Asymmetric Information and Middleman Margins: An Experiment with Indian Potato Farmers

A Theory Appendix

Proof of Proposition 1: The off-equilibrium path beliefs imply that any price offer below $M(\underline{w})$ is definitely rejected, and any price offer above $M(\bar{w})$ is definitely accepted. Any price offer v between $M(\underline{w})$ and $M(\bar{w})$ leads F to believe that $w = M^{-1}(v)$, and he is indifferent between accepting and rejecting it, making it optimal for him to randomize his acceptance decision. Finally, when the randomization satisfies condition (3), it is optimal for VT in state w to offer price $M(w)$ rather than any other price in the interval $[M(\underline{w}), M(\bar{w})]$, for the following reason. Selecting a price $M(\hat{w})$ would lead VT to earn an expected profit of $\alpha(\hat{w})[w - M(\hat{w})]q(M(\hat{w})$. (3) is the first-order condition corresponding to the condition that $\hat{w} = w$ is locally optimal. Standard arguments ensure that it is also globally optimal under the assumptions imposed above. This completes the proof.

Proof of Proposition 2: To show sufficiency, recall the off-equilibrium-path beliefs: If the price offer is $p \leq \bar{p}$, then F does not update his beliefs. If $p \geq \bar{p}$, then he believes $w = \bar{w}$. Condition (FP1) then implies that every type of VT is better off trading with F at price $\bar{p}$ than not trading with him, while F is indifferent between accepting and rejecting this offer given his prior beliefs. F will definitely reject any offer below $\bar{p}$ because it does not cause him to alter his beliefs about what he will get at the market, and he expects to do better by rejecting the offer and going to the market instead. Any price higher than $\bar{p}$ causes F to believe that $w = \bar{w}$, so VT would have to offer at least $M(\bar{w})$ to induce F to accept. Condition (FP2) ensures that type $\bar{w}$ does not benefit from such a deviation. This also implies that no other type of VT benefits from deviating, as their benefits would be smaller than they would be for type $\bar{w}$.

If we refine the equilibrium concept to require that F never plays a dominated strategy off the equilibrium path, these conditions are also necessary. If VT were to offer him a price above $M(\bar{w})$, then accepting this offer strongly dominates the option of refusing it, since F would be strictly better off accepting the offer than rejecting it and going to the market, no matter what the realization of w is. With such a restriction, any price offer above $M(\bar{w})$ would be accepted for sure. Then condition (FP2) is necessary; the necessity of (FP1) is obvious. This completes the proof.

Proof of Proposition 3: Conditions (PP1) and (PP3) ensure that the two terminal types $\underline{w}, \bar{w}$ of VT are behaving optimally, given the acceptance strategy of F. Condition (PP2) ensures that the "corner" type at the intersection of two adjacent pooled intervals is behaving optimally. The single-crossing property then ensures that all other types are also behaving optimally. Conditions (PP1) and (PP2) are necessary for the two terminal types to pool at the end-point prices assigned to them, given the restriction on off-equilibrium-path play to undominated strategies. The necessity of the indifference condition (PP2) follows from the optimality of assigned strategies to intermediate types, which switches from $\bar{p}_i$ to $\bar{p}_{i+1}$ when w transits from slightly below w_i to slightly above. This completes the proof.

Proof of Proposition 4: The *ex ante* profit of VT in the FNRE and FRE respectively given consumption benefit parameter β are given by

$$\Pi^N(\beta) \equiv E[(w - \bar{p})q(\bar{p}; \beta)] \tag{4}$$

$$\Pi^R(\beta) \equiv E[(1 - \alpha(w; \beta))\{w - M(w; \beta)\}q(M(w; \beta); \beta)] \tag{5}$$

Asβ approaches 0, $M(w;\beta)$ approaches $M^*(w) \in (0, w)$ and $m(w;\beta)$ approaches 0 for any w. Moreover, $q(p;\beta)$ approaches Q for all $p > 0$. And $\alpha(w;\beta)$ approaches $\alpha^*(w)$, where

$$\frac{\alpha^{*'}(w)}{\alpha^*(w)} = M^{*'}(w)\frac{1}{w - M^*(w)} \tag{6}$$

so $\alpha^*(.)$ is strictly increasing, with $\alpha^*(\bar{w}) = 1$.

Since $W(\Pi(\bar{p})) = E[W(\Pi(M(w))]$, the concavity of $W(\Pi(.))$ implies via Jensen's inequality that

$$\bar{p} \leq \bar{M}(\beta) \equiv E[M(w;\beta)] \tag{7}$$

Hence

$$\Pi^N(\beta) \geq E[(w - \bar{M}(\beta))q(\bar{p};\beta)] \longrightarrow QE[(w - M^*(w)] \tag{8}$$

as $\beta \to 0$.

On the other hand,

$$\Pi^R(\beta) \longrightarrow QE[(1 - \alpha^*(w))\{w - M^*(w)\}] \tag{9}$$

which is strictly smaller than the lower bound to the limiting FNRE profit given at the right end of (8), since $1 > \alpha^*(w)$ for all $w < \bar{w}$. This completes the proof of Proposition 4.

Proof of Proposition 5: Any other WPBE involves offer strategies in which the set of types can be partitioned into intervals $W_i = (w_i, w_{i+1}), i = 1, \ldots, n$ with $\underline{w} = w_1, \bar{w} = w_{n+1}$ such that it is either strictly increasing or locally constant over W_i. As long as this equilibrium is not an FNRE, the price offer must be strictly lower on intervals $W_1, \ldots W_{n-1}$ than at w_{n+1}. To ensure incentive compatibility it must be the case that offers will be accepted with probability strictly less than one on intervals $W_1, \ldots W_{n-1}$.

Hence over these intervals, F must be indifferent between accepting and rejecting.

The same will be true in interval W_n if the price function is strictly increasing over W_n. If it is constant over W_n, and is accepted with probability one, F is at least as well off accepting it rather than rejecting it. If F is strictly better off, the offer p_n can be reduced slightly to p'_n and will still be accepted with probability one. This will raise VT's profits when the type of VT is in W_n. Some types from other intervals $W_{n-1}, W_{n-2}, ..$ may now be induced to deviate to offering p'_n. So we can rearrange the intervals so that W_n is expanded (all the types offering p'_n) while other intervals below are shrunk or dropped to take account of the types who chose to deviate to p'_n from some $p_i, i = n-1, ..$ F's beliefs must now be readjusted accordingly. Since the set of types that are now added to W_n correspond to lower values of w, this only serves to lower F's reservation price. Hence it will continue to be optimal for F to accept p'_n with probability one. This argument shows that we can find another WPBE generating higher profit for VT, if F is strictly better off from accepting p_n to rejecting it. Hence we can limit attention to WPBE's in which F is indifferent between accepting and rejecting every price offer that is made on the equilibrium path.

Let P denote the set of elements i of the partition over which the price offer is constant (denoted $\hat{p}_i$), and S the remaining set of elements over which the price offer is strictly increasing. Let F_i denote the prior probability of W_i. Then the expected profit of VT in the non-FNRE is

$$\Pi^R \equiv Q[\sum_{i \in P} F_i \alpha_i [\hat{w}_i - \hat{p}_i] + \sum_{i \in S} \int_{w_i}^{w_{i+1}} \alpha(w)[w - p(w)]dG(w)] \tag{10}$$

where $\hat{w}_i$ denotes the mean of w conditional on $w \in W_i$, and $\alpha(w), p(w)$ denote the acceptance probability and price over intervals in S. Since the equilibrium is not FNRE, there exists at least one element i over which acceptance probabilities are strictly less than one. Hence

$$\begin{aligned}\Pi^R &< Q[\sum_{i\in P} F_i[\hat{w}_i - \hat{p}_i] + \sum_{i\in S}\int_{w_i}^{w_{i+1}}[w - p(w)]dG(w)] \\ &= Q[\sum_{i\in P} F_i[\hat{w}_i - \hat{p}_i] + \sum_{i\in S} F_i[\hat{w}_i - \hat{p}_i]] \\ &= Q[\sum_{i} F_i[\hat{w}_i - \hat{p}_i]] \\ &= Q[\hat{w} - \hat{p}]\end{aligned}$$

where $\hat{p}_i$ for $i \in P$ denotes the mean price offer conditional on $w \in W_i$, and $\hat{p}$ denotes the unconditional mean price offer.

Now consider the FNRE with a constant price offer $\tilde{p}$ satisfying

$$W(\Pi(\tilde{p})) = E[W(\Pi(M(w))] \tag{11}$$

Since for every W_i, F is indifferent between accepting the price and rejecting it, the right-hand-side of (11) equals the expected payoff of the farmer in the original equilibrium, given by $E[W(\Pi(p(w))]$. Hence

$$W(\Pi(\tilde{p})) = E[W(\Pi(p(w))]. \tag{12}$$

Since $W(\Pi(.))$ is concave, it follows that $\tilde{p} \leq \hat{p}$. Hence using (11), the expected profit in the original equilibrium is smaller than expected profit $Q[\hat{w} - \tilde{p}]$ in the FNRE. This concludes the proof of Proposition 5.

B Extension of the Model to a Dynamic Setting, and Effects on Storage

So far we have abstracted from intra-year dynamics by focusing on a static model where farmers sell all of their output at a single date. In practice, farmers can respond to the traders' price offers by postponing their sale to a later date. This can conceivably alter the predictions of the model in a number of ways: storage options raise the price elasticity of farmer supply, in turn influencing village traders' pricing strategy. Improved access to information increases the pass-through of wholesale prices to farmgate prices, which could benefit farmers by allowing them to time their sales better, and thus change their returns from storage.

Below we extend our bargaining model to a two-period context. The results can also be extended to incorporate an arbitrary (finite) number of dates when trading can occur. We show that the main results about the set of equilibria possible continue to hold. In the non-revealing equilibria, at each date the village middleman makes a constant price offer (that do not vary with the wholesale price) which equals the farmer's expected reservation price at that date. These equilibria also generate the largest profits for the trader. However, the model makes no clear prediction about the effects of the information interventions on storage. Column 6 of Table 6 shows that neither the public information nor the private intervention on farmers without phones changed harvest-time sales. We estimate a positive effect on storage only for the farmers who directly received phonecalls from the telecallers. Since these farmers are a small minority in the sample, we infer that the impacts on storage cannot account for the pattern of observed treatment effects.

B.1 The Bargaining Model with Two Dates

To simplify the analysis, we assume that $\beta = 0$ so that farmers cannot consume their potatoes. The harvest takes place at date 1; date 2 denotes the post-harvest period.[50] The output is normalized to 1, and q_t denotes the fraction of output sold at $t = 1, 2$. All output must be sold by the end of the year, so that $q_2 = 1 - q_1$. The farmer's prior belief about the wholesale price w_1 at date 1 is represented by the distribution function $G_1(.)$ on support $[\underline{w}, \bar{w}]$. If shocks to prices are year-specific, the prices at the two dates could be correlated: $G_2(w_2|w_1)$ denotes the conditional distribution over date 2 wholesale price w_2, conditional on w_1. At each date t, the farmer's outside option of selling to market traders outside the village is represented by the same reservation price function $M(w_t)$. The farmer now has an additional outside option: instead of selling at $t = 1$, he can store the crop and wait to sell at $t = 2$. The wholesale price w_2 at date 2 is measured net of storage costs, so in what follows we can abstract from such costs.

Farmers are credit-constrained, so that their payoff function is $W(y_1) + \delta W(y_2)$ where y_t denotes sales revenue realized at t, $W(.)$ is strictly concave and strictly increasing satisfying $W'(0) = \infty$, and $\delta \in (0, 1)$ is a discount rate. Middlemen are risk-neutral, and can smooth incomes perfectly across the two dates by borrowing and lending at constant interest rate i.

We proceed via backward induction. Suppose that F sells q_1 at price p_1 at date 1. Consider the subgame at the beginning of date 2. Since this is the last date, the static analysis applies. In the absence of any information provision, the equilibrium is a FNRE, where the farmer sells $1 - q_1$ to the village trader at a price of $p_2^* = E[M(w_2)|p_1]$.

[50] The model can easily be extended to more than two dates, using backward induction; the equilibrium will involve the village middleman making a non-revealing price offer at every date which equals the expected reservation price of the farmer.

Now consider F's decision at date 1. If the equilibrium offer is non-revealing, a price p_1 will only be accepted if $p_1 \geq E[M(w_1)]$. The farmer will then decide to sell q_1^*, which maximizes $W(p_1 q_1) + \delta W(p_2^*(1 - q_1))$, and is thereby characterized by the first order condition

$$p_1 W'(p_1 q_1^*) = \delta p_2^* W'(p_2^*(1 - q_1^*)) \tag{13}$$

This generates a supply function where $q_1 = q_1^*(p_1; p_2^*)$ over the range $p_1 \geq E[M(w_1)]$, and $q_1 = 0$ if $p \leq p_1$. The comparative statics of q_1^* with respect to p_1 are ambiguous in general, because of conflicting wealth and substitution effects. The wealth effect is represented by the concavity of $W(\cdot)$, which causes $W'(p_1 q_1^*)$ to decrease in p_1 for any q_1^*. The p_1 term that pre-multiplies $W'(\cdot)$ on the left-hand side of (13) represents the substitution effect. The net effect depends on the curvature of $W(\cdot)$. If $W = \frac{y^{1-\theta}}{1-\theta}, \theta > 0, \neq 1$, then q_1 increases (resp. decreases) in p_1 depending on whether θ is smaller (resp. larger) than one. In what follows we assume that $\theta > 1$, so the wealth effect dominates. Then the farmer supply function is backward-bending.[51]

Continuing to restrict attention to non-revealing price offers, the (constant) price offer that maximizes VT's *ex ante* profits is

$$\arg\max_{p_1} (E[w_1] - p_1) q_1^*(p_1; p_2^*) + \frac{E[w_2] - p_2^*}{1+i}[1 - q_1^*(p^1; p_2^*)] \text{subject to} p_1 \geq E[M(w_1)] \tag{14}$$

If $E[w_1 - M(w_1)] < \frac{E[w_2]}{1+i} - p_2^*$, then the village middleman does not want to purchase anything at $t = 1$. This would cause a shortage of potatoes on the market at date 1, so that w_1 would increase until this inequality is reversed. In equilibrium there must be positive purchases by middlemen at both dates, and $E[w_1 - M(w_1)] \geq \frac{E[w_2]}{1+i} - p_2^*$ must hold.

[51] If $\theta = 1$ then the supply function is inelastic. Note that the supply curve bends backwards only with respect to harvest vis-a-vis post-harvest supply, not with respect to aggregate yearly supply.

Then it is profitable for the village trader to purchase at $t = 1$, and offer $p_1 \geq E[M(w_1)]$. Since the farmer supply function is backward-bending, it is not profitable for the village trader to offer a price above $E[M(w_1)]$. Hence the VT will offer $p_1 = E[M(w_1)]$ at $t = 1$, just as in the static model.

We restrict attention to non-revealing price offers for the same reason as in the static model: the village middleman wants to lower the price offer as much as possible subject to the farmer agreeing to sell at $t = 1$, i.e. the price is such that $p_1 \geq E[M(w_1)]$. In separating equilibria, there is some probability that trades do not occur; this reduces the trader's profit.

Now consider the information intervention. As in the static model, the intervention increases the pass-through of the wholesale price to the farmgate price at every date. For simplicity, consider the information as a binary signal at each date σ_t: either low (L) indicating that $w_t \in (\underline{w}, \hat{w})$, or high (H), indicating that $w_t \in (\underline{w}, \bar{w})$. The farmgate price p_t^k at each date depends on the signal realization $k = H, L$; it will satisfy $p_t^L < p_t^* < p_t^H$ where p_t^* denotes the pre-intervention price. The proportion of output the farmer sells at $t = 1$ now satisfies the first order condition

$$p_1^k W'(p_1^k q_1) = \delta[\alpha_k^H p_2^H W'(p_2^H(1 - q_1) + (1 - \alpha_k^H)p_2^L W'(p_2^L(1 - q_1)] \qquad (15)$$

where after observing signal $k = H, L$, F believes that the date 2 price will be high with probability α_k^H. Under the plausible assumption that the wholesale price shocks at the two dates are positively correlated, $\alpha_H^H \geq \alpha_L^H$.

If w_1 and w_2 are independent, then $\alpha_H^H = \alpha_L^H$, so that the right-hand-side of (15) is independent of k. Given the concavity of $W(\cdot)$, this implies that if F observes a low signal at date 1, this induces him to sell more at date 1 than if he observes a high signal.

If instead w_1 and w_2 are positively correlated, then a low date 1 signal makes the farmer more pessimistic about the post-harvest price, which raises the value of storage. The net result is then ambiguous: the farmer may sell less at date 1 when the wholesale harvest price is low. In general, the model makes no prediction about how harvest sales will vary with the wholesale price at the time of harvest.

When we compare the storage decision of farmers without and with the intervention, there is an additional twist: the pass-through from the *mandi* price to the farmgate price is also higher for better informed farmers. This increases the risk of storing the potatoes. While the precautionary demand for saving would increase the amount stored, risk-aversion would reduce it. The model therefore places no restriction on how storage varies with the information treatment, or with the harvest wholesale price.

Column 6 in Table 6 examines how our information treatment affected the proportion of output sold at the time of harvest. We see that in the absence of the intervention, the proportion sold at harvest time decreased in the harvest time wholesale price, as well as in the land owned by the farmer. Both findings are consistent with our model, on the plausible assumption that farmers who own more land are less credit constrained.[52] The information interventions decrease the proportion of output sold at harvest time; this effect is significant only for those who received the phones in the private information treatment villages. There were no significant interactions of the information treatments with the harvest time wholesale price.

Thus the information treatment had a significant effect only on the small proportion of farmers who received the information directly through the distributed cell phones. These farmers were induced to store 17% more of their harvest output. For all other

[52]It is easily verified that with $W(y) = \frac{y^{1-\theta}}{1-\theta}$, the proportion of output sold at the harvest in control villages satisfies $\frac{q_1}{1-q_1} = \frac{1}{\delta}(\frac{p_1}{p_2})^{\frac{1}{\theta}-1}$. Given $p_2 \geq p_1$, it follows that q_1 is increasing in θ. Wealthier farmers will have a lower θ, hence they will sell a smaller proportion during the harvest.

treated farmers, the point estimate of the effect on storage is small (3%) and statistically insignificant. In 2008, prices did not rise after the harvest period and so the returns to storage turned out to be low. This contributed to the limited average treatment effect on the yearly average farmgate price for phone recipients. For all other treated farmers, the effects on storage were insignificant. Thus we do not believe that impacts on storage account for the pattern of observed treatment effects; instead the evidence suggests they were driven by the bargaining effects highlighted in the static model.

However, one general point is reinforced: the effect of the information treatments depends on the particular realizations of *mandi* prices. The static model already predicted that the treatment effects would be positive (resp. negative) if wholesale prices were high (resp. low). This pattern was reinforced when we took dynamic effects on storage into account. However, we also found that storage effects are unlikely to account for the observed heterogeneity of treatment effects for the majority of treated farmers. This rationalizes our focus on a static context in our empirical analysis in Section 5 above.

C Additional Tables

Table A1: Lower Bounds on Average Middleman Margins

	Harvest period (1)	Post-harvest period (2)
Traders sold at	4.81	4.83
Traders bought at	2.22	2.11
Traders' gross margin	2.59	2.72
Transport costs	0.39	-
Handling costs	0.35	0.45
Storage costs	-	0.91
Traders' net margin	1.85	1.36

Statistics are computed from farmer survey data collected in 2008. The price that traders sold at is the average *mandi* price per kilogram we collected through market "insiders". The price that traders bought at is the average price per kilogram farmers in our survey received when they sold to traders. Both averages are computed by using the distribution of quantities sold in the sample in different weeks as weights. All transactions costs are averages per kilogram of costs incurred by farmers when they sold at *haats*, and are considered to be upper bounds to the costs traders would incur in order to buy and sell. Transport costs are adjusted upwards to account for the fact that traders transport potatoes longer distances on average than farmers do. Further details of the calculations are in footnotes 17 and 18.

Table A2: Baseline Characteristics of Sample Villages and Households, 2007

	Total	Control	Private info.	Public info.	——Differences—— Public v. Control	Private v. Control	Public v. Private
	(1)	(2)	(3)	(4)	(4)-(2)	(3)-(2)	(4)-(3)
Panel A: Village Characteristics							
Distance to mandi (km)	8.52	8.93	8.56	8.07	-0.86	-0.37	-0.49
	(0.700)	(0.882)	(1.648)	(1.014)	*0.53*	*0.84*	*0.80*
Has a public telephone box	0.51	0.67	0.42	0.46	-0.21	-0.25*	0.04
	(0.059)	(0.098)	(0.103)	(0.104)	*0.15*	*0.09*	*0.78*
Has a factory/mill	0.56	0.46	0.67	0.54	0.08	0.21	-0.13
	(0.059)	(0.104)	(0.098)	(0.104)	*0.57*	*0.15*	*0.39*
Has a metalled road	0.36	0.25	0.46	0.38	0.13	0.21	-0.08
	(0.057)	(0.090)	(0.104)	(0.101)	*0.36*	*0.14*	*0.57*
Panel B: Household Characteristics							
Land owned	1.114	1.123	1.079	1.144	0.021	-0.045	0.065
	(0.031)	(0.050)	(0.050)	(0.058)	*0.889*	*0.675*	*0.653*
Cultivator's age	48.84	49.50	48.92	48.05	-1.451	-0.577	-0.874
	(0.404)	(0.682)	(0.682)	(0.737)	*0.304*	*0.644*	*0.385*
Cultivator's years of schooling	6.989	6.597	7.010	7.400	0.803	0.413	0.390
	(0.116)	(0.204)	(0.201)	(0.192)	*0.062*	*0.356*	*0.333*
Panel C: Potato Cultivation							
Planted potatoes	0.995	0.987	0.998	1.000	0.013	0.011	0.002
	(0.002)	(0.005)	(0.002)	(0.000)	*0.047*	*0.099*	*0.316*
Planted *jyoti*	0.935	0.949	0.954	0.901	-0.048	0.005	-0.053
	(0.006)	(0.010)	(0.009)	(0.013)	*0.195*	*0.844*	*0.172*
Planted *chandramukhi*	0.0957	0.0508	0.111	0.126	0.076	0.060	0.016
	(0.007)	(0.010)	(0.014)	(0.015)	*0.123*	*0.192*	*0.763*
Area planted (acres)	0.904	0.822	0.851	1.051	0.229	0.029	0.200
	(0.058)	(0.087)	(0.048)	(0.151)	*0.243*	*0.833*	*0.270*
Quantity harvested (kg)	7056.3	6396.6	7186.7	7641.4	1244.8	790.1	454.7
	(224.5)	(282.7)	(376.7)	(496.8)	*0.429*	*0.432*	*0.778*
Fraction of harvest consumed	0.046	0.049	0.041	0.048	-0.001	-0.009	-0.009
	(0.002)	(0.003)	(0.002)	(0.004)	*0.907*	*0.302*	*0.302*
Fraction of harvest sold	0.798	0.811	0.783	0.801	-0.010	-0.028	0.018
	(0.006)	(0.009)	(0.010)	(0.010)	*0.764*	*0.400*	*0.601*
Average price	3.94	3.88	3.84	4.09	0.214	-0.035	0.249
	(0.022)	(0.036)	(0.040)	(0.034)	*0.126*	*0.832*	*0.094*
Frac. sold to trader	0.986	0.989	0.986	0.984	-0.005	-0.002	-0.003
	(0.003)	(0.005)	(0.005)	(0.006)	*0.620*	*0.766*	*0.781*
Frac. sold at *haat*	0.008	0.006	0.010	0.009	0.003	0.004	-0.001
	(0.002)	(0.004)	(0.005)	(0.004)	*0.725*	*0.498*	*0.846*
Panel D: Telecommunications							
Has landline phone	0.248	0.231	0.249	0.265	0.034	0.018	0.016
	(0.012)	(0.019)	(0.02)	(0.021)	*0.707*	*0.833*	*0.851*
Has cellphone	0.338	0.323	0.322	0.372	0.050	-0.001	0.050
	(0.013)	(0.021)	(0.022)	(0.023)	*0.563*	*0.994*	*0.525*

continued on next page

Table A2 – Continued

	Total (1)	Control (2)	Private information (3)	Public information (4)	Public v. Control (4)-(2)	Private v. Control (3)-(2)	Public v. Private (4)-(3)
Panel E: Source of Price Information							
Trader	0.702	0.795	0.657	0.644	-0.059	-0.090	0.031
	(0.012)	(0.018)	(0.022)	(0.023)	*0.482*	*0.368*	*0.722*
Only trader	0.438	0.487	0.397	0.428	-0.151	-0.138	-0.013
	(0.013)	(0.023)	(0.023)	(0.024)	*0.041*	*0.118*	*0.884*
Market	0.182	0.148	0.195	0.206	0.058	0.047	0.011
	(0.010)	(0.016)	(0.018)	(0.019)	*0.415*	*0.543*	*0.895*
Friends	0.132	0.150	0.155	0.0870	-0.063	0.004	-0.068
	(0.009)	(0.016)	(0.017)	(0.014)	*0.211*	*0.951*	*0.305*
Media	0.0630	0.0811	0.0601	0.0458	-0.035	-0.021	-0.014
	(0.007)	(0.012)	(0.011)	(0.010)	*0.298*	*0.592*	*0.693*
Doesn't search	0.005	0.004	0.006	0.005	0.001	0.002	-0.002
	(0.002)	(0.003)	(0.003)	(0.003)	*0.922*	*0.732*	*0.812*
Test of joint significance (χ^2 p-value)					*0.283*	*0.255*	*0.408*

Statistics in Panel A are computed from village survey data collected in 2006. Statistics in Panels B, C, D & E are computed from farmer survey data collected in 2007. Standard errors are in parentheses. p-values of tests of significance are in italics.

Table A3: Tests of balance in *mandi* characteristics by relation to median *mandi* price

	Hugli			W. Medinipur		
	Below median	Above median	p-value	Below median	Above median	p-value
	(1)	(2)	(3)	(5)	(6)	(7)
Retail price (Rs/kg)	4.91	4.91	*1.000*	7.78	7.78	*1.000*
	(0.00)	(0.00)		(0.00)	(0.00)	
Distance from retail market (km)	0.51	0.45	*0.262*	3.22	3.23	*0.882*
	(0.02)	(0.05)		(0.05)	(0.05)	
Average yield (kg/acre)	10.58	10.08	*0.074*	9.80	9.05	*0.202*
	(0.09)	(0.27)		(0.29)	(0.47)	
Agricultural wages for males (Rs/day)	56.04	53.4	*0.638*	52.74	55.56	*0.675*
	(3.52)	(4.20)		(4.16)	(4.37)	
Pct. households with landlines	0.07	0.10	*0.022*	0.03	0.06	*0.589*
	(0.00)	(0.01)		(0.02)	(0.05)	
Pct. villages with metalled roads	0.60	0.58	*0.856*	0.12	0.07	*0.640*
	(0.09)	(0.11)		(0.08)	(0.07)	
Pct. villages with factories/mills	0.56	0.54	*0.896*	0.56	0.42	*0.521*
	(0.11)	(0.11)		(0.13)	(0.13)	

Standard errors are in parentheses. p-values are in italics.

Table A4: Heterogeneous Treatment Effects of Interventions on Households Not Asked About Price Tracking Behavior

	Quantity Sold (1)	Net Price (2)
Price regressor	-1.3	0.19**
	(322.4)	(0.07)
Private information	-2,944.8*	-0.42
	(1,678.5)	(0.32)
Private information x Price regressor	544.5	0.12
	(381.9)	(0.07)
Phone	2,609.0	-0.06
	(2,029.4)	(0.43)
Phone x Price regressor	-479.9	0.02
	(445.9)	(0.10)
Public information	-3,972.9**	0.42
	(1,676.5)	(0.33)
Public information x Price regressor	766.8**	-0.09
	(376.9)	(0.08)
Land	2,002.4***	-0.08***
	(201.2)	(0.02)
Constant	3,520.8**	1.45***
	(1,408.7)	(0.32)
Observations	*1,139*	*1,139*
R-squared	*0.405*	*0.437*
Mean DV	4060	1.99
SE DV	348.5	0.04

Notes for Table 6 Column 1 apply. The sample is restricted to farmers who were randomly chosen not to be questioned about price-tracking behavior.