Market Integration, Demand and the Growth of Firms:
Evidence From a Natural Experiment in India

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ONLINE APPENDIX

APPENDIX A. EXPLORING OTHER DIMENSIONS OF QUALITY

Our analysis focuses on boat longevity as the sole or primary factor of quality. As noted above, in focus groups with fishermen and builders, there was no suggestion that different builders' boats might vary by speed, fuel efficiency or other dimensions relevant for a fisherman's productivity. However, we can examine whether some other potential attributes may vary across builders.

The fisherman's survey asked for the amount of fish caught, fuel consumed, time spent fishing, where they fished and where they sold their fish, on the day of the interview (fishermen were interviewed in the afternoon, after their fishing was done for the day). From these data we can provide estimates of speed and fuel efficiency, as well as a measure of capacity.[1]

We can't just test whether these attributes vary across boats from different builders at baseline, since any variation in fishing conditions on the day of the survey would look like attributes of the boats. For example, if the water had been rough near village A on the survey day, it will look like builder A's boats are slower or consume more fuel to travel a given distance. Or if the catch was poor near village A, it will look like builder A's boats don't hold as many fish. Therefore, we instead control for any such variation by using village fixed effects once fishermen begin buying from non-local builders. Once mobile phones are available in a village, some fishermen will still be using the local builder's boats and some will have switched to other builders.[2] Thus, we can compare whether catch, fuel efficiency and speed vary with the builder of the fisherman's boat, among fishermen from the same village in the same round (who are therefore facing the same fish, weather, sea and other conditions).

The table below shows regressions where catch, speed and fuel efficiency are regressed on whether the fisherman was using the local or non-local builder's boats, where we have included village fixed and round effects (with a sample restricted to just those periods when mobile phones are available in a region). Overall, there is no evidence that using non-local boats is associated with differences in average catch, speed or fuel efficiency compared to local boats. Thus, if there were any variation in quality along these dimensions, it does not appear that it is driving boat purchasing decisions, as the field work had suggested.

However, we can't test for quality variation in things like comfort (maybe a more comfortable seat) or stability (whether they tip over (we do have data on boat accidents in general, but they are rare in our data, and it is unclear how much is driven to boat design rather than the operator's behavior)). All we can say about these other factors is that fishermen never mentioned them in discussions.

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[1] Average catch size can tell us something about capacity because fishermen often catch enough fish to fully load their boats. Catch size might also capture speed (you can get around more quickly searching for fish) and fuel efficiency (if travel is expensive, extra marginal time searching for fish may not be worth it). However, this composite of whether different builders have boats that enable you to catch more fish (for any of these reasons) is perhaps what fishermen would care about, even if this measure overlaps somewhat with speed and efficiency.

[2] Buying locally vs. non-locally is not random, so there may be unobserved fishermen characteristics in these estimates; however, in villages where fishermen start to switch, much of the initial variation within villages is likely driven by where the fisherman was in the lifecycle of their previous boat when mobile phones entered and they learned about non-local builders. Thus, some fishermen will have bought a boat from the local builder within the past few years, and thus are still using it, whereas others were just about to order a new boat, but switched to the non-local builder when they learned more about them (we control for boat age in these regressions, though it makes little difference).

NON-LOCAL BOATS AND POTENTIAL QUALITY ATTRIBUTES

	(1) Fish Caught (kg)	(2) Fuel Efficiency (l/km)	(3) Speed (km/hour)
Local Boat	-0.230 (0.554)	-0.00896 (0.0124)	-0.325 (0.253)
Constant	167.8 (1.322)	1.729 (0.0200)	10.56 (0.405)
Number of Observations	16,920	16,740	16,740

Notes: Dependent variable listed at the top of each column. Sample restricted to periods when a region has mobile phones. Local boat indicates that the boat was bought from a builder in the fisherman's own village. Regressions include village and round fixed effects. Standard errors, clustered at the village level, in parentheses.

APPENDIX FIGURE 1. STUDY REGION
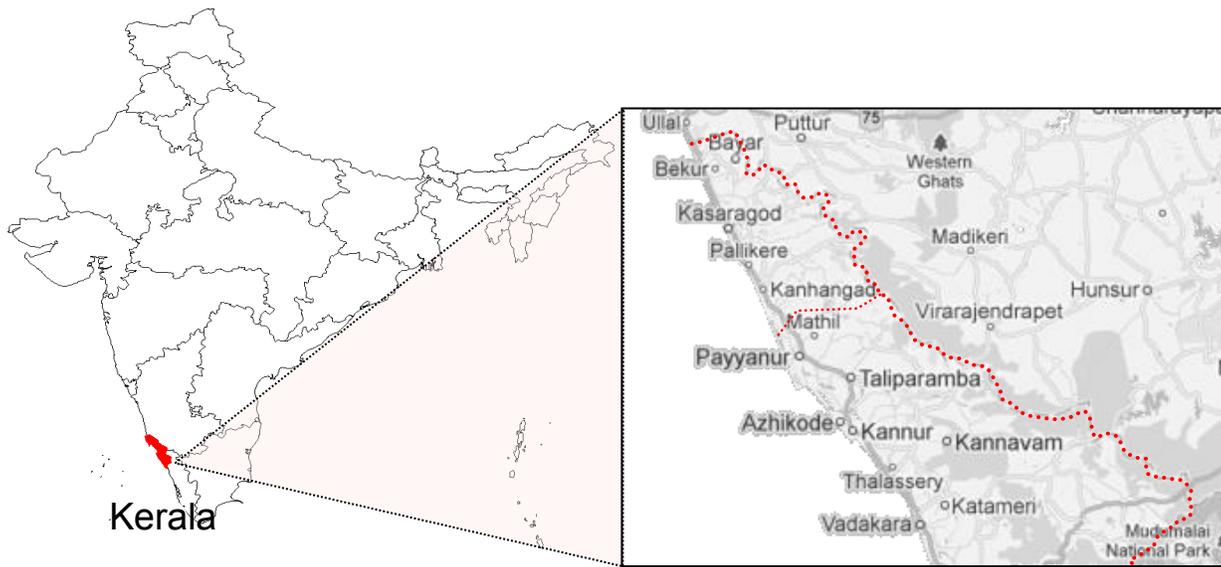
APPENDIX TABLE 1. REGRESSION RESULTS (EXCLUDING INLAND REGION III)

A. "Previous Boat" Life Expectancy (years)	(1) Exit	(2) Market Share	(3) # Workers	(4) Boats Built
Phone*Baseline Quality	-0.0473	0.00483	0.579	9.551
	(0.00873)	(0.000899)	(0.113)	(1.775)
Phone	0.221	-0.0237	-2.823	-46.93
	(0.0446)	(0.00536)	(0.642)	(10.57)
Baseline Quality	-0.000589	-0.000433	-0.0587	-0.866
	(0.000871)	(0.000274)	(0.0480)	(0.549)
Observations	1,050	1,050	1,050	1,050

B. Auditor's Assessment (years)	Exit	Market Share	# Workers	Boats Built
Phone*Baseline Quality	-0.0264	0.00373	0.478	7.374
	(0.00798)	(0.000792)	(0.103)	(1.564)
Phone	0.106	-0.0164	-2.079	-32.45
	(0.0411)	(0.00453)	(0.535)	(8.941)
Baseline Quality	-0.00375	-0.000370	-0.0496	-0.738
	(0.00381)	(0.000212)	(0.0323)	(0.424)
Observations	1,050	1,050	1,050	1,050

C. Fishermen's Estimates (years)	Exit	Market Share	# Workers	Boats Built
Phone*Baseline Quality	-0.0526	0.00578	0.711	11.44
	(0.00994)	(0.00108)	(0.134)	(2.141)
Phone	0.234	-0.0269	-3.285	-53.23
	(0.0469)	(0.00580)	(0.697)	(11.45)
Baseline Quality	-0.000683	-0.000505	-0.0550	-1.011
	(0.00124)	(0.000362)	(0.0606)	(0.725)
Observations	1,050	1,050	1,050	1,050

D. TFP Residuals	Exit	Market Share	# Workers	Boats Built
Phone*Baseline Quality	-0.0439	0.00470	0.568	9.299
	(0.00962)	(0.000958)	(0.115)	(1.890)
Phone	-0.00366	-0.000781	-0.0741	-1.557
	(0.0240)	(0.00179)	(0.220)	(3.542)
Baseline Quality	-0.00177	-0.000142	-0.0396	-0.285
	(0.00197)	(0.000288)	(0.0474)	(0.576)
Observations	1,050	1,050	1,050	1,050

Notes: Dependent variable listed at the top of each column. Each panel represents the primary regression specification using a different measure of builder quality, indicated at the top of the panel. Regressions include region and round fixed effects. All data are from the boat builder survey. Units of observation are builder*round, with builders dropping from the sample once they have exited. Standard errors, clustered at the builder level, in parentheses.

APPENDIX TABLE 2. REGRESSION RESULTS, WITH BUILDER FIXED EFFECTS

A. "Previous Boat" Life Expectancy (years)	(1) Exit	(2) Market Share	(3) # Workers	(4) Boats Built
Phone*Baseline Quality	-0.0585 (0.00906)	0.00449 (0.000815)	0.476 (0.112)	8.896 (1.613)
Phone	0.331 (0.0479)	-0.0206 (0.00372)	-2.132 (0.492)	-40.86 (7.350)
Observations	1,524	1,524	1,524	1,524
B. Auditor's Assessment (years)	Exit	Market Share	# Workers	Boats Built
Phone*Baseline Quality	-0.0372 (0.00821)	0.00367 (0.000724)	0.426 (0.113)	7.282 (1.434)
Phone	0.206 (0.0398)	-0.0147 (0.00296)	-1.667 (0.443)	-29.13 (5.860)
Observations	1,524	1,524	1,524	1,524
C. Fishermen's Estimates (years)	Exit	Market Share	# Workers	Boats Built
Phone*Baseline Quality	-0.0677 (0.0121)	0.00550 (0.00105)	0.583 (0.135)	10.90 (2.072)
Phone	0.356 (0.0572)	-0.0240 (0.00447)	-2.492 (0.562)	-47.62 (8.845)
Observations	1,524	1,524	1,524	1,524
D. TFP Residuals	Exit	Market Share	# Workers	Boats Built
Phone*Baseline Quality	-0.0565 (0.00993)	0.00439 (0.000842)	0.476 (0.113)	8.686 (1.667)
Phone	0.0516 (0.0164)	0.000768 (0.000849)	0.135 (0.108)	1.542 (1.684)
Observations	1,524	1,524	1,524	1,524

Notes: Dependent variable listed at the top of each column. Each panel represents the primary regression specification using a different measure of builder quality, indicated at the top of the panel. Regressions include builder and round fixed effects. All data are from the boat builder survey. Units of observation are builder*round, with builders dropping from the sample once they have exited. Standard errors, clustered at the builder level, in parentheses.

APPENDIX TABLE 3. CHANGES IN FISHERMEN'S BEHAVIOR AND INFORMATION

A. "Previous Boat" Life Expectancy (years)	(1) Sold Fish Locally	(2) Error, Local Builder	(3) Error, Non-Local Builder	(4) Bought Boat Locally
Has Phone	-0.187 (0.0183)	-0.00202 (0.0129)	-0.300 (0.0695)	-0.210 (0.0429)
Constant	0.899 (0.0128)	0.661 (0.0164)	1.689 (0.0875)	0.941 (0.0330)
Observations	27,860	27,860	21,210	3,057

Notes: Dependent variable listed at the top of each column. Data are from the fisherman's survey. Columns 2 and 3 measure the absolute value of the difference between our estimates of life expectancy for boats (based on "previous boat" estimates) and fishermen's estimates, measured in years. "Local Builder" refers to a builder in the fisherman's village, and "Non-Local Builder" is any other builder the fisherman is aware of. The fourth column restricts the sample to fishermen who report having bought a boat in the last 6 months. Regressions include region and round fixed effects. Standard errors, clustered at the village level, in parentheses.

APPENDIX TABLE 4. OUTPUTS AND INPUTS OVER TIME

	(1) Boats Produced	(2) Capital Value/ Boat	(3) Labor Hours/ Boat	(4) Labor Value/ Boat	(5) Materials Value/ Boat	(6) Variable Costs /Boat	(7) BoatYrs. Produced	(8) Capital Value/ BoatYr.	(9) Labor Hours/ BoatYr.	(10) Labor Value/ BoatYr.	(11) Materials Value/ BoatYr.	(12) Variable Costs /BoatYr.	(13) Boat*years /Boat	(14) Tasks per worker
Phone	8.146	-0.225	-70.29	-220.8	-2.943	-224.0	759.4	-0.0765	-27.94	-87.79	-8.454	-96.28	0.978	-2.863
	(11.33)	(0.0577)	(13.47)	(42.34)	(3.180)	(43.09)	(160.4)	(0.0168)	(4.991)	(15.71)	(1.548)	(17.18)	(0.219)	(0.542)
Const.	683.3	1.056	385.0	1,215	205.4	1,421	3,185	0.234	86.17	271.9	44.99	316.9	4.732	7.583
	(11.69)	(0.0696)	(15.19)	(48.18)	(3.438)	(48.63)	(202.8)	(0.0214)	(6.142)	(19.46)	(1.994)	(21.39)	(0.299)	(0.673)
Obs.	39	39	39	39	39	39	39	39	39	39	39	39	39	36

Notes: Dependent variable listed at the top of each column. All values (capital, labor, material and variable costs) are measured in 1999 Rupees. Units of observation are district*round. Regressions include region and round fixed effects. Standard errors in parentheses.

APPENDIX TABLE 5: TESTING MELITZ AND MELITZ-OTTAVIANO: EARLY VS. LATE

	FIRM-LEVEL TESTS					VILLAGE/MARKET-LEVEL TESTS	
	(1)	(2) Price (boat)	(3) Price (boat*year)	(4) Markup (boat)	(5) Markup (boat*year)	(6)	(7) Product Diversity
	Profits					Wages	
Early Phone	703.9	176.9	38.28	205.0	48.23	-0.132	0.109
	(651.0)	(47.99)	(17.09)	(58.95)	(14.79)	(0.309)	(0.0365)
Late Phone	4,613	-123.9	-154.1	150.9	-32.40	-0.0429	0.205
	(1,244)	(76.87)	(33.18)	(97.51)	(25.82)	(0.629)	(0.0406)
Observations	1,521	1,521	1,521	1,521	1,521	1,858	1,858

Notes: Dependent variable listed at the top of each column. Baseline quality is measured using our "previous boat" estimates of life expectancy. For the first five columns, observations are builder*round. For the last two columns, observations are village*round. "Late Phone" indicates the builder's region has a phone in the final three survey rounds (11-13) and "Early Phone" indicates having a phone in rounds 10 or earlier. Regressions include region and round fixed effects. Standard errors, clustered at the builder level in columns 1-5 and at the village level in columns 6 and 7, in parentheses.

APPENDIX TABLE 6: REGRESSION RESULTS FOR ALTERNATIVE EXPLANATIONS

	(1) Electricity	(2) # fishing boats	(3) Input price index
Phone*Baseline Quality	-0.0350	-5.035	0.0318
	(0.0527)	(4.030)	(0.0609)
Phone	0.164	24.49	0.0870
	(0.258)	(19.66)	(0.320)
Baseline Quality	0.00731	-0.194	-0.0187
	(0.0487)	(3.698)	(0.0373)
Observations	1,858	1,858	1,858

Notes: Dependent variable listed at the top of each column. Baseline quality is measured using our "previous boat" estimates of life expectancy. The unit of observation is a village*round, using data from the village survey (for columns 1 and 3) and the landing canvas (column 2). Input price index is measured in 1999 Rupees. Regressions include region and round fixed effects. Standard errors, clustered at the village level, in parentheses.

APPENDIX TABLE 7: CORRELATES OF BUYING BOATS NON-LOCALLY

	(1)	(2)
	Buy non-locally?	Buy non-locally?
Income (/1000)	-0.00281	-8.96e-06
	(0.00184)	(0.00114)
Distance (km)	-0.00236	-0.00164
	(0.00194)	(0.00125)
Village Fixed Effects?	NO	YES
Observations	1,795	1,795

Notes: Dependent variable is whether a fisherman bought their boat from a local or a non-local builder (one in the fisherman's village), for all periods when their village has mobile phones. Data are from the fisherman's survey. Regressions also include round fixed effects. Regression in column 2 includes village fixed effects. Income measured in 1999 Rupees. Standard errors, clustered at the village level, in parentheses.