summit 2010,⁵ microfinance was discussed as one of the pathways to obtain MDGs. MDGs will be described in more details in section 2.1.

Extensive research has been done on micro level in order to examine the effects of microfinance on poverty and welfare indicators as well as empowerment of women. This thesis explores whether microfinance is so substantial that the effects also show

total employment”, World Bank (2010) www.worldbank.org

⁴“Women’s access to bank loans is an index that indicates whether women are allowed to and can de facto have access to bank loans. In all cases, the variables are between 0 and 1. The value 0 means no or very low inequality and the value 1 indicates high inequality”. World Bank (2010)

⁵UNDP (2010b) MDG Summit Outcome Document, www.undp.org

Table 1: Women's access to bank loans (0=no restriction to 1=full restriction), 2009.
Source: Worldbank

Angola	0.2	Albania	0.5
United Arab Emirates	0	Argentina	0
Armenia	0	Benin	0
Burkina Faso	0.5	Bangladesh	0.3
Bulgaria	0	Bahrain	0
Bolivia	0.5	Brazil	0
Botswana	0.5	Central African Republic	0
Chad	0.7	Chile	0
China	0.2	Cote d'Ivoire	0
Cameroon	0.5	Colombia	0
Costa Rica	0	Cuba	0
Dominican Republic	0	Algeria	0.2
Ecuador	0.6	Egypt, Arab Rep.	0
Eritrea	0.5	Estonia	0
Ethiopia	0.5	Fiji	0.5
Ghana	0.5	Guinea	0
Equatorial Guinea	1	Honduras	0.3
Haiti	0	Indonesia	0.2
India	0.5	Iran, Islamic Rep.	0
Israel	0.2	Jordan	0
Kenya	0.7	Kuwait	0
Lebanon	0	Libya	0
Sri Lanka	0	Morocco	0.2
Madagascar	0	Mali	0.7
Malta	0	Myanmar	0
Mozambique	0.5	Mauritania	0.5
Mauritius	0	Malawi	0.5
Malaysia	0.2	Namibia	0.6
Niger	0.3	Nigeria	0.8
Nicaragua	0	Nepal	0.7
Oman	0	Pakistan	0.7
Panama	0	Peru	0.5
Philippines	0	Paraguay	0
Romania	0	Russian Federation	0.2
Saudi Arabia	0.8	Sudan	1
Senegal	0.5	El Salvador	0.1
Syrian Arab Republic	0.4	Togo	0.7
Thailand	0	Tanzania	0.8
Uganda	0.9	Ukraine	0
Vietnam	0.3	Yemen	0.5
South Africa	0.5	Zambia	0.7
Zimbabwe	0.7		

up in the aggregate. Using panel data on microfinance from 79 countries covering the period 1995-2008, it will investigate the impact on several development indicators, link the results to MDGs and thereafter suggest whether microfinance is an effective strategy to achieve the MDGs. Whether the effect of microfinance is larger when lending to women rather than men is also examined. Using Stata 11, a standard fixed-effects approach is employed to study the impacts of microfinance's coverage on fertility rate, child mortality, life expectancy at birth and children's schooling. A detailed description of these development indicators as well as the fixed-effects approach will be explained in section 4.

If positive effects on the aggregate is found, it underlines the importance of credit constraints on human development, especially the credit constraints on women, and thereby also the importance of equal economic opportunities for men and women.

The outline of the thesis is as follows: Section 2 provides a background discussion of MDGs and microfinance. Section 3 gives a survey of previous literature on microfinance in relation to the contribution of microfinance to achieve MDGs. Section 4 presents the data and the econometric specification before the empirical results are discussed in section 5. Effects that are not captured in the model are discussed in section 6. Section 7 concludes the paper.

2 Background

Microfinance increases opportunities for poor people by helping them to access credit. The formal financial sector usually does not offer financial services to poor people. The main reason why banks do not find poor people credit-worthy is lack of collateral as well as lack of information⁶. Even though poor people may have project ideas that give high expected returns, the risks of lending to poor people is often considered too high. In order to reduce the risk many MFIs offer loans to groups of micro entrepreneurs. Members of the groups are mutually responsible for repaying the loans which leads to self-monitoring within the group and make each member to work hard to succeed.

2.1 Millenium Development Goals

“The MDGs provide a basic roadmap for development. Gender equality is the third goal, but it is also integral to achieving all eight MDGs, from preventing the spread of HIV to sustaining the environment in the face of climate change”⁷.

In September 2000, world leaders came together at United Nations Headquarters in New York to adopt the United Nations Millennium Declaration. The eight goals adopted by the international community are as follows:

MDG1: End Poverty and Hunger

MDG2: Universal Education

MDG3: Gender Equality

MDG4: Child Health

MDG5: Maternal Health

MDG6: Combat HIV/AIDS

MDG7: Environmental Sustainability

MDG8: Global Partnership

All eight MDGs are targeted to meet poor people’s needs and are set to be achieved within 2015. At the UN Summit on the MDGs 2010, Heads of State and Government appraised the progress made related to MDGs since their last meeting in 2005, but they also expressed their concern that this development is not enough for what is

⁶Moral hazard problem: Banks are unable to ensure whether customers are making full effort for their investment projects.

⁷UNWomen (2011) www.unwomen.org

needed to achieve the goals by the 2015 target date. UNDP reports that the child mortality (MDG 4) has been reduced, but not enough to reach the target, while maternal mortality (MDG 5) remains high in much of the developing world. The UN Summit 2010 announced new commitments for women's and children's health and other actions against poverty, hunger and disease. Ines Albredi, UNIFEM Executive director, held a speech at the UN Summit 2010, while emphasizing the importance of women empowerment and women entrepreneurs. "...Women who have lost their jobs and are unable to find new ones are exploring entrepreneurial possibilities in an effort to maintain a livelihood. Credit access is essential if they are to have any hope of success" (Albredi, 2010).

The MDG Summit Outcome Document⁸ reports that the following elements about microfinance were included on the agenda for UNDP to obtain MDGs:

MDG1: Eradicate extreme poverty and hunger

Facilitating access by women to affordable microfinance, in particular microcredit, which can contribute to poverty eradication, gender equality and the empowerment of women.

MDG3: Promoting Gender equality and empowerment of women

Promoting inclusive financial services, particularly microfinance and including affordable and accessible credit, savings, insurance and payments products, for all segments of society, especially women, people in vulnerable situations and those who would not normally be served or are underserved by traditional financial enterprises.

2.2 Microfinance

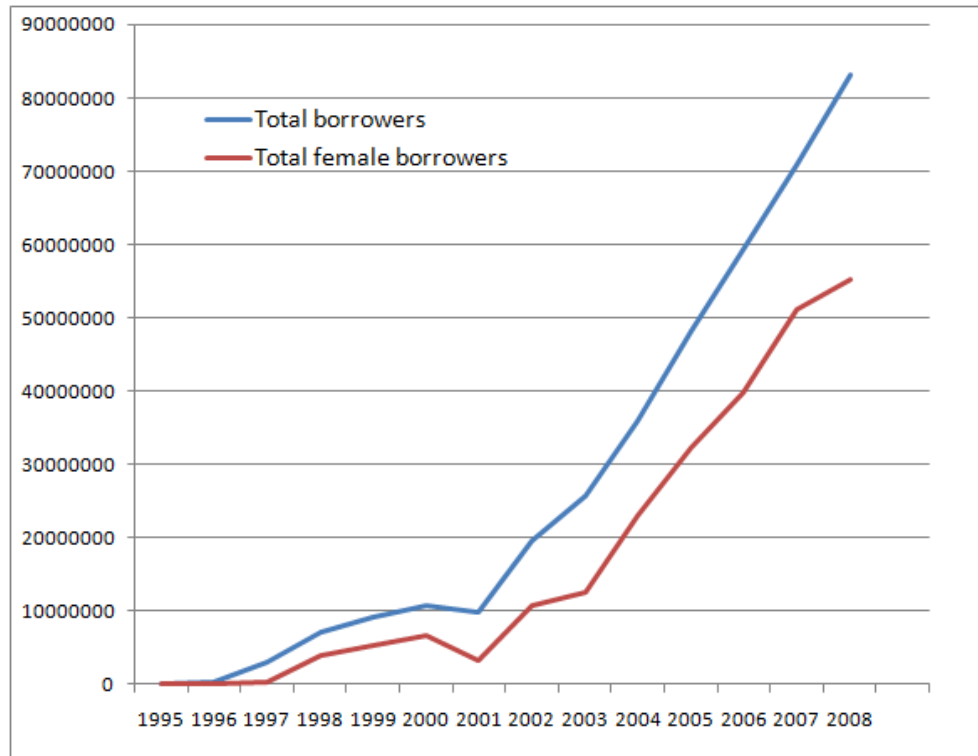
There are numerous microfinance institutions (MFIs) worldwide offering financial services to impoverished people, so they can start entrepreneurial activities and become self-employed and independent. These activities could be to buy a buffalo, start a local kiosk, buy a sewing machine, selling vegetables etc. Microfinance has potential to be a road to new opportunities for a large number of people. In addition to provide micro credit, microfinance programs may also offer organizational help, training, safety nets and empowerment (Khandker, 2001).⁹ The main goal for most

⁸UNDP (2010b) www.undp.org. The outcome document for the MDG Summit 2010 includes an action agenda for achieving the MDGs by 2015.

⁹Facilities and services beyond credit is discussed in section 2.2.2

MFI is to reach women and involve them in the development process.

Figure 2: Evolution of total borrowers and total female borrowers over the period 1995-2008 as reported by Mix Market



For generations, poor people with no land or assets have been borrowing from informal money lenders, mostly from the rich farmers, at very high interest rents. Thus, informal savings and credit arrangements have existed for a long time, and the roots of microfinance can be found in many places. The Grameen Bank is often considered as the establisher of microcredit and was founded by Professor Muhammad Yunus in Bangladesh in the middle of 1970s (Armendariz and Morduch, 2005). The bank grew quickly and it now serves more than 7 million poor families with loans, savings, insurances and other services (Grameen Bank). The microfinance sector is booming in developing countries. Per 2009 number of active¹⁰ microfinance borrowers worldwide was calculated to be around 92.4 millions where 20.6 millions of the borrowers were from Bangladesh and 26.6 from India (Mix Market, 2010). Figure 2 shows the growth of microfinance borrowers from 1995 to 2008 as reported by Mix Market.

¹⁰ "Active borrowers refers to those who have active accounts with the organization; it would exclude any prior clients or clients with long-dormant accounts", in an email correspondence with Scott Gaul, Mix Market

Figure 3: Figure 2 without Bangladesh and India

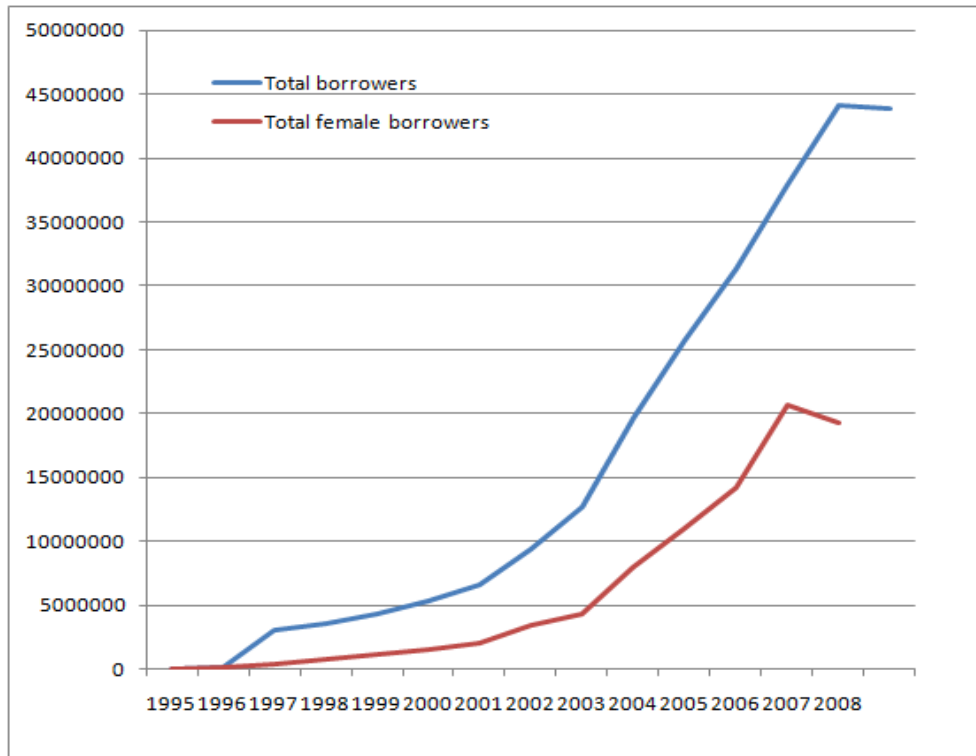


Figure 3 shows the same evolution though excluding Bangladesh and India. The gap between total borrowers and total female borrowers is remarkably bigger when excluding Bangladesh and India. This indicates that the share of female borrowers is larger in countries like Bangladesh and India that also have high prevalence of microfinance. Anyhow, figure 2 shows that total female borrowers has grown fast worldwide and started exceeding total male borrowers in late 90s. After 2001 most of the evolution of total borrowers is explained by growth in total female borrowers.

2.2.1 Why Target Women?

A large number of MFIs target women, hence microfinance contribute in aiming resources to women rather than men. Some, like the Self Employed Women's Association (Sewa)¹¹ in India only have female customers. In 2009 the percentage of female borrowers at Grameen Bank was as high as 97 percent¹².

¹¹Sewa is a trade union registered in 1972. Sewa's main goal is to organize women workers for full employment. SEWA (2011) www.sewa.org

¹²These numbers are adapted from Grameen Foundation Annual Report 2009. Grameen-Bank (2009) www.grameen.com

The main reason for MFIs to prioritize women is the fact that women are considered to be better customers. Women are often more reliable than men when it comes to repayment of loans. The relation between gender and repayment of loans has been analyzed in a number of studies. Khandker, Khalily, and Khan (1995) find that in 1994 9,7 percent of Grameen's male borrowers were irregular and had difficulties to pay before the due date, compared to only 3,7 percent of the women. Similarly, Sharma and Zeller (1997) report that the default rate was reduced significantly in Bangladesh, when the percentage of women increased. Kevane and Wydick (2001) find in a study from Guatemala that female credit groups misused funds less often and performed better than male groups.

Armendariz and Morduch (2005) discuss *why* women are better customers. They are less mobile, thus more likely to work from home and this makes it easier for MFIs to follow and monitor the investment projects. This argument is also discussed in Goetz and Gupta (1996). Similarly Sharma and Zeller (1997) argue that women are more conservative in their investment and business strategies which make them choose projects that are less risky.

Another explanation for the rising proportion of female borrowers is that the socioeconomic impacts of lending to women may be bigger. A number of previous studies suggest that women care more about improving their families' welfare and nutrition, and thus deliver stronger development impacts. Soufias and McClafferty (2001) argue that bigger social and economic impacts of microfinance by lending to women can be explained by men's habits to misuse the resources, probably through tobacco, alcohol and gambling. Thomas (1990) finds an improvement in children's health and households' nutrition when non-labor income is in the hands of women rather than men. Similarly Schultz (1990) finds that the fertility rate in Thailand tends to decline when women are the heads of non-labor income. Thomas (1994) reports that the budget share spent on households' health and education in Brazil increases when the bargaining power of women is increased¹³.

2.2.2 Services Beyond Credit

Credit is the most common service that MFIs provide. As stated earlier in this section, MFIs also provide other services such as savings, insurances, micro leasing

¹³See Khandker (2005) and Pitt and Khandker (1998) for more

of income generating objects, education loans etc.

In order to succeed as entrepreneurs basic entrepreneurial skills are needed (Khandker, 2001). Poor people that are unable to read or write and have never owned businesses may lack such skills. Therefore, to succeed as micro entrepreneurs, basic entrepreneurial education may be crucial. Gray and Karlan (2006)¹⁴ emphasize the importance of entrepreneurial skills by measuring the impact of business education. Clients receiving only financial services and clients receiving added business training were followed over a period of two years. The results indicate increased revenues during bad periods for clients that received financial services and business education. Gray and Karlan (2006) conclude that by receiving added business training clients are able to smooth their income through good and bad economic periods.

There are already many MFIs and organizations that offer facilities and services beyond credit and design the product to better meet the poor clients' needs. Some few examples are Brac, Basix and Freedom from Hunger. Brac in Bangladesh offer services in the areas of e.g. education and health, economic and social empowerment and livelihood training in order to help poor out of poverty.¹⁵ Basix in India provides savings and insurance services for the less enterprising poor people and Agricultural/Business Development Services¹⁶ to poor people in backward regions to better meet their needs.¹⁷ Freedom from Hunger offer microfinance with education that consist of group meetings for better health, nutrition, business and money management.¹⁸

¹⁴The study was carried out with Freedom from Hunger's partners FINCA-Peru and Innovations for Poverty Action.

¹⁵BRAC (2011) www.brac.net

¹⁶These services consist of productivity enhancement, risk mitigation, local value addition, and market linkages

¹⁷BASIX (2011): www.basixindia.com

¹⁸Freedom From Hunger (2011) www.freedomfromhunger.org

3 Review of Impact Studies

Extensive research has been done on micro level to examine the impacts of microfinance. Unfortunately, impact assessments of microfinance on aggregate level are yet limited. Estimating the effects on aggregate level is discussed more in detail in a later section.

3.1 Methodology

Different approaches and methods have been used to study the impact of microfinance at participant and village level. Non-randomness in program participation and non-randomness in program placement are two main estimation problems that researchers have dealt with, when computing effects of microfinance. Tedeschi (2008) reports that selection is a substantial problem and finds that those who eventually will become borrowers have higher incomes than those who will not become borrowers. Consequently, program assessments that are based on simple comparisons between participants and non participants are likely to be biased. Non-randomness in program placement leads to selection bias when estimating, because microfinance institutions do not randomize when they choose area for the programs. Upward biases occur when programs choose areas that are already doing well, and downward biases when programs are placed in less advantaged regions. In addition, selection of villages are often based on characteristics that may not be observable for researchers (Berhane and Gardebreek, 2009).

One of the earliest studies that instrument non-random program placement and non-random program participant is Pitt and Khandker (1998). The study is a collaboration between Bangladesh Institute for Development Studies (BIDS) and the World Bank, which investigates impacts of three different credit programs¹⁹ on household expenditure, non-land assets held by women, male and female labor supply, and boys' and girls' schooling in Bangladesh. They use cross-sectional data and deal with selection problem using quasi-experimental methods and generate control and treatment groups.

Furthermore, cross-sectional studies are often subject to bias because these approaches assume that the initial conditions of control and experiment areas are

¹⁹Grameen Bank, the Bangladesh rural Advancement Committee, and the Bangladesh Rural Development Board's RD-12 program

identical. Another problem is the difficulty of introducing strong and valid instrumental variables (Berhane and Gardebroke, 2009). Copestake, Bhalotra, and Johnson (2001), Khandker (2005), Tedeschi (2008) and Berhane and Gardebroke (2009) use panel data to deal with biases that occur in cross-sectional studies. They use difference-in-difference and fixed-effects methods to evaluate the impact of microfinance. The results vary across these studies and are presented in the next subsection. See also Khandker (1998b) for an analysis of the methodologies employed to evaluate microcredit programs

3.2 Relevance of Microfinance on MDGs

There is limited literature that shows a direct link between microfinance and MDGS. Dunford (2006) and Littlefield, Hashemi, and Morduch (2003) provide a good basis by discussing the articles that show evidence of microfinance's contribution to reach the MDGs. The following discussion on the relevance of microfinance for MDGs is based on these two articles, as well as results from other articles of relevance.

3.2.1 Effect on Poverty

Pitt and Khandker (1998) suggest that the presence of microfinance programs helps the poor to build more assets and net worth. Morduch (1998) criticizes the findings by Pitt and Khandker (1998) by using the same BIDS-survey data of nearly 1800 households he concludes that results by Pitt and Khandker are overestimated and that programs such as Grameen Bank does not really benefit the poor. Morduch (1998) reports that households that are eligible to borrow and have access to microfinance programs do not have remarkably higher consumption than the control groups.

Khandker (2001) argues that whether microfinance helps the poor, depends on the definition of poverty and what kind of microfinance programs are available for the poor. Khandker further states that success in business depends on entrepreneurial skills and local economic conditions. Since many poor people may lack such skills, they may benefit very little from their participation in microfinance programs. Furthermore, Khandker identifies the participants of a microfinance program and their characteristics and then assess the short-term and long-term impacts of microfinance on aggregate welfare. Results indicate that some time after lending, the poor participants do have higher consumption, income as well as net worth. He further shows

that the socioeconomic impacts are positive for households that participate in the programs as well as for non-participating households and concludes that involvement in microfinance also leads to a positive but small welfare impact on the local economy.

Khandker (2005) studies the effect of microfinance on participant and aggregate level using panel data in Bangladesh.²⁰ He suggests that microfinance contributes to poverty reduction, especially for female participants: each 100 additional taka that was borrowed to women increased the total annual household expenditures by more than 20 taka. He also reports significant effects on overall poverty reduction at the village-level, both for participating and non-participating households.

Copestake, Bhalotra, and Johnson (2001) use data of urban credit program in Zambia and find higher growth on business profits and household income for microfinance borrowers, compared to non-borrowers (otherwise similar business operators). They also find that some borrowers were worse off financially after borrowing, 50 percent or so were those who only borrowed once.

Banerjee, Duflo, Glennerster, and Kinnan (2009) examine what happens when microcredit becomes available in a new market. They follow the startup of new MFI in Hyderabad in India and study the effects on the creation and the profitability of small businesses, investment, and consumption. After 15-18 months, they find that microcredit has an important effect on business outcome and household expenditure, though the effects are heterogeneous for the participants. The paper reports a decrease in non-durable consumption for new business-starters in order to pay a fixed cost to enter entrepreneurship. Households that were already involved in businesses invest more in durable goods and increase their profit. The findings also suggest an increase in non-durable spending for households who were not in a position to become entrepreneurs. Moreover, authors find no socioeconomic impacts on health, education or women's empowerment.

Berhane and Gardebroek (2009) use panel data from 16 villages in Northern Ethiopia covering the period 1997-2006 to test the impact of microfinance. They use standard fixed-effects approach and random trend model and suggest positive effects on annual household per capita consumption and housing improvements. Results from fixed and trend deviate somewhat, but they all indicate improved welfare.

²⁰Panel data consisted of 1,638 households in two waves of the BIDS and World Bank 1991/92 and 1998/99 survey in Bangladesh.

Repeat borrowing also matter in both cases and consequently, they suggest that impact evaluations that do not account for long run effect may underestimate the effect of microfinance.

Tedeschi (2008) tests the impact of micro credit on microenterprise profit using a panel data set on a MFI from Peru. He employs fixed-effects and quasi-experimental cross-section methods to mitigate selection bias and finds that microentrepreneurs who take loans make higher profits on average than entrepreneurs who do not borrow. Fixed-effects estimates give roughly the same results as the quasi-experimental cross-selection analysis.

Fixed-effects approach accounts for time-invariant individual and area/village unobservables. Fixed-effects method is used in this study and is explained in more detail in section 4.3.

3.2.2 Effect on Health

There are not many studies that have examined whether extra income gained through microfinance improves health and nutritional outcomes among household members. Illness may lead to loss of earnings which may effect the entire household. Access to loans make these people able to seek health care services. Some microfinance programs even offer education on basic health issues.

Mohindra, Haddad, and Narayana (2008) examine the relationship between female participation in a microcredit program in India, called Self Help Groups (SHGs), and women's health.²¹ The main finding from the study is that participation in SHG may help poor women with not being excluded from health care. Further, Hamad and Fernald (2010) investigate relationship between longer participation in microcredit services and better nutritional status in women in Peru. This study supports the hypothesis that microcredit participation has positive effects on the dietary status of female clients.

Pitt and Khandker (1998), Thomas (1990), Thomas (1994) and Khandker (1998a) also report that microfinance has positive effect on health issues. Furthermore, there are also some few studies that were not able to find any impact on health, e.g.

²¹The study was carried out in the south Indian state of Kerala and included information on 928 non elderly poor women.

Banerjee, Duflo, Glennerster, and Kinnan (2009)

3.2.3 Effect on Education

Access to credit widens opportunities for many poor people, which again may result in increased income. This extra income allows poor people to invest in their children's education and a better future.

Impact assessment of microfinance on children's schooling is not extensive. Yet there have been some studies measuring this impact. Khandker (1998a) finds significant impact on children's schooling, especially for boys. Khandker suggests that a 1 percent increase in Grameen Bank credit provided to women at the mean level, increases the probability of joining school by 1.9 percent for girls and 2.4 percent for boys. Pitt and Khandker (1998) find similar positive effects on children's schooling.

Moreover, Banerjee, Duflo, Glennerster, and Kinnan (2009) and Morduch (1998) find no socioeconomic impacts on education.

3.2.4 Effect on Women

A number of studies find that socioeconomic effects of microfinance are larger for women. Pitt and Khandker (1998) investigate whether women benefit from participation in microfinance programs. Findings indicate that women who participate in the programs are more actively involved in decision making in households and they also obtain their own assets. Similarly, Khandker (2005) and Hossain (1988) report that presence of microfinance has been a benefit for women in terms of social development and poverty reduction.

Somewhat different but interesting relevant research is done by Dupas and Robinson (2009), who focus on the role of access to formal saving services rather than credit. This study is a field experiment from rural Kenya where self-employed people were randomly selected and given access to bank accounts with no interest. The bank charged large withdrawal fees which implied that interest rate on the account became negative. Nonetheless, the usage of the account was high, particularly among women. Findings indicated a positive impact on levels of productive investments among entrepreneurial women, and led to higher income levels within six months.

4 Estimating Impact on the Aggregate

This paper investigates whether the suggested positive effects of microfinance are so substantial that they also show up in the aggregate. Motivation to assess the impacts on poverty and aggregate welfare mainly comes from United Nation's commitment to achieve MDGs within 2015. Firstly, the impact on several development indicators are examined, and the results are linked to the MDGs. Secondly, the paper will suggest whether microfinance is an effective strategy to achieve the MDGs. Lastly, it is explored whether the effects of microfinance are greater when lending to men rather than women.

4.1 Data

The data on microfinance is collected from Mix Market which is a large database for microfinance programs. Most of the largest and well-known MFIs report to Mix Market.

The following data on microfinance has been selected: total active borrowers²², and share of female borrowers²³. This data covers the period 1995 to 2008 and shows the trend in microfinance borrowers in 79 countries. Some countries are excluded from the sample due to missing data. It is assumed that this data is representative for the evolution of microfinance even if it does not cover all the MFIs worldwide. See table 9 in appendix for the list of the countries of interest. Most of the countries are developing countries in Asia, Africa and Latin America.

Several types of data would be interesting to include in the model, but it is unavailable to us. Considering that we are interested in analyzing the effect of microfinance on development indicators, it would be appropriate to include data on e.g. vulnerable employment, literacy rate and poverty indexes such as people who live under \$ 1,25 a day. The problem is that data is not collected in the relevant time periods and too much data is missing. The data in the sample is selected due to availability of an adequate amount of data on the countries of interest, over the preferred time period. The data remains unbalanced.

²²As stated earlier in section 2.2, active borrowers refer to those who have active accounts with the organization; it would exclude any prior clients or clients with long-dormant accounts

²³Share of female borrowers is calculated by dividing number of total female borrowers on total borrowers.

The thesis is assessing the impact of microfinance on several development indicators as listed and described below. This data is collected from World Development Indicators (WDI) which is the primary World Bank database for development data from officially-recognized international sources.

4.1.1 Description of Data

The dependent variables are as follows:

Fertility rate, total (births per woman) ('fertility')

“Total fertility rate represents the number of children that would be born to a woman if she were to live to the end of her childbearing years and bear children in accordance with current age-specific fertility rates”.

Life expectancy at birth, total (years) ('life-expectancy')

“Life expectancy at birth indicates the number of years a newborn infant would live if prevailing patterns of mortality at the time of its birth were to stay the same throughout its life”.

Mortality rate, under-5 (per 1,000) ('mortality')

“Under-five mortality rate is the probability per 1,000 that a newborn baby will die before reaching age five, if subject to current age-specific mortality rates”.

Primary completion rate, female/male (% of relevant age group) ('school-complete-fem/male')

“Primary completion rate is the percentage of students completing the last year of primary school. It is calculated by taking the total number of students in the last grade of primary school, minus the number of repeaters in that grade, divided by the total number of children of official graduation age”.

School enrollment, primary, female/male (% gross) ('school-enrol-male/fem')

“Gross enrollment ratio is the ratio of total enrollment, regardless of age, to the population of the age group that officially corresponds to the level of education shown. Primary education provides children with basic reading, writing, and mathematics skills along with an elementary understanding of such subjects as history, geography, natural science, social science, art, and music”.

One control variable is added:

GDP per capita, PPP (current international \$) ('gdppc')

“GDP per capita based on purchasing power parity (PPP). PPP GDP is gross domestic product converted to international dollars using purchasing power parity rates. An international dollar has the same purchasing power over GDP as the U.S. dollar has in the United States. GDP at purchaser’s prices is the sum of gross value added by all resident producers in the economy plus any product taxes and minus any subsidies not included in the value of the products. It is calculated without making deductions for depreciation of fabricated assets or for depletion and degradation of natural resources”.

Table 2 and 3 present descriptive statistics of the explained and the explanatory variables for 1999 and 2008 respectively. These years are included in order to observe development of the variables since MFIs started to establish in 1995. The tables show huge increment in the mean for total borrowers as well as GDP per capita. Column 3 and 4 in both tables indicate large variation across countries in all the variables observed. Share of female borrowers is however not as expected. Due to table 2 and 3 the mean for the share of female borrowers has decreased over time. Considering that many of the large MFIs have been focusing on women the last years the share of female borrowers should have been higher. As mentioned in section 2.2 the share of female borrowers is largest in countries like India and Bangladesh who also have the highest amount of total borrowers. Thus, the overall share of female worldwide is more than half, but the lower share of female borrowers in the rest of the countries decreases the mean. Otherwise, the rest of the variables are as expected.

Column 5 in table 2 and 3 show that the data is unbalanced for many of the variables, especially for the variables related to schooling.

4.2 Complications

Microfinance mostly support the informal sector. Because this sector is difficult to document, it is problematic to estimate its impacts. Hence estimations produced in this thesis could be biased due to lack of information and should be viewed critically. In addition, amounts of loans may be so small that entrepreneurial activities generated by micro loans may not give high enough returns to make an impact on aggregate poverty (Khandker, 2005). Thus, the loans provided to the poor people

Table 2: Descriptive statistics of the dependent and independent variables in year 1995. GDP per capita in 100 international \$

	(1)	(2)	(3)	(4)	(5)
	Mean	Std. Dev.	Min.	Max.	N
Total borrowers	38.81	344.95	0	3066	79
Share of female borrowers	1	1	1	1	1
GDP per capita	2874.41	2821.09	286.12	16763.88	76
Fertility rate, total (births per woman)	4.09	1.81	1.23	8.05	79
Mortality rate, under-5 (per 1000)	92.04	69.73	8.80	273.80	79
Life expectancy at birth, total (years)	61.81	10.21	29.10	77.45	79
School enrollment, primary, male (% gross)	92.48	21.61	33.89	124.25	58
School enrollment, primary, female (% gross)	83.12	28.18	21.38	123.94	58
Primary completion rate, male (% of relevant age group)	63.45	27.75	16.83	98.33	34
Primary completion rate, female (% of relevant age group)	57.83	32.83	6.43	99.54	34

Table 3: Descriptive statistics of the dependent and independent variables in year 2008. GDP per capita in 100 international \$

	(1)	(2)	(3)	(4)	(5)
	Mean	Std. Dev.	Min.	Max.	N
Total borrowers	1023909	3216964	0	22100000	79
Share of female borrowers	.47	.25	0	.98	77
GDP per capita	6023.91	5946.57	316.39	27651.80	78
Fertility rate, total (births per woman)	3.37	1.57	1.35	7.12	79
Mortality rate, under-5 (per 1000)	64.79	57.98	4.70	209	79
Life expectancy at birth, total (years)	64.83	16.09	64.72	153.97	79
School enrollment, primary, male (% gross)	107.49	16.09	64.72	153.97	63
School enrollment, primary, female (% gross)	101.94	18.46	50.58	152.01	63
Primary completion rate, male (% of relevant age group)	82.08	20.66	42.31	122.83	53
Primary completion rate, female (% of relevant age group)	78.62	24.77	26.26	119.19	53

are so small that the possible impact on poverty and welfare indicators might be small or negligible.

It is also important to pay attention to deficiency in the data set. The effects may be underestimated since not all MFIs are presented in the data. It is not possible to say how many MFIs that are not presented since none of them are required to report themselves at Mix Market. But the acquired data represents the trend of microfinance, making it possible to test the impacts on the aggregate. The effect of microfinance estimated in this study may also be underestimated because we are only testing for microfinance *borrowers*. MFIs also offer services such as *savings* that may generate socioeconomic impacts. This is not addressed in the present study. This paper only addresses the impact of microfinance through the total number of active borrowers.

4.3 Econometric Approach

In this thesis, a linear estimator with country fixed-effects is employed. We have a set of countries ($i = 1, \dots, 79$), each of whom is measured over a period t ($t = 1995, \dots, 2008$).

Fixed-effects models make it possible to control for unobserved and unmeasured variables by creating a dummy for each country and omitting the standard intercept. Fixed-effects method can then be easily implemented using ordinary least squares (OLS) linear regression. Creating country specific intercepts mitigates many problems with omitted variable bias, since any unobserved characteristics which are persistent for the country through the time series will be controlled for, e.g. institutions, culture, religion etc. In a fixed effect model, the fixed unobserved variables are allowed to be correlated with the observed variables.

This is equal to estimating a linear regression on the differences in the variation from year to year. Thus, we are making comparisons within countries, and then averaging those differences across all the countries in the sample. With the fixed effects method, we compare only changes over time, not levels.

The basic model is:

$$Y_{it} = \alpha + \beta_1 \text{borrowers}_{it} + \beta_2 \text{sharefem}_{it} + v_i + d_t + e_{it} \quad (1)$$

Y is a set of the seven dependent variables. $Y = \{\text{fertility, mortality, life-expectancy, school-enrol-male, school-enrol-fem, school-complete-male and school-complete-fem}\}$. β_1 is the estimated impact of the number of total microfinance borrowers (borrowers) on the dependent variables. β_2 is the estimated impact of share of female borrowers (sharefem) on the dependent variables. We are interested in seeing how the variable, 'sharefem' affect the results. In this way, we can see if lending to women gives extra impact on the development indicators. The term v_i is the vector of country fixed effects and e_{it} is the error term.

The country fixed effect, v_i , only varies across countries, not over time. It represents the combined effect on Y of all unobserved variables that are constant over time. Estimators of the parameters β_1 and β_2 of the fixed-effect models (1) must remove the fixed-effects v_i . This fixed-effects v_i can be eliminated by subtracting the corresponding model for country means \bar{Y}_{it} .

In addition to country fixed-effects, time dummies are included. d_t is the time specific effect for each period t but common for all countries, e.g. global economic crisis, international political tensions etc. This means that the countries' intercepts can vary from year to year due to the time fixed-effects, but the yearly effect is equal for all countries.

There is a different e_{it} for each country for every year and represents random variation at each point in time. It is possible to imagine that this random error may correlate with explanatory variables. Error term may suffer from heteroskedasticity, e.g. if the variance of the error term increases as the total number of borrowers increases. Intra-country correlation could be another problem, the error term for country i in year t could be correlated with the error term for country i in the other periods. Random shocks have effects that often persist over more than one time period. Consider a policy change that affects the fertility rate in the following years. If the effect of the shock reduces over time, it will not be captured in v_i since it is time-invariant, but instead be captured in the error term. Consequently, error terms will be serially correlated. Anyhow, regressing OLS will not affect the estimated coefficients, but it will bias the standard errors. Since it is likely that the errors are correlated over time for a given country, cluster-robust standard errors that cluster on the country are utilized.

All regressions will include the control variable 'gdppc'. As explained in chapter 3.1, selection bias is a substantial problem and leads to bias results when estimating the effects of microfinance. Occurrence and placement of MFIs are not randomized. Most of the MFIs are placed in poor countries with low GDP per capita. These countries often have relatively low economic and social development over time but strong evolution of microfinance. This paper only looks at countries that have some microfinance during the preferred time period. In this way the countries are similar. Nevertheless, downward biases will occur if countries that have weaker social development also have the highest growth in microfinance. GDP per capita is included to control for this selection bias. Effect of GDP per capita is not of interest in this study, but it is important to include in the model since it most probably will have an impact on the dependent variables.

The main model is:

$$Y_{it} = \alpha + \beta_1 \text{borrowers}_{it} + \beta_2 \text{sharefem}_{it} + \beta_3 \text{gdppc}_{it} + v_i + d_t + e_{it} \quad (2)$$

The fixed-effects estimator is computed by using the xtreg command with fe and vce(robust) option on Stata 11. The results are presented in the following section.²⁴

²⁴Test regressions were also run comparing fixed-effects regressions with OLS results. Results from OLS regressions are greater for both the variable 'borrowers' and 'gdppc' on all the dependent variables. These larger effects from OLS regressions may be due to omitted variables, both unobserved and unmeasured country specific variables that are constant over time. Cross sectional based analysis is not able to control away country-specific factors. Considering that fixed-effects analysis reduce risk of omitted variable bias it was decided to only employ fixed-effects methods. OLS results are not presented in this study.

5 Empirical Results

It is of interest to assess the impact of 'borrowers' as well as 'sharefem'. The sample of data that include the variable 'sharefem' is remarkably smaller than our full data with 79 countries over 14 years and 1106 observations for the variable 'borrowers'. 'Sharefem' amounts to 761 observations. This is due to small or no prevalence of MFIs in the beginning of the period in the sample. Since many of the countries did not have MFIs in the years 1995 to 1998, missing values were generated for the variable 'sharefem' for these observations. Consequently, this thesis tests whether the effect of 'borrowers' is remarkably different by regressing equation (2) without 'sharefem' using two different data sets. One with the full sample and one that only includes observations in years where 'sharefem' is non-missing. The latter sample will be referred to as the small sample from now on. Running regressions on both datasets, whether the small sample is representative for the big set is tested. The results are presented in table 4, table 5 and table 6. The estimates of 'borrowers' is quite similar in both sets for most of the dependent variables. Impacts are somewhat lower when using the small sample and impact on child mortality becomes insignificant. This may be due to insufficiency of the small sample. In order to not lose too much information, the focus will be on the full data when assessing the effect of 'borrowers'. Furthermore, in section 5.3, regressions on the small sample will be done making it possible to compare the effects of 'borrowers' and 'sharefem'.

All the results presented in this study provide standard errors that are adjusted for clustering.

5.1 Impact on Fertility, Child Mortality and Life Expectancy

Column 1 in table 4 shows the result of regressing equation (2) on our first dependent variable 'life-expectancy'. Per 100 000 increase in the mean level of microfinance borrowers life expectancy at birth increases with 0,0184 years. Descriptive tables 2 and 3 show that mean of life expectancy increased with 3 years over the total period and the mean of microfinance borrowers increased with about one million. This means that microfinance borrowers make out 6 percent²⁵ of the total increase in life expectancy.

²⁵This is calculated by multiplying 0,0184 with 10 and dividing the product on 3. Similar calculations are done for rest of the estimates in this section.

Table 4: Regression on 'life-expectancy', 'mortality' and 'fertility' with full and small sample. 'Borrowers' in 100 000 persons, 'gdppc' in 100 international \$

	(1)	(2)	(3)	(4)	(5)	(6)
	full sample	little sample	full sample	little sample	full sample	little sample
	life-expectancy	life-expectancy	fertility	fertility	mortality	mortality
	(years)	(years)	(births per woman)	(births per woman)	(per 1000)	(per 1000)
borrowers	.0184*** (.0047)	.0131** (.0046)	-.00129** (.0004)	-.00129** (.0003)	-.0817* (.0372)	-.0221 (.0337)
gdppc	-.0077 (.0076)	-.0116 (.0075)	.00738*** (.0014)	.00776*** (.0016)	.231*** (.057)	.205*** (.056)
constant	61.95*** (.2470)	61.69*** (.2482)	3.893*** (.0457)	3.916*** (.0503)	85.43*** (1.615)	93.01*** (2.753)
N	1083	748	1077	747	470	365

Std. error in parentheses * p<0.05, ** p<0.01, *** p<0.001

Moreover, positive and significant effects on the 'fertility' are found (Table 4, column 3). The results indicate that an increase in microfinance borrowers reduces the fertility rate. At the mean, a 100 000 increase in microfinance borrowers leads to 0,00129 reduction in 'fertility'. 0,7 is the total reduction in the mean of fertility, according to table 2 and 3. Hence, microfinance explains 2 percent of the total reduction in fertility over the period 1995 to 2008.

Furthermore, this study finds significant effect of microfinance borrowers on the 'mortality' (Table 4, column 5). The results indicate 0,0817 reduction in mortality, when number of borrowers increase with 100 000 at the mean. Total reduction in probability per 1000 in child mortality over the entire period is 27,5. Hence 3 percent of the reduction is explained with microfinance borrowers. Table 4 also shows that the number of observations for 'mortality' is much lower than for the other variables. Despite the fact that the data for the 'mortality' is highly unbalanced, it was included in the study because of the relevance to MDGs and the interest to assess whether microfinance has any impact on child mortality. We need to keep in mind that the unbalanced data for the dependent variables may lead to insignificant estimates. For 'mortality' most of the missing values are in the first five years of the sample and mostly random. This means that the length of the time period is shortened even further and we have lost some information.

Fertility rate, child mortality rate and life expectancy are interesting factors to assess due to a number of reasons. Lower fertility rates, higher life expectancy, and lower child mortality can be linked to many of the MDGs. Lower child mortality is directly captured by MDG 4 and MDG 5. Lower child mortality can be explained by greater expenditure on the food and the health care of the children (Eswaran, 2002). This indicates that microfinance gives extra income that may be used for health and better nutrition.

Increased life expectancy is generally a result of better nourishment and better health care.²⁶ The mechanism between microfinance and higher life expectancy at birth may be explained by the fact that possible higher income gained through involvement in microfinance leads to better nourishment and more frequent visits

²⁶See Weil (2009) for evidence on the relationship between better nourishment and higher life expectancy. Weil shows that as people become richer, they get better food and more resistant to disease. Additionally, they also get better living standards through improvements in housing and more frequent washing of clothes etc.

to the doctor. This may again lead to higher life expectancy through higher living standards. Hence, according to my estimates, microfinance does increase health and as a result contribute to reach MDGs.

Low fertility is a desired scenario in many developing countries. Kravdal (2002) highlights some of the reasons for why low fertility is preferred. “Parents may suffer from having many children, and growing up with many siblings may be determinant to the children’s well being. In addition, large families may contribute to burden on other families because of the possibly harmful social effects of population growth” (Kravdal, 2002). Lower fertility rates can be linked to MDG 1 by explaining the mechanism through improved household earnings.²⁷ Given that children are considered as an income source for the family, when a household becomes richer the extra income gained from the child labor may not be necessary for the household and consequently a family might want less children. This can be an indication of graduating out of poverty and thus contribute in achieving MDG 1.²⁸

In addition, decline in both child mortality and fertility may be linked to MDG 3. Extensive research has shown the relationship between women’s autonomy and decline in both fertility and child mortality. Eswaran (2002) investigates this relationship in developing countries. Eswaran demonstrates that the empowerment of women through increased bargaining power of wives relative to their husbands results in lower fertility and child mortality. Furthermore, Woldemicael and Tenkorang (2010) show that women in Ethiopia that are more independent are more likely to seek health care during pregnancy and delivery than those with lower autonomy.²⁹ Relying on this evidence, results of decreasing fertility and child mortality from this study are indications of women’s empowerment through microfinance.

5.2 Impact on Schooling

Variables ‘school-enrol-male’ and ‘school-enrol-fem’ are added to investigate whether microfinance can contribute to children’s education, and also to be able to compare differences between schooling for male and female children. Variables ‘school-complete-male’ and ‘school-complete-fem’ are added to see if microfinance has an effect on whether the children complete their primary education. It is interesting to

²⁷Bloom and Finlay (2009) show the relationship between higher income and lower fertility.

²⁸This relationship is also explained in Weil (2009)

²⁹See also Bloom, Wypij, and Das Gupta (2001) for more evidence.

Table 5: Regression on 'school-enrol-male/fem' with full and small sample. 'Borrowers' in 100 000 persons, 'gdppc' in 100 international \$

	(1) full sample school-enrol-male	(2) small sample school-enrol-male	(3) full sample school-enrol-fem	(4) small sample school-enrol-fem
borrowers	-0.0940 (.0875)	-0.0620 (.0763)	-0.0282 (.1112)	-0.00662 (.0996)
gdppc	-0.247*** (.07)	-0.251*** (.06)	-0.307*** (.07)	-0.308*** (.06)
constant	101.4*** (2.260)	107.4*** (1.883)	94.43*** (2.332)	93.97*** (2.410)
N	894	659	894	659

Std. error in parentheses * p<0.05, ** p<0.01, *** p<0.001

Table 6: Regression on 'school-complete-male/fem' with full and small sample. 'Borrowers' in 100 000 persons, 'gdppc' in 100 international \$

	(1) full sample school-enrol-male	(2) small sample school-enrol-male	(3) full sample school-enrol-fem	(4) small sample school-enrol-fem
borrowers	-0.0432 (.0443)	-0.0440 (.0462)	-0.00476 (.0725)	-0.00584 (.0758)
gdppc	-0.160** (.05)	-0.168** (.06)	-0.177*** (.05)	-0.204** (.06)
constant	70.97*** (2.026)	82.45*** (2.090)	67.64*** (1.773)	70.78*** (2.612)
N	726	561	726	561

Std. error in parentheses * p<0.05, ** p<0.01, *** p<0.001

investigate this factor because parents are more likely to take their children out of school when extra income is needed in the household.

Table 5 and table 6 show the results on school dependent variables. Results indicate no significant effect of 'borrowers' on any of the schooling variables.

The time period of the data is worth concern. 14 years may be too short to estimate the effects of microfinance on socioeconomic variables, such as schooling. If the household is relying on income earned through children, the extra income gained after participating in microfinance programs needs to be sufficiently higher, as the household is no longer dependent on child labor income. To earn sufficient income that covers the cost of sending their children to school and to cover the income gap from the loss of child labor may take some time, maybe many years for some households. The mindsets of parents also need to be changed so they are aware of the positive effects of investing in children's education.

5.3 Effects of the Borrower Being a Woman

As stated in the beginning of this section, regressions are now run on equation (2) using the small sample, in order to assess the impact of a borrower being female. The results are presented in table 7 for the impact on 'fertility', 'mortality' and 'life-expectancy'. Results for school related dependent variables are presented in table 8. In comparison to 'borrowers', the effect of the borrowers being women has no significant effect on any of the dependent variables. This can be due to the loss of information in the small sample. Extracting a balanced panel out of an unbalanced data set leads to a substantial loss of efficiency. Hence, given the data set available, it is not possible to tell whether lending to a woman rather than a man generate higher socioeconomic impacts and whether they contribute more to achieve MDGs within 2015.

Table 7: Regression on 'fertility', 'mortality' and 'life-expectancy' with small sample. 'Borrowers' in 100 000 persons, 'gdppc' in 100 international \$

	(1) fertility (births per woman)	(2) mortality (per 1000)	(3) life-expectancy (years)
borrowers	-0.00121** (.0004)	-0.0212 (2.800)	0.0120** (.0042)
sharefem	-0.0454 (.0354)	-0.779 (.0006)	0.529 (.3362)
gdppc	0.0077*** (.002)	0.204*** (.06)	-0.0110 (.007)
constant	3.947*** (.0468)	93.55*** (3.313)	61.34*** (.2733)
N	747	365	748

Std. errors in parentheses * p<0.05, ** p<0.01, *** p<0.001

Table 8: Regression on 'school-enrol-male/fem' and 'school-complete-male/fem' with small sample. 'Borrowers' in 100 000 persons, 'gdppc' in 100 international \$

	(1) school-enrol-male	(2) school-enrol-fem	(3) school-complete-male	(4) school-complete-fem
borrowers	-0.0622 (.0763)	-0.00630 (.0996)	-0.0439 (.04622)	-0.00630 (.0996)
sharefem	0.232 (2.227)	-0.404 (2.537)	-0.381 (1.683)	-0.404 (2.536)
gdppc	-0.251*** (.056)	-0.309*** (.06)	-0.169** (.06)	-0.309*** (.06)
constant	107.2*** (2.3510)	94.23*** (2.876)	82.70*** (2.432)	94.23*** (2.876)
N	659	659	561	659

Std. errors in parentheses * p<0.05, ** p<0.01, *** p<0.001

5.4 Robustness Tests

In addition to 'gdppc' the control variables 'rural-population' and 'population-growth' are now included. Rural population (% of total population) and population growth (annual %) are both collected from World bank on-line database. Percentage of rural population is added as a control variable for level of development. Microfinance is often more prevailing in rural areas and socioeconomic factors such as health and schooling also tend to be lower in rural areas. Further, population growth is included because it may also affect socioeconomic development. The estimates changed only marginally. Effect of total borrowers on mortality rate becomes insignificant when the control variables 'population-growth' and 'rural-population' are added. Effect on fertility is now significant at the 10 % level compared to 5 % with only GDP per capita as control variable. However, neither 'population-growth' nor 'rural-population' have any statistically significant effect on any of the dependent variables.³⁰

Further, GDP per capita has unexpected impact on all the dependent variables. GDP per capita has statistically significant, negative effect on children's schooling (table 5 and table 6). Furthermore, the findings suggest that GDP per capita increases fertility and child mortality. These results are also statistically significant (column 3 and 5, table 4). Moreover, impact on life expectancy is not statistically significant (column 1, table 4). These unexpected opposite effects may be explained by the fact that the time period in this study is too short to capture any positive effect on development indicators. The effect of GDP per capita is, however, not of interest in this study. Considering that the impact of GDP per capita on the dependent variables is contradicting to what was expected, several tests are undertaken to examine whether the results are robust when extending the regression model in various ways.

One possible explanation for the unexpected findings could be that there are some countries with extreme values, such as very high GDP per capita over the period but low level and development of socioeconomic factors, such as life expectancy and schooling. This may be due to unequal distribution of income in the country. Such values may draw the entire effect of GDP in opposite direction. Regressions excluding the extreme values were therefore run to see whether the direction of GDP's impact changes. The results founded earlier were robust against this test.

³⁰All the regressions in this subsection are carried out using the full sample, excluding the analysis of the variable 'sharefem'.

Regressions were also run for different regions testing whether the impact of GDP is different in e.g. Africa and Asia. Effects of GDP on the dependent variables remain opposite than expected.³¹

Further, regressions with interaction between GDP and dummy for positive GDP growth were run to test whether the impact on development indicators is positive when the growth of GDP is positive. The results do not change in any significant manner. Moreover, the results do not change much even though GDP is the only explanatory variable³², suggesting that the time period of 14 years is too short to see positive effects of GDP on human development indicators. With longer time-series, the empirical investigation would become more valid.

Ruhm (2005) and Tapia Granados and Ionides (2008) also find negative effects of economic growth on health³³. Ruhm (2005) argues that the long- and short-term impacts of a rise in income may differ. He argues that even if a permanent rise in income improves health, temporary growth could cause an increase in mortality. He further discusses the possible reasons for pro-cyclical effect of income on mortality. Ruhm(2005, cited in Tapia Granados and Ionides 2008) states the following to explain the short-term negative effect of income on health: “Higher mortality during temporary expansions need not imply negative effects of permanent growth. The key distinction is that transitory increases in output usually require more intensive use of labour and health inputs with existing technologies, whereas lasting changes result from technological innovations or expansions in the capital stock that have the potential to ameliorate any costs to health. Individuals are also more likely to defer health investments during temporary than permanent increases in work hours and sustained growth permits the purchase of consumption goods (like safer cars) that benefit health”.

³¹However, impact of total borrowers became insignificant for almost all of the dependent variables. That is probably because number of observations were too small for the specific regions.

³²A test regression was run excluding 'borrowers' as an explanatory variable.

³³See See Ruhm (2000) and Ruhm (2003) for more.

6 Effects not Captured in the Model

Microfinance may have positive effects on households' income and other welfare variables, but due to a lack of data it was not possible to measure impact on these variables. As stated earlier, it is difficult to assess impact on many variables of interest if these are generated in the informal sector. For example, even if this paper does not find that microfinance leads to a higher schooling level, it is possible to imagine that children who already go to school no longer will need to be an income source for the family after school time. E.g. they do not have to work part-time as shoe-shiners or wash dishes at the local restaurant. Hence, the number of children that goes to school does not increase but children can focus more on their education. This indirectly leads to more investment in education, but this is difficult to document.

Another important factor not captured is the effect of microfinance on the growth of small scale entrepreneurs in the informal sector. MFIs mainly support and lend credit to poor and eligible people who have potential to be entrepreneurs. It is likely to assume that many of these newcomers, especially in the informal sector never register their business. Thus, it is difficult to estimate this effect. This is unfortunate because successive business ventures create jobs for other poor people, which also remains undocumented. Ines Albredi, UNIFEM Executive Director, emphasizes the positive spillover effects of these entrepreneurs in a speech held at UN Summit on the Millennium Development Goals 2010: "...the links between successful entrepreneurship and job creation, as today's struggling entrepreneurs become tomorrow's employers" (Albredi, 2010).

An additional effect of microfinance that is difficult to measure is the effect of people who borrow small amounts from MFIs in periods of shocks on household income and consumption. The shocks could be due to illness or too much rainfall that destroys the harvest etc. If the person who brings the main income to the household falls ill, it is better to take a micro loan and receive instant health care in order to recover faster and thus return faster to work. Freedom From Hunger³⁴ illustrates this with an example of a working woman with a sick child that prevents her from earning money for days, or weeks. Without microfinance people in such conditions without proper security schemes may lose their income, job or income-generating assets, such as a cow or a sewing machine. Hence, access to micro loans in periods of shocks may

³⁴Freedom From Hunger (2011). Financial education to protect and empower women. www.freedomfromhunger.org

lead to more smooth income and consumption. This is an effect of microfinance that has not been assessed in this study due to lack of adequate data. It is not measured by any of the dependent variables in this study.

Furthermore, microfinance loans may be invested in non-profit projects such as better isolation of the house or a new roof. Such projects do not generate any instant income or profit for the poor, but it can help the poor prohibit extra costs in the future. Investing in better isolation may keep the family members warm during the winter, which reduces the possibility of falling ill and loose valuable income.

By making credit and other financial services available for poor people microfinance help developing a more equal credit marked. The poor, especially women who cannot afford collateral are denied loans in traditional banks. These millions of women who take loans with the ambition of becoming small-scale entrepreneurs should be regarded as women with empowerment. Participation in a microfinance program is a large step for many poor women, a step towards autonomy. Even though this study could not find any significant effect of lending to women as opposed to men, the fact that women *actually use* the opportunity of borrowing small loans deserves to be characterized as empowerment and gender equality.

7 Conclusions

This thesis evaluates the impact of microfinance on several development indicators and investigates whether microfinance is an effective strategy to reach MDGs within 2015. Panel data from 79 countries covering the period 1995-2008 is used to assess the effects of microfinance coverage on fertility rate, child mortality, life expectancy at birth and children's schooling.

The results confirm earlier findings at micro level that microfinance contributes to poverty reduction. Results from this study indicate that microfinance explains 2 % of the decrease in fertility, 6 % of the increase in life expectancy and 3 % of the decrease in child mortality over the entire period. However, no significant effects on children's schooling are found.

The thesis also examines whether the effects of microfinance are greater when lending to women rather than men. No significant effects are found, which indicates that gender does not matter. This result together with the positive impact of microfinance on fertility, child mortality and life expectancy suggest that it is the access of credit to the poor that is crucial, not whether the borrower is female or male. These findings contradict with results from studies on micro/village level which show that socioeconomic effects of lending to women are remarkably larger than when lending to men. Moreover, positive effects found on the aggregate underlines the importance of credit constraints on human development, and especially the credit constraints on women, since women constitute the largest share of the poor.

There is already extensive evidence on participant- and village level suggesting that microfinance does alleviate poverty. Relying on this evidence and the positive results on the aggregate level found in this study, one may conclude that microfinance *does* contribute to achieve the MDGs. The effects of microfinance found in this thesis are small, but they should not be neglected. Microfinance has the potential to become an effective strategy to reach out to the majority of poor people. This requires programs that are designed to meet their needs. Services beyond credit may be crucial to involve poor people who are not even eligible for microcredit. Some programs focus on awareness of the poor to broaden their minds. It is e.g. important to provide knowledge to poor people about the positive long-term effects of investing in children's education as well as health. However, it is important to bear in mind that microfinance is only one of the pathways to achieve MDGs. Policy

makers should take into account the positive effects of microfinance and combine this strategy with other poverty reduction strategies. Furthermore, policy makers and governments should construct policies that support basic education and health in backward regions, making it easier for MFIs to penetrate in such areas and reach out to the majority.

References

- ALBREDI, I. (2010): “Speech: World’s Women at the centre of Achieving MDGs,” http://www.unifem.org/news_events/story_detail.php?StoryID=1171, last accessed 01.05.2011.
- ALLISON, P. D. (2009): *Fixed Effects Regression Models*, vol. 160 of *Quantitative Applications in the Social Sciences*. SAGE Publications, Inc.
- ARMENDARIZ, B., AND J. MORDUCH (2005): *The Economics of Microfinance*. MIT Press: Cambridge, 2nd edn.
- BANERJEE, A., E. DUFLO, R. GLENNERSTER, AND C. KINNAN (2009): “The Miracle of Microfinance? Evidence from a Randomized Evaluation,” *Available at: <http://econ-www.mit.edu/files/4162>*.
- BASIX (2011): <http://www.basixindia.com/>, last accessed 01.05.2011.
- BERHANE, G., AND C. GARDEBROEK (2009): “Does microfinance reduce rural poverty? Evidence based on household panel data from northern Ethiopia,” Contributed paper 327, Agricultural Economics and Rural Policy Group, Department of Social Sciences, Wageningen University.
- BLOOM, D. E., AND J. E. FINLAY (2009): “Demographic Change and Economic Growth in Asia,” *Asian Economic Policy Review*, 4(1), 45–64.
- BLOOM, S., D. WYPIJ, AND M. DAS GUPTA (2001): “Dimensions of women’s autonomy and the influence on maternal health care utilization in a north indian city,” *Demography*, 38, 67–78, 10.1353/dem.2001.0001.
- BRAC (2011): <http://www.brac.net/content/where-we-work>, last accessed 01.05.2011.
- CAMERON, A. C., AND P. K. TRIVEDI (2010): *Microeconometrics Using Stata, Revised Edition*. Stata Press.
- CHEN, S., AND M. RAVALLION (2008): “The developing world is poorer than we thought, but no less successful in the fight against poverty. World Bank Policy Research Working Paper 4703,” .
- COPESTAKE, J., S. BHALOTRA, AND S. JOHNSON (2001): “Assessing the Impact of Microcredit: A Zambian Case Study,” *Journal of Development Studies*, 37(4), 81 – 100.

- DUNFORD, C. (2006): “Evidence of Microfinance’s Contribution to Achieving the Millenium Development Goals,” Available through <http://www.ffhtechnical.org/resources/articles/>, last accessed 01.05.2011.
- DUPAS, P., AND J. ROBINSON (2009): “Savings Constraints and Microenterprise Development: Evidence from a Field Experiment in Kenya,” NBER Working Papers 14693, National Bureau of Economic Research, Inc.
- ESWARAN, M. (2002): “The empowerment of women, fertility, and child mortality: Towards a theoretical analysis,” *Journal of Population Economics*, 15, 433–454, 10.1007/s001480100070.
- FREEDOM-FROM-HUNGER (2011): “Financial Education to Protect and Empower Women,” <http://www.freedomfromhunger.org/press/financial-education.php>, last accessed 01.05.2011.
- GOETZ, A. M., AND R. S. GUPTA (1996): “Who takes the credit? Gender, power, and control over loan use in rural credit programs in Bangladesh,” *World Development*, 24(1), 45 – 63.
- GRAMEEN-BANK (2009): “Grameen Foundation Annual Report,” http://www.grameeninfo.org/index.php?option=com_content&task=view&id=782&Itemid=751, last accessed 01.05.2011.
- GRAY, B., AND D. KARLAN (2006): “CREDIT WITH EDUCATION IMPACT REVIEW NO. 4: TEACHING ENTREPRENEURSHIP,” Available through <http://www.ffhtechnical.org/resources/research-reports/>, last accessed 01.05.2011.
- HAMAD, R., AND L. C. H. FERNALD (2010): “Microcredit participation and nutrition outcomes among women in Peru,” *Journal of Epidemiology and Community Health*.
- HAUGHTON, J. H., AND S. R. KHANDKER (2009): “Handbook on Poverty and Inequality. Chapter 1: What Is Poverty and Why Measure It?,” Available on <http://go.worldbank.org/7JGPK76TM0>, last accessed 01.05.2011.
- HOSSAIN, M. (1988): *Credit for Alleviation of Rural Poverty: The Grameen Bank of Bangladesh*. International Food Policy Research: Institute Research Report 65, Washington DC.

- KEVANE, M., AND B. WYDICK (2001): “Microenterprise Lending to Female Entrepreneurs: Sacrificing Economic Growth for Poverty Alleviation?,” *World Development*, 29(7), 1225 – 1236.
- KHANDKER, S. R. (1998a): *Fighting Poverty With Microcredit : Experience in Bangladesh*. World Bank.
- KHANDKER, S. R. (1998b): “Micro-Credit Programme Evaluation: A Critical Review1,” *IDS Bulletin*, 29(4), 11–20.
- (2001): “Does Micro-finance Really Benefit the Poor? Evidence from Bangladesh,” Discussion paper, Paper delivered at the Asia and Pacific Forum on Poverty: Reforming Policies and Institutions for Poverty Reduction, held at the Asian Development Bank, Manilla.
- (2005): “Microfinance and Poverty: Evidence Using Panel Data from Bangladesh,” *The World Bank Economic Review*, 19(2), 263–286.
- KHANDKER, S. R., B. KHALILY, AND Z. KHAN (1995): *Grameen Bank: Performance and Sustainability*. World Bank Discussion Papers Paper 306, Washington DC.
- KRAVDAL, O. (2002): “Education and fertility in sub-Saharan africa: Individual and community effects,” *Demography*, 39, 233–250, 10.1353/dem.2002.0017.
- LITTLEFIELD, E., S. HASHEMI, AND J. MORDUCH (2003): “Is Microfinance an Effective Strategy to Reach the Millennium Development Goals?,” Available through <http://www.cgap.org/p/site/c/template.rc/1.9.2568/>, last accessed 01.05.2011.
- MIX-MARKET (2010): www.mixmarket.org, last accessed 02.03.2011.
- MOHINDRA, K., S. HADDAD, AND D. NARAYANA (2008): “Can microcredit help improve the health of poor women? Some findings from a cross-sectional study in Kerala, India,” *International Journal for Equity in Health*, 7(1), 2.
- MORDUCH, J. (1998): “Does Microfinance Really Help the Poor? New Evidence from Flagship Programs in Bangladesh,” Working Papers 198, Princeton University, Woodrow Wilson School of Public and International Affairs, Research Program in Development Studies.
- PITT, M. M., AND S. R. KHANDKER (1998): “The Impact of Group Based Credit Programs on Poor Households in Bangladesh: Does the Gender of Participants Matter?,” *The Journal of Political Economy*, 106(5), pp. 958–996.

- RUHM, C. J. (2000): “Are Recessions Good for Your Health?*,” *Quarterly Journal of Economics*, 115(2), 617–650.
- (2003): “Good times make you sick,” *Journal of Health Economics*, 22(4), 637 – 658.
- (2005): “Healthy living in hard times,” *Journal of Health Economics*, 24(2), 341 – 363.
- SCHULTZ, T. P. (1990): “Testing the Neoclassical Model of Family Labor Supply and Fertility,” *The Journal of Human Resources*, 25(4), pp. 599–634.
- SEN, A. (1992): “Missing Women: Social Inequality Outweighs Women’s Survival Advantage In Asia And North Africa,” *BMJ: British Medical Journal*, 304(6827), pp. 587–588.
- SEWA (2011): <http://www.sewa.org/>, last accessed 01.05.2011.
- SHARMA, M., AND M. ZELLER (1997): “Repayment performance in group-based credit programs in Bangladesh: An empirical analysis,” *World Development*, 25(10), 1731 – 1742.
- SOUFIAS, E., AND B. MCCLAFFERTY (2001): *Is PROGRESSA working? Summary of the results of an evaluation by International Food Policy Research Institute (IFPRI)*. Food Consumption and Nutrition Division, Discussion Paper No. 118, Washington, DC.
- TAPIA GRANADOS, J. A., AND E. L. IONIDES (2008): “The reversal of the relation between economic growth and health progress: Sweden in the 19th and 20th centuries,” *Journal of Health Economics*, 27(3), 544–563.
- TEDESCHI, G. A. (2008): “Overcoming Selection Bias in Microcredit Impact Assessments: A Case Study in Peru,” *Journal of Development Studies*, 44(4), pp. 504–518.
- THOMAS, D. (1990): “Intra-Household Resource Allocation: An Inferential Approach,” *The Journal of Human Resources*, 25(4), pp. 635–664.
- (1994): “Like Father, like Son; Like Mother, like Daughter: Parental Resources and Child Height,” *The Journal of Human Resources*, 29(4), pp. 950–988.

- UNDP (2010a): “Human Development Report, 2010,” Available on <http://hdr.undp.org/en/reports/global/hdr2010/>, last accessed 01.05.2011.
- (2010b): “MDG Summit Outcome Document, 2010,” Available through <http://www.undp.org/mdg/summit.shtml>, last accessed 01.05.2011.
- UNWOMEN (2011): “Focus areas,” [http://www.unwomen.org/focus-areas/?show=Millennium Development Goals](http://www.unwomen.org/focus-areas/?show=Millennium+Development+Goals), last accessed 01.05.2011.
- WEIL, D. N. (2009): *Economic Growth*, The Addison-Wesley Series in Economics. Pearson Education, Inc.
- WOLDEMICAEL, G., AND E. TENKORANG (2010): “Women’s Autonomy and Maternal Health-Seeking Behavior in Ethiopia,” *Maternal and Child Health Journal*, 14, 988–998, 10.1007/s10995-009-0535-5.
- WORLDBANK (2010): “World Development Indicators, 2010,” <http://data.worldbank.org/data-catalog>, last accessed 02.03.2011.

A Appendix

Table 9: Countries of interest

Afghanistan	Albania
Argentina	Armenia
Azerbaijan	Bangladesh
Benin	Bolivia
Brazil	Bulgaria
Burkina Faso	Burundi
Cambodia	Cameroon
Central African Republic	Chad
Chile	China
Colombia	Congo
Costa Rica	Cote d'Ivoire (Ivory Coast)
Croatia	Dominican Republic
Ecuador	Egypt
El Salvador	Ethiopia
Gambia	Georgia
Ghana	Guinea
India	Indonesia
Iraq	Israel
Jordan	Kazakhstan
Kenya	Kyrgyzstan
Macedonia	Madagascar
Mali	Mexico
Moldova	Mongolia
Morocco	Mozambique
Namibia	Nicaragua
Niger	Nigeria
Pakistan	Panama
Paraguay	Peru
Philippines	Romania
Russia	Rwanda
Samoa	Senegal
South Africa	Sri Lanka
Sudan	Swaziland
Syria	Tajikistan
Tanzania	Thailand
Togo	Trinidad and Tobago
Tunisia	Turkey
Uganda	Ukraine
Venezuela	Vietnam
Zambia	
