Accounting for Empowerment? Examining Women's Financial Inclusion in India

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Abstract

Bank accounts are an essential first step to access formal financial services, yet their impact on women's control over resources remains ambiguous. Using a 2014 policy in India that provided free bank accounts and exploiting regional variation in pre-policy bank infrastructure, I find no significant change in women's participation in large household purchase decisions or their spending autonomy. Additionally, high-frequency household survey data reveal broader household-level benefits: women's account ownership increased household saving and borrowing without affecting private consumption.

Keywords: Bank Account Ownership, Women's decision making, Household resource allocation, Government Policy, Women's Empowerment, India *JEL:* D13, D14, G21, G28, G51, I38, J12, J16, R28

1. Introduction

Over the past decade, financial inclusion has been a key priority for policymakers to help households exit poverty (Burgess and Pande, 2005; Jiang and Liu, 2022). Research on financial inclusion has evolved alongside shifts in policy, highlighting the economic and social impacts of microfinance institutions(Chliova et al., 2015; Kochar et al., 2022), bank branches (Garg

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and Gupta, 2021; Bhukta et al., 2024), and digital financial services (Karlan et al., 2016; Schaner, 2016; Suri, 2017; Toth and Greenland, 2023; Riley and Shonchoy, 2024). Women's financial inclusion has also improved through direct interventions and indirectly as a spillover effect. Access to savings and credit has enhanced women's labor force participation (Field et al., 2021), entrepreneurship (Garg and Gupta, 2021), savings(Dupas and Robinson, 2013), self-esteem (Basargekar, 2009; Kato and Kratze, 2013; Morgan and Coombes, 2013), household decision making power (Duflo, 2003; Prina, 2015; Karlan et al., 2016; Steinert et al., 2018), and reduced intimate parent violence (IPV) (Goetz and Gupta, 1996; Rahman, 1999; Ahmed, 2005). However, there is limited evidence on the impact that large-scale policies focused solely on increasing bank account ownership have on women's empowerment.

This paper tests the effects of an exogenous shock to account ownership on women's empowerment in India. I measure empowerment through women's participation in decision making. Descriptive results from nationally representative surveys show that unbanked women have lower decision making power and mobility¹. Bank account ownership is a fundamental step towards integrating with formal financial services in India. To address low account ownership (close to 50%), the Indian government mandated commercial banks to provide free, on-demand bank accounts to unbanked individuals in 2014. These accounts required no opening or maintenance fees and minimal identification. The policy achieved unprecedented success with over 18 million accounts opened within the first week, earning a Guinness World Record (Government of India, 2014). Although the policy did not target women specifically, I use descriptive evidence to show that it disproportionately increased women's account ownership.

I examine changes in women's empowerment outcomes by exploiting prepolicy differences in bank branch density across districts. Before 2014, account ownership was positively correlated with bank branch supply in a district. After the policy, districts with bank branch density below the state median experienced a faster expansion of account ownership than those above

¹The India Human Development Survey reported 48% of unbanked women versus 55% of all banked women could participate in decisions on large household purchases, 87% versus 96% could spend money autonomously and 12% versus 15% had mobility to visit friends and relatives in 2011-12.

the median. I refer to districts that experienced a faster expansion as "High Impact" districts. Using a difference-in- difference (DiD) estimation, I leverage this spatial and time variation in total account growth to assess changes in women's empowerment. I then investigate changes in household resource allocation by focusing on households where the wife of the head was unbanked prior to the policy. This analysis leverages the precise timing of the policy and household-level longitudinal data to compare households where she opened a bank account within four months of policy's implementation to those where she remained unbanked up to a year afterwards. To address potential biases from sample selection, I estimate the wife's likelihood to open a bank account before the policy using observable characteristics and apply inverse-probability weighting in a DID framework.

I find no significant improvements in women's participation in large household purchase decisions or autonomy in spending money. Additionally, the inverse probability weighted DiD estimation shows no changes in the bundle of goods typically affected by women's private consumption (such as clothing, footwear, beauty products, and services). However, there was a decline in the consumption of goods that substitute for women's domestic labor, such as kitchen appliances and domestic help, with no corresponding increase in consumption of goods that reflected men's preferences (such as intoxicants, fuel for non-cooking purposes). There were no changes in gender-segregated savings and investment patterns such as gold and related assets (for women) or real estate and shares (for men). Overall, households became more likely to save in formal instruments, such as fixed deposits and government bonds, and to borrow from formal sources like banks and registered companies. The results suggest overall improvement in household's saving and credit requirements as a result of addition of the wife's bank account. However, in the absence of evidence on consumption and savings linked with women's preferences, the increased saving and borrowing cannot entirely be attributed to women's increased control over resources.

This paper makes three significant contributions to the literature. First, it expands the literature on financial inclusion and women's empowerment by providing empirical evidence on the effects of account ownership across rural and urban India. Previously, the literature in India has focused on either the impact of women in savings groups (Vaessen et al., 2014; Brody et al., 2017) or the expansion of bank branches in rural areas (Ghosh, 2022). While the study

of microfinance programs has helped test a variety of outcomes for women's well-being, these interventions are often bundled with training and other components that also improve women's agency and autonomy. In contrast, I test the direct effects of account ownership. Second, more specifically, this paper relates to the study on account ownership and women's labor force participation and empowerment in four districts of Central India by Field et al. (2021). I build on their analysis by extending this question across rural and urban India and expanding the set of empowerment outcomes from survey-based measures to police reports of crime and changes in household resource allocations. This paper is distinct from studies testing the effect of bank infrastructure on rural poverty and women's borrowing as I estimate the effects of account ownership while holding bank infrastructure fixed.

Third, it contributes evidence to the literature on women's asset ownership and household consumption allocations. Prior studies found an increase in household expenditure on the consumption of clothes, time-saving appliances, jewelry, food, health and education (Beegle et al., 2001; Quisumbing and Maluccio, 2003; Duflo and Udry, 2004; Mishra and Sam, 2016). A multicountry analysis across South Asia, Sub-Saharan Africa and the Middle East finds increased participation in decisions on women's healthcare, large household purchases and visiting friends or relatives (Amir-ud Din et al., 2024). Pangaribowo et al. (2019) shows that effects on consumption expenditure can vary by the liquidity of an asset. In my paper, I find bank account ownership corresponds with an increased uptake of saving instruments and no changes in household consumption of foods, clothing, jewelry. There is an increase in health expenditure and decline in education.

The findings of this paper are also relevant to the global policy agenda on financial inclusion. In recent years, the policy focus has shifted to digital platforms like mobile banking and e-wallets. However, in many low- and middle-income countries, traditional bank accounts remain the primary entry point for financial inclusion. Studying this policy provides valuable insights into the effects of such a sequential approach to expanding digital financial inclusion. The results of this paper add to other evaluations of this policy which focus on access to credit (Agarwal et al., 2017; Shah, 2023).

The rest of this paper is organized as follows: Section II discusses the definition of women's empowerment and the expected impact of the policy. Section III describes the policy efforts to improve financial inclusion in India and the 2014 account expansion policy. Section IV describes the variables

used in analysis and the sample. Section V explains the two empirical models used in this paper along with robustness checks. Section VI provides the corresponding results. I summarize the findings of this paper and conclude in section VII.

II. Women's empowerment and expected impact of account ownership

A. Measuring empowerment

A widely accepted definition of empowerment is the one provided by Kabeer (1999): "the expansion in people's ability to make strategic life choices in a context where this ability was previously denied to them." Women's ability to negotiate within the household and make strategic choices is typically reflected in how household members resources. Resource sharing may be dependent on relative incomes or assets ownership of the two spouses (Browning et al., 1994). A bank account can operate as an asset not only by virtue of storing money but also through the perceived sense of control over resources from potential access to the account and linked financial services. Either channel can help improve women's empowerment.

In this paper, I analyze the expansion of women's empowerment using her self-reported participation in household decisions. I supplement this with the analysis of household resource allocation in response to women's account ownership. This section discusses the theoretical motivation and limitations of the outcome variables.

Decision making

This paper assumes that a woman's ability to negotiate with other household members is reflected in her decision making power, and a significantly large unexpected shock can change the bargaining weights of members of the household (Chiappori and Mazzocco, 2017). Kochar et al. (2022) and Ding et al. (2024) provide empirical evidence to support this argument by studying loan provision and poverty alleviation and relocation program, respectively, that improved women's decision making ability on investment in children's education, clothing, household durables and routine purchases, food expenditure and borrowing/lending decisions. Recent empirical works examining women's empowerment outcomes use survey based measures to determine women's decision making ability and household's gender attitudes (Heckert et al., 2023; Doss et al., 2022; Kosec et al., 2022; Annan et al., 2021; Field et al., 2021; Swaminathan et al., 2012; Connelly et al., 2010; Allendorf, $2007)^2$. In this paper, I analyze women's participation in decisions on large household purchases and autonomy. These variables are likely to cover more discretionary and non-essential expenditures. This makes the more reliable predictors of women's autonomy in the household in comparison to several of the decision making variables included in the above literature that are strongly correlated with gender norms and stereotypical division of labor within the household. They are also less likely to be threatened by the possibility (noted in Kochar et al. (2022)) that decision making is delegated to a spouse when the opportunity cost of time utilized in decision making is high. In such cases, being the decision maker corresponds with lower bargaining weight or autonomy for the individual.

The implication of individual and joint decision making with spouse on autonomy is likely to vary by the domain of decision (e.g. crop choice, input purchase, household expenditure, health, family planning) and whether there was agreement between spouses on who typically makes decisions in that domain (Seymour and Peterman, 2018). There are very few reports of solo decisions on large household purchases in the data suggesting that it is rare for women to individually make this decision in this paper's setting. Given that such purchases are infrequent and constitute a significant share of household budget, it is reasonable to expect more than one household member helps to decide such a purchase. Therefore, in this paper's analysis, the decision variable on large household purchases includes both decisions made by the woman on her own, and jointly with her spouse.

Household resource allocation

If consumption preferences between men and women vary for a subset of goods, any improvements in women's negotiation with other household members from account ownership will affect household's consumption allocations. In low and middle income countries, women's asset ownership has

²In these papers, women are asked about their participation in decisions on food purchase and preparation, control/ use of income, employment, productive decisions in agriculture, mobility, attitudes towards gender equality, borrowing, lending, health, attitudes towards/experience of violence. Quisumbing et al. (2023) provide a comprehensive review of the survey-based measurement of women's empowerment in agriculture and its correspondence with women and children's health and nutrition outcomes, household diet diversity, agricultural output and children's educational attainment.

systematically increased household's expenditure on consumption of clothes, time-saving appliances, jewelry, food, health and education (Beegle et al., 2001; Quisumbing and Maluccio, 2003; Duflo and Udry, 2004; Mishra and Sam, 2016). However, effects on consumption allocation vary by the type of asset: there is a positive correspondence between women's share of liquid assets such as jewelry savings and high nutrient foods while the ownership of non-liquid assets does not significantly affect consumption expenditures (Pangaribowo et al., 2019).

Consumption allocations in the data are reported for an entire household, and are not separable into private and public consumption. Therefore, I analyze household's consumption for categories most influenced by women and men's private consumption separately. I examine a consumption category that complements women's domestic responsibilities at home such as food and toiletries. A larger expenditure on these categories might be correlated with more time spent cooking and cleaning as a substitute of leisure or other remunerative activities. I also investigate changes in consumption of appliances and services that save women's time in domestic chores. Finally, I analyze variations in household saving and borrowing patterns, anticipating a stronger effect on saving than on credit. Evidence from Kenya shows that women entrepreneurs were more likely to save than men when provided with a savings account (Dupas and Robinson, 2013). In India, women's access to bank credit has not kept pace with their rising account ownership. While 77% of women had a bank account in 2017, only 7% of total bank credit was allocated to women (Chavan, 2020).

B. Hypotheses

If a woman opens a bank account in response to this policy shock and is able to store money safely for use, it would improve her ability to make spending decisions and save. Private consumption and expenditure on time saving appliances may vary based on her baseline decision making power. Ashraf et al. (2010) find an greater expenditure on consumer durables for women below median decision making power.

In this paper's setting, the expected impact of account ownership on women's empowerment is ambiguous due to the following data limitations. First, I cannot distinguish accounts by type of ownership. An individually owned account may have a larger impact on women's decision making ability although effects may vary by social norms and spousal relations. For example, an individually owned bank account can improve the privacy of a woman in saving and spending but lower trust between her and her spouse, potentially increasing the risk of violence to extract her resources. Conversely, a joint account can reduce women's privacy in handling money but could increase trust between spouses and lower controlling behavior by her husband. To address this theoretical ambiguity, I control for norms that might be correlated with women's access to the bank account, social norms and spousal relations. Second, this paper is unable to condition results on deposits and withdrawals. In the absence of transaction data it is hard to distinguish between women who are active users of their account and non-operational account holders. However, the findings of Field et al. (2021) suggest that receiving earnings in an independent bank account has limited impact on women's empowerment outcomes. Their experiment establishes that women who own a bank account and receive payments for their wage labor are not more likely to report greater decision making ability and mobility, and lower gender based violence. There are positive impacts on participation in household purchase decisions but only for the group of women that also received training to use their bank accounts.

III. Financial inclusion policies in India

This section describes initiatives by the Government of India (GOI) and Reserve Bank of India (RBI) to improve financial inclusion and highlights the limited expansion of account ownership before 2014.

A. Bank branch and credit penetration

The GOI made concerted efforts throughout the 20th century to expand the network of bank branches and extend credit to underserved populations and regions. From 1969 until the early 1990s, several commercial banks were brought under the ownership and management of the government (Government of India, 1970). This increased the bank branch density significantly (International Monetary Fund, 1973). Between 1977 and 1990, a licensing policy by RBI mandated that for every new branch opened in a location with existing bank infrastructure, four branches had to be opened in underserved areas (see Burgess and Pande (2005) for a description). The two policies increased the uptake of bank credit by rural households, and rural branch expansion corresponded with a decline in poverty (Burgess and Pande, 2005).

In the 1980s and early 1990s, policies aimed at increasing lending to priority sectors such as agriculture and socio-economically disadvantaged groups were introduced. The initiative by the National Bank for Agriculture and Rural Development (NABARD) to connect self-help groups (SHGs) with banks helped economically marginalized groups, especially women, access financial services³. These groups were initially identified through poverty estimates and later through community mapping processes⁴. These savings groups increased women's control over savings and income, and participation in borrowing decisions (Raghunathan et al., 2023; Kumar et al., 2021). They enabled peer groups that positively impacted women's self-esteem and personal agency (Basargekar, 2009; Kato and Kratze, 2013; Morgan and Coombes, 2013), and reduced experience of intimate partner violence (Goetz and Gupta, 1996; Rahman, 1999; Ahmed, 2005). However, the impact of SHGs varied in different parts of the country and some regions experienced higher non-performing assets (Sinha and Navin, 2021).

B. Early efforts to expand account ownership

Against this background, RBI announced the "no-frills account" policy in 2005, advising banks to offer accounts with low or no minimum balance requirements⁵. Banks were advised to offer these accounts and extend financial services in remote areas with the help of Business Correspondents (BCs)⁶. BCs particularly helped customers with irregular and small transactions to open accounts, process loans, and facilitate small deposits, remittances, insurance and pension products. In an attempt to scale up, BCs were expanded from non-profit organizations to include individuals⁷. They were allowed to conduct business for more than one bank and their operational area increased from 15 to 30 kms⁸. Despite these modifications, banking through BCs was unprofitable due to low volume of transactions (Uzma and Pratihari, 2019; Enclude and Grameen Foundation, 2013; Kolloju, 2014). The implementation suffered from technological issues, concerns about legal risks, and low

³This was implemented through the National Rural Livelihoods Project (NRLP) and corresponding state-specific Rural Livelihoods Mission.

⁴See RBI Master Circular RBI/2016-17/9: https://www.rbi.org.in/commonperson/English/Scripts/ Notification.aspx?Id=1757

⁵See RBI Master Circular RBI/2005-06/204)

 $^{^6\}mathrm{Full}$ notification given in Circular RBI/2005-06/288

⁷Retired employees from banks, post office, government, teaching and other agents who worked with the government such as owners of fair price shops, insurance/ saving schemes agents.

⁸See RBI/2011-12/100

financial literacy among clients (Khan, 2012; Enclude and Grameen Foundation, 2013). Account ownership remained low with only 58.7% of households reporting access to banking services⁹ in the 2011 Population Census.

The no-frills account was subsequently restructured into the Basic Savings Deposit Account, offering digital services like ATMs and electronic payments¹⁰. This scheme led to an increase of 100 million accounts between 2011-13 as opposed to the 6 million through the introduction of BCs in 2007 (Helix Institute of Digital Finance (2015) cited in Uzma and Pratihari (2019)). Despite this, account ownership and access to bank infrastructure remained low. At the end of 2013, 54% (two out of three men and four out of five women) did not have a bank account¹¹ (Intermedia, 2014). Only 37%of all bank branches were located in rural areas, and 34% of the villages had access to banking services through BCs (Enclude and Grameen Foundation, 2013). The main reasons for not having a bank account included insufficient money (56%) and lack of transactions (27%). The World Bank's 2011 Findex survey reported additional reasons such as the costs of maintaining an account, using another family member's account, distance to the bank, lack of documentation and limited trust in institutions. The government's efforts to deposit welfare payments directly into bank accounts in 2013 had a limited impact as they were implemented without adequate infrastructure. In the case of the cooking gas subsidy, the policy had to be rolled back as a result (Jain et al., 2018).

C. Account expansion since 2014

The GOI intensified its efforts through Pradhan Mantri Jan Dhan Yojana (PMJDY), implemented in end-August 2014 with the aim that every household would have at least one basic savings deposit account within the first year of implementation. This policy advanced previous efforts by adding more features to the basic account and a comprehensive mapping of villages to BCs.

Under PMJDY, banks could not charge account opening or maintenance fees to the account holder and beneficiaries were required to provide only one government validated identification. The account could be opened at a

 $^{^{9}{\}rm These}$ include services from brick and mortar bank, BC and microfinance institution. $^{10}{\rm See}$ RBI notification RBI/2012-13/169

¹¹Financial Inclusion Insights is a nationally representative survey of Indian population aged 15 and above (N=45,024)

brank branch or on-site with the help of a BC. The account was bundled with additional financial services such as a debit card free of charge, an accident insurance of USD 1,638 (in nominal terms, USD 5,439 in purchasing power parity terms¹²) and an overdraft facility of up to USD 82 (in nominal terms, 272 in purchasing power parity terms) after six months of satisfactory savings/credit performance. Anyone who opened the account in the first five months of the policy was eligible for life insurance. One of the goals of the policy was to provide basic financial literacy to help new account owners keep their accounts active.

The first phase of the policy was implemented nationwide from August 2014 to August 2015, except in states with infrastructure and connectivity constraints and districts affected by armed insurgency¹³. Over 125 million accounts were opened in the first five months of the policy with an average account balance of INR 836.8 per account (USD 45.5, purchasing power parity)¹⁴. Figure C.1 in the Appendix plots the estimated annual changes in total account ownership in Phase 1 districts since 2006. The coefficient for 2015 highlights that the impact of PMJDY was significantly greater in contrast to previous policy initiatives.

The PMJDY was a comprehensive bank account policy helping individuals store money, transact using ATM and allowing an overdraft for nonbusiness purposes. Unlike the microcredit and savings initiatives, this policy did not target women. However, it offered the potential for women (both income-earners and unemployed) to improve their control over resources conditional on account ownership. I provide descriptive evidence of the policy disproportionately affecting women in Section IV.B.

D. Advancements in digital finance

This paper does not investigate the interaction of account ownership with digital infrastructure and financial products due to limited use of ATMs and mobile banking in 2014-15. Figure 1 in the Supplemental Appendix shows that the annual transaction values through ATMs and mobile banking were

¹²Estimated using OECD Data on Purchasing Power Parities available <u>here</u>.

¹³These include states in the North East - Arunachal Pradesh, Manipur, Meghalaya, Mizoram, Nagaland and Tripura - as well as parts of Himachal Pradesh, Jammu & Kashmir and Uttarakhand. A list of 35 districts worst affected by "Left-Wing Extremism" is available here.

¹⁴Link to progress report.

a fraction (25% and 1%, respectively) of the value of total bank deposits in 2014. The low use of ATMs was explained by the limited machines in rural areas and significant transaction costs: only four free withdrawals were allowed per month. This paper does not capture the effects of the spike in mobile and internet banking transactions and short-term decline in ATM withdrawals (Figure 2, Supplemental Appendix) as a result of a monetary policy implemented in November 2016. This policy increased deposits in bank accounts, reduced cash supply and boosted e-wallet transactions (Chodorow-Reich et al., 2020). The analysis is restricted until 2016, determined by the timing of the post-policy survey data capturing women's decision making, where less than 0.007% of the survey observations were collected in November and December.

IV. Data and sample statistics

A. Variables

This paper combines three types of datasets - administrative, Census and household surveys. In this section, I describe the data source of the key variables relevant for analysis (Table A.1 provides a useful summary). Appendix A includes information on sampling methodology and describes the variables generated for analysis.

Banking and population characteristics

I use the annual number of bank accounts and branches for each district between 2006 and 2017 from the "Database on the Indian Economy" by the RBI¹⁵. These two variables are reported over the financial year: from April 1 of the preceding calendar year until March 31 of the current calendar year. The following information linked to the bank account cannot be observed in the data: whether the account is used for transaction and savings or business, whether it is held individually or joint and transaction history of the account. Therefore, this paper does not explore differences by type of ownership or account use. The variable of total bank branches can be disaggregated by type of ownership: public, foreign, regional rural, private, and small finance.

¹⁵It includes branch and account information for all banks that meet RBI's requirements such as the cash reserve ratio and paid-up capital.

Demographic and infrastructure characteristics of each district, including rural/urban population, number of schools, and access to paved roads and electricity, are extracted from the 2001 and 2011 Population Censuses.

Women's participation in decision making

The India Human Development Survey (IHDS), 2004-05 and 2011-12, and Demographic Health Survey (DHS) 2015-16 are nationally representative household surveys that interview women between ages 15 and 49. The surveys include a variety of topics such as household demographics and asset ownership, employment, women and children's health outcomes, gender issues and family planning. The sampling stratification of both surveys is explained in the Appendix. These two surveys describe household and women's characteristics before and after the policy. I construct a balanced panel of districts enumerated in both surveys and use the following variables on women's decision making that are consistently measured in both Surveys. These are - women's reports of, alone or jointly, participating in decisions on large household purchases, and having money available for autonomous use.

Violence against women

In this paper, I analyze dowry related violence¹⁶ to estimate second order effects on women's empowerment. This variable includes cases recorded under "Cruelty by husband or his relatives" (Section 498A of the Indian Penal Code) from 2011 until 2016. It includes any conduct that drives a woman to harm herself or harasses the woman or her relatives to meet any unlawful demand for property or valuable security. The National Crime Records Bureau (NCRB) within the Ministry of Home Affairs publishes annual reports of these crimes by district.

Household resource allocation

The Consumer Pyramids Households Survey (CPdx) is the world's largest household panel dataset. Beginning in January 2014, this nationally representative longitudinal survey continuously interviews over 174,000 households three times a year. Employing a two-stage stratification method (described

¹⁶Dowry is the transfer of wealth, property, or goods from the bride's family to the groom or his family at the time of marriage. Such transfers are prohibited in India by law since 1961.

in the Appendix), it collects information on household demographics, consumption expenditure, assets, borrowing and investment, financial inclusion, and income. I use the first five survey waves to estimate trends in household resource allocation before policy and upto a year after. These waves did not observe the employment status of household members. Therefore, I am unable to test for heterogeneity of the effects of women's account ownership by her likelihood of receiving an income. Instead, I report results by her educational achievement and age.

B. Analysis sample and summary statistics

District panel

The sample is restricted to 329 districts using boundaries from the 2001 Population Census. Each district was merged back to a "parent" district to define a consistent unit across time, henceforth called an *analytical* district. All datasets included in the paper are linked to these analytical districts. Districts formed from more than one parent district of the 2001 boundaries were excluded¹⁷. The eight Union Territories of India are also excluded¹⁸. Ultimately, the sample includes all the districts covered in the first phase of the PMJDY scheme that were also enumerated by the ex-ante and expost household surveys. This allows examining the impact of the policy on account ownership as well as estimating effects on women's empowerment. Using the state-wise median principle of bank branch density, the sample contains 168 High Impact districts (state median bank branch density or below) and 161 Low Impact districts. Figure 1 plots both the High/Low impact districts included in the estimation and the out-of-sample districts. Within each districts, only the households where the respondent is married at the time of survey are included.

Table 1 reports unweighted mean estimates of the decision-making variables and characteristics of the sample households and analytical districts before policy implementation. Household characteristics differ by women's

¹⁷These districts could potentially be split into their 2001 parent districts using population shares. However, in the absence of an official census in 2014, such a split was expected to introduce noise in the data.

¹⁸Union Territories are governed by the Central government jurisdiction, and therefore, administratively different from the state districts. They are smaller in area and population, and divided into a handful of districts. Given the small number of districts, they cannot be categorized by the state median principle for analysis.

account ownership while the sign of these differences was the same in high and low impact districts before the policy. For instance, unbanked women's inputs in decision making are lower than women with a bank account in both high and low impact districts. Unbanked women are at least three years younger, have completed less years of schooling. Consistent with being younger, they have fewer children, they married later and have a smaller age gap with the spouse. They are equally (less) like to be employed than banked women in the Low (High) impact district. The households of unbanked women are larger in size. Exploring population characteristics of the district, the High Impact districts are more rural, have a larger share of population from socially disadvantaged groups (Scheduled Caste/ Scheduled Tribe) and lower literacy. They have a larger share of villages with electricity supply to commercial, agricultural and domestic users and better connectivity by paved road. The differences in infrastructure may partially be the result of government interventions supporting production and connectivity of rural, agrarian households¹⁹. They suggest that the difference in bank branch density between High/Low Impact districts is not driven by district's infrastructure. Instead, it could be due to other factors not observed in the Population data such as income and lower demand of bank services. These descriptive results justify controlling for district variables that are correlated with the assignment to High/Low Impact when estimating the effects of policy on account ownership.

Household panel

In the household-level analysis, the sample includes 20,435 households in the same 329 districts. The following households are excluded – if they were in the top 5% of monthly expenditure distribution at least once, relocated to another district, reported no adult member, their household head changed during the analysis period. States and districts where the policy was not enforced in the first year are also excluded from this analysis. Columns 1-3 in Table 2 report pre-policy summary statistics. Column 1 describes households where the wife of the household head opened an account as soon as the policy was implemented. Column 2 summarizes households where the wife didn't open an account within the first year. Column 3 reports the stan-

 $^{^{19}\}mathrm{Pradhan}$ Mantri Gram Sadak Yojana was la
unched in 2000 to connect rural areas with all-weather roads.

dardized mean difference between the first two columns. The composition of households by religion and caste were similar in both groups. The head of the account-opening households had more years of schooling and these households had less men and were more likely to reside in urban areas. The men in the households were less likely to have a bank account or mobile phone. These differences motivate use of inverse probability weights to match households on observable characteristics before estimating the aggregate effect of wife's account ownership.

Stylistic facts

Population-weighted estimates of the high frequency household longitudinal survey in Table A.3 show that account ownership by men was close to saturation at the time of policy implementation: 1.42 men in a household owned a bank account. On the other hand, the average number of banked women in a household was 0.74 before policy and increased to 1.1 a year after. The number of adults in the household was approximately 3 during this time.

The World Bank Global Findex survey reports gender-wise account ownership over a longer time period, from 2011 to 2021. Fig. C.2 shows a consistent gender gap in account ownership before policy that significantly reduced in the years after. These descriptive results motivate the paper's test for changes in women's empowerment as a result of the policy.

V. Empirical strategy

A. Identifying the impact of PMJDY on account ownership

Figure 2 shows that before policy implementation, the supply of bank branches was positively correlated with account ownership in a district. With the policy's push for every household to own at least one bank account in the first year, I anticipate a faster growth of bank accounts in districts with lower bank branch availability. Since previous policy efforts targeted the supply of bank infrastructure to villages by population, I use the per capita branch availability (total bank branches of a district divided by 100,000 population) as the metric for characterization. I classify districts as "High Impact" if their branch density was equal to the state median or below and the remaining as "Low Impact". Sorting districts by the state median instead of the national accommodates the heterogeneity in levels of bank infrastructure and economic growth between states²⁰. The equation below measures differences in account ownership and physical bank infrastructure between High and Low Impact districts in response to the policy.

$$Y_{dy} = \rho_0 + \sum_{j=2006}^{2017} \rho_j \mathbb{1}(\tau_y = j) \times HighImpact_d + \rho_1 \mathbf{X}_{dy} + \phi_d + \tau_y + \epsilon_{dy} \quad (1)$$

The outcome variables tested include the total bank branches in a district per 100,000 population, total bank accounts per 100,000 population, percent change in number of bank accounts since 2006 and percent change in number of bank accounts since 2014. The annual time series data on bank branches and accounts in a district uses the financial year (from April 1 of preceding year to March 31 of current year). Therefore, in this model y defines a financial year and τ_y identifies a dummy variable for each financial year. The coefficient ρ_i estimates mean difference in the outcome variable between High and Low impact districts. I control for time-invariant differences between districts using district fixed effects (ϕ_d). In addition, the matrix $\mathbf{X}_{\mathbf{d}}$ includes pre-policy population characteristics of a district as well as inter-temporal differences that predict its classification as high/low impact and are also correlated with the dependent variable²¹. These covariates are selected from variables in the 2001 and 2011 Population Censuses such as the total, rural and urban population in a district, proportion of literate and socially disadvantaged, number of schools and colleges, electricity supply and access to paved road as well as district-wise differences between 2001 and 2011. Thus I control for both pre-policy characteristics as well as inter-temporal trends in these characteristics. I cluster standard errors at the state level to preserve the intra-state correlation between districts and account for the different correlation structures across states because of the High/ Low Impact assignment.

 $^{^{20}{\}rm Figure~2}$ in the Supplemental Appendix shows the heterogeneity in the state median values in the sample.

²¹These variables are selected using post-double-selection methodology by Belloni et al. (2013) which runs two Least Absolute Shrinkage and Selection Operator (LASSO) regressions and reports the intersection of controls that are significantly correlated with the dependent variable in both estimations. The first regression tests for effects of all potential controls on the outcome variable in equation 1 and the second tests the effect of the same controls on the binary variable of High/Low impact. This is operationalized using the STATA module pdslasso.

The results of equation 1 are plotted in Fig. 3. The top left and top right panels show the levels of branch and account density in High and Low Impact districts between year 2006-17. Low Impact districts consistently had more bank branches and accounts per capita in each year. The bottom left and right panels report the percent growth of bank accounts in High and Low Impact districts with respect to the financial year 2006 and 2014, respectively. Given the level differences in account ownership before policy, High Impact districts saw faster acceleration in account ownership over the years. Anchoring differences in the growth of accounts with respect to the financial year 2014 (starting April 1, 2013 and ending on March 31, 2014) shows that the changes in account ownership between High and Low Impact districts relative to the policy year were statistically similar before policy and diverged after policy implementation. High impact districts (with lower supply of bank branches) experienced faster growth in bank accounts as a result of the policy. The Low Impact districts were not affected by the policy similarly because account ownership was closer to saturation in these districts. Therefore, I exploit the differential rates of expansion in account ownership in response to the policy, and extend the analysis to test if it resulted in differential trends in women's empowerment while controlling for ex-ante differences between the two types of districts.

B. Estimating the effect of account expansion on women's empowerment

Equation 2 estimates the effect of account expansion on women's empowerment between High and Low Impact districts in response to the policy. Empowerment in this model is measured using binary variables of women reporting participation in decision making on large household expenditures (alone/ jointly with spouse) and having spending autonomy. Due to survey design, this test is restricted to married women between ages 15 and 49. I control for time-invariant characteristics of each district using district fixed effects. A difference-in-difference estimation eliminates the residual differences between districts that explain women's empowerment levels. The identifying assumption that empowerment outcomes between High and Low Impact districts did not vary before policy shock is tested in Table 3. Verifying that women's empowerment evolved statistically similarly between the two district types, the coefficient of $HighImpact \times Post$ in the equation below captures the effect of account expansion within a district on women's empowerment.

$$Empowerment_{idt} = \beta_0 + \beta_1 (HighImpact \times Post)_{dt} + \beta_2 HighImpact_d + \beta_3 Post_t + \eta_s + \epsilon_{idt}$$
(2)

The variable HighImpact = 1 for districts with bank branch density equal to the state median or below at the time of policy implementation, and 0 otherwise. The time dummy *Post* identifies survey rounds before and after policy. Finally, η_s controls for state-wise differences in the outcome variables. I estimate inter-temporal trends for calendar years t in this model, and opposed to the financial year y in equation 1. I preserve the intrastate correlation between districts due to High/Low Impact assignment by clustering standard errors at the state level.

B.1. Robustness

I test the robustness of the estimation in three ways. First, I rule out any confounding effects by bank branch expansion in response to PMJDY by including controls for annual changes in bank branch density in 2015 and 2016. Second, I vary the definition of High/Low Impact districts in Table B.4 in the Appendix. Panel A estimates equation 1 and Panel B estimates 2. Column 1 reports results for definition of High/Low Impact by median bank branches instead of bank branch density, Column 2 by median private banks, Column 3 by median government owned banks and Column 4 reports results by the continuous measure of bank branch density. The scale and functionality of banks in India vary by type of ownership: state, private sector, foreign owned, regional etc. Columns 2 and 3 investigate whether this subsequently determined the policy's implementation and women's empowerment. Column 4 captures the effect of marginal changes in banking infrastructure. Third, I test for heterogeneity in results by characteristics of the survey respondents likely correlated with her empowerment such as whether the respondent woman owns a bank account, her age, education and employment. This is reported in the Supplemental Appendix.

This analysis includes two implicit assumptions. First, the policy had a disproportionately larger impact on account ownership for women. The World Bank Findex survey provides evidence to support this (Fig. C.2). Second, the expansion of women's accounts was significantly greater in High Impact districts than others. Estimating the proportion of women banked among survey respondents in IHDS and DHS yields no significant differences between the High and Low Impact districts in response to the policy (Table B.5).

B.2. Mechanisms

I include additional variables into the model to account for other channels affecting women's empowerment and correlated with account ownership. The inclusion of these variables does not allow for causal testing of any of the mechanisms discussed below. First, the impact of account ownership on women's empowerment may differ by the type of ownership. Second, saving in an account may increase the visibility of women's resources to other family members, potentially reducing her bargaining power in the household. Third, the frequency of account use may be a stronger determinant of empowerment than ownership alone. To explore these issues, I construct three indices from household survey data prior to the policy intervention: gender equality within the household, household trust in banking institutions, and women's mobility. A description of these indices is given in Table A.5 in the Appendix.

Women's access to an account, whether individually or jointly owned, may reflect intrahousehold gender norms. I investigate this by including a score of variables for equitable household division of labor and spousal relations, and whether women are home owners to control for potential confounding by type of account ownership. Household trust in banking institutions serves as a predictor of whether money is held in cash or deposited in the account. It is included in the model to assess whether empowerment outcomes vary with increasing account use, and addresses the second and third limitations. I include a score of women's mobility to examine whether transaction costs, such as traveling to a bank branch or ATM, may limit account usage. Although this variable does not directly measure mobility related to bank access, it captures the number of situations in which women can leave their home without seeking permission from their spouse or other family members. Finally, I test whether a score of restrictive gender norms, the converse of intrahousehold gender equality and women's mobility, explain the outcomes. This score includes a count of variables for whether wife beating is common in different circumstances and women require permission to go outside the home.

B.3. Alternative measures of women's empowerment

I explore changes in crimes against women as an additional measure of women's empowerment in the district. The Demographic Health Survey (2015-16) reports higher experience of intimate partner violence (IPV) for unbanked women. Almost 31% of unbanked women had experienced physical violence at least once in the form of pushing, slapping or kicking from their intimate partner in comparison to 28% of banked women. Their experience of emotional and sexual violence was also higher (15% versus 13%, 8% versus 6%, respectively). These estimates are for married women between ages 15 and 49.

In this paper, I analyze the number of cases of women's harassment linked with dowry payments that are reported with the policy. In India, dowry payments correspond positively with women's decision making on food and clothing expenditure (Calvi and Keskar, 2021). Therefore, I expect that reports of women's harassment around the demand of property or other assets will correspond with lower resource allocation to women and lower participation in decision making. In this case, lower reports of such crimes should correspond with more empowerment of women in the household. This variable provides a lower bound estimate of the impact of account ownership on women's harassment within the household, as domestic violence is likely under-reported to the police. This is the only variable associated with domestic violence against women that is reported both before and after policy shock. The related literature on asset ownership and IPV is inconclusive. (Pereira et al., 2017) found no significant correspondence between IPV and land/ household ownership. Bank accounts reduced risk of IPV in India (Raj et al., 2018) but there is a positive association between women's financial inclusion and experience of IPV in countries with high male controlling behaviors (McDougal et al., 2019).

C. Women's account ownership and household resource allocation

As shown in Appendix Figure C.1, the PMJDY policy led to a significantly larger increase in all bank accounts. In this section, I exploit the sharp timing of this unprecedented increase in bank accounts after policy. I analyze a balanced panel of households where the wife of the household head was unbanked before policy. The sample is also restricted to households where the wife is the oldest woman to capture effects of the woman with the highest potential to influence household spending²². I investigate the effects of the

²²The literature predicts lower autonomy for women in the household in the presence of mother in-law. For instance, Anukriti et al. (2020) find that mother in-laws limit women's social networks and decision making ability on family planning, and Gram et al. (2018) highlight the negative implications of mother in-laws on women's financial autonomy.

wife's first bank account on four types of monthly consumption expenditures - expenses dominated by women's preferences, men's preferences, expenditure on education and total household expenditures. Since the survey data does not distinguish whether the bank account was opened under PMJDY, I capture the effects of any new bank account in response to the policy.

Households where the wife of the male household head opened a bank account in the survey wave after PMJDY was implemented (n=5,999) are characterized as the "treated" group. All households where the wife remained unbanked in the first year of the policy form the "comparison" group (n=14,443). The logit regression below estimates the likelihood of the wife being banked for all households in the analytical sample using pre-policy characteristics of the household. The matrix of covariates X_{hdsw} includes religion and caste of household head, sex ratio of adults within household, urban/ rural location, age and years of completed education of household head and his wife, the number of women and men in the household owning a bank account, trading account, credit card and mobile phone.

Figure 4 plots the common support of the likelihood estimate for households in the treated and comparison groups revealing the overlap of observations in both groups. I use the propensity of wife's account ownership to re-weight households in the sample such that the comparison group acts as a counterfactual to households in the treatment group. Each treated household is assigned a weight equal to the inverse of its propensity score and each comparison group household is assigned a weight equal to the inverse of one minus its propensity score. Table 2 reports the mean standardized differences between the covariates of the treatment and comparison groups for the original, unweighted sample and for the sample re-weighted using inverse probability weights (IPW). The difference between each variable is close to 0.

$$Pr(Banked = 1 | \mathbf{X}_{hdw}) = \frac{1}{1 + e^{-}(\beta_0 + \beta_1 X_1 + \dots + \beta_k X_k)}$$
(3)

Equation 4 estimates the effect of wife's bank account ownership on household h's monthly consumption expenditure on category j in district d and survey wave w. $WifeBanked_{hdw}$ is a dummy variable that equals 1 for the treated households and 0 for households in the comparison group. The time dummy $Post_w$ estimates differences between survey waves before and after policy. The equation includes district and survey wave fixed effects to control the effects of time-invariant characteristics of districts and time trends on the outcome variable, respectively. It also includes time-varying household covariates in $X_{\rm h}$ which are the observations of controls included in the propensity score estimation for each survey wave. The model preserves correlation of households within districts and allows for a different correlation structure for each district by clustering standard errors at the district level. Coefficient δ estimates the causal effect of the wife opening a bank account on the outcome variables given that households in the treatment and comparison groups are re-weighted to match on observables. I also analyze changes in the household's uptake of formal and informal credit and savings, investment in real estate and capital as well as saving in gold related assets. I report the sharpened two-stage q values to control for the risk of false discovery rate (Type 1 errors) from testing multiple hypotheses (Benjamini et al., 2006) in each of the results tables. The effect of wife's account ownership is identified by examining differential trends between outcomes of the treatment and comparison groups in the pre-policy time period (Tables 5 and 7).

$$Y_{hdw} = \alpha + \beta WifeBanked_{hd} + \gamma Post_w + \delta (WifeBanked_{hd} \times Post_w) + \theta_d + \phi_w + \rho_4 \mathbf{X}_{hdw} + \epsilon_{hdw}$$
(4)

Analyzing changes in household's consumption and investment decisions instead of individual consumption expenditures and asset ownership provides partial insights into women's preferences and contribution to household purchase decisions. Therefore, I examine the effect of account ownership among female headed households to articulate the expectation of how women behave in an "unconstrained" setting in this sample. These are results for the subset of households (n=634) where the female head did not have a bank account before the policy and use inverse probability-weighting to estimate the differences between account ownership and the lack of. Although women's decision making ability and autonomy as the head might be significantly different from wives of male household heads, this analysis helps understand whether outcomes for banked wives are consistent with the expected direction of autonomous decision making. Only two consumption categories satisfy the test for parallel trends. These are consumption of essential items like food, utensils and toiletries and, consumption influenced by men's preferences. There is an increase in the consumption of essential items in female headed households once she opens an account and no change in consumption of items reflecting men's preferences. The number of households that opted

for borrowing, saving and investment is too low to reliably interpret the effects of the female head's account ownership. All results of this analysis are included in the Supplemental Appendix.

VI. Results

A. Policy's effect on account ownership and women's empowerment Identifying policy's effect on account ownership

I report the lack of pre-trends in empowerment outcomes between High and Low Impact districts in Table 3. The first row of the table reports the differences between the two types of districts and across the two IHDS survey rounds conducted before policy. Both women's participation in decisions regarding large household purchases and women's spending autonomy show no significant differences between High and Low Impact districts during this time.

Account expansion and women's empowerment

There are no significant changes in women's decision making in the High Impact districts after the policy was implemented. I report coefficients of the interaction term in the first row of Table 4. Columns 3-4 of Table 4 control for changes in bank branch density between financial years 2014 and 2016. Empowerment outcomes do not vary with post-policy changes in bank infrastructure as effect sizes remain similar with the inclusion of these controls. Inter-temporal trends in the Low Impact districts (given in the third row of the table) show more participation in purchase decisions of expensive items for the household but lower spending autonomy over time. This can partly be attributed to differences in the survey questions before and after policy. The pre-policy survey asked whether women could use *any cash* at hand, while the post-policy survey asked whether women could autonomously use *their own* money.

Table B.5 shows that unlike the expansion rates of bank accounts observed in the administrative data reporting total bank accounts in a district, there was no significant increase in the proportion of banked households and women between the IHDS and DHS survey samples. This helps explain the lack of observed improvement in women's decision making outcomes in High Impact districts relative to trends in the Low Impact districts.

The expansion of bank account ownership seems to reduce conflict around material resources. Dowry-related violence by the spouse and his relatives is lower by 15% in the High Impact districts (Table B.3). There were no pre-trends in this variable in the years before policy (Table B.2).

Robustness

I test the robustness of the above results using two additional discrete classifications of High/Low Impact and the continuous variable of branch density in Table B.4. Columns 1 and 2 estimate the differences between districts below and above the median branch density of government and private-owned banks, respectively. The results in Panel A reveal that the differential effect in expansion of account ownership is driven by the ex-ante differences in the supply of private bank branches. The lack of effect of the supply of government-owned banks could be because the demand for bank accounts was unchanged by the presence of government-supplied bank infrastructure or government-owned banks did not implement the policy effectively through BCs in the first year. The continuous measure of total branch density (column 3) emphasizes the result that acceleration in account ownership decreases as bank branches per capita increase. Women's participation in large household purchases (panel B) is unaffected by the ex-ante supply of government or private bank branches. Women's spending abilities also do not vary by classification of government/ private banks (panel C). However, the continuous measure of the supply of bank branches per capita correlates with more women participating in this decision. The effect is small but statistically significant. There are no similar effects of the intensity of bank branches on women's autonomy in spending.

Testing for heterogeneity of outcomes by respondent characteristics show no significant differences in case of her participation in large household purchases and experience of violence (see Table 2 in the Supplemental Appendix). Her age and employment, however, correspond with lower autonomy.

Mechanisms

Using pre-police survey rounds, I construct aggregate scores for each district on its intrahousehold gender equality, restrictive norms, trust in banks, and women's mobility. If I include a variable in the model that largely explains the changes in the outcome variable, the coefficient of this included variable should be statistically significant and differences between β_2 in equation 2 with and without these controls should be significantly different. Table B.6 reports results with the inclusion of these variables. Household's experience in uptake of formal credit and confidence in banks to store money safely corresponds negatively with women's decision making outcomes (column 2). However, the effects of the account expansion policy (estimated using the interaction term of High Impact and Post policy time dummy) does not change with the inclusion of this score. A triple interaction with the score of trust in banking predicts more women participating in large household purchase decisions but no significant differences in their spending autonomy (Table 2, Supplemental Appendix). The inclusion of norms altogether (banking, intrahousehold gender equality/ restriction and women's mobility) reduce the size of the effect of the policy on both decision making variables (columns 5 and 6). Spending autonomy corresponds positively with intrahousehold gender equality and women's mobility but negatively with banking experience.

B. Effect of wife's account ownership on household's resource allocation

This section investigates the effects of wife's account ownership on household's consumption allocations, borrowing, savings and investment decisions. Table 5 examines pre-trends in consumption between households in the treatment and comparison group.

I construct three consumption categories for the household that are likely dominated by women's preferences (columns 1-3 in Tables 5 and 6). The first category (column 1) includes items most strongly affected by women's private consumption: clothing and footwear, cosmetics, accessories, and beauty goods and services. The second category (column 2) includes items that are also correlated with women's time spent on domestic chores such as cooking and cleaning. These are food, utensils and toiletries. The third category (column 3) includes items that help women minimize the time they spend on household chores. These include time saving appliances (e.g. kitchen appliances and washing machine) and time saving services such as domestic help. Column 4 items dominated by male preferences. This includes intoxicants such as tobacco products and liquor, shaving articles and fuel for purposes other than cooking. Empirical analysis shows that men are more likely to consume tobacco products and alcohol (Cawley and Ruhm, 2011; Oncini and Guetto, 2018) and have a more inelastic demand than women (Nelson, 2014). Fuel consumption captures usage for automobiles and all purposes other than cooking. With the share of licensed female drivers in India less than 7% as recently as 2023 (Ministry of Road Transport and Highways (India), 2023), fuel expenditure is also expected to be driven by men's demand. The fifth category includes fees to schools, colleges and private

tuition. The sixth category is the total expenditure on education (books, uniforms etc. in addition to fees), respectively. Expected effects of women's account ownership on spending for children's education is ambiguous as the literature evaluating non-income transfers to women finds contrasting effects. The results also differ between countries: while women's assets at the time of marriage increased the share of expenditure on education in Bangladesh and South Africa, there was negative correspondence in Indonesia, and a positive effect of men's asset ownership in Ethiopia instead (Quisumbing and Maluccio, 2003). In Morocco, Benhassine et al. (2015) found improvement in school attendance regardless of whether men or women were beneficiaries of the cash transfer labeled as an education promotion program. In the case of women's representation in local leadership positions in India, the gender gap in education of adolescents was reduced (Beaman et al., 2012), but education was not the focus of decisions on the provision of public goods by elected women in the same region (Chattopadhyay and Duflo, 2004). The last category (column 7) is household's total monthly consumption expenditure. All consumption values are analyzed in real terms. The appendix includes a description of each consumption variable.

Table 5 shows that the consumption categories reflecting women's preferences on items that complement (column 2) and substitute (column 3) their time spent on domestic chores do not satisfy the test for parallel trends. Households in the treated group spent significantly more on food, utensils and toiletries; and less on time saving appliances and services. Their total monthly consumption expenditure (column 7) was also significantly lower. This justifies controlling for total monthly consumption expenditure in the analysis of consumption allocations. Table 6 reports effects of account ownership on the six consumption categories. A way to store money or keep it from being spent by other household members is through non observable private consumption (Zhang, 2014). However, I find no increases in consumption in the categories where it is easiest for women to hide their private consumption (column 1). There are no significant differences in consumption reflecting men's preferences and household's expenditure on education declined by approximately 16%. Table B.7 includes the results for additional consumption categories. Expenditure on all appliances (kitchen, household and mobile) was systematically lower in response to wife's account ownership. Health expenditures increased while recurring payment such as rent and utilities remained unchanged.

I explore changes in household's uptake of formal savings to test whether the decline in consumption allocation is the result of households saving. Tables 7 and 8 report changes in the extensive margin for borrowing from formal and informal sources, saving instruments provided by formal institutions, saving in microfinance institutions and in the form of gold or related assets. Before policy induced account ownership, there were no pre-trends in these outcomes between households in the treated and comparison groups (Table 7). After policy, households where the wife opened an account were 0.4% more likely to borrow from formal sources such as banks, registered loan companies and employers. There was a statistically insignificant decline in this group's borrowing from informal sources such as moneylenders, shops and relatives during this time. Households in the treated group were 10%more likely to save using formal instruments provided by banks, Post Office and the government. This result is consistent with findings in the applied microeconomics literature where women are more likely to save when provided commitment savings accounts Ashraf et al. (2010) or in response to positive, income shocks (Robinson, 2012). However, it can be interpreted as a lower bound estimate of women's preferences to save in formal institutions as the variable captures household level decisions and not individual demand. These savings instruments are (eg. fixed deposits and bonds), and that partially explains the decline in consumption expenditures. There are no significant differences in treated households' saving behavior with respect to self-help groups, chit funds and other microfinance institutions (column 4, Table 8). Lastly, I assume that asset ownership varies by sex, and explore two kinds of investment by the household. The first is gold and related assets which is preferred by women as an asset accumulation strategy (Antonopoulos and Floro, 2005; Quisumbing, 2011); and the second includes mutual funds, private equity, and real estate. Pangaribowo et al. (2019) find that more women owned jewelry while more men owned non-agricultural land and house in rural Indonesia. A household's preference for either type of investment did not change significantly in response to wife's account ownership. Given that households make these decisions infrequently, it is likely that analyzing short-term effects provide limited insights.

These results offer insight into the nuanced aspects of women's empowerment. These findings suggest that the wife's account could potentially be treated as an additional account for the household and the use of the account may be driven by preferences of both wife and her spouse. A possible use of the account is to expand borrowing. It is unclear if the decline in consumption of appliances (time saving and overall) durables is evidence of women's decision making ability. The literature predicts contrasting outcomes. On one hand, reducing transaction costs of savings account increased savings and daily private expenditure in Kenya (Dupas and Robinson, 2013) and educational expenditures in Nepal (Prina, 2015). Ashraf et al. (2010) found that consumption of female-oriented consumer durables increased for women below median decision making power at baseline. On the other hand, spouses are more likely to use resources for consumption when they receive a lumpsum transfer publicly. If the transfer is received privately, spouses prefer to deposit the money in their own account (Ashraf, 2009; Castilla, 2019). Therefore, reduced consumption and increased saving in response to a bank account can potentially imply more privacy and autonomy for women on how to use resources. Pangaribowo et al. (2019)'s analysis of individual and household assets in Indonesia shows that men were more likely to own household appliances. Therefore, a decline in consumption allocation to appliances can be inferred as improvements to women's decision making power in the household.

VII. Conclusion

This paper's motivation stems from the global emphasis on financial inclusion as a pathway to alleviate poverty. Although numerous studies have explored various financial inclusion mechanisms, such as microfinance, digital financial services, there is limited evidence on large-scale policies that directly increase bank account ownership, particularly in relation to women's empowerment. This paper seeks to fill that gap by investigating the effects of India's 2014 bank account expansion policy, which mandated free, on-demand accounts to unbanked individuals. Specifically, the research examines the impact of this exogenous shock to account ownership on women's decision-making ability.

Exploiting pre-policy differences in bank branch density bttween districts and applying a difference-in-differences (DiD) approach, this paper examines whether districts with lower bank branch density prior to the policy experienced greater improvements in women's empowerment outcomes than those with higher density. The study also evaluates changes in household resource allocation by comparing households where the wife opened a bank account shortly after the policy with those where she remained unbanked using an inverse probability-weighted DiD specification.

The results indicate no significant improvement in women's decisionmaking power or spending autonomy in districts that experienced substantial increases in account ownership. Analyzing a second order outcome of empowerment shows reduced violence against women related to control over material resources in these High Impact districts. Additionally, households with newly banked women showed an increased propensity to save in formal instruments and borrow from formal financial institutions, although there were no major changes in women's discretionary spending patterns.

This paper expands on studies of financial inclusion by providing empirical evidence of the effects of bank account ownership in a large-scale policy context. Unlike more targeted and localized interventions, broad regulatory policies that do not directly address user behavior are simpler and less costly for governments to implement. However, they can have limited impacts on women constrained by mobility and restrictive gender norms. As many low- and middle-income countries continue to prioritize financial inclusion, particularly through traditional banking, this study highlights the need to evaluate how such policies impact women's empowerment. It captures the effects of both the actual and perceived control over resources from owning a bank account. While increased account ownership may not directly improve women's decision-making, it appears to enhance household's financial inclusion through savings and credit. These findings suggest that financial inclusion policies should be accompanied by broader interventions that target gender inequality within households.

VIII. Tables

Variable	Full	Low impact		High impact				
	sample	Unbanked Banked		Unbanked	Banked			
	Household characteristics							
Alone/Joint decision on	0.49	0.48	0.54	0.45	0.54			
big purchases	(0.50)	(0.50)	(0.50)	(0.50)	(0.50)			
Spending autonomy	0.04	0.03	0.07	0.03	0.05			

Table 1: Descriptive statistics of district panel

Variable	Full	Low in	Low impact		High impact	
	sample	Unbanked	Banked	Unbanked	Banked	
	(0.20)	(0.17)	(0.25)	(0.18)	(0.22)	
Household size	5.55	5.64	5.14	5.84	5.28	
	(2.49)	(2.51)	(2.24)	(2.67)	(2.31)	
Female headed	0.12	0.10	0.15	0.10	0.16	
household	(0.33)	(0.30)	(0.36)	(0.30)	(0.37)	
Head household: Hindu	0.82	0.83	0.85	0.78	0.84	
	(0.38)	(0.37)	(0.36)	(0.42)	(0.36)	
Respondent: Years of	5.29	5.04	7.26	4.10	5.83	
schooling	(4.90)	(4.57)	(5.23)	(4.42)	(5.16)	
Respondent: Age	34.25	33.42	36.58	32.73	35.95	
	(8.35)	(8.50)	(7.58)	(8.54)	(7.69)	
Age at first marriage	14.98	15.47	15.24	14.85	14.46	
	(4.57)	(5.31)	(5.04)	(4.27)	(3.67)	
Age gap between	5.14	5.30	5.50	4.86	5.05	
spouses	(3.50)	(3.51)	(3.64)	(3.45)	(3.37)	
Respondent is employed	0.58	0.55	0.55	0.58	0.65	
	(0.49)	(0.50)	(0.50)	(0.49)	(0.48)	
Employed in agriculture	0.38	0.38	0.29	0.42	0.39	
	(0.49)	(0.49)	(0.45)	(0.49)	(0.49)	
Respondent has children	0.92	0.91	0.95	0.90	0.95	
	(0.27)	(0.29)	(0.21)	(0.30)	(0.22)	
Number of children	2.45	2.35	2.37	2.50	2.59	
	(1.50)	(1.49)	(1.32)	(1.61)	(1.44)	
	District	characteristic	cs			
Rural $(\%)$	71.05	64.9	64.97		76.55	
	(17.85)	(18.9)	97)	(14.76)		
SC/ST (%)	26.03	24.0)6	27.82		
	(12.72)	(11.5)	51)	(13.4)	17)	
Literate (%)	64.55	68.0)3	61.3	39	
	(9.48)	(8.9)	2)	(8.8)	6)	
Electricity (hours)	3.67	3.1	3.19		1	
	(2.51)	(1.6)	7)	(3.0	2)	
Road (kms)	3.67	3.1	5	4.15		
	(2.25)	(1.5)	1)	(2.6)	7)	
Violence by spouse/	207.25	203.	88	210.	43	
family members						

Variable	Full	Low impact		High impact	
	sample	Unbanked Banked		Unbanked	Banked
	(267.74)	(230.93)		(299.06)	
Sample size households	31,268	9,029	$5,\!802$	10,507	5,758
Sample size districts	329	161		169	

Notes: The table reports means of household variables from IHDS 2011-12. They are disaggregated by Low and High Impact districts, and banked and unbanked women within each type of district. The district variables are extracted from the 2011 Population Census. Districts are defined using the 2001 Population Census boundaries.

	Original sample			Inverse Probability Weighted Sample		
	Mean	Mean	Standardized	Mean	Mean	Standardized
	Treatment	Comparison	Mean Diff.	Treatment	Comparison	Mean Diff.
	(1)	(2)	(3)	(4)	(5)	(6)
Buddhist	0.006	0.001	0.021	0.002	0.002	-0.001
Christian	0.007	0.006	0.006	0.006	0.006	0.001
Hindu	0.845	0.831	0.024	0.833	0.831	0.002
Jain	0.001	0.000	0.003	0.000	0.000	0.000
Muslim	0.104	0.131	-0.047	0.127	0.128	-0.001
Intermediate Caste	0.114	0.072	0.078	0.081	0.081	0.000
Other Backward Caste	0.388	0.387	0.001	0.392	0.393	-0.001
Scheduled Caste	0.215	0.228	-0.020	0.231	0.229	0.004
Scheduled Tribe	0.048	0.060	-0.025	0.057	0.058	-0.001
Upper Caste	0.222	0.231	-0.014	0.218	0.219	0.000
Household head education level	4.004	3.653	0.160	3.719	3.704	0.007
Number women in household	2.028	2.020	0.008	2.049	2.050	-0.001
Number men in household	2.351	2.461	-0.107	2.416	2.415	0.001
Urban	0.694	0.607	0.126	0.628	0.625	0.004
Any woman in household: credit card	0.001	0.001	0.002	0.000	0.000	0.000
Any woman in household:	0.010	0.009	0.001	0.007	0.007	0.000
retirement savings						
Any man in household:bank account	0.926	0.944	-0.037	0.939	0.939	0.000
Any man in household:credit card	0.015	0.011	0.012	0.009	0.009	-0.001
Any man in household:	0.002	0.002	-0.001	0.001	0.001	0.001
Trading account						
Any man in household: Mobile	0.963	0.956	0.016	0.960	0.959	0.002

Table 2: Balance of covariates in original and inverse probability weighted (IPW) sample

Notes: The table reports mean estimates of variables in wave 2 (pre-policy) for the (original) sample of households drawn from CPdx (columns 1-2), and the standardized difference (column 3). The sample includes households where the wife of the male household head did not have a bank account in wave 2. In these households, she is the only spouse, and there is no older female present. A household is treated if the wife opened a bank account in the survey wave after policy implementation. In the comparison group, the wife did not own a bank account throughout waves 1-5. Columns 3 and 4 report means of the sample transformed using inverse probability weighting, and column 6 estimates the standardized mean difference between them.

	Alone/ joint	Money available
	decision on big	for autonomous
	household	use
	purchases	
	(1)	(2)
High impact \times	0.018	0.011
Pre-treatment time dummy	[0.026]	[0.020]
High Impact	-0.027	-0.029*
	[0.020]	[0.016]
Pre-treatment time dummy	-0.002	0.077^{***}
	[0.033]	[0.025]
Observations	57375	57454
R^2	0.025	0.067
Comparison group mean	0.51	0.86
State FE	Yes	Yes

Table 3: Parallel trends test: Effect of expansion in account ownership on women's empowerment

Notes: This table reports differences in empowerment outcomes between High and Low Impact districts in the years before policy implementation. Dependent variables are listed as column titles. The decision making variables - whether woman participates jointly or with spouse on decisions to purchase big household items, and has money available for autonomous use - are binary. High impact includes districts with bank branch density equal to the state median or less. Low impact includes the districts with branch density greater than state median. Bank branch density is calculated per 100,000 population. Only coefficients of interaction terms of High Impact districts with year dummy are reported. Districts are defined by 2001 Population Census Boundary. The sample includes districts where the account expansion policy (PMJDY) was implemented from August 2014 to August 2015. Decision making variables are extracted from nationally representative household surveys (IHDS 2005 and 2012), bank infrastructure is estimated using data from RBI and Population Census. All specifications include state fixed effects. Standard errors are clustered by state and reported in parentheses. * p < 0.1, ** p < .05, *** p < .01

	Changes in bank infrast			
	Alone/ joint	Money	Alone/ joint	Money
	decision on	available for	decision on	available for
	big household	autonomous	big household	autonomous
	purchases	use	purchases	use
	(1)	(2)	(3)	(4)
High impact \times	-0.004	-0.026	-0.004	-0.024
Post	[0.020]	[0.015]	[0.020]	[0.016]
High impact	-0.015	-0.015	-0.016	-0.015
nign impact	[0.022]	[0.010]	[0.022]	[0.010]
\mathbf{D}_{out} (Voors 9014)	0.233^{***}	-0.462^{***}	0.233***	-0.463***
1050 (10a1 > 2014)	[0.016]	[0.024]	[0.016]	[0.025]
Observations	77225	77371	76768	76916
R^2	0.063	0.237	0.063	0.238
Comparison group	0.65	0.62	0.65	0.62
mean				
State FE	Yes	Yes	Yes	Yes
Year FE	No	No	No	No
Bank Infrastructure	No	No	Yes	Yes

Table 4: DiD: Effect of expansion in account ownership on women's empowerment

Notes: This table reports differences in empowerment outcomes between High and Low Impact districts before and after policy implementation. Dependent variables are listed as column titles. The decision making variables - whether woman participates jointly or with spouse on decisions to purchase big household items, and has money available for autonomous use - are binary. High impact includes districts with bank branch density equal to the state median or less. Low impact includes the districts with branch density greater than state median. Bank branch density is calculated per 100,000 population. Post is a binary variable estimating differences before and after policy. Post is 1 for observations from DHS 2015-16 and 0 for IHDS 2011-12. Districts are defined by 2001 Population Census Boundary. The sample includes districts where the account expansion policy (PMJDY) was implemented from August 2014 to August 2015. Decision making variables are extracted from nationally representative household surveys (IHDS, DHS), bank infrastructure is estimated using data from RBI and Population Census. Districts not surveyed in both IHDS and DHS are excluded from analysis. All specifications include state fixed effects. Columns 3-4 also control for changes in bank branch density between 2014-16. Standard errors are clustered by state and reported in parentheses. * p < 0.1, ** p < .05, *** p < .01

	Women's preferences		Men's	Children's		Total exp-	
				preferences	educatio	n	enditure
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Wife banked \times	-19.966	47.730	-1.884	-8.276	-5.984	1.415	-273.168
Pre-treatment	[0.210]	[0.058]	[0.026]	[0.419]	[0.238]	[0.818]	[0.018]
dummy							
Wife banked in	8.451	8.485	0.869	2.662	3.917	-0.187	379.130
wave 3	[0.410]	[0.599]	[0.094]	[0.778]	[0.400]	[0.974]	[0.000]
Pre-treatment	28.315	13.874	-0.273	37.608	18.931	18.816	-18.851
time dummy	[0.099]	[0.586]	[0.712]	[0.000]	[0.000]	[0.005]	[0.811]
Sharpened	0.235	0.107	0.1	0.389	0.235	0.499	0.1
q-values							
Observations	159593	159593	159593	159593	159593	159593	159593
R^2	0.570	0.828	0.244	0.660	0.329	0.354	0.611
Comparison	396.59	3661.82	4.3	528.06	134.62	169.54	6195.45
group mean							
Non-zero	162620	162620	9810	148701	52330	71088	162620
observations							
District FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Controls included	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Table 5: Pre-trends test: Wife's account ownership and consumption allocations

Notes: This table reports changes in consumption allocations between households of the treatment and comparison groups before policy. Dependent variables are listed as column titles. Column 1 includes household's expenditure on clothing and footwear, cosmetics, accessories, and beauty goods and services; column 2 includes household essential items such as food and toiletries; column 3 includes time saving appliances (kitchen appliances), utensils and services (domestic help). Column 4 includes expenditure on tobacco products and liquor, shaving articles and fuel for purposes other than cooking. Columns 5 and 6 analyze effects on fees to schools, colleges/ private tuition and total expenditure on education (including books, uniforms etc.), respectively. The sample is restricted to households where the wife of household head didn't have a bank account in the second survey wave. The treatment group includes households where female spouse of household head opened a bank account in survey wave 3 (September - December 2014) and comparison group includes households where the spouse didn't own a bank account at least 1 year after implementation (waves 1-5). The pre-trend dummy variable is assigned 1 for CPdx's survey wave 2 (May to August 2014) and 0 for survey wave 1 (January to April 2014). The estimation controls for time varying characteristics of households and total monthly consumption expenditure. It includes district and survey wave fixed effects. Non-zero observations are the number of observations in the analytical sample where households reported positive expenditure. Standard errors are clustered by district. p values of coefficient terms are included in parentheses. The table reports sharpened two- stage q-values that correct the p-value of the interaction coefficient for the false discovery rate from testing multiple hypotheses. * p < 0.1, **p < .05, * * * p < .01
	Wom	en's prefei	rences	Men's	Children	ı's	Total exp-
				preferences	educatio	n	enditure
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Wife banked \times	5.441	11.893	-1.646	11.155	-11.347	-16.164	-820.488
Post-treatment	[0.779]	[0.658]	[0.004]	[0.294]	[0.044]	[0.018]	[0.000]
Wife banked in	-6.051	17.812	0.813	-11.744	12.026	16.685	619.900
wave 3	[0.636]	[0.342]	[0.061]	[0.229]	[0.012]	[0.003]	[0.000]
Post-treatment	61.718	53.820	0.792	-50.948	23.282	20.786	264.996
time dummy	[0.000]	[0.038]	[0.121]	[0.000]	[0.000]	[0.000]	[0.001]
Sharpened q-values	0.5	0.49	0.01	0.22	0.05	0.03	0.001
Observations	394079	394079	394079	394079	394079	394079	394079
R^2	0.521	0.817	0.174	0.642	0.343	0.350	0.560
Comparison	396.59	3661.82	4.3	528.06	134.62	169.54	6195.45
group mean							
Non-zero	406033	406033	25347	372518	142622	182262	406033
observations							
District FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Controls included	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Table 6: Inverse probability-weighted DiD: Wife's account ownership and consumption allocations

Notes: This table reports changes in consumption allocations between households of the treatment and comparison groups after policy. Dependent variables are listed as column titles. Column 1 includes household's expenditure on clothing and footwear, cosmetics, accessories, and beauty goods and services; column 2 includes household essential items such as food and toiletries; column 3 includes time saving appliances (kitchen appliances), utensils and services (domestic help). Column 4 includes expenditure on tobacco products and liquor, shaving articles and fuel for purposes other than cooking. Columns 5 and 6 analyze effects on fees to schools, colleges/ private tuition and total expenditure on education (including books, uniforms etc.), respectively. The sample is restricted to households where the wife of household head didn't have a bank account in the second survey wave. The treatment group includes households where female spouse of household head opened a bank account in survey wave 3 (September - December 2014) and comparison group includes households where the spouse didn't own a bank account at least 1 year after implementation (waves 1-5). The post-treatment dummy variable is assigned 1 for CPdx's surveys 3-5 (September 2014 to August 2015) and 0 for survey waves 1-2 (January to August 2014). The estimation controls for time varying characteristics of households and total monthly consumption expenditure. It includes district and survey wave fixed effects. Standard errors are clustered by district. Non-zero observations are the number of observations in the analytical sample where households reported positive expenditure. p values of coefficient terms are included in parentheses. The table reports sharpened two- stage q-values that correct the p-value of the interaction coefficient for the false discovery rate from testing multiple hypotheses. * p < 0.1, **p < .05, * * * p < .01

	Formal	Informal	Formal	Saving	Inves-	Gold
	Borrowin	gBorrowin	g Saving	SHG/MF	${ m I}{ m tment}$	Savings
	(1)	(2)	(3)	(4)	(5)	(6)
Woman banked in wave	-0.001	-0.001	0.003	0.000	0.013	0.007
$3 \times \text{Pre-treatment}$	[0.583]	[0.828]	[0.733]	[0.901]	[0.600]	[0.577]
dummy						
Woman banked in wave	-0.002	-0.005	0.008	-0.001	-0.007	0.001
3	[0.327]	[0.304]	[0.316]	[0.817]	[0.633]	[0.922]
Pre-treatment time	-0.001	0.000	-0.023***	-0.002	-0.073***	-0.040***
dummy	[0.320]	[0.860]	[0.001]	[0.403]	[0.000]	[0.001]
Sharpened q-values	1	1	1	1	1	1
Observations	40112	40112	40112	40112	40112	40112
R^2	0.111	0.290	0.458	0.261	0.478	0.487
Comparison group mean	0.007	0.03	0.069	0.004	0.082	0.058
Non-zero observations	385	1451	3259	312	4584	3266
District FE	Yes	Yes	Yes	Yes	Yes	Yes
Controls included	Yes	Yes	Yes	Yes	Yes	Yes

Table 7: Pre-trends test: Wife's account ownership and household borrowing, saving and investment

Notes: This table reports changes in household's uptake of financial services between the treatment and comparison groups before policy. The dependent variables specified in column title are binary indicators of whether-household has outstanding borrowing from a bank/ registered company (Column 1), informal source (Column 2), saved in bank/ post office deposits or government bonds (Column 3), saved in Self-Help group, Chit fund, microfinance institute (Column 4), has invested in shares, mutual funds/ real estate, (Column 5) and saved in gold/related assets (Column 6). The sample is restricted to households where the wife of household head didn't have a bank account in the second survey wave. The treatment group includes households where female spouse of household head opened a bank account in survey wave 3 (September -December 2014) and comparison group includes households where the spouse didn't own a bank account at least 1 year after implementation (waves 1-5). The pre-trend dummy variable is assigned 1 for CPdx's survey wave 2 (May to August 2014) and 0 for survey wave 1 (January to April 2014). The estimation controls for time varying characteristics of households and total monthly consumption expenditure. It includes district and survey wave fixed effects. Non-zero observations are the number of observations in the analytical sample where households reported use of financial service/product. Standard errors are clustered by district. p values of coefficient terms are included in parentheses. The table reports sharpened twostage q-values that correct the p-value of the interaction coefficient for the false discovery rate from testing multiple hypotheses. * p < 0.1, ** p < .05, *** p < .01

	Formal	Informal	Formal	Saving	Inves-	Gold
	Borrowin	g Borrowin	$\operatorname{gSaving}$	SHG/MF	'I tment	Savings
	(1)	(2)	(3)	(4)	(5)	(6)
Woman banked in wave	0.004^{*}	-0.007	0.100***	0.001	0.010	0.017
$3 \times \text{Post-treatment}$	[0.036]	[0.336]	[0.001]	[0.569]	[0.560]	[0.150]
dummy						
Woman banked in wave	-0.001	-0.007	-0.045^{*}	-0.001	-0.006	0.000
3	[0.538]	[0.229]	[0.011]	[0.661]	[0.572]	[0.953]
Post-treatment time	-0.004^{*}	-0.003	0.028^{*}	-0.008*	-0.103***	-0.064^{***}
dummy	[0.028]	[0.371]	[0.025]	[0.030]	[0.000]	[0.000]
Sharpened q-values	0.1	0.43	0.01	0.43	0.43	0.25
Observations	100293	100293	100293	100293	100293	100293
R^2	0.068	0.245	0.399	0.120	0.275	0.286
Comparison group mean	0.007	0.03	0.069	0.004	0.082	0.058
Non-zero observations	1043	3170	11184	509	8271	6099
District FE	Yes	Yes	Yes	Yes	Yes	Yes
Controls included	Yes	Yes	Yes	Yes	Yes	Yes

Table 8: Inverse probability-weighted DiD: Wife's account ownership and household borrowing, saving and investment

Notes: This table reports changes in household's uptake of financial services between the treatment and comparison groups after policy. The dependent variables specified in column title are binary indicators of whether-household has outstanding borrowing from a bank/ registered company (Column 1), informal source (Column 2), saved in bank/ post office deposits or government bonds (Column 3), saved in Self-Help group, Chit fund, microfinance institute (Column 4), has invested in shares, mutual funds/ real estate, (Column 5) and saved in gold/related assets (Column 6). The sample is restricted to households where the wife of household head didn't have a bank account in the second survey wave. The treatment group includes households where female spouse of household head opened a bank account in survey wave 3 (September -December 2014) and comparison group includes households where the spouse didn't own a bank account at least 1 year after implementation (waves 1-5). The post-treatment dummy variable is assigned 1 for CPdx's surveys 3-5 (September 2014 to August 2015) and 0 for survey waves 1-2 (January to August 2014). The estimation controls for time varying characteristics of households and total monthly consumption expenditure. It includes district and survey wave fixed effects. Non-zero observations are the number of observations in the analytical sample where households reported use of financial service/product. Standard errors are clustered by district. p values of coefficient terms are included in parentheses. The table reports sharpened two-stage q-values that correct the p-value of the interaction coefficient for the false discovery rate from testing multiple hypotheses. * p < 0.1, ** p < .05, * ** p < .01

IX. Figures



Figure 1: Districts included in sample

Notes: This is a district-wise map using boundaries consistent with the 2001 Population Census. The districts are characterized by their exposure to the policy. "High impact districts" are districts with less than/equal to state median bank branch density in March 2014 and "Low impact" are districts above state median branch density. Districts that were excluded from phase 1 of the account expansion policy are highlighted in dotted gray. Other districts excluded from the analysis include - districts not enumerated before and after policy change by household surveys on women's decision making (unbalanced panel), and belonging to Union Territories.



Figure 2: Correlation between bank branch and account before policy

Notes: The figure plots the correspondence between bank branches and accounts in a district before policy implementation. Districts are binned into percentile scores of total accounts (panel a) or account density (panel b). Plotting the average bank branches or branch density for each percentile shows that districts with more brick and mortar banks had more total accounts or accounts per person (respectively) in 2014. The density variables estimate bank branches/ total accounts in a district per 100,000 population. All variables are district-wise estimates from April 2013 until March 2014. Sources: Basic Statistical Returns, Reserve Bank of India and Population Census of India 2011. Author's calculations.



Figure 3: Trends in bank infrastructure and account ownership for High/Low Impact districts

Notes: This figure reports estimated annual trends in bank branch and accounts in High and Low Impact districts using Eq. 1. The specification controls for time-invariant characteristics of a district and variables correlated with both the outcome variable and assignment to High/Low Impact. The top left panel plots the estimated bank branch density (total bank branches per 100,000 population) in a district, top right panel reports bank account density, bottom left shows percent growth in bank accounts since 2006 and the bottom right shows percent difference in accounts since 2014. The x axis depicts years consistent with the Government of India's financial year where the financial year 2006 covers observations from April 1, 2005 until March 31, 2006, and so on. Each square is the estimated mean of the dependent variable for a High Impact district in that year, while every circle reports estimates for a Low Impact district. The vertical solid lines depict 95% confidence intervals and the red dashed line indicates policy implementation (in August 2014). For all panels except the one reporting percent difference in accounts since 2006 is omitted as reference group. In that last panel, the reference year omitted is 2014.



Figure 4: Distribution of Propensity Score across Treatment and Comparison Groups

Notes: The figure plots the predicted likelihood of wife of male household head opening a bank account in the survey wave after policy implementation (September to December 2014) for treatment and comparison groups. The treatment group consists of all households where the wife was unbanked before policy and opened a bank account in the survey wave after policy implementation. The comparison group includes households where the wife did not own a bank account before and through the first phase of the policy (until August 2015). Section B describes the covariates used to measure the propensity score and the logit regression (equation 3).

Appendix A. Data and variables

	Theme	Variable(s)	Unit	Years	Source	Enum-
			of			eration
			analys	is		type
		Alone/ joint participa-	Indiv-	2004-05,	IHDS,	Survey
		tion in decisions on big	idual	2011-12,	DHS	
	Women's	household purchases		2015 - 16		
	empower-	Using money au-	Distric	t		
Outcome	ment	tonomously				
variables		Cruelty by husband or		2011-16	NCRB	Census
		his relatives				
	Household	Monthly consumption	House-	2014-	CPdx	Survey
	resource	expenditures	hold	2015		
	allocation					
	Bank	Total bank branches	Distria	+ 2005 17	BBI	Concus
	adminis-	Total bank accounts	DISTIC	12000-17	IUDI	Census
	trative					
Fyplana	data					
tory	Population	Total population, lit-		2001	Office of	
voriables	character	eracy, rural/urban,	Distric	t_{2001}^{2001}	the	Census
variables	intica	SC/ST, school infras-		2011	Regis-	
	ISUICS	tructure, paved road,			trar	
		electricity supply			General	
					and	
					Census	
					Commissi	oner

Table A.1: Summary of datasets

A. Sampling methodology of household surveys

This section describes the sampling methodology of the three nationally representative household surveys used in the analysis.

India Human Development Survey (IHDS)

The survey was conducted in all states and union territories (except 2 - Andaman & Nicobar Islands and Lakshwadeep). It includes 382 of the

612 districts in India in 2001. The 2005 round interviewed 26,734 rural and 14,820 urban households. Both samples were selected by stratified sampling. The second round in 2011-12 re-interviewed 83% of households in the first survey round. counting split households as separate, the second round interviewed 27,579 rural and 14,573 urban households. They survey adopted 13,900 rural households from an older survey by the National Council of Applied Economics Research India and added an urban sample using enumeration areas from Census 2001. It selected towns using the probability proportional to population.

Demographic Health Surveys

The survey uses 2011 Census information to draw a stratified two-stage sample. The primary sampling unit (PSU) is the village in rural areas and the census enumeration block (CEB) in urban areas. Villages are selected with probability proportional to size from the sampling frame. Within each stratum (rural/urban), six substrata are created based on number of households in village and percentage share of scheduled casts and scheduled tribes in a village. The PSUs were sorted by literacy rate of women aged 6 and more, and final selection used probability proportional to size. Each selected urban and rural primary sampling unit was divided into segments of 100-150 households each and from each randomly selected segment, 22 households were randomly selected with systematic sampling.

Consumer Pyramids Household Survey (CPdx)

The CPdx stratifies 640 districts of the 2011 Population Census into 110 homogeneous regions (HRs) which groups districts with similar agro-climatic conditions, urbanization and female literacy levels as well as number of house-holds. The North-Eastern states and Union Territories are each treated as a single HR. Each HR is further stratified based on population into a Rural stratum, a Very Large Towns stratum, a Large Towns stratum, a Medium-sized Towns stratum and a Small Towns stratum based on distinct classification by number of households and not the percentile households within the HR. Therefore, there are unequal number of strata observed across HRs. The following regions were not fully surveyed and having missing strata: Andaman & Nicobar Islands, Arunachal Pradesh, Dadra & Nagar Haveli, Diu & Daman, Lakshadweep, Manipur, Meghalaya, Mizoram, Nagaland and Sikkim. The sampling strategy across the stratum is different: 25-30 villages were selected from each rural stratum using simple random sampling

and at least 1 town from each town-size stratum (if available). Households within each village are selected using Systematic Random Sampling where every n^{th} household was selected (*n* ranging from 5 to 15) to survey a total of 16 households per village. For each selected town, 21 CEBs were randomly selected and 16 households were selected from each CEB using systematic random sampling. The survey, therefore, has a larger sample of urban households. There were 166,744 households (47,715 rural and 119,029 urban) in 438 districts surveyed in the first wave (January to April 2014) and 158,666 households (46,604 rural and 112,062 urban) in 425 districts in the fifth wave (May-August 2015). Every sample household within a strata is meant to represent the same number of households from the population using the survey weight. These weights are calculated using population projections by the survey implementers. This weight is generated for each round of survey (wave).

B. Summary statistics by survey wave

Table A.2: Summary	^r statistics	of district	panel
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	Panel A: Individual and household covariates						
	Before policy				After policy		
	IHDS	2005	IHDS 2	2011-12	DHS 2015-16		
	Mean	SD	Mean	SD	Mean	SD	
Respondent has bank a/c	0.167	0.373	0.366	0.482	0.517	0.500	
Household has bank a/c	0.356	0.479	0.670	0.470	0.908	0.289	
Household size	5.595	2.487	5.439	2.423	5.511	2.605	
Number Adults	2.972	2.459	2.980	2.495	3.489	1.751	
Adult sex ratio	1.119	0.558	1.167	0.610	1.132	0.583	
Households with female head	0.081	0.273	0.126	0.332	0.100	0.300	
Urban	0.328	0.470	0.310	0.462	0.269	0.444	
Hindu: Head	0.825	0.380	0.829	0.377	0.812	0.391	
Muslim: Head	0.119	0.324	0.125	0.330	0.134	0.340	
Christian: Head	0.021	0.144	0.016	0.127	0.022	0.147	
Sikh: Head	0.014	0.119	0.013	0.111	0.017	0.128	
Jain: Head	0.002	0.047	0.002	0.046	0.002	0.042	
Buddhist: Head	0.007	0.086	0.008	0.089	0.008	0.091	
Scheduled Caste: Head	0.226	0.418	0.046	0.210	0.215	0.411	
Scheduled Tribe: Head	0.074	0.262	0.211	0.408	0.099	0.298	
Other Backward Caste: Head	0.049	0.216	0.432	0.495	0.455	0.498	
Intermediate Caste: Head	0.237	0.425	0.081	0.272	0.232	0.422	
Upper Caste: Head	0.049	0.216	0.046	0.210			
Head: Education	5.230	4.778	5.454	4.831	6.048	5.076	
Head: Age	32.817	8.079	47.028	12.542	46.737	13.061	
Respondent: Education	3.985	4.574	5.011	4.862	5.914	5.153	
Respondent: Age	33.475	7.946	34.171	8.413	32.787	8.530	
Respondent employed	0.258	0.437	0.506	0.500	0.299	0.458	
Employed in Agriculture	0.444	0.497	0.366	0.482	0.165	0.166	
Employed in Non-agriculture	0.086	0.281	0.188	0.391	0.134	0.149	
Number districts	35	0	35	50	57	75	
		Panel l	B: Distric	t-level ba	anking		
	Me	an	\mathbf{S}	D	Mean	SD	
Total branches	725.	466	619	.604	1097.399	895.130	
Total accounts	$1,\!520,\!9$	31.473	1,564,5	501.266	$3,\!142,\!346.893$	$2,\!580,\!975.683$	
Number districts		3	29		325		

Notes: The individual and household covariates are population weighted aggregates from nationally representative household surveys (IHDS and DHS). The sample districts are defined by 2001 Population Census boundaries. The district level banking aggregates are generated using administrative census data (RBI's Basic Statistical Returns). "Before Policy" includes aggregates of annual observations between April 2006 and March 2014 from the banking data. Aggregates for the banking variables in the period "After Policy" are estimated between April 2014 to March 2017.

	Wave 1		Wave 2		Wave 3		Wave 4		Wave 5	
	(Jan-An	or'14)	(May-A	ug'14)	(Sep-De	c'14)	(Jan-Ap	r'15)	(Mav-A	ug'15)
	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD
			Wife of h	nouseholo	d head ov	vns (%)			
Bank account	47.109	49.903	48.735	49.974	59.145	49.149	66.979	47.024	74.453	43.608
Credit card	0.377	6.126	0.400	6.316	1.230	11.021	0.853	9.195	0.632	7.928
Own mobile	39.135	48.794	40.156	49.010	46.757	49.888	50.535	49.992	53.449	49.876
phone										
		Nun	ber of w	omen in	the hous	sehold wi	$\operatorname{ith}\ldots$			
Bank account	0.714	0.797	0.742	0.802	0.896	0.833	1.008	0.844	1.100	0.835
Credit card	0.006	0.079	0.006	0.083	0.020	0.156	0.013	0.126	0.010	0.111
Own mobile	0.634	0.757	0.648	0.753	0.744	0.780	0.795	0.788	0.817	0.781
phone										
		\mathbf{Nu}	mber of	men in t	he house	hold wit	h			
Bank account	1.388	0.821	1.420	0.806	1.474	0.811	1.496	0.823	1.502	0.827
Credit card	0.055	0.254	0.055	0.253	0.093	0.346	0.073	0.297	0.061	0.269
Own mobile	1.459	0.822	1.479	0.804	1.498	0.807	1.504	0.806	1.477	0.799
phone										
			Ho	usehold o	lemograp	\mathbf{bhics}				
Household size	4.319	1.597	4.285	1.573	4.269	1.579	4.208	1.573	4.064	1.559
Number Adults	3.078	1.254	3.062	1.238	3.067	1.240	3.043	1.230	2.976	1.205
Adult sex ratio	1.040	0.548	1.035	0.541	1.040	0.552	1.038	0.549	1.033	0.541
Households with	9.607	29.469	9.836	29.780	10.063	30.084	10.453	30.595	10.803	31.042
female head $(\%)$										
Real monthly to-	8499.57	5249.39	8448.29	4902.09	8236.61	4588.89	8068.99	4457.61	8250.74	4416.89
tal expenditure										
Urban $(\%)$	70.304	45.692	70.484	45.611	70.387	45.655	69.517	46.034	70.141	45.764
Hindu	0.830	0.376	0.839	0.368	0.836	0.370	0.839	0.367	0.842	0.365
Muslim	0.107	0.309	0.108	0.310	0.109	0.312	0.107	0.309	0.104	0.305
Christian	0.017	0.130	0.015	0.121	0.016	0.126	0.016	0.124	0.018	0.132

Table A.3: Summary statistics of household longitudinal survey

	Wave 1		Wave 2		Wave 3		Wave 4		Wave 5	
	(Jan-Ap	or'14)	(May-A	ug'14)	(Sep-De	c'14)	(Jan-Ap	r'15)	(May-A	ug'15)
	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD
Jain	0.002	0.042	0.002	0.042	0.002	0.044	0.002	0.044	0.002	0.045
Buddhist	0.005	0.068	0.005	0.068	0.005	0.068	0.005	0.068	0.004	0.066
Scheduled Caste	0.178	0.383	0.178	0.382	0.179	0.384	0.183	0.387	0.181	0.385
Scheduled Tribe	0.031	0.174	0.030	0.170	0.030	0.170	0.031	0.172	0.030	0.170
Other Backward	0.376	0.484	0.379	0.485	0.381	0.486	0.384	0.486	0.387	0.487
Caste										
Intermediate	0.098	0.297	0.096	0.294	0.095	0.294	0.093	0.290	0.093	0.290
Caste										
Upper caste	0.316	0.465	0.317	0.465	0.314	0.464	0.309	0.462	0.310	0.462
Male head: Age	49.036	12.541	49.055	12.544	49.337	12.463	49.559	12.408	49.507	12.388
Male head: Edu-	8.236	5.477	8.253	5.470	8.203	5.466	8.154	5.456	8.207	5.369
cation										
Wife: Age	42.804	11.552	42.886	11.528	43.142	11.503	43.341	11.461	43.272	11.478
Wife: Education	6.506	5.480	6.490	5.476	6.507	5.489	6.514	5.473	6.595	5.397
Female head:	54.005	12.087	54.242	12.055	54.353	11.870	54.383	11.872	54.383	11.837
Age										
Female head:	4.374	5.062	4.256	5.037	4.264	4.994	4.244	4.998	4.294	4.989
Education										
N	144	,886	140	,627	136	,762	134	,060	135	,705

Notes: The table uses household weight provided by the survey to reports statistics for five waves ending August 2015. Each wave includes four consecutive months.

C. Variable definition

The variables used to measure women's empowerment are - self-reported participation in household's big purchase decisions, autonomous use of money and violence from spouse or his relatives. The decision making variables are extracted from IHDS and DHS and the The crime variable from NCRB's reports on Crime against Women. Table A.4 lists the survey questions used to create the indicators. The first indicator, women's self reported participation in household's decisions on purchase of big/ expensive items is constructed as binary indicator which assigns the value 1 when women respond if they make the decision independently or jointly with their spouse and 0 if the spouse and/or other members of the household make this decision. The indicator constructed for analysis is essentially a measure of joint decision making because the DHS asks respondents if she or other members "usually" make this decision, failing to capture whether the woman makes this decision independently always. The second indicator asks respondents if they have access to any money that they can autonomously decide how to spend. The variables in IHDS and DHS allow for a lower bound estimate of women's autonomous use of money as they differ in the source of money and type of expenditure they capture. The DHS asks if the money available to the woman is her own while the responses captured in IHDS could potentially include cash from another member's earnings. The IHDS specifically asks about household expenditures while the DHS does not limit the use of money by type of expenditure. The binary indicator constructed from these two variables is assigned 1 when they respond yes to a question and 0 if they respond no. Both indicators generate estimates for married women between the ages 15 and 49.

The third indicator, "cruelty" by spouse or his family members includes dowry-related violence. It includes any conduct that drives the woman to harm herself or harassment of the woman or her relatives "to meet any unlawful demand for any property or valuable security".

	Participation in pur- chase decisions (1)	Autonomous use of money (2)	Cruelty from spouse or family members (3)
IHDS (2005, 2012)	Who in your family decides the following: Whether to buy an ex- pensive item such as a TV or fridge?	Do you yourself have any cash in hand to spend on household expenditures?	
DHS (2015-16)	Who usually makes decisions about mak- ing major household purchases: mainly you, mainly your husband, you and your husband jointly, or someone else?	Do you have any money of your own that you alone can decide how to use?	
NCRB (2013- 2016)			Cruelty by Husband or his relatives (Sec. 498A Indian Penal Code)

Table A.4: Description of raw indicators: women's self-reported decision-making and police-reported crimes

Norms	Description
Trust in banking	 Whether household took loan from bank in last 5 years Whether household has confidence in bank to keep money safe
Gender Equality	 Family eats together or woman eats first Woman does not practice purdah (scree, curtain/ veil) Both men and women shop for food and vegetables Both men and women supervise children's homework Respondent and spouse discuss things that happen at work or farm Respondent and spouse discuss what to spend money on Respondent and spouse discuss things about the community such as elections or politics
Restrictive	 8. Woman is a nome-owner 1. Is it usual for husband to beat wife if she goes out without telling him 2. Is it usual for husband to beat wife if her natal family does not give gifts (money/ jewelry) 3. Is it usual for husband to beat wife if she neglects house or child 4. Is it usual for husband to beat wife if she doesn't cook food properly 5. Is it usual for husband to beat wife if he suspects her of having relations with other men 6. Women need permission to visit health centre 7. Women need permission to visit friend 8. Women need permission to go to local convenience store
Mobility	 Can visit health centre alone Can visit friends/ relatives alone Can visit local convenience store alone

Table A.5: Description of norms variables

Category	Variable	Description
Women's prefer- ences	1. Women's priva	te consumption
	Clothing and Footwear	Garments, Footwear and accessories such as accessories such like socks, tie, scarves, handkerchiefs, fabric and tailoring
	Accessories	Artificial jewelry, bags, wallets, watches, goggles, glasses and gems and jewelry
	Cosmetics	Includes 'dental care products', 'bathing soap', 'face wash', 'shaving articles', 'hair oil', 'shampoo and hair conditioner', 'powder', 'creams', 'deodor- ants and perfumes', 'henna, hair color, hair gel, etc.', 'lipstick and other cosmetics'
	Beauty products and services	Beauty enhancement services like beauty parlors, hair stylists, barber services, salons and spas, masseur services etc
	2 Essential goods	masseur services, etc.
	Food	Includes cereals & pulses, edible oils, spices, veg- etables & fruits, meat, fish & eggs, milk & milk products, ready-to-eat food, spices, bread, bis- cuits, namkeens & salty snacks, noodles & pasta, flakes, muesli & oats, confectionery & ice-creams, health supplements, tea, coffee, sweeteners, and beverages, juices & bottled water
	Toiletries	Includes detergent bar, powder, liquids, scourer and house cleaning agents, and other house care prod- ucts
	3. Substitutes for	women's time in domestic chores
	Time saving appliances and services	Gadgets such as toasters, water filters, microwave oven, refrigerator, cooking range, stove, mixer/- grinder, juicer, coffee machine, grill, induction, chimney, exhaust system and any other appliances that are used in kitchens to improve the efficiency of cooking

Table A.6: Description of raw indicators: household resource allocation

		Salary paid to maid servants, cooks, drivers, guards, gardeners, baby sitters and other staff, and laundry services
	Utensils	Cookware including cups, saucers, plates,
		spoons, containers, frying pans etc. and kitchen accessories including kitchen knives, cutting plates, sieves (chalni), can openers, coffee filters, etc.
Men's prefer-	Shaving articles	Shaving brush, razors, blades, shaving foams,
ences	Ū.	shaving gels, shaving lather sticks, after
		shave lotions and shaving creams
	Intoxicant	Cigarettes, 'bidis', other tobacco products and liquor
	Fuel other than cook-	Petrol and diesel or any other petroleum fuel
	ing	product for its own consumption
Education	School and college fees	Admission and exam fees, uniform, lab and
		library fees, extra classes, use of sport facili-
		ties etc.
	Private coaching	Private tutors or classes
	Stationery	Notebooks, writing pads, paper, pens and pencils, markers, erasers, rulers, compass set, pins staplers post-it and related articles
Borrowing	Household has	- Banks
0	outstanding debt in	- Employer
	formal sources	- Registered companies engaged in the busi-
		ness of loans and advances, insurance busi-
		ness or chit business
		- Microfinance Institution
		- Credit card
	Informal sources	- Moneylender
		- Kelatives or friends
		- Shops Other courses such as non professional
		money-lender religious institutions and mis
		sionaries etc

Savings	Formal sources	 Bank fixed deposits Schemes offered by India Post (eg. Post Office Savings Account, Post Office Time Deposit Account, Senior Citizen Savings Scheme etc.) Government bonds and Public Provident Funds Kisan Vikas Patra
	Women-oriented sources	Employee Provident FundSelf-Help GroupsChit funds
Investment	Household has outstanding investment	 Microfinance Institution Mutual funds Listed shares Private business enterprise including equity capital of an unlisted company, limited liability partnership or a contribution to a part
	Gold and related	 reship of a contribution to a part- nership or a proprietorship concern Real investment including house, plot of land, apartment, bungalow, office space, shop or farmhouse Gold assets or funds including gold bars, or- naments, jewelry and Gold Exchange Traded Funds

Appendix B. Tables

Table B.1: Differences in bank infrastructure and expansion of account ownership between High and Low Impact districts

	(1)	(2)	(3)	(4)
	Branch	Account	Percent growth	Percent difference in
	density	density	of accounts	accounts since 2014
High impact \times 2006				-4.94209**
				[1.770]
High impact \times 2007	-0.00001^{***}	-0.01342	3.55254	-4.25990**
	[0.000]	[0.009]	[2.627]	[1.720]
High impact \times 2008	-0.00002***	-0.03780***	4.67646	-4.44779**
	[0.000]	[0.011]	[3.127]	[1.904]
High impact \times 2009	-0.00003***	-0.05760***	8.48462**	-4.13515^*
	[0.000]	[0.012]	[3.792]	[1.984]
High impact \times 2010	-0.00004***	-0.07768***	12.23721**	-3.69719*
	[0.000]	[0.016]	[4.690]	[2.053]
High impact \times 2011	-0.00005***	-0.08718***	20.06069***	-2.01022
	[0.000]	[0.018]	[6.066]	[2.064]
High impact \times 2012	-0.00006***	-0.11585***	25.84749***	-1.24866
	[0.000]	[0.022]	[8.539]	[2.093]
High impact \times 2013	-0.00008***	-0.17381***	24.90572**	-4.60945
	[0.000]	[0.030]	[10.562]	[2.737]
High impact \times 2014	-0.00010***	-0.18226***	45.23505***	
	[0.000]	[0.031]	[15.461]	
High impact \times 2015	-0.00012***	-0.22146***	63.24235**	3.00752^{**}
	[0.000]	[0.038]	[23.060]	[1.390]
High impact \times 2016	-0.00013***	-0.24835***	85.75099***	7.10592**
	[0.000]	[0.043]	[29.213]	[2.501]
High impact \times 2017	-0.00014***	-0.27431***	101.94119***	9.33579**
	[0.000]	[0.051]	[35.161]	[3.502]
Observations	3936	3936	3936	3168
R^2	0.940	0.946	0.821	0.922
Adjusted \mathbb{R}^2	0.934	0.940	0.803	0.905

Notes: The table reports year-by-year differences in bank branch and account variables between High and Low Impact districts. High impact includes districts with bank branch density less than or equal to state median. Low impact includes the districts greater than state median. The dependent variables are listed as column titles. The density variables in columns 1 and 2 are estimated as bank branches or bank accounts per 100,000 population. Percent growth of bank accounts is estimated since 2006 in column 3. The estimation includes district fixed effects and controls selected by post double (LASSO) selection method (Belloni et al., 2013). The controls selected from LASSO for column 4 are the number of senior secondary schools in towns in 2011, change in length of paved roads connecting villages and change in hours of electricity supply to domestic users. Standard errors reported in parentheses are clustered at state level. * p< 0.1, ** p< .05, *** p< .01

	Cruelty by spouse/
	his family
	(1)
High impact \times (Year=2011)	27.847
	[35.132]
High impact \times (Year=2012)	22.352
	[31.824]
High impact \times (Year=2013)	11.314
	[28.049]
High impact \times (Year=2014)	8.052
	[33.501]
Observations	1236
R^2	0.526
Comparison group mean	195.8
State FE	Yes

Table B.2: Pre-trends test: District-wise account expansion and Dowry-related violence against women

Notes: This table reports differences in dowry-related violence against women between High and Low Impact districts in the years before policy implementation. The dependent variable is a continuous measure of the number of cases reported in a district in year t. High impact includes districts with bank branch density equal to the state median or less. Low impact includes the districts with branch density greater than state median. Bank branch density is calculated per 100,000 population. Only coefficients of interaction terms of High Impact districts with year dummy are reported. Districts are defined by 2001 Population Census Boundary. The sample includes districts where the account expansion policy (PMJDY) was implemented from August 2014 to August 2015. The variable is extracted from NCRB's dataset on Violence Against Women, bank infrastructure is estimated using data from RBI and Population Census. All specifications include state fixed effects. Standard errors are clustered by state and reported in parentheses. * p < 0.1, ** p < .05, * ** p < .01

		Changes in bank
		infrastructure
	Cruelty by spouse/	Cruelty by spouse/
	his family	his family
	(1)	(2)
High impact \times Post	-29.161*	-28.366*
	[16.271]	[15.274]
High impact	17.505	19.434
	[31.653]	[29.106]
Post (Year>2014)	16.477	17.221
	[12.589]	[12.643]
Observations	1830	1824
R^2	0.522	0.532
Comparison group mean	190.5	190.5
State FE	Yes	Yes
Year FE	Yes	Yes
Bank Infrastructure	No	Yes

Table B.3: DiD: District-wise account expansion and Dowry-related violence against women

Notes: This table reports differences in dowry-related violence against women between High and Low Impact districts in the years before policy implementation. The dependent variable is a continuous measure of the number of cases reported in a district in year t. High impact includes districts with bank branch density equal to the state median or less. Low impact includes the districts with branch density greater than state median. Bank branch density is calculated per 100,000 population. Post is a binary variable estimating differences before and after policy. Post=1 for years 2015-16 and 0 otherwise. Districts are defined by 2001 Population Census Boundary. The sample includes districts where the account expansion policy (PMJDY) was implemented from August 2014 to August 2015. The variable is extracted from NCRB's dataset on Violence Against Women, bank infrastructure is estimated using data from RBI and Population Census. All specifications include state fixed effects. Standard errors are clustered by state and reported in parentheses. * p < 0.1, ** p < .05, *** p < .01

Table B.4: DiD: Varying definition of High/Low Impact districts							
Discrete classification Continue							
	Government owned	Private owned	Branch density				
	(1)	(2)	(3)				
Panel A: P	ercent difference in a	counts since 201	4				
High impact \times Post	3.680	8.641***	-1.610^{***}				
	[3.050]	[2.702]	[0.339]				
High impact district	-1.779	-3.525^{**}	0.502^{***}				
	[1.358]	[1.251]	[0.119]				
Post (Year > 2014)	79.893***	77.360***	98.369***				
	[3.828]	[3.329]	[6.006]				
Observations	3619	3619	3608				
Comparison group mean	-18.36	-18.36	-18.36				
Panel B: Alone	e/ joint decision on bi	g household purc	hases				
High impact \times Post	0.021	-0.032	0.003^{*}				
	[0.015]	[0.020]	[0.002]				
High impact district	-0.038**	0.004	-0.001				
	[0.016]	[0.023]	[0.001]				
Post (Year > 2014)	0.220^{***}	0.248^{***}	0.198^{***}				
	[0.018]	[0.018]	[0.034]				
Observations	77225	77225	76768				
Comparison group mean	0.65	0.65	0.65				
Panel C:	Money available for	autonomous use					
High impact \times Post	-0.014	-0.017	0.003				
	[0.014]	[0.015]	[0.002]				
High impact district	-0.010	-0.019	0.002				
	[0.011]	[0.012]	[0.002]				
Post (Year > 2014)	-0.468***	-0.467^{***}	-0.510^{***}				
	[0.023]	[0.025]	[0.035]				
Observations	77371	77371	76916				
Comparison group mean	0.62	0.62	0.62				

Notes: I vary the definitions of High/Low Impact and tests the effects on growth in bank accounts since 2014 (panel A), and women's participation in decision making (panels B and C). Columns 1 and 2 define High/Low Impact by greater/less than median branch density of government and private owned banks, respectively. Column 3 tests effects of continuous variable of branch density. Post is a time dummy estimating differences before and after policy. Standard errors are clustered by state and reported in parentheses. * p < 0.1, ** p < .05, *** p < .01

	Proportion of		Proportio	n of
	households banked		women ba	anked
	(1)	(2)	(3)	(4)
High impact \times Post	-0.007	-0.008	0.030	0.028
	[0.019]	[0.019]	[0.024]	[0.023]
High Impact	-0.014	-0.013	-0.038	-0.037
	[0.020]	[0.020]	[0.023]	[0.023]
Post (Year> 2014)	0.228^{***}	0.229^{***}	-0.283***	-0.282***
	[0.020]	[0.020]	[0.020]	[0.020]
Observations	309231	307812	309231	307812
R^2	0.639	0.640	0.775	0.776
Comparison group mean	0.9	0.9	0.11	0.11
State FE	Yes	Yes	Yes	Yes
Bank Infrastructure	No	Yes	No	Yes

Table B.5: DiD: Effect of account expansion policy on account ownership in sample

Notes: This table reports differences in proportion of banked households (columns 1-2) and women (columns 3-4) in the sample between High and Low Impact districts before and after policy implementation. High impact includes districts with bank branch density equal to the state median or less. Low impact includes the districts with branch density greater than state median. Bank branch density is calculated per 100,000 population. Post is a binary variable that assigns 1 to observations from household survey after policy implementation (DHS 2015-16) and 0 to observations from survey before policy implementation (IHDS 2012). Districts are defined by 2001 Population Census Boundary. The sample includes districts where the account expansion policy (PMJDY) was implemented from August 2014 to August 2015. Decision making variables are extracted from nationally representative household surveys (IHDS, DHS), bank infrastructure is estimated using data from RBI and Population Census and information on crime is extracted from NCRB's dataset on Violence Against Women. Districts not surveyed in both IHDS and DHS are excluded from analysis. All specifications include state fixed effects. Columns 2 and 4 also control for changes in bank branch density between 2014-16. Standard errors are clustered by state and reported in parentheses. * p < 0.1, ** p < .05, * ** p < .01

	(1)	(2)	(3)	(4)	(5)	(6)
Panel	A: Alone/	joint decisio	on on big h	ousehold p	urchases	
High	-0.004	-0.004	-0.004	-0.006	-0.003	-0.005
impact \times	[0.020]	[0.020]	[0.020]	[0.020]	[0.020]	[0.020]
Post						
Gender equality	0.010				0.003	
	[0.008]				[0.009]	
Restrictive norms				0.009		0.009
				[0.006]		[0.006]
Trust in bank			-0.128^{***}		-0.122^{***}	-0.121^{***}
			[0.036]		[0.035]	[0.036]
Women's mobility		0.023			0.020	0.022
		[0.019]			[0.017]	[0.016]
High impact	-0.014	-0.014	-0.017	-0.015	-0.015	-0.015
	[0.022]	[0.022]	[0.020]	[0.021]	[0.021]	[0.020]
Post(Year > 2014)	0.233***	0.232***	0.232***	0.235***	0.231***	0.233***
	[0.016]	[0.016]	[0.016]	[0.017]	[0.016]	[0.016]
Observations	77225	77225	77225	77225	77225	77225
Comparison	0.65	0.65	0.65	0.65	0.65	0.65
group mean						
	Panel B: M	loney availa	able for aut	onomous u	se	
High	-0.025	-0.025	-0.025	-0.026	-0.024	-0.025
impact \times	[0.015]	[0.015]	[0.015]	[0.016]	[0.015]	[0.015]
Post						
Gender equality	0.015^{**}				0.009	
1 0	[0.007]				[0.008]	
Restrictive norms				0.003		0.003
				[0.004]		[0.004]
Trust in bank			-0.050*		-0.038	-0.045^{*}
			[0.024]		[0.024]	[0.023]
Women's mobility		0.030***	LJ		0.023*	0.029***
Ū		[0.010]			[0.013]	[0.010]
High Impact	-0.013	-0.013	-0.016	-0.015	-0.013	-0.014
	[0.010]	[0.010]	[0.010]	[0.010]	[0.010]	[0.010]
Post (Year>2014)	-0.463***	-0.464***	-0.463***	-0.462***	-0.464***	-0.464***
× /	[0.025]	[0.025]	[0.025]	[0.025]	[0.025]	[0.025]
	L J	L J	L J	L J	L J	L J

Table B.6: Mechanisms affecting account expansion and women's empowerment

	(1)	(2)	(3)	(4)	(5)	(6)
Observations	77371	77371	77371	77371	77371	77371
Comparison	0.62	0.62	0.62	0.62	0.62	0.62
group mean						

Notes: This table replicates the DiD results in 4 while controlling for norms that can potentially influence how account expansion impacts women's empowerment outcomes. These norms are measured as indices of ex-ante gender equality and restrictive norms in a household, household's trust and engagement with banks and women's mobility. See C for construction of each index. Dependent variables are listed as panel titles. The decision making variables - whether woman participates jointly or with spouse on decisions to purchase big household items, and has money available for autonomous use - are binary. The table examines differences between High and Low Impact districts over time. High impact includes districts with bank branch density equal to the state median or less. Low impact includes the districts with branch density greater than state median. Bank branch density is calculated per 100,000 population. Post is a binary variable estimating differences before and after policy. Post is 1 for observations from DHS 2015-16 and 0 for IHDS 2011-12. Districts are defined by 2001 Population Census Boundary. The sample includes districts where the account expansion policy (PMJDY) was implemented from August 2014 to August 2015. Decision making variables are extracted from nationally representative household surveys (IHDS, DHS), bank infrastructure is estimated using data from RBI and Population Census. Districts not surveyed in both IHDS and DHS are excluded from analysis. All specifications include state fixed effects. Standard errors are clustered by state and reported in parentheses. * p < 0.1, ** p < .05, ** p < .01

	Appliances	Rent & Utilities	Health
	(1)	(2)	(3)
Woman banked in wave 3	-4.164	0.787	5.424
\times Post-treatment dummy	[0.006]	[0.604]	[0.123]
Post-treatment time	4.987	-0.944	4.012
dummy	[0.001]	[0.276]	[0.161]
Woman banked in wave 3	1.298	-1.377	-3.849
	[0.199]	[0.253]	[0.149]
Comparison group mean	10.994	15.488	149.72
Sharpened q-values	0.024	0.754	0.249
Observations	394188	394188	394188
R^2	0.203	0.407	0.621
State FE	Yes	Yes	Yes
Controls included	Yes	Yes	Yes

Table B.7: Inverse-probability weighted DiD: Wife's account ownership and other consumption

Notes: This table reports changes in consumption allocations between households of the treatment and comparison groups after policy. Dependent variables are listed as column titles. Column 1 includes kitchen, household and mobile appliances column 2 includes house rent and utilities and column 3 includes expenditure on medicines, doctor's/physiotherapists and hospitalization fees, medical tests and health insurance. The sample is restricted to households where the wife of household head didn't have a bank account in the second survey wave. The treatment group includes households where female spouse of household head opened a bank account in survey wave 3 (September - December 2014) and comparison group includes households where the spouse didn't own a bank account at least 1 year after implementation (waves 1-5). The post-treatment dummy variable is assigned 1 for CPdx's surveys 3-5 (September 2014 to August 2015) and 0 for survey waves 1-2 (January to August 2014). The estimation controls for time varying characteristics of households and total monthly consumption expenditure. It includes district and survey wave fixed effects. The table reports sharpened two-stage q-values that corrects the p-value of the interaction coefficient for the false discovery rate from testing multiple hypotheses. Standard errors are clustered by district. p values of coefficient terms are included in parentheses. The table reports sharpened two- stage q-values that correct the p-value of the interaction coefficient for the false discovery rate from testing multiple hypotheses. * p < 0.1, ** p < .05, *** p < .01

Appendix C. Figures



Figure C.1: Percent annual increases in account ownership

Notes: This figure shows that the annual percentage increase in bank accounts for a given district was largest after PMJDY policy. The blue dots depict the average percentage change in total bank accounts for a district by financial year and the vertical lines represent 95% confidence intervals. The financial year 2015 starts April 1, 2014 and ends March 31, 2015.

Source: Basic Statistical Returns, Reserve Bank of India. Author's calculations.



Figure C.2: Trends in bank account ownership by sex

Notes: Percent share of bank accounts by sex over time. The vertical dash line signifies year PMJDY was implemented. The gender gap in account ownership started decreasing after 2011, and further reduced after the 2014 policy.

Source: World Bank Findex Data for India. Author's calculations.

Supplemental Appendix

Link to Appendix.

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