The impact of Fair Trade on banana producers in northern Peru

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Abstract
This study provides one of the first detailed analyses of the impact of Fair Trade (FT) banana certification at the household level. With a careful selection of treatment and control farmers (through their associations) and the use of a propensity score matching technique, we were able to construct an appropriate counterfactual for the situation of FT farmers prior to their involvement in this supply chain. Due to the fact that all sales of banana FT in the Chira Valley also have an organic certification, and to be able to distinguish the effects of FT involvement from the effects of participating in the organic market, we compared the outcomes of organic farmers which belong to a FT association with the outcomes of two different types of farmers: (a) organic farmers which belong to an association recently FT certified, and (b) conventional farmers in the same area which do not belong to any association. Our results provide clear evidence of an impact of FT involvement on income and overall welfare indicators for banana farmers in the Chira Valley. These improvements are not only achieved via the better price obtained for FT sales but also because of higher productivity levels obtained as a results of the FT premium investment.
Keywords: Fair trade, Impact evaluation, Peru

1. Introduction

Even though the principal idea of Fair Trade (FT) labeling is to provide small producers with new opportunities to improve their livelihoods, very few studies that analyze the effects on the final beneficiaries of participating in this supply chain can be found in the literature. The basic question of what would have being the situation of the producers participating in FT if they would have not participated emerges then as relevant and fundamental to evaluate the impact of FT. The principal objective of this paper is to try to answer that question by using information on a sample of FT banana producers in the north coast of Peru and comparing them with Non-FT producers with similar characteristics.

The expected effects that can appear as a consequence of FT involvement can be of different sorts. First, the higher price that FT farmers usually get for their products will most likely increase their monetary income derived from the production of the FT good even in the short run. A change in relative prices, as well as the price stability that is part of the FT deal, can also create a specialization effect with farmers concentrating more effort in the production of the FT good and moving away from others. This behavior will be more likely to appear when farmers have a good perception about FT benefits and a reliable relationship with their farmer's association.

Second, the investment of the FT premium that is pay to the farmer's association can generate different types of economic and social impacts on individual producers depending on how it is used. Provision of agricultural inputs, investments in large infrastructures, improvements in schools, provision of loans, are just some of the commonly seeing expenditures made with this premium. It is important to note that some of these investments can benefit not only FT farmers but also other farmers leaving in the same area.

Third, if we combine these two principal effects of FT on small producers, it would be expected to observe also some changes in terms of household welfare after some years of involvement on FT. Household' consumption expenditures, the value of durable goods and agricultural assets, animal stocks, will be some of the items where we will anticipate an improvement. Finally, getting and maintaining the FT certification implies amongst other things using environmentally safe production techniques and a participatory process for decision making, which might also generate some changes in production and on the perception of their organization.

In the next section we give an overview of the context in which FT banana certification first appear in the Piura region, and discuss the criteria for the selection of the treatment and control group for analyzing the different expected effects mentioned before, as well as the sampling strategy used for choosing farmer's within each group. Section 3 presents the characteristics of farmers in each group and highlights the main differences found between them. In Section 4 we use a propensity score matching technique to "balance" the overall sample of farmers to be compared, and then we analyze the difference between treatment and control groups for the selected outcome indicators. Section 5 explores the perception of farmers about their benefits from the use of the FT premium, and finally we present the conclusions for this study on Section 6.

2. Regional Context and Selection of Banana Producer's for the Impact Evaluation

Banana production for export in Piura started in the beginning of the 90's with the arrival of a few international traders to the region. First attempts to deliver the product to the US and European markets failed because of quality problems and bad coordination between the different

agents in the chain. Given the good conditions of the Chira Valley to develop organic production[1], the Agricultural Ministry started in 1999 a program to promote the export chain for organic banana in the Valley. The program promoted producer's association and gave them technical assistance as well as credit for the purchase of organic fertilizers and packing equipment.

As a result, several trading enterprises start working in the Valley since the year 2000 increasing the volume of organic banana exports in more than 30 times its initial level in less than 5 years. Currently, there are only 3 export firms operating in the Valle: *Biocosta*, who started in 2002 and provides products for *T.Port* in Germany; *COPDEBAN/DOLE*, who started in 2001 and provides organic bananas to the US market; and *Grupo Hualtaco*, who started in 2002 (previously called *Biorganika*) and concentrates more than 80% of their sales on Organic Fair Trade bananas to the European market.

By the time this study began, there were around 14 organizations of producers selling banana for export to these traders. Most of them were associated to one of two Networks in the valley: The *Central Piurana de Bananeros* Organicos (CEPIBO), functioning since 2004 with 5 member organizations; and the *Red de Pequenhos Productores de Banano Organico Comercio Justo* (REPEBAN), which started in 2005 with 6 member organizations. One of the oldest producers association in the valley which does not belong to any of these networks is the *Asosiación de Productores de Banano Orgánico del Valle del Chira* (APVCH), founded in 2001 by a group of farmers which are members of the Peasant Community of Querecotillo and Salitral. The Community exists since 1820 and is located in the Department of Piura, Province of Sullana, Districts of Querecotillo and Salitral. It currently counts with more than 6,000 peasants. Land is formally owned by the Community as a whole (title officially registered), but it was distributed equally among its members, receiving each around 1.5 hectares.

APVCH has a strong relationship with the *Grupo Hualtaco* with whom they worked since their formalization, and helped them obtaining their Organic and FT certifications. APVCH

[1] The climate conditions of the Valley impede the development of Black Sigatoka which is one of the principal plagues that affect organic banana production.

counts at this moment with 241 associates, 95% of them organic certified since 2002, and the rest since 2006. FT sales started also since 2002 and have being increasing since then. This producers association was selected as the treatment group to evaluate the impact of FT given the relatively longer period that their members have being able to benefit from it.

2.1. Selection of Control Groups

Based on the characteristics of APVCH, we decided to select two different control groups for this study. Given the idiosyncrasy of farmers belonging to the Community, and their structural difference with other farmers in the region who acquired land trough the Agrarian Reform, both control groups will be composed by Community farmers. The first group consists of farmers participating since the year 2003 in the *Asociacion de Productores de Banano Organico de Salitral* (APBOS), in the District of Salitral[2]. This association, currently with 173 members, obtained FT certification at the beginning of 2007 but have not made any sales yet under this trademark. From this group we wanted to select a sample of farmers with organic banana production, and another sample without organic production. However, this distinction couldn't be implemented in practice as there were only a few producers within the association that didn't have organic certification or where not in transitional period to become organic producers. Moreover, we find out that even producers with parcels in transition to become organic were selling some percentages of their production as if they were organic producers.

The second control group is composed by banana producers that belong to the Community, but are not associated in any organization (consequently, they do not have FT) and do not have organic production of banana. This category of farmers can be considered as traditional banana producers. The main different with the other groups is that these farmers are not integrated to the export chain and sale only to local intermediaries.

2.2. Sampling Strategy

We collected information for 50 producers of APVCH, 110 producers of APBOS, and 40 non-associated producers of conventional banana, for a total of 200 surveys. For the selection of

[2] APBOS is one of the Associations members of CEPIBO.

APVCH and APBOS farmers we made use of the *Padron de Miembros* (List of all members) of these organizations, containing information on total farm size and the size of their banana plantation. Sample selection was done in two steps. First we randomly sample farmers from APVCH. Then we restrict the universe of farmers from APBOS to the ones with total farm size and size of their banana plantations within the range of the APVCH random sample, and performed a random sampling on them.

For the selection of non-associated conventional farmers we implemented the following strategy. After finishing a questionnaire for a farmer in APVCH, the surveyor asked him to recommend two neighbor farmers that are non-organic banana producers, do not belong to any association, and that sale their product to local intermediaries. The surveyors will then look for one of them and use some "filter" questions before starting the interview. These questions provided confirmation for the required farmer' characteristics (Community member, non-organic banana producer, do not belong to any association, sale to local intermediaries).

3. Characteristics of banana producers by Group

The comparison of households between groups reveals some differences that need to be taken into account for the impact analysis. First, the head of household in the APVCH group have on average 3 years less of schooling than its counterpart in APBOS group. Second, parcels in the APVCH group are located further away from the district's capital than the ones in the other two groups. Third, the mean area of banana plantation in the APVCH group is larger than the average one for conventional farmers.

Table 1: Characteristics of producers by group

	Fair Trade	APBOS	Conv	FT vs APBOS	FT vs Conv
	Mean			t-test (p > | t |)	
Household characteristics					
Age head of hh	55.4	53.9	56.5	0.56	0.71
Education head of hh	4.7	7.8	5.8	0.00	0.26
Family size	4.1	4.1	3.6	0.99	0.16
Migration	1.6	1.4	1.3	0.36	0.39
Residence	29.5	27.7	33.3	0.50	0.22
Land					
Area banana (Has.)	1.0	0.9	0.7	0.29	0.01
Area other crops	0.0	0.2	0.1	0.17	0.44
Total productive area	1.1	1.1	0.8	0.70	0.03
Accesibility					
Time from parcel to capital	24.0	12.5	13.1	0.00	0.00
Time from house to parcel	21.1	13.7	15.0	0.00	0.04
Time from house to capital	8.7	3.6	3.9	0.00	0.02
Income					
Salary Income	3,057.8	3,803.8	3,243.0	0.48	0.90
Non-Salary Income	938.2	1,898.1	2,121.4	0.19	0.22
Gross Income banano	12,817.2	9,232.0	7,874.8	0.00	0.00
Gross Income other crops	453.0	748.6	538.7	0.46	0.78
Total Gross Income	17,266.1	15,682.5	13,777.8	0.34	0.13
Total Net Income	15,572.4	13,026.3	11,752.1	0.09	0.08
Profit banano production	11,338.8	6,909.6	6,039.4	0.00	0.00
Banano production (Kg.)	27,924.4	20,509.4	21,448.9	0.00	0.08
Banano productivity (Kg./Ha.)	27,712.4	23,491.6	32,131.7	0.02	0.14
Price Banano-high season	0.5	0.4	0.3	0.17	0.00
Price Banano-low season	0.5	0.5	0.4	0.97	0.01
Wealth					
Household Expenditures	10,060.8	10,892.8	7,224.6	0.36	0.01
Value household durables	1,892.0	1,653.0	1,276.0	0.59	0.25
Value agricultural assets	89.6	480.9	90.4	0.41	0.98
Value of animals stock	647.1	465.5	545.9	0.27	0.67
Credit Access	0.6	0.4	0.3	0.04	0.00
Amount of Credit	2,177.1	2,355.1	584.7	0.83	0.02
Value of savings	102.3	281.3	277.8	0.14	0.23
Value hosehold assets since 2000	1,527.0	1,344.0	948.9	0.66	0.23
Value hosehold assets until 1999	365.2	308.5	327.1	0.59	0.80
Value agricultural assets since 2000	80.3	473.8	67.3	0.41	0.52
Value agricultural assets until 1999	9.3	7.1	23.1	0.72	0.23
Investments					
Have land-attached investment	0.1	0.2	0.1	0.67	0.19
Value of land-attached invest	54.9	72.5	3.2	0.66	0.12
Made land-attached investment	0.1	0.1	0.1	0.80	0.63
Made house improvement	0.4	0.5	0.2	0.37	0.06
Investment in new bananos	90.9	147.0	120.3	0.57	0.72
Family labor jornales in banano	201.5	290.9	120.6	0.39	0.00
Hired labor jornales in banano	30.5	20.8	6.3	0.38	0.08
Value of hired jornal	13.6	13.0	12.8	0.50	0.44
Perception & Participation					
Economic perception1	1.7	1.8	2.0	0.42	0.11
Economic perception2	1.7	2.4	1.7	0.57	0.65
Satisfaction price	4.4	5.1		0.07	
Satisfaction technical assis	7.1	6.2		0.01	
Satisfaction trade	6.8	6.1		0.06	
Identification index	3.8	3.6		0.10	
Force index	3.8	3.6		0.00	
Number Organizations	3.9	3.9	2.7	0.98	0.00
Number of Organizations before 2000	2.1	2.2	2.1	0.65	0.79
Number of Organizations after 2000	1.8	1.7	0.5	0.72	0.00
Willingness to buy	42,833.0	22,553.0	23,306.0	0.01	0.12
Willingness to rent	4,004.0	2,370.0	1,761.0	0.02	0.04
Gender and Environment					
Number decisions head of hh	1.7	1.3	1.1	0.23	0.13
Number decisions spouse	0.5	0.4	0.4	0.52	0.38
Number decisions both	2.6	3.0	3.4	0.24	0.07
Number environmental practices	1.5	1.6	1.2	0.29	0.20
Organic fertilizer in banano	0.2	0.2	0.1	0.97	0.48
Quemical fertilizer in banano	0.3	0.2	0.3	0.69	0.60
Organic fertilizer in other crops	0.5	0.7	0.3	0.00	0.00
Quemical fertilizer in other crops	0.0	0.0	0.5	0.43	0.00
Risk attitude					
Risk attitude	3.9	4.4	4.8	0.04	0.01
Obs	48	103	36		

These variables, as well as other variables that might be affecting the expected outcomes from FT or influencing the probability of getting the FT certification, have to be taken into account in order to construct a good counterfactual for measuring the impact on FT producers.

4. Matching producers to obtain FT impact

In order to "balance" the sample of FT farmers with the samples of the two control groups we estimate the probability of having FT certification based on a set of exogenous characteristics and pre-treatment variables.

Table 2: Probit regression for the probability of having FT certification

Variables	FT-APBOS	FT-Conv
Age head of hh	-0.015	0.012
	(0.014)	(0.0189)
Education head of hh	-0.096**	-0.020
	(0.035)	(0.049)
Family size	0.049	0.153
	(0.081)	(0.123)
Area banana	0.085	0.921**
	(0.242)	(0.362)
Area other crops	-0.594	-0.755
	(0.599)	(0.923)
Time parcel capital	0.040***	0.049**
	(0.011)	(0.016)
Value agricultural assets until 1999	0.002	-0.007**
	(0.004)	(0.003)
Organizations before year 2000	-0.055	0.156
	(0.146)	(0.204)
Years that household reside in locality	0.000	-0.030
	(0.012)	(0.018)
Constant	0.128	-1.898
	(0.880)	(1.281)
	Obs= 150	Obs = 84
	LR chi2(9) = 38.95	LR chi2(9) = 31.43
	Prob > chi2 = 0	Prob > chi2 = 0.0002
	Pseudo R2 = 0.2071	Pseudo R2 = 0.2739

For the comparison between FT producers and members of APBOS we find a significant difference in terms of the level of education of the household head and the distance of the parcel to the district's capital. This later difference is maintained when comparing them with the sample of conventional farmers who also present a significantly smaller size of their banana parcels and

a higher value of agricultural assets before the year 2000. More importantly, this model presents an overall explanatory power (according to the Pseudo R2 reported) of around 21% for the comparison with APBOS and 27% for the sample of conventional farmers.

Based on the results of these regressions we proceed by estimating the propensity score (pscore - predicted probability of having FT certification) for each comparison (FT-APBOS, FT-Conv) and identifying the regions of "common-support". These regions are set after eliminating the observations in the control group with a pscore lower than the minimum pscore in the treatment group, and the observations in the treatment group with a pscore higher than the maximum pscore in the control group (see Appendix). The matching estimation is performed for both comparisons on common-support observations.

We initially use three different matching algorithms in order to check the robustness of the results to the method applied:

a. Kernel matching is a non-parametric matching estimator that uses weighted averages of all individuals in the control group to construct the counterfactual outcome.

b. One-to-One matching (with replacement) chooses for each treatment observation the observation in the control group that is closest in terms of propensity score.

c. Nearest Neighbor matching (3) uses a weighted average of the 3 closest neighbors in terms of propensity scores for each treatment observation.

Given the small size of our sample (in particular of the sample in the control groups) and the strong restrictions placed on the common-support, we will use the results from the Kernel matching to discuss our findings. Because the principal idea of the propensity score matching technique is to balance the treatment and control samples by using the propensity scores derived from these regressions, we carry out two methods to assess the performance of our model. In the Appendix we show the results of the same Probit regressions but this time only considering the observations that are used for the matching, and we also plot the distribution of the estimated

propensity scores before and after the matching is done[3]. Overall variability is largely reduced and the distributions of the propensity scores reveal now a more balanced sample.

[3] Observations included for these tasks are the ones within the identified region of common-support and then used for the calculation of the One-to-One matching estimator.

Table 3: Matching estimation FT vs. APBOS

	Kernel			One to One			Near Neighbor(3)		
Variable	Difference	S.E.	T-stat	Difference	S.E.	T-stat	Difference	S.E.	T-stat
INCOME									
Salary Income	711	1,001	0.71	1,094	1,335	0.82	1,204	1,169	1.03
Non-Salary Income	16	667	0.02	-1,463	996	-1.47	16	659	0.02
Gross Income banano	2,864	1,593	1.80	4,015	1,626	2.47	2,777	1,639	1.69
Gross Income other crops	9	321	0.03	-128	518	-0.25	-85	512	-0.17
Total Gross Income	3,600	1,802	2.00	3,518	2,146	1.64	3,771	2,128	1.77
Total Net Income	4,252	1,582	2.69	3,928	1,890	2.08	4,432	1,953	2.27
Profit banano production	3,559	1,375	2.59	4,440	1,444	3.08	3,464	1,413	2.45
Banano production (Kg.)	6,007	3,251	1.85	8,339	3,670	2.27	5,685	3,420	1.66
Banano productivity (Kg./Ha.)	5,338	2,123	2.51	4,615	2,961	1.56	5,489	2,629	2.09
Price Banano-high season	0.00	0.01	0.50	0.01	0.01	0.51	0.01	0.01	0.52
Price Banano-low season	0.00	0.01	0.47	0.01	0.01	0.60	0.00	0.01	0.26
WEALTH									
Household Expenditures	-101	1,091	-0.09	1,414	1,294	1.09	115	1,196	0.10
Value household durables	1,062	407	2.61	680	592	1.15	1,109	472	2.35
Value agricultural assets	-225	137	-1.64	-198	248	-0.80	-137	245	-0.56
Value of animals stock	-297	185	-1.61	-340	280	-1.21	-376	244	-1.54
Credit Access	0.29	0.10	2.89	0.29	0.14	2.07	0.28	0.13	2.16
Amount of Credit	1,225	645	1.90	1,355	647	2.09	1,374	633	2.17
Value of savings	-350	262	-1.34	-202	214	-0.95	-208	281	-0.74
Value hosehold assets since 2000	817	397	2.06	380	564	0.67	872	432	2.02
Value agricultural assets since 2000	-223	146	-1.53	-200	232	-0.86	-136	240	-0.57
INVESTMENTS									
Have land-attached investment	-0.02	0.09	-0.26	-0.02	0.13	-0.18	-0.06	0.12	-0.46
Value of land-attached invest	-11	43	-0.26	-7	58	-0.11	-35	58	-0.60
Made land-attached investment	-0.01	0.07	-0.13	0.00	0.10	0.00	-0.04	0.08	-0.48
Made house improvement	-0.07	0.11	-0.61	-0.07	0.14	-0.51	-0.06	0.13	-0.42
Investment in new bananos	5	12	0.42	4	16	0.23	10	13	0.80
Family labor jornales in banano	-136	120	-1.13	-112	98	-1.14	-106	119	-0.89
Hired labor jornales in banano	13	17	0.74	11	18	0.62	18	16	1.13
Value of hired jornal	2	1	1.25	2	1	1.24	2	1	1.72
PERCEPTION & PARTICIPATION									
Economic perception1	0.11	0.21	0.51	-0.07	0.25	-0.28	0.08	0.22	0.35
Economic perception2	-2.30	2.95	-0.78	0.31	2.07	0.15	-1.04	2.27	-0.46
Satisfaction price	-0.61	0.50	-1.20	-0.21	0.59	-0.36	-0.67	0.55	-1.21
Satisfaction technical assis	0.81	0.52	1.56	0.50	0.62	0.80	0.66	0.53	1.24
Satisfaction trade	0.79	0.48	1.63	0.88	0.61	1.45	0.86	0.58	1.48
Identification index	0.25	0.15	1.66	0.21	0.19	1.09	0.23	0.17	1.35
Force index	0.24	0.10	2.49	0.21	0.12	1.75	0.24	0.11	2.13
Number Organizations	0.30	0.26	1.16	0.31	0.27	1.13	0.33	0.24	1.34
Number of Organizations after 2000	0.26	0.22	1.16	0.19	0.26	0.74	0.31	0.25	1.25
Willingness to buy	20,004	11,211	1.78	24,405	11,978	2.04	20,976	11,121	1.89
Willingness to rent	1,853	1,123	1.65	1,662	1,133	1.47	1,690	1,100	1.54
GENDER & ENVIRONMENT									
Number decisions head hh	0.27	0.44	0.61	0.21	0.48	0.45	0.40	0.41	0.96
Number decisions spouse	0.15	0.19	0.77	0.21	0.19	1.10	0.24	0.18	1.35
Number decisions both	-0.24	0.47	-0.50	-0.21	0.57	-0.37	-0.48	0.57	-0.84
Number environmental pract	-0.27	0.17	-1.61	-0.29	0.21	-1.38	-0.27	0.18	-1.53
Organic fertilizer in banano	0.00	0.01	0.32	0.01	0.01	0.55	0.01	0.01	0.96
Quemical fertilizer in banano	0.00	0.02	0.24	-0.01	0.03	-0.22	0.00	0.02	-0.16
Organic fertilizer in other crops	-0.20	0.06	-3.36	-0.23	0.07	-3.25	-0.23	0.07	-3.23
Quemical fertilizer in other crops	-0.01	0.03	-0.59	0.02	0.03	0.72	0.00	0.03	-0.17
RISK ATTITUDE									
Risk attitude	-0.69	0.34	-2.05	-0.54	0.46	-1.17	-0.65	0.36	-1.80
Migration	0.02	0.22	0.08	-0.14	0.25	-0.58	0.07	0.24	0.30

Table 4: Matching estimation FT vs. Conventional

	Kernel			One to One			Near Neighbor(3)		
Variable	Difference	S.E.	T-stat	Difference	S.E.	T-stat	Difference	S.E.	T-stat
INCOME									
Salary Income	555	1,708	0.33	603	1,835	0.33	1,542	1,647	0.94
Non-Salary Income	-1,896	2,361	-0.80	-379	2,669	-0.14	-1,896	2,550	-0.74
Gross Income banano	3,357	2,059	1.63	4,944	2,596	1.90	3,885	2,364	1.64
Gross Income other crops	-8	386	-0.02	91	404	0.22	-33	371	-0.09
Total Gross Income	2,008	3,272	0.61	5,259	3,358	1.57	2,427	3,167	0.77
Total Net Income	2,801	2,968	0.94	5,573	3,426	1.63	3,452	3,104	1.11
Profit banano production	4,243	1,942	2.18	5,355	2,929	1.83	5,020	2,357	2.13
Banano production (Kg.)	3,733	4,570	0.82	7,045	5,830	1.21	4,662	6,189	0.75
Banano productivity (Kg./Ha.)	3,609	5,336	0.68	3,343	5,124	0.65	5,267	5,245	1.00
Price Banano-high season	0.14	0.02	6.67	0.14	0.03	5.55	0.14	0.02	6.08
Price Banano-low season	0.02	0.01	1.78	0.03	0.01	1.96	0.02	0.02	1.61
WEALTH									
Household Expenditures	3,392	1,551	2.19	3,470	1,231	2.82	3,021	1,297	2.33
Value household durables	891	599	1.49	912	667	1.37	1,068	595	1.79
Value agricultural assets	35	33	1.05	-5	37	-0.13	22	30	0.74
Value of animals stock	183	301	0.61	169	328	0.52	204	314	0.65
Credit Access	0.30	0.18	1.70	0.38	0.19	2.06	0.32	0.19	1.75
Amount of Credit	1,198	516	2.32	1,994	722	2.76	1,882	690	2.73
Value of savings	64	125	0.51	85	99	0.86	99	124	0.79
Value hosehold assets since 2000	588	530	1.11	588	644	0.91	748	503	1.49
Value agricultural assets since 2000	24	30	0.82	-12	31	-0.40	14	27	0.51
INVESTMENTS									
Have land-attached investment	0.08	0.06	1.33	0.10	0.05	2.01	0.09	0.06	1.69
Value of land-attached invest	7	6	1.21	20	14	1.47	19	14	1.42
Made land-attached investment	0.02	0.03	0.61	0.05	0.04	1.23	0.04	0.04	1.19
Made house improvement	0.16	0.18	0.87	-0.05	0.20	-0.25	0.09	0.19	0.50
Investment in new bananos	-36	34	-1.07	-34	27	-1.25	-8	36	-0.23
Family labor jornales in banano	97	35	2.76	76	29	2.63	82	27	3.05
Hired labor jornales in banano	23	13	1.79	30	13	2.25	30	12	2.37
Value of hired jornal	-4	4	-0.87	-5	4	-1.47	0	3	-0.10
PERCEPTION & PARTICIPATION									
Economic perception1	-0.33	0.31	-1.04	-0.77	0.41	-1.89	-0.36	0.31	-1.18
Economic perception2	-0.11	0.31	-0.35	-0.36	0.37	-0.97	-0.03	0.29	-0.12
Number Organizations	1.32	0.33	3.99	1.33	0.33	4.04	1.31	0.30	4.40
Number of Organizations after 2000	1.30	0.31	4.24	1.21	0.30	4.03	1.28	0.27	4.70
Willingness to buy	-3,410	26,876	-0.13	-1,205	21,570	-0.06	-7,419	21,841	-0.34
Willingness to rent	1,620	1,606	1.01	1,665	1,329	1.25	1,219	1,248	0.98
GENDER & ENVIRONMENT									
Number decisions head hh	0.91	0.45	2.00	0.64	0.52	1.24	0.81	0.50	1.62
Number decisions spouse	-0.13	0.43	-0.29	0.36	0.53	0.68	-0.06	0.47	-0.13
Number decisions both	-1.01	0.72	-1.41	-1.21	0.84	-1.43	-0.96	0.78	-1.23
Number environmental pract	0.12	0.41	0.29	0.56	0.50	1.14	0.06	0.40	0.15
Organic fertilizer in banano	0.04	0.02	2.11	0.04	0.02	1.94	0.04	0.02	2.19
Quemical fertilizer in banano	-0.07	0.09	-0.86	-0.06	0.07	-0.75	-0.07	0.07	-0.89
Organic fertilizer in other crops	0.14	0.11	1.25	0.26	0.14	1.83	0.10	0.13	0.74
Quemical fertilizer in other crops	-0.38	0.12	-3.26	-0.48	0.14	-3.39	-0.37	0.13	-2.87
RISK ATTITUDE									
Risk attitude	-1.06	0.58	-1.83	-1.20	0.57	-2.11	-1.31	0.59	-2.21
Migration	0.32	0.26	1.25	0.36	0.26	1.40	0.46	0.24	1.92

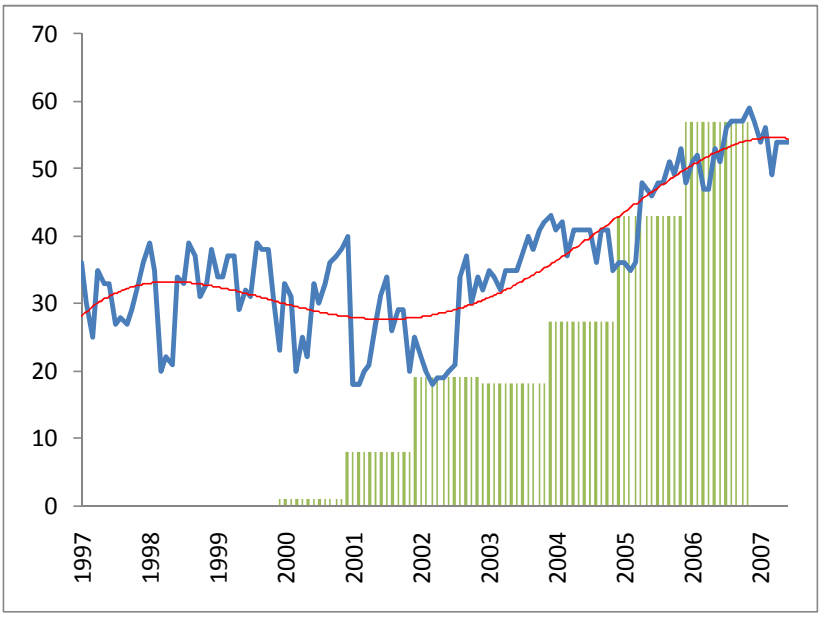
In terms of the comparison between FT banana producers and producers from APBOS, we observe a significant difference on net household income which is mainly driven by a higher productivity on banana production. It is interesting to note that this difference is obtained despite the similarity of banana prices for farmers in both organizations (prices for organic banana and organic-FT banana are very close).

Even though we do not see a significant difference in total household expenditures, FT farmers present a higher value of household assets and also receive more credit than the controls. The value of household assets acquired since the year 2000 is significantly higher than the one for the controls which may imply that they invest a large proportion of their extra earnings on these improvements. Another impact of FT in terms of household wealth can be derived from the perception of higher land values. The price that an average FT household will be willing to pay for a parcel with the same characteristics as his (willingness to buy) almost doubles the price for an average farmer from APBOS.

In other areas, FT producers are also more identified with their organization (Identification index) and more convince of the good bargaining capacity of it (Force index). Finally, FT banana farmers seem to be more willing to undertake risk (risk attitude) than APBOS producers.

Broadly similar results are obtained when comparing FT producers with Conventional farmers, but this time the higher income in banana production is driven by the price difference rather than banana productivity. Conventional farmers are more affected by local market conditions during the high-season when excess supply drives banana prices down. Despite this price difference, it is very important to notice that the introduction of the FT market for banana producers in the valley seems to have had an important effect on local farm-gate prices for conventional banana. As many key informants in the valley suggested, local retailers who buy conventional banana for markets in the region and in Lima appear to have being forced to increase prices in order to maintain their providers working with them. As we can observe in the next graph, the price for conventional banana in the valley (cents per Kg.) has being increasing together with the amount of organic and FT banana exports (in thousands of tons).

Graph 1: Banana exports and price of conventional banana in Piura



Source: Sisagri database-Ministry of Agriculture and Prompex database.

Total household expenditures are also significantly higher for FT farmers when compared to this group, reflecting an overall welfare effect of FT. Important new differences emerge in terms of the number of jornales used for banana production, the number of organizations that family members joined since the year 2000, and the use of organic and chemical fertilizer. FT farmers do not only use more family labor for this activity but also employ more labor outside the household. This fact, together with the increased willingness to bear risk, seem to indicate that FT farmers are concentrating their effort on banana production instead of pursuing more income diversification activities that could reduce their risk exposure but also decrease their expected income.

5. The FT Premium

Another important benefit from FT certification can be derived from the use of the FT premium. We incorporated a section in the survey to recover the perception of farmers about the benefits they get from the use of the premium. All sampled farmers from APVCH declared to know the existence of the FT premium and 92% considered that their households got some direct benefit from its use.

Table 5: Perception of FT premium

	% who benefit from	Average benefit value
Technical Assistence	37%	84
Education	46%	155
Credit	46%	334
Health Services	13%	83
Infrastructure	9%	1,146
Agricultural inputs	100%	1,083
Food Basket	39%	23
Total value		2,906

Farmers where then asked to identify all the different categories in which they got some benefit and also to put a value of that benefit for the last year. All of them mentioned the reception of agricultural inputs as an important and valuable benefit, followed by the improvement of education services and access to credit. The use of the premium for the development of infrastructure was only mentioned as a benefit for 9% of the sampled farmers, but the value they placed on it was very large compared to other items.

Adding up the perceived value of benefits for each household we have that the use of the FT premium gives on average almost three thousand soles per household, what represents around one fifth of their yearly net income.

6. Conclusions

This study provides one of the first detailed analyses of the impact of FT banana certification at the household level. With a careful selection of treatment and control farmer's associations and the use of a propensity score matching technique, we constructed a good counterfactual for the situation of FT farmers prior to their involvement in this supply chain. Due to the fact that all sales of banana FT in the Chira Valley have also an organic certification, and to be able to distinguish the effects of FT involvement from the effects of participating in the Organic market, we compare the outcomes of organic farmers which belong to a FT association with the outcomes of two different types of farmers: organic farmers which belong to an association recently FT certified (APBOS), and conventional farmers in the same area which do not belong to any association.

In both cases the net income derived from banana production is higher for FT producers. While this difference is exclusively based on higher productivity levels in the comparison with APBOS farmers, it is mainly derived from a better price than the one Conventional farmers get. Higher productivity levels for FT farmers might be obtained in part because of the FT premium use in technical assistance, delivery of agricultural inputs, and credit availability. A better attitude towards risk could also explain FT farmer's concentration in banana production. In particular, a higher use of family and hired labor for this activity appears to be compensating the lack of chemical fertilizers that Conventional farmers use intensively.

A clear difference in terms of household wealth appears for the comparison with Conventional farmers. Household expenditures for FT producers are around 40% higher than the ones of Conventional farmers. Even though this effect is not present when comparing expenditures with APBOS farmers, some other indicators like the value of durable assets and the value of land also reveal a welfare effect derived from FT.

These results provide clear evidence of on impact of FT involvement on income and overall welfare indicators for banana farmers in the Chira Valley. These improvements are not only achieved via the better price obtained for FT sales but also because of higher productivity levels obtained as a results of the FT premium investment.

Moreover, the introduction of the FT market for banana producers in the valley seems to have had an important effect on local farm-gate prices for conventional banana. Local retailers who buy conventional banana for markets in the region and in Lima appear to have being forced to increase prices in order to maintain their providers working with them.

A similar type of externality could be expected in terms of the FT premium use if this will be invested more on infrastructure development and improvements of public services. So far, however, the use of the premium is mostly oriented to improve the working conditions of FT members. Even though this use might be needed at the beginning for FT farmers to take-off, community development investments in the near future can produce important externalities for a broader and more sustainable progress. Given the reduced size of the international market for FT products, it would be important to take advantage of the current FT opportunities to help built the grounds for other development prospects in the region.

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Table 1A

Number of observations on Common Support

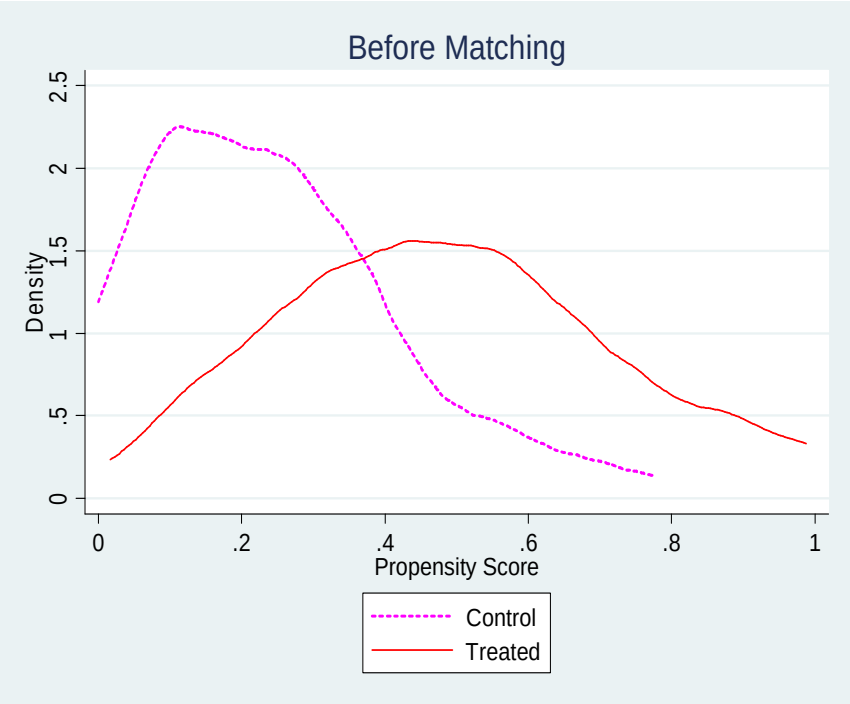
	ON-CS	OFF-CS	Total
FT	42	6	48
APBOS	97	6	103
FT	39	9	48
Conventional	30	6	36

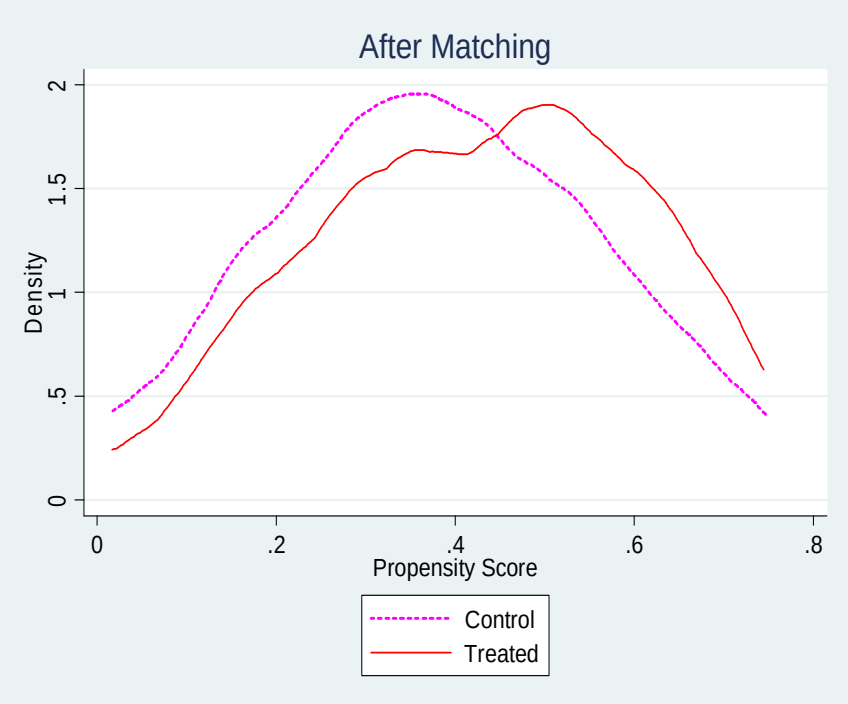
Table 2A: Probit model after matching

Variables	FT-APBOS	FT-Conv
Age head of hh	-0.011	0.012
	(0.019)	(0.024)
Education head of hh	-0.051	-0.005
	(0.047)	(0.063)
Family size	0.025	0.179
	(0.123)	(0.154)
Area banana	-0.072	0.052
	(0.310)	(0.516)
Area other crops	-0.998	-1.143
	(0.860)	(1.020)
Time parcel capital	-0.007	0.033
	(0.0178)	(0.024)
Value agricultural assets until 1999	0.027	-0.003
	(0.026)	(0.006)
Organizations before year 2000	0.000	-0.037
	(0.232)	(0.246)
Years that household reside in locality	0.008	-0.017
	(0.015)	(0.023)
Constant	1.148	-0.471
	(1.257)	(1.772)
	Number of ob = 66	Number of ob = 51
	LR chi2(9) = 5.09	LR chi2(9) = 5.42
	Prob > chi2 = 0.826	Prob > chi2 = 0.7962
	Pseudo R2 = 0.0589	Pseudo R2 = 0.0974

Graph 1A: Fair Trade vs. APBOS

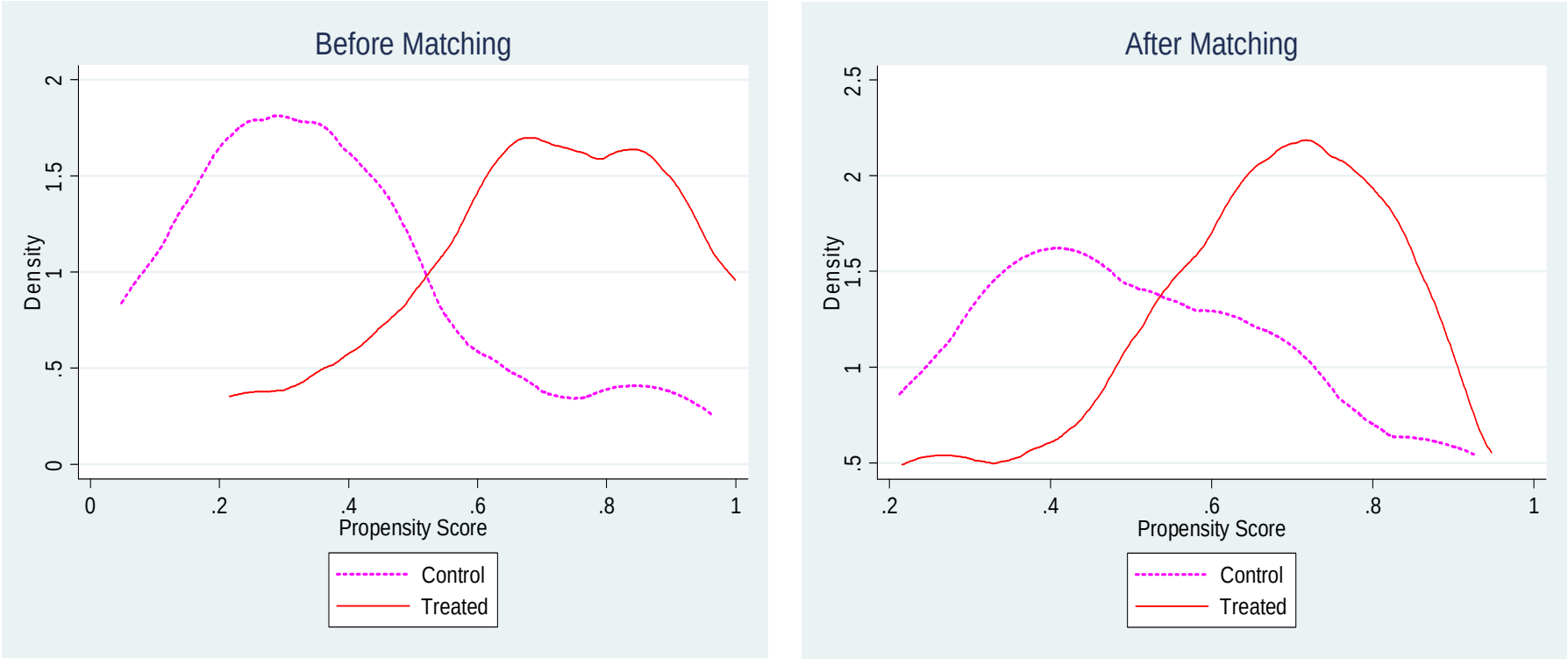
Distribution of Propensity Scores





Graph 2A: Fair Trade vs. Conventional

Distribution of Propensity Scores



Descriptions Table of Variables used

#	*Variables*	*Description of variables*	*Units*
	Household characteristics		
1	Age head of hh	Age of head of the household	year
2	Education head of hh	Years od education of head of household	year
3	Family size	Number of members in household	Nº
4	migration	Number of ex-members of household that migrated	Nº
5	years live in locality	Years that family live in locality	year
	Land		
6	Area banana (Has.)	Total area under banana production	Ha
7	Area other crops	Total area producing other crops	Ha
	Accesibility		
8	Time from parcel to capital		minutes
9	Time from house to parcel		minutes
10	Time from house to capital		minutes
	Income		
11	Salary Income	From jornales outside own farm or other activities	S/
12	Non-Salary Income	Own bussiness	S/
13	Gross Income banano	Total production times price received	S/
14	Gross Income other crops	Total production times price received	S/
15	Total Gross Income	11+12+13+14	S/
16	Total Net Income	15 - Total production costs	S/
17	Profit banano production	13 - Total banana production cost	S/
18	Banano production		Kg
19	Banano productivity	18 / 6	Kg/Ha
20	Price Banano-high season		S/
21	Price Banano-low season		S/
	Wealth		
22	Household Expenditures	Yearly	S/
23	Value household durables	Stock	S/
24	Value agricultural assets	Stock	S/
25	Value of animals stock	Stock	S/
26	Credit Access	In the last 3 years	Yes/No
27	Amount of Credit	In the last 3 years	S/
28	Value of savings		S/
29	Value hosehold assets since 2000		S/
30	Value hosehold assets until 1999		S/
31	Value agricultural assets since 2000		S/
32	Value agricultural assets until 1999		S/
	Investments		S/
33	Have land-attached investment		Yes/No
34	Value of land-attached invest		S/
35	Made land-attached investment	Since year 2000	Yes/No
36	Made house improvement	In the last 5 years	Yes/No
37	Investment in new bananos		S/
38	Family labor jornales in banano		Nº
39	Hired labor jornales in banano		Nº
40	Value of hired jornal		S/
	Perception & Participation		
41	Economic perception1	Last 5 years. 1"Better off"; 2"Same"; 3"Worse off"	1-3
42	Economic perception2	Next 5 years. 1"Better off"; 2"Same"; 3"Worse off"	1-3
43	Satisfaction price	1"little satisfied" - 10"very satisfied"	1-10
44	Satisfaction technical assis	1"little satisfied" - 10"very satisfied"	1-10
45	Satisfaction trade	1"little satisfied" - 10"very satisfied"	1-10
46	Identification index	1"Totaly disagree" - 5"Totaly agreed"	1-5
47	Force index	1"Totaly disagree" - 5"Totaly agreed"	1-5
48	Number Organizations		Nº
49	Number of Organizations before 2000		Nº
50	Number of Organizations after 2000		Nº
51	Willingness to buy	Perceived land selling price	S/
52	Willingness to rent	Perceived land rental price	S/
	Gender and Environment		
55	Number decisions head of hh		Nº
56	Number decisions spouse		Nº
57	Number decisions both		Nº
58	Number environmental practices		Nº
59	Organic fertilizer in banano	Expenditures in organic fertilizer/Total expenditures	%
60	Quemical fertilizer in banano	Expenditures in chemical fertilizer/Total expenditures	%
61	Organic fertilizer in other crops	Expenditures in organic fertilizer/Total expenditures	%
62	Quemical fertilizer in other crops	Expenditures in chemical fertilizer/Total expenditures	%
	Risk attitude		
63	Risk attitude	1"Risk lover" - 7"Risk adverse"	1-7