

Effects of Bank Branch/ATM Consolidations on Cash Demand: Evidence from Bank Account Transaction Data in Japan

Kozo Ueda

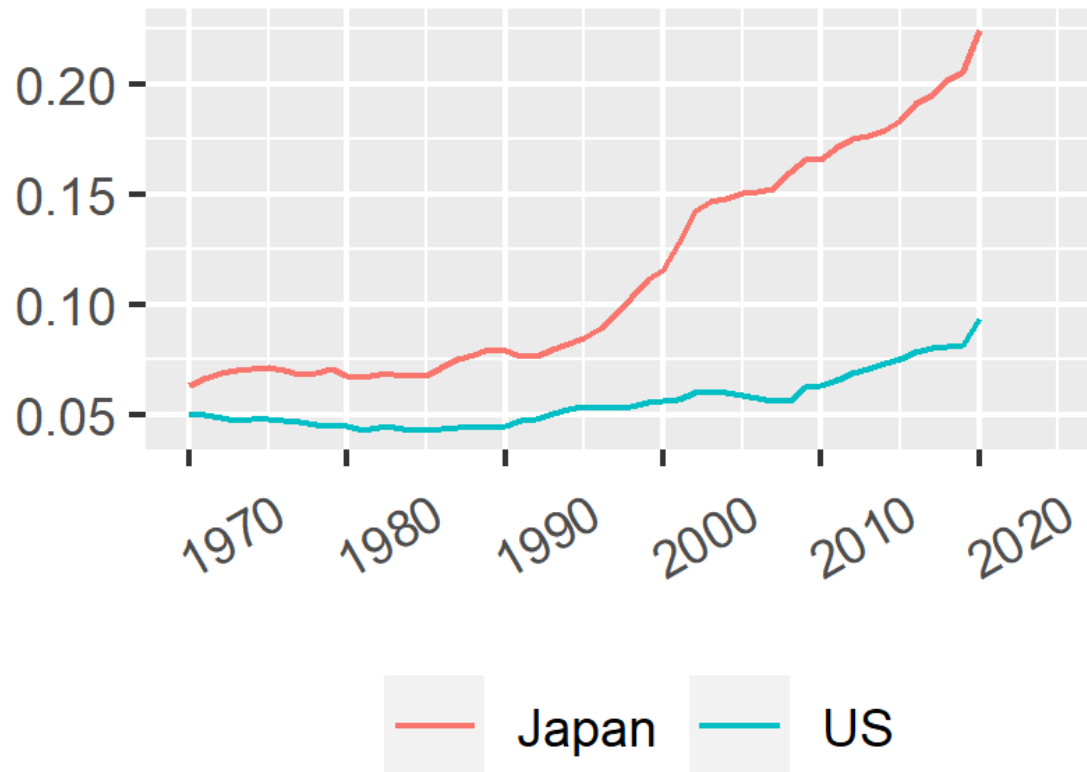
Waseda University

March 2023 @ TRIO Conference

The data used in this study were obtained under an academic agreement between Mizuho Bank and Waseda University. The views and opinions expressed in this paper are solely those of the author and do not reflect those of Mizuho Bank.

Currency in Circulation (Ratio to Nominal GDP)

- Increasing



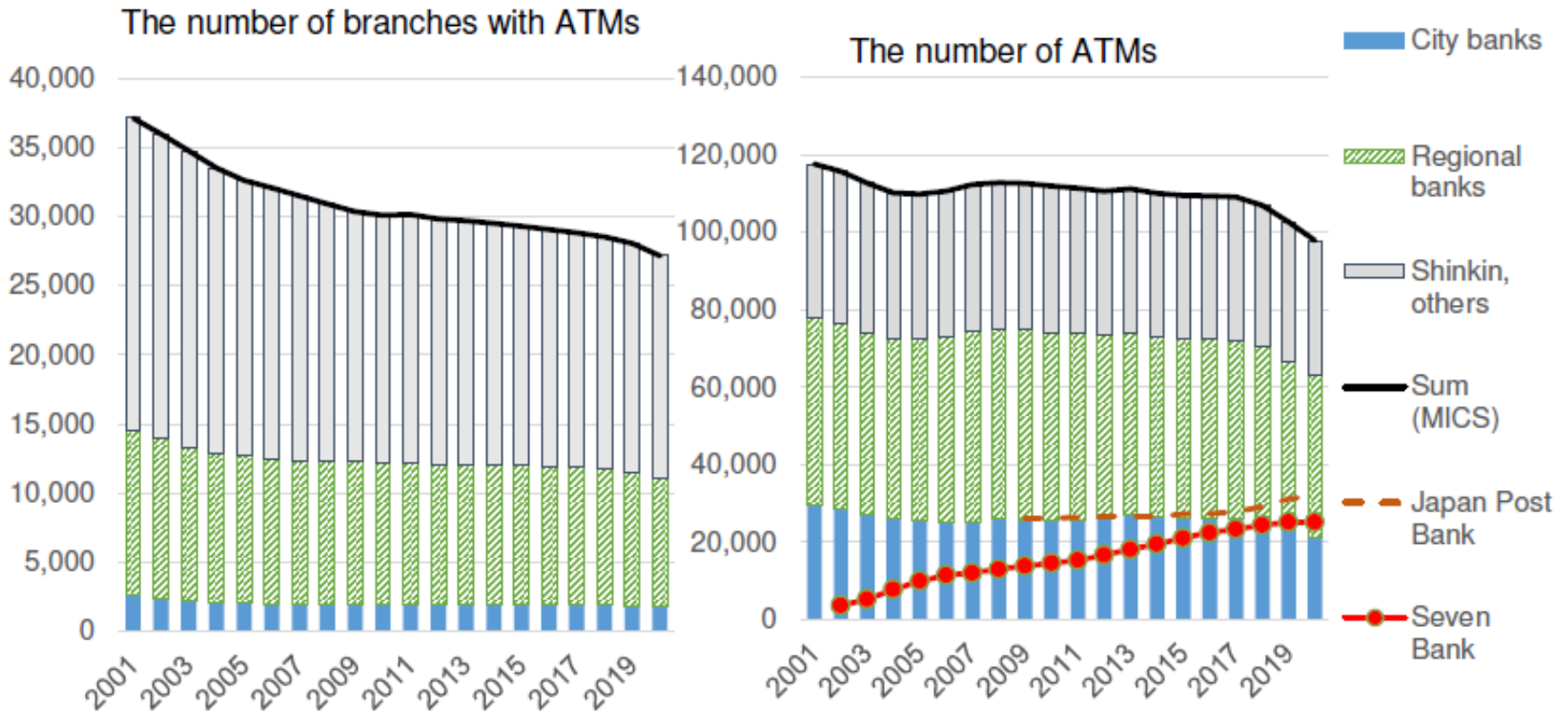
Sources: Bank of Japan, Cabinet Office, St. Louis FRED

Motivations

- Cash demand remains large in Japan.
- Surprising, considering
 - development of (cashless) financial technology,
 - need for contactless payments under the COVID-19,
 - decrease in the number of branches and Automatic Teller Machines (ATMs, ABM)
- How does the last development affect the shift from cash to non-cash?

Number of Branches and ATMs

- Decreasing



Sources: Japanese Bankers Association “Annual Report on Settlements”, “Financial Statements of All Banks”

Note: The MICS, Multi Integrated Cash Service, is aimed for facilitating the smooth operation of CD and ATM online services among private financial institutions. Japan Post Bank and Seven Bank do not participate in the MICS.

What We Do

- Use of bank account transaction data
 - Mizuho bank, one of three major banks in Japan
- Two things
 - Present basic facts about cash demand, especially ATM use
 - Consider the retrogression event of convenience for bank users as a natural experiment and analyze the effect of this event on the cash demand by bank users

Literature (Empirical)

- Cash demand
 - Japan. Fujiki and Tanaka (2014, 2018), Fujiki (2021), Japanese Bankers Association (2012)
 - Price effects (surcharge, loyalty reward) on payment methods. Humphrey (2010), Borzekowski et al. (2008), Zinman (2009), Hannan et al. (2003), Ching and Hayashi (2010), Simon et al. (2010), Bolt et al. (2008), Humphrey et al. (2001)
 - Shoe leather costs. Bachas et al. (2018, 2021), Chen et al. (2021a, b)
 - Past studies rely on surveys.
- Bank transaction data
 - MPC to government's lump-sum payment. Kubota, Onishi, and Toyama (2021)
 - COVID-19. Cox et al. (2020), Andersen et al. (2022), Landais et al. (2020)
 - Debit card provision on cash demand. Bachas et al. (2018, 2021)
- Contribution
 - Use bank account transaction data
 - Conduct causal inference for the effects of bank branch/ATM consolidations on cash demand

Facts about Cash Demand

Mizuho Bank Data

- Data confidentiality
 - Available through a contract between Mizuho and Waseda
 - Analyzed in a setting where measures were taken to prevent the identification of individuals.
- One of the three largest banks in Japan
 - Accounts held by one out of every five people
- Record all transactions involving Mizuho Bank
 - ATM withdrawals, payroll receipts, utility bill payments, and bank transfers.
 - For teller windows and ATMs, the information on branches and terminals
 - Balance of deposits, annual income, year of birth, gender, and registered address

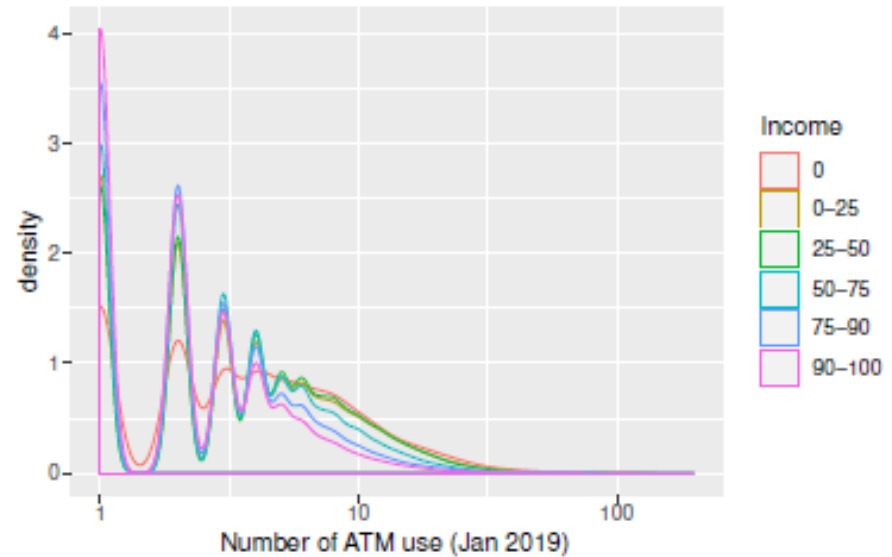
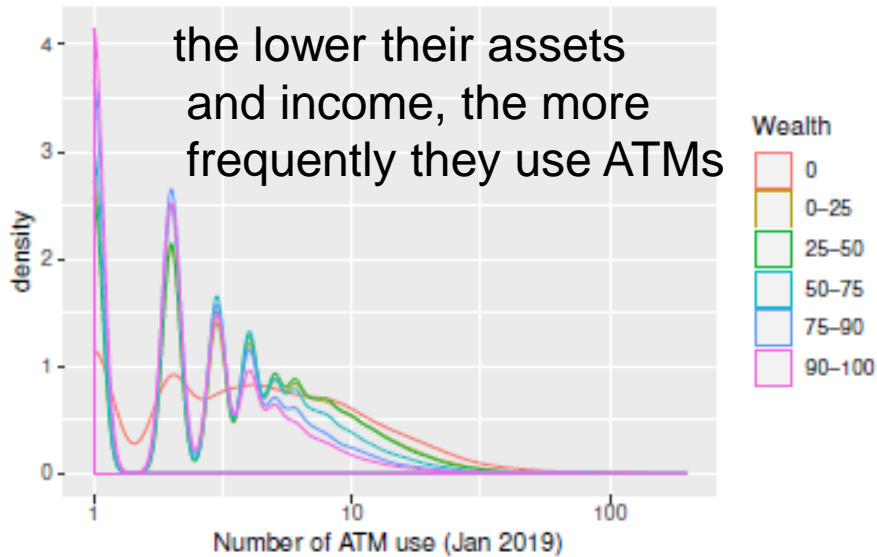
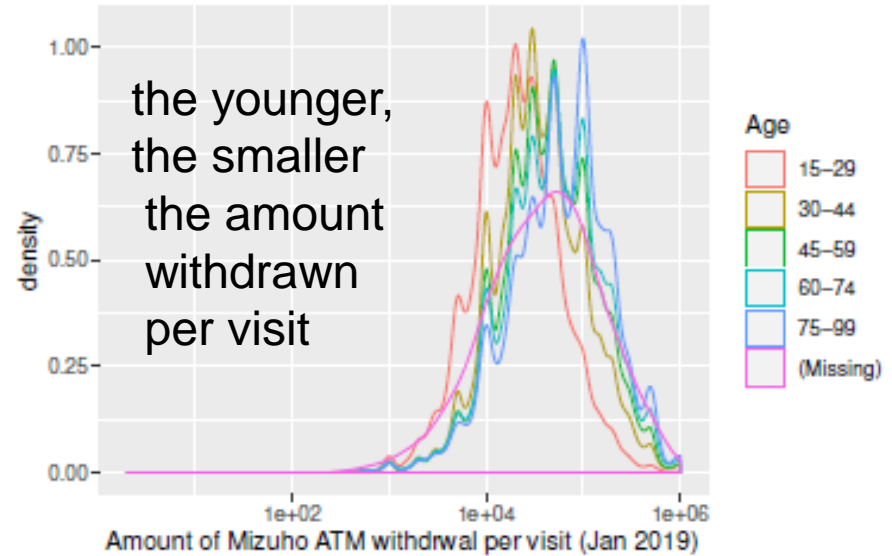
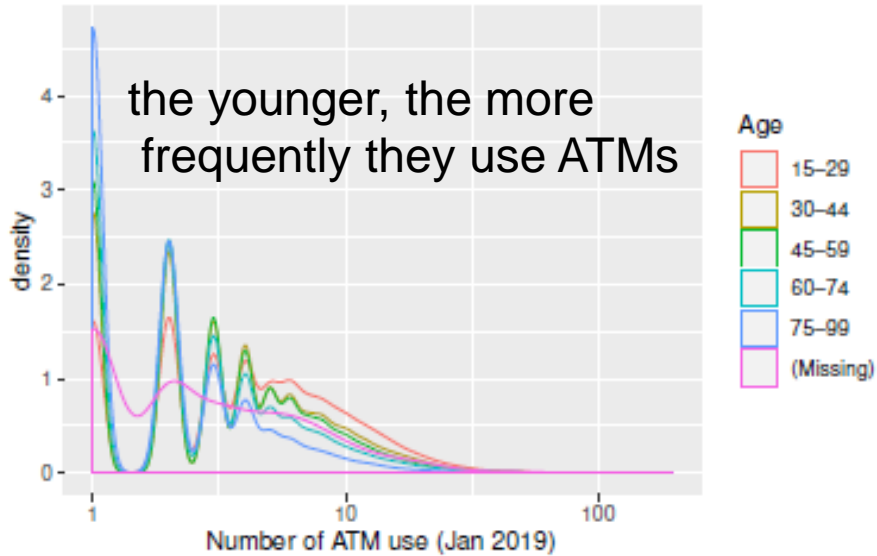
- Focus on two variables
 - cash deposit withdrawals from ATMs
 - total outflows
 - include non-cash payments such as withdrawals from credit card payments, interbank transfers, and automatic utility bill withdrawals.
- Caveats
 - cannot know the purpose of the withdrawals (consumption)
 - information on transactions at other financial institutions is not available
 - especially securities companies and postal savings accounts
 - concentrated in metropolitan areas
- June 2018 to March 2021

Descriptive Statistics (as of 2019)

- Account users
 - Chiba prefecture, next to Tokyo
 - At least six outflows in 2019

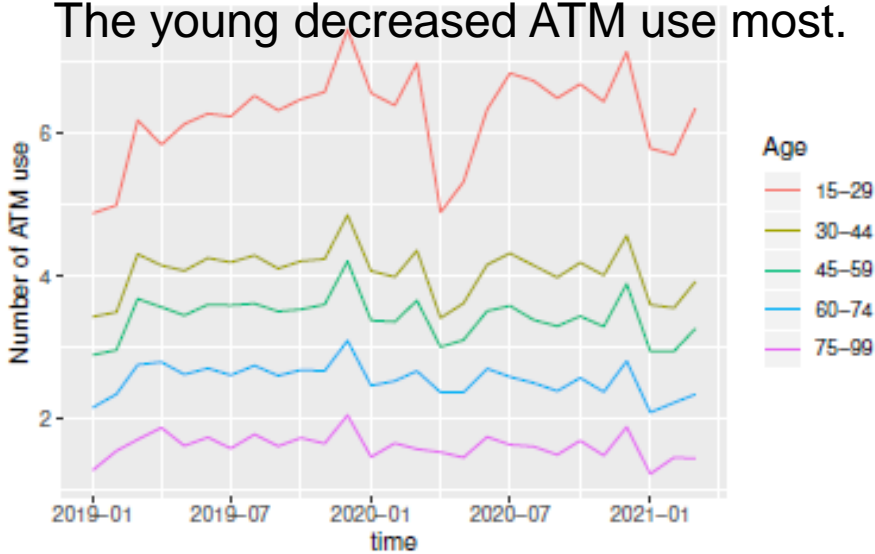
Statistic	N	Mean	St. Dev.	Pctl(25)	Median	Pctl(75)
No. of outflows	545,849	96.017	79.333	41	80	131
No. of ATM	545,849	41.847	56.082	7	25	56
Amount of outflows	545,849	5,613,553	38,814,597	1,246,441	2,911,757	5,500,954
Amount of ATM withdrawals	545,849	1,801,386	10,106,964	211,000	1,062,136	2,298,000
Ratio of ATM withdrawals	545,849	0.419	0.329	0.106	0.386	0.696
Wealth	545,849	3,474,534	19,333,760	129,000	588,000	2,818,000
Income	545,849	2,194,583	6,831,595	95,000	399,000	1,643,000
Age	545,849	50.552	16.971	37	50	63

Distribution of ATM Use

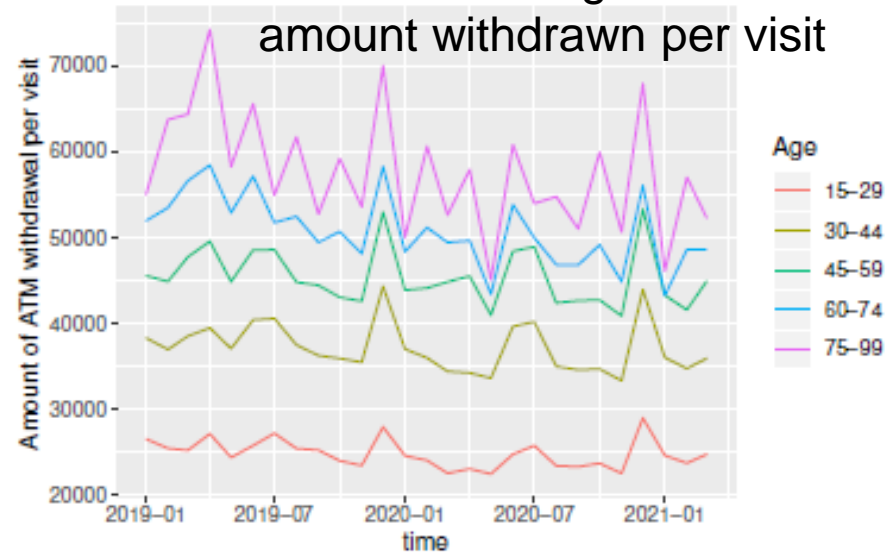


Time-Series Changes in ATM Use

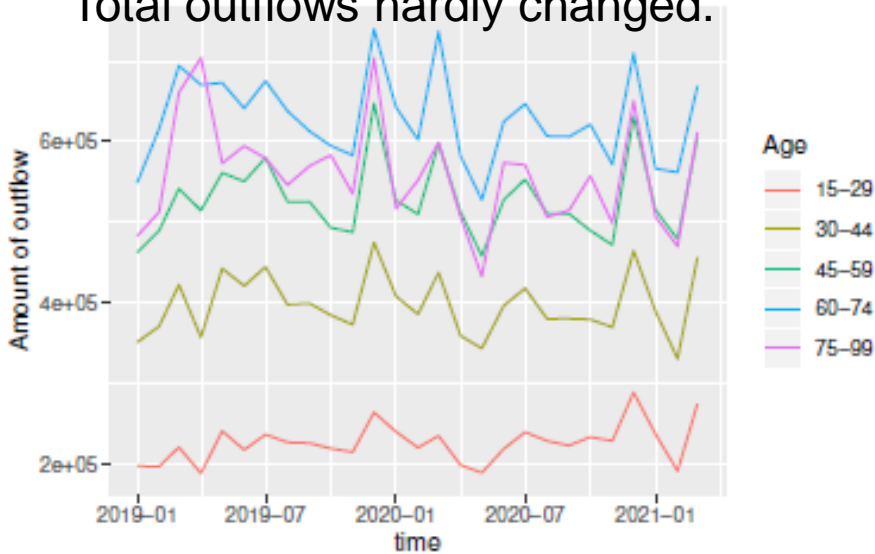
The young use more frequently
The young decreased ATM use most.



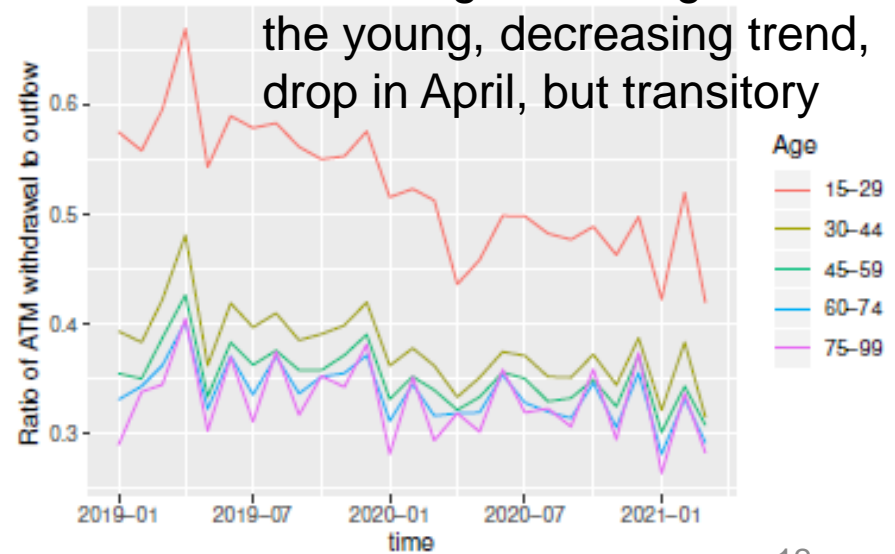
Not much change in the
amount withdrawn per visit



Total outflows hardly changed.



Cash usage ratio: higher for
the young, decreasing trend,
drop in April, but transitory



Effect of Bank Branch Consolidation on Cash Demand

What will you do
if your bank branch is closed?

Step 1

- Extract information on the consolidation of bank branches from the Mizuho Bank website.
 - excludes a mere relocation
 - 33 events between December 2019 and November 2020
 - Average distance is 10km
- The timing is exogeneous for users
 - Causal inference

The screenshot shows the Mizuho Bank website with a navigation bar at the top. The main content area is titled "店舗移転のお知らせ" (Branch Relocation Notice). Below the title, there is a brief notice: "お客さまには何かとご不便をおかけしますが、ご理解を賜りますようお願い申し上げます。(移転日の新しいものから順に記載しております。)" (We apologize for any inconvenience to our customers, but we request your understanding. (The information is listed in order of the latest relocation date.)).

移転日	移転店	移転後新住所・電話番号
2022年3月14日 月曜日 (予定)	銀座遠支店	〒104-0061 東京都中央区銀座4-2-11 (銀座支店内) TEL 03-3563-6661
	川越支店	〒350-0043 埼玉県川越市新富町2-10-5 TEL 049-225-2211 (電話番号は変更ございません)
2022年3月7日 月曜日 (予定)	銀座中央支店	〒104-0061 東京都中央区銀座4-2-11 (銀座支店内) TEL 03-3561-3171 (電話番号は変更ございません)
2022年2月21日 月曜日 (予定)	高崎支店	〒370-0849 群馬県高崎市八島町265 TEL 027-322-2231 (電話番号は変更ございません)
2022年2月14日 月曜日 (予定)	湘田駅前支店	〒101-0052 東京都千代田区神田小川町1-1 (神田支店内) TEL 03-3293-6021
	稲荷町支店	〒110-0005 東京都台東区上野3-16-5 (上野支店内) TEL 03-3832-0251
	外苑前支店	〒107-0061 東京都港区北青山3-6-12 (青山支店内)

Step 2

- Identify users who have used ATMs at the consolidated bank branch in the past
 - At least twice before
 - 737,785 users
 - All the users in the sample experienced branch consolidation.
 - Nationwide (not limited to Chiba prefecture)

Step 3

- Difference in Differences (DID)

$$\Delta_{12}\log y_{im} = \alpha_m + \sum_{k=a}^b \gamma^k D_{im}^k + \varepsilon_{im},$$

where $D_{im}^k = 1$ if $m - T_i = k$ and T_i denotes the month in which the branch for account i was closed. The index D_{im}^k takes zero otherwise.

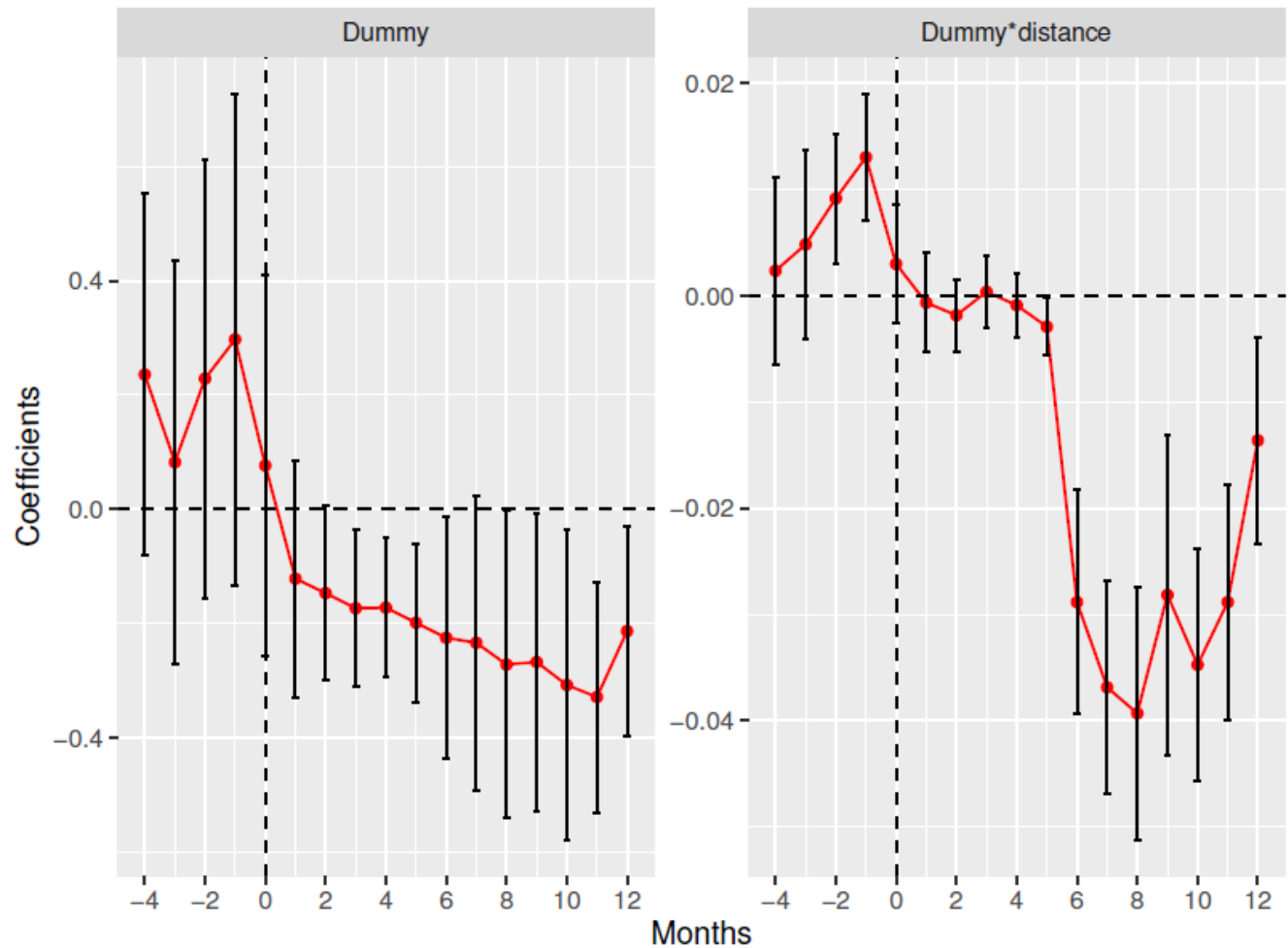
- User i , month m (June 2019 to March 2021)
- y : ATM cash withdrawals, etc. (log difference from the same month of the previous year)

- Consider the distance between the consolidated and consolidating branches (km)

$$\Delta_{12}\log y_{im} = \alpha_m + \sum_{k=a}^b \gamma^k D_{im}^k \times \text{dist}_b + \varepsilon_{im},$$

Result 1

- Significant and sizable decrease in the amount of ATM cash withdrawals



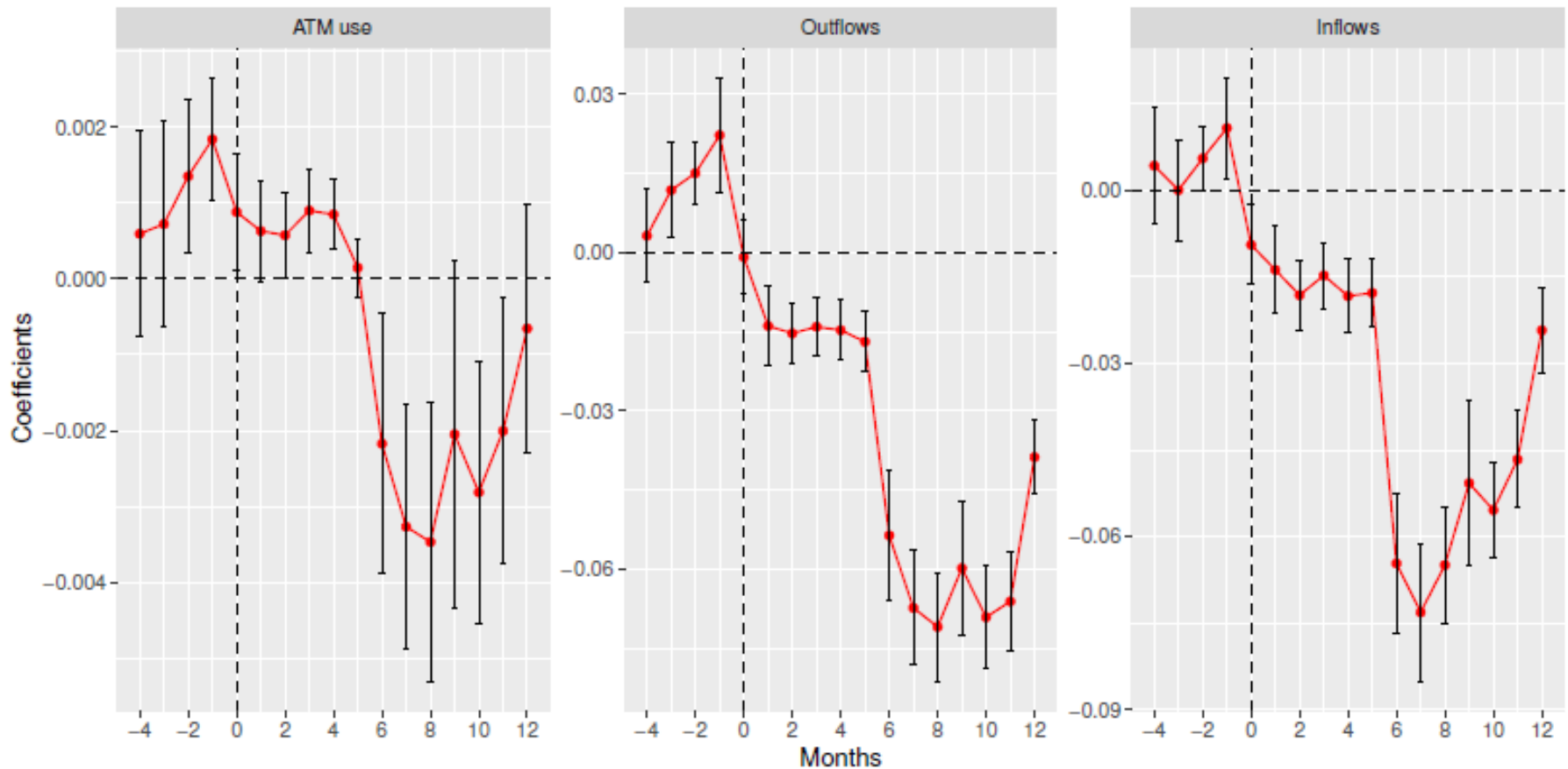
month elapsed after branch consolidation

Further Investigations

- Outflows, inflows, salaries, the number of transactions as y
- Heterogeneity
 - Age, income, wealth
- Past use only once
- Different discontinuation event
 - ATMs, not branch

Result 2

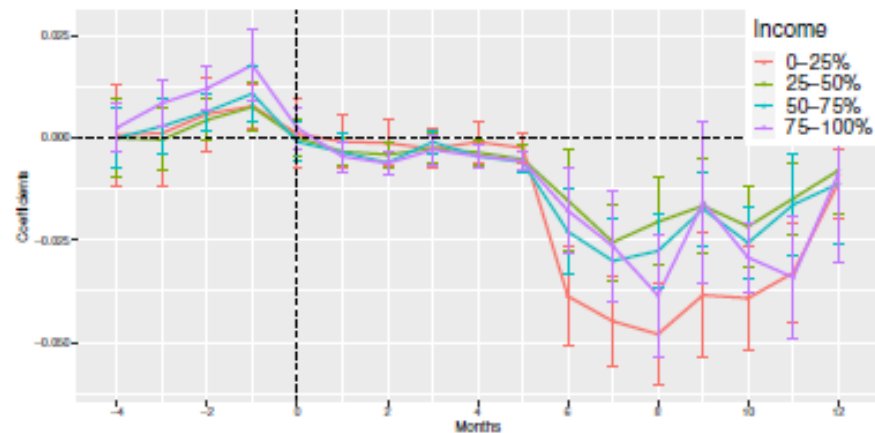
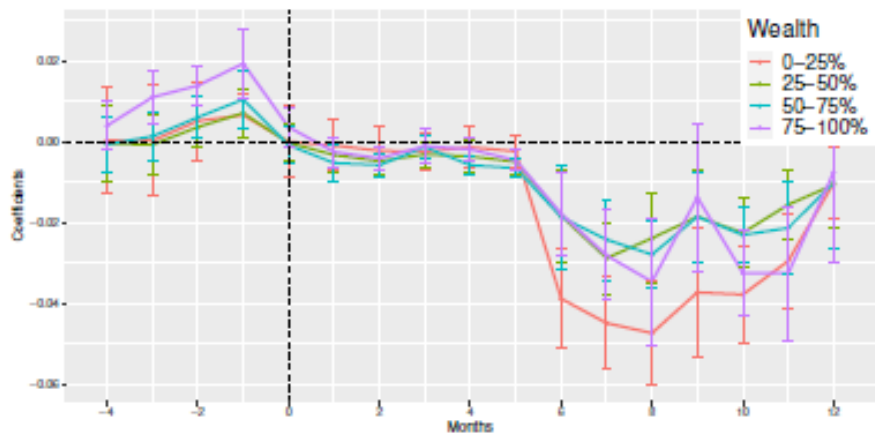
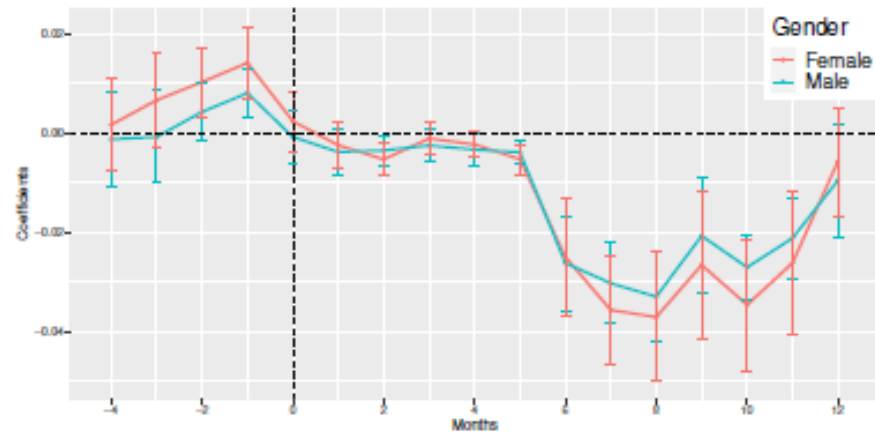
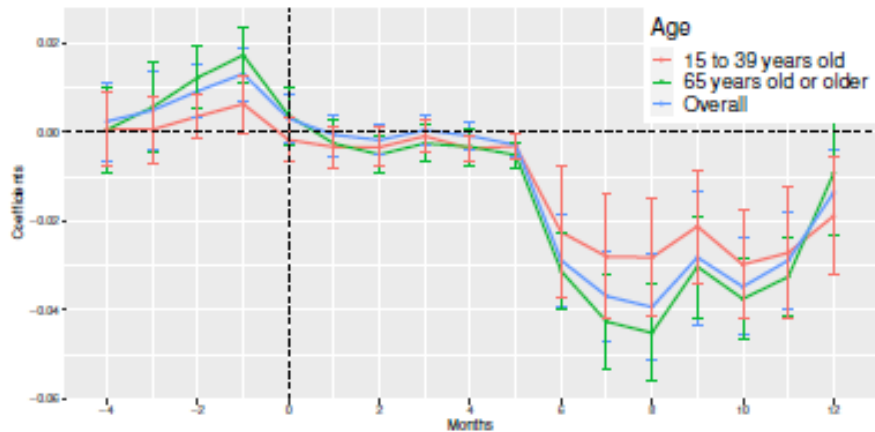
- Significant and sizable decrease in the amount of outflows and inflows
 - shifting their means of transactions to other financial institutions, which may not have reduced cash demand from a macro perspective.



Result 3

- Heterogeneity

- Larger for the elderly, female, less wealthy, with lower incomes.



month elapsed after branch consolidation

Concluding Remarks

- Studied cash demand using bank account transaction data.
 - Facts
 - Significant impacts of bank branch/ATM consolidations
 - Users moved their payment accounts to other banks. Cash demand may have not decreased.