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Unlocking Rural Property Rights: Social Inclusion and Credit Expansion through SVAMITVA

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Abstract

The Government of India's introduction of the SVAMITVA scheme marks a landmark policy effort in rural property-rights reform. By seeking to provide formal recognition to residential abadi holdings that have long remained outside clear legal and financial records, the scheme lays foundation for stronger tenure security, better local governance and wider participation in formal credit markets. This paper evaluates how SVAMITVA by formalizing rural property rights has significantly enabled women and those at the bottom the pyramid to leverage such residential property rights as a collateral to gain access to formal credit. Using granular level data and high-dimensional fixed-effects difference-in-differences and triple-difference specifications, the baseline estimates show that sanctioned loan amounts increased by 23% in districts where SVAMITVA were implemented after rollout. The gains are distributionally progressive: borrowers from backward classes experience an additional 21% increase , while borrowers in Aspirational Districts record an additional 23% increase, both over common treatment effect of 23%. Among women, the strongest gains are concentrated at the bottom of the pyramid: the bottom 20% of women borrowers see a 24% increase in sanctioned loan amounts. In particular, across all such women, Muslim women exhibit an incremental 5.8% increase over the common treatment effect of 23%. This increase is significant as Muslim Women (Protection of Rights on Marriage) Act that was passed in 2019 rendered the practice of triple talaq void and aimed to strengthen Muslim women's legal protection. Thus, it is the possible that 2021 SVAMTIVA act coupled with 2019 Muslim Women Act has created a favorable institutional impact. Overall, the findings suggest that SVAMITVA relaxed collateral constraints, deepened formal credit access, and did so in a socially and spatially inclusive manner. We recommend that a SVAMITVA-like scheme be launched in urban India as well to integrate scattered land records across states and the ongoing NAKSHA scheme be extended to all Urban Local Bodies.

Keywords: SVAMITVA, property rights, credit, collateral

JEL: G21, G23, G51, P26

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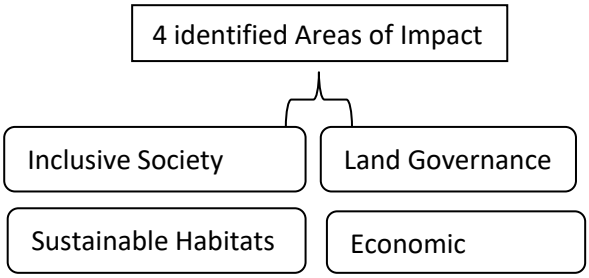
1. Introduction

SVAMITVA (Survey of Villages and Mapping with Improvised Technology in Village Areas) is a Central Sector initiative of the Ministry of Panchayati Raj that was rolled out across the country on 24 April 2021, after a pilot implementation in nine states during 2020–21. The scheme represents a significant institutional reform aimed at formalizing property rights in rural inhabited (Abadi) areas through the systematic use of drone-based cadastral mapping and the issuance of legally recognized property ownership cards. Historically, rural India has suffered from incomplete, outdated or non-standardized land records particularly within village habitation zones where informal property delineations have prevailed. This institutional ambiguity has constrained asset monetization, limited access to formal credit markets, and contributed to property-related disputes and planning inefficiencies. SVAMITVA address these structural constraints by creating accurate, geospatially validated land records that establish clear ownership titles for rural households. (Ministry of Panchayati Raj, 2021, 2023)[2]



The reform addresses a longstanding institutional gap in rural India. In many states, abadi areas were historically not surveyed or mapped with the same degree of administrative clarity as other land categories, leaving households without documentary proof to support formal transactions or access to institutional finance (Development Monitoring and Evaluation Office (DMEO), 2023).[3] SVAMITVA attempts to close this gap by generating geo-referenced maps, survey infrastructure, and property records through coordination among the Ministry of Panchayati Raj, State Revenue Departments, State Panchayati Raj Departments, and the Survey of India (Ministry of Panchayati Raj, 2021, 2023). In this sense, the scheme has been designed

[2] https://www.pib.gov.in/PressReleaseIframePage.aspx?PRID=1944989&reg=3&lang=2
[3] https://dmeo.gov.in/article/analysis-svamitva-scheme-successes-and-way-forward

to transform residential property in rural abadi areas from an informally or weakly documented asset into an administratively recognized and potentially bankable one.

By leveraging drone technology and Geographic Information Systems (GIS), the scheme introduces standardized, digitized land parcel maps that are legally integrated into state revenue records. The issuance of property cards formalizes previously undocumented or ambiguously recorded rural residential holdings effectively converting informal assets into legally enforceable property rights. In doing so the scheme operationalizes a core principle of institutional economics: that clearly defined and enforceable property rights form the foundation of functioning credit markets and efficient resource allocation.

Beyond property formalization, SVAMITVA is designed to generate multiple interlinked economic and governance outcomes.

First, it aims to reduce property-related disputes by providing authoritative ownership documentation, thereby lowering transaction costs and legal uncertainty in rural land markets.

Second, and central to this paper's focus the scheme seeks to enhance financial stability and inclusion by enabling rural households to use their property as a financial asset for accessing formal bank loans and other financial services. In contexts where collateral constraints bind particularly for socially and economically marginalized groups the formal recognition of property rights is expected to reduce information asymmetry and enforcement risk, thereby expanding access to secured lending.

Third, the creation of accurate land records facilitates the determination of property tax, strengthening the fiscal capacity of Gram Panchayats in states where taxation powers are devolved, and contributing to broader local revenue mobilization.

Fourth, the development of survey infrastructure and GIS-based village maps creates a public digital asset that can be leveraged across departments for planning, infrastructure development, disaster management and service delivery.

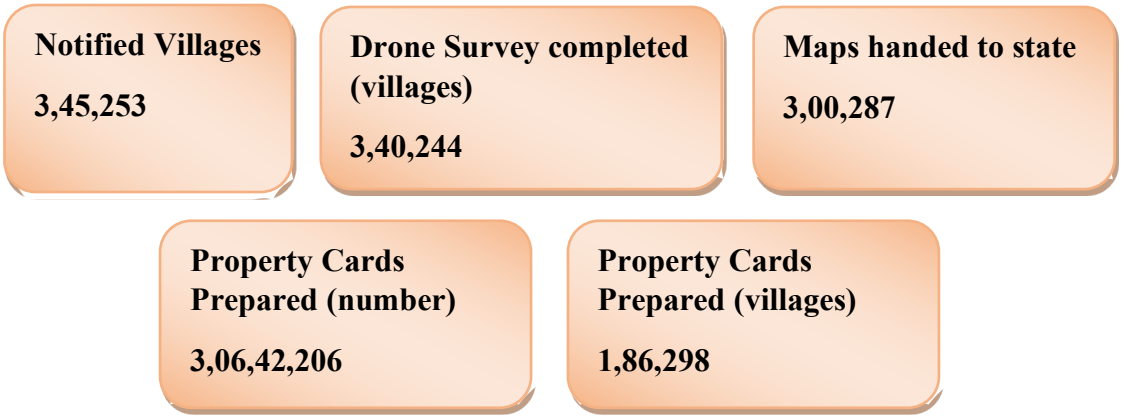
Finally, the integration of geospatial mapping with local governance processes supports the preparation of more robust and data-driven Gram Panchayat Development Plans, advancing the broader objective of decentralized planning and Gram Swaraj.

In sum, SVAMITVA represents not merely a land digitization initiative but a comprehensive institutional reform with implications for financial inclusion, local governance, dispute resolution, fiscal decentralization, and rural asset monetization. By transforming informal rural property into formally documented, legally recognized assets, the scheme has the potential to alter the functioning of rural credit markets and to generate significant heterogeneous effects across social groups and spatially lagging regions. It is within this broader institutional and economic context that the present study evaluates the impact of SVAMITVA on formal credit outcomes across districts in India.

2. SVAMITVA: Progress so far

The implementation of the SVAMITVA scheme has witnessed substantial progress since its nationwide launch, reflecting a rapid scale-up of drone-based cadastral mapping and the issuance of legally recognized property ownership documents across rural India. Official data from the Ministry of Panchayati Raj indicate that the scheme has achieved significant coverage within a relatively short time frame. As of early 2026, approximately 3.06 crore property cards have been prepared across nearly 1.86 lakh villages, marking a major milestone in the effort to formalize property rights in rural inhabited areas.[4]

Figure 1: Progress Snapshot



The scheme uses advanced geospatial technologies to create accurate property records in rural inhabited areas. Under the scheme, drone-based aerial surveys along with the Continuously Operating Reference Stations (CORS) network are employed to map the Abadi (residential) areas of villages with high precision. The survey process begins with the capture of high-

[4] https://www.pib.gov.in/PressReleasePage.aspx?PRID=2222547&reg=3&lang=1

resolution aerial images, which are then converted into orthorectified imagery and geo-referenced village maps. These maps are subsequently verified on the ground through field validation involving local authorities, panchayat representatives, and villagers to ensure the correctness of property boundaries. Based on the verified maps, State Governments issue Property Cards to property holders, formally recognizing their ownership rights. By leveraging such technology-driven mapping techniques, the scheme aims to establish clear and reliable property ownership records in rural areas, thereby improving land governance and facilitating better planning and access to credit.[5]

Table 1: SVAMITVA Progress so far

States/UTs	Property Cards prepared (villages)	Number of Property Cards prepared
Andaman and Nicobar Islands	141	7409
Andhra Pradesh	908	384336
Chhattisgarh	2557	196757
Dadra and Nagar Haveli and Daman and Diu	75	4397
Goa	410	672646
Gujarat	10122	1658089
Haryana	6260	2515646
Himachal Pradesh	364	5419
Jammu and Kashmir	1294	43910
Karnataka	4930	1038215
Ladakh	225	18788
Lakshadweep Islands	10	13563
Madhya Pradesh	39474	6565879
Maharashtra	22609	3758310
Mizoram	30	4041
Odisha	43	1716
Puducherry	92	2801
Punjab	319	43922
Rajasthan	15163	1443423
Tripura	893	571783
Uttar Pradesh	72938	11412927
Uttarakhand	7441	278229
Source: PIB		

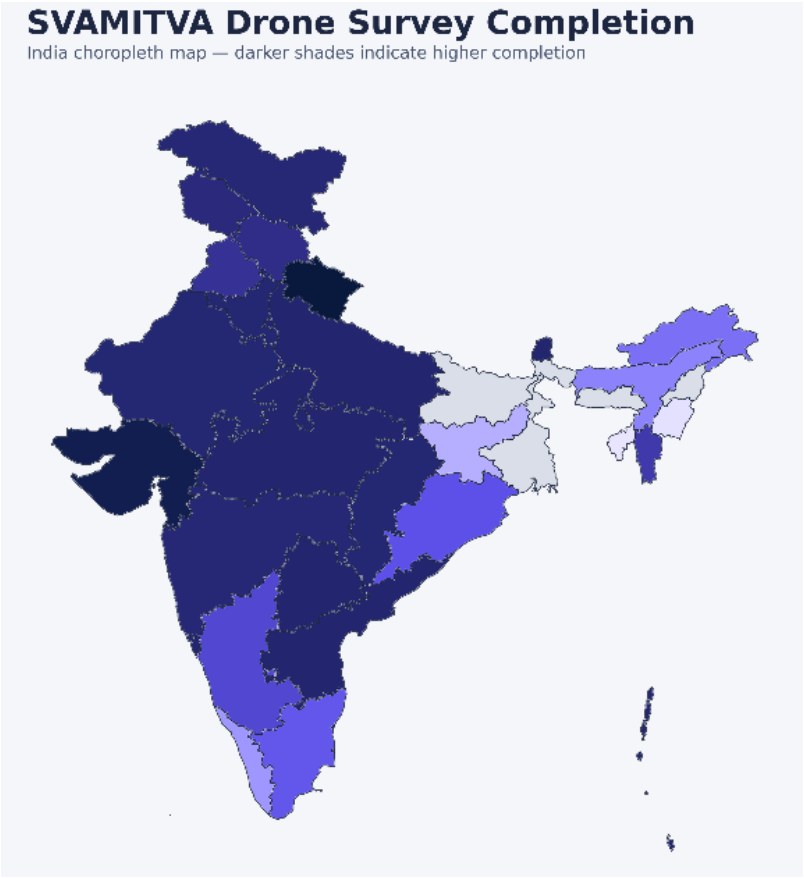
[5] https://www.pib.gov.in/PressReleasePage.aspx?PRID=2225839&reg=3&lang=2

The pace of implementation has also been reflected in several large-scale distribution initiatives. For instance, in January 2025 the Government of India facilitated the electronic distribution of 65 lakh property cards across more than 50,000 villages in ten states and two Union Territories, representing one of the largest single-day property rights distribution exercises globally.

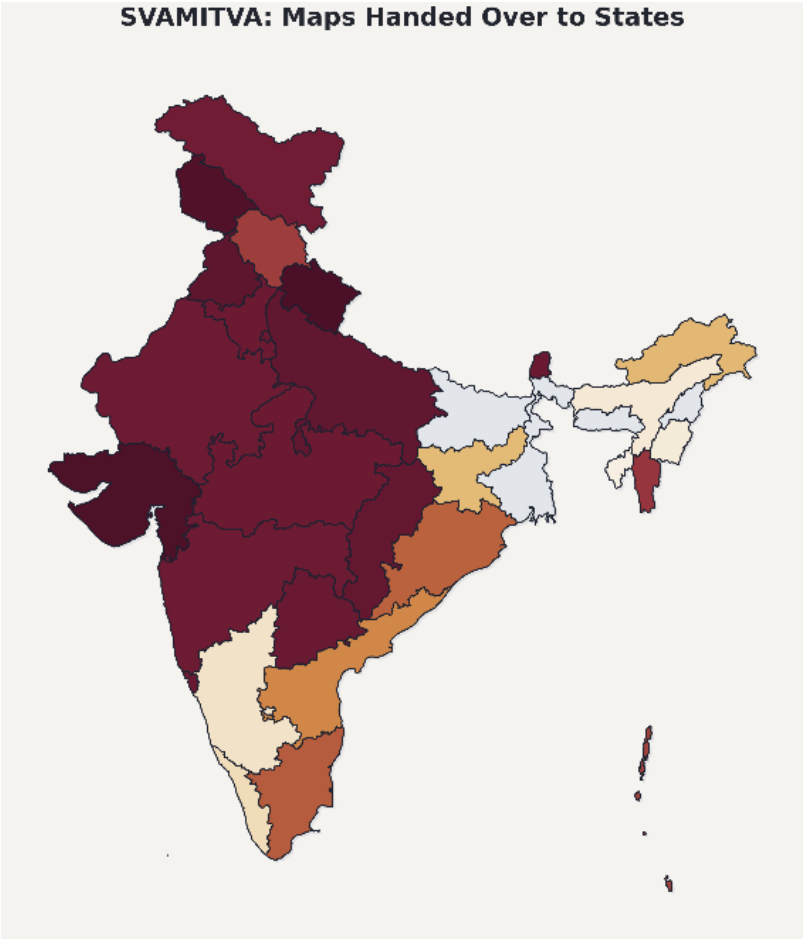
Two messages follow from the national pipeline. First, the survey stage is already close to saturation at the aggregate level: drone flying is complete in 95.6% of notified villages. Second, the larger remaining gap lies downstream: property cards have been prepared for 54.2% of notified villages, and 86.1% of prepared cards have been distributed. This suggests that the implementation frontier has shifted away from aerial mapping and toward ground verification, adjudication of claims, and state-level issuance logistics.

SVAMITVA Drone Survey Completion

India choropleth map — darker shades indicate higher completion



SVAMITVA: Maps Handed Over to States



3. Related literature

It is indeed true that well-defined property rights act as a catalyst for in investment and growth by enabling assets to be used as collateral, thereby reducing credit frictions (Besley,1995; Johnson et al., 2002; Field, 2007). A central theme in the literature is whether SVAMITVA can improve tenure security and reduce land disputes. Official narratives strongly assume that clearer boundaries, better records, and updated village-level spatial data will reduce conflict and lower transaction frictions.

This logic is also consistent with a broad literature in institutional economics and development. Secure and well-defined property rights can reduce uncertainty, strengthen investment incentives, improve transferability, and expand the scope for collateralized lending (Feder & Feeny, 1991; Besley, 1995). Subsequent work formalizes the idea that improving property rights may relax credit frictions the so-called "de Soto effect" while also showing that these gains can be heterogeneous across borrowers and credit-market environments (Besley, Burchardi, & Ghatak, 2012). Recent evidence from India is consistent with this mechanism: Subramanian and Kumar (2024) show that obtaining formal land titles increased formal borrowing, alongside improvements in investment and household welfare.

There is also evidence from states. For example, emerging state-level evidence from Haryana also reports benefits such as greater clarity of boundaries, better access to land records and enhanced transparency. On this reading, the scheme's main contribution is to make rural residential property more legible to both households and the state. (Dass & Dara, 2025; MoPR, 2025).

DMEO (2023) reinforces this interpretation by identifying two major outcomes of the scheme beyond card distribution: monetization of rural residential assets and clearer property-tax assessment. At the same time, both DMEO and the CSEP literature imply that these benefits are institutionally uneven. Tax gains depend on state law, actual devolution to Panchayats, and the capacity of local institutions to maintain and update records after the initial survey. Thara (2022) notes that if the scheme is expected to support taxation in areas previously exempt or untaxed, relevant state laws may need amendment to withstand legal scrutiny. Thus, the literature sees strong planning and fiscal potential but also emphasizes that potential does not translate into realized local-state capacity by itself. (DMEO, 2023; Thara, 2022).

D'Andrea et al. (2025) examine how technology and property rights jointly influence mortgage market development in Rwanda. Using quasi-experimental variation in 3G mobile internet rollout and a land tenure reform, the study shows that improved digital connectivity facilitates the distribution and verification of land titles, enabling their use as collateral and shifting borrowers from microfinance institutions to formal banks. The authors identify a key property rights channel, through which mobile internet enhances access to collateralized loans and mortgages, with mediation analysis showing that a large share of the effect operates via improved land titling. The findings further indicate that this transition improves credit allocation and stimulates real estate investment, highlighting how technological infrastructure can complement institutional reforms to deepen financial markets in developing economies.

Xue, F., Fan, M., Xue, S., & Zhao, X. (2025) examine the spillover effects of a property-rights reform on digital credit markets by exploiting China's 2016 Rural Land Management Rights Mortgage policy, which allowed rural households to use land-use rights as collateral. Using a difference-in-differences framework on peer-to-peer lending data, the authors show that strengthening collateral capacity in traditional banking generates significant positive spillovers into fintech credit markets. Specifically, male borrowers who predominantly hold land rights experience increased credit demand, larger loan sizes, lower interest rates, and reduced default probabilities, while no significant effects are observed for female borrowers, highlighting gender-based institutional asymmetries.

4. Methodology

The empirical strategy adopted in this paper is designed to identify the causal impact of the SVAMITVA reform on formal credit outcomes by exploiting temporal and spatial variation in the rollout of the scheme across districts using a quasi-experimental framework. Specifically, we implement a Difference-in-Differences (DID) methodology that compares changes in sanctioned loan amounts in districts exposed to the SVAMITVA programme with contemporaneous changes in districts that are not yet exposed to the scheme. The districts where SVAMITVA has been implemented are the "Treated Districts" or "Treatment Group" while the districts where SVAMITVA has not been implemented are the "Control Districts" or "Control Group".

The baseline estimating equation is specified with the natural logarithm of sanctioned loan amount as the dependent variable to mitigate the influence of extreme values in loan

distributions and allow coefficients to be interpreted in proportional terms. We begin with a canonical Difference-in-Differences (DID) framework. Let i index borrowers, $d$index districts, and $t$index time Formally, the specification can be expressed as

$$\ln(Loan_{idt}) = aTreatd + a2\ Post\ t + \beta(Treat_d \times Post_t) + \gamma_d + \delta_t + \epsilon_{idt},$$

$$\tau DID = [\mathbb{E}(Y_{idt} \mid Treat_d = 1,\ Post_{dt} = 1) - \mathbb{E}(Y_{idt} \mid Treat_d = 1,\ Post_{dt} = 0)] - [\mathbb{E}(Y_{idt} \mid Treat_d = 0,\ Post_{dt} = 1) - \mathbb{E}(Y_{idt} \mid Treat_d = 0,\ Post_{dt} = 0)].$$

where $Loan_{idt}$denotes the sanctioned loan amount for borrower i in district d and year t; $Treat_d$ is a district-level indicator equal to one for districts covered under SVAMITVA; and $Post_t$ captures the post-implementation period. The interaction term $Treat_d \times Post_t$ constitutes the DID estimator and identifies the average treatment effect under the parallel trends with the assumption that in the absence of the reform, treated and untreated districts would have followed similar credit trajectories over time.

To account for unobserved heterogeneity that may bias naïve comparisons, the specification incorporates district fixed effects (γ_d) which absorb all time-invariant district characteristics such as baseline financial development, land administration systems, socio-economic structure, and historical institutional capacity as well as year fixed effects (δ_t) which capture macroeconomic shocks, national credit cycle fluctuations, regulatory changes in banking and economy-wide credit supply shifts. Estimation is carried out using the high-dimensional fixed effects estimator, which efficiently partials out multiple levels of fixed effects while maintaining computational tractability in large administrative datasets. Standard errors are clustered at the district level to address serial correlation and heteroskedasticity arising from the fact that treatment assignment occurs at the district level and observations within districts are likely to exhibit correlated shocks. Since the scheme is implemented administratively at the district level but not every household necessarily receives a property card the DID coefficient is interpreted as an intent-to-treat (ITT) effect capturing the average district-level exposure to the reform rather than the treatment-on-the-treated effect at the individual borrower level.

The DID design relies on the parallel trends assumption: in the absence of the reform, treated and untreated districts would have experienced similar trends in sanctioned loan amounts over time. In our setting, this assumption is supported by the absence of differential pre-treatment

trends in the outcome variable, indicating that treated and control districts followed comparable trajectories prior to SVAMITVA implementation.

To further examine distributional heterogeneity and strengthen the identification strategy, the analysis extends the baseline DID framework to a Triple Difference (DDD) specification that interacts treatment exposure with borrower-level and district-level socio-economic characteristics. In particular, we introduce interaction terms with a caste disadvantage dummy (equal to one for Scheduled Castes, Scheduled Tribes, and Other Backward Classes) and a district-level indicator for Aspirational District status, thereby estimating whether the credit effects of SVAMITVA differ systematically across historically marginalized social groups and developmentally lagging regions.

Let Z_{id}denote a generic indicator for belonging to subgroup Z, $Z_{id}$is alternately defined as an indicator for socially backward classes, Muslim women, or aspirational districts. Let D_{dt}denote treatment exposure, defined as

$$D_{dt} = Treat_d \times Post_{dt},$$

The DDD specification includes all lower-order interaction terms to avoid omitted variable bias and can be expressed as

$$\ln (Loan_{idt}) = \beta_1(D_{dt}) + \beta_2(\, Z_{id}) + \beta_3(D_{dt}\; x\; Z_{id}\,) + \gamma_d + \delta_t + \epsilon_{idt}.$$

The triple interaction coefficients isolate the incremental treatment effect for disadvantaged groups and aspirational districts relative to their respective reference groups while netting out baseline caste disparities, spatial development gaps, and group-specific time trends unrelated to the reform. In effect, the DDD estimator differences out three sources of variation i.e. across time, across treated and untreated districts, and across social or spatial subgroups thereby strengthening causal inference by controlling for confounding trends that could otherwise bias the DID estimates.

The DDD estimate can be expressed directly in terms of conditional expectations as

$$\begin{aligned}\tau^{DDD} = [(\mathbb{E}[Y_{idt} \mid Treat_d = 1, Post_{dt} = 1, Z_{id} = 1] - \mathbb{E}[Y_{idt} \mid Treat_d = 1, Post_{dt} = 0, Z_{id} \\ = 1]) - (\mathbb{E}[Y_{idt} \mid Treat_d = 0, Post_{dt} = 1, Z_{id} = 1] - \mathbb{E}[Y_{idt} \mid Treat_d \\ = 0, Post_{dt} = 0, Z_{id} = 1])]\end{aligned}$$

$$-[(\mathbb{E}[Y_{idt} \mid Treat_d = 1, Post_{dt} = 1, Z_{id} = 0] - \mathbb{E}[Y_{idt} \mid Treat_d = 1, Post_{dt} = 0, Z_{id} = 0]) - (\mathbb{E}[Y_{idt} \mid Treat_d = 0, Post_{dt} = 1, Z_{id} = 0] - \mathbb{E}[Y_{idt} \mid Treat_d = 0, Post_{dt} = 0, Z_{id} = 0])],$$

where $Y_{idt} = \ln(Loan_{idt})$

This can be read as the difference between two DID estimators: one computed for subgroup $Z = 1$, and the other for subgroup $Z = 0$. Equivalently,

$$\tau^{DDD} = DID_{Z=1} - DID_{Z=0}.$$

Under the maintained identifying assumptions, the regression coefficient $\theta_3$consistently estimates τ^{DDD}.

While the baseline DID and DDD specifications estimate average treatment effects, they may mask important distributional heterogeneity. In particular, if SVAMITVA disproportionately affects borrowers at the lower end of the formal credit distribution, mean effects alone may understate the policy's redistributive implications. To examine this, we estimate DID models separately across quantiles of the loan distribution for women borrowers.

Let $q \in Q$denote a set of quantile groups, such as the bottom 25th %ile, 25th–50th %ile, 50th–75th %ile, and top 25th %ile of the sanctioned loan amount distribution. For each quantile group q, we estimate:

$$\ln(Loan_{idt}) = \beta_0^q + \beta_1^q(Treat_d \times Post_{dt}) + \gamma_d^q + \delta_t^q + \varepsilon_{idt}^q$$

on the subsample of women borrowers belonging to quantile group q. The coefficient β_1^qtherefore measures the treatment effect of SVAMITVA for women in that segment of the loan distribution.

This approach allows the treatment effect to vary flexibly across different parts of the credit distribution and is especially useful for identifying whether the reform disproportionately benefits women with smaller initial loan access, who are more likely to be financially constrained. A larger estimated effect in the lower quantiles would indicate that the reform has an inclusion-enhancing effect by disproportionately increasing access to formal credit among women at the bottom of the borrowing distribution. Quantile groups are defined using the pre-reform distribution of sanctioned loan amounts so that subgroup assignment is not itself endogenously influenced by treatment.

Identification therefore arises from differential within-district changes in credit outcomes across time and across socio-economic categories, conditional on district and year fixed effects. The logarithmic specification ensures that estimated coefficients can be interpreted as elasticities reflecting proportional changes in loan amounts, allowing meaningful comparison of credit responses across heterogeneous borrowers and districts. Taken together, the combined DID and DDD framework provides a rigorous empirical strategy to evaluate both the average impact of the SVAMITVA reform and its heterogeneous effects across socially disadvantaged groups and developmentally lagging regions, while addressing potential sources of omitted variable bias, serial correlation, and unobserved heterogeneity inherent in observational policy evaluation.

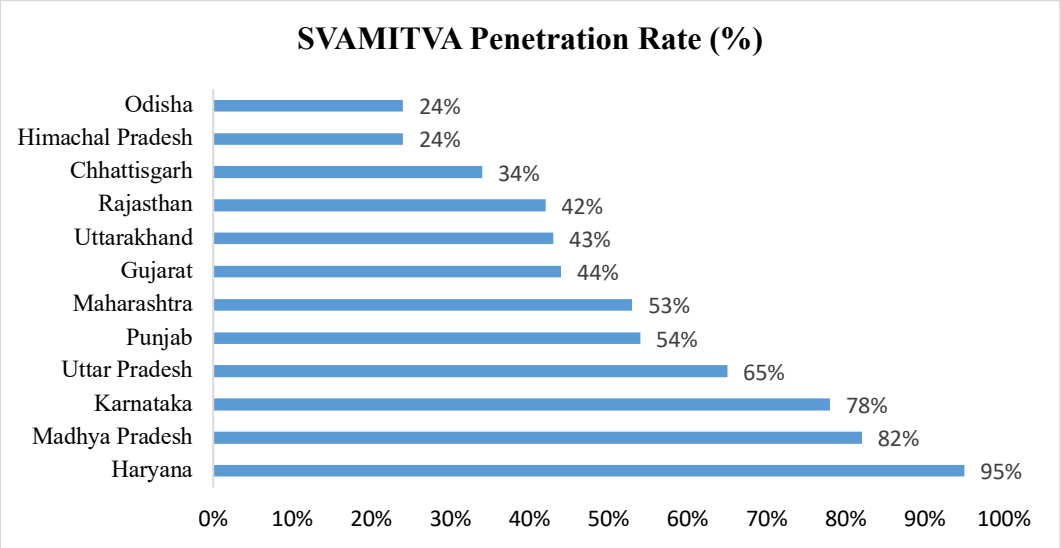
5. Impact Assessment

To address the concern that not all borrowers in treated districts directly received a SVAMITVA property card, we explicitly ground our empirical design in both program penetration metrics and the institutional nature of the reform. Using administrative data on the total number of property cards issued under SVAMITVA at the state level, we first compute the average number of property cards per village by dividing total cards issued by the total number of villages in the state. We then use Socio-Economic Caste Census (SECC) data to calculate the average number of rural households per village (total rural households divided by total villages). The ratio of average property cards per village to average rural households per village yields an estimated penetration rate of approximately 53%. This implies that more than half of rural households, on average, are covered under the reform in treated areas, indicating that SVAMITVA is not a marginal or narrowly targeted intervention but one with substantial spatial saturation. From an identification perspective, this magnitude of penetration supports treating SVAMITVA as a district-level institutional shock rather than a sparse individual-level intervention.[6]

[6] Notes: 1) Andhra Pradesh's total rural household data is not available post bifurcation and hence not mentioned here

2) Penetration rate has been calculated as average number of property cards per village divided by the average number of households in each village

Figure 2: SVAMITVA Penetration Rate



Source: Author's Computation using SVAMITVA Data and SECC

Econometrically, our Difference-in-Differences specification therefore estimates an Intent-to-Treat (ITT) effect, defined at the district level, rather than a Treatment-on-the-Treated (TOT) effect at the borrower level. Since treatment assignment (SVAMITVA rollout) occurs administratively at the district level and affects land record digitization, cadastral mapping, collateral verification procedures and banking practices within the district's institutional ecosystem, it plausibly alters credit supply conditions for all rural borrowers both direct beneficiaries and indirectly exposed households.

Furthermore, treatment is constant within districts by construction, and we cluster standard errors at the district level to account for within-district correlation in both exposure and credit outcomes. District fixed effects absorb time-invariant heterogeneity in financial development, land market structure, and institutional quality, while year fixed effects absorb aggregate credit cycle fluctuations and macroeconomic shocks. Identification thus comes from within-district changes in credit outcomes in treated districts relative to contemporaneous changes in control districts. Given the substantial penetration rate, the administrative level of implementation, and the institutional mechanisms through which land formalization affects collateral constraints, assigning treatment at the district level is both theoretically coherent and econometrically appropriate.

5.1 Aggregate effects of SVAMITVA on Formal Credit Outcomes

The mechanism through which SVAMITVA is expected to influence credit access operates not merely through mapping, but through the formalization of a previously informal rural asset into a form that is more legible, verifiable, and economically usable within the formal financial system. In many village abadi areas, households may enjoy de facto possession of residential property, but in the absence of standardized and legally recognized records, such assets remain difficult for banks to verify, value, and consider in credit appraisal. By generating a formal Record of Rights and property card based on geospatial survey and administrative recognition, SVAMITVA reduces ambiguity, thereby strengthening the credibility of the asset in the eyes of lenders. This can ease credit constraints through several interrelated channels. First, clearer and more enforceable property rights enhance the effective collateral value of the property by improving lenders' confidence that the asset is identifiable, attributable to the borrower, and less encumbered by dispute or uncertainty (Besley, 1995; Deininger & Feder, 2009).

Second, formal records reduce information asymmetries and lower transaction and verification costs in the loan approval process, which is especially important in rural markets where informal tenure historically limited the integration of households into formal banking systems. Third, legal recognition may change borrower behaviour itself: once households possess documentary proof of ownership, they may view the property as a financeable asset, feel more secure in undertaking investment, and become more willing to approach formal institutions for loans related to housing improvement, non-farm enterprise, agriculture, or consumption smoothing. In this sense, SVAMITVA's effect on credit should be understood as the outcome of a broader asset-formalization process that improves both the supply conditions of lending and the demand for formal borrowing.

The estimated DID coefficient on the SVAMITVA treatment interaction is 0.2306, suggesting a positive and economically meaningful effect on sanctioned home loan amounts. From an econometric standpoint, this coefficient measures the post-treatment change in treated districts relative to the contemporaneous change in untreated districts, net of fixed cross-district differences and aggregate period effects captured in the model. Accordingly, the estimate identifies the average treatment effect of SVAMITVA on sanctioned housing credit. Thus, treated districts witmessed a 23% rise in credit post SVAMITVA implementation compared to the control districts.

From an economic standpoint, the result supports the hypothesis that formalization of property rights in village abadi areas enhances households' integration into formal credit markets. By generating a recognized Record of Rights, SVAMITVA appears to have improved the verifiability, security, and collateral relevance of residential property, thereby reducing lender risk and easing borrowing constraints. The positive coefficient therefore suggests that the scheme strengthened the transmission from rural property ownership to formal financial access, leading to higher sanctioned home loan amounts in treated districts.

Table 2: HDFE Regression Estimation

Statistics robust to heteroskedasticity

Number of Obs. = 199131

	Loan Sanctioned (Log Amount)
Treat * Post	0.2306 (0.003)***
R-squared	0.6573
Fixed Effects	Included
HDFE Groups Absorbed	2

Standard errors clustered at district level

Notes: Estimated using a high-dimensional fixed effects specification. Robust standard errors in parentheses. The interaction term **Treat × Post** is the difference-in-differences estimator. Significance levels: *** $p < 0.01$, ** $p < 0.05$, * $p < 0.10$.

5.2 Distributional and Spatial Heterogeneity

Land formalization, cadastral mapping programs are predicted by theory to relax collateral constraints, reduce informational frictions and lower enforcement costs. These are mechanisms that generate larger credit responses among economically excluded groups. The argument is that secure, documented property rights convert illiquid, informally held assets into bankable collateral, thereby lowering lender perceived risk and screening costs and increasing credit supply; (Hernando de soto).

5.3 SVAMITVA and Social Equity: Credit Gains among Backward Classes

In the Indian context, caste-based exclusion has been shown to create observable gaps in formal credit access. A policy that increases verifiable documentation can, in principle, have a larger marginal impact for SC/ST/OBC households who previously faced binding documentation and enforcement constraints. Complementary evidence on gender shows that putting women's names on land titles and improving formal recognition can increase women's bargaining power and, in some contexts, their access to credit. Taken together, the literature implies a clear empirical hypothesis for SVAMITVA: because SVAMITVA creates verifiable, standardized property documentation across rural localities. It should thus relax collateral constraints and increase formal loan amounts for historically disadvantaged social groups.

The persistence of caste-based disparities in access to formal finance in India is well documented in the empirical literature. (Sangwan, N., & Saha, B., 2026) have shown that households belonging to General Castes are significantly more likely to apply for and receive loans from formal banking institutions, and when they do borrow, they obtain larger sanctioned amounts relative to households belonging to Scheduled Castes (SC), Scheduled Tribes (ST), and Other Backward Classes (OBC). In contrast, SC/ST/OBC households exhibit a higher reliance on informal sources of credit, particularly moneylenders, suggesting either constrained access to formal channels or self-selection away from formal institutions due to anticipated rejection, documentation barriers, or discriminatory treatment. This residual gap indicates that structural and possibly discriminatory factors may be at play within formal financial institutions.

Such findings are consistent with theories of caste-based discrimination, wherein lenders may perceive borrowers from historically marginalized castes as riskier, less creditworthy. Moreover, lower-caste households often possess informal or inadequately documented landholdings which further weakens their ability to provide legally enforceable collateral which is a critical requirement in formal secured lending.

This entrenched structural disadvantage in formal credit markets implies that reforms enhancing the verifiability and standardization of property rights documentation such as SVAMITVA's issuance of legally recognized property cards could play a pivotal role in mitigating collateral related exclusion.

Our results (*presented in Table 3*) indicate that after the rollout of SVAMITVA, borrowers belonging to backward classes in treated districts experienced an additional increase of 21% in

sanctioned loan amounts relative to non-backward-class borrowers, over and above the general post-treatment effect and net of fixed differences across districts and time.

Substantively, this suggests that SVAMITVA may have been especially effective in easing collateral and documentation constraints for historically disadvantaged caste groups, enabling them to translate formalized property rights into better access to formal credit. The broader implication is that the scheme is not only a land-records reform but also a potentially socially equalizing institutional intervention, with the capacity to reduce long-standing caste-based barriers in rural credit markets.

5.4 Regional Inclusion under SVAMITVA: Evidence from Aspirational Districts

The 112 districts targeted under NITI Aayog's Aspirational Districts Programme constitute a distinct case for potentially large policy returns from institutional reforms like SVAMITVA because they combine low baseline service/institutional quality with concentrated development deficits; the ADP itself is designed to accelerate convergence through concentrated monitoring, convergence of schemes and governance improvements. From an economic perspective, reforms that raise the quality and reliability of local public goods (land records, cadastral information, mapping) have greater marginal impact where baseline institutions are weakest: when title uncertainty and operational frictions are high, formalization creates a larger step change in the feasibility of secured lending, risk assessment, and collateral enforcement.

Recent empirical work and theoretical modeling emphasize that the effectiveness of titling reforms is modulated by lender competition and enforcement capacity — precisely the dimensions where aspirational districts typically lag — so formalization should yield proportionally larger credit supply responses in these districts than in better-served areas. Policy evaluations of the Aspirational Districts Programme document that concentrated administrative effort and convergence of schemes can rapidly change district-level service delivery and institutional capacity; when a land formalization program coincides with such focused governance attention, the combined institutional shock is likely to produce amplified credit-market responses. Finally, official SVAMITVA implementation metrics show rapid scale-up (millions of property cards, wide drone mapping coverage), which implies that aspirational districts in particular could experience substantive gains and therefore stronger supply-side shifts in bank behavior.

Our findings (*presented in Table 3*) indicate that a triple-difference result showing an additional 22% gain implies that, after the rollout of SVAMITVA, borrowers in Aspirational Districts

experienced a larger increase in sanctioned loan amounts in treated districts than comparable borrowers in non-Aspirational Districts, over and above the general post-SVAMITVA effect.

This is an important finding because it indicates that SVAMITVA may not simply improve credit outcomes on average but may also help narrow regional disparities by enabling households in historically underdeveloped districts to better leverage their residential assets in formal credit markets. The broader policy implication is that digital property-rights reforms helps to deepen financial access in spatially disadvantaged areas where traditional credit penetration has remained limited.

5.5 Empirical Results and findings

To examine whether the credit expansion effects of SVAMITVA are distributionally and spatially heterogeneous, we extend the baseline district-level Difference-in-Differences (DID) framework to a Triple Difference (DDD) specification that interacts treatment exposure not only with the post-implementation period but also with borrower-level social disadvantage (SC/ST/OBC) and district-level structural backwardness (Aspirational District status). The baseline DID identifies the average intent-to-treat effect of district-level SVAMITVA rollout on sanctioned loan amounts by comparing within-district changes in treated districts relative to contemporaneous changes in untreated districts, controlling for district fixed effects (which absorb time-invariant heterogeneity such as historical land institutions, baseline financial depth, and structural economic conditions) and year fixed effects (which net out macroeconomic shocks, national credit cycles, inflationary pressures, and regulatory changes).

Formally, the estimating equation is:

$$ln(Loan_{idt}) = \beta 1(Treat_d \times Post_t) + \beta 2\ (Treat_d \times Post_t \times Disadv_i) + \gamma_d + \delta_t + \varepsilon_{idt}$$

$$ln(Loan_{idt}) = \beta 1(Treat_d \times Post_t) + \beta 2\ (Treat_d \times Post_t \times Aspi_i) + \gamma_d + \delta_t + \varepsilon_{idt}$$

where $Treat_d$ indicates districts exposed to SVAMITVA rollout
$Post_t$ captures the post-implementation period
$Disadv_i$ is a dummy equal to 1 for SC/ST/OBC borrowers
$Aspi_i$ is a dummy equal to 1 for Aspirational Districts

Econometrically, this ensures that the estimated triple interaction coefficients isolate the incremental policy-induced change for disadvantaged caste borrowers and aspirational districts

relative to their respective reference groups, netting out baseline caste gaps, spatial development gaps, and group-specific time trends unrelated to the reform.

Table 3. Triple-Difference Estimates: Social and Spatial Heterogeneity in SVAMITVA Effects

Dependent variable: Log sanctioned loan amount (ln_loan)

Variables	(1) Backward Classes	(2) Aspirational Districts
Treat × Post × Backward Class	0.2110**	
	(0.045)	
95% Confidence Interval	[0.2145, 0.2681]	
Treat × Post × Aspirational District		0.2295**
		(0.038)
95% Confidence Interval		[0.1834, 0.2756]
Observations	1,99,131	1,99,131
R-squared	0.6611	0.6578
Root MSE	0.592	0.5991
Account Fixed Effects	Yes	Yes
Year Fixed Effects	Yes	Yes
District-clustered Ses	Yes	Yes

The results indicate that minority (SC/ST/OBC) borrowers experience an additional 21% increase in sanctioned loan amounts relative to general category borrowers in treated districts post-rollout, while aspirational districts exhibit an incremental 23% increase relative to non-aspirational districts.

By absorbing district and year fixed effects and clustering standard errors at the district level to account for group-level treatment assignment and intra-district correlation, the specification exploits within-district temporal variation while maintaining valid inference under district-level exposure. Importantly, given that SVAMITVA penetration is approximately 53% on average, the estimates represent district-level intent-to-treat. Taken together, the triple difference results suggest that SVAMITVA operates not merely as a land digitization initiative but as an institutional reform that deepens financial inclusion in a distributionally progressive manner, disproportionately enhancing formal credit access for historically marginalized communities and structurally lagging regions, thereby strengthening the equity-enhancing dimension of property rights formalization in rural credit markets.

6. Strengthening Women's Economic Agency through SVAMITVA

In many rural households, property titles and asset records are traditionally registered in the names of male household members, which restricts women's ability to independently leverage household assets when applying for loans. Consequently, women borrowers are often concentrated in the lower segments of the credit market and rely more heavily on smaller loans or informal borrowing channels.

The SVAMITVA scheme directly addresses this institutional constraint by creating digitally verified and legally recognized property records for rural residential holdings.

Women borrowers particularly those located at the lower end of the loan distribution are likely to benefit disproportionately from improved property documentation, as the reform effectively relaxes one of the primary institutional barriers limiting their participation in formal financial markets. This theoretical channel suggests that the impact of SVAMITVA on women's borrowing outcomes may not necessarily manifest as a uniform increase in loan sizes across all female borrowers but may instead appear more prominently among smaller borrowers who face the strongest collateral constraints. In the following section, we formally test this hypothesis using a distributional difference-in-differences framework that allows the treatment effect of the SVAMITVA reform to vary across different segments of the loan distribution for women borrowers.

To examine whether the impact of the SVAMITVA reform varies across the distribution of loan sizes for female borrowers, the analysis adopts a distributional difference-in-differences approach in which the sample is restricted to women borrowers and the treatment effect is estimated separately across different quantiles of the loan distribution. This empirical strategy divides the loan distribution into quintile groups and estimates the DID specification within each group. This approach allows the treatment effect to vary across different segments of the credit distribution and provides insights into whether the reform disproportionately benefits borrowers located at the lower end of the loan spectrum, where credit constraints are typically most binding.

For each quantile q, the following DID specification is estimated:

$$\ln\left(Loan_{idt}^{q}\right) = \beta_q(Treat_d \times Post_t) + \gamma_d + \delta_t + \varepsilon_{idt}$$

The results reveal substantial heterogeneity in the treatment effects across different segments of the loan distribution. The most striking finding emerges in the bottom 20% of the loan distribution, where the DID coefficient is 0.246 and highly statistically significant. This suggests that women borrowers in the lowest loan quantile experienced an increase of roughly 24.6% in sanctioned loan amounts following the implementation of SVAMITVA in treated districts relative to control districts. Economically, this indicates that the scheme had its strongest impact among smaller borrowers i.e. those who are typically more financially constrained and less likely to possess formally documented collateral prior to the reform.

In contrast, the results for the 20–40% quantile and 40–60% segments of the loan distribution show coefficients that are close to zero and statistically insignificant. These estimates suggest that for women borrowers located in the middle of the credit distribution, the rollout of SVAMITVA did not lead to any statistically discernible change in sanctioned loan amounts relative to control districts. One possible explanation for this pattern is that borrowers in the middle quantiles may already have had some degree of access to formal credit or alternative collateral mechanisms prior to the reform, thereby limiting the incremental impact of property documentation on their borrowing capacity.

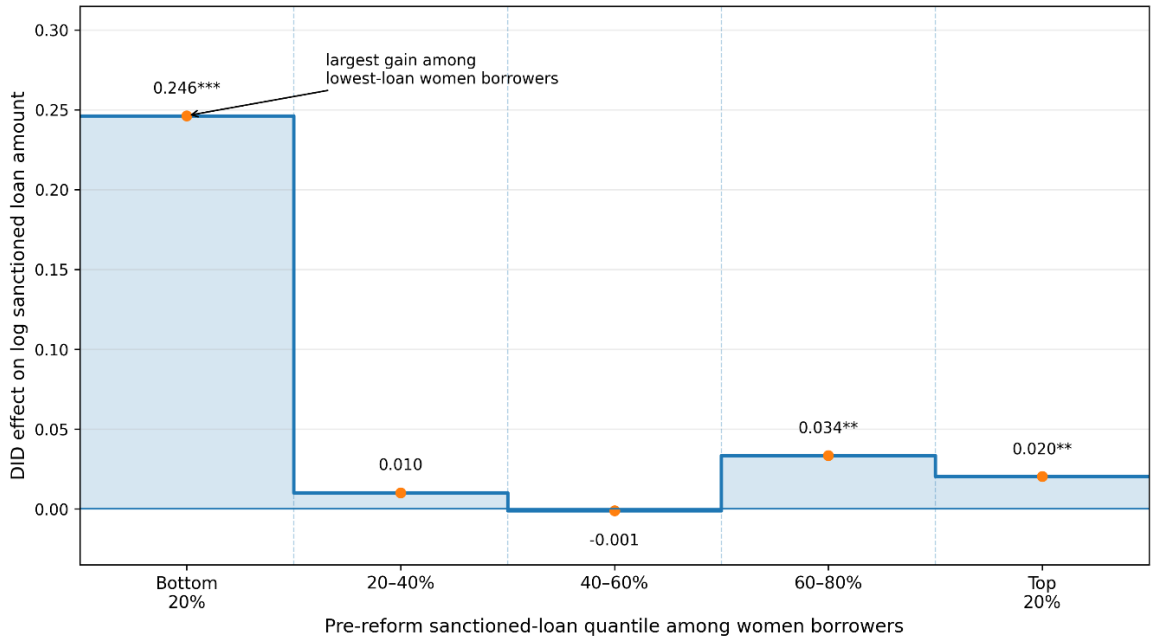
Table 4. Distributional Heterogeneity in SVAMITVA Effects for Women Borrowers

Dependent variable: ln_loan_sanctioned

Quantile of women's loan distribution	DID coefficient	p-value
Bottom 20%	0.2463***	<0.001
20–40%	0.0102	0.844
40–60%	-0.0011	0.972
60–80%	0.0335**	0.037
Top 20%	0.0203**	0.033

Notes: Each estimate is obtained from a separate DID specification estimated for women borrowers in the indicated quantile group. All regressions include account and year fixed effects, and standard errors are clustered at the district level. The results indicate that the strongest post-SVAMITVA gains among women are concentrated at the lower end of the loan distribution.

Figure3. Distributional impact of SVAMITVA on women borrowers across the pre-reform loan distribution



Each segment covers 20% of women borrowers. Labels show Table 3 coefficients; exact p-values remain in the table.

Interestingly, the results indicate modest but statistically significant effects again in the upper segments of the loan distribution, particularly in the 60–80 % and top 20 % quantiles. The DID coefficients for these groups imply relatively small increases in sanctioned loan amounts of roughly 2–3% following the rollout of SVAMITVA. Although these effects are statistically significant, their magnitude is substantially smaller than the impact observed in the lowest quantile. This suggests that while the reform may have marginally improved borrowing conditions for women with larger loans, the relative importance of property documentation as a binding constraint is considerably weaker for these borrowers compared to those at the lower end of the credit spectrum.

Taken together, the pattern of results points toward a strongly distributional impact of the SVAMITVA reform for women borrowers. The largest and most economically meaningful gains are concentrated in the lowest segment of the loan distribution, while the effects in the middle segments are negligible and the effects at the top are comparatively modest. This pattern is consistent with the theoretical expectation that property rights formalization primarily benefits borrowers who face binding collateral constraints typically those with smaller loans and weaker asset documentation prior to the reform.

6.1 From Legal Protection to Financial Empowerment: Muslim Women under SVAMITVA

The analytical motivation for examining the differential impact of the SVAMITVA reform on Muslim women is grounded in the broader institutional and socio-legal literature on gendered economic constraints within Muslim communities in India, particularly those associated with the historical practice of instant triple talaq. The practice of *talaq-e-biddat*, commonly referred to as triple talaq, permitted a Muslim husband to unilaterally dissolve a marriage by pronouncing divorce three times in a single instance, often leaving women without financial security, property rights, or bargaining power within the household. Scholars have argued that such unilateral divorce mechanisms created significant power asymmetries within marriage, reinforcing patriarchal authority and limiting women's economic autonomy and security within Muslim households (*Kalindri, 2019).*

These institutional constraints have been linked to lower asset ownership and reduced financial independence for Muslim women, as the threat of instant divorce historically weakened their negotiating power over household resources and property. Legal scholars such as Agnes (2017) further argue that reforms addressing discriminatory marital practices are central to improving Muslim women's economic rights, since marital instability and lack of enforceable protections historically constrained women's ability to accumulate or control assets within marriage. Recognizing these structural inequalities, the Supreme Court of India in *Shayara Bano v. Union of India* (2017) declared instant triple talaq unconstitutional, and the subsequent Muslim Women (Protection of Rights on Marriage) Act, 2019 rendered the practice void and criminalized its use. The legislation aimed to strengthen Muslim women's legal protection and enhance their dignity, security, and economic rights within marriage. [7]

However, while legal reforms addressing marital rights are necessary for improving women's agency, the economic literature suggests that legal empowerment must often be complemented by asset ownership or collateral rights in order to translate into measurable improvements in financial inclusion. Studies on gender and property rights have consistently shown that secure ownership of assets enhances women's bargaining power, financial independence, and access to formal credit markets, because financial institutions rely heavily on verifiable collateral when extending loans. Thus, reforms that strengthen both legal protections and asset

[7] https://www.pib.gov.in/PressReleasePage.aspx?PRID=1574077&reg=3&lang=2

formalization may jointly reduce structural constraints faced by women. In this context, the SVAMITVA scheme represents a complementary institutional reform that enable women, including Muslim women, to leverage residential property as collateral for formal credit.

To evaluate whether SVAMITVA produces differential credit outcomes for Muslim women relative to other borrowers, we estimate a difference-in-differences model augmented with group-specific interactions. Let i index borrowers, d districts, and t time. Treatment occurs at the district level, where $Treat_d$equals one for districts covered under the SVAMITVA programme and zero otherwise, while Post t denotes the post-implementation period. To capture the intersectional group of interest, we construct a dummy variable *MuslimFemale_i* equal to one for borrowers who are both Muslim and female and zero otherwise. The empirical specification is given by:

$$\ln(Loan_{idt}) = \beta_1(Treat_d \times Post_t) + \beta_2(Treat_d \times MuslimFemale_i) + \beta_3(Post_t \times MuslimFemale_i) + \beta_4(Treat_d \times Post_t \times MuslimFemale_i) + \gamma_d + \delta_t + \varepsilon_{idt}$$

where $\gamma_d$and $\delta_t$represent district and year fixed effects respectively. District fixed effects absorb time-invariant heterogeneity such as baseline financial infrastructure, socio-economic composition, and land governance institutions across districts, while year fixed effects capture macroeconomic shocks, credit cycle fluctuations, and nationwide regulatory changes affecting bank lending. Standard errors are clustered at the district level to account for intra-district correlation arising from district-level treatment assignment.

Within this framework, the coefficient $\beta_1$represents the standard DID estimator capturing the average treatment effect of SVAMITVA on loan sanctions for the reference group (all borrowers other than Muslim women). The coefficient of primary interest is β_4, which measures the incremental treatment effect for Muslim women relative to the rest of the borrower population. Formally, the triple interaction term identifies the following contrast:

$$\beta_4 = [(DID_{MuslimWomen}) - (DID_{Others})]$$

Thus, $\beta_4$captures whether the SVAMITVA-induced credit expansion differs systematically for Muslim women relative to all other borrowers after controlling for district and time effects.

The triple difference coefficient corresponding to Muslim women is positive, suggesting that Muslim female borrowers experienced an additional increase in sanctioned loan amounts beyond the average treatment effect observed for the broader borrower population. In quantitative terms, the coefficient implies that Muslim women witnessed an incremental rise of 5.8% in loan sanctions relative to other borrowers following the rollout of SVAMITVA. This implies that muslim women borrowers have experienced an overall rise of 29% in sanctioned amount.

The analysis is further extended to examine whether similar effects are observed among non-Muslim female borrowers, which provides a useful falsification exercise for the proposed mechanism. However, the estimates for non-Muslim women are statistically insignificant, indicating that their post-SVAMITVA credit outcomes are not meaningfully different from those of the baseline comparison group. This absence of a differential effect among non-Muslim women suggests that the earlier results for Muslim women are unlikely to be driven solely by a broad gender empowerment channel.

Instead, the pattern is consistent with the interpretation that institutional changes affecting Muslim women specifically such as the legal reforms surrounding triple talaq may have strengthened their bargaining position and financial credibility, enabling them to better leverage the formalized property rights created through SVAMITVA. While the timing of the reforms does not allow a clean causal separation of the two policies, the lack of a similar response among non-Muslim women provides suggestive evidence that the observed gains for Muslim women are linked to group-specific institutional changes rather than a generic female credit effect.

Table 6. Triple-Difference Estimates by Religion and Gender

Dependent variable: Log sanctioned loan amount (ln_loan)
Estimator: High-dimensional fixed effects (HDFE) linear regression
Sample size: 187,611 observations

Variables	(1) Muslim Women	(2) Muslim Men	(3) Non-Muslim Women
Treat × Post	0.2349***	0.2349***	0.2349***
p-value	0.001	0.001	0.001
95% CI	[0.1361, 0.3339]	[0.1361, 0.3339]	[0.1361, 0.3339]
Treat × Post × Muslim Woman	0.0585*		
p-value	0.0656		
95% CI	[-0.0335, 0.1105]		
Treat × Post × Non-Muslim Woman			0.1216
p-value			0.689
95% CI			[-0.4890, 0.7330]
Account fixed effects	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes
District-clustered standard errors	Yes	Yes	Yes
Estimation method	HDFE DDD	HDFE DDD	HDFE DDD

The table reports estimates from triple-difference (DDD) specifications estimated using high-dimensional fixed effects (HDFE) regressions.
The coefficient on **Treat × Post** captures the common post-treatment effect in treated districts relative to control districts for the omitted reference group.
The coefficient on the triple interaction term:

Treat × Post × Muslim Woman

Treat × Post × Muslim Man

Treat × Post × Non-Muslim Woman
measures the **incremental treatment effect** for that subgroup, over and above the common Treat × Post effect.
All regressions include account fixed effects and year fixed effects. Account fixed effects absorb time-invariant borrower heterogeneity, while year fixed effects absorb common macroeconomic and policy shocks.
Standard errors are clustered at the district level, which is appropriate because treatment exposure varies at the district level.

Reported significance levels are: *** $p < 0.01$, ** $p < 0.05$, * $p < 0.10$.

Viewed in a broader institutional context, these findings can be interpreted alongside recent legal reforms affecting Muslim women in India, particularly the criminalization of instant triple talaq under the Muslim Women (Protection of Rights on Marriage) Act, 2019. In this regard, the SVAMITVA reform, by formalizing property ownership and enabling rural households to use residential property as a collateralizable asset, may complement such legal reforms by strengthening the economic foundations of women's autonomy.

7. Complementary evidence on Household Liquidity, and Consumption Smoothing

The primary results of the paper establish that SVAMITVA led to a significant increase in formal credit access, as reflected in higher sanctioned loan amounts in treated districts. A natural next question is whether this expansion in credit translated into greater household spending capacity. To examine this channel, we study average monthly balance (AMB) in bank accounts as a proxy for household liquidity. The underlying idea is that if SVAMITVA improved access to formal credit, and if households actively used this credit to finance expenditures, then one would not necessarily expect account balances to rise immediately after the scheme. Instead, one may observe a temporary decline in balances, reflecting the drawdown of liquidity for current spending, household consumption or other uses. Over time, if the scheme eased liquidity constraints and strengthened household cash flow, balances would be expected to stabilize and recover.

To examine the downstream financial effect, we define the outcome as the logarithm of average monthly balance. We then estimate the following dynamic post-period specification:

$$\ln\left(AMB_{idt}\right) = \alpha_d + \sum_{s=2021}^{2026} \lambda_s \, \mathbf{1}\{t = s\} + \sum_{s=2021}^{2026} \beta_s \left(\mathbf{1}\{t = s\} \times Svamitva_d\right) + u_{idt}$$

where $Svamitva_d$ is an indicator for whether district d belongs to the SVAMITVA-treated group, α_d denotes district fixed effects, and λ_s are year fixed effects. Standard errors are clustered at the district level, which is appropriate because treatment varies at the district level. The omitted year is 2020, so each interaction coefficient β_s measures how the treated-control difference in average monthly balance in year s differs from the treated-control difference in 2020.

It is important to note that this is not a standard difference-in-differences design, because we do not observe pre-treatment balance data. Accordingly, the estimates cannot be interpreted as

a fully identified causal effect in the same sense as the loan-sanction regressions. Instead, they should be interpreted as a dynamic post-period comparison between treated and control districts. Even so, the temporal pattern of the estimates is highly informative for understanding the mechanism through which SVAMITVA may have affected household financial behavior.

Table 7. Dynamic Post-Period Consumption Pattern

Dependent variable: ln (AMBidt)
Estimator: HDFE linear regression

Year × SVAMITVA	Coefficient	p-value
2021	-0.0840***	0.001
2022	-0.0510***	0.000
2023	-0.0320*	0.067
2024	-0.019	0.181
2025	-0.0002	0.996
2026	0.0210**	0.028

District fixed effects: Yes
Year fixed effects: Yes
District-clustered standard errors: Yes

Thus, the post-period pattern is one of steady convergence and eventual reversal: treated districts initially exhibit lower balances relative to controls, but this differential narrows consistently over time and turns positive in the later years.

This pattern is highly consistent with a consumption-smoothing and liquidity-use mechanism. The combination of higher sanctioned loans and lower balances immediately after rollout is consistent with households drawing upon new formal credit to support expenditures that were previously constrained. The fact that balances subsequently recover suggests that households appear to smooth out their consumption over time.

The economic interpretation is therefore a two-stage one. In the short run, SVAMITVA improved credit access and generated a liquidity inflow, which was then utilized rather than hoarded, leading to lower observed account balances. In the medium run, as households adjusted and possibly benefited from improved financial access, balances became less depressed and eventually normalized. This is precisely the type of pattern one would expect if a property-rights reform relaxed borrowing constraints, enabled households to smooth expenditures more effectively, and then improved their ability to manage cash balances over time.

In sum, the dynamic AMB analysis complements the main loan-sanction results by showing that SVAMITVA is associated not only with greater access to formal credit, but also with a meaningful change in household liquidity behavior. The immediate fall in balances, followed by gradual recovery, is consistent with a scenario in which newly formalized property rights expand borrowing capacity, enable households to meet expenditure needs that were previously credit constrained, and ultimately strengthen their capacity to smooth consumption and rebuild financial buffers over time. Although the absence of pre-treatment balance data prevents a strict causal interpretation, the joint evidence from loan sanctions and account balances provides a coherent and economically persuasive account of how SVAMITVA may have affected household welfare.

8. Conclusion

This paper shows that SVAMITVA is more than a land-record modernization exercise: it is an institutional reform that makes rural residential property more legible, verifiable, and bankable within the formal financial system. The baseline DID results indicate a sizeable expansion in sanctioned home loans in treated districts, supporting the core proposition that property-rights formalization can relax collateral and verification constraints in rural credit markets. The heterogeneity results sharpen this conclusion by showing that the gains were not uniform. Borrowers from backward classes and those in Aspirational Districts benefited disproportionately, and among women the strongest effects were concentrated at the bottom of the loan distribution. This pattern is consistent with a progressive collateral-constraint mechanism in which the largest effects arise precisely where documentation gaps and institutional frictions were initially most severe.

The complementary evidence on average monthly balances further supports the proposed mechanism: treated districts receive more sanctioned credit, show an immediate decline in balances, and then display gradual normalization and recovery over time.

Taken together, the results indicate that SVAMITVA deepened formal credit, broadened financial inclusion across social and spatial margins, strengthened women's economic agency, and likely improved household liquidity management. Future work linking individual property-card receipt to credit outcomes, and incorporating pre-treatment balance data, would sharpen the welfare interpretation further; even so, the present evidence already establishes SVAMITVA as a promising instrument of inclusive rural financial development.

Although currently restricted to rural areas, the benefits of this scheme will accrue to urban India, as some of these rural areas became a part of the urban landscape. However, existing records of urban and peri-urban land ownership are scattered across multiple State and municipal bodies, making them difficult to reconcile. The land survey department prepares cadastral maps, the Department of Registration and Stamps oversee land transactions, the Revenue Department maintains the Records of Rights, and municipal bodies collect property taxes. The lack of data sharing among these entities adds to this challenge.

Launching a SVAMITVA-like scheme in urban India as well and the creation of property cards in urban areas could significantly contribute to making urban land markets more transparent, efficient, and competitive. It could also make it much easier for businesses to assemble at least small to moderate-sized pieces of land by purchasing contiguous parcels of land without government intervention

In this context, it is important to note that the Department of Land Resources under the Ministry of Rural Development has launched the National Geospatial Knowledge-based Land Survey of Urban Habitations (NAKSHA), a pilot programme under the Digital India Land Records Modernisation Programme (DILRMP). This initiative seeks to modernise urban land records across 150 urban local bodies (ULBs) over one year by leveraging advanced geospatial technologies with Survey of India as the technical partner. The pilot initiative equally emphasizes on field surveys to validate and update the data collected using aerial surveys. A robust WebGIS platform will be developed which will serve as a unified repository for urban land records to facilitate data visualisation, analysis and decision making. This project aims to improve the accuracy of urban land records, promoting transparent and efficient land administration that may further aid increased investments. We believe that this initiative will provide valuable insights and soon will be expanded to all the ULBs.

References

Besley, T. (1995). *Property rights and investment incentives: Theory and evidence from Ghana*. *Journal of Political Economy, 103*(5), 903–937.

Besley, T. J., Burchardi, K. B., & Ghatak, M. (2012). *Incentives and the de Soto effect*. *The Quarterly Journal of Economics, 127*(1), 237–282.

Development Monitoring and Evaluation Office. (2023, January 12). *An analysis of the SVAMITVA scheme: Successes and way forward*. NITI Aayog.

D'Andrea, A., Hitayezu, P., Kpodar, K., Limodio, N., & Presbitero, A. F. (2025). Developing the mortgage market: Technology, property rights, and banking.

Feder, G., & Feeny, D. (1991). *Land tenure and property rights: Theory and implications for development policy*. *The World Bank Economic Review, 5*(1), 135–153.

Johnson, S., McMillan, J., Woodruff, C., 2002. Property rights and finance. American Economic Review 92, 1335-1356

Kalindri. Triple Talaq and the Rights of Muslim Women. Res. J. Humanities and Social Sciences. 2019; 10(3):887-890. doi: 10.5958/2321-5828.2019.00146.3

Ministry of Panchayati Raj. (2021, April 24). *PM launches distribution of e-property cards under SWAMITVA scheme*. Press Information Bureau, Government of India.

Ministry of Panchayati Raj. (2021, December 21). *SVAMITVA scheme*. Press Information Bureau, Government of India.

Ministry of Panchayati Raj. (2023, August 2). *SVAMITVA scheme*. Press Information Bureau, Government of India.

Ministry of Panchayati Raj. (2026, February3). *SVAMITVA scheme*. Press Information Bureau, Government of India.

Sangwan, N., & Saha, B. (2026). Caste and Credit: Discrimination in India's Credit Sector. *Progress in Development Studies*, *0*(0). https://doi.org/10.1177/14649934251411694

Subramanian, A., & Kumar, P. (2024). *Property rights, factor allocation and household welfare: Experimental evidence from a land titling program in India*. *Journal of Development Economics, 167*, 103238