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Does a farmer's knowledge of minimum support price (MSP) affect the farm-gate price? Evidence from India

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Abstract

Purpose – This paper examines whether farmers' knowledge of the minimum support prices (MSPs) affects farm-gate prices. MSP is the minimum guaranteed price for agricultural commodities announced by the Government of India for 24 commodities. Most farmers in India prefer to sell their produce at the farm-gate due to a small marketable surplus and hence do not directly benefit from MSP. The authors test the common argument in the political discourse that if farmers have knowledge of MSP, then they can bargain with traders during the farm-gate transaction and demand a better price close to MSP.

Design/methodology/approach – The authors use matching methods to examine the impact of knowledge of MSP on farm-gate prices.

Findings – Using nationally representative data, the authors show that there is no empirical evidence that the knowledge of MSP of the crops leads to higher bargaining power and better farm-gate prices.

Practical implications – Price information (MSP in this case) alone cannot improve the bargaining power of farmers and result in a better price realization. As a safety net, MSP fails in the absence of procurement of

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products by the government. This also raises the question of the equitability of the price support system in India and calls for a rethink of the MSP policy.
Originality/value – This study is the first of its kind to examine the anchoring effect of knowledge of MSP on farm-gate prices using a nationally representative dataset.
Keywords Minimum support prices, Bargaining, Information asymmetry, On-farm negotiations
Paper type Research paper

1. Introduction

Minimum support prices (MSPs) in India refer to the minimum prices set by the government for 24 agricultural crops. When the prevailing market prices fall below the assured MSP, designated government agencies intervene by entering the market and purchasing the products at the MSP. The government announces the MSP before the sowing season (Das, 2020; Aditya *et al.*, 2017; Chand, 2008; Deshpande, 2008). One of the main objectives of the MSP is to establish a floor price for the commodity, providing farmers with a minimum assured price. Although the MSP is announced for 24 crops and applies to all farmers across India, the actual procurement and direct benefits of the MSP are limited to a few surplus states and specific commodities due to storage constraints and the availability of procurement channels. Numerous studies have highlighted the inequitable distribution of the scheme's benefits, with only food surplus states reaping advantages (Das, 2020; Chand, 2003; Desai *et al.*, 2011; Deshpande, 2008). However, a counter-argument suggests that the announcement of the MSP can still positively influence prices, even without direct government procurement. Farmers who are aware of the MSP for their crops are assumed to perceive the MSP as a "fair outcome" or a "status quo" and are more likely to negotiate better prices with traders. This paper examines whether farmers who are aware of the MSP for the crops they grow receive higher prices at the farm-gate than those who are unaware.

The government announces the MSP based on the Commission on Agricultural Costs and Prices (CACP) recommendations. The CACP determines the MSP by considering the cost of cultivation of crops across different regions of the country. The MSP serves two main objectives: one has been mentioned earlier, acting as a floor price; the second objective is to use the food grains procured at the MSP to maintain a buffer stock and distribute it to vulnerable sections at subsidized rates through the Public Distribution System (Chand, 2008; Parikh and Singh, 2007). Additionally, the MSP is utilized as an economic instrument to incentivize farmers to adopt socially desirable cropping patterns. For example, there has been a significant increase in the MSP of pulse crops in recent years, aligning with the government's aim to promote pulse cultivation and achieve self-sufficiency in pulse production. However, the procurement of commodities at the MSP is limited by the availability of storage facilities and is primarily focused on major crops such as rice, wheat and selected pulse crops. Several studies have raised questions regarding the relevance and effectiveness of MSP in Indian agriculture (Ali *et al.*, 2012; Singh *et al.*, 2015).

The MSP policy, with large procurements of rice and wheat, is believed to incentivize an increase in the area under these crops. As a result, even regions that were not traditionally engaged in rice and wheat cultivation have started growing them due to the assured prices, leading to the overexploitation of water resources. Punjab serves as a prime example of this phenomenon (Mittal and Hariharan, 2016; Tripathi, 2012). Additionally, the MSP policy is often criticized for primarily benefiting farmers in states where procurement occurs, such as Punjab, Haryana, Madhya Pradesh and Andhra Pradesh. This regional disparity in benefit distribution has been highlighted (Negi *et al.*, 2018).

Furthermore, most farmers in India are small and marginal, with limited marketable surpluses. Consequently, they prefer selling their produce to village traders rather than

taking it to formal markets. According to Negi *et al.* (2018), approximately 68% of farmers sell their produce at the farm-gate through village traders. As a result, these small farmers do not benefit significantly from the support prices set by the MSP policy.

Alternatively, there is an argument that the MSP policy can have positive effects even in areas without direct procurement of grains. Even farmers who sell their produce to village traders can benefit from having knowledge of the MSP for the crops they have grown. The Economic Survey of 2016 highlights that when farmers are aware of the MSP, they are more likely to negotiate with traders and aim for a price closer to the support price (Economic Survey, 2016). Additionally, the Ministry's report on doubling farmers' income acknowledges that knowledge of the MSP can enhance farmers' bargaining power and enable them to obtain better prices than those unaware of the MSP for their crops (Government of India, 2017). This can be explained through the behavioral concept of the anchoring effect in decision-making. Further elaboration on the anchoring effect will be discussed in detail in the conceptual framework section.

In this paper, we utilize nationally representative data to investigate the impact of MSP knowledge on the prices received by farmers at the farm-gate. The data used in this study are obtained from the NSSO's Situational Assessment Survey of Farmers, specifically focusing on the data pertaining to the year 2011–12. Our analysis focuses on a specific subset of farmers, namely rice farmers who sold their produce to village traders. We employ an appropriate econometric identification strategy to estimate the effect of MSP knowledge on the prices received.

Our analysis results indicate no statistically significant effect of MSP knowledge on the prices received by farmers compared with those unaware of the MSP. Several factors could contribute to this finding. Firstly, farmers often have limited marketable surpluses, restricting their market access. Additionally, farmers frequently face immediate cash requirements, which diminishes their bargaining power when negotiating with traders. Furthermore, the lack of storage facilities and credit constraints further disadvantage farmers in price negotiations. It is also plausible that the anchoring effect of MSP knowledge is counterbalanced by contextual factors, such as the importance placed on shared experiences and historical transactions. In conclusion, we find that knowledge of MSP alone does not statistically affect the prices realized by farmers at the farm-gate, merely announcing the MSP is insufficient to guarantee a minimum price for the agricultural produce.

Our paper makes two significant contributions. Firstly, it sheds light on the ineffectiveness of MSP in establishing a floor price for agricultural produce. The study reveals that only a small proportion of farmers can sell their produce directly to government agencies at the MSP, and the knowledge of MSP does not significantly enhance farmers' bargaining power or impact the prices realized at the farm-gate. These findings highlight the need to overhaul the MSP scheme and expand the procurement network to address these limitations effectively. Secondly, our paper contributes to the understanding of two-actor trade negotiations within agricultural markets. Specifically, it examines the impact of cognitive anchors, the support prices, on the prices received by farmers at the farm-gate. To the best of our knowledge, this is the first study to estimate the effect of support prices as cognitive anchors on the final outcomes of negotiation in the context of two-person trade negotiations at the farm-gate. This contribution enhances our understanding of the dynamics of agricultural trade negotiations and provides insights into the role of cognitive factors in shaping price outcomes.

The remainder of the section is arranged as follows: in section 2, we present the conceptual framework, and in section 3, we explain our empirical strategy and data. In section 4, we present and discuss the results. Finally, section 5 concludes.

2. Conceptual framework

Small and marginal farmers with small landholdings dominate Indian agriculture. Due to their limited marketable surplus, they prefer selling their produce to village traders instead of taking it to formal markets. In this context, the negotiation between the farmer and the trader becomes the determining factor in setting the price received by the farmer. According to the model of two-player trade negotiations, both the trader and the farmer have their respective reservation prices. The trader's reservation price represents the maximum price they are willing to pay for the product. In contrast, the farmer's reservation price is the minimum price they expect below which they are unwilling to trade their produce. The final outcome of the negotiation, known as the farm-gate price, depends on the relative bargaining power of the two parties and their reservation prices (Blount *et al.*, 1996; Fafchamps and Minten, 2012; Henrik and Tommy, 2000).

The lack of market transparency, characterized by asymmetric information, is prevalent in this context (Aker and Fafchamps, 2010; Nakasone *et al.*, 2013; Svensson and Yanagizawa, 2009; Woldie and Nuppenau, 2010). Traders are often well informed about prices, arrivals and expected price trends, while farmers have limited access to market information (Bergaly Kamdem *et al.*, 2010; Islam and Grönlund, 2010; Mitchell, 2011; Mittal *et al.*, 2012; Sorrentino *et al.*, 2017). The existing literature suggests that the party with greater information tends to achieve more favorable negotiation outcomes (Courtois and Subervie, 2014; Malak-Rawlikowska *et al.*, 2019).

Numerous studies have attempted to estimate the effect of price information on the prices realized by farmers, but the results are mixed. Some studies have found that price information increases the prices realized (Beuermann, 2011; Courtois and Subervie, 2014; Hildebrandt *et al.*, 2015; Nakasone *et al.*, 2013; Svensson and Yanagizawa, 2009). On the other hand, other studies have reported statistically insignificant effects of price information on farm-gate prices (Aker and Fafchamps, 2015; Camacho and Conover, 2012; Einiö, 2014; Fafchamps and Minten, 2012; Futch and Mcintosh, 2009; Goyal, 2010; Toledo and Ksoll, 2018).

According to traditional economic theory, price information is expected to increase prices primarily by providing access to new markets with higher prices (Aker and Fafchamps, 2010; Aker and Ksoll, 2012; Beuermann, 2011). Improved market information and reduced search costs open up new marketing opportunities for farmers and challenge the traders' monopoly (Jensen, 2010). However, within a behavioral economic framework, the price information can influence farm-gate prices even when access to new markets is constrained (Blount *et al.*, 1996; Fafchamps and Minten, 2012; Woldie and Nuppenau, 2010). In this framework, price information serves as a "cognitive anchor," leading to a better price realization for farmers (Chuah and Devlin, 2011). The anchoring effect refers to the disproportionate influence of the initial piece of information on the final outcome of a negotiation (Adrian and Hua, 2011). Literature suggests that the anchoring effect is robust across various decision-making heuristics (Ritov, 1996). The anchoring effect on the final negotiation outcome has been observed in different contexts, such as supply chains, asset prices and various bidding games (Galinsky and Thomas, 2012; Korobkin and Guthrie, 2003; Law *et al.*, 2006; Leider and Lovejoy, 2016).

In the context of the present study, the knowledge of MSP for rice serves as a behavioral anchor in the negotiation between the village trader and the farmer at the farm-gate. The conceptual framework is illustrated in Figure 1. The main focus of this paper is to examine the role of MSP as a behavioral anchor in farm-gate sales. Therefore, we specifically analyze pathways 1 and 2 to investigate the impact of MSP awareness on the price realized during farm-gate sales. However, our data do not allow us to separate the effects of these two pathways. We hypothesize that farmers aware of the MSP for rice will adjust their reservation price upward, moving closer to the MSP, and engage in negotiations with traders to obtain a higher price than farmers unaware of the MSP. This expectation holds even when

farmers do not have direct access to sell their produce to government agencies at the MSP. Farmers who possess knowledge of the MSP are likely to revise their reservation price upward not only due to the anchoring effect but also because they perceive it as a fair outcome or status quo. Another reason to anticipate a positive effect of MSP knowledge on prices is that the anchoring effect is more pronounced in information-poor environments, such as in trader–farmer negotiations.

3. Data and methodology

The data used for the study are from the National Sample Survey Office (NSSO)'s Situation Assessment Survey of Agricultural Households, 2011–12, a nationally representative survey data. The data are collected from 35,200 rural households across India in two rounds: Kharif corresponding to June to December 2011 and Rabi corresponding to January to June 2012. Data from "Situational Assessment Survey" – a nationally representative dataset consisting of 4,529 villages spread over rural areas of all States and Union Territories and with a sample size of 35,200, and it has all the variables for the intended analysis. We have extracted a subset of farmers who grow rice from the dataset as our analysis requires crop-wise analysis. From the data, the rice crop has the highest number of farmers growing and selling it, 8,877 farmers in total. Rice has the highest cropped area in India and is the crop with the highest procurement at MSP, as a percentage of the total quantity produced. Hence, we focus our analysis on farmers growing rice crops.

Furthermore, we restrict our analysis to only those who sold their produce at the farm-gate as our paper aims to analyze the effect of MSP on the farm-gate price of rice. The final sample size used for the analysis is 7,671. To understand the farmers' preference for local traders vis-à-vis a formal market, we use the logit model and the insights from the data to select variables for the causal model. In the data, a specific question is asked to the respondents about the knowledge of MSP of the crop they grow. We use the response for this question variable as the treatment variable to explore the causal link between knowledge of MSP and the price realized.

3.1 Identification strategy

We aim to estimate the causal effect of MSP knowledge on the farm-gate price received by farmers. However, directly estimating this impact is challenging due to confounding factors. In a regression framework, this issue is commonly referred to as "imbalance," which can lead to biased estimates and model sensitivity. Imbalance arises when there are significant differences in the values of independent variables between the two treatment groups (in this

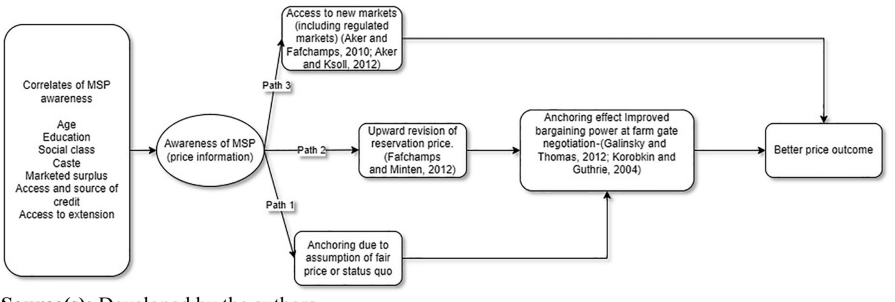

Figure 1.
Conceptual diagram indicating the role of MSP awareness on price outcomes

Source(s): Developed by the authors

case, those with knowledge of MSP and those without), which can introduce bias into the impact estimate.

In such scenarios, a common estimation strategy is to employ quasi-experimental designs to simulate randomization and address the issue of confounding. Matching methods, such as propensity score matching (PSM), utilize the propensity score, representing the likelihood of being in the treated group, to match similar units. Units across the two groups with similar propensity scores were paired, and any units without a match were excluded from the analysis. The objective of matching is to ensure that, on average, the two groups are comparable in terms of their covariates. Balancing the data through matching has been shown to reduce bias compared with using unmatched data (Ho *et al.*, 2007). Matching methods estimate treatment effects based on the assumption that some degree of randomness will resemble an experimental setting after conditioning on variable X.

The issue with univariate matching techniques like PSM is that they do not necessarily improve the balance in the dataset. When matching methods are used to drop observations based on a lack of common support, they can actually worsen the imbalance, which is referred to as the PSM paradox by Gary and Richard (2019). It has also been observed that since propensity scores are derived from a model, the model's specification is crucial. In some cases, it can improve balance with respect to certain variables while worsening balance with respect to others (Qin, 2011). Univariate balancing methods aim to achieve balance by means of covariates, but they may not address imbalance resulting from interactions and nonlinear functions of the confounder vector, denoted as X.

Coarsened exact matching (CEM) belongs to Monotonic Imbalance Bounding method (Blackwell *et al.*, 2009). These methods use multivariate distributions for balancing, and studies have indicated the superiority of these methods over other methods of matching in reducing data imbalance and model dependence. Let us denote the pre-treatment variables by a vector X. The method can be best described with the following set of equations: (Iacus *et al.*, 2012; Kumar *et al.*, 2021).

$$\left\{ \begin{array}{c} D\left(f_1\left(x_{m_{T(\pi)}}\right), f_1\left(x_{m_{C(\pi)}}\right)\right) \leq \gamma_1(\pi_1) \\ \cdot \\ \cdot \\ \cdot \\ D\left(f_k\left(x_{m_{T(\pi)}}\right), f_k\left(x_{m_{C(\pi)}}\right)\right) \leq \gamma_k(\pi_k) \end{array} \right\}$$

In every dimension of X, Distance D between function f(.) of X in treated and f(.) X in control should be smaller than the monotonically increasing function of $\gamma(\pi)$. This directly leads us to

$$D\left(f_j\left(x_{m_{T(\pi)}}\right), f_j\left(x_{m_{C(\pi)}}\right)\right) \leq \gamma_j(\pi - \epsilon) < \gamma_j(\pi), j = 1, \ldots, k.), \text{if } \epsilon > 0$$

where the value of π is specified by the researchers. The treated and control units are matched when the set of covariates X meets the above set of inequalities.

Furthermore, let us consider X_i, one element of vector X. In CEM, X_i is divided into V_i number of classes or intervals based on researchers' understanding/intuitions.

$$\gamma_i(\pi_i) = \gamma_{i1}(\pi_{i1}), \gamma_{i2}(\pi_{i2}) \ldots \gamma_{iV_i}(\pi_{iV_i})$$

3.2 Imbalance measure

The difference in the mean value of the covariate across the treated and control groups is generally considered a measure of imbalance. However, such measures cannot be used for

comparison and do not account for imbalance due to other moments. Iacus *et al.* (2012) suggest an alternate multivariate measure that accounts for different degrees of interaction among variables. If the value of $\mathcal{L}_1$ is 1, it indicates perfect separation; if the value is 0, it indicates perfect matching of the multivariate distributions. A good matching process should result in a decreased value of $\mathcal{L}_1$.

In this study, we measured the value of $\mathcal{L}_1$ for the original data, and then CEM algorithm was employed. We found that CEM reduced the imbalance in the data (as indicated by the lower value of $\mathcal{L}_1$ after matching – Table 5). This is used as a pre-processing step to reduce the imbalance, and the causal effect was estimated with nearest neighbor matching as suggested by Iacus *et al.* (2012). The variables used for matching are provided in Table 1, along with the reasons for including them in the analysis. Units without matches were dropped from the analysis. We then use Mahalanobis distance as the matching parameter, with the nearest neighbor as the matching rule (Abadie *et al.*, 2004). We also employ PSM with different matching algorithms for robustness checks.

4. Results and discussion

The data on the marketing of paddy were analyzed to examine farmers' preferences regarding the agents they sold their products to. A summary of the characteristics of farmers selling to local traders (village traders) and traders in Mandi is provided in Annexure Table A1. Our primary focus is to understand the influence of marketing information, specifically the information on MSP, on the farm-gate price that farmers receive when selling their products to village traders. Table 2 indicates that approximately 65% of the farmers

Variable	Reason for inclusion in matching algorithm
Quantity sold	Market channel choice is significantly influenced by the marketed surplus, which is closely correlated with the size of the farm. Small farmers with a lower marketed surplus tend to sell their produce at the farm-gate and are less likely to be aware of the minimum support price (MSP) (Aditya *et al.*, 2017)
Credit from local trader	In the context of Indian agriculture, the input and output markets are known to be interlocked. Farmers who obtain loans from local traders are more inclined to sell their produce to them. These farmers typically belong to the small-scale category and often have limited knowledge of support prices (Cariappa and Chandel, 2021)
Disadvantaged caste (SC/ST)	Farmers with lower social class are more likely to be unaware of support prices due to limited extension contact, education and training (Aditya *et al.*, 2017)
BPL	Farmers who are below the poverty line are less likely to have taken the market to regulated markets and are more likely to be unaware of support prices (Aditya *et al.*, 2017)
Gender	Female-headed households are often constrained for resources, are less likely to receive trainings and are more likely to be unaware about the support prices and other government programs compared to the male-headed households. (Aditya *et al.*, 2017)
Education	To capture the education of the head of the household, which is an important correlate of awareness about various policies related to agriculture and support prices in particular
Purchased input from local trader	Another variable to capture the interlocking between the input and output markets. (Cariappa and Chandel, 2021)
Age	A commonly used socioeconomic variable, which is a correlate for awareness
Receive information	A variable that captures the extension contact and expected to have a strong correlation with awareness of MSP

Source(s): Compiled by authors

Table 1. Variables used in matching and the justification for inclusion

chose to sell their produce to village traders. Despite several decades of marketing reforms, farmers continue to prefer local itinerant traders. To avail the benefits of MSP, farmers are required to market their produce either at procurement centers or in registered agricultural commodity marketplaces known as Mandis. However, since most farmers still sell their produce to local traders, they do not directly benefit from MSP. Additionally, the level of awareness regarding MSP was found to be very low, with 70% of farmers being unaware of it.

The next question we aim to address is why farmers prefer village traders. The results of the logit regression are presented in Table 3. According to the findings, small-scale farmers with a smaller quantity of produce to market tend to prefer local traders. This preference can be attributed to the increased cost of transportation per unit of produce when the quantity is small. Moreover, small farmers have a higher unit value of time in terms of opportunity cost, and they often choose to sell their produce to traders who can conveniently come to their farm-gates, aligning with the findings of Hassan *et al.* (1999). Although the magnitude of the marginal effect is small, when considering that the quantity is measured in kilograms, the overall impact becomes more significant.

Farmers from lower social strata and having limited access to extension information were also found to prefer village traders overtaking their produce to the market. The literature suggests an interlocking relationship between input and output markets in rural areas (Cariappa and Chandel, 2021). Farmers often rely on credit from traders to address liquidity constraints and subsequently sell their produce to them. We observe a similar trend in our data, where farmers who have purchased inputs from local traders have a higher probability of selling their produce to them. However, the impact of credit from traders is not statistically significant, possibly because only 5% of farmers reported taking credit from traders.

Particulars	Private local trader		Aware of MSP	
	Frequency	Percent	Frequency	Percent
No	2,702	35.22	5,653	73.69
Yes	4,969	64.78	2,018	26.31
Total	7,671	100	7,671	100

Source(s): Data from the NSSO 2012–13, n = 7,671

Table 2. Farmer's preference for local traders and their awareness of MSP

Dependent variable – Sold to local trader (1 vs 0)	Coefficient	Marginal effect	Standard error	*p* value
Age	−0.000	0.000	0.002	0.66
Aware about MSP	−0.356	−0.087	0.085	0.00
Quantity sold	0.000	0.000	0.000	0.02
Credit from local trader	0.157	0.038	0.273	0.56
Disadvantaged caste (SC/ST)	0.092	0.022	0.120	0.44
Dummy for wage employment	−0.041	−0.010	0.064	0.52
BPL	0.015	0.004	0.084	0.86
Gender	0.048	0.012	0.096	0.61
Received training in agriculture	0.004	0.001	0.160	0.98
Illiterate	0.032	0.008	0.070	0.64
Purchased input from local trader	0.380	0.092	0.092	0.00
Expenditure on agrochemicals	0.000	0.000	0.000	0.31
State fixed effects		Yes		
Constant	1.904		0.2281	0.00

Source(s): Estimated by authors

Table 3. Correlates of farmer preference for local traders in marketing of paddy: estimates from the logit model (n = 7,671)

Next, we aim to investigate the impact of MSP knowledge on the prices farmers receive at the farm-gate. The underlying hypothesis is that MSP knowledge will serve as a price anchor and enhance bargaining power during farm-gate sales. We focus on the data of farmers who sold their produce to local traders and compare the prices received between two groups: those who are aware of MSP and those who are not. However, directly comparing the groups does not allow for estimating a causal relationship. Furthermore, additional factors differ between the two groups, as shown in Table 4.

As described in the methodology section, we employ CEM as a data pre-processing technique. We drop units in unmatched strata from the analysis, which helps reduce data imbalance, as shown in Table 5. To estimate the causal impact of MSP knowledge on prices, we employ nearest neighbor matching using Mahalanobis distance as a matching parameter. We consider two outcome variables: the price per unit of production and a dummy variable indicating whether the farmer obtained a higher price than the average price received by all farmers in the sample. As a robustness check, we conducted the analysis using different matching metrics, and the results remained largely consistent. Table 6 presents the results, indicating no empirical evidence to support the notion that farmers who are aware of MSP receive higher prices as the impact coefficients are not statistically significant.

There are two important implications for these results. Firstly, the current MSP scheme directly benefits only 6% of farmers. While it was anticipated that MSP knowledge would help farmers secure better prices through improved bargaining power, the results indicate that MSP knowledge does not necessarily lead to better price outcomes. This raises questions about the equity of India's existing price support scheme. Secondly, the findings suggest

Particulars	Not aware of MSP Mean	Not aware of MSP sd	Aware of MSP Mean	Aware of MSP sd	Mean difference
Quantity sold	3767.79	4054.46	5695.15	7,213.98	−1927.361
Credit from local trader	0.01	0.10	0.02	0.13	−0.005**
Disadvantaged caste (SC/ST)	0.36	0.48	0.20	0.40	0.180***
Dummy for wage employment	0.50	0.50	0.45	0.50	0.064***
BPL	0.33	0.47	0.25	0.43	0.105***
Gender	0.93	0.26	0.96	0.21	−0.026***
Illiterate	0.32	0.47	0.20	0.40	0.099***
Purchased input from local trader	0.52	0.50	0.55	0.50	0.035***
Age	51.08	13.42	51.95	13.10	−0.900***
Receive information	0.45	0.49	0.60	0.48	−0.160***

Note(s): ***, ** and * indicate significance at 1, 5 and 10% levels
For continuous variables, the mean difference across groups is tested by the *t*-test, and for dummy variables, the mean difference is tested by the χ^2 test
Source(s): Estimated by authors

Table 4. Summary of key variables across MSP awareness groups (n = 7,671)

Particulars	Value
Multivariate L1 distance before matching	0.40
Number of strata	85
Matched strata	76
Matched units from control group (aware of MSP)	5643
Matched units from treated group (not aware of MSP)	2013
Multivariate L1 distance after matching	0.34

Source(s): Calculated by authors

Table 5. Particulars of coarsened exact matching (CEM)

Outcome variable (ATT)	Matching estimator	Coefficient	SE	*p* value	95% confidence interval
Ln (Price received (Rs/Quintal))	Nearest neighbor (nn) matching (Mahalanobis distance)	0.0010	0.0048	0.828	−0.0105 to 0.0084
	Propensity score matching (nn(2))	−0.0045	0.0045	0.318	−0.0134 to 0.0043
	Propensity score matching (nn(2) with caliper)	−0.0015	0.0049	0.760	−0.0111 to 0.0081
Dummy variable = 1 if price received > average price	Nearest neighbor matching (Mahalanobis distance)	−0.0210	0.0505	0.677	−0.1201 to 0.0780
	Propensity score matching (nn(2))	−0.0656	0.0475	0.167	−0.1588 to 0.0274
	Propensity score matching (nn(2) with caliper)	−0.0045	0.0441	0.303	−0.1320 to 0.0410

Note(s): Robust standard errors are used in the analysis
Source(s): Calculated by authors

Table 6. Estimates of impact of awareness of MSP on price received at the farm-gate (n = 7,656)

that price information alone may not significantly increase the bargaining power of farmers, possibly due to the asymmetric power dynamics between farmers and traders. Previous studies have also reported a lack of empirical support for the notion that price information helps farmers achieve better prices (Aker and Fafchamps, 2015; Camacho and Conover, 2012; Einiö, 2014; Fafchamps and Minten, 2012; Futch and Mcintosh, 2009; Goyal, 2010; Toledo and Ksoll, 2018).

According to traditional economic theory, the main welfare implication of price information is its ability to increase access to other markets, reduce search costs and create a psychological anchoring effect (Blount *et al.*, 1996; Fafchamps and Minten, 2012; Woldie and Nuppenau, 2010). However, in cases where there are no nearby procurement centers, the first two effects may be negligible, and the only potential welfare implication would be through the psychological anchoring effect on bargaining power. Nevertheless, the study results indicate no significant effect in terms of bargaining outcomes and prices.

The argument put forth by the government, claiming that farmers benefit from MSP even in regions without procurement centers by bargaining with traders for better prices, is flawed. The bargaining power in one-on-one farmer–trader negotiations depends on various factors, such as the availability of alternative options for the farmer, the quantity of produce for sale and the liquidity constraints of farmers (Jaleta and Gardebroek, 2007). When the quantity available for sale is small and the market is far away, the farmer has limited bargaining power in farm-gate negotiations and faces restricted choices due to high transaction costs. Moreover, if there is no procurement infrastructure in the region, both the farmer and the trader recognize that MSP is merely a theoretical concept, resulting in a low influence of information on bargaining outcomes. As highlighted by Ariely and Simonson (2003), when negotiators have access to both global and local contexts, the local context tends to dominate in negotiations.

Similarly, the fact that there is no nearby procurement center significantly impacts bargaining power in our case. This is the reason why we observe that farmers who are aware of MSP do not obtain higher prices in farm-gate negotiations than those who are unaware. However, we also acknowledge the limitation of the paper that we use quasi-experimental methods to examine the link between the awareness of the MSP and its impact on price

realization. Despite the robustness checks, there can be a chance of selection due to unobservable biasing of the results, which cannot be addressed by this set of methods.

5. Conclusion

Although MSP is theoretically intended to benefit all farmers in India who grow notified crops, only around 6% of farmers receive the direct benefit of MSP due to limited procurement and on-farm sales. In the ongoing debate regarding the relevance of MSP in the current agricultural landscape of India, there is an argument suggesting that MSP can still provide benefits, even in regions without procurement centers, through the anchoring effect. According to this argument, farmers who are aware of the MSP can negotiate with traders and secure better prices. We aim to empirically examine this argument using a nationally representative dataset from the NSSO. By employing methods such as CEM and other matching techniques, we investigate the causal impact of MSP knowledge on farm-gate prices.

The study reveals that there is no evidence that knowledge of MSP influences the price that farmers receive when selling their produce at the farm-gate. The argument suggesting that farmers who are aware of MSP can negotiate for better prices lacks empirical evidence. Small farmers, in particular, opt to sell their produce at the farm-gate because of the excessive transaction costs associated with taking it to the market. Additionally, they often face liquidity constraints, further diminishing their bargaining power. It becomes evident that price information alone, such as MSP, is insufficient to enhance their bargaining power and improve their overall situation.

Based on these findings, it is necessary to re-evaluate the MSP policy. The effectiveness of MSP as a safety net is compromised when there is a lack of government procurement and limitations in expanding procurement efforts. Exploring alternative systems, such as deficiency price systems or direct benefit transfers, may be better options than the current support price system. However, it is essential to empirically examine the welfare implications of these alternatives in comparison to support prices.

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(The Appendix follows overleaf)

Annexure

Table A1.
Summary of key variables by preference to village trader

Sold to village trader	Sold to Mandi Mean	Sold to Mandi SD	Sold to local traders Mean	Sold to local traders SD	Mean difference
Quantity sold	6406.66	10719.69	4324.31	5241.56	−2082.35
Credit from local trader	0.01	0.09	0.01	0.11	−0.003
Disadvantaged caste (SC/ST)	0.27	0.44	0.32	0.47	−0.050***
Dummy for wage employment	0.45	0.50	0.49	0.50	−0.037***
Dummy for Below Poverty Line (BPL)	0.27	0.44	0.31	0.46	−0.038***
Gender	0.93	0.25	0.93	0.25	−0.002
Received training in agriculture	0.04	0.21	0.04	0.20	0.003
Illiterate	0.28	0.45	0.28	0.45	0.001
Purchased input from local trader	0.37	0.48	0.53	0.50	−0.163***
Expenditure on agrochemicals	4119.49	12550.07	4714.03	14596.56	−594.538**

Note(s): ***, ** and * indicate significance at 1, 5 and 10% levels
For continuous variables, the test of mean difference across groups is through *t*-test, and for dummy variables, the mean difference is tested by the χ^2 test
Source(s): Data NSSO 2011–12

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