Does Microfinance Still Hold Promise for Reaching the Poor? Facts and (A Little) Speculation

Robert Cull
March 17, 2015
The Promise (1)

“The hope is that much poverty can be eliminated – and that economic and social structures can be transformed fundamentally – by providing financial services to low-income households. These institutions, united under the banner of microfinance, share a commitment to serving clients that have been excluded from the formal banking sector.”

Morduch, *Journal of Econ Lit*, 1999
The Promise (2)

“No one argues seriously that finance-based programs will be the answer for truly destitute households, but the promise remains that microfinance may be an important aid for households that are not destitute but still remain considerably below poverty lines.”

Morduch, *Journal of Econ Lit*, 1999
The Critics

• Modest Benefits
• Over-indebtedness
• Commercialization, Less focus on serving the poor
Modest Benefits

• “We note a consistent pattern of modestly positive, but not transformative, effects.... The studies do not find clear evidence of reductions in poverty or substantial improvement in living standards.”

  Banerjee, Karlan, Zinman

• “These loans do help, but the changes are not transformative, certainly not transformative enough to justify charitable donations to the standard microcredit model.”

  Esther Duflo, Innovations for Poverty Action (IPA) Press Release, 1/22/2015
Over-Indebtedness

“Microcredit markets are fragile. The poor have limited absorptive capacity for debt and can easily overextend themselves by taking on debt obligations in excess of what they can reasonably hope to service. While ambitious MFI outreach goals are to be applauded in principle, the reality is that overly zealous loan origination activities can override governance and control systems, leading to less rigorous credit standards and destructive, unintended consequences.”

Luis A. Viada (MicroRate) & Scott Gaul (MIX), *MicroBanking Bulletin, Feb 2012*

“The point is not to assert that we have a general problem with over-indebted microborrowers. The point is that for most markets we simply don’t know. We’re flying blind...”

Richard Rosenberg, CGAP blog, January 2011
Over-indebtedness (2)

Some emerging research, but not our focus today

  - Survey of 531 microborrowers in Accra, Ghana
  - Over-Indebted if: (1) struggle to repay, (2) make (unacceptable) sacrifices to repay, (3) sacrifices are recurrent
  - Progress, but: self-reported, highlights difficulties in defining over-indebtedness, what’s the counter-factual?

- Adrian Gonzalez, MIX (now at World Bank), “Over-Indebtedness in Microcredit, CGAP blog, September 2011
  - Portfolio Quality Problems: Some Correlates
    - Market Saturation: Borrowers > 10% of population
    - Move toward formal: Salaried borrowers; non-microenterprise loans
    - Growth in already crowded markets
Commercialization: Compartamos vs. Yunus

- Compartamos: Small, uncollateralized loans, often to women, at high interest rates (~90% ann.)
  - April 2007 IPO, 30% of insiders’ holdings
  - Oversubscribed by 13 times, Compartamos worth $1.6 billion
- Grameen Bank founder Muhammad Yunus, 2006 Nobel Peace Prize winner

“I am shocked by the news about the Compartamos IPO....When socially responsible investors and the general public learn what is going on at Compartamos, there will very likely be a backlash against microfinance.”
Wrong turn?

[C]ommercialization has been a terrible wrong turn for microfinance, and it indicates a worrying ‘mission drift’ in the motivation of those lending to the poor.”

Talk Outline

I. Some Facts: Based on new (funding) data from the Microfinance Information eXchange (MIX)

II. A Commercial model: Greenfield MFIs and the IFC approach

III. Alternative MFI funding models and outcomes: The role of subsidy (More from the MIX) in reaching the poorest

IV. Alternative Delivery Channels: Reducing the costs of reaching the poorest
Part I: Some Facts on Microfinance Business Models

Based on work with

Asli Demirgüç-Kunt, World Bank
Jonathan Morduch, New York University
2005-2009 MIX Market Data

- Largest industry data source on finances of microfinance institutions
  - Biased toward commercially-focused lenders.
- Access to disaggregated data
  - Allows adjustment for implicit subsidy.
- 1336 observations max,
  - Fewer for some variables.
- Cross-section of most-recent observations.
Different Business Models: Smaller Loans Entail Higher Costs

![Graph showing the relationship between operation expenses (Op Exp) and loan portfolio. The x-axis represents the average loan balance per borrower per GNI per capita, while the y-axis represents the percentage of Op Exp. The graph illustrates a decreasing trend, indicating higher costs for smaller loans.]
...And thus Higher Interest Rates
And MFI types cater to different market segments

Real portfolio yield
Average interest and fees, %, 2009
Composition of costs (Divided by Gross Loan Portfolio)

- Rural Bank
- Non-Bank Financial Intermediary
- Non Governmental Organization (NGO)
- Credit Union/cooperative
- Bank

All variables are means

- % Operating Expense
- % Cost of Funds
- % Loan Loss Provisions

All variables are means
NGOs, Nonbank Financial Institutions, and Banks

The diagram illustrates the distribution of average loan balances relative to GNI per capita for the poorest 20% of the population. The average loan balances are as follows:

- **NGO (median avg loan = 0.5)**
- **NBFI (median = 1.1)**
- **Bank (median = 3.4)**
A major accomplishment: Innovation to reduce cost per customer
Operating expense per borrower, PPP$

NGO (n=307)
Bank (n=65)
NBFI (n=279)

Average loan balance / GNI p.c. for the poorest 20%
A large and durable tension:
Small transaction sizes mean high cost per unit transacted
Operating expense per dollar lent
Response: raise prices on the low-end
Average real interest rates

Yield on gross loan portfolio (real)

Bank (n=82)

NBFI (n=380)

NGO (n=446)

Average loan balance / GNI p.c. for the poorest 20%
Part II: Commercial Microfinance, Greenfields and the “IFC” Model

Based on work with

Greta Bull, IFC
Sven Harten, IFC
Ippei Nishida, World Bank (now at Hitachi Research)
IFC-MasterCard Partnership for Financial Inclusion in Sub-Saharan Africa

• Provide technical assistance to participating African microfinance institutions
• Enable MFIs to grow their numbers of accounts (primarily, loan and savings) and clients.
• Substantial research, evaluation, and knowledge component designed to distill lessons
• Emerging research agenda (RCTs) on alternative delivery channels
  • Agent banking
  • Mobile Financial Services
The Greenfield Model

• Created without any pre-existing organization
• Standard operating procedures disseminated by a central group (typically a holding company “HC”).
• HC holds majority stake; plays strong role in governance, management, and branding
• Typically majority-owned by foreign entities
• Two types of HCs
  • Consulting firm led (European): Top-down approach
    • Deep commitment to branded retail banking networks spanning multiple countries
    • Investment by DFIs (AfDB, EIB, IFC, KfW)
  • Network Support Organization led: Bottom-up approach
    • Consolidating existing affiliates, adding new greenfields

Source: Earne at al. 2014.
**Table 1. MFI name and Country Location: Bank greenfields, Non-bank greenfields & Non-greenfields**

<table>
<thead>
<tr>
<th>Category</th>
<th>MFI name</th>
<th>Country</th>
<th>Years</th>
<th>Predominant lending style</th>
<th>Average loan size / GNI per capita (median)</th>
<th>Is an institution included in the regression model (3) in Table 2-4</th>
<th>% of female borrowers</th>
<th>OSS</th>
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<tr>
<td><strong>Bank greenfields</strong></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td></td>
<td>Accion Cameroon</td>
<td>Cameroon</td>
<td>2009 - 2012</td>
<td>60% Ind, 40% grp</td>
<td>0.98</td>
<td>X</td>
<td>X</td>
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<td></td>
<td>Advans Cameroon</td>
<td>Cameroon</td>
<td>2007 - 2012</td>
<td>91% Ind, 9% grp</td>
<td>0.90</td>
<td>X</td>
<td>X</td>
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<td></td>
<td>Advans DRC</td>
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<td>2008 - 2012</td>
<td>Individual</td>
<td>10.46</td>
<td>X</td>
<td>X</td>
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<td>ProCredit DRC</td>
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<td>2005 - 2012</td>
<td>Individual</td>
<td>20.58</td>
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<td></td>
<td>MicroCred Ivory Coast</td>
<td>Cote d'Ivoire (Ivory Coast)</td>
<td>2009 - 2012</td>
<td>Individual</td>
<td>0.70</td>
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<td>Accion Ghana</td>
<td>Ghana</td>
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<td>0.71</td>
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<td>2008 - 2012</td>
<td>Individual</td>
<td>0.43</td>
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<td>2004 - 2010</td>
<td>Individual</td>
<td>1.54</td>
<td>X</td>
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<td>MicroCred Madagascar</td>
<td>Madagascar</td>
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<td>Individual</td>
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<td>Access Nigeria</td>
<td>Nigeria</td>
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<td>Individual</td>
<td>0.44</td>
<td>X</td>
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<td>Fides Senegal</td>
<td>Senegal</td>
<td>2011 - 2012</td>
<td>10% Ind, 90% grp</td>
<td>0.15</td>
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<td>Individual</td>
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<td>PAMF-BFA</td>
<td>Burkina Faso</td>
<td>2006 - 2008</td>
<td>91% grp, 9% Ind</td>
<td>N/A</td>
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<td>ACEP Cameroon</td>
<td>Cameroon</td>
<td>2001 - 2010</td>
<td>Individual</td>
<td>1.88</td>
<td>X</td>
<td>X</td>
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<td></td>
<td>FINCA DRC</td>
<td>Democratic Republic of the Congo</td>
<td>2003 - 2012</td>
<td>50% grp, 50% Ind</td>
<td>1.06</td>
<td>X</td>
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<td>Opportunity DRC</td>
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<td>1.77</td>
<td>X</td>
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<td>ASA Ghana</td>
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<td>2007 - 2012</td>
<td>Group</td>
<td>0.12</td>
<td>X</td>
<td>X</td>
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<td>Opportunity Ghana</td>
<td>Ghana</td>
<td>2004 - 2010</td>
<td>72% grp, 28% Ind</td>
<td>0.35</td>
<td>X</td>
<td>X</td>
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<tr>
<td></td>
<td>BRAC Liberia</td>
<td>Liberia</td>
<td>2008 - 2012</td>
<td>64% grp, 36% Ind</td>
<td>0.41</td>
<td>X</td>
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<td>OIBM</td>
<td>Malawi</td>
<td>2003 - 2010</td>
<td>89% Ind, 11% grp</td>
<td>2.36</td>
<td>X</td>
<td>X</td>
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<tr>
<td></td>
<td>BOM</td>
<td>Mozambique</td>
<td>2005 - 2010</td>
<td>Individual</td>
<td>0.79</td>
<td>X</td>
<td>X</td>
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<td>ASA Lagos</td>
<td>Nigeria</td>
<td>2010 - 2012</td>
<td>Group</td>
<td>0.10</td>
<td>X</td>
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<td>ASA Nigeria</td>
<td>Nigeria</td>
<td>2009 - 2012</td>
<td>Group</td>
<td>0.09</td>
<td>X</td>
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<td>ACEP Senegal</td>
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<td>1997 - 2010</td>
<td>Individual</td>
<td>2.40</td>
<td>X</td>
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<td>Sierra Leone</td>
<td>2009 - 2012</td>
<td>Group</td>
<td>0.20</td>
<td>X</td>
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<td></td>
<td>BRAC - SS</td>
<td>Sudan</td>
<td>2007 - 2010</td>
<td>Group</td>
<td>0.08</td>
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<td></td>
<td>BRAC Tanzania</td>
<td>Tanzania</td>
<td>2006 - 2012</td>
<td>86% grp, 14% Ind</td>
<td>0.26</td>
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<td>BRAC Uganda</td>
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<td>2004 - 2012</td>
<td>82% grp, 18% Ind</td>
<td>0.30</td>
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<td><strong>Non-greenfields</strong></td>
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<td></td>
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<tr>
<td></td>
<td>Finadev Benin</td>
<td>Benin</td>
<td>2006 - 2007</td>
<td>N/A</td>
<td>N/A</td>
<td>X</td>
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<td>Faulu - KEN</td>
<td>Kenya</td>
<td>1999 - 2011</td>
<td>83% grp, 17% Ind</td>
<td>0.46</td>
<td>X</td>
<td>X</td>
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<td></td>
<td>K-Rep</td>
<td>Kenya</td>
<td>2000 - 2011</td>
<td>Group</td>
<td>1.01</td>
<td>X</td>
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<td></td>
<td>Opportunity Bank Rwanda</td>
<td>Rwanda</td>
<td>2011 - 2011</td>
<td>62% grp, 38% Ind</td>
<td>0.55</td>
<td>X</td>
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</table>
## Growth of Greenfields

Source: Earne et al., 2014.

<table>
<thead>
<tr>
<th></th>
<th>Greenfields</th>
<th>MIX Young Africa</th>
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<tr>
<td></td>
<td>Month 12</td>
<td>Month 36</td>
</tr>
<tr>
<td>No. Staff</td>
<td>131</td>
<td>318</td>
</tr>
<tr>
<td>No. Branches</td>
<td>9</td>
<td>22</td>
</tr>
<tr>
<td>No. Loans Outstanding</td>
<td>9,495</td>
<td>25,009</td>
</tr>
<tr>
<td>Gross Portfolio ($ million)</td>
<td>2.3</td>
<td>9.2</td>
</tr>
<tr>
<td>No. Deposit Accounts</td>
<td>7,123</td>
<td>37,460</td>
</tr>
<tr>
<td>Deposits ($ million)</td>
<td>0.8</td>
<td>8.7</td>
</tr>
<tr>
<td>PaR 30</td>
<td>3.9%</td>
<td>4.0%</td>
</tr>
<tr>
<td>Operating Exp/Portfolio</td>
<td>200%</td>
<td>53%</td>
</tr>
<tr>
<td>Equity ($ million)</td>
<td>3.6</td>
<td>4.3</td>
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<tr>
<td>Net income/Assets</td>
<td>-12.4%</td>
<td>-0.1%</td>
</tr>
<tr>
<td>Net Income/Equity</td>
<td>-44.6%</td>
<td>-0.3%</td>
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</table>
Average Loan Size / GNI per capita and Gross Loan Portfolio size of each MFI type

- Bank GFs GLP
- Non-bank GFs GLP
- Bank GLP
- Others GLP
- Bank GFs Trend
- Non-bank GFs Trend
- Bank Trend
- Others Trend

Age of MFIs (year)
% of Women Borrowers and Gross Loan Portfolio size of each MFI type

- Bank GFs GLP
- Non-bank GFs GLP
- Bank GLP
- Others GLP
- Bank GFs Trend
- Non-bank GFs Trend
- Bank Trend
- Others Trend
Operational Self-Sufficiency (OSS)
and Gross Loan Portfolio size of each MFI type

- Bank GFs GLP
- Non-bank GFs GLP
- Bank GLP
- Others GLP
- Bank GFs Trend
- Non-bank GFs Trend
- Bank Trend
- Others Trend

Age of MFIs (year)
Portfolio at Risk >30days
and Gross Loan Portfolio size of each MFI type

- **Bank GFs GLP**
- **Non-bank GFs GLP**
- **Bank GLP**
- **Others GLP**
- **Bank GFs Trend**
- **Non-bank GFs Trend**
- **Bank Trend**
- **Others Trend**
Part III: Alternative Models, Role of Subsidy

Again, based on work with

Asli Demirgüç-Kunt, World Bank
Jonathan Morduch, New York University
Back to the Promise of MF

“No one argues seriously that finance-based programs will be the answer for truly destitute households, but the promise remains that microfinance may be an important aid for households that are not destitute but still remain considerably below poverty lines.....

The tension is that the scale of lending to this group is not likely to permit the scale economies available to programs focused on households just above poverty lines. Subsidizing may yield greater social benefits than costs here.”
What institutions report
% of institutions that are profitable

Profit as reported by institution. No adjustment for subsidy, explicit or implicit
What donors report

% of institutions that are profitable

Adjusted to account for cheap credit. Opportunity cost of capital is deposit rate. No adjustment to equity.
What economics/finance suggests

% of institutions that are profitable

Adjusted to account for cheap credit. Opportunity cost of capital is prime rate + . Adjustment to equity too.
Adjustments

Subsidy =
Opportunity costs for equity capital
+ Profit before tax
+ Adjusted in kind subsidy
+ Opportunity costs for loan capital (opp. cost of capital - actual paid rate)

Preferred opp cost of capital = local prime rate + 2%
What’s the question?

By adjusting for realistic opportunity cost of capital:

Q: Would institution earn profit if they *operated the same way* but had to pay the market rate of capital?
Relatively flat: Subsidy per dollar lent

γ = local prime + 2% (obs = 973)
Upward sloping: Subsidy per borrower
\[ \gamma = \text{local prime} + 2\% \ (\text{obs} = 737,690) \]
## Subsidy per borrower

Most recent observations 2005-2009

<table>
<thead>
<tr>
<th></th>
<th>Mean</th>
<th>25th percentile</th>
<th>Median</th>
<th>75th percentile</th>
<th>Obs</th>
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<tbody>
<tr>
<td>Full sample</td>
<td>145</td>
<td>4</td>
<td>40</td>
<td>122</td>
<td>762</td>
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<tr>
<td>Bank</td>
<td>241</td>
<td>25</td>
<td>103</td>
<td>259</td>
<td>65</td>
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<td>NGO</td>
<td>117</td>
<td>6</td>
<td>34</td>
<td>85</td>
<td>285</td>
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<td>NBFI</td>
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<td>4</td>
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<td>144</td>
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<td>21</td>
<td>129</td>
<td>291</td>
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<tr>
<td>Not-For-profit</td>
<td>131</td>
<td>9</td>
<td>46</td>
<td>116</td>
<td>470</td>
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Some of the subsidies are large
### PPP adjusted subsidy per borrower

Most recent observations 2005-2009

<table>
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<tr>
<th></th>
<th>Mean</th>
<th>25th percentile</th>
<th>Median</th>
<th>75th percentile</th>
<th>Obs</th>
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</thead>
<tbody>
<tr>
<td>Full sample</td>
<td>267</td>
<td>6</td>
<td>70</td>
<td>246</td>
<td>694</td>
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<tr>
<td>Bank</td>
<td>508</td>
<td>42</td>
<td>210</td>
<td>566</td>
<td>60</td>
</tr>
<tr>
<td>NGO</td>
<td>206</td>
<td>11</td>
<td>60</td>
<td>176</td>
<td>260</td>
</tr>
<tr>
<td>NBFI</td>
<td>302</td>
<td>10</td>
<td>70</td>
<td>268</td>
<td>241</td>
</tr>
<tr>
<td>For-profit</td>
<td>288</td>
<td>0</td>
<td>34</td>
<td>258</td>
<td>285</td>
</tr>
<tr>
<td>Not-For-profit</td>
<td>131</td>
<td>9</td>
<td>46</td>
<td>117</td>
<td>470</td>
</tr>
</tbody>
</table>

Large… especially in PPP terms
Subsidy: by institution

$\gamma = \text{local prime} + 2\%$

**Subsidy per dollar**

- Bank (n=71)
- NGO (n=361)
- NBFI (n=303)

**Subsidy per borrower**

- Bank (n=63)
- NBFI (n=240)
- NGO (n=273)

**PPP adj. Subsidy per borrower**

- Bank (n=60)
- NBFI (n=240)
- NGO (n=257)
Subsidy: by institution
By gender of customers

Subsidy per dollar

<table>
<thead>
<tr>
<th>Institution</th>
<th>Number of Customers</th>
</tr>
</thead>
<tbody>
<tr>
<td>NGO</td>
<td>358</td>
</tr>
<tr>
<td>NBFI</td>
<td>284</td>
</tr>
<tr>
<td>Bank</td>
<td>46</td>
</tr>
</tbody>
</table>

Subsidy per borrower

<table>
<thead>
<tr>
<th>Institution</th>
<th>Number of Customers</th>
</tr>
</thead>
<tbody>
<tr>
<td>NGO</td>
<td>275</td>
</tr>
<tr>
<td>NBFI</td>
<td>225</td>
</tr>
<tr>
<td>Bank</td>
<td>40</td>
</tr>
</tbody>
</table>

Graphs showing the subsidy per dollar and per borrower for different institutions (NGO, NBFI, Bank) based on the percentage of female customers.
NGOs: Financial self-sufficiency

Unadjusted (Operational self-sufficiency)

FSS ($\gamma=$local deposit rate)

FSS ($\gamma=$US prime rate)

FSS ($\gamma=$local prime rate +2%)

Average loan balance / GNI p.c. for the poorest 20%
NBFIs: Financial self-sufficiency

Average loan balance / GNI p.c. for the poorest 20%
## Persistence of Subsidies

<table>
<thead>
<tr>
<th>Sample</th>
<th>Mean</th>
<th>25th pctile</th>
<th>Median</th>
<th>75th pctile</th>
<th>Obs</th>
</tr>
</thead>
<tbody>
<tr>
<td>If age &lt; 10 years</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Age</td>
<td>5.20</td>
<td>3.00</td>
<td>5.00</td>
<td>7.00</td>
<td>562</td>
</tr>
<tr>
<td>Average loan size per GNI at bottom 20th percentile</td>
<td>2.23</td>
<td>0.29</td>
<td>0.78</td>
<td>2.02</td>
<td>529</td>
</tr>
<tr>
<td>Subsidy per dollar lent (percent)</td>
<td>21</td>
<td>2</td>
<td>10</td>
<td>24</td>
<td>409</td>
</tr>
<tr>
<td>Subsidy per borrower ($)</td>
<td>191</td>
<td>5</td>
<td>46</td>
<td>167</td>
<td>404</td>
</tr>
<tr>
<td>If age &gt;=10</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Age</td>
<td>18.44</td>
<td>12.00</td>
<td>15.00</td>
<td>21.00</td>
<td>761</td>
</tr>
<tr>
<td>Average loan size per GNI at bottom 20th percentile</td>
<td>2.53</td>
<td>0.47</td>
<td>1.16</td>
<td>2.68</td>
<td>750</td>
</tr>
<tr>
<td>Subsidy per dollar lent (percent)</td>
<td>10</td>
<td>1</td>
<td>5</td>
<td>13</td>
<td>615</td>
</tr>
<tr>
<td>Subsidy per borrower ($)</td>
<td>126</td>
<td>2</td>
<td>32</td>
<td>94</td>
<td>599</td>
</tr>
</tbody>
</table>
Conclusions ~2009-2010

“The clash between profit-driven Banco Compartamos and the ‘social business’ model of Grameen Bank offers a false choice. Commercial investment is necessary to fund the continued expansion of microfinance, but institutions with strong social missions, many taking advantage of subsidies, remain best placed to reach and serve the poorest customers, and some are doing so at a massive scale. The market is a powerful force, but it cannot fill all gaps.”

Updating 2010 conclusions

- General gist still probably correct
- Cost component still crucial for designing business models to reach the poorest.

BUT:
- Commercial microfinance a good vehicle to achieve scale among the (somewhat less) poor
- Reaching the poorest with less reliance on subsidy remains a challenge
  - Technological innovation, mobile financial services
  - Nearer points of contact, agent banking
  - Understanding client needs better
    - Commitment savings devices
    - Conditional cash transfer: accounts, electronic payments
    - More flexible loan repayment schedules
Part IV: Alternative Delivery Channels, Reducing Costs

Based on work with

Joshua Blumenstock, Univ. Washington
Miriam Bruhn, World Bank
Sinja Buri, IFC
Xavier Gine, World Bank
Sven Harten, IFC
Anca Bogdana Rusu, World Bank
Quick Detour: Interpreting Modest Benefits
Banerjee, Karlan, Zinman, AEJ: Applied, Jan. 2015

• Statistical power remains a challenge
• Insufficiently long time horizons (?)
• External validity: Extending to other contexts
• Heterogeneous effects
• Spillover effects/General Equilibrium
• Effects on inframarginal borrowers
• Need to vary terms of the loan contract
• Microfinance is more than microcredit
Microeconomic Level: Savings

Savings help manage cash flow spikes, smooth consumption and build working capital

- Business investments of women (Kenya)*
- Health savings and investments (Kenya)**
- Agricultural activity (Malawi)***

A More Modest Assessment of Modest Benefits

“We must think beyond the standard microcredit model. Modern microfinance – savings and insurance, and more flexible credit products – often has generated larger impacts than simple credit....Financial services can make important differences in people’s lives, but we need more innovation and evidence to determine what is best to do, and meanwhile we should set our expectations appropriately.”

Dean Karlan, Innovations for Poverty Action (IPA) Press Release, 1/22/2015
### Alternative Delivery Channels (1): Agent Banking in DRC

<table>
<thead>
<tr>
<th>VARIABLES</th>
<th>Number of cash in transactions</th>
<th>Volume of cash in transactions</th>
</tr>
</thead>
<tbody>
<tr>
<td>business_age</td>
<td>-0.702</td>
<td>-0.00300</td>
</tr>
<tr>
<td></td>
<td>(2.482)</td>
<td>(0.0168)</td>
</tr>
<tr>
<td>business_number_employees</td>
<td>3.365</td>
<td>0.0177</td>
</tr>
<tr>
<td></td>
<td>(4.219)</td>
<td>(0.0285)</td>
</tr>
<tr>
<td>Commerce</td>
<td>-134.4***</td>
<td>-0.514**</td>
</tr>
<tr>
<td></td>
<td>(35.67)</td>
<td>(0.241)</td>
</tr>
<tr>
<td>business_daysperweek</td>
<td>23.25</td>
<td>-0.212</td>
</tr>
<tr>
<td></td>
<td>(41.15)</td>
<td>(0.278)</td>
</tr>
<tr>
<td>hrsopenperday</td>
<td>-4.960</td>
<td>-0.0605</td>
</tr>
<tr>
<td></td>
<td>(7.165)</td>
<td>(0.0484)</td>
</tr>
<tr>
<td>owner_age</td>
<td>0.661</td>
<td>0.0229*</td>
</tr>
<tr>
<td></td>
<td>(1.726)</td>
<td>(0.0117)</td>
</tr>
<tr>
<td>last_degree</td>
<td>82.77**</td>
<td>0.281</td>
</tr>
<tr>
<td></td>
<td>(34.67)</td>
<td>(0.234)</td>
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<tr>
<td>Funa</td>
<td>69.14</td>
<td>0.296</td>
</tr>
<tr>
<td></td>
<td>(48.92)</td>
<td>(0.330)</td>
</tr>
<tr>
<td>Mont_Amba</td>
<td>147.1***</td>
<td>1.303***</td>
</tr>
<tr>
<td></td>
<td>(53.25)</td>
<td>(0.360)</td>
</tr>
<tr>
<td>Tshangu</td>
<td>174.5***</td>
<td>0.572*</td>
</tr>
<tr>
<td></td>
<td>(49.00)</td>
<td>(0.331)</td>
</tr>
<tr>
<td>Other_KinEst</td>
<td>317.5***</td>
<td>1.248**</td>
</tr>
<tr>
<td></td>
<td>(79.65)</td>
<td>(0.538)</td>
</tr>
<tr>
<td>liquiditytotal</td>
<td>23.42***</td>
<td>0.0502</td>
</tr>
<tr>
<td></td>
<td>(5.529)</td>
<td>(0.0373)</td>
</tr>
<tr>
<td>clientservicetotal</td>
<td>15.88</td>
<td>0.0777</td>
</tr>
<tr>
<td></td>
<td>(23.74)</td>
<td>(0.160)</td>
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<tr>
<td>performancetotal</td>
<td>6.756</td>
<td>0.165*</td>
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<tr>
<td></td>
<td>(14.11)</td>
<td>(0.0953)</td>
</tr>
<tr>
<td>brandingtotal</td>
<td>31.88***</td>
<td>0.554***</td>
</tr>
<tr>
<td></td>
<td>(9.597)</td>
<td>(0.0648)</td>
</tr>
<tr>
<td>Constant</td>
<td>-363.3</td>
<td>5.791***</td>
</tr>
<tr>
<td></td>
<td>(273.6)</td>
<td>(1.848)</td>
</tr>
<tr>
<td>Observations</td>
<td>259</td>
<td>259</td>
</tr>
<tr>
<td>R-squared</td>
<td>0.301</td>
<td>0.362</td>
</tr>
</tbody>
</table>

Standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1
Alternative Delivery Channels (1): Agent Banking in DRC

- Agent Network Density Experiment
  - Work with Finca DRC to randomly assign high/low density in their roll-out of 200-300 new agents
  - 60-80 areas assigned high, 60-80 assigned low
  - Examine what the density of the agent network implies for users of Finca services, and for Finca agents
  - Also examine how results differ depending on agent proximity to a branch, liquidity management methods
Alternative Delivery Channels (2): Agent Banking in Senegal

• Topic: Saving with Branches versus Agents, MicroCred Senegal, Encouragement RCT

HH Survey –
Breakdown of sample over survey groups

2500 respondents for the HH survey were selected based on characteristics that were collected during a filter survey with 8000 respondents.

2500 people selected are among those that are the ones that are most likely to open a savings account in the future (based on own predictions).

The HH survey will be repeated with the same respondents one year after the initial survey.
Branches v. Agents, Savings Encouragement RCT, Senegal

1) **Control group**
500 people completed the questionnaire but will not receive any incentive or information about MicroCred savings account

2) **Treatment group**
2000 people in total which were randomly assigned into 4 different treatment groups

(a) **Treatment subgroup 1**
500 people will receive savings account information and will be sent to open an account at a *branch*

(b) **Treatment subgroup 2**
500 people will receive savings account information and will be sent to open an account at an *agent*

(c) **Treatment subgroup 3**
500 people will receive account information, *initial amount of 1500 CFA* transferred to their account (if they open one) and will be sent to open an account at a *branch*

(d) **Treatment subgroup 4**
500 people will receive account information, *initial amount of 1500 CFA* transferred to their account (if they open one) and will be sent to open an account at an *agent*
Alternative Delivery Channels (3): Mobile Fin Services, Ghana
Blumenstock, Harten, Khan, Ngahu

• **Project Goals**
  ✓ Analyze differences in usage patterns of Tigo subscribers who only use Tigo voice services, and those who adopt and use Tigo Cash
  ✓ *Identify likely adopters and active users of Tigo Cash*

• **Data**
  ✓ Six months of Call Detail Records, SMS records, and Tigo Cash records

• **Methods**
  ✓ Statistical and econometric analysis used to isolate key differences between different types of Tigo subscribers
  ✓ Supervised machine learning models used to accurately predict, based only on Call and SMS records, whether a subscriber will use Tigo Cash

• **Results**
  ✓ “Conversion Scores” are assigned to each of 4.5 million Tigo voice subscribers, indicating the likelihood of becoming a Tigo Cash user
  ✓ Using cross-validation, results are up to 86% accurate
Tigo Cash, Methodology

“Training” and “Testing” samples drawn randomly from full subscriber population
- **25,000 Voice Only**: Voice subscribers who have never used Tigo Cash
- **25,000 Active Tigo Cash**: Subscribers who use TC at least once in each of 6 months
- **25,000 Tigo Cash**: Subscribers who have used Tigo Cash, but not every month

Feature generation: several hundred statistics measured using voice and SMS data
- Voice use: total calls, incoming vs. outgoing calls, consistent vs. sporadic users, …
- Other CDR metrics: SMS use, solutions use, data use, reload use, …
- Network and mobility: number of unique towers visited, number of unique contacts, …

Feature selection and statistical analysis
- T-tests, regressions, and recursive feature elimination used to identify which of the above metrics are most predictive of user type

Prediction and “Conversion Score” calculation
- Machine learning models used to predict user type
- Models developed on “Training” sample; accuracy calculated on “Testing” sample
- Best model is used to compute a “conversion score” to Tigo Cash and Active Tigo Cash for all 4.5 million subscribers.

Overlay RCT?
How important is the list of input features?

Performance of logistic regression classifier for variable number of features

- Significant performance gains are realized for the first 10-15 features, after which only modest improvements result from additional features.
In a nutshell…

• It remains costly to provide financial services to the poor
• Commercial microfinance is unlikely to be well suited to reaching the poorest
• Subsidy will continue to play a role, and could be allocated in a more pro-poor way
• Modest benefits of microcredit so far, but there are reasons for that
• Encouraging signs for other forms of microfinance beyond credit
• Plenty for researchers to continue working on