The Impact of Automated Loans on Mobile Money Agents

Siobhan Herbert

Russell Toth

School of Economics
The University of Sydney

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EBRD, We-Fi, CEPR Research Conference
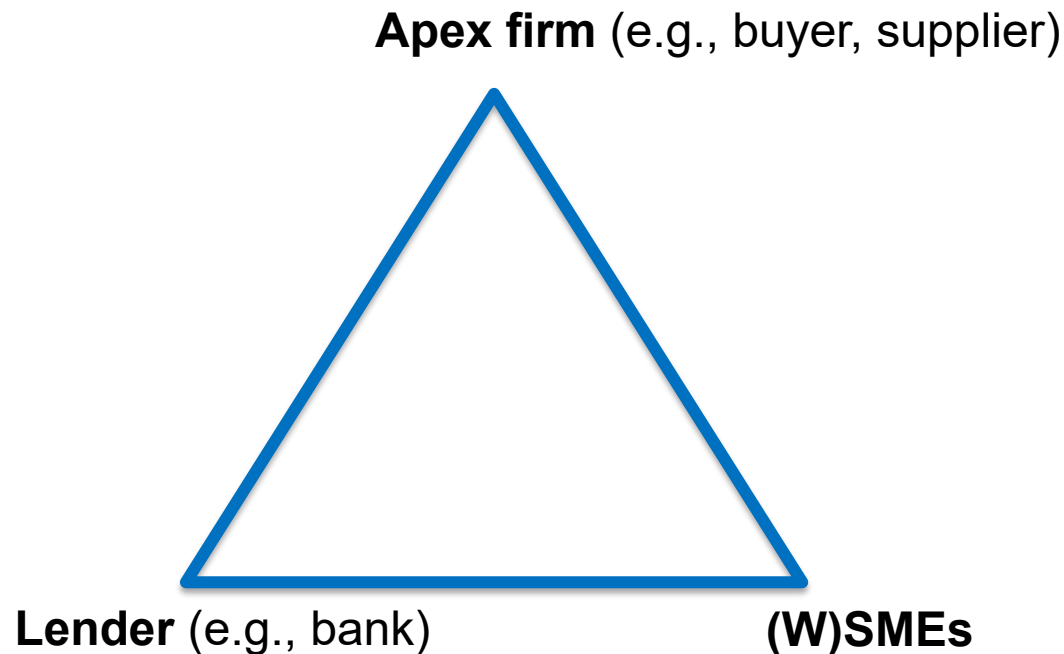"Financing Women-led SMEs"

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Financing Women-Led SMEs

❑ Broad recognition that many SMEs struggle with access to credit.
  ❑ It has been estimated that micro, small and medium enterprises (MSMEs) in developing countries globally face a $5.2 *trillion* USD annual financing gap (Bruhn, 2017).

❑ Traditional loan approval processes may create barriers to access
  ❑ Collateral
  ❑ Networks linking prospective borrowers with financial institutions, and giving them comfort to apply for financing
  ❑ Subjective credit assessment

❑ These barriers may be particularly pressing for groups that have traditionally lacked access to finance, such as women entrepreneurs.
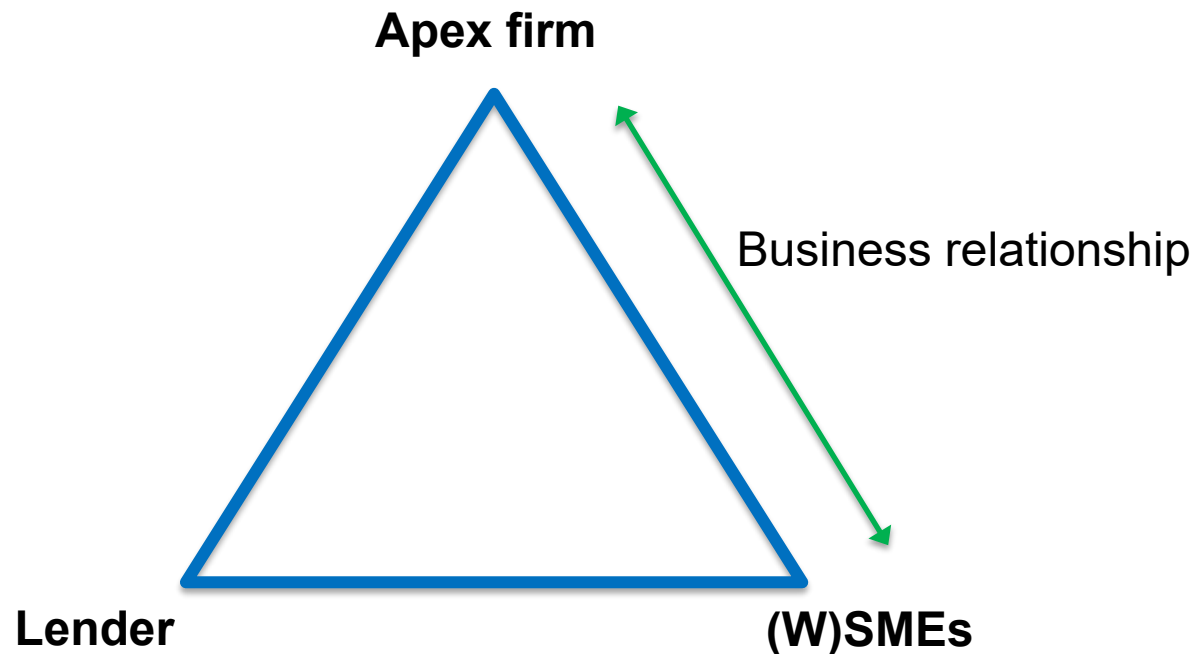 ❑ Women are estimated to face a financing gap of $1.5 trillion.

A Loan Product Design to Help Fill the Gap

- ❑ Traditional loan approval processes may create barriers to access
    - ❑ **Collateral**
    - ❑ **Networks linking prospective borrowers with financial institutions, and giving them comfort to apply for financing**
    - ❑ **Subjective credit assessment**

Apex firm (e.g., buyer, supplier)

Lender (e.g., bank)   **(W)SMEs**

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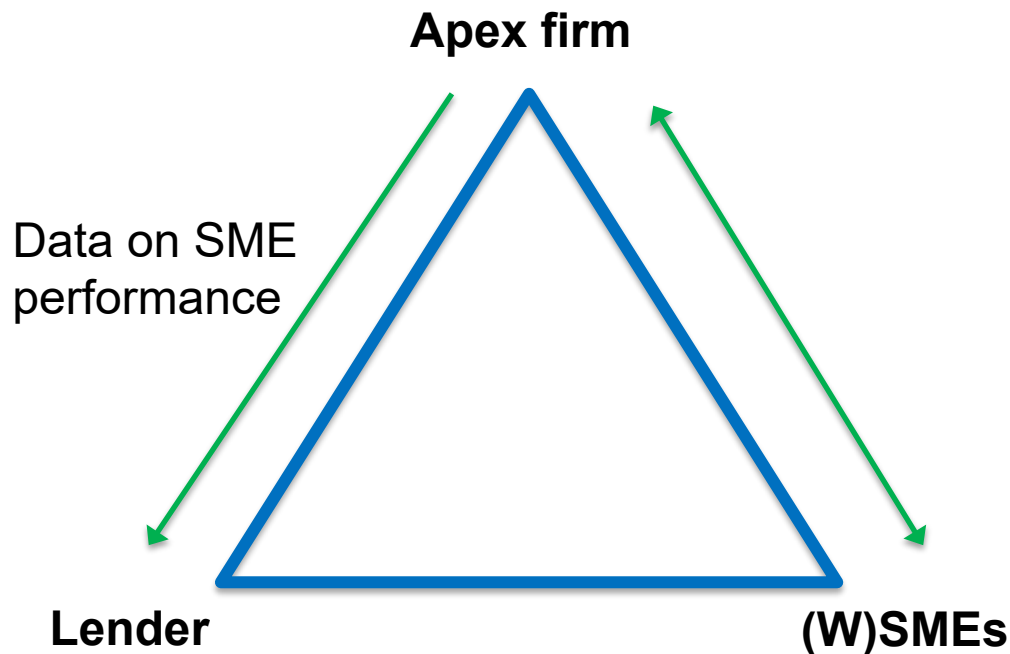   ❑ **Subjective credit assessment**

Apex firm

Business relationship

Lender   **(W)SMEs**

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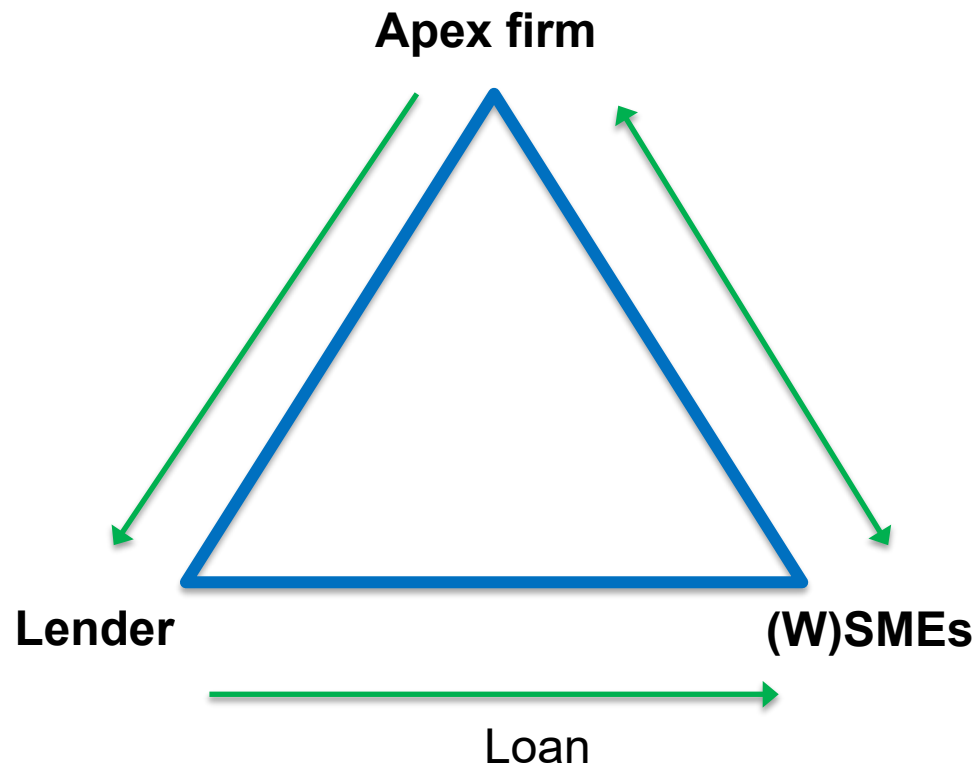 ❑ **Subjective credit assessment**

Apex firm

Data on SME performance

Lender   **(W)SMEs**

A Loan Product Design to Help Fill the Gap

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Apex firm

Lender   **(W)SMEs**

Loan

A Loan Product Design to Help Fill the Gap

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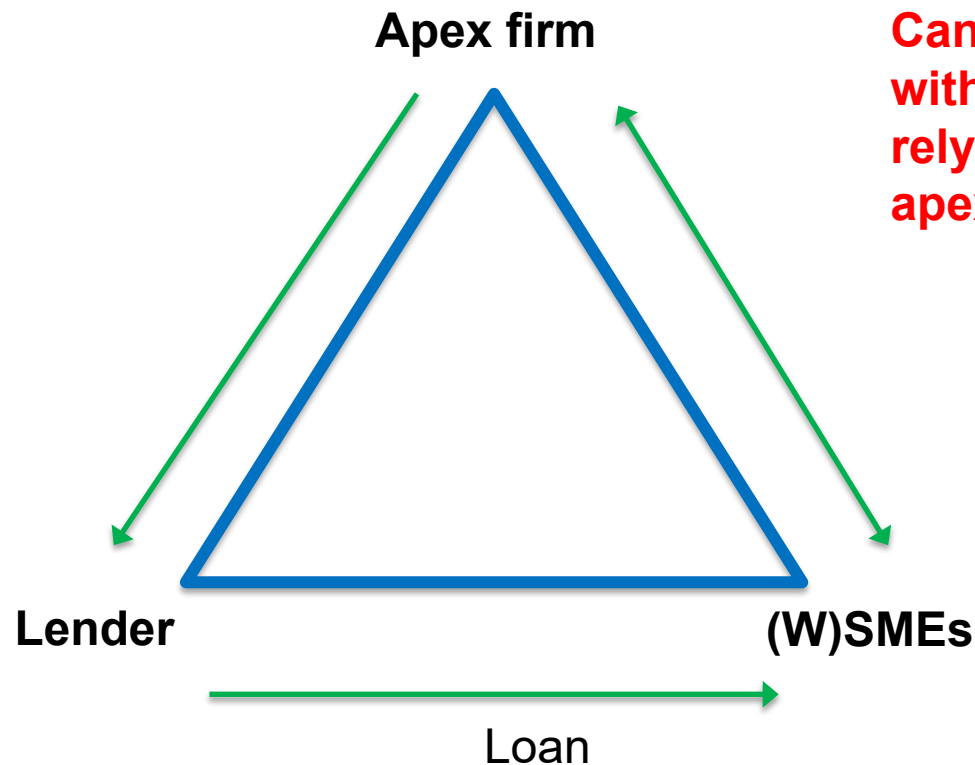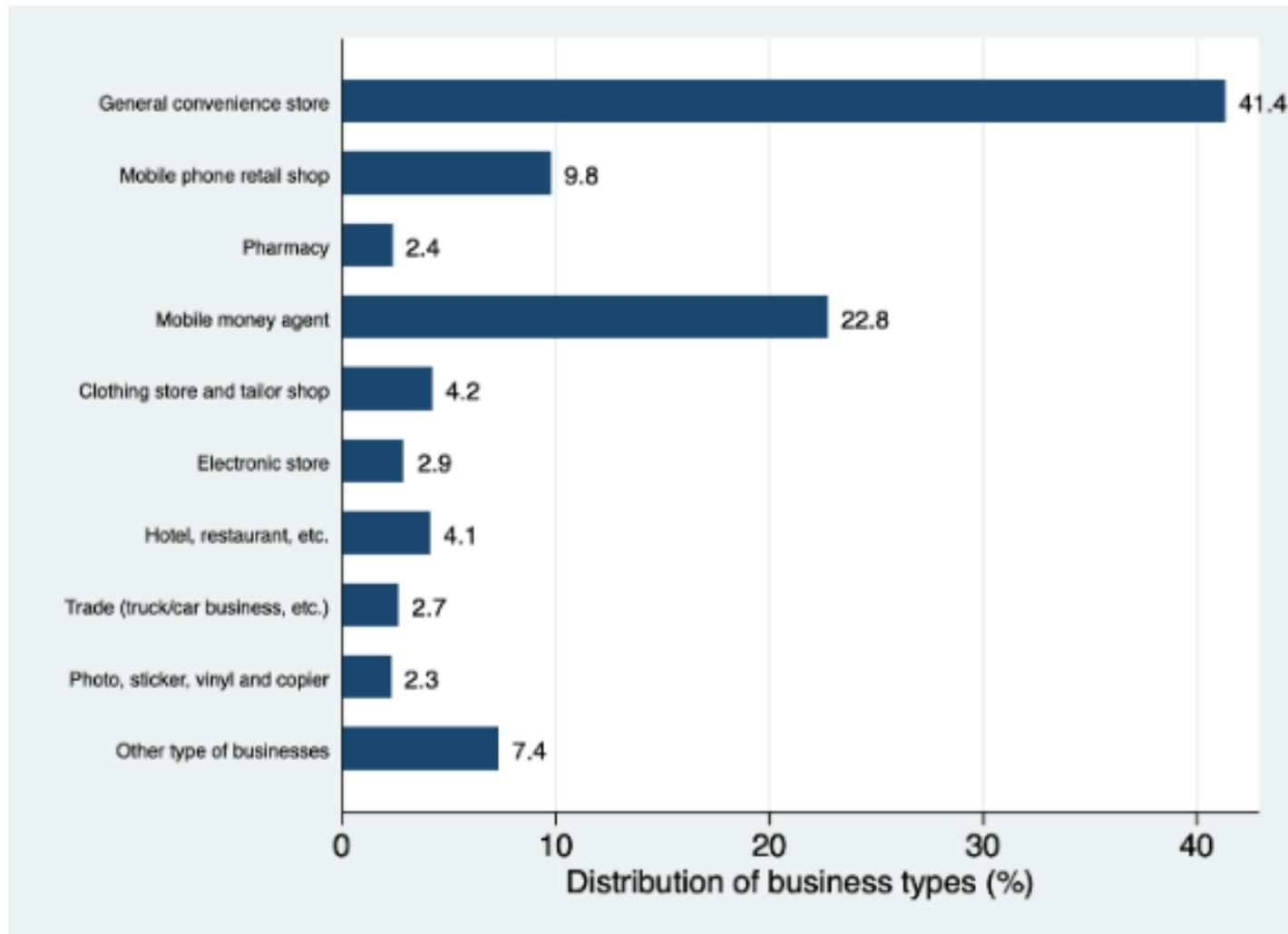 ❑ **Subjective credit assessment**

Apex firm

Can this be done without collateral, relying on data from apex firm, alone?

Lender

(W)SMEs

Loan

Need to enhance financial liquidity of mobile money agents

❑ While mobile money systems have expanded rapidly in emerging markets (surpassing 1.2 billion users), questions are increasingly being asked about the *quality* (density, reliability, etc) of **mobile money agent networks.**

❑ Many mobile money agents operate MSMEs, with mobile money as one of their secondary business activities.

❑ One key issue is the **liquidity of mobile money agents**, who need to manage sufficient cash and e-float to meet the needs of their clients.

    ❑ Jumah (2015); Francis et al (2017); Unnikrishnan et al (2019) provide anecdotal evidence on these frictions, and highlight lack of research.

    ❑ In our setting **73% of agents report at least occasionally struggling to balance liquidity for mobile money, and 14% report struggling at least every 2-4 weeks.**

In our setting most mobile money agents run micro, small and medium enterprises (MSMEs)

General convenience store — 41.4
Mobile phone retail shop — 9.8
Pharmacy — 2.4
Mobile money agent — 22.8
Clothing store and tailor shop — 4.2
Electronic store — 2.9
Hotel, restaurant, etc. — 4.1
Trade (truck/car business, etc.) — 2.7
Photo, sticker, vinyl and copier — 2.3
Other type of businesses — 7.4

Distribution of business types (%)

Mobile money agent networks: agents and MM company exchange money and information

❑ In mobile money networks, agents are linked to the mobile money company through a value chain relationship, exchanging monetary value (transfers and fees) and information.

❑ Even if agents can access bank or MFI loans, the loans may not be optimally structured to support mobile money liquidity.

Mobile money company

$ + information

Mobile money agents
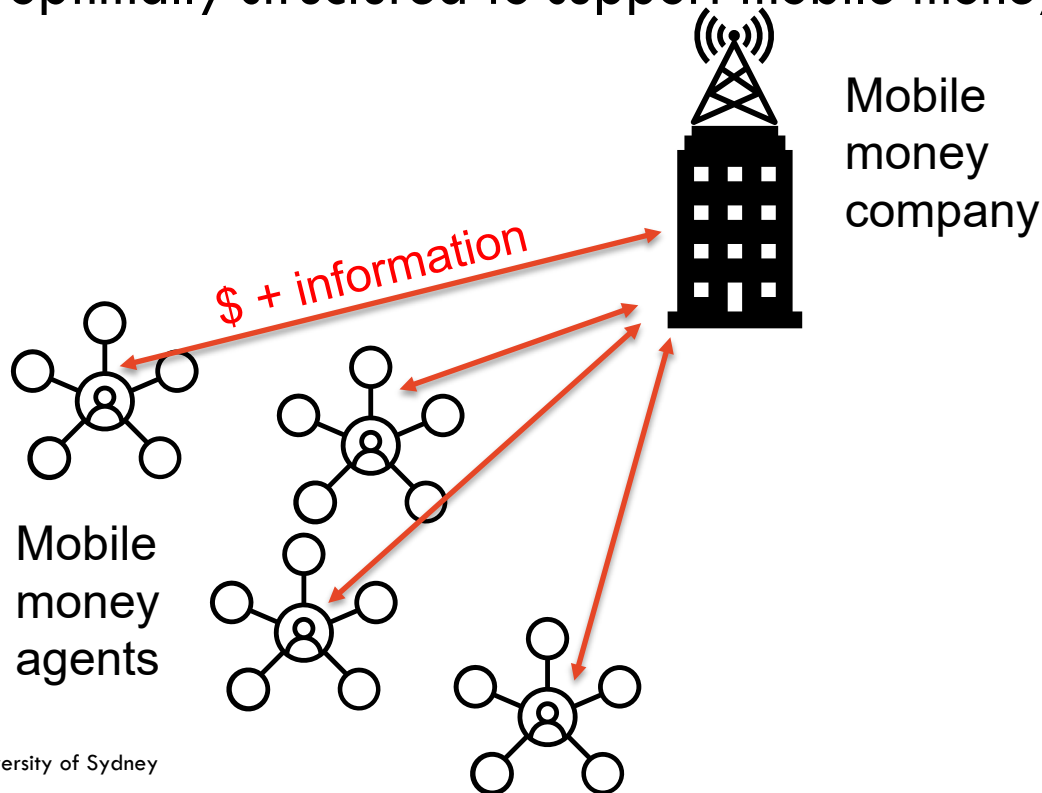
An innovative value chain lending model: MM company shares agent volumes with bank

❑ We evaluate an innovative value chain lending model that overcomes some of these challenges.

❑ The mobile money company shares information about agents' past mobile money volumes with a commercial bank, as a proxy of credit worthiness.
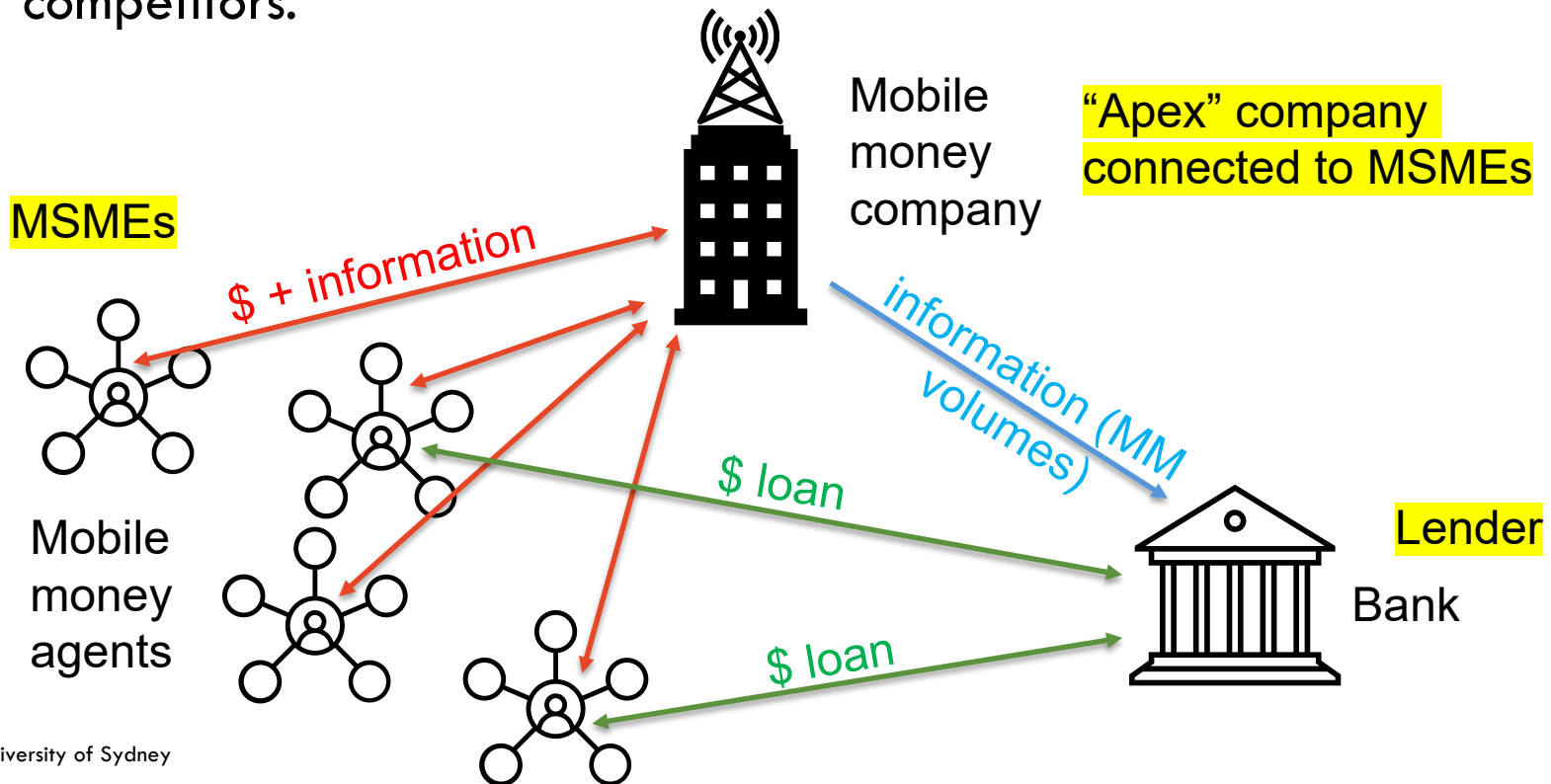
Mobile money company

$ + information

information (MM volumes)

Mobile money agents
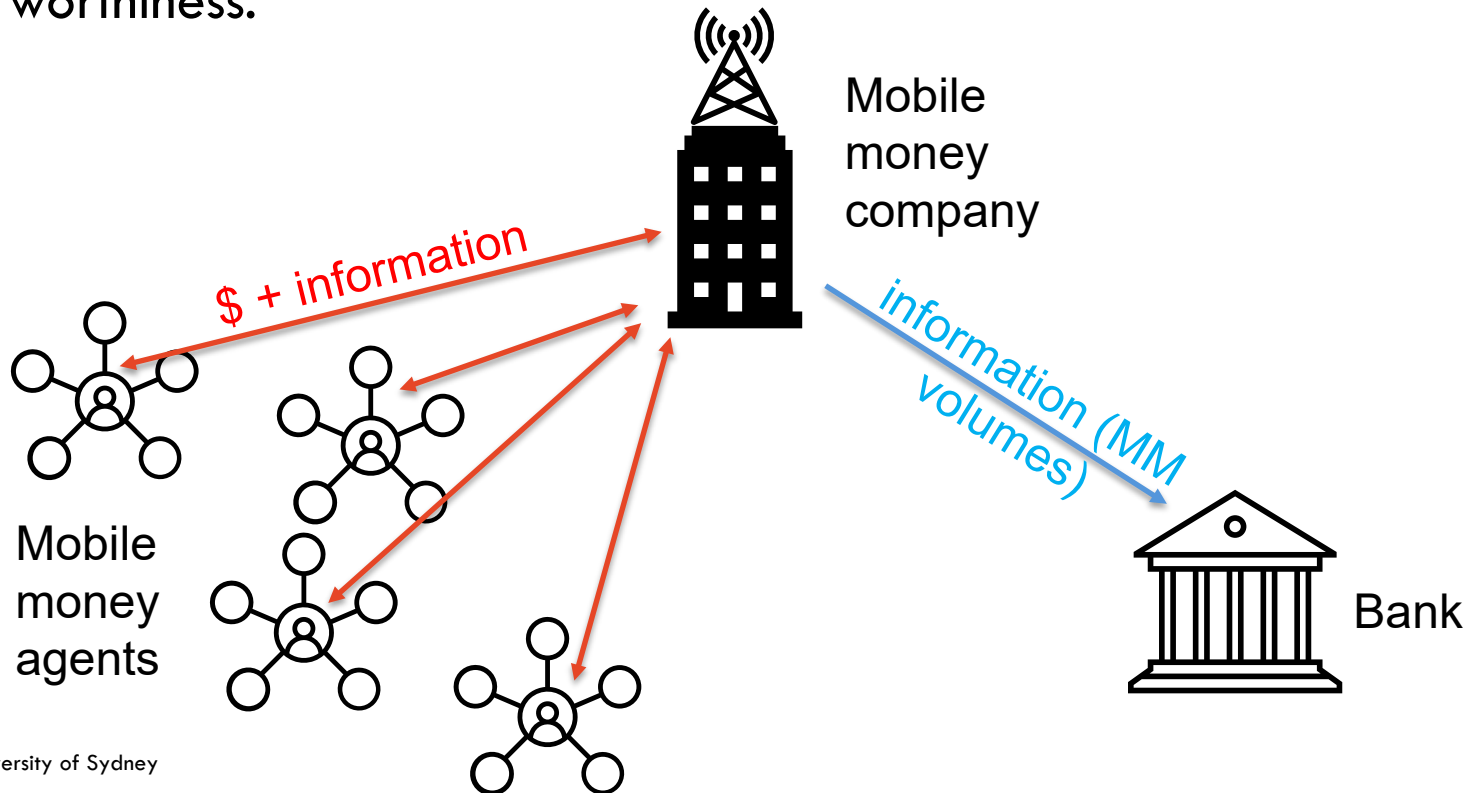
Bank

An innovative value chain lending model: bank uses this information for credit scoring

❑ The bank creates a simple credit score exclusively based on these volumes, and lends on that basis (qualification and amount).

❑ The loans are structured to facilitate mobile money liquidity, but in practice can be spent on anything.
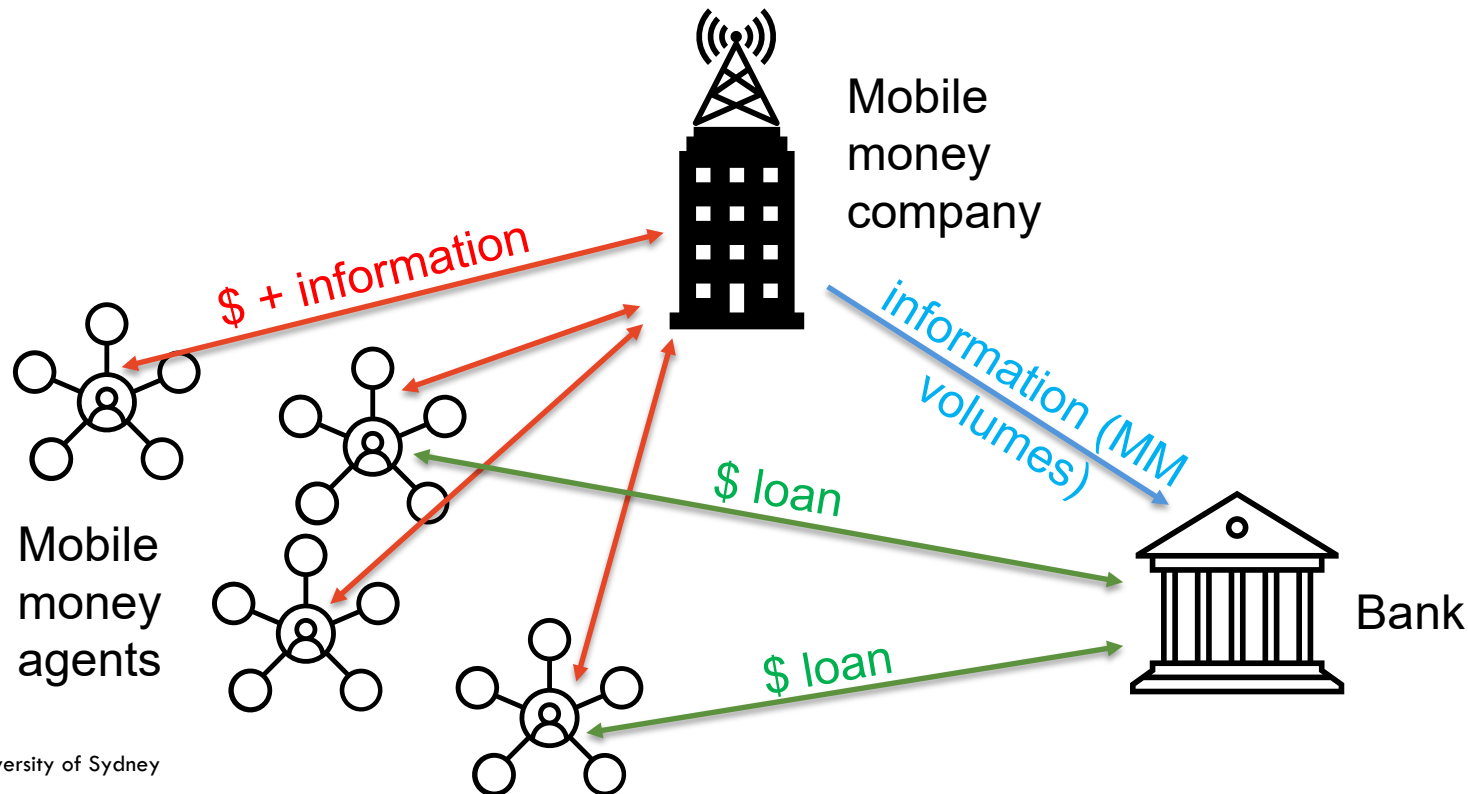
An innovative value chain lending model: applicable in other contexts

❑ This model could be relevant in many value chain lending contexts – apex buyer, supplier or platform could provide valuable information to a prospective lender on otherwise credit-starved MSMEs.

❑ But apex companies might be worried about helping their competitors.

Mobile money company

"Apex" company connected to MSMEs

MSMEs

$ + information

information (MM volumes)

$ loan

Lender

Bank

Mobile money agents

$ loan

Loan product features

❑ Loans offers are based on prior mobile money volumes, so they are:

    ❑ **Automatic:** Qualification for a loan and the amount depends purely on an agent's prior mobile money processing volumes, specifically in their best previous month (BMDA). Removes the typical subjective credit assessment process, which could allow for discrimination in credit provision.

    ❑ **Virtually instant:** Once an agent qualifies, they could receive their loan within 24 hours.

    ❑ **Remote:** Agents can access their loan funds from a branch of the commercial bank, or any other eligible MM agent.

❑ The maximum loan size increased in 2019 from 5 to 10 million Myanmar kyat (about 3500 to 7000 USD), and then later to 20 million MMK (about 14,000 USD). The minimum loan size is 100,000 MMK (about 70 USD).

❑ Loans can be 1-12 months in length (borrower can propose).

❑ Interest rate was the maximum bank lending rate in Myanmar (16%).

Initial loan product indicators

❑ Our study covers loans issued from November, 2018 (launch), to November, 2019.

❑ By end of November, 2019, the loan product had reached 9,500 unique borrowers (MM agents) with over 20,000 loans.

❑ The default rate had been less than 1% [next slide]

❑ The average loan size was about 2.8 million Myanmar kyat (about 1,900 USD), on a 3.8-month term on average.
  ❑ Myanmar GDP per capita is about 1500 USD (2019).

❑ 49% of borrowers were female.

❑ Has been one of the most successful SME lending products in the market.

Initial loan product indicators: delinquency and default
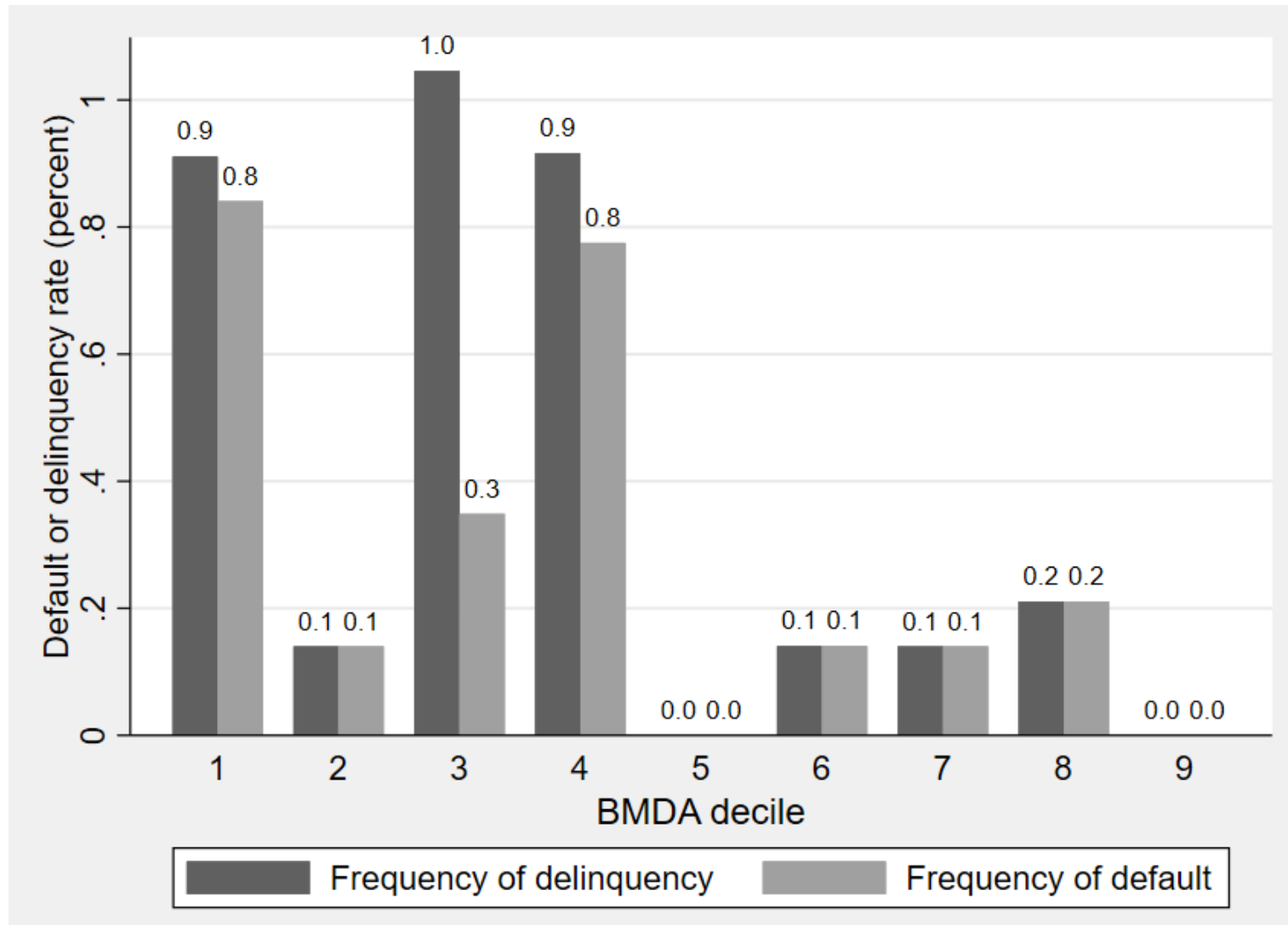
What impacts would we expect the product to have?

❑ MM agents are not constrained in how they use the loans, formally or informally.

❑ In the relatively underdeveloped financial economy in Myanmar, it is likely that agents face credit constraints. Hence the **loan product should relieve credit constraints**, leading on average to
  ❑ **Increased mobile money volumes**
  ❑ **Increased business and household investment**

❑ However, *highly* **credit constrained households might also make larger changes with new credit access** – start a new business, migrate, tighten the belt to make a large investment elsewhere, etc, pulling resources from other uses (so, e.g., mobile money volumes *could* decrease).
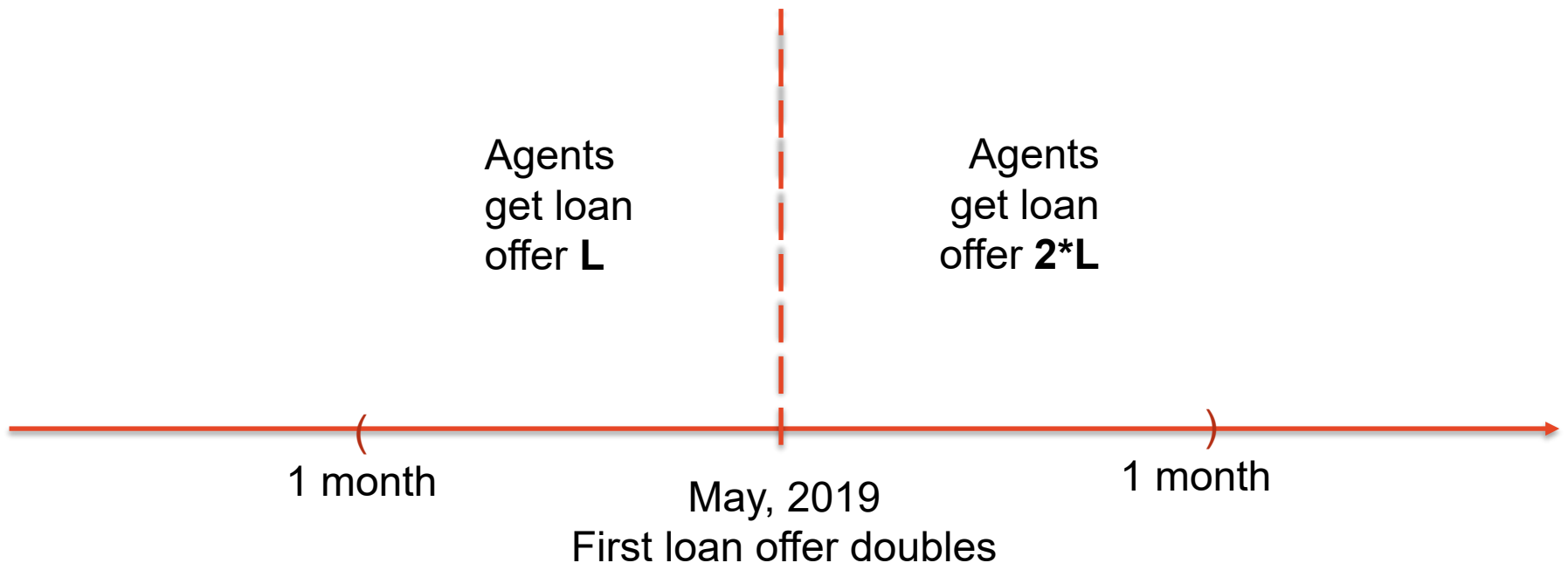 ❑ Similar to what we see in some microcredit studies (e.g., Banerjee, Karlan, Zinman, 2015).

Study design: admin and survey data

❑ Two main sources of data.

1. Proprietary **administrative data** shared by the commercial bank and mobile money company.
   ❑ Provides details on monthly mobile money volume of agents, and loan data.
   ❑ Location data by mobile money provider map.
   ❑ Some survey data.

2. A **phone survey** that reached about 5,400 MM agents in Q4 2020. This allowed us to learn about agents' broader MM activities, enterprise activities (e.g., investment, earnings, work hours), and household outcomes (e.g., household finance, borrowing, empowerment).
   ❑ Sample not representative, but rather selected to target agents most affected by the variations we leverage.
   ❑ Since loan variations occurred in 2019, we asked for recall back to this period.

Empirical strategy: effect of loan doubling

Compare otherwise-similar agents who happened to take out a loan just before / after unexpected loan policy change.
- They are balanced on most observables without any adjustments.
- We use matching to impose balance on best previous months' mobile money volume.

Agents get loan offer **L**

Agents get loan offer **2*L**

1 month

May, 2019
First loan offer doubles

1 month

Methodology: effect of loan doubling

- Idea: the first-loan offer unexpectedly doubled in early May, 2019. Compare agents in the same mobile money volume (best previous month) bins, who borrow just before and after the change.
  - Focus on 1-month bandwidth (before-after)

- When we compare agents who borrowed just before and after the change, they are balanced except on best previous month's volume.
  - Use propensity score matching to match.

- Then regress, for each agent i:
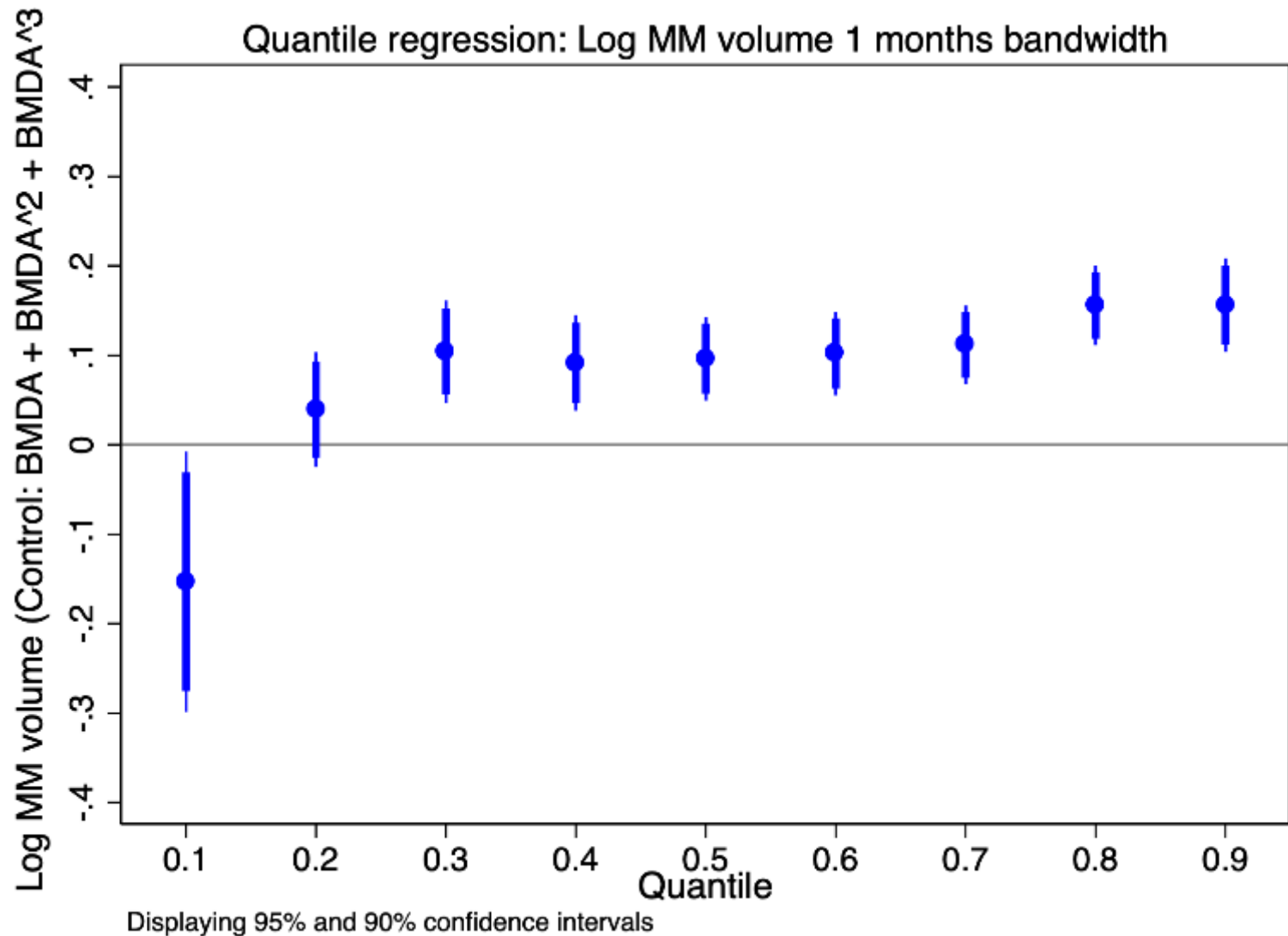$$Y_i = \alpha + \beta LoanDouble_i + \boldsymbol{X_i}\boldsymbol{\gamma} + \varepsilon_i,$$

where

- Y_i is an outcome, $LoanDouble = 1$ if they borrowed after the policy change, $\boldsymbol{X_i}$ controls for gender, region fixed effect and polynomial of best previous monthly volume.
- Use weights from PSM.
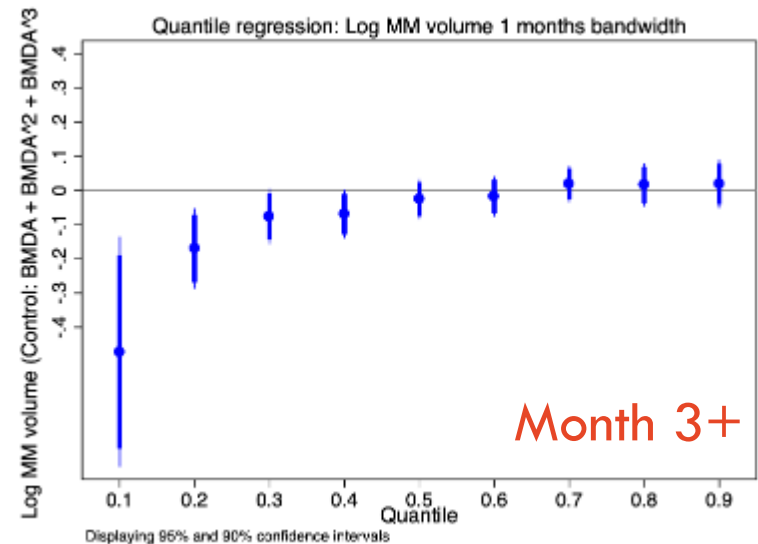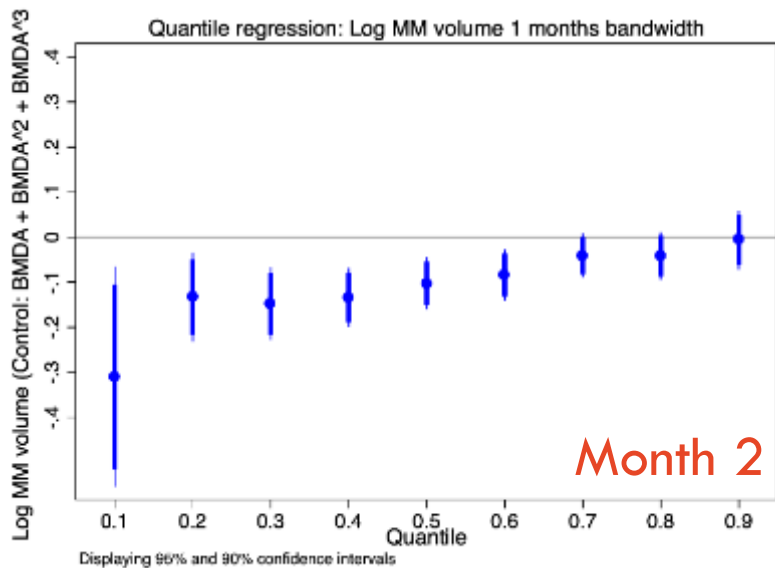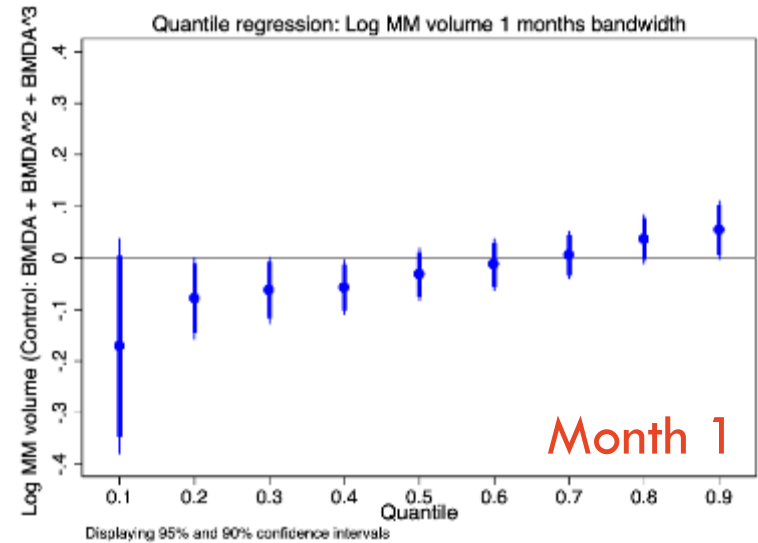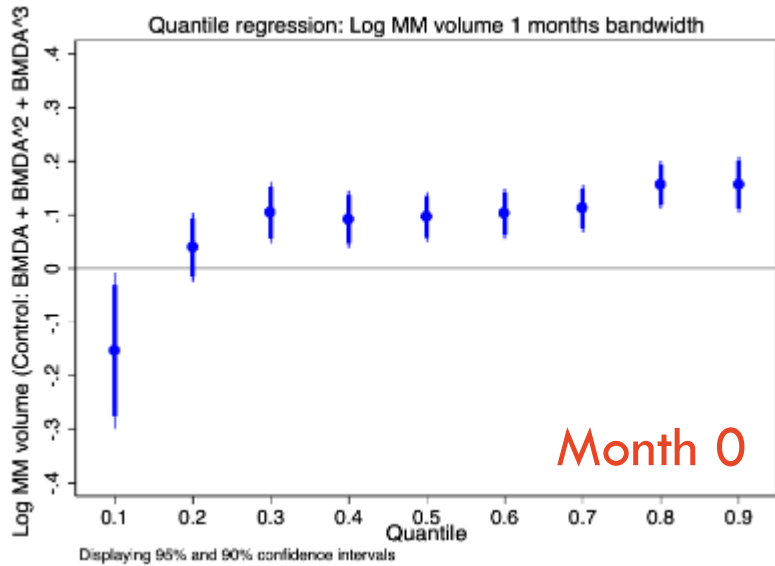- Show results from a quantile regression.

Results: loan doubling

1. Impact of loan doubling on future mobile money volumes
   - ❑ Show impact in "month 0" (receive loan), next month, 2 months later, 3+ months later.

2. Explore mechanisms.

3. Heterogeneity in impacts by gender.

4. Impact of loan doubling on agent loyalty.

5. Impact of loan doubling on other enterprise and household outcomes.

# Effect of loan doubling: month 0

Quantile regression: Log MM volume 1 months bandwidth

Displaying 95% and 90% confidence intervals

The University of Sydney

Interpret y-axis as %: -0.1 = -10%, 0.1 = 10%, 0.2 = 20%.

Effect of loan doubling

Interpret y-axis as %: -0.1 = -10%, 0.1 = 10%, 0.2 = 20%.

Why do volumes dip negative in month 2 for higher-volume agents? Repayment?

Weak evidence that closer to a repayment date (red) there is a dip in volume relative to further out (blue), but not significant.

Quantile regression: Log MM volume 1 months bandwidth

Displaying 95% confidence intervals
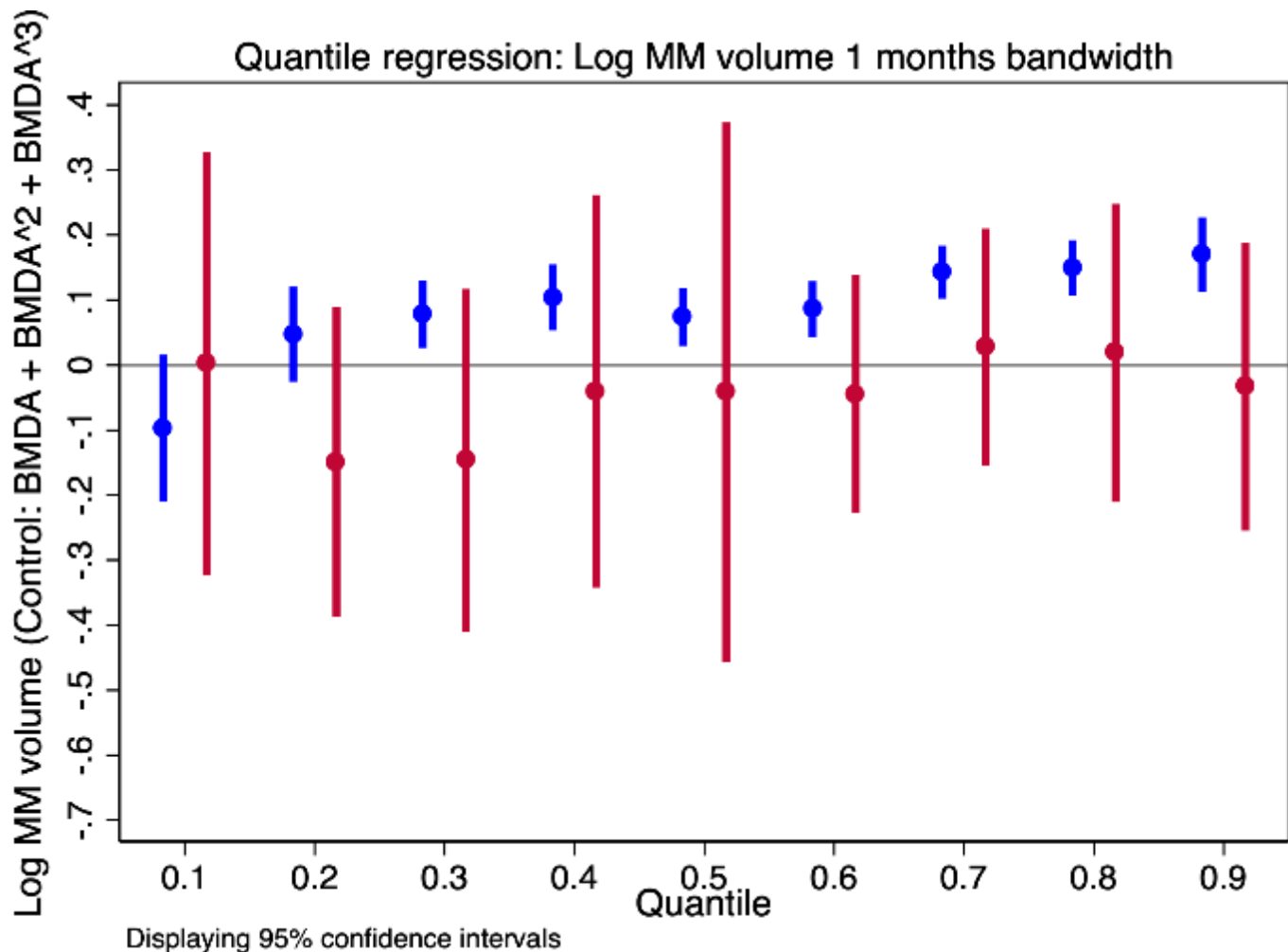
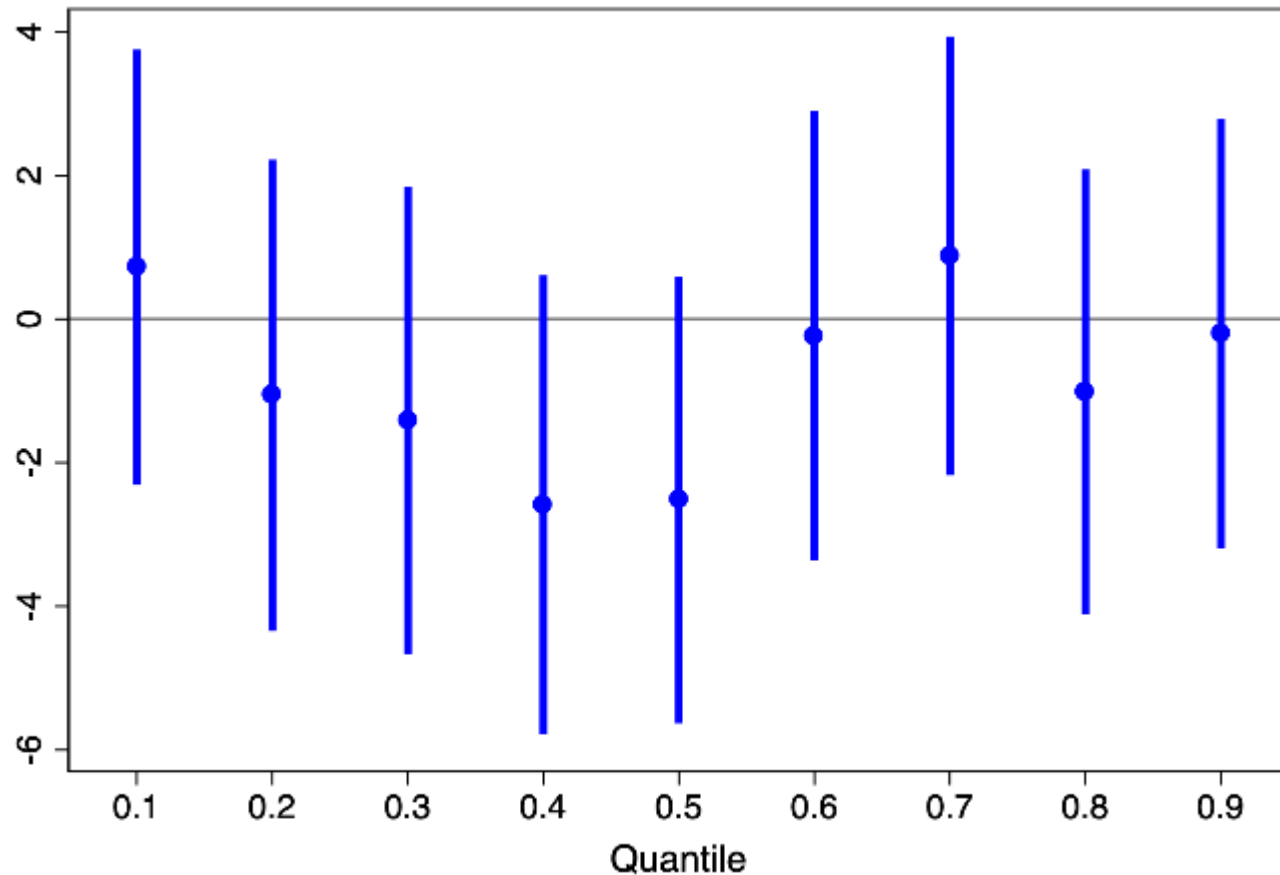# What are lower-volume agents doing with the money? Purchasing assets?

Spending on assets declines slightly less amongst lowest-volume agents, relative to other lower-volume agents.
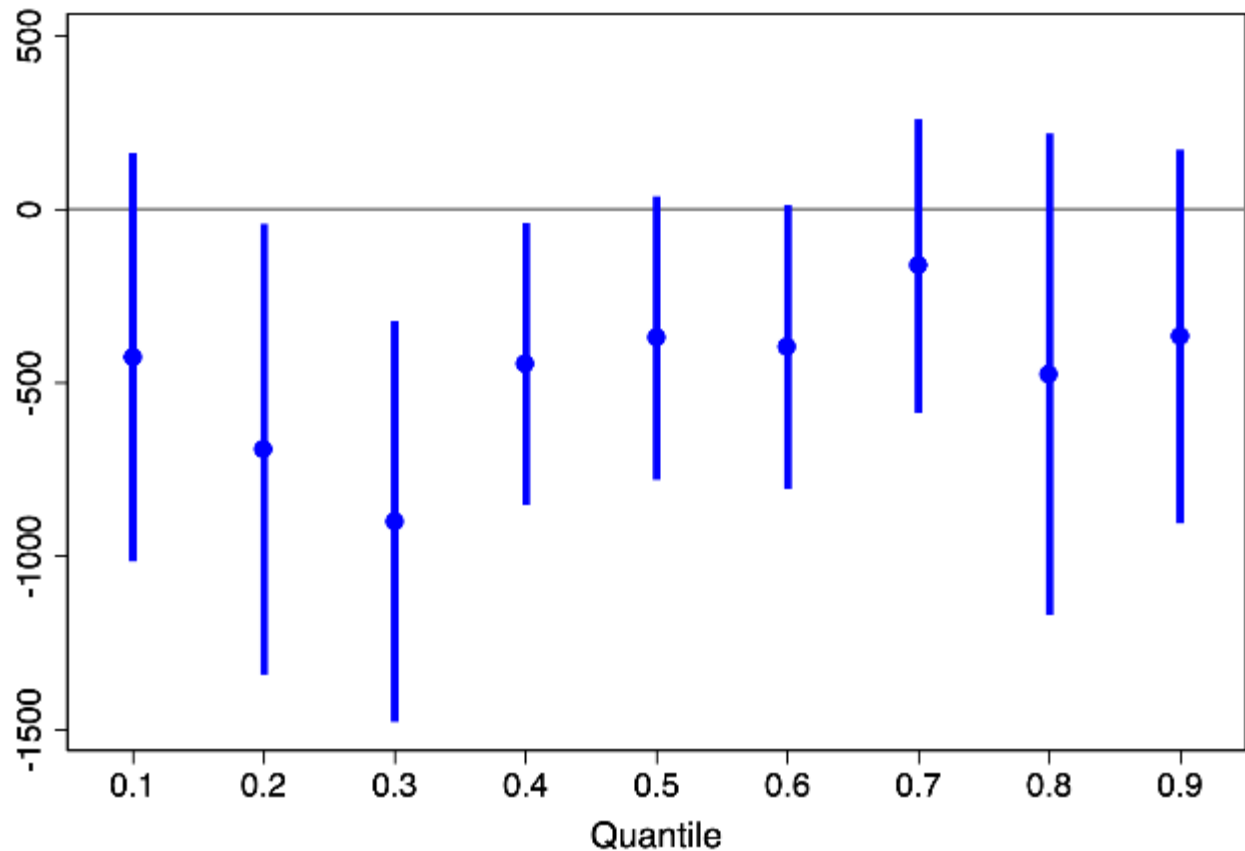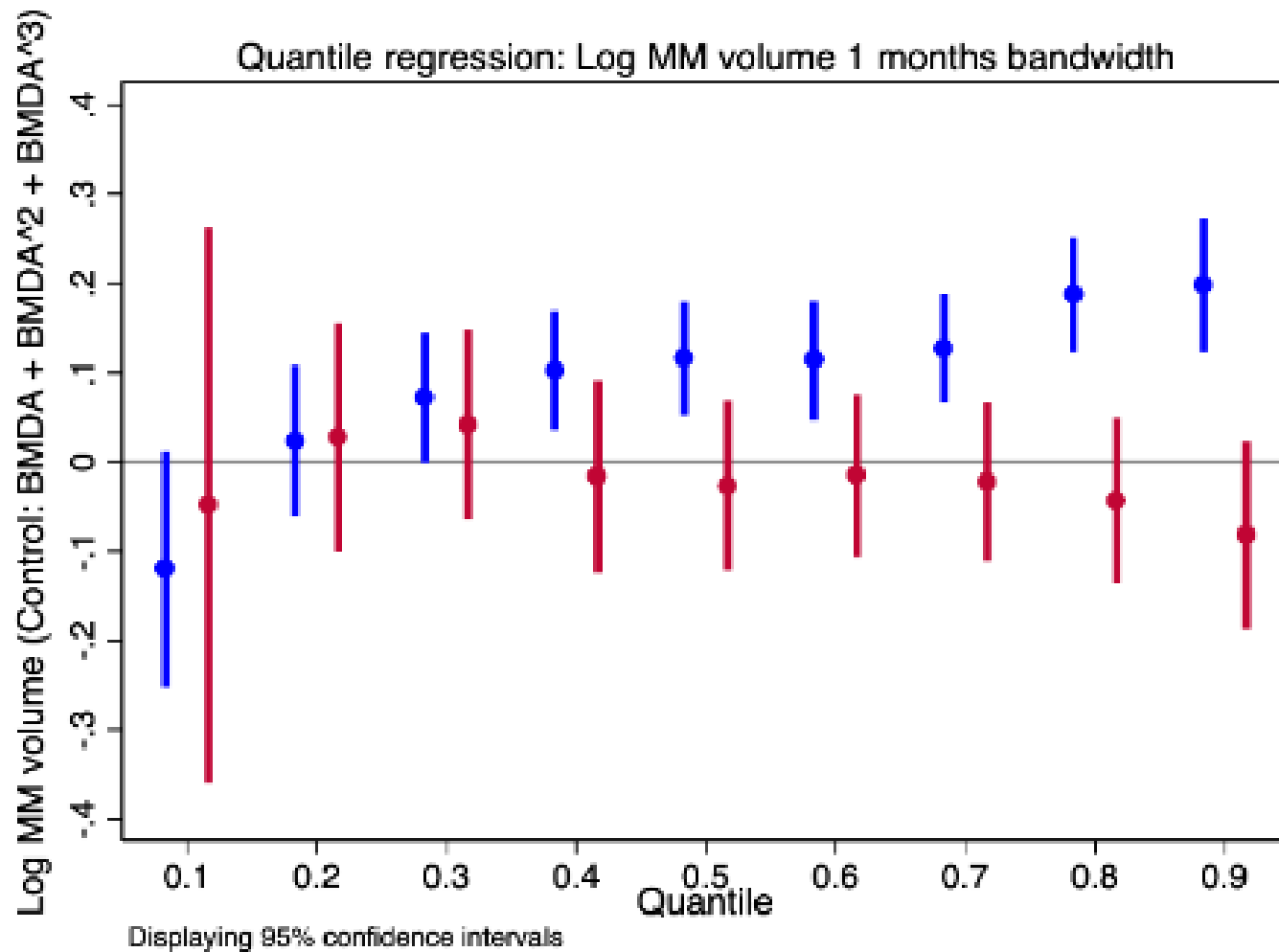

Displaying 95% confidence intervals

What are lower-volume agents doing with the money? Saving?

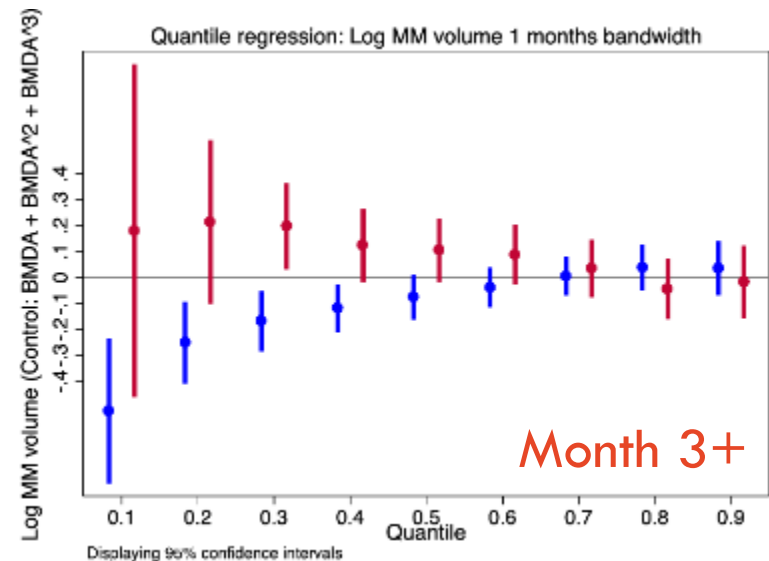Propensity to save slightly higher amongst lowest-volume agents, again not significant.

Displaying 95% confidence intervals

Female vs male: effect of loan doubling: month 0

Quantile regression: Log MM volume 1 months bandwidth

Y-axis: Log MM volume (Control: BMDA + BMDA^2 + BMDA^3)

X-axis: Quantile

Displaying 95% confidence intervals

Interpret y-axis as %: -0.1 = -10%, 0.1 = 10%, 0.2 = 20%.

Female vs male: effect of loan doubling

Interpret y-axis as %: -0.1 = -10%, 0.1 = 10%, 0.2 = 20%.
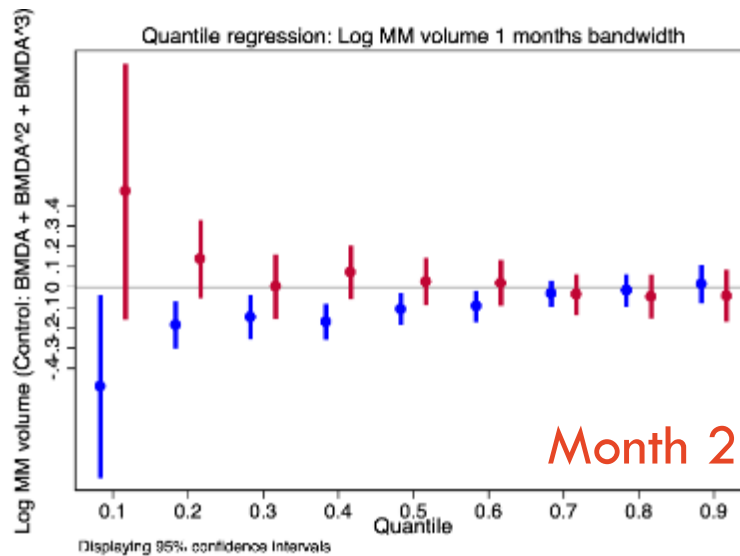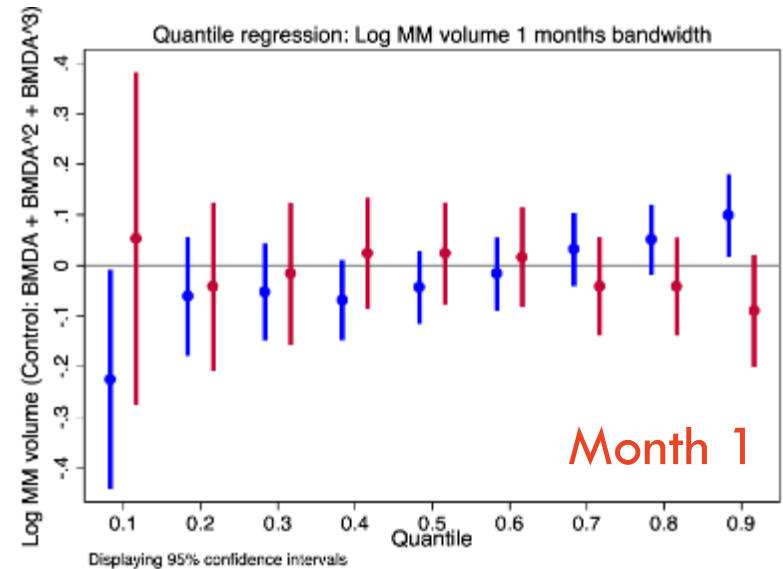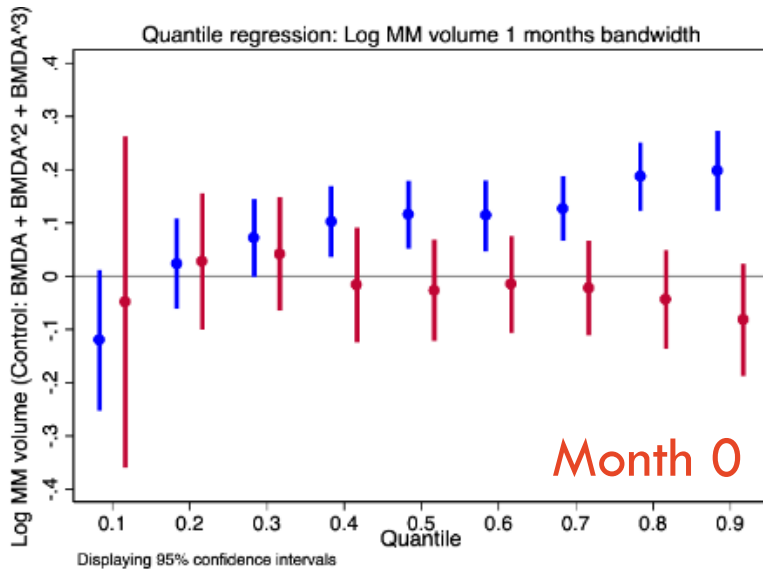
Effect of loan doubling: agent loyalty

❑ For most MM agents, larger loans generate **increased loyalty**: the average agent goes from about 0.78 to 0.63 relationships with *other* MM companies (significant at 5%), a 19% decrease.

    ❑ This is associated with a decrease in overall self-reported income from mobile money activity.

    ❑ This is within set of agents who got a loan, so they would have been exposed to similar marketing and other information.

    ❑ Provides counter-example to concern that such loan programs benefit the apex company's competitors.

Loan doubling: broader enterprise and household outcomes

❑ **The impacts we detect on other enterprise and household outcomes are relatively muted**, however we do find the following statistically significant impacts:

   ❑ A 6.8% decrease in reporting struggling with liquidity.

   ❑ A slight decrease in hours worked in the MM-related business (4.3 per week), and investment in the MM-related business (4.6%).

   ❑ A 4.6% increase in using formal savings.

   ❑ An increase in decision-making power over household loan proceeds, on the part of the recipient.

❑ Mainly surprised not to see an impact on business or household physical asset investments, where we could expect good recall and plausible impact.

Overall take-aways

❑ The loans are an innovative and robust digital lending product, based on automated credit scoring with zero collateral, attaining high take-up and low default rates even for relatively large loan values.

    ❑ Provides example of how new digital data streams can be leveraged to increase access to finance in settings with relatively less capable financial institutions.

    ❑ May increase equity as lending decisions can be driven more by objective criteria (e.g., in our setting 50% of loans were to women).

❑ Loans generate sizeable impacts on MM volumes for agents in the upper deciles, though effects taper within a couple of months after loan receipt.

    ❑ Negative average effect on volumes for lower-volume agents.

❑ Impacts on other outcomes are more muted, though we do see evidence of increased loyalty to the mobile money company, liquidity management, formal savings, and empowerment in loan decision-making.

Contributions

- **Credit access for SMEs**
  - To our knowledge first evaluation of a credit product that leverages hard information sourced through the value chain to increase credit access for SMEs in an emerging market setting.
  - Existing studies on SME finance focus on conventional SME grant and loan products provided directly by a bank to an enterprise through traditional credit screening processes (e.g., Banerjee and Duflo, 2014; Bryan et al, 2022; McKenzie, 2017; Cai and Szeidl, 2018). Other studies have attempted to leverage subjective third-party recommendations to screen microcredit loans (e.g., Bryan et al, 2015; Maitra et al, 2017; Hussam et al, 2021).

- **Performance of mobile money agents**
  - One of the very first studies to rigorously evaluate an intervention to improve the performance of mobile money agents.
  - Emerging descriptive and theoretical analysis of challenges mobile money agents face in balancing liquidity (e.g., Balasubramanian and Drake, 2015; Balasubramanian, Drake, and Fearing, 2017).
  - RCTs with mobile money agents mainly focus on agent misconduct (Annan, 2020; Annan, 2021).

- **Impacts of DFS credit products**
  - To our knowledge, first evaluation of the impacts of access to digital credit on SMEs.
  - Literature on credit provision through mobile money systems focuses on consumers and microentrepreneurs (Riley, 2020; Francis et al, 2017; Bjorkegren and Grissen, 2018; Bharadwaj et al., 2019; Bjorkegren and Grissen, 2018; Bjorkegren and Grissen, 2021).

Other emerging work on WSME finance

Increasing access to finance for WSMEs in Vietnam

- I'm a co-PI on a project running two RCTs with a leading commercial bank in Vietnam, with support from the ADB

- Intervention 1: optimizing incentives for loan officers to lend to WSMEs

- Intervention 2: incentivizing WMSE referrals from customers

- Results expected 2024

Evaluating the Secured Transaction Reform in Fiji

- Secured transaction reform expands set of eligible collateral, especially movable collateral (vehicles, accounts receivable, etc)

- Study oversamples on women entrepreneurs, using encouragement design RCT to enhance SME loan access for a randomly-chosen subset of prospective borrowers

- Results expected 2025

Thank you!

Russell Toth

russell.toth@sydney.edu.au