Institutional Farm Credit Through Kisan Credit Cards: Comparative Evidence on Productivity, Income and Financial Autonomy

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Abstract— The present paper tries to establish the extent to which short-term institutional credit for agriculture through the Kisan Credit Card (KCC) has helped in improving the productivity levels of crops, incomes from agriculture and financial autonomy of farmers' households. A cross-sectional survey of 480 agricultural households – 240 KCCs and 240 non-KCCs – was carried out in three districts of western Uttar Pradesh for the crop year 2023-24. A logit model was used to find out the correlates of KCCs while the average treatment effects on the treated (ATET) was worked out by PSM with nearest-neighbour and kernel estimates for input usage, yield, income and reliance on non-institutional sources of credit. A FAI, based on five variables, was constructed by PCA. KCC households showed an ATET of 12.3% higher wheat yield, 20.1% higher income from farm business per hectare, and 22.6 percentage points lower dependence on moneylenders. The FAI was 0.176 points higher among KCC households. It seems that the credit-productivity relationship works mainly through input intensification and no distress sale.

Keywords: Kisan Credit Card, institutional credit, farm productivity, financial autonomy, propensity score matching, agricultural households

Introduction

Short-term liquidity is the constraining factor in Indian smallholder agriculture. If a farmer cannot raise funds for his seeds, fertilizers, and irrigation at the beginning of the farming season he will underinvest or borrow from the local moneylender at interest rates which will take away any eventual margin. The Kisan Credit Card program, launched in 1998, sought to change that by replacing periodic loan assessment with a revolving credit line that would be determined at the district level, based on scale of finance and operated area of each farmer.

The evidence of the last three decades of implementation of the program is mixed to say the least. Disbursements have been growing but disbursement does not mean utilization, and possession of the card does not mean access to the full credit line sanctioned for a particular individual. Most importantly, all impact assessments seem to concentrate only on yield and income and do not try to find out whether the person who possesses the card has become financially independent – that is, he is now able to decide when to purchase and when to sell independently of any lender.

This article tries to answer that question. It compares two groups of farmers – card holders and non-holders – in a highly developed irrigated area, and considers financial independence as a separate variable.

Literature Review

Narayanan (2016) set up the foundation of elasticity for this literature, estimating that a 10% increase in the nominal supply of agricultural credit in India leads to 1.7% increase in the use of fertilizers, 5.1% increase in pesticides and 10.8% increase in tractors purchases. This is important because the magnitude of the effect differs for capital-intensive versus labour-intensive goods, meaning that term credit and short-term revolving credit operate via different transmission channels.

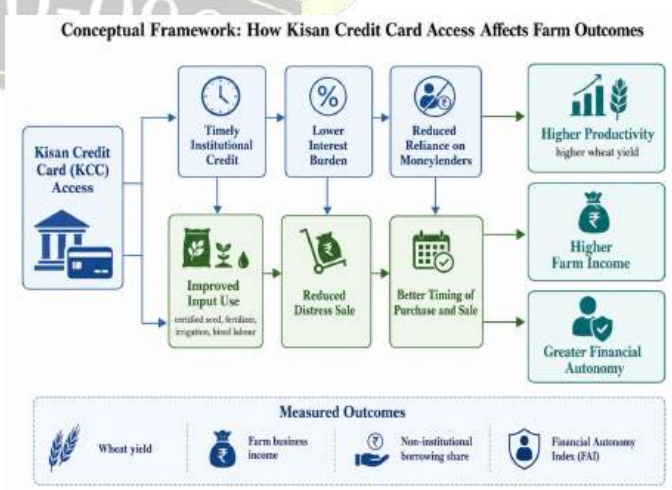

Fig. 1. Conceptual pathway linking Kisan Credit Card access with farm productivity, income, and financial autonomy.

Kumar, Sonkar and Aditya (2023), applying coarsened exact matching on a large-scale survey of rural households in the states of Bihar, eastern Uttar Pradesh, Jharkhand, Odisha and West Bengal, found that KCC usage is positively correlated with both input usage and agricultural income, and — crucially for this study — lower borrowing from moneylenders. Sharma, Kumar and Agrawal (2025), applying panel regression to the same dataset, found that the benefits persist across seasons, indicating that the effect is not seasonal.

Shivaswamy et al. (2020), applying panel regression to state-level data of 1991-92 to 2016-17, found that institutional credit is positively and significantly correlated with agricultural productivity, as well as substantial regional disparity in credit penetration. Sidhu, Vatta and Kaur (2008) document the gap between demand and supply of institutional credit in Punjab, arguing that even in states saturated with institutional credit, it is not the level of credit but its composition that affects productivity.

Regarding the determinants of adoption, Aditya et al. (2019) find that size of landholding, level of education and distance to the nearest branch of bank are key drivers of both access and depth of formal credit in eastern India. Similar conclusion was made by Kumar, Singh and Sinha (2010) for institutional credit at large. Singh and Sekhon (2005) make an early warning that productivity effect of the KCC depends on how the limit is used, with diversion to consumption reducing the effect.

Regarding substitution, Kumar et al. (2017) compare institutional credit with non-institutional credit of agricultural households and find that institutional credit users have higher consumption expenditure and smaller interest burden, with incomplete displacement of informal lenders. Pradhan (2013) explains the persistence of informal credit despite decades of growth of institutional credit due to its speed and flexibility, not due to lack of supply of formal credit. Binswanger and Khandker (1995) showed for rural India that formal finance increases the use of inputs and non-agricultural employment, but not total output — an early hint that credit affects agriculture through intensification and not transformation.

Feder et al. (1990) build the theoretical basis for this study through a disequilibrium model that distinguishes credit-constrained from unconstrained farmers, forming the treatment-control distinction used in this study. Mohan (2006) puts it into the policy context by identifying transaction costs and collateral as residual constraints. According to the results of the second All India Rural Financial Inclusion Survey conducted by NABARD in 2024, the proportion of agricultural households borrowing from institutional sources increased from 60.5 per cent in 2016-17 to 75.5 per cent in 2021-22, while borrowing from non-institutional sources declined from 30.3 per cent to 23.4 per cent. NABARD identifies KCC as an effective means of farm sector financial inclusion. Kumar, Rath and Singh (2024) in their survey of 160 households in Odisha find productivity difference of 8% for non-basmati rice between card holders and non-holders.

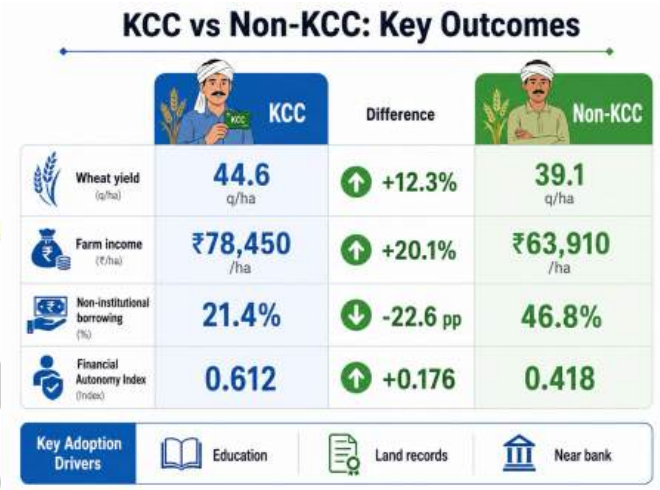

Fig. 2. Study area and sampled districts in western Uttar Pradesh.

This literature thus converges to positive but moderate productivity effect and incomplete substitution effect. What remains unmeasured is the intermediate mechanism — control of household over timing of its transactions.

Research Gap and Objectives

The existing literature treats reduction in moneylender dependence as a binary indicator. There is no attempt to create a composite indicator of financial autonomy including credit source, interest burden, marketing practices and ability to purchase inputs freely. In addition, there is a gap in evidence from intensively irrigated north-western plains, where credit availability is not the issue but timing of transactions.

Objectives of the study are: identification of socio-economic correlates of KCC adoption; estimation of effect of KCC adoption on input usage, crop productivity and agricultural income; estimation of its effect on composite indicator of household financial autonomy.

RESEARCH METHODOLOGY

The study covers Meerut, Bulandshahr and Bijnor districts of western Uttar Pradesh. Three-stage sampling technique was employed: four villages were randomly sampled in each district and 20 KCC holding and 20 non-holding households were randomly sampled in each village (stratified sampling),

resulting in 480 households. Data collection was conducted via pre-tested questionnaire between July 2023 and June 2024 and covered kharif and rabi seasons. Wheat, which is cultivated by 94.2 per cent of sample households, was taken as a reference crop to assess productivity.

Adoption of KCC was modelled through binary logistic regression with age, years of schooling, operated area, social group, distance to the nearest bank branch, clarity of land records and knowledge about PM-Kisan as predictors.

Since adoption is self-selected, simple comparison of means would be biased. Propensity scores were estimated based on logit model and matching was conducted using nearest-neighbour matching (n = 3, replacement allowed, calliper = 0.05) and Epanechnikov kernel matching (bandwidth = 0.06). Nine observations from treated group did not satisfy common support condition and were discarded, resulting in 231 matched observations from treated group. Balance of covariates was checked with standardised bias. Sensitivity of results to unobservable selection factor was tested via computation of Rosenbaum bounds.

Financial Autonomy Index was built based on five variables: share of institutional sources in total borrowing, no borrowing from moneylender during the reference period, no distress sale within 15 days after harvesting, self-financing of input purchase without dealer credits and ability to incur an emergency expense of ₹25,000 without using informal credit. Variables were standardized to 0-1 scale and aggregated by principal component loading, which accounted for 61.4% of total variance (KMO = 0.74).

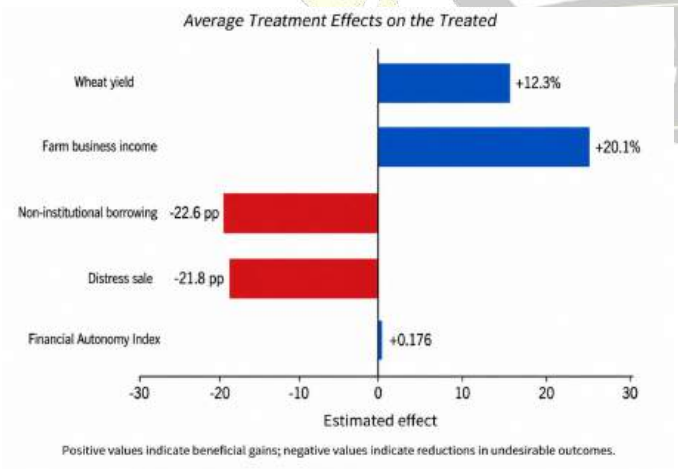

Fig. 3. Estimated treatment effects of KCC access after propensity score matching

Results and Discussion

Table 1. Socio-economic profile of sample households (2023–24)

Characteristic	KCC holders (n = 240)	Non-holders (n = 240)	Difference
Average age of head (years)	47.3	45.1	2.2*
Schooling of head (years)	8.6	6.4	2.2***
Operated area (ha)	1.42	1.19	0.23***
Household size (no.)	5.8	6.1	−0.3
Distance to bank branch (km)	4.2	7.6	−3.4***
Cropping intensity (%)	168.4	151.2	17.2***
Irrigated area share (%)	91.7	84.3	7.4***

*Note: *, **, *** denote significance at 10, 5 and 1 per cent respectively.*

Cardholders are older, better educated, closer to a branch and operate larger holdings — precisely the selection pattern that necessitates matching.

Table 2. Logit estimates of KCC adoption

Variable	Coefficient	Std. error	Marginal effect
Age of head (years)	−0.018	0.011	−0.004
Schooling (years)	0.087**	0.036	0.021
Operated area (ha)	0.412***	0.104	0.098
Scheduled caste/tribe (dummy)	−0.394**	0.187	−0.093
Distance to bank (km)	−0.094***	0.028	−0.022
Clear land record (dummy)	0.631***	0.203	0.149
PM-Kisan awareness (dummy)	0.556***	0.198	0.131
Constant	−1.207**	0.541	—

Number of observations = 480; LR χ^2 (7) = 158.6; Prob > χ^2 = 0.000; Pseudo R^2 = 0.284.

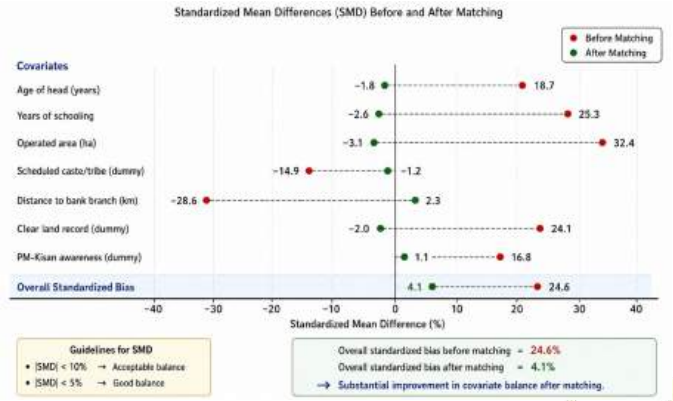

Fig. 4. Propensity Score Matching (PSM) balance plot showing standardized mean differences in observed covariates before and after matching.

Operated area, land-record clarity and branch proximity dominate. The negative caste coefficient indicates that access remains socially stratified, echoing Kumar, Sonkar and Aditya (2023). After matching, mean standardised bias fell from 24.6 per cent to 4.1 per cent, and the joint significance of covariates disappeared (p = 0.612), confirming balance.

Table 3. Effect of KCC access on input use and productivity (per hectare)

Outcome	KCC mean	Non-KCC mean	ATT (NN)	ATT (kernel)	t-value
NPK use (kg)	218.4	181.7	31.2	29.8	4.71***
Certified seed users (%)	71.3	48.8	19.4	18.6	4.02***
Irrigations per season (no.)	5.4	4.6	0.7	0.7	3.18***
Hired labour (person-days)	62.8	54.1	7.4	7.1	2.87***
Wheat yield (q)	44.6	39.1	4.8	4.6	4.35***
Cost of cultivation (₹)	51,240	44,860	5,190	5,020	3.44***

The unmatched yield gap of 5.5 quintals per hectare (14.1 per cent) narrows to 4.8 quintals (12.3 per cent) after matching, implying that roughly one-eighth of the raw differential is attributable to selection on observables. The input results identify the mechanism clearly: the gain runs through fertiliser dose and seed quality, not through mechanisation. This is consistent with Narayanan's (2016) finding that short-term credit elasticity is highest for divisible inputs, and with Binswanger and Khandker's (1995) intensification argument.

Table 4. Effect of KCC access on income and financial autonomy

Outcome	KCC mean	Non-KCC mean	ATT (NN)	t-value
Farm business income (₹/ha)	78,450	63,910	12,860	4.89***
Net household income (₹/year)	3,42,700	2,86,400	47,300	3.62***
Non-institutional share in borrowing (%)	21.4	46.8	−22.6	−5.14***
Weighted interest cost (% per annum)	10.3	19.2	−8.4	−6.02***
Distress sale within 15 days (%)	27.9	52.5	−21.8	−4.77***
Financial Autonomy Index (0–1)	0.612	0.418	0.176	5.31***

Per hectare income rises by 20.1 per cent after matching. It is worth noting that reduction in interest burden of 8.4 percentage points contributes significantly to income gain irrespective of yield – a source of gains that studies with focus on yield alone miss completely.

The findings on autonomy constitute the key contribution of the paper. The 21.8 percentage point decrease in distress sales demonstrates that the ability of the card to revolve enables the household to retain the grain even beyond the immediate post-harvest period of low prices. In other words, autonomy is not simply non-use of the moneylender but retaining power. However, at the same time, 21.4 per cent of borrowing by cardholders is from informal sector, which confirms Pradhan's (2013) observation that informal borrowing survives due to speed of lending, and not due to inaccessibility of formal finance.

Rosenbaum bounds suggest that income effect continues to hold true at $\Gamma = 1.55$, while autonomy effect – at $\Gamma = 1.72$, indicating fairly strong robustness to unobservables.

Limitations

It is a cross-sectional design, with estimates based on selection on observables, meaning that managerial ability may remain unobserved in some degree. Comparison is conducted only in respect of wheat, while horticultural and allied enterprises are not covered. The study region is intensively irrigated and well banked, hence effect sizes should not be extrapolated to rainfed or credit poor areas. Income data is collected on self-reported basis and is prone to memory biases.

Policy Implications

There are three implications of the findings. Firstly, since land-record clarity is one of the best predictors of adoption, digitization and correction of tenancy and record would increase coverage cheaper than increasing credit targets. Secondly, since the benefit works through timely input, disbursement schedule needs to be coordinated with planting periods, not with financial year. Finally, since cardholders continue to borrow informally, there is a need for introduction of a small consumption sub-limit into card, which would eliminate the sole reason of farmers' borrowing from moneylenders.

Conclusion

Adoption of the Kisan Credit Card is associated with a 12.3 per cent increase in wheat yield, 20.1 per cent increase in per hectare farm business income, and an improvement of 0.176 in financial autonomy index after correcting for selection. Productivity effect is driven by increased inputs, while income effect – by yield and reduction of interest burden. Autonomy effect is caused by the acquisition of the household capability to defer sale. Thus, the value of the program lies more in the autonomy restored to the farmer than in credit itself. Increasing that autonomy – by fastening disbursements, cleaning up land records, and introducing a minor consumption sub-limit into the card – is what remains to be done.

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