

Literature Review of Rigorous Impact Evaluations of Mobile Phone Interventions

Specific focus on economic outcomes and how they may be different for men and women.

Megan Zella Rounseville

Prepared for the United Nations Foundation
Submitted on November 11, 2012

Essay	3
1. Introduction	3
2. Impacts of Mobile Phones on Economic Outcomes	4
Access to Mobile Phones.....	4
Mobile Money	5
Text Message Reminders to Save and Make Loan Payments	6
3. Benefits for Women	7
4. Research Gaps	8
References	10
Annex 1: Detailed Summaries of Selected Impact Evaluations	14
Jensen, Robert. 2007. "The Digital Provide: Information (Technology) Market Performance, and Welfare in the Southern Indian Fisheries Sector." <i>The Quarterly Journal of Economics</i> August 2007.....	14
Aker, Jenny. 2010. "Information from Markets Near and Far: Mobile Phones and Agricultural Markets in Niger." <i>American Economic Journal: Applied Economics</i> 2 (July 2010).....	15
Jack, William and Tavneet Suri. 2011. "Risk Sharing and Transaction Costs: Evidence from Kenya's Mobile Money Revolution."	16
Blumenstock, Joshua, Nathan Eagle, and Marcel Fafchamps. 2011. "Risk and Reciprocity Over the Mobile Phone Network: Evidence from Rwanda." <i>Center for Study of African Economies Working Paper WPS/2011-19</i> . Oxford.	16
Mbiti, Isaac and David N. Weil. 2011. "Mobile Banking: The Impact of M-Pesa In Kenya." <i>Working Paper 17129 NBER</i>	17
Aker, Jenny, Rachid Boumnijel, Amanda McClelland, and Niall Tierney. 2011. "Zap It to Me: The Short-Term Impacts of a Mobile Cash Transfer Program." <i>CGD Working Paper 268</i> . Washington, D.C.: Center for Global Development.	18
Karlan, Dean, Margaret McConnell, Sendhil Mullainathan, and Jonathan Zinman. 2011. "Getting to the Top of Mind: How Reminders Increase Saving." Unpublished. Available at: http://www.povertyactionlab.org/evaluation/text-message-reminders-and-incentives-save-Bolivia	21
Cadena, Ximena and Antoinette Schoar. 2011. "Remembering to Pay? Reminders vs. Financial Incentives for Loan Payments."	22
Karlan, Dean Melanie Morten, and Jonathan Zinman. 2012. "A personal touch: Text messaging for loan repayment." <i>Poverty Action Lab</i>	23
Aker, Jenny, Christopher Ksoll and Travis Lybber. 2010. "ABC, 123: The Impact of Mobile Phone Literacy Program on Education Outcomes." <i>Center for Global Development. Working Paper 223</i> . September 2010. www.cgdev.org	23

Essay

1. Introduction

Over the past decade access and ownership of mobile phones has increased with great speed. Today an estimated 6 billion mobile subscriptions are in use worldwide. The ubiquity of this technology offers new opportunities for engagement and development. Mobile phones have become one of the most valuable household assets facilitating real-time information sharing; connecting people to the internet and services such as mobile banking, mobile health provision, and channels for civic engagement. The research community is racing to keep up with the ever-growing pace of new developments in the mobile arena. Nonetheless, the current availability of rigorous impact evaluations remains quite limited. Narrowing the focus to evaluations that estimate effects on economic outcomes and how they may differ for men and women leaves even fewer evaluations, still.¹

Several authors have published rigorous findings on the positive impacts of mobile phones on market efficiency, business profits, and consumer savings (Jensen 2007, Aker 2008, Beuermann et al. 2010, and Labonne et al. 2009). Benefits from mobile phone introduction and access tell a consistent story across several evaluations. In developing countries, large shares of the population engage in productive labor such as agriculture, forestry or fishing, yet they also commonly face challenges of poor infrastructure and disperse markets, leading to high transportation costs and imperfect information. In these contexts, household wellbeing is highly dependent upon the functioning of markets for producers and consumers alike. The papers that explore impacts of mobile phone introduction show that mobile phones can help overcome market inefficiencies and waste by increasing information. Several authors have shown how these gains for market participants also have positive impacts on household wellbeing.²

The development of Mobile Money over the past decade has led to a large research interest in the impacts of mobile money on formal financial sector participation, remittances, risk sharing, savings strategies, and most recently intra-household gender dynamics. This area of literature, while burgeoning, is still inconclusive. The existing research primarily emphasizes on the benefits from mobile money but this may be due, in part, to a research bias because of the difficulty in measuring community based informal risk sharing norms and practices. While most findings have shown benefits, researchers are cautious, and discuss the need for continued rigorous study, and the potential harms of mobile money.

The use of text message reminders to incentivize timely loan repayments has been tested in two impact evaluations (and several others that had not been completed or published at the time of writing), however they produced opposing findings. It remains unknown why the results found in the two studies are diverging, and it attests to the difficulty in extrapolating findings to make general policy recommendations at large on savings or loan repayment while the breadth of research in this area is so limited.

The following essay is divided into three sections. Section 2 summarizes the main findings within the impact evaluation literature that assess the effects of mobile phone access, mobile money, and text messaging on economic outcomes. Section 3 notes any findings that assess heterogeneous effects for women as compared to men as well as how general findings may have particular impacts on gender dynamics. Section 4 concludes identifying gaps within existing research and questions that remain unanswered.

2. Impacts of Mobile Phones on Economic Outcomes

Access to Mobile Phones

Jensen 2007 is recognized for contributing the first rigorous impact evaluation that shows effects of mobile phones. He exploits the staggered introduction of mobile phones in the Indian state of Kerala between 1997 and 2001 to assess how improved market information affects market performance and in turn effects fish seller profits and fish consumer savings. Jensen finds that after the introduction of mobile phones, price variation between markets dropped and the presence of market waste virtually disappeared. The increases in market efficiency created welfare gains for both consumers and producers; fishermen profits increased by 8 percent on average and consumer prices declined by 4 percent on average – an economic win-win.³

Aker 2010 showed similar findings for grain markets in Niger. She also used the exogenous introduction of mobile phone coverage to assess the impacts of mobile phones on agricultural market performance. Aker found that mobile phone coverage reduced price dispersion in markets by 3.5 CFA per kilogram between 2001 and 2006. This translated into an average decrease in price dispersion of between 10 and 16 percent in markets with mobile phone coverage, as compared to the price dispersion in markets without coverage.⁴ In assessing heterogeneity across markets, Aker found that mobile phones were more effective at reducing price dispersion between market pairs when markets were farther apart or when there was poor road quality between markets.⁵

Aker's findings also showed network effects: mobile phones had a greater impact as more markets gained coverage. The impact of mobiles on price dispersion increased slightly and became more statistically significant as more people had phones making the same technology have greater value.⁶

The mechanism that Aker argued explained her findings was a reduction in search costs for grain traders. "Grain traders operating in mobile phone markets change their search and marketing behavior as compared to their non-mobile phone counterparts."⁷ Aker found that the reductions in search costs and reduction in price dispersion was associated with improvements in trader and consumer wellbeing.⁸

In addition to Jensen 2007 and Aker 2010 other authors have found similar findings (Beuermann et al. 2010, and Labonne et al. 2009), which supports the external validity of these relationships.

Mobile Money

Jack and Suri 2011, were two of the first researchers to use impact evaluations to assess the impacts of Mobile Money. During the rapid takeoff of M-PESA between 2008 and 2010, in Kenya, they conducted a panel study measuring impacts of mobile money on household consumption during shocks. They used several evaluation strategies (panel difference-in-differences and instrumental variables) and a number of treatment indicator variables to provide a breadth of support for their findings. Across the various specifications they found that per capita consumption fell by 7-10 percent on average when households experienced a negative income shock, if households did not use M-PESA or if households lacked access to the M-PESA agent network. However M-PESA user households experienced “no such fall in per capita consumption” and often the post-shock consumption fall was statistically indistinguishable from zero. The effects were more discernible for households that were in lower income distribution quintiles than those in higher quintiles.⁹

Jack and Suri also take it one step further and show that the benefits were due to improved risk sharing, not increased liquidity. They find that M-PESA user households were similar in all demographic characteristics yet different from non-user households in that they are 13 percent more likely to receive remittances; they also receive remittances from a larger network of people. Jack and Suri present a very rigorous case providing many robustness checks and addressing challenges of attrition with care and detail. For this reason, their paper shows promising results, even though it assesses the impacts using non-experimental methods.¹⁰

Blumenstock et al. used microlevel mobile phone data to test the Jack and Suri 2011 hypothesis that households with access to mobile money are better insured against shocks. They measured the extent to which individuals transferred funds over cell phone networks as a means of sending money to help friends and family cope with severe economic shocks after a large earthquake, in Rwanda. They specifically examined whether people in unaffected areas transferred airtime to people close to the earthquake epicenter.¹¹

They found “that the earthquake did cause individuals living outside the affected area to transfer large and significant volume of airtime to people living close to the earthquake’s epicenter.” The earthquake produced an additional influx of transferred airtime equivalent to \$84 USD to the area covered by 15 cell phone towers within 20 km of the epicenter. Blumenstock et al., explained that while this figure appeared small economically it was representative of the level of cell phone usage at the time of the study. Since 2008, they argue, mobile phone usage increased over 400-fold, in Rwanda. As a consequence they estimated that the size of the transfer would be between \$22,000 and \$30,000 USD if the earthquake occurred in 2011 (the date of the publication).¹²

In assessing the heterogeneity of users and the types of transfers they received, they find that wealthier phone users were significantly more likely to receive a transfer after the earthquake. This finding led the authors to pose an important question that still remains unanswered in the academic literature: does mobile phone take-up have regressive consequences if better-off individuals substitute out of informal risk sharing behaviors and instead move into technology-facilitated relationships?¹³

Aker et al. 2011 use a unique study design that allowed them to parse out the impacts of having a mobile phone from the impacts of receiving a transfer through mobile money from receiving a manual cash transfer. They explored these impacts through a program that provided cash transfers during a humanitarian response to a drought and a food crisis, in Niger, in 2010. While this context limits the external validity of their findings, they explore heterogeneous impacts on households that expand our understanding of the impacts of mobile money.

The Aker et al. findings on overall wellbeing, diet diversity, expenditures, and consumption, add to the reported benefits of mobile money. In terms of expenditures, they find that mobile money recipient households purchased on average .86 more types food and non-food items with the transfer, as compared to both the manual transfer group and the placebo group (the placebo group received mobile phones and cash transfers that were delivered manually). These spending trends do not carry over into the analysis of health and school fee expenditures made with the transfer but are supported by additional benefits found in diet diversity, and consumption. In mobile money villages as compared with placebo villages household diet diversity was .16 points higher and households were on average “4-5 percentage points more likely to consume fruits -- and 6-12 percentage points more likely to consume fats than households in cash and placebo villages, a 28-percent increase.”¹⁴ Households in the mobile money treatment villages had on average .15 more non-durable assets as compared to the placebo group, suggesting that they “were selling non-durable assets less frequently than those in placebo or cash villages.”¹⁵ Aker et al. findings are discussed in more depth in the section on gender specific findings.

Mbiti and Weil 2011 build upon the existing mobile money research, but offer less rigorous findings. They used a somewhat questionable instrument to show that M-Pesa adoption increased the frequency of sending remittances by 2. They also find that M-Pesa users on average increased formal bank usage by 11 percentage points. They use binary responses to questions about informal savings strategies (use of rotating savings groups, credit associations, giving savings to a friend or family for safe keeping, saving with a group of friends, or storing funds in a secret place) and estimate that M-Pesa reduces the prevalence of informal saving by 15 percentage points on average. They also found that M-Pesa increased average levels of employment by 12 percentage points, which they note was driven by increased farm employment.¹⁶

Text Message Reminders to Save and Make Loan Payments

Cadena and Schoar 2011 compare different interventions aimed at improving loan repayment rates for small businesses in Uganda. One treatment group received reminder text messages three days prior to the repayment date. A second treatment group was offered a cash incentive if they paid on time over the full course of their repayment and a third group was offered a discounted interest rate on their next loan if they had no late payments throughout the duration of their repayment schedule. Cadena and Schoar find that the text message strategy increased the probability of perfect repayment by 9 points

on average. This impact was statistically significant and larger in magnitude than either of the other incentive schemes.¹⁷

Cadena and Schoar use multiple treatments, in part as a strategy to monetize the value of the text message strategy. They show that the text message treatment, which is “almost costless” for the financial institution has a very comparable effect size of a 25% reduction in interest rate (on a second loan)– a very costly incentive. This finding provides support for text message reminders as a cost effective strategy for financial institutions. Additionally, they find that the effects are stronger for borrowers with smaller loans (less than \$450) and for borrowers under 30 years of age.

Karlan et al. 2012 also evaluate the impact of text message reminders on savings account balances in Bolivia, Peru and the Philippines and loan repayment outcomes but find opposing evidence. They randomly assigned the types of text messages used, the content within the messages, and the timing of the messages in relationship to payment schedules. Unlike the Cadena and Schoar study, they found that messages on average did not have an impact in repayment performance relative to the control group or significant differences between treatment types. Their only finding that was statistically significant was a reduction in the rate of unpaid loans 30 days after maturity by 5.5 percentage points (a 41% reduction) for borrowers that received messages that incorporate the loan officer’s name. This finding was only significant for one subsection of the population: repeat borrowers. Karlan et al. therefore argue that the mechanism at play was not the message reminders themselves but instead the personal obligation or fear of reciprocity between the borrower and the bank employee that was most likely driving the impact on borrowers.¹⁸

Karlan et al. does however make some contributions to our understanding of the relationship between text reminders and saving. On average across all three locations clients who received monthly reminders saved 6 percent more than individuals that did not. Clients who received the reminders were also 3 percentage points more likely to reach their savings goal by their goal date.¹⁹

3. Benefits for Women

Very few impact evaluations on the use of mobiles even made mention of gender within their analysis, making it hard to assess the potential economic benefits of mobile technologies for women. Aker et al. 2011 is the one exception.

Aker et al. found that mobile money villages on average grew .36 more types of crops than those in the placebo villages, a finding that was statistically significant at the 5 percent level. Interestingly, these findings were driven by an increased likeliness for mobile money village households to engage in marginal cash crops such as vouandzou and okra production - both of which are crops that were primarily grown by women in Niger.²⁰

The program was implemented in an area of Niger where sociocultural norms did not permit younger, married women to travel to markets individually or in groups if they

belonged to the Hausa tribe – the ethnic group that made up 83 percent of the sample. Aker et al. tried to assess the impacts of the different programs on intra-household decision-making but were limited to assessing impacts within a subsample of non-Hausa minority tribes (they were the only ones that offered enough variation to assess impacts). These findings were reported but were not statistically significant due to the small sample size. Mobile money program recipients in Fulani and Toureg tribal households were “4 percentage points more likely to be responsible for spending the cash transfer as compared with the placebo groups.”²¹ “Fulani and Touareg [mobile money] recipients were 17 percentage points more likely to use the transfer to pay for health fees, as compared with 1 percentage in Hausa [mobile money] recipients.”²² Aker et al. did not present any findings on heterogeneity in mobile phone usage or mobile money along ethnic groups that could provide insight into mobile phone uses to overcome mobility restrictions.

The Aker et al. 2011 evaluation provides the most insightful rigorous research on the impacts of mobile money on intra-household decision-making and gender roles, available today. Nonetheless it is one evaluation that assesses impacts on a very narrowly defined population.

The findings presented by Jensen 2007 and Aker 2008 for consumers, apply to both male and female consumers. However, the impacts on producer profits, sales and prices are assessed for (primarily) male populations: fishermen and grain traders. Nonetheless, they identify mechanisms that may be transferrable to female participation in markets as well. The decreases in market inefficiencies and waste caused by the introduction of mobile phones may be applicable to female producers or female vendors. The key factors that contributed to these impacts in both papers were pre-existing barriers to market participation. These barriers included high transportation costs, dispersed markets, and imperfect information about prices, supply, and demand for the product being sold. These market conditions are most definitely present for many women engaging in trade. For this reason, even though the papers do not explicitly address impacts for women their findings may be highly transferable to female vendors.

Many questions remain as to how mobiles affect women differently from men, and whether the benefits that have been identified are transferable.

4. Research Gaps

1. What types of markets have inefficiencies and waste that can be addressed through the use of mobile phones and increased information?
2. Along with mobile interventions, what types of complimentary interventions are necessary to generate the desired decreases in market waste and inefficiencies?
3. Does mobile phone take-up have regressive consequences if better-off individuals substitute out of informal risk sharing behaviors and instead move into technology-facilitated relationships?
4. Mobile money appears to enable people to “hide” money, making it easier for them to opt out of informal social safety-net payouts, does this have positive or negative consequences to communities and social cohesion?

5. What are the mechanisms at play that cause mobile phones, mobile money or text messaging to change how money is saved, perceived, controlled, or invested?
6. How do mobile phones affect women differently from men?
7. How do mobile phones enable women to address constraints in mobility?
8. How do mobile phones affect entrepreneurship for women?
9. What are the impacts of mobile applications and text message services that are targeted at development challenges (apps or programs designed with this intention such as a text message to households to alert them that the water will be turned on at a specific date and time)? How are these impacts different for women, men, girls and boys.

References

- Aker, Jenny, Christopher Ksoll and Travis Lybber. 2010. "ABC, 123: The Impact of Mobile Phone Literacy Program on Education Outcomes." CGD Working Paper 223. Washington, D.C.: Center for Global Development. <http://www.cgdev.org/content/publications/detail/1424423>
- Aker, Jenny, Rachid Boumnijel, Amanda McClelland, and Niall Tierney. 2011. "Zap It to Me: The Short-Term Impacts of a Mobile Cash Transfer Program." CGD Working Paper 268. Washington, D.C.: Center for Global Development. <http://www.cgdev.org/content/publications/detail/1425470>
- Aker, Jenny. 2010. "Information from Markets Near and Far: Mobile Phones and Agricultural Markets in Niger." *American Economic Journal: Applied Economics* 2 (July 2010): 46–59 <http://www.aeaweb.org/articles.php?doi=10.1257/app.2.3.46>
- Autor, David H., Lawrence F. Katz, and Alan B. Krueger. 1998. "Computing Inequality: Have Computers Changed the Labor Market?" *Quarterly Journal of Economics*.
- Banerjee, Abhijit, Shawn Cole, Esther Duflo and Leigh Linden. 2005. "Remedying Education: Evidence from Two Randomized Experiments in India." NBER Working Paper Series. Working Paper 11904.
- Barrera-Osorio, Felipe and Leigh L. Linden. 2009. "The Use and Misuse of Computers in Education: Evidence from a Randomized Experiment in Colombia." Policy Research Working Paper #4836. Impact Evaluation Series No. 29 The World Bank.
- Beuermann, Diether, Christopher McKelvey, and Carlos Sotelo-Lopez. 2010. "The Effects of Mobile Phone Infrastructure: Evidence from Rural Peru." Unpublished draft.
- Bhatta, Saurav Dev. 2008. "Tackling the Problems of Quality and Disparity in Nepal's School Education: The OLPC Model." *Studies in Nepali History and Society* 13(1): 17-48.
- Blumenstock, Joshua and Nathan Eagle. 2010. "MobileDivides: Gender, Socioeconomic Status, and Mobile Phone Use in Rwanda." 4th International Conference on Information and Communications Technologies and Development .
- Blumenstock, Joshua, Nathan Eagle, and Marcel Fafchamps. 2011. "Risk and Reciprocity Over the Mobile Phone Network: Evidence from Rwanda." Center for Study of African Economies Working Paper WPS/2011-19. Oxford.
- Blumenstock, Joshua, Ye Shen, and Nathan Eagle. 2010. "A Method for Estimating the relationship between phone usage and wealth." QualMeetsQuant Workshop at the 4th International Conference on Information and Communication Technologies and Development.
- Booze&co., Cherie Blair Foundation for Women, and ExxonMobil Foundation. "Mobile Value Added Services: A Business Growth Opportunity for Women Entrepreneurs." 2012. Booze&co., Cherie Blair Foundation for Women, and ExxonMobil Foundation.

- Internal Publication. Available at:
<http://www.cherieblairfoundation.org/uploads/pdf/Mobile%20Value%20Added%20Services%20digital%20report.pdf>
- Brynin, Malcom. 2006. "Gender Equality Through Computerization." *European Sociological Review* 22(2): 111-121.
- Cadena, Ximena and Antoinette Schoar. 2011. "Remembering to Pay? Reminders vs. Financial Incentives for Loan Payments." Available at:
<http://www.mit.edu/~aschoar/Remembering%20to%20Pay-%20Cadena%20&%20Schoar-%20April2011.pdf>
- Carillo, Paul, Mercedes Onofa, and Juan Ponce. 2010. "Information Technology and Student Achievement: Evidence from a Randomized Experiment in Ecuador." Inter-American Development Bank.
- Casaburi, Lorenzo, Michael Kremer, and Sendhil Mullainathan. Forthcoming. "Contract Farming, Technology Adoption and Agricultural Productivity: Evidence from Small Scale Farmers in Western Kenya." Available at:
<http://www.povertyactionlab.org/evaluation/contract-farming-technology-adoption-and-agricultural-productivity-evidence-small-scale-f>
- Chavan, Apala Lahiri, Sarit Arora, Anand Kumar, and Praneet Koppula. 2009. "How Mobile Money Can Drive Financial Inclusion for Women at the Bottom of the Pyramid (BOP) in Indian Urban Centers." *Internationalization, Design, LNCS 5623*: 475-484.
- Chi, Benhamin and Jeffery S A Stringer. 2010. "Mobile phones to improve HIV treatment adherence." *The Lancet*. Vol. 376: 1807-1808. Additional information found at:
http://www.inrud.org/ICIUM/ConferenceMaterials/744-lester-_a.pdf
- Chong, Alberto, Virgilio Galdo, and Maximo Torero. 2005. "Does Privatization Deliver? Access to Telephone Service and Household Income in Poor Rural Areas Using a Quasi-natural Experiment in Peru." Inter-American Development Bank. Latin American Research Network. Working Paper #535.
- Cristia, Julian P., Pablo Ibarra, Santiago Cueto, Ana Santiago, and Eugenio Severin. 2012. "Technology and Child Development: Evidence from the One Laptop per Child Program." Inter-American Development Bank.
- Egyir, Irene S., Ramatu M. Al-Hassan, and James Abakah. 2011. "The Effect of ICT-Based Market Information Services on the Performance of Agricultural Markets: Experiences from Ghana." *International Journal of ICT Research and Development in Africa* 2(2) 1-13, July-December 2011.
- Fafchamps, Marcel and Bart Minten. 2012. "Impact of SMS-Based Agricultural Information on Indian Farmers." *World Bank Economic Review*. 1-32.
- Ferris, Shaun, Patrick Engoru, and Elly Kaganzi. 2008. "Making Market Information Services Work Better for the Poor in Uganda." *International Food Policy Research*

- Institute (IFPRI). CGIAR Systemwide Program on Collective Action and Property Rights.
- Gil, Kirrin, Kim Brooks, Janna McDougall, Payal Patel, and Aslihan Kes. 2010. "Bridging the Gender Divide: How Technology can Advance Women Economically." ICRW Available at: <http://www.icrw.org/publications/bridging-gender-divide>
- GSMA Association, Cherie Blair Foundation for Women, and Vital Wave Consulting. "Women & Mobile: A Global Opportunity. A study on the mobile phone gender gap in low and middle-income countries." GSMA Association, Cherie Blair Foundation for Women, and Vital Wave Consulting. Internal publication. Available at: http://www.cherieblairfoundation.org/uploads/pdf/women_and_mobile_a_global_opportunity.pdf
- Heeks, Richard. 2010. "Do Information and Communication Technologies (ICTs) Contribute to Development?" *Journal of International Development*. 22: 625-640.
- Jack, William and Tavneet Suri. 2011. "Risk Sharing and Transaction Costs: Evidence from Kenya's Mobile Money Revolution."
- Jack, William and Tavneet Suri. 2011. "Mobile Money: The Economics of M-Pesa." Working Paper 16721 NBER
- Jakiela, Pamela and Owen Ozier. 2011. "Does Africa Need a Rotten Kin Theorem? Experimental Evidence from Village Economies." Unpublished.
- Jensen, Robert. 2007. "The Digital Divide: Information (Technology) Market Performance, and Welfare in the Southern Indian Fisheries Sector." *The Quarterly Journal of Economics* August 2007.
- Jensen, Robert. 2010. "Economic Opportunities and Gender Differences in Human Capital: Experimental Evidence for India." NBER Working Paper 16021.
- Karlan, Dean, Melanie Morten, and Jonathan Zinman. 2012. "A personal touch: Text messaging for loan repayment." Poverty Action Lab. Available at: <http://www.povertyactionlab.org/publication/personal-touch-text-messaging-loan-repayment> Summary also available at: <http://www.povertyaction.org/project/0074>
- Karlan, Dean, Alberto Chong, Jeremy Shapiro, and Jonathan Zinman. 2011. "Tried and True? The Contextual Specificity of 'Proven' Approaches to Behavioral Change."
- Karlan, Dean, Margaret McConnell, Miguel Paredes, Dylan Ramshaw, and Jonathan Zinman. Forthcoming. "Text Messages and Reminders to Save in Ecuador." Available at: <http://www.povertyactionlab.org/evaluation/text-messages-and-reminders-save-ecuador>
- Karlan, Dean, Margaret McConnell, Sendhil Mullainathan, and Jonathan Zinman. 2011. "Getting to the Top of Mind: How Reminders Increase Saving." Unpublished. Available at: <http://www.povertyactionlab.org/evaluation/text-message->

reminders-and-incentives-save-Bolivia. Summary of Bolivia case also available at: <http://www.poverty-action.org/project/0055>

- Khan, Farida and Rehana Ghadially. 2010. "Empowerment Through ICT Education, Access and Use: A Gender Analysis of Muslim Youth In India." *Journal of International Development*. 22: 659-673.
- Labonne, Julien and Robert S. Chase. 2009. "The Power of Information: The Impact of Mobile Phones on Farmers' Welfare in the Philippines." The World Bank. Sustainable Development Network, Social Development Department. July 2009.
- Linden, Leigh L. 2008. "Complement or Substitute? The Effect of Technology on Student Achievement in India." Columbia University. MIT Jameel Poverty Action Lab.
- Linden, Leigh, Abhijit Banerjee, and Esther Duflo. 2003. "Computer-Assisted Learning: Evidence from a Randomized Experiment." *Poverty Action Lab Paper No. 5*
- Malamud, Ofer and Cristian Pop-Eleches. 2011. "Home Computer Use and the Development of Human Capital." *The Quarterly Journal of Economics* 126: 987-1027.
- Malhotra, Anju, Anjala Kanesathasan, and Payal Patel. 2012. "Connectivity: How Mobile Phones, Computers and the Internet can Catalyze Women's Entrepreneurship. India: A Case Study." ICRW and Cherie Blair Foundation. Internal Publication
- Mbiti, Isaac and David N. Weil. 2011. "Mobile Banking: The Impact of M-Pesa In Kenya." Working Paper 17129 NBER
- Morawczynski, Olga and Mark Pickens. 2009. "Poor People Using Mobile Financial Services: Observations on Customer Usage and Impact from M-PESA." CGAP Brief. August 2009. Available at: www.cgap.org
- Morawczynski, Olga. 2009. "Examining the Usage and Impact of Transformational M-Banking in Kenya." *Internationalization, Design, LNCS* 5623: 495-504.
- Porteous, David. 2007. "Just How Transformational is M-Banking?" Comissioned by FinMark Trust
- Svensson, Jakob and David Yanagizawa. 2009. "Getting Prices Right: The Impact of the Market Information Service in Uganda." *Journal of the European Economic Association*. April-May 2009. 7(2-3): 435-445.
- The World Bank. 2012. "Maximizing Mobile: 2012 Information and Communications for Development." The World Bank. Washington D.C.

Annex 1: Detailed Summaries of Selected Impact Evaluations

This annex includes word format of the summaries of the impact evaluations as they appear in the table, for ease of reading.

Jensen, Robert. 2007. "The Digital Divide: Information (Technology) Market Performance, and Welfare in the Southern Indian Fisheries Sector." The Quarterly Journal of Economics August 2007.

Jensen exploits the introduction of mobile phones in the Indian state of Kerala between 1997 and 2001 to assess how improved market information affects market performance. Jensen specifically looks at fishing markets within a relatively small area using the natural experiment to assess how changes in market performance affect producers and consumers differently.²³

Mobile phones were first introduced in 1997 and by 2001 over 60 percent of fishing boats and most wholesale and retail traders were using mobile phones to enable transactions. Jensen uses the staggered introduction of mobile phones across regions to generate four quasi treatment statuses. He compares each treatment status in a given time period that has mobile phone service to those that do not. The study set-up resembles a phase-in treatment, finally eliminating the control status in the last round as all regions have access to mobile phones by 2001.²⁴

Jensen finds that in this period the mean coefficient of variation of price across markets declined from 60-70 percent to 15 percent. The presence of waste (either fish that did not sell or buyers that incurred transport costs and could not buy) virtually disappeared after the introduction of mobile phones.

The increases in market efficiency created welfare gains for both consumers and producers. Fish sellers saw an average daily increase in profits of 133 rupees per day or about a 9 percent daily increase.²⁵ Within the markets that were using cell phones, those using mobile phones had approximately gains that were twice as much as those gains by non-mobile users. However the non-mobile users also saw gains, which points to the positive externalities of the mobile phone access. For consumers the introduction of mobile phones was associated with an average of a 4 percent decrease in prices. This price is consistent for each day, which increases magnitude of the savings for households over time.²⁶

These findings led Jensen to make the case for the importance of ICT advancements in developing countries where a large proportion of the population engages in productive labor such as agriculture, forestry or fishing. Jensen argues that, in these contexts, household wellbeing is highly dependent upon the functioning of markets either as producers or consumers. However, in developing countries people also commonly face challenges of poor infrastructure and dispersed markets. As in Kerala, Jensen shows that

these contexts prove to have sharp gains from the introduction of ICTs in improving market efficiency with immense impacts on household wellbeing for both sellers and consumers. He supports this argument through the evidence from Kerala, and asserts that the logic of the argument transcends this case and supports the external validity of the findings.²⁷

Aker, Jenny. 2010. "Information from Markets Near and Far: Mobile Phones and Agricultural Markets in Niger." American Economic Journal: Applied Economics 2 (July 2010).

Aker uses the exogenous introduction of mobile phone coverage in Niger between 2001 and 2006 to assess the impacts of mobile phones on agricultural market performance. Aker collects data on monthly agricultural prices, transaction costs, rainfall, and mobile phone coverage from 42 domestic and cross border markets. Between 2005 and 2007, she also collects a panel data set on traders and transporters. The panel data follows 415 traders "located in 35 markets across 6 geographic regions of Niger."²⁸

Mobile phone coverage was rolled out gradually beginning in 2001. By 2006, mobile phone customers represented only 4 percent of the population. However, mobile phone take-up was much higher among grain traders. By 2006, 76 percent of grain markets had cell phone coverage, and 29 percent of grain traders surveyed owned a mobile phone.²⁹

Throughout her analysis Aker measures market performance as the absolute value of the price difference of a specific good between a set of markets in a given month.³⁰ Each market is paired with all other markets. This method leads to correlations among pairs with the same market, however Aker corrects for this problem.

Aker finds that mobile phone coverage reduces price dispersion in markets by 3.5 CFA per kilogram. This translates into an average decrease in price dispersion, in markets with mobile phone coverage, of between 10 and 16 percent as compared to the price dispersion in markets without coverage.³¹ In assessing heterogeneity of markets, Aker finds that mobile phones are more effective at reducing price dispersion between market pairs when markets are farther apart or when there is poor road quality between markets.³²

Aker also finds support for network effects: mobile phones have a greater impact as more markets gain coverage. Her findings show that the impact of mobiles on price dispersion increases slightly and becomes more statistically significant as more people have phones making the same technology have greater value.³³

The mechanism Aker uses to explain her findings is one she found in her previous work in the region (Aker 2008): mobile phones primarily affect market-level outcomes through a reduction in search costs for grain traders. "Grain traders operating in mobile phone markets change their search and marketing behavior as compared to their non-mobile phone counterparts."³⁴ Aker asserts that the reductions in search costs and reduction in price dispersion is associated with improvements in trader and consumer wellbeing.³⁵

Jack, William and Tavneet Suri. 2011. "Risk Sharing and Transaction Costs: Evidence from Kenya's Mobile Money Revolution."

In the midst of the rapid takeoff of M-PESA Jack and Suri 2011 jumped into action and conducted a panel study between late 2008 and early 2010 with the aim of measuring impacts of mobile money on household consumption in the face of shocks. They use several evaluation strategies (panel difference in difference and instrumental variables) and a number of treatment indicator variables to provide a breadth of support for their findings.

Across the various specifications they find that for households that do not use M-PESA or households that lack access to the M-PESA agent network, per capita consumption falls by 7-10 percent on average when they experience a negative income shock. However, they find that M-PESA user households experience “no such fall in per capita consumption” and often the post-shock consumption fall is statistically indistinguishable from zero. The effects that they find are more discernible for households that are in lower income distribution quintiles than those in higher quintiles. ³⁶

Jack and Suri also take it one step further and show that the effects are due to improved risk sharing, not liquidity effects. They find that M-PESA user households are similar in all demographic characteristics yet different from non-user households in that they are 13 percent more likely to receive remittances; they also receive remittances from a larger network of people. Jack and Suri present a very rigorous case providing many robustness checks and addressing challenges with attrition with care and detail. For this reason, their paper shows promising results, even though it assesses the impacts using non-experimental methods. ³⁷

Blumenstock, Joshua, Nathan Eagle, and Marcel Fafchamps. 2011. "Risk and Reciprocity Over the Mobile Phone Network: Evidence from Rwanda." Center for Study of African Economies Working Paper WPS/2011-19. Oxford.

Blumenstock et al. 2011, measure the extent to which individuals transfer funds over cell phone networks as a means of sending money to help friends and family cope with severe economic shocks after a large earthquake in Rwanda. Blumenstock et al. use microlevel data and mobile phone data to test the Jack and Suri 2011 hypothesis that households with access to mobile money are better insured against shocks. They specifically examine whether people in unaffected areas transfer airtime to people close to the earthquake epicenter. ³⁸

They find “that the earthquake did cause individuals living outside the affected area to transfer large and significant volume of airtime to people living close to the earthquake’s epicenter.” The earthquake produced an additional influx of transferred airtime equivalent to \$84 USD to the area covered by 15 cell phone towers within 20 km of the epicenter. Blumenstock et al., explain that while this figure appears small economically it is representative of the level of cell phone usage at the time of the study. Since 2008 phone

usage has increased over 400-fold in Rwanda, and the authors estimate that with today's usage rates the size of the transfer would be between \$22,000 and \$30,000 USD.³⁹

In assessing the heterogeneity of users and the types of transfers they receive they find that wealthier phone users were significantly more likely to receive a transfer after the earthquake. They also use phone records to identify how many contacts an individual has – a proxy for the size of their social network. They find that while on normal days people with larger social networks are more likely to receive transfers, in response to the earthquake the size of a person's network does not significantly affect their likelihood of receiving a transfer. This finding leads the authors to pose an important question that still remains unanswered in the academic literature: does mobile phone take-up have regressive consequences if better-off individuals substitute out of informal risk sharing behaviors and instead move into technology-facilitated relationships?⁴⁰

Lastly Blumenstock et al. 2011 use a subsequent phone survey to gather information on the motivations of giving in response to the earthquake. They show that transfers, sent after the earthquake, are significantly more likely if the recipient has previously sent to the sender. They also show that the larger the distance between the sender community and the affected community the lower the levels of transfers, and also that wealthier individuals are more likely to receive greater levels of transfers. They use these findings to assert that giving, in this context was driven by altruistic intentions, instead based on an expectation of reciprocity.⁴¹

Mbiti, Isaac and David N. Weil. 2011. "Mobile Banking: The Impact of M-Pesa In Kenya." Working Paper 17129 NBER

Mbiti and Weil 2011 present a number of statistics about M-Pesa users as well as construct several difference in difference models to assess the impacts of M-Pesa usage on money transfer prices and on household economic indicators. They find that the primary use of M-Pesa is the purchase of airtime – 42 percent of users. Contradictory to findings by Jack and Suri (2011) they find that only 26 percent of M-Pesa users report using the service for savings. Very small percentages of users report using M-Pesa for direct purchasing, paying bills or receiving salaries or wages.⁴²

Using data from 2009 they also present findings on the demographic characteristics of M-Pesa users. They show that M-Pesa users are more likely to be male, wealthier, better educated, banked in the formal sector, employed in non-farm sectors, and reside in urban areas. They also find that 35 percent of banked individuals use M-Pesa to save, compared to only 19 percent of the unbanked that use it as a savings tool. Wealthy individuals also more frequently use M-Pesa as a savings tool - 30 percent - as compared to poor individuals at 15 percent. They also find that men use M-Pesa 35 percent more frequently than women.⁴³

Mbiti and Weil find somewhat murky results in assessing whether M-Pesa usage leads to an increase or decrease in money transfers. They find that 35 percent of respondents

indicated that they had increased the frequency of sending transfers and 18 percent indicating that they had decreased the frequency. Approximately 35 percent of M-Pesa users indicated that they had send higher amounts in the transfers they had made and almost 20 percent stated they had decreased the amount. ⁴⁴

Moving beyond summary statistics and correlation assessments Mibiti and Weil build several models to estimate impacts. They develop a sub-location fixed effects instrumental variable that uses qualitative responses to a survey about the confidence in different money transfer mechanisms prior to the entry of mobile money, in 2006. They argue that certain responses collected in 2006 can serve as indicators of likeliness to adopt mobile money in 2009, but not having an impact on individual outcomes in 2009. ⁴⁵

Using this instrument they find a positive relationship between M-Pesa adoption and the frequency of sending transfers. They show that M-Pesa adoption increased the frequency of sending remittances by 2. They also find that M-Pesa users on average increased formal bank usage by 11 percentage points. They use binary responses to questions about informal savings strategies (use of rotating savings groups, credit associations, giving savings to a friend or family for safe keeping, saving with a group of friends, or storing funds in a secret place) and estimate that M-Pesa reduces the prevalence of informal saving by 15 percentage points or “approximately a 30% reduction from the 2006 level.”⁴⁶ They also find that for the average M-Pesa adoption level M-Pesa would increase employment in any sector by 12 percentage points. When looking the types of employment M-Pesa impacts they find that there is no impact on non-farm employment. ⁴⁷

Applying a difference in differences methodology to evaluate the impact of M-Pesa on the prices of money transfers through MoneyGram and Western Union, they find that overall prices fell 43 percent from 2003 to 2010. They show that competitive pressure from the invention and spread of M-Pesa accounts for 60 percent of the price decline. ⁴⁸

Aker, Jenny, Rachid Boumnijel, Amanda McClelland, and Niall Tierney. 2011. “Zap It to Me: The Short-Term Impacts of a Mobile Cash Transfer Program.” CGD Working Paper 268. Washington, D.C.: Center for Global Development.

Aker et al. explore the impact to of mobile phone cash transfers within a humanitarian response to drought and a food crisis in Niger in 2010. They use a unique study design that allows them to parse out the impacts of having a mobile phone from the impacts of receiving a transfer through mobile money as compared to receiving a manual cash transfer. They find that households in villages that received the cash transfers through their mobile phone “spent the cash transfer on more types of items, sold fewer non-durable assets, consumed more diverse foods and cultivated more diverse crops as compared to those receiving a manual cash transfer.”⁴⁹ They attribute these impacts to the time savings for program recipients, greater privacy of the mobile transfer mechanism, and a shift in women’s influence within the household.⁵⁰

The study randomly assigned villages into one of three types of cash transfer programs. One program was a standard manual cash intervention in which the beneficiary household received an unconditional cash transfer of 22,000 CFA each month the equivalent to approximately US\$45. The transfer payments were made to recipients at a central village location, requiring recipients to travel to the designated location.⁵¹ The second program was titled Zap. In this program recipients received a cash transfer, of equal value, through an electronic transfer to their mobile phone. Recipients in this group were also provided mobile phones with a previously installed Zap account. To receive cash payouts of the mobile transfer recipients had to take their phone to an m-transfer agent located in their village, a nearby village, or a nearby market. The third program is referred to as the Placebo program. This program was identical to the manual cash intervention with the exception that each program recipient received a mobile phone with a previously installed mobile transfer account. This third group, however, did not receive mobile transfers through the program.⁵²

Using a classification system provided by the Government of Niger, Concern Worldwide identified 116 villages within the Tahoua region that were in “food deficit” equivalent to the government indicator of “having produced less than 50 percent of their consumption needs during the 2009 harvest”.⁵³ Of the eligible villages Concern identified approximately twenty as priority areas for the intervention. Of the remaining 96 villages Concern used random assignment to identify which of the three programs would be implemented (32 villages were assigned to the manual cash program, 32 villages were assigned to the Zap program, and 32 villages were assigned to the Placebo program.)⁵⁴

Within each selected village the assignment of the treatment was done based upon two criteria:

1. The level of household poverty determined using a “village-level vulnerability exercise”, and
2. The necessary requirement of having at least one child under five.

The number of program recipient households per each program village ranged from 20 to 75 percent of the total village population. The cash transfers were also always administered to women within the household.⁵⁵

Aker et al. show that “differences in pre-program household characteristics are small and insignificant” supporting a successful randomization.⁵⁶ The household survey used for their analysis was taken from a sample of 1,200 program recipients, with representation from all 96 program villages. Data was collected in April of 2010 and again eight months later in December of 2010. The collected data did not include detailed income or expenditure module.⁵⁷

They use a reduced form regression specification using only post data to determine the impacts of the placebo and Zap programs as compared to the regular cash program. They also used a difference in difference model for robustness checks. They test several initial hypothesis and present impacts on a variety of development outcomes.

Time Usage

They find that participants in the Zap program incurred significantly fewer costs in the process of obtaining the cash transfer as compared to the placebo group or the manual cash transfer group. “Whereas cash and placebo program recipients travelled an average of 4.04 km round trip to obtain the transfer, zap program recipients only traveled .9 km to ‘cash out’ at the nearest agent, with a statistically significant difference at the 1 percent level. This is equivalent to an opportunity cost savings of 30 minutes for each cash transfer, or 2.5 hours over the entire program.”⁵⁸

Expenditures

Zap households as compared to both the manual transfer group and the placebo group purchased on average .86 more types food and non-food items with the cash transfer. This finding was statistically significant and shows that the m-transfer encourages a larger variety of purchases. These spending trends do not carry over into the analysis of health and school fee expenditures made with the transfer. They find no statistically significant differences between the groups in spending on health or education.⁵⁹

Food Security and Coping Strategies

Household diet diversity is .16 points higher in Zap villages as compared with placebo villages, a statistically significant finding.⁶⁰ There was no statistically significant difference between the levels of consumption of staple foods but there were notable and statistically significant differences among consumption of fruit and fats. Households in Zap program villages were on average “4-5 percentage points more likely to consume fruits -- and 6-12 percentage points more likely to consume fats than households in cash and placebo villages, a 28-percent increase.”⁶¹

They also assess differences in the use of coping strategies during the hungry period across program types and find no statistically significant differences across groups. The coping strategies they assess are commonly practiced in the Sahel and include selling seeds and land, cutting trees, searching for anthills, and reducing the number of meals per day.

Durable and Non-Durable Good Ownership

While they did not find any statistically significant differences among program types in ownership of durable assets they did in ownership of non-durable assets such as lamps and flashlights. Households in the Zap program villages had on average .15 more non-durable assets as compared to the placebo group. This finding suggests that “zap households were selling non-durable assets less frequently than those in placebo or cash villages.”⁶²

Agricultural Production

Aker et al. also found that Zap villages on average grew .36 more types of crops than those in the placebo villages, a finding that was statistically significant at the 5 percent level. Interestingly, these findings are driven by an increased likelihood for Zap village households to engage in marginal cash crops such as vouandzou and okra production. Both of these crops are primarily grown women in Niger.⁶³

Intra Household Decision Making

The program is implemented in an area of Niger where socio cultural norms do not permit younger, married women to travel to markets individually or in groups if they belong to the Hausa tribe – the ethnic group that makes up 83 percent of the sample. Aker et al. try to assess the impacts of the different programs on intra-household decision making but are limited to assessing impacts with a subsample from the minority tribes. These findings are reported but are not statistically significant due to the small sample size. “Zap program recipients in Fulani and Toureg tribal households were... 4 percentage points more likely to be responsible for spending the cash transfer as compared with the placebo groups.”⁶⁴ “Fulani and Touareg zap recipients were 17 percentage points more likely to use the transfer to pay for health fees, as compared with 1 percentage in Hausa zap recipients.”⁶⁵ There were also no differences among groups in levels of spending for school fees or spending in markets outside the village.

Mobile Phone Usage

The Zap program had a statistically significant impact on mobile phone ownership and the frequency of usage since the last harvest as compared to the placebo group.

Aker highlight some potential threats to the validity of their results. They raise the potential for differential levels of take-up across program types or differential levels of attrition. However they quickly disprove this potential threat “there are no differential effects in attrition, the probability of receiving the cash transfer or shocks across groups.”⁶⁶ They also highlight the potential for spurious identification of statistical significance when testing multiple hypotheses with the data. They use a Bonferroni correction for multiple testing and an adjusted p-value to re-assess statistical significance on their primary findings. “The outcomes that are significant at this level are the cost of obtaining the cash transfer, the different uses of the cash transfer (number of food and non-food items, other grains, condiments and oil), the impact on non-durable assets and likelihood of growing vouandzou and okra. ... Yet none of the food security or crop diversity outcomes are significant when correcting for multiple testing.”⁶⁷

They also apply a very creative test to assess whether the different program types caused different inflationary responses in local markets. Using weekly market price data collected from 45 markets in the region between May and December of 2010, they show that “overall, the presence of a cash transfer in a particular market area during the week did not have a statistically significant impact upon food prices.”⁶⁸

Karlan, Dean, Margaret McConnell, Sendhil Mullainathan, and Jonathan Zinman. 2011. “Getting to the Top of Mind: How Reminders Increase Saving.” Unpublished. Available at: <http://www.povertyactionlab.org/evaluation/text-message-reminders-and-incentives-save-Bolivia>.

Karlan et al. 2011, evaluate the impact of text message reminders on savings account balances in Bolivia, Peru and the Philippines. In each location the client had to open a savings account in a bank and set a “goal amount” they hoped to save within a year. They

also had to make a plan for how they would save for deposits each month. However, in each location the incentives to save were different. In the Philippines the account had a commitment feature that limited the client's ability to withdraw their money until they had reached their savings goal. In Peru, the bank did not have withdrawal restrictions but did ask the client what they were saving for – how they would spend their goal saving amount. They also offered a reward for sticking to their plan. In Bolivia, there were no withdrawal restrictions and they did not ask the client for specific expenditure goals but they did offer a reward for sticking to their savings plan.⁶⁹

The types of text messages were also randomly varied within samples. Some clients received monthly text message reminders to save that used either gain or loss framing. Other clients received late text messages if savings deposits were not made, once again, with varying gain or loss message language. The content of the messages also varied, some clients received messages that specifically mentioned their savings goals. One important note is that, in Peru, low cell phone coverage required the bank to use old-fashioned direct mail messaging. The results are consolidated across methods with no statistically significant difference between the type of message method.⁷⁰

On average across all three locations clients who received monthly reminders saved 6 percent more than individuals that did not. Clients who received the reminders were also 3 percentage points more likely to reach their savings goal by their goal date.⁷¹

Cadena, Ximena and Antoinette Schoar. 2011. "Remembering to Pay? Reminders vs. Financial Incentives for Loan Payments."

The use of text message reminders to incentivize timely loan repayments has been tested in two impact evaluations, however they produced opposing findings. Cadena and Schoar 2011 compare different interventions aimed at improving loan repayment rates for small businesses in Uganda. One treatment group received reminder text messages three days prior to the repayment date. A second treatment group was offered a cash incentive if they paid on time over the full course of their repayment and a third group was offered a discounted interest rate on their next loan if they had no late payments on the duration of their repayment schedule. Cadena and Schoar find that the text message strategy increased the probability of perfect repayment by 9 points on average. This impact was statistically significant and larger in magnitude than either of the other incentive schemes.⁷² Cadena and Schoar use multiple treatments, in part as a strategy to monetize the value of the text message strategy. They show that the text message treatment, which is "almost costless" for the financial institution has a very comparable effect size of a 25% reduction in interest rate – a very costly incentive. This finding provides support for text message reminders as a cost effective strategy for financial institutions. Additionally, they find that the effects are stronger for borrowers with smaller loans (less than \$450) and for borrowers under 30 years of age.

Karlan, Dean Melanie Morten, and Jonathan Zinman. 2012. "A personal touch: Text messaging for loan repayment." Poverty Action Lab.

Karlan et al. 2012 also assess the effects of text message reminders on loan repayment outcomes but find opposing evidence that the messaging has no effect on timely repayment rates. Karlan et al. use additional variation to assess whether the content or the timing of the delivery of the message has differing effect sizes. The variation in timing includes messages sent two days prior, one day prior, or on the repayment due date. The content variation included a message that incorporated the loan officer's name, a message that stated how much the borrower could lose if they did not pay, or a message that stated how much the borrower would gain if they made the payment on time.

Unlike the Cadena and Schoar study, they find that messages on average do not have an impact in repayment performance relative to the control group or significant differences between treatment types. The only finding that was statistically significant was a reduction in the rate of unpaid loans 30 days after maturity by 5.5 percentage points (a 41% reduction) for borrowers that received messages that incorporate the loan officer's name. This finding was only significant for a subsection of the population: repeat borrowers. Karlan et al. therefore argue that the mechanism at play was not the message reminders themselves but instead the personal obligation or fear of reciprocity between the borrower and the bank employee that was most likely driving the impact on borrowers.⁷³

It remains a puzzle why the results found in the two studies are diverging, and it attests to the inability of extrapolating the findings to make general policy recommendations at large.

Aker, Jenny, Christopher Ksoll and Travis Lybber. 2010. "ABC, 123: The Impact of Mobile Phone Literacy Program on Education Outcomes." Center for Global Development. Working Paper 223. September 2010. www.cgdev.org

Aker and Ksoll provide evidence that mobile phones have a direct impact on improvements in educational outcomes and the persistence of learning in Niger. Their study was implemented in two regions of Niger: Dosso and Zinder, both primarily rural areas with an estimated adult illiteracy rate of approximately 90%.

The study built upon an already existing adult literacy and numeracy program implemented by Catholic Relief Services, and developed a new curriculum that incorporated the provision of mobile phones and a module of training on basic usage of mobile phones. This modified version of the adult literacy program was titled *Project Alphabétisation de Base par Cellulaire (ABC)*.

One hundred and five (105) villages were identified as eligible within Dosso and Zinder. The eligibility criteria for a village was that it receive cell phone coverage and that the village did not have other NGOs present conducting adult literacy programs. The

randomization of villages into groups was done at the outset of the program for year one of implementation in 2009 and year two in 2010. The study was designed as a phase-in. In the first year a control group existed which by the second year was phased out and received year-one training. Of the eligible villages, 49 were randomly selected for the control group (for the first year), 28 villages were randomly selected for ABC programming and 31 villages were selected for non-cell phone regular literacy and numeracy training. In the second year, those villages that had received ABC training in the first year continued to receive ABC training in the second year of and the villages that received non-ABC training in the first year received a second year of non-ABC training. In 2010 the control group of 49 villages was randomly assigned to either ABC or non-ABC, in each case they received the relevant year one of the curriculum of either ABC or non-ABC training. The village level randomization stratified villages by region and then by administrative divisions within each region.⁷⁴

The adult literacy programs consisted of two classes per village each made up of 25 students. The classes were divided by gender (25 women, 25 men). Courses were taught five days a week, for three hours each day, for four months. The first year of courses was taught from February to June in 2009 and the second year in 2010 again from February to June. Four of the five class days each week were dedicated to new material and the fifth day was allocated to revision of previous material.⁷⁵ The courses were taught in the local tribal language of the village either Zarma or Hausa. During the first year of the course the classes covered basic literacy and numeracy and in the second year the courses covered “functional literacy topics (agro-enterprise and health).”⁷⁶

While the amount of class time received by both the ABC and non-ABC groups were the same, the ABC programming did differ from the regular adult literacy and numeracy training in two ways: “(1) participants were trained in how to use a simple mobile phone, including turning on and charging the phone, learning how to recognize numbers and letters on the mobile phone handset, sending and receiving calls and writing and reading SMS; and (2) the project provided mobile phones to groups of literacy participants (one mobile phone per group of five people) at wholesale prices.”⁷⁷ Aker and Ksoll refute any potential for individual wealth effects as a result of the provision of cell phones because the phones were shared among five individuals.⁷⁸

On the individual level eligibility criteria for participation in the class was that individuals “had to be members of existing or newly formed producers’ associations and unable to read or write in any language.”⁷⁹ Eligible applicants represented more than 60 percent of the adult population across eligible villages.⁸⁰ Approximately 5 slots in each village were reserved for members of CRS partner Village Development Committees. Individuals were selected in a public lottery to fill the remainder of the available class seats.⁸¹

To assess the impact of the ABC program on educational outcomes Aker and Ksoll collected three rounds of test scores: a baseline in February 2009, prior to the start of classes, a second round immediately after the completion of the course in June of 2009, and then a follow-up collected in January of 2010 – six months after the completion of the course.⁸² The literacy and numeracy tests “were identical in structure and difficulty for all survey

rounds and between the two regions.”⁸³ Scores ranged from zero (complete illiteracy or innumeracy) to six. A 6 score in literacy “implies that the student can correctly write two complete sentences with more complex word patterns” and in math a score of six means that a student can solve “math word problems involving addition, subtraction, multiplication and division.”⁸⁴

Aker and Ksoll analyze the data to assess both the immediate impact of mobile phones – after exposure to phones for only three weeks – as well as the persistence of learning over time assessed using data collected six months after the completion of the course. They find that literacy and math scores are higher in ABC villages immediately after the program, with even stronger improvements in math scores. ABC villages on average scored .32 points higher than their counterparts in the non-ABC villages, a difference that was significant at the 10 percent level. When they assess the impact over time they find that “both groups experience a strong depreciation in literacy and numeracy skills during the eight months when classes are not held, but ABC math scores are still higher in ABC villages. This suggests that the ABC program could not only improve skills acquisition in the short-term, but also mitigate skills depreciation after the end of the program.”⁸⁵

Aker et al. also disaggregated the data according to region and ran the difference in differences regression again. In Dosso, the difference between ABC and non-ABC groups was statistically significant at the 5 percent level. ABC participants scored on average .5 points higher in math than non-ABC participants. In contrast in the Zinder region there were no statistically significant differences between treatment types or between the control group and treatment types.

Aker et al. also look at heterogeneous effects according to gender and age. They find that the ABC program does not have statistically significant effects on literacy scores for the overall population or for Zinder, but they do find that the program had a positive impact on literacy for women in the Dosso region. However, they are unable to reject the hypothesis that the difference in scores between men and women are statistically significant. In the numeracy scores they do find that the ABC program had a positive and statistically significant impact on women in the overall sample and a Chow test supports the statistical significance of this finding.⁸⁶

Using a cutoff point of 45 years of age they also find that the ABC program is relatively more useful for younger participants. “younger participants have higher literacy scores, but there is only a statistically significant difference between the two samples in the Dosso region. In terms of numeracy, ABC increases math scores for younger populations overall, but we cannot reject the hypothesis that the two samples are not statistically significant in the Dosso region.”⁸⁷

In their assessment of persistence of learning they find that “math scores in ABC villages are 0.21 points higher than non-ABC villages eight months after the end of classes and the effect is statistically significant at the 5 percent level.”⁸⁸ They explain that this difference could be attributed to both the persistence of the initial gains in learning as well as gains

from application and continued learning with the mobile phones over the six month period without classes.⁸⁹

Aker et al. are able to convincingly show that mobile phones do have positive effects on educational outcomes especially in numeracy.

-
- ¹ The World Bank. 2012. "Maximizing Mobile: 2012 Information and Communications for Development." The World Bank. Washington D.C.
- ² Jensen, Robert. 2007. "The Digital Provide: Information (Technology) Market Performance, and Welfare in the Southern Indian Fisheries Sector." *The Quarterly Journal of Economics* August 2007.
- ³ Jensen, Robert. 2007. "The Digital Provide: Information (Technology) Market Performance, and Welfare in the Southern Indian Fisheries Sector." *The Quarterly Journal of Economics* August 2007. 883
- ⁴ Aker, Jenny. 2010. "Information from Markets Near and Far: Mobile Phones and Agrigultural Markets in Niger." *American Economic Journal: Applied Economics* 2 (July 2010): 52
- ⁵ Aker, Jenny. 2010. "Information from Markets Near and Far: Mobile Phones and Agrigultural Markets in Niger." *American Economic Journal: Applied Economics* 2 (July 2010): 54
- ⁶ Aker, Jenny. 2010. "Information from Markets Near and Far: Mobile Phones and Agrigultural Markets in Niger." *American Economic Journal: Applied Economics* 2 (July 2010): 54-55
- ⁷ Aker, Jenny. 2010. "Information from Markets Near and Far: Mobile Phones and Agrigultural Markets in Niger." *American Economic Journal: Applied Economics* 2 (July 2010): 58
- ⁸ Aker, Jenny. 2010. "Information from Markets Near and Far: Mobile Phones and Agrigultural Markets in Niger." *American Economic Journal: Applied Economics* 2 (July 2010): 58
- ⁹ Jack, William and Tavneet Suri. Unknown Publication Date. "Risk Sharing and Transaction Costs: Evidence from Kenya's Mobile Money Revolution."
- ¹⁰ Jack, William and Tavneet Suri. Unknown Publication Date. "Risk Sharing and Transaction Costs: Evidence from Kenya's Mobile Money Revolution."
- ¹¹ Blumenstock, Joshua, Nathan Eagle, and Marcel Fafchamps. 2011. "Risk and Reciprocity Over the Mobile Phone Network: Evidence from Rwanda." Center for Study of African Economies Working Paper WPS/2011-19. Oxford.
- ¹² Blumenstock, Joshua, Nathan Eagle, and Marcel Fafchamps. 2011. "Risk and Reciprocity Over the Mobile Phone Network: Evidence from Rwanda." Center for Study of African Economies Working Paper WPS/2011-19. Oxford.
- ¹³ Blumenstock, Joshua, Nathan Eagle, and Marcel Fafchamps. 2011. "Risk and Reciprocity Over the Mobile Phone Network: Evidence from Rwanda." Center for Study of African Economies Working Paper WPS/2011-19. Oxford.
- ¹⁴ Aker, Jenny, Rachid Boumnijel, Amanda McClelland, and Niall Tierney. 2011. "Zap It to Me: The Short-Term Impacts of a Mobile Cash Transfer Program." CGD Working Paper 268. Washington, D.C.: Center for Global Development.
<http://www.cgdev.org/content/publications/detail/1425470> p.11
- ¹⁵ Aker, Jenny, Rachid Boumnijel, Amanda McClelland, and Niall Tierney. 2011. "Zap It to Me: The Short-Term Impacts of a Mobile Cash Transfer Program." CGD Working Paper 268. Washington, D.C.: Center for Global Development.
<http://www.cgdev.org/content/publications/detail/1425470> p.12

-
- ¹⁶ Mbiti, Isaac and David N. Weil. 2011. "Mobile Banking: The Impact of M-Pesa In Kenya." Working Paper 17129 NBER
- ¹⁷ Cadena, Ximena and Antoinette Schoar. 2011. "Remembering to Pay? Reminders vs. Financial Incentives for Loan Payments." Available at: <http://www.mit.edu/~aschoar/Remembering%20to%20Pay-%20Cadena%20&%20Schoar-%20April2011.pdf>
- ¹⁸ Karlan, Dean Melanie Morten, and Jonathan Zinman. 2012. "A personal touch: Text messaging for loan repayment." Poverty Action Lab. Available at: <http://www.povertyactionlab.org/publication/personal-touch-text-messaging-loan-repayment> Summary also available at: <http://www.poverty-action.org/project/0074>
- ¹⁹ Karlan, Dean, Margaret McConnell, Sendhil Mullainathan, and Jonathan Zinman. 2011. "Getting to the Top of Mind: How Reminders Increase Saving." Unpublished. Available at: <http://www.povertyactionlab.org/evaluation/text-message-reminders-and-incentives-save-Bolivia>. Summary of Bolivia case also available at: <http://www.poverty-action.org/project/0055>
- ²⁰ Aker, Jenny, Rachid Boumnijel, Amanda McClelland, and Niall Tierney. 2011. "Zap It to Me: The Short-Term Impacts of a Mobile Cash Transfer Program." CGD Working Paper 268. Washington, D.C.: Center for Global Development. <http://www.cgdev.org/content/publications/detail/1425470> p.12
- ²¹ Aker, Jenny, Rachid Boumnijel, Amanda McClelland, and Niall Tierney. 2011. "Zap It to Me: The Short-Term Impacts of a Mobile Cash Transfer Program." CGD Working Paper 268. Washington, D.C.: Center for Global Development. <http://www.cgdev.org/content/publications/detail/1425470> p.15
- ²² Aker, Jenny, Rachid Boumnijel, Amanda McClelland, and Niall Tierney. 2011. "Zap It to Me: The Short-Term Impacts of a Mobile Cash Transfer Program." CGD Working Paper 268. Washington, D.C.: Center for Global Development. <http://www.cgdev.org/content/publications/detail/1425470> p.15
- ²³ Jensen, Robert. 2007. "The Digital Provide: Information (Technology) Market Performance, and Welfare in the Southern Indian Fisheries Sector." The Quarterly Journal of Economics August 2007.
- ²⁴ Jensen, Robert. 2007. "The Digital Provide: Information (Technology) Market Performance, and Welfare in the Southern Indian Fisheries Sector." The Quarterly Journal of Economics August 2007.
- ²⁵ Jensen, Robert. 2007. "The Digital Provide: Information (Technology) Market Performance, and Welfare in the Southern Indian Fisheries Sector." The Quarterly Journal of Economics August 2007. 914
- ²⁶ Jensen, Robert. 2007. "The Digital Provide: Information (Technology) Market Performance, and Welfare in the Southern Indian Fisheries Sector." The Quarterly Journal of Economics August 2007.
- ²⁷ Jensen, Robert. 2007. "The Digital Provide: Information (Technology) Market Performance, and Welfare in the Southern Indian Fisheries Sector." The Quarterly Journal of Economics August 2007.
- ²⁸ Aker, Jenny. 2010. "Information from Markets Near and Far: Mobile Phones and Agrgricultural Markets in Niger." American Economic Journal: Applied Economics 2 (July 2010): 50

-
- ²⁹ Aker, Jenny. 2010. "Information from Markets Near and Far: Mobile Phones and Agrigultural Markets in Niger." *American Economic Journal: Applied Economics* 2 (July 2010): 49
- ³⁰ Aker, Jenny. 2010. "Information from Markets Near and Far: Mobile Phones and Agrigultural Markets in Niger." *American Economic Journal: Applied Economics* 2 (July 2010): 50
- ³¹ Aker, Jenny. 2010. "Information from Markets Near and Far: Mobile Phones and Agrigultural Markets in Niger." *American Economic Journal: Applied Economics* 2 (July 2010): 52
- ³² Aker, Jenny. 2010. "Information from Markets Near and Far: Mobile Phones and Agrigultural Markets in Niger." *American Economic Journal: Applied Economics* 2 (July 2010): 54
- ³³ Aker, Jenny. 2010. "Information from Markets Near and Far: Mobile Phones and Agrigultural Markets in Niger." *American Economic Journal: Applied Economics* 2 (July 2010): 54-55
- ³⁴ Aker, Jenny. 2010. "Information from Markets Near and Far: Mobile Phones and Agrigultural Markets in Niger." *American Economic Journal: Applied Economics* 2 (July 2010): 58
- ³⁵ Aker, Jenny. 2010. "Information from Markets Near and Far: Mobile Phones and Agrigultural Markets in Niger." *American Economic Journal: Applied Economics* 2 (July 2010): 58
- ³⁶ Jack, William and Tavneet Suri. Unknown Publication Date. "Risk Sharing and Transaction Costs: Evidence from Kenya's Mobile Money Revolution."
- ³⁷ Jack, William and Tavneet Suri. Unknown Publication Date. "Risk Sharing and Transaction Costs: Evidence from Kenya's Mobile Money Revolution."
- ³⁸ Blumenstock, Joshua, Nathan Eagle, and Marcel Fafchamps. 2011. "Risk and Reciprocity Over the Mobile Phone Network: Evidence from Rwanda." Center for Study of African Economies Working Paper WPS/2011-19. Oxford.
- ³⁹ Blumenstock, Joshua, Nathan Eagle, and Marcel Fafchamps. 2011. "Risk and Reciprocity Over the Mobile Phone Network: Evidence from Rwanda." Center for Study of African Economies Working Paper WPS/2011-19. Oxford.
- ⁴⁰ Blumenstock, Joshua, Nathan Eagle, and Marcel Fafchamps. 2011. "Risk and Reciprocity Over the Mobile Phone Network: Evidence from Rwanda." Center for Study of African Economies Working Paper WPS/2011-19. Oxford.
- ⁴¹ Blumenstock, Joshua, Nathan Eagle, and Marcel Fafchamps. 2011. "Risk and Reciprocity Over the Mobile Phone Network: Evidence from Rwanda." Center for Study of African Economies Working Paper WPS/2011-19. Oxford.
- ⁴² Mbiti, Isaac and David N. Weil. 2011. "Mobile Banking: The Impact of M-Pesa In Kenya." Working Paper 17129 NBER
- ⁴³ Mbiti, Isaac and David N. Weil. 2011. "Mobile Banking: The Impact of M-Pesa In Kenya." Working Paper 17129 NBER
- ⁴⁴ Mbiti, Isaac and David N. Weil. 2011. "Mobile Banking: The Impact of M-Pesa In Kenya." Working Paper 17129 NBER
- ⁴⁵ Mbiti, Isaac and David N. Weil. 2011. "Mobile Banking: The Impact of M-Pesa In Kenya." Working Paper 17129 NBER

-
- ⁴⁶ Mbiti, Isaac and David N. Weil. 2011. "Mobile Banking: The Impact of M-Pesa In Kenya." Working Paper 17129 NBER p. 17
- ⁴⁷ Mbiti, Isaac and David N. Weil. 2011. "Mobile Banking: The Impact of M-Pesa In Kenya." Working Paper 17129 NBER
- ⁴⁸ Mbiti, Isaac and David N. Weil. 2011. "Mobile Banking: The Impact of M-Pesa In Kenya." Working Paper 17129 NBER
- ⁴⁹ Aker, Jenny, Rachid Boumnijel, Amanda McClelland, and Niall Tierney. 2011. "Zap It to Me: The Short-Term Impacts of a Mobile Cash Transfer Program." CGD Working Paper 268. Washington, D.C.: Center for Global Development.
<http://www.cgdev.org/content/publications/detail/1425470> p.2
- ⁵⁰ Aker, Jenny, Rachid Boumnijel, Amanda McClelland, and Niall Tierney. 2011. "Zap It to Me: The Short-Term Impacts of a Mobile Cash Transfer Program." CGD Working Paper 268. Washington, D.C.: Center for Global Development.
<http://www.cgdev.org/content/publications/detail/1425470> p.2
- ⁵¹ Aker, Jenny, Rachid Boumnijel, Amanda McClelland, and Niall Tierney. 2011. "Zap It to Me: The Short-Term Impacts of a Mobile Cash Transfer Program." CGD Working Paper 268. Washington, D.C.: Center for Global Development.
<http://www.cgdev.org/content/publications/detail/1425470> p.4
- ⁵² Aker, Jenny, Rachid Boumnijel, Amanda McClelland, and Niall Tierney. 2011. "Zap It to Me: The Short-Term Impacts of a Mobile Cash Transfer Program." CGD Working Paper 268. Washington, D.C.: Center for Global Development.
<http://www.cgdev.org/content/publications/detail/1425470> p.4-5
- ⁵³ Aker, Jenny, Rachid Boumnijel, Amanda McClelland, and Niall Tierney. 2011. "Zap It to Me: The Short-Term Impacts of a Mobile Cash Transfer Program." CGD Working Paper 268. Washington, D.C.: Center for Global Development.
<http://www.cgdev.org/content/publications/detail/1425470> p.6
- ⁵⁴ Aker, Jenny, Rachid Boumnijel, Amanda McClelland, and Niall Tierney. 2011. "Zap It to Me: The Short-Term Impacts of a Mobile Cash Transfer Program." CGD Working Paper 268. Washington, D.C.: Center for Global Development.
<http://www.cgdev.org/content/publications/detail/1425470> p.6
- ⁵⁵ Aker, Jenny, Rachid Boumnijel, Amanda McClelland, and Niall Tierney. 2011. "Zap It to Me: The Short-Term Impacts of a Mobile Cash Transfer Program." CGD Working Paper 268. Washington, D.C.: Center for Global Development.
<http://www.cgdev.org/content/publications/detail/1425470> p.6
- ⁵⁶ Aker, Jenny, Rachid Boumnijel, Amanda McClelland, and Niall Tierney. 2011. "Zap It to Me: The Short-Term Impacts of a Mobile Cash Transfer Program." CGD Working Paper 268. Washington, D.C.: Center for Global Development.
<http://www.cgdev.org/content/publications/detail/1425470> p.7
- ⁵⁷ Aker, Jenny, Rachid Boumnijel, Amanda McClelland, and Niall Tierney. 2011. "Zap It to Me: The Short-Term Impacts of a Mobile Cash Transfer Program." CGD Working Paper 268. Washington, D.C.: Center for Global Development.
<http://www.cgdev.org/content/publications/detail/1425470> p.6
- ⁵⁸ Aker, Jenny, Rachid Boumnijel, Amanda McClelland, and Niall Tierney. 2011. "Zap It to Me: The Short-Term Impacts of a Mobile Cash Transfer Program." CGD Working Paper 268.

Washington, D.C.: Center for Global Development.

<http://www.cgdev.org/content/publications/detail/1425470> p.10

⁵⁹ Aker, Jenny, Rachid Boumnijel, Amanda McClelland, and Niall Tierney. 2011. "Zap It to Me: The Short-Term Impacts of a Mobile Cash Transfer Program." CGD Working Paper 268. Washington, D.C.: Center for Global Development.

<http://www.cgdev.org/content/publications/detail/1425470> p.11

⁶⁰ Aker, Jenny, Rachid Boumnijel, Amanda McClelland, and Niall Tierney. 2011. "Zap It to Me: The Short-Term Impacts of a Mobile Cash Transfer Program." CGD Working Paper 268. Washington, D.C.: Center for Global Development.

<http://www.cgdev.org/content/publications/detail/1425470> p.11

⁶¹ Aker, Jenny, Rachid Boumnijel, Amanda McClelland, and Niall Tierney. 2011. "Zap It to Me: The Short-Term Impacts of a Mobile Cash Transfer Program." CGD Working Paper 268. Washington, D.C.: Center for Global Development.

<http://www.cgdev.org/content/publications/detail/1425470> p.11

⁶² Aker, Jenny, Rachid Boumnijel, Amanda McClelland, and Niall Tierney. 2011. "Zap It to Me: The Short-Term Impacts of a Mobile Cash Transfer Program." CGD Working Paper 268. Washington, D.C.: Center for Global Development.

<http://www.cgdev.org/content/publications/detail/1425470> p.12

⁶³ Aker, Jenny, Rachid Boumnijel, Amanda McClelland, and Niall Tierney. 2011. "Zap It to Me: The Short-Term Impacts of a Mobile Cash Transfer Program." CGD Working Paper 268. Washington, D.C.: Center for Global Development.

<http://www.cgdev.org/content/publications/detail/1425470> p.12

⁶⁴ Aker, Jenny, Rachid Boumnijel, Amanda McClelland, and Niall Tierney. 2011. "Zap It to Me: The Short-Term Impacts of a Mobile Cash Transfer Program." CGD Working Paper 268. Washington, D.C.: Center for Global Development.

<http://www.cgdev.org/content/publications/detail/1425470> p.15

⁶⁵ Aker, Jenny, Rachid Boumnijel, Amanda McClelland, and Niall Tierney. 2011. "Zap It to Me: The Short-Term Impacts of a Mobile Cash Transfer Program." CGD Working Paper 268. Washington, D.C.: Center for Global Development.

<http://www.cgdev.org/content/publications/detail/1425470> p.15

⁶⁶ Aker, Jenny, Rachid Boumnijel, Amanda McClelland, and Niall Tierney. 2011. "Zap It to Me: The Short-Term Impacts of a Mobile Cash Transfer Program." CGD Working Paper 268. Washington, D.C.: Center for Global Development.

<http://www.cgdev.org/content/publications/detail/1425470> p.16

⁶⁷ Aker, Jenny, Rachid Boumnijel, Amanda McClelland, and Niall Tierney. 2011. "Zap It to Me: The Short-Term Impacts of a Mobile Cash Transfer Program." CGD Working Paper 268. Washington, D.C.: Center for Global Development.

<http://www.cgdev.org/content/publications/detail/1425470> p.17

⁶⁸ Aker, Jenny, Rachid Boumnijel, Amanda McClelland, and Niall Tierney. 2011. "Zap It to Me: The Short-Term Impacts of a Mobile Cash Transfer Program." CGD Working Paper 268. Washington, D.C.: Center for Global Development.

<http://www.cgdev.org/content/publications/detail/1425470> p.18

⁶⁹ Karlan, Dean, Margaret McConnell, Sendhil Mullainathan, and Jonathan Zinman. 2011. "Getting to the Top of Mind: How Reminders Increase Saving." Unpublished. Available at: <http://www.povertyactionlab.org/evaluation/text-message-reminders-and-incentives->

save-Bolivia. Summary of Bolivia case also available at: <http://www.poverty-action.org/project/0055>

⁷⁰ Karlan, Dean, Margaret McConnell, Sendhil Mullainathan, and Jonathan Zinman. 2011. "Getting to the Top of Mind: How Reminders Increase Saving." Unpublished. Available at: <http://www.povertyactionlab.org/evaluation/text-message-reminders-and-incentives-save-Bolivia>. Summary of Bolivia case also available at: <http://www.poverty-action.org/project/0055>

⁷¹ Karlan, Dean, Margaret McConnell, Sendhil Mullainathan, and Jonathan Zinman. 2011. "Getting to the Top of Mind: How Reminders Increase Saving." Unpublished. Available at: <http://www.povertyactionlab.org/evaluation/text-message-reminders-and-incentives-save-Bolivia>. Summary of Bolivia case also available at: <http://www.poverty-action.org/project/0055>

⁷² Cadena, Ximena and Antoinette Schoar. 2011. "Remembering to Pay? Reminders vs. Financial Incentives for Loan Payments." Available at: <http://www.mit.edu/~aschoar/Remembering%20to%20Pay-%20Cadena%20&%20Schoar-%20April2011.pdf>

⁷³ Karlan, Dean, Melanie Morten, and Jonathan Zinman. 2012. "A personal touch: Text messaging for loan repayment." Poverty Action Lab. Available at: <http://www.povertyactionlab.org/publication/personal-touch-text-messaging-loan-repayment> Summary also available at: <http://www.poverty-action.org/project/0074>

⁷⁴ Aker, Jenny, Christopher Ksoll and Travis Lybber. 2010. "ABC, 123: The Impact of Mobile Phone Literacy Program on Education Outcomes." Center for Global Development. Working Paper 223. September 2010. www.cgdev.org p.6

⁷⁵ Aker, Jenny, Christopher Ksoll and Travis Lybber. 2010. "ABC, 123: The Impact of Mobile Phone Literacy Program on Education Outcomes." Center for Global Development. Working Paper 223. September 2010. www.cgdev.org p.7

⁷⁶ Aker, Jenny, Christopher Ksoll and Travis Lybber. 2010. "ABC, 123: The Impact of Mobile Phone Literacy Program on Education Outcomes." Center for Global Development. Working Paper 223. September 2010. www.cgdev.org p.7

⁷⁷ Aker, Jenny, Christopher Ksoll and Travis Lybber. 2010. "ABC, 123: The Impact of Mobile Phone Literacy Program on Education Outcomes." Center for Global Development. Working Paper 223. September 2010. www.cgdev.org p.7

⁷⁸ Aker, Jenny, Christopher Ksoll and Travis Lybber. 2010. "ABC, 123: The Impact of Mobile Phone Literacy Program on Education Outcomes." Center for Global Development. Working Paper 223. September 2010. www.cgdev.org p.7

⁷⁹ Aker, Jenny, Christopher Ksoll and Travis Lybber. 2010. "ABC, 123: The Impact of Mobile Phone Literacy Program on Education Outcomes." Center for Global Development. Working Paper 223. September 2010. www.cgdev.org p.6

⁸⁰ Aker, Jenny, Christopher Ksoll and Travis Lybber. 2010. "ABC, 123: The Impact of Mobile Phone Literacy Program on Education Outcomes." Center for Global Development. Working Paper 223. September 2010. www.cgdev.org p.6

⁸¹ Aker, Jenny, Christopher Ksoll and Travis Lybber. 2010. "ABC, 123: The Impact of Mobile Phone Literacy Program on Education Outcomes." Center for Global Development. Working Paper 223. September 2010. www.cgdev.org p.7

-
- ⁸² Aker, Jenny, Christopher Ksoll and Travis Lybber. 2010. "ABC, 123: The Impact of Mobile Phone Literacy Program on Education Outcomes." Center for Global Development. Working Paper 223. September 2010. www.cgdev.org p. 8
- ⁸³ Aker, Jenny, Christopher Ksoll and Travis Lybber. 2010. "ABC, 123: The Impact of Mobile Phone Literacy Program on Education Outcomes." Center for Global Development. Working Paper 223. September 2010. www.cgdev.org p. 8
- ⁸⁴ Aker, Jenny, Christopher Ksoll and Travis Lybber. 2010. "ABC, 123: The Impact of Mobile Phone Literacy Program on Education Outcomes." Center for Global Development. Working Paper 223. September 2010. www.cgdev.org p. 8
- ⁸⁵ Aker, Jenny, Christopher Ksoll and Travis Lybber. 2010. "ABC, 123: The Impact of Mobile Phone Literacy Program on Education Outcomes." Center for Global Development. Working Paper 223. September 2010. www.cgdev.org p. 11
- ⁸⁶ Aker, Jenny, Christopher Ksoll and Travis Lybber. 2010. "ABC, 123: The Impact of Mobile Phone Literacy Program on Education Outcomes." Center for Global Development. Working Paper 223. September 2010. www.cgdev.org p. 13
- ⁸⁷ Aker, Jenny, Christopher Ksoll and Travis Lybber. 2010. "ABC, 123: The Impact of Mobile Phone Literacy Program on Education Outcomes." Center for Global Development. Working Paper 223. September 2010. www.cgdev.org p. 13
- ⁸⁸ Aker, Jenny, Christopher Ksoll and Travis Lybber. 2010. "ABC, 123: The Impact of Mobile Phone Literacy Program on Education Outcomes." Center for Global Development. Working Paper 223. September 2010. www.cgdev.org p. 14
- ⁸⁹ Aker, Jenny, Christopher Ksoll and Travis Lybber. 2010. "ABC, 123: The Impact of Mobile Phone Literacy Program on Education Outcomes." Center for Global Development. Working Paper 223. September 2010. www.cgdev.org p. 8