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The Effects of Fair Trade on Affiliated Producers: An Impact Analysis on Kenyan Farmers

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Summary. — We analyse the impact of fair trade (FT) affiliation on monetary and non-monetary measures of well-being in a sample of Kenyan farmers. Our descriptive and econometric findings document significant differences in terms of varieties of products sold, price satisfaction, monthly household food consumption, (self declared) satisfaction with living conditions, dietary quality, and child mortality for affiliates of fair trade and Meru Herbs (first-level local producer organization) with respect to a control sample. Methodological problems such as FT's *vis à vis* Meru Herbs' relative contribution, control sample bias, FT and Meru Herbs selection biases are discussed and addressed showing that *ex ante* (self) selection of Meru Herbs members contributes to explaining some but not all of our results.

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Key words — impact analysis, child labor, fair trade, monetary and non-monetary well-being

1. INTRODUCTION

Fair trade schemes use consumption and trade in an aim to promote the inclusion of poor farmers in global product markets through a package of benefits that includes anti-cyclical mark-ups on prices, long-term relationships, credit facilities, and consultancy to build producers' capacity.¹ The distribution channel offered to affiliated producers by fair trade importers does not intend to be exclusive, since one of the movement's goals is to strengthen these producers' positions in global product markets. Skill advancement and progressive independence are therefore two of the most critical issues in the relationship between fair traders and affiliated producers.

The literature on FT impact analyses is surprisingly scarce, given the importance of evaluating claims that participation in the FT chain brings advantages to producers.

To our knowledge, one of the very few impact studies testing the statistical significance

of fair trade is performed by Bacon (2005) on a sample of Guatemalan coffee producers. The study uses a two-way ANOVA approach to show that access to certified markets has a positive and significant effect on sale prices.

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49 The finding is not controlled for other potential
50 concurring factors.

51 A statistical and econometric approach is
52 also used by [Pariante \(2000\)](#), who observes
53 the positive impact of minimum price on coffee
54 producers' security in the Coocafè cooperative
55 in Costa Rica. The research documents a re-
56 duced price variability (and a minimum price
57 higher than the world price) when local produc-
58 ers sell to FT. All other existing impact analyses
59 are based on non-systematic, though qualita-
60 tively very rich, evidence collected in case stud-
61 ies ([Castro, 2001a, 2001b](#); [Hopkins, 2000](#);
62 [Nelson & Galvez, 2000](#); [Oxford Policy Man-
63 agement, 2000](#); [Ronchi, 2002](#)).

64 The main findings of these studies are: (i) FT's
65 relationships are predominantly with first-level
66 producer organizations rather than individual
67 producers; (ii) the fair trade premium is managed
68 by the organization to satisfy the individual's
69 welfare needs (in such cases, the evaluation of
70 the impact of FT is dependent on the particular
71 merits of the decision to certify a given local pro-
72 ducer organization); and (iii) the main role of fair
73 trade is capacity building, an activity which is
74 deemed crucial to support inclusion of local pro-
75 ducers in international trade.

76 Many of these papers acknowledge the impor-
77 tance of a rigorous impact evaluation. [Nelson
78 and Galvez \(2000\)](#) conclude their work by argu-
79 ing that "*as with many organisations involved in
80 fair-trade MCCH has not yet been able to make
81 an assessment themselves of the longer-term im-
82 pact of its involvement in cocoa marketing for
83 smallholders and their livelihoods. There is a
84 growing recognition amongst organisations in-
85 volved in fair-trade that more attention needs to
86 be paid to impact assessment.*" In a similar man-
87 ner, [Oxford Policy Management \(2000\)](#) agrees
88 that it would be important to compare (levels
89 and changes of) quality of living indicators of
90 farmers affiliated to FT with farmers from a ran-
91 domly selected control sample.

92 The aim of this paper is therefore to evaluate
93 econometrically the FT impact on various indi-
94 cators of well-being. To do so, we constructed a
95 survey and collected information from a sample
96 of 120 Kenyan farmers divided into four
97 groups, three of which (Bio, Conversion, Only-
98 fruit) had varying intensities of relationship
99 with fair trade while the fourth (Control sam-
100 ple) had no fair trade relationship at all.

101 The paper is divided into seven sections
102 (including the introduction and conclusion), pre-
103 senting and commenting on descriptive and
104 econometric findings from the survey. In Section

2, we provide concise descriptions of (i) fair
105 trade, its current diffusion, and debates sur-
106 rounding it; (ii) the main features of the Ng'uuru
107 Gakirwe Water Project from which the Meru
108 Herbs producers' association originated; (iii)
109 the relationship between Meru Herbs and FT
110 importers; (iv) the main features of the Meru
111 Herbs organization and, finally; (v) details on
112 the construction of our survey.

113 In Section 3, we use descriptive statistics to
114 compare characteristics among the four groups
115 of farmers by examining market conditions (crop
116 variety, average market price for each product
117 sold, sale conditions, and subjective price satis-
118 faction) and selected socio-economic indicators.
119

120 In Section 4 our econometric analysis high-
121 lights the following main results: Meru Herbs
122 members with access to the FT channel have
123 a more diversified product portfolio, relatively
124 higher price and living condition satisfaction,
125 spend significantly more on food consumption,
126 have higher nutritional standards and have rela-
127 tively fewer episodes of infant mortality in
128 their households.

129 Section 5 highlights FT's lack of clear-cut ef-
130 fects on child labor and human capital invest-
131 ment.

132 A discussion of the econometric results and
133 associated methodological problems such as
134 FT's *vis-à-vis* Meru Herbs' relative contribu-
135 tion, control sample bias and FT and Meru
136 Herbs (self) selection biases is included in Sec-
137 tion 6. This section also indicates that *ex ante*
138 selection of members contributes to explaining
139 some but not all of our results.

140 Section 7 concludes that FT benefits are
141 mainly related to risk reduction (product diver-
142 sification, price stabilization, *etc.*) and the pro-
143 vision of in-kind services (technical assistance,
144 for example) to affiliated members.

2. FAIR TRADE 145

146 Fair trade is a production chain created by
147 importers, distributors, and retailers of food
148 and textile products that have been partially
149 or wholly manufactured by poor rural commu-
150 nities in developing countries under specific so-
151 cial and environmental criteria.

152 In 2003, the European Fairtrade Labelling
153 Organization (FLO) certified 315 organizations
154 representing almost 500 first-level producer
155 structures and around 1,500,000 families of
156 farmers and workers from 40 countries ([Moore,
157 2004](#)). FT products were sold by 2,700 dedi-

158 cated outlets (known as *World Shops*) and
159 43,000 supermarkets across Europe (7,000 in
160 the United States).

161 The Fair Trade in Europe Report, 2005 (*Fair
162 Trade Advocacy, 2005b*) documents that Euro-
163 pean FT net sales grew by 20% per year in the last
164 five years. Also in 2005, FT products achieved
165 significant market shares in specific sectors such
166 as the banana market in Switzerland (49%) and
167 the ground coffee market in the UK (20%).

168 To obtain the “fair trade” label, these prod-
169 ucts need to comply with the following require-
170 ments, defined by the Fairtrade Labelling
171 Organization (FLO) (*Fair Trade Advocacy,
172 2005a*) and hence must: (i) pay a fair wage
173 (price) in the local context; (ii) stabilize price
174 fluctuations; (iii) offer employees opportuni-
175 ties for advancement (including investment in
176 local public goods); (iv) provide equal employ-
177 ment opportunities for all, particularly the most
178 disadvantaged; (v) engage in environmentally
179 sustainable practices; (vi) be open to public
180 accountability; (vii) build long-term trade rela-
181 tionships; (viii) provide healthy and safe work-
182 ing conditions within the local context; (ix)
183 provide technical and financial assistance (price
184 stabilization insurance services and anticipated
185 financing arrangements which reduce financial
186 constraints) to producers whenever possible.

187 Opponents of fair trade argue that the “fair
188 price” is a distortion of market prices and pro-
189 vides mistaken incentives to affiliated farmers,
190 increasing their dependence on products which
191 are overproduced in the market.² Fair trade
192 advocates counter this argument by pointing
193 out that the fair price should not be considered
194 as a price distortion since transactions between
195 first-level producers and intermediaries often
196 do not occur in a competitive framework but
197 rather in a monopsonistic (oligopsonistic) one
198 where producer prices fall below the marginal
199 value of the product. A second criticism of the
200 above argument is that the food industry has
201 historically produced highly differentiated prod-
202 ucts with continuous waves of innovation, creat-
203 ing new varieties. Fair trade continues this
204 tradition; there is not one coffee but many
205 different varieties of coffee products, each differ-
206 entiated by varying combinations of quality,
207 blends, packaging, and now also “social respon-
208 sibility” features. Each of these products has a
209 specific and different market price that is influ-
210 enced by consumer tastes according to the par-
211 ticular coffee variety. In creating a new range
212 of products, fair trade is an innovation in the
213 food industry.

A final point shared by the empirical litera-
ture is that the impact of FT must be assessed
not just on the price rule but mainly on the
whole set of criteria with particular attention
to those of price stabilization, prefinancing,
and provision of technical assistance.

Our empirical analysis aims to provide new
evidence to solve this *querelle* by answering some
crucial questions: Are FT criteria effectively ap-
plied on the field? What is their impact on socio-
economic well-being of affiliated farmers? Is
impact of FT due to the official criteria or are
there other hidden elements emerging from the
empirical analysis which can neither be identified
by FT organizations nor by their opponents? Q2 228

(a) *The irrigation project, Meru Herbs, and free
trade* 229 230

Meru Herbs is the commercial organization
created by the Ng’uuru Gakirwe Water Com-
mittee, an association of local farmers who
started the project with the aim of bringing
water to every house and farm by canalizing
the Kitheno River. The Committee originates
from a group of 430 families that established
themselves in various plots (between 10 and 40
acres) that were granted by the Kenyan Govern-
ment in the 1960s. The plots are located in the
districts of Meru Central and Tharaka, approx-
imately 200 km from Nairobi, on Mount Ken-
ya’s eastern slopes. 231 232 233 234 235 236 237 238 239 240 241 242 243

Meru Herbs was established in 1991 to gener-
ate income to cover the project’s costs by com-
mercializing several food products. Regional
commercialization of these products had nor-
mally been under the control of traders from
Nairobi. To reduce their monopsonistic power
and create new trade opportunities, Meru
Herbs decided to develop a partnership with
CTM (the leading Italian fair trade importer).
The partnership therefore began experimentally
in 1991 and continued in 1992 with the delivery
of a container of karkadé to diversify the
households’ production possibilities. In 2000,
the organization received organic certification
from the British company Soil Association Cer-
tification Ltd., and today it exports a significant
part of its production (see Section 2(c)) through
the fair trade channel (in Italy and Japan). 244 245 246 247 248 249 250 251 252 253 254 255 256 257 258 259 260 261

(b) *The composition of Meru Herbs producers* 262

Meru Herbs signs a contract with farmers
who have organic certification (or who are in
the process of obtaining it), in which farmers 263 264 265

266 agree to sell part of their produce to Meru
267 Herbs. In exchange, the organization under-
268 takes the obligation to provide a series of bene-
269 fits in terms of services and technical assistance.
270 More specifically, Meru Herbs (i) provides com-
271 plimentary seeds and organic fertilizers to farm-
272 ers; (ii) sells them fruit trees for production at
273 subsidised prices; (iii) organizes complimentary
274 training courses in the implementation of or-
275 ganic farming techniques; and (iv) offers the ser-
276 vices of two of its employees (the farmer
277 manager and vice-manager) with the specific
278 task of supervising and providing technical
279 assistance to the affiliated farmers.

280 Since organic farmers' production is not en-
281 ough for the organization to reach efficient

scales of activity, Meru Herbs also buys fruit
for producing jams from non-organic farmers
without requiring the above-mentioned con-
tract.

Based on these characteristics, we divide pro-
ducers having relationship with Meru Herbs
into three groups: Bio farmers (organic farmers
who have signed the contract with Meru
Herbs), Conversion farmers (farmers who have
recently signed the contract with Meru Herbs
and started, but not concluded, a process of
conversion to organic production), and Only-
fruit farmers (farmers who sell fruit for jams
to Meru Herbs but who have not signed any
contract with the organization and who there-
fore do not enjoy organization benefits (i)–(iv)

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Table 1. Summary characteristics of the four farmer groups

	Bio	Conversion	Onlyfruit	Control
Male (percent)	54.94	33.57	74.7	43.4
Catholics (percent)	46.23	56.6	60.24	46.24
Age	48	43	48	38
Average years of commercial relationship with Meru Herbs	13.3	1.1	2.8	0
Schooling years	6.3	9.17	7.53	8.97
Tharaka ethnic group (percent)	86.7	60	76.7	70
Meru ethnic group (percent)	6.6	3.3	26.7	10
Acres	10	7.16	9.36	6.8
No. of employees hired during harvesting season	1.3	1.9	1.96	0.7
No. of children	3.1	2.5	3.6	1.9
Other income ^a	23.15	26.14	20.16	20.34
No other activities ^a	80.27	73.73	70.26	76.12
Share of products directly sold to customers (percent)	17	18	28	38
Share of products sold to intermediaries (percent)	9	7	12	20
Share of products sold to Meru Herbs (percent)	60	55	38	0
Avg. varieties of products sold	8.8	7.7	6.6	4
[95% confidence intervals]	[8.00–9.66]	[6.40–9.10]	[5.74–7.85]	[3.05–4.94]
Papaw ^b	5 (20)	5 (18)	5 (19)	5 (1)
Mango ^b	7 (20)	7 (15)	7 (25)	–
Okra ^b	26 (6)	32 (9)	30 (10)	31 (11)
Karkadé ^b	7 (30)	7 (1)	7 (28)	–
Sorghum ^b	12.2 (17)	11.7 (16)	12.4 (13)	10.2 (18)
Maize ^b	12.4 (15)	12.8 (15)	13 (21)	11.7 (18)
Millet ^b	15 (16)	12 (15)	16.7 (14)	13.5 (20)
Pilipili ^b	40 (13)	30.5 (19)	30.7 (13)	14 (4)
[95% confidence intervals]	[40–40]	[28.54–32.50]	[23.77–37.76]	[7.42–22.02]
Guava ^b	7 (18)	7 (7)	7 (8)	–
Lemon ^b	5 (19)	5 (10)	5 (14)	–
Number of respondents	30	30	30	30

Group legend: *Bio*: certified organic farmers with long-term affiliation to Meru Herbs and access to FT export channels. *Conversion*: Meru Herbs members of recent affiliation undergoing conversion towards organic certification. *Onlyfruit*: non-affiliated farmers selling fruit to Meru Herbs. *Control*: farmers with no commercial relationship with Meru Herbs or FT who share the same productive environment and advantages of the local irrigation infrastructure with affiliated farmers. The survey was undertaken in January 2005.

^a Share of respondents for which the item applies.

^b Price in Kenyan shillings, with the number of group farmers selling the product on the market in parenthesis.

298 described above. These apply only to full mem- 350
 299 bers such as Bio and Conversion farmers). 351

300 (c) *The overlap between Meru Herbs and fair 352*
 301 trade 353

302 In 2004, 97% of net sales of Meru Herbs 354
 303 came from export via fair trade organizations 355
 304 (three different fair trade organizations—Con- 356
 305 sorzio CTM Altromercato and Centrale Equo 357
 306 Mercato from Italy and People Tree from Ja- 358
 307 pan—with CTM having the lion's share with 359
 308 around 80%). Export through FT channels 360
 309 started as soon as Meru Herbs was created. It 361
 310 is not possible, therefore, to separate FT from 362
 311 Meru Herbs effects since FT exports and the 363
 312 characteristics of the first-level producers' asso- 364
 313 ciation were two parts of an integrated project 365
 314 from the very beginning. 366

315 However, affiliated farmers are more inde- 367
 316 pendent, since they sell no less than 40% of pro- 368
 317 duction locally (see Table 1 in descriptive 369
 318 statistics below). 370

319 (d) *Construction of the survey 371*

320 A crucial step in our research consisted of 372
 321 identifying a control group of farmers in the 373
 322 same irrigation area who had no relationship 374
 323 with Meru Herbs. This control group selection 375
 324 was made easier by the homogeneity of the 376
 325 population living in the project area: All the 377
 326 interviewed farmers benefit from the Ng'uuru 378
 327 Gakirwe Water Project and therefore all of 379
 328 them share the same irrigation infrastructure. 380
 329 They differ only in marketing channels (Meru 381
 330 Herbs with or without FT partnership, local 382
 331 middlemen or direct sale in local markets). 383

332 More specifically, our reference population is 384
 333 composed of the 474 farmers who benefit from 385
 334 the irrigation project. Within this population, 386
 335 we randomly selected four groups according 387
 336 to the composition described in Section 2(b), 388
 337 which includes Bio, Conversion, Onlyfruit, 389
 338 and Control farmers.³ 390

339 The advantage of having four groups is that 391
 340 we can distinguish between long-term and 392
 341 short-term effects of the relationship with Meru 393
 342 Herbs and FT (Bio and Conversion farmers 394
 343 respectively), relationship with Meru Herbs 395
 344 without the full FT relationship (Onlyfruit 396
 345 farmers) and the absence of any relationship 397
 346 with FT (Control farmers). 398

347 During January 2005, the four groups re- 399
 348 sponded to a 100-item questionnaire in per- 400
 349 sonal interviews.⁴ From the responses, we 401
 402

obtained information on demographics, prod- 350
 uct sale conditions, monetary and non-mone- 351
 tary sources of income, food consumption 352
 expenditure and dietary quality, schooling 353
 years and working status of household mem- 354
 bers, various social and capability indicators, 355
 subjective measures of price satisfaction and 356
 living condition satisfaction as well as social 357
 capital indicators. 358

The final version of the questionnaire was 359
 modified with respect to an initial draft on the 360
 basis of considerations regarding the quality 361
 of responses and their possible biases.⁵ 362

363 3. DESCRIPTIVE STATISTICS 363

Table 1 describes the characteristics of the 364
 four groups. Control group farmers are rela- 365
 tively younger (ten year difference on average 366
 with respect to Bio and Onlyfruit farmers) 367
 and are less educated when compared with 368
 Conversion farmers. Bio and Onlyfruit house- 369
 holds are relatively larger. Farmers belonging 370
 to the Control group employ, on average, rela- 371
 tively fewer workers during the harvesting sea- 372
 son. 373

With regard to the ethnic composition of our 374
 sample, we consider 15 potential affiliations 375
 (Embu, Kalenjin, Kamba, Kikuyu, Kisii, Luhy- 376
 a, Luo, Maasai, Meru, Mijikenda, Somali, 377
 Taita, Tharaka, Turkana, Kuria) and observe 378
 that a large majority of interviewees belong 379
 to the Tharaka group (from 60% to around 87% 380
 in the four groups). The second largest ethnic 381
 group is Meru (around 27% among Onlyfruit 382
 farmers). 383

An important difference among the three 384
 groups selling to Meru Herbs is that, as ex- 385
 pected, Bio farmers declare a much longer com- 386
 mercial relationship with the organization 387
 (more than 13 years on average), while Con- 388
 version and Onlyfruit farmers have initiated the 389
 relationship more recently (one and three years, 390
 respectively, on average). The already men- 391
 tioned non-full membership of Onlyfruit farm- 392
 ers is, therefore, also associated with a much 393
 more recent commercial relationship with Meru 394
 Herbs. 395

The four groups appear quite homogeneous 396
 in terms of the availability of other sources of 397
 income, whilst we register a 10% difference be- 398
 tween two groups when asking farmers whether 399
 they have other working activities (30% of 400
 Onlyfruit respond affirmatively as opposed to 401
 20% of Bio farmers). 402

403 As an initial observation regarding this data, 423
 404 it should be noted that no access restrictions exist 424
 405 in principle to affiliation to Meru Herbs. The 425
 406 differences we observe in the descriptive analy- 426
 407 sis should therefore not be correlated to the 427
 408 organization's selection criteria (even though 428
 409 we will control for any such differences in the 429
 410 econometric analysis). However, such differ- 430
 411 ences imply that we cannot just compare aver- 431
 412 age subgroup values to infer the impact of 432
 413 Meru Herbs and FT relationship on farmers' 433
 414 living standards. An econometric analysis is 434
 415 needed to single out the Meru Herbs affiliation 435
 416 and the FT impact effects from those of addi- 436
 417 tional controls which differentiate the four 437
 418 groups and are expected to affect our target 438
 419 variables. 439

420 We continue our descriptive analysis by 440
 421 focusing on crop variety, sale conditions, and 441
 422 quality of life (Table 2). In the survey we ask 442

questions about production, sale conditions, 423
 and price satisfaction concerning the 18 prod- 424
 ucts that represent the whole range of crops 425
 produced in the area. ⁶ For each of these prod- 426
 ucts we have information about production and 427
 distribution channels (Meru Herbs, traditional 428
 local intermediaries, directly to customers). 429
 Descriptive evidence on this point shows that 430
 FT is not an exclusive channel for affiliated 431
 farmers, consistent with FT criteria and previ- 432
 ous research findings. ⁷ Bio, Conversion, and 433
 Onlyfruit farmers also sell between 17% and 434
 28% of their products directly to customers 435
 and between 7% and 12% to local intermediar- 436
 ies. Again, as expected, the share of products 437
 sold to FT importers is far smaller for non-or- 438
 ganic farmers not signing a contract with Meru 439
 Herbs (Onlyfruit farmers) than for fully affili- 440
 ated members (38% against 60% and 55% for 441
 Bio and Conversion farmers, respectively). 442

Table 2. Price satisfaction and income satisfaction, socio-economic indicators

	Bio	Conversion	Onlyfruit	Control
<i>Wage income, prices and consumption</i>				
Weekly household consumption expenditure ^a	425	510	429	357
Satisfaction of living conditions (percent)	75.23	28.14	45.64	22.16
Household monthly earnings ^a	4,972	5,257	4,394	3,195
Equivalentized monthly earnings ^a	974	1,168	784	819
Desired monthly earnings ^a	26,333	28,750	31,436	28,000
Share of respondents declaring the highest level of price satisfaction (percent)	7.35	6.26	3.68	0
Share of respondents declaring the next to highest level of price satisfaction (percent)	24	24	19	11
<i>Technical assistance</i>				
Technical assistance from buyers (percent)	100	100	30.00	33.33
[95% confidence intervals]			[12.59–47.40]	[15.42–51.23]
<i>Health</i>				
Infant mortality (percent)	14.20	17.32	7.33	29.75
Child vaccination (percent)	100	100	93	93
Last child born in hospital (percent)	93.33	83.33	60.00	60.00
[95% confidence intervals]	[83.85–102.80]	[69.17–97.48]	[41.39–78.60]	[41.39–78.60]
<i>Child labor and human capital</i>				
Child labor	0.87	0.55	0.92	0.77
[95% confidence intervals]	[0.79–0.95]	[0.40–0.70]	[0.75–1.09]	[0.60–0.94]
Human capital investment	0.09	0.25	0.04	0.19
Number of respondents	30	30	30	30

Variable legend. *Income satisfaction*: share of respondents declaring the highest, or next to highest, satisfaction of living conditions; *Equivalentized monthly earnings*: household monthly earnings scaled by the number of family members. *Infant mortality*: share of group respondents with a child between zero and five years old who died in the last three years; *child labor*: children between six and 15 not attending school expressed in relation to the total number of household children in that age cohort; *human capital investment*: teenagers between 15 and 18 going to school expressed in relation to the total number of household members in that age cohort. Group legend (see Table 1).

^a In Kenyan Shillings.

443 Control farmers seem to differ markedly from
444 those affiliated to the other three groups in
445 terms of average sale prices and crop variety,
446 with a relatively lower variety of products sold
447 on the market (on average four) against a value
448 ranging from six to nine for the rest of the sam-
449 ple. By examining 95% confidence intervals of
450 these means we find that both full membership
451 (Bio and Conversion) and Onlyfruit groups
452 produce a significantly higher variety of crops
453 than the control sample. Furthermore, long-
454 term full members (Bio farmers) have a signifi-
455 cantly higher variety of products sold than non-
456 full members such as Onlyfruit farmers. These
457 findings confirm that diversification benefits
458 crucially depend on full membership and are
459 consistent with Meru Herbs' specific FT trade
460 channel and in-kind benefits (see Section 2(b))
461 that give affiliated farmers the trade opportuni-
462 ties and the skills, respectively, to cultivate the
463 new products. Among such benefits, the provi-
464 sion of technical assistance to farmers is defi-
465 nitely an advantage for all Meru Herbs
466 affiliates since only around 30% of non-full
467 members receive such assistance from their
468 buyers (Table 2).

469 From this evidence it is clear that an explicit
470 test on the FT price premium criterion is diffi-
471 cult to perform since (i) FT, in cooperation
472 with Meru Herbs, introduces four new prod-
473 ucts (mango, karkadé, guava, and lemon)
474 which are cultivated only by affiliated farm-
475 ers.⁸ It is therefore impossible to make a price
476 comparison with the Control group on these
477 products; (ii) Sorghum, maize, millet, and okra
478 are produced by all of the four groups and sold
479 only on the local market, not to FT. For these
480 products, there is no evidence of better price
481 conditions for affiliated farmers; (iii) pilipili
482 (red pepper in Swahili) is the only product that
483 is both sold to FT by affiliated farmers and pro-
484 duced (and sold through traditional trade chan-
485 nels) by Control group farmers. For this
486 product the price premium is strong and signif-
487 icant (see also confidence intervals in Table 2).

488 At this point, three main conclusions may
489 therefore be drawn: (i) the price premium seems
490 to exist when we compare products cultivated
491 by all farmers and for which affiliated farmers
492 have the additional FT trading channel (though
493 our observation is based on only one product);
494 (ii) a more generalized effect of FT in the area
495 seems to be product diversification rather than
496 price premium; and (iii) FT and Meru Herbs
497 affiliation do not help to reinforce (as it often
498 happens when producers' organizations are

499 formed) bargaining power when selling prod-
500 ucts on local markets (affiliated farmers do
501 not have significantly better price conditions
502 on the four products sold on the local market).

503 When we look at the socioeconomic indica-
504 tors in the four groups we observe that the
505 Control group exhibits lower weekly household
506 consumption expenditure and lower monthly
507 earnings (Table 2).

508 We must remember, though, that Control
509 group farmers have relatively smaller families.
510 This explains why the gap is significantly re-
511 duced when earnings are equivalized for house-
512 hold size using a suitable approach for our
513 sample.⁹

514 Another relevant finding is that farmers in the
515 group with longer Meru Herbs and FT affilia-
516 tion (Bio farmers) declare lower desired monthly
517 earnings than those of the Control group.

518 The combination of average group values on
519 perceived and desired income is consistent with
520 a far higher level of declared satisfaction about
521 living conditions for Bio farmers compared to
522 the control sample. If we compare, in Table 2,
523 the ratio between declared (non-equivalized)
524 and desired household income we find that it
525 is approximately one to five for Bio farmers
526 against approximately one to nine for Control
527 farmers. This finding is likely to be related to
528 two important distinguishing features of affilia-
529 ted farmers: (i) greater product diversification;
530 (ii) in-kind benefits received by Meru Herbs'
531 farmers (see Section 2(b)).

532 More specifically, the reduction of risk that
533 affiliated farmers have for the more diversified
534 product portfolio, the stability of prices, and
535 purchases from Meru Herbs and from fair
536 trade in the export channel suggests that a low-
537 er risk premium may be asked by farmers for
538 their activity. This should imply relatively high-
539 er price and income satisfaction for a given lev-
540 el of price and income.

541 The same risk reduction effect should raise
542 permanent disposable income (i.e., reducing cur-
543 rent or expected precautionary savings in mone-
544 tary or non-monetary forms), thereby increasing
545 the level of consumption for a given level
546 of monthly earnings. These hypotheses will be
547 tested in the econometric analysis which follows.

548 With regard to health indicators, the share of
549 those declaring episodes of infant mortality
550 during the last three years is markedly higher
551 in the Control group (around 30%) than in
552 the other three groups (between 17% and 7%).
553 This evidence seems to be related to the fact
554 that, while the gap in child vaccination between

555 long-term full Meru Herbs members (Bio farm-
556 ers) and non-affiliated farmers is reduced (100%
557 against 92%), 93% of Bio farmers had their
558 most recent child born in hospital compared
559 with 83% of Conversion, 78% of Control and
560 60% of Onlyfruit farmers.

561 A somewhat unexpected result concerns the
562 share of child labor (according to our definition,
563 the number of children between six and 15 not
564 attending school on the total number of house-
565 hold children in that age cohort) and the human
566 capital investment rate (according to our defini-
567 tion, the number of those between 15 and 18
568 going to school on the total number of house-
569 hold members in that age cohort). While Con-
570 version households exhibit the best figures
571 (0.55% for the child labor rate and 0.25 for the
572 human capital investment rate), Bio and Only-
573 fruit household figures appear to be worse than
574 Control group households (though this differ-
575 ence is not statistically significant).

576 **4. ECONOMETRIC ANALYSIS**

577 The descriptive findings presented in the previ-
578 ous section suggest that farmers participating in
579 the FT initiative have more diversified crops,
580 higher food consumption, fewer episodes of child
581 mortality, and superior income satisfaction.
582 However, observed findings do not allow us to
583 conclude that participation *per se* in the FT chan-
584 nel has assured significant effects on these indica-
585 tors. There are several reasons for this.

586 First, composition effects and heterogeneous
587 characteristics of the four groups may influence
588 some of our findings. As an example, one of the
589 most obvious considerations is that Control
590 group farmers may have lower household con-
591 sumption expenditure because they have, on
592 average, fewer children, slightly less cultivated
593 land, and are relatively younger (if age and work-
594 ing experience, presumably correlated, have
595 some effects on performance and standard of
596 living).

597 Second, endogeneity and a selection bias in
598 the affiliation to Meru Herbs seem difficult, in
599 principle, to disentangle from the concurring
600 interpretation of the positive impact of FT.
601 Do all our findings reflect advantages obtained
602 Q3 during and thanks to the affiliation with Meru
603 Herbs and the FT project, or do they measure
604 characteristics which were already present
605 (and, presumably, contributed to the affiliation)
606 at the moment in which farmers became affili-
607 ated to Meru Herbs?¹⁰

608 Whilst some of the problems considered
609 above (Meru Herbs selection biases) may lead
610 us to believe that observed findings on the FT
611 impact could be excessively optimistic, two
612 further arguments may counterbalance this
613 interpretation. First, if the Meru Herbs project
614 generates positive spillovers in the area, differ-
615 ences between the three project groups and
616 the control group may be underestimated.¹¹
617 Second, a Meru Herbs survivorship bias may
618 also arise since it is likely that the most success-
619 ful farmers leave the project.

620 In the following section, we attempt to answer
621 at least some of these questions, while recogniz-
622 ing the limits of our longitudinal database. With
623 regard to the first point (composition effects),
624 the vast amount of information collected in
625 the survey allows us to control our results for
626 a wide range of concurring factors.

627 In an initial econometric exercise we test
628 whether findings on: (i) price satisfaction; (ii)
629 weekly household consumption expenditure;
630 (iii) dietary quality; (iv) satisfaction about living
631 conditions; (v) infant mortality; and (vi) child
632 labor are robust to the inclusion of proper con-
633 trol factors.

(a) *Price satisfaction*

634 To measure econometrically whether FT sig-
635 nificantly improves price conditions for affili-
636 ated farmers, we have chosen to use declared
637 price satisfaction instead of a simpler index of
638 price conditions. The first reason for this is
639 that price satisfaction depends not just on price
640 levels but also on other important price charac-
641 teristics (such as price stabilization which is
642 among FT criteria), which are conveyed by
643 other questions in the survey (advanced/antici-
644 pated payment conditions, price stability, the
645 absence of sharp price declines). By taking just
646 one of these complementary aspects of price
647 satisfaction, we observe that a significantly
648 higher proportion of farmers in the control
649 sample declare that they had suffered price de-
650 creases. A second reason is that there is not
651 much more that can be added about price levels
652 beyond what is shown in Table 2 and com-
653 mented in detail in Section 3.

654 A third reason is that a standardized index of
655 price conditions would downweigh the effects
656 of crop diversification which are dominant in
657 the Meru Herbs project and would be condi-
658 tioned by the fact that affiliated farmers are
659 the only ones who sell additional goods (kar-
660 kadé, mango, guava, lemon).¹²
661

662 We therefore build an index of the farmer's
663 subjective perception of price satisfaction under
664 the assumption that the latter can successfully
665 incorporate the above-mentioned complemen-
666 tary factors not included in the standardized
667 price index. To build this index we consider
668 that, for each of the products sold, farmers
669 are asked whether they are satisfied a lot, en-
670 ough, a little or not at all. Our index of price
671 satisfaction (IPS) for the i th farmer is therefore
672 equal to

$$674 \quad IPS_i = (3 * muchperch_i + 2 * enoughperc_i + afewperch_i) / 3, \quad (1)$$

675 where *muchperc* is the share of products sold on
676 the market for which the i th farmer declares
677 highest price satisfaction, *enoughperc* (*afewp-*
678 *erc*) the share of products sold on the market
679 for which he declares next to highest (next to
680 lowest) price satisfaction. The construction of
681 the price satisfaction index implies that, as it
682 is reasonable to be, the "not at all" answer is
683 given a zero weight.

684 We regress the index on monthly income and
685 several additional demographic controls to
686 evaluate whether differences among groups in
687 terms of price satisfaction are spuriously driven
688 by other economic, sociologic, and demo-
689 graphic factors.

690 The selected specification is ¹³

$$691 \quad IPS_i = \alpha_0 + \alpha_1 Bio + \alpha_2 Conversion + \alpha_3 Control + \alpha_4 Income + \alpha_5 Male + \alpha_6 Birth + \alpha_7 Married + \alpha_8 Schoolyears + \alpha_9 Famsize + \alpha_{10} Catholic + \alpha_{11} Tharaka + \alpha_{12} Meru + \alpha_{13} Acres + \alpha_{14} Employees + \alpha_{15} Othincome + \alpha_{16} People home + \alpha_{15} Noothact + \epsilon_i, \quad (2)$$

693 where *Control* is a dummy that takes a value of
694 one if the respondent belongs to the Control
695 group and zero otherwise, *Income* is monthly
696 household income, *Male* is a dummy variable
697 taking the value of one for male respondents
698 and zero otherwise; *Birth* is the year of birth;
699 *Married* is a dummy variable taking the value
700 of one for married farmers; *Schoolyears* are
701 the schooling years of the respondent; *Famsize*
702 is the number of the respondent's children;
703 *Catholic* is a dummy variable taking the value
704 of one if the farmer is Catholic; *Tharaka* (*Meru*)
705 is a dummy variable taking the value of one if
706 the respondent belongs to the Tharaka (*Meru*)
707

708 ethnic group; *Acres* is the extension in acres
709 of the farmer's land; *Employees* is the number
710 of workers hired during the harvesting season;
711 *Othincome* is a dummy variable taking the val-
712 ue of one if the respondent has additional
713 sources of income and zero otherwise; *People-*
714 *home* is the number of individuals (beyond fam-
715 ily members) living at the respondent's home;
716 *Noothact* is a dummy variable taking the value
717 of one if the respondent has another working
718 activity. ¹⁴

719 Since participation in the Onlyfruit group is
720 the omitted variable among group dummies,
721 our findings must be read in the sense that Control
722 group farmers exhibit significantly lower
723 price satisfaction than Onlyfruit farmers, while
724 the opposite occurs for Bio and Conversion
725 farmers (Table 3).

726 These results imply a hierarchy of effects and
727 are consistent with the hypothesis that only full
728 membership provides all of those benefits (sta-
729 bilization of prices and of trade channels, price
730 premia on a wide range of products) that gener-
731 ate price satisfaction. Onlyfruit farmers are on
732 a lower step (as shown in Table 1 they sell a re-
733 duced share of products to Meru Herbs), but
734 still better than Control group farmers who
735 are fully excluded from these benefits. Consider
736 also that price satisfaction rankings extracted
737 from the econometric estimate therefore corre-
738 spond not only to the ranks in term of product
739 diversification but also to rankings in the share
740 of production sold to Meru Herbs (see Table
741 1). ¹⁵ Among control variables, only income
742 (and male) is (weakly) significant; spurious ef-
743 fects seem to be excluded.

(b) *Food consumption and dietary quality* 744

745 Well-being in developing countries depends
746 on a mix of monetary and non-monetary com-
747 ponents (wage income, government and local
748 transfers, self-production and self-consump-
749 tion, livestock, education, dietary quality, so-
750 cial capital). All of these factors contribute to
751 enhance capabilities and functionalities of the
752 local farmers and therefore their quality of life.
753 Our survey collects information on these differ-
754 ent types of indicators. A relevant component
755 within this framework capturing both formal
756 and some of the informal aspects of economic
757 well-being is weekly household food expendi-
758 ture.

759 To evaluate the effect of FT affiliation on this
760 variable we must necessarily control the main
761 factors affecting it. The standard theoretical ref-

Table 3. *The impact of Meru Herbs and FT affiliation on the index of price satisfaction (IPS)*

Var. Dip.	IPS	Var. Dip.	IPS
Bio	0.171** [0.058]	Famsize	0.008 [0.009]
Conversion	0.174** [0.069]	Catholic	-0.013 [0.043]
Control	-0.132** [0.059]	Acres	0.051 [0.084]
Income	0.0042** [0.0003]	Employees	-0.042 [0.053]
Male	0.114* [0.052]	Othincome	0.071 [0.034]
Birth	0.002 [0.002]	Peoplehome	-0.016 [0.013]
Married	-0.026 [0.095]	Noothact	-0.0029 [0.065]
Schoolyears	-0.005 [0.005]		
Constant	-1.992 [2.774]		
LR χ^2 (17)	45.25		
Prob > χ^2	0.0001		
Pseudo R^2	0.5913		
Observations	106		

Variable legend: $IPS_i = (3 * muchperc_i + 2 * enoughperc_i + afewperc_i) / 3$ where *muchperc* is the share of products sold for which the farmer declares highest price satisfaction, *enoughperc* (*afewperc*) the share of products sold for which the farmer declares next to highest (next to lowest) price satisfaction. The index is the dependent variables in Tobit a specification since it has upper and lower bounds.

Legend of regressors: *Control* (*Bio*, *Conversion*): dummy variable taking the value of one if the farmer belongs to the *Control* (*Bio*, *Conversion*) group and zero otherwise, *Income*: monthly income from the respondent's working activity, *Male*: dummy variable taking the value of one for male respondents and zero otherwise; *birth*: year of birth; *married*: dummy variable taking the value of one for married respondents and zero otherwise; *schoolyears*: schooling years of the respondent; *Famsize*: number of the respondent children; *catholic*: dummy variable taking the value of one if the farmer is catholic and zero otherwise; *Acres*: extension in acres of the farmer land; *Employees*: number of employees hired during the harvesting season; *Othincome*: dummy variable taking the value of one if the respondent's family has additional sources of income and zero otherwise; *peoplehome*: number of persons living at the respondent's home; *noothact*: dummy variable taking the value of one if the respondent has another working activity and zero otherwise. Results on ethnic group affiliation dummies are omitted for reasons of space. Robust standard errors in square brackets.

* 90% significance.

** 95% significance.

762 erence for consumption equations is the "perman- 785
 763 ent (household) income" hypothesis (Hall, 786
 764 1978). Few empirical tests of the PIH for devel- 787
 765 oping countries exist and are based on models 788
 766 of intertemporal optimization which require 789
 767 lagged (as well as current) levels of consump- 790
 768 tion and income (Khan, 1987; Rao, 2005). 791
 769 In our case, we do not have a time dimen- 792
 770 sion and must consider that sample farmers 793
 771 live in rural areas close to the poverty line. 794
 772 Two distinctive features, therefore, are: (i) food 795
 773 consumption is a large share of total consump- 796
 774 tion hence positive changes in permanent in- 797
 775 come are likely to translate into positive 798
 776 changes in food consumption and *vice-versa*, 799
 777 and (ii) food consumption does not depend 800
 778 only on what is purchased at market prices 801
 779 since non-monetary sources (self-consumption 802
 780 and self-production) play an important role as 803
 781 well. 804

782 Our modified permanent income benchmark 805
 783 must therefore consider that weekly house-
 784 hold food consumption expenditure is a func-

tion of the unobserved, permanent, disposable 785
 flow of monetary and non-monetary resources 786
 (PFMNR) and of the number of family members 787
 (since food consumption cannot be suppressed 788
 beyond certain levels, larger families should exhibit 789
 higher food consumption expenditure for a given 790
 level of household monetary income) as 791
 expressed by the following specification: 792

$$Foodcons_i = a_0 + a_1 PFMNR + a_3 MEMBERS + v_i. \quad (3) \quad 794$$

To proxy these variables we refer to a more 795
 complex set of regressors including household 796
 monthly income as well as measures of self-con- 797
 sumption and self-production (which should reduce 798
 consumption expenditure for a given level of 799
 monetary income) and effective number of 800
 individuals living in a given household. More 801
 specifically, we include among regressors (i) 802
peoplehome and *famsize* which help us to see 803
 how household food consumption expenditure 804
 relates to the number of individuals (see vari- 805

806 able description in Section 4(a)), (ii) *Othincome*
807 and *Noothact*, capturing the existence of addi-
808 tional sources of income; (iii) *employees* which
809 are a proxy of labor costs for the producers,
810 and (iv) land size (*Acre*s) and dummies of own-
811 ership of livestock which help us to proxy
812 unobserved self-consumption and self-produc-
813 tion variables.

814 To these variables we add some demographic
815 ones that may proxy for future changes in pro-
816 ductivity affecting permanent income beyond
817 what is captured by current monthly income
818 (age, education, gender) and the dummy for
819 participation in the Control group that mea-
820 sures the effects of not having any kind of eco-
821 nomic transaction with Meru Herbs. A
822 rationale for the FT effects (years of affiliation
823 or affiliation dummy) in this specific case is that
824 in-kind services provided by Meru Herbs re-
825 duce farmers' investment costs. As well as this,
826 the reduction of risk generated by product
827 diversification and price stabilization raises per-
828 manent disposable income (i.e., reducing cur-
829 rent or expected precautionary savings in
830 monetary or non-monetary forms), thereby
831 increasing the level of consumption for a given
832 monthly wage.

833 We therefore adopt the following specifica-
834 tion:

$$\begin{aligned}
 \text{Foodcons}_i = & \alpha_0 + \alpha_1 \text{Income} + \alpha_2 \text{Control} \\
 & + \alpha_3 \text{Male} + \alpha_4 \text{Birth} \\
 & + \alpha_5 \text{Married} + \alpha_6 \text{Schoolyears} \\
 & + \alpha_7 \text{Famsize} + \alpha_8 \text{Catholic} \\
 & + \alpha_9 \text{Tharaka} + \alpha_{10} \text{Meru} \\
 & + \alpha_{11} \text{Acre} + \alpha_{12} \text{Employee} \\
 & + \alpha_{13} \text{Othincome} + \alpha_{14} \text{People} \\
 & \times \text{hom}e + \alpha_{15} \text{Noothact} \\
 & + \sum_{l=1}^5 \gamma_l \text{Cattle}_l + \varepsilon_i, \quad (4)
 \end{aligned}$$

836

837 where *Foodcons* is weekly household food
838 expenditure in Kenyan shillings and the regres-
839 sors are defined as in (2).

840 Regression findings illustrate that the absence
841 of relationships with FT and Meru Herbs has a
842 significant and negative effect on weekly house-
843 hold food expenditure, net of the variables con-
844 trolling for demographic factors and various
845 controls affecting permanent household flow of
846 monetary and non-monetary resources. In a

second specification, we replace the control dum-
847 my with an indicator of price (dis)satisfaction
848 (*nopricesatisf*), which measures the share of prod-
849 ucts sold for which the farmer is not satisfied at
850 all about price conditions (Table 4, column 2).
851 Again, the results are significant and negative.
852 This result reveals an important link between
853 one of the most important FT criteria (price sat-
854 isfaction) discussed in Section 4(a) and the eco-
855 nomic well-being of local farmers in our survey.
856

857 A complementary and relevant indicator of
858 household well-being is the dietary quality of
859 their food consumption. In our survey, we have
860 information about the frequency of consump-
861 tion (more than once a day, once a day, once
862 every three days, once a week, rarely, never)
863 of the following food items (*ugali, chapati, rice,*
864 *maize, beans, eggs, milk, chicken, other meat,*
865 *fish, potatoes, greens, fresh fruit*). On this basis,
866 we build an index of dietary quality giving
867 descending values (from a maximum of five to
868 a minimum of one) to the above-mentioned fre-
869 quency modalities. Finally, we calculate our
870 synthetic index as an unweighted average of
871 the values given to each food item.¹⁶
872

873 Since in subsistence economies higher dispos-
874 able flows of monetary and non-monetary re-
875 sources should raise both quantity of food
876 consumed and dietary quality, the reasons for
877 the selection of regressors given above also apply
878 here. We therefore regress the dietary quality
879 synthetic index on the usual set of controls and
880 on measures of affiliation to the project or partic-
881 ipation in the control sample. In this case, we ob-
882 serve that participation in the control sample is
883 related to a significantly lower value of the
884 dependent variable (Table 4, column 3). A sec-
885 ond estimate in which we replace the control
886 dummy with the duration of Meru Herbs affilia-
887 tion ("workyears" measuring years of affiliation)
888 documents the significance of this variable, to-
889 gether with the absence of other sources of in-
890 come and ownership of livestock (chicken and
891 cows) (Table 4, column 4).¹⁷ The link between
892 affiliation and dietary quality (beyond the in-
893 creased food consumption effect) is explained
894 by the fact that product diversification is *per se*
895 a source of nutritional improvement if part of
896 that production is self-consumed.

897 Since findings in both estimates support the
898 hypothesis that advantages of full affiliation
899 (such as product diversification, price stabiliza-
900 tion, and in-kind services) affect quality and
901 quantity of food consumption via an increase
902 of the "permanent household flow of dispos-
903 able monetary and non-monetary resources"

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Table 4. *The impact of FT and Meru Herbs affiliation on price satisfaction (PRICESAT), household weekly food expenditure (FOODCONS), and dietary quality (QUALCONS)*

Dep. Var.	FOODCONS	FOODCONS	QUALCONS	QUALCONS
Nopricesatisf		-143.214** [72.932]		
Control	-125.024** [62.365]		-0.362* [0.202]	
Income	0.0062** [0.0024]	0.0056** [0.0021]	0.0008** [0.00001]	0.0009** [0.00002]
Workyears				0.038** [0.012]
Male	-10.325 [29.352]	-10.325 [51.352]	0.214 [0.213]	0.152 [0.183]
Birth	4.315 [3.262]	4.132 [3.241]	0.009 [0.003]	0.005 [0.007]
Married	-20.251 [33.465]	-10.214 [30.241]	0.262 [0.325]	0.203 [0.347]
Schoolyears	-5.251 [6.352]	-4.023 [6.345]	0.031 [0.023]	0.034 [0.064]
Famsize	21.264 [19.262]	21.352 [14.241]	0.008 [0.024]	-0.053 [0.065]
Catholic	-93.243 [54.251]	-81.241 [52.141]	0.129 [0.122]	0.510 [0.316]
Acres	-4.753 [3.032]	-44.321 [64.241]	0.010 [0.010]	0.032 [0.007]
Employees	-0.264 [9.032]	0.620 [3.042]	0.041 [0.042]	0.132** [0.050]
Othincome	-10.244 [58.254]	45.231* [22.241]	0.0394 [0.125]	0.025 [0.340]
Peoplehome	-9.214 [10.251]	-2.031 [11.231]	-0.063 [0.041]	-0.073 [0.031]
Noothact	-23.214 [61.352]	-93.224 [68.241]	0.321 [0.303]	0.693** [0.251]
Chickens	0.423 [0.254]	0.401 [0.235]	0.600 [0.391]	0.701* [0.401]
Goats	0.214 [0.932]	0.325 [0.251]	-0.352 [0.295]	-0.542 [0.366]
Cows	0.534 [0.215]	0.524 [0.352]	0.704** [0.392]	0.712** [0.432]
Pigs	0.042 [0.142]	0.254 [0.153]	0.123 [0.205]	0.311 [0.354]
Constant	-4625.321 [2415.435]	-5264.251 [4253.352]	-8.635 [10.362]	-12.318 [13.427]
R ²	0.1001	0.1301	0.169	0.3512
Observations	102	105	103	75

In columns 1 and 2 the dependent variable (*Foodcons*) is monthly household food expenditure. In columns 3 and 4 the dependent variable (*qualcons*) is an index of nutritional quality built as an unweighted average of frequencies of consumption (more than once a day, once a day, once every three days, once a week, rarely, never) of the following food items (*ugali, chapati, rice, maize, beans, eggs, milk, chicken, other meat, fish, tubers (potatoes), greens, fresh fruit*). On this basis we build an index of dietary quality giving descending values from a maximum of five to a minimum of one to the above mentioned frequency modalities and, finally, we calculate our synthetic index as an average of the values for each food item. The regression is estimated with a Tobit model since the dependent variable has upper and lower bounds. Variable legend: *workyears*: years of affiliation to Meru Herbs, *Nopricesatisf*: share of products sold on the market for which the farmer is not at all satisfied about price conditions over products sold on the market. Column 4 legend: *chickens, goats, cows, pigs*: dummy variables taking the value of one if the relevant animal is raised and zero otherwise. For the other variables see Table 3 legend and Section 4(a) in the paper. Robust standard errors in square brackets.

* 90% significance.
** 95% significance.

903 we should also observe a significant effect of
904 affiliation on satisfaction concerning living con-
905 ditions. We will go on to test this in the follow-
906 ing section.

907 (c) *Living satisfaction and infant mortality*

908 We measure income satisfaction by directly
909 referring to the qualitative question concerning
910 the level of satisfaction with living condi-
911 tions.¹⁸ The dependent variable is discrete
912 and qualitative, assuming values from three to
913 one. We, therefore, estimate the following or-
914 dered logit model:

$$\begin{aligned}
 Livsat_i = & \alpha_0 + \alpha_1 Bio + \alpha_2 Income + \alpha_3 Male \\
 & + \alpha_4 Birth + \alpha_5 Married + \alpha_6 Schoolyears \\
 & + \alpha_7 Famsize + \alpha_8 Catholic + \alpha_9 Tharaka \\
 & + \alpha_{10} Meru + \alpha_{11} Acres + \alpha_{12} Employees \\
 & + \alpha_{13} Othincome + \alpha_{14} People\ home \\
 & + \alpha_{15} Noothact + \sum_{l=1}^5 \gamma_l Cattle_l + \varepsilon_i. \quad (5)
 \end{aligned}$$

917 For the selection of regressors, we again refer to
918 all of the possible factors affecting disposable
919 monetary and non-monetary sources of income
920 (see Section 4(a) for variable legend). Our find-

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921 ings document a significant and positive effect
922 of affiliation in the Bio project (Table 5, column
923 1) or duration of project affiliation (Table 5,
924 column 2) on the dependent variable. Both
925 findings indicate that affiliation years matter
926 in this case. The only additional regressor that
927 is significant and positive is the availability of
928 other sources of income confirming the reason-
929 able assumption that, *Ceteris paribus*, this vari-
930 able should reduce risk and increase the
931 satisfaction with living conditions.

932 It should be noted that the positive relation-
933 ship between satisfaction of living conditions
934 and project duration is consistent with the low-
935 er desired wage declared by Bio farmers (see
936 descriptive statistics in Table 2). Again, the rel-
937 evance of this dependent variable to our analy-

938 sis lies in its capacity to capture the provision
939 of public or private goods and services which
940 cannot be measured by the information on per-
941 ceived income. In fact, it is reasonable to as-
942 sume that a lower desired wage is significantly
943 related to a higher quality of monetary and
944 non-monetary goods and services, since in-kind
945 benefits and product diversification are ex-
946 pected to increase satisfaction with living con-
947 ditions for a given level of monthly income.

948 Finally, we wanted to test whether participa-
949 tion in the project generates significant differ-
950 ences in an important indicator such as child
951 mortality, thereby validating the descriptive
952 evidence provided in Table 3.

953 The dependent variable is a dummy taking
954 the value of one if the respondents' household

Table 5. *The impact of FT and Meru Herbs affiliation on life satisfaction and on infant mortality*

Dep. Var.	LIVSAT	LIVSAT	INF MOR	INF MOR
Bio	1.052** [0.463]		-1.942* [1.090]	
Control				1.532** [0.632]
Income	0.0003** [0.0001]	0.0002** [0.00007]	-0.0002** [0.00007]	-0.0002* [0.00001]
Workyear		0.074** [0.032]		
Male	0.058 [0.525]	0.094 [0.315]	1.832 [1.252]	0.753 [0.622]
Birth	-0.013 [0.031]	-0.012 [0.024]	-0.090 [0.094]	-0.085 [0.121]
Married	-0.052 [0.321]	-0.043 [0.342]		
Schoolyears	-0.063 [0.042]	-0.085 [0.044]	-0.005 [0.063]	0.010 [0.094]
Famsize	-0.055 [0.043]	-0.057 [0.047]	0.193 [0.201]	0.183 [0.176]
Catholic	0.643 [0.432]	0.631 [0.430]	0.008 [0.639]	0.062 [0.652]
Acres	0.007 [0.018]	0.006 [0.019]	-0.210 [0.315]	-0.254 [0.652]
Employees	-0.004 [0.086]	0.003 [0.083]	0.381 [0.311]	0.251 [0.143]
Othincome	1.812** [0.631]	1.913** [0.695]	-2.712** [1.415]	-2.964* [1.542]
Peoplehome	-0.142 [0.103]	-0.123 [0.094]	-0.083 [0.201]	0.065 [0.231]
Noothact	-0.214 [0.843]	-0.325 [0.722]	1.831 [1.532]	1.042 [1.042]
Chickens	0.392 [0.812]	0.932 [0.539]	-2.938** [1.154]	-2.923** [1.152]
Cows	0.304 [0.832]	0.823 [0.732]	-0.742 [0.593]	-0.642 [0.503]
Goats	-1.732 [0.732]	-1.532 [0.623]	0.532 [1.325]	0.422 [1.125]
Pigs	1.425 [1.512]	2.352 [1.039]	-0.831 [1.842]	-0.731 [1.32]
/cut1	-21.312 [36.320]	-18.031 [37.250] Const.	105.253 [80.325]	104.132 [72.12]
/cut2	-19.893 [34.254]	-16.032 [32.359]		
/cut3	-17.032 [35.153]	-13.943 [32.351]		
LR χ^2 (20)	28.43	29.23 LR χ^2 (21)	21.32	(16) 16.04
Prob > χ^2	0.0554	0.0646 Prob > χ^2	0.4140	0.4012
Pseudo R^2	0.093	0.095 Pseudo R^2	0.2723	0.1991
Observations	103	103	86	86

The dependent variable of the first and second column regression (LIVSAT) is based on answers to the following question: *Are you satisfied with your household's living conditions?* We give the following score to qualitative answers: a lot = 3; enough = 2 a little = 1 not at all = 0. The specification is estimated with an ordered logit approach. The dependent variable of the third and fourth column (INF MOR) is a dummy taking the value of one if the respondent had episodes of infant mortality in the last three years and zero otherwise. For the legend regarding other variables see Table 3 and Section 4(a) in the paper. Robust standard errors in square brackets.

* 90% significance.

** 95% significance.

955 had an episode of infant mortality in the last
956 three years and zero otherwise.

957 The empirical literature on this point indicates
958 that, beyond the usual cultural and economic
959 factors, one of the main factors affecting this
960 variable is the availability of healthcare (see,
961 among others, Mosley & Chen, 1984; Wang,
962 2003) (hospital births, vaccinations, etc.) which
963 depend, in turn, on disposable income, parental
964 education, and availability of free-of-charge
965 health services. The usual set of controls is included
966 in the estimates to capture these effects.

967 Econometric estimates confirm the significance
968 of the difference in child mortality between
969 Control group farmers, on one side, and Meru
970 Herbs and FT-affiliated, on the other (Table 5,
971 columns 3 and 4). Both higher disposable income
972 and/or the culture promoted by the Meru
973 Herbs association should therefore contribute to
974 a wider use of health services (i.e., hospital
975 births) reducing child mortality. The empirical
976 differences, described earlier, concerning hospital
977 births (Table 2) may contribute to the explanation
978 of this result. Additional significant regressors
979 (in the expected direction) in this estimate
980 are the availability of other sources of income
981 and ownership of chickens, both of which
982 reduce the likelihood of child mortality.

983 5. FAIR TRADE AND EDUCATION

984 Finally, we investigate the impact of FT on
985 child labor (according to our definition, children
986 aged between six and 15 not attending
987 school expressed in relation to the total number
988 of household children in that age cohort) and
989 human capital (according to our definition,
990 young aged between 15 and 18 going to school
991 expressed in relation to the total number of
992 household members in that age cohort) investment
993 rates in the year of the survey. The estimated
994 specification is
995

$$\begin{aligned}
 Eduperf_i = & \alpha_0 + \alpha_1 Project + \alpha_2 Income \\
 & + \alpha_3 Male + \alpha_4 Birth + \alpha_5 Married \\
 & + \alpha_6 Schoolyears + \alpha_7 Famsize \\
 & + \alpha_8 Catholic + \alpha_9 Tharaka \\
 & + \alpha_{10} Meru + \alpha_{11} Acres \\
 & + \alpha_{12} Employees + \alpha_{13} Othincome \\
 & + \alpha_{14} People\ home + \alpha_{15} Noothact + \varepsilon_i.
 \end{aligned}
 \tag{6}$$

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As opposed to previous specifications the
dependent variable here ($Eduperf_i$) is, alternatively,
 $CHILDLAB$ (children aged between six
and 15 not attending school over the total number
of household children of that age cohort),
(Table 6 column 1) or $HUMCAP$ (children
aged between 15 and 18 attending school over
the total number of household children of that
age cohort) (Table 6 column 2). We include a
measure of *Income* among regressors, one of
the most important determinants of the dependent
variable.¹⁹ Use of the variable *Project*
indicates whether affiliation to one of the four
sample groups affects the dependent variable
(*Project* is alternatively represented by the already
defined *Bio* and *Conversion* dummies). It should
also be noted that the *Schoolyear* variable is
particularly important here as several contributions
to the child labor literature have shown that
parental education has significant effects on
household child labor choices.²⁰ Unfortunately,
our cross sectional estimate has a lower number
of observations in this case because of the
presence of households without children of
school age in the period the survey was
conducted.

Our results confirm descriptive findings
(Table 2) and show that affiliation to the
Conversion group is associated with reduced
child labor and increased human capital
investment. The only other significant variable
in the cross sectional estimate is the absence
of other working activities, which has effects
in the opposite direction.

Here again, the selection effect seems
dominant. FT affiliation does not seem to
affect significantly either child labor or
investment in human capital since participation
in the group of (Bio) long-term affiliated
members is not significant in the estimate
and the positive relationship in the Conversion
group, with only one year of membership on
average, seems more related to an *ex ante*
characteristic than to an effect of FT. We
presume that two effects are at work here.
On the one hand, higher disposable income
should reduce the likelihood of child labor
(and, conversely, should increase that of
human capital investment). On the other
hand, the increased farmer activity could
raise household demand for unskilled labor
and therefore child work. Without an explicit
policy of Meru Herbs addressed to achieve
child labor problems it is therefore reasonable
to observe inconclusive findings.

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Table 6. *The impact of Meru Herbs and FT affiliation on human capital investment and child labor*

CHILDLAB		HUMCAP	
Conversion	-1.012* [0.432]	Conversion	0.901* [0.441]
Bio	0.019 [0.536]	Bio	-0.164 [0.215]
Income	-0.0001 [0.0001]	Income	0.0001 [0.0001]
Male	-0.531 [0.412]	Male	0.0142 [0.031]
Birth	-0.053 [0.062]	Birth	-0.040 [0.021]
Married	0.912 [0.843]	Married	0.042 [0.215]
Schoolyears	0.009 [0.046]	Schoolyears	-0.012 [0.020]
Famsize	0.062 [0.093]	Famsize	0.052 [0.031]
Catholic	0.312 [0.403]	Catholic	0.932 [0.823]
Acres	0.006 [0.029]	Acres	0.031 [0.041]
Employees	0.022 [0.192]	Employees	0.062 [0.143]
Othincome	-0.752 [0.532]	Othincome	0.251 [0.403]
Peoplehome	-0.042 [0.101]	Peoplehome	-0.191 [0.121]
Noothact	1.032* [0.503]	Noothact	-1.028* [0.425]
Constant	93.241 [62.323]	Constant	82.294 [70.142]
LR χ^2 (19)	30.421		27.010
Pseudo R^2	0.309		0.250
No. of observations	70		69

The base Tobit estimate specification of the two regressions is described in Section 5 (Eqn. (6)). Dependent variables: *childdlab*: children aged between six and 15 not attending school expressed in relation to the total number of household children in that age cohort; *humcap*: teenagers aged between 15 and 18 attending school expressed in relation to the total number of household members in that age cohort.

**95% significance. Robust standard errors in square brackets.

* 90% significance.

6. ROBUSTNESS TEST FOR THE SELECTION BIAS FINDINGS: A TREATMENT REGRESSION APPROACH

Results presented in Sections 4 and 5 show a significant association between affiliation to Meru Herbs and the FT project with monetary and non-monetary objectives and subjectively perceived components of individual well-being. Dataset limitations do not completely enable us to respond to objections. Do these findings depend on a significant impact of FT on farmers' well-being or are they affected by project selection and control sample bias? On the one hand, we can argue that descriptive findings show that the four groups are not so different in terms of equalized monthly earnings, and that differences in household size, extent of cultivated land, and number of employees in the harvesting season are controlled for in our econometric estimates. On the other hand, it is always possible that hidden variables affecting the selection of the four groups are also the determinants of differences in well-being, even though this is

more difficult to believe in the case of some of our findings. More specifically, the link between price satisfaction and affiliation to Meru Herbs and the FT project (Table 3, columns 1 and 2) seems an obvious direct consequence of FT criteria and the link between household food consumption expenditure and price satisfaction (Table 4, column 2) seems to demonstrate that FT criteria have positive effects on farmers' well-being.

To provide a more rigorous evaluation of the effects of project affiliation, net of the Meru Herbs and fair trade selection biases, we specify a treatment regression model in which the previously estimated model equation is re-estimated together with a selection equation in which affiliation/no affiliation to FT is regressed on a set of individual characteristics. This estimate helps to disentangle the effects generated by the project (affiliated farmers are better off in terms of a given indicator for the effects of FT) from the selection effect (affiliated farmers have a superior outcome because affiliation to FT was somehow related to farmers' high outcome or to characteristics correlated to high outcome).

The estimated two equation model is

$$\begin{aligned}
 Perform_i = & \alpha_0 + \alpha_1 Income + \alpha_2 Workyears \\
 & + \alpha_3 Male + \alpha_4 Birth + \alpha_5 Married \\
 & + \alpha_6 Schoolyears + \alpha_7 Famsize \\
 & + \alpha_8 Catholic + \alpha_9 TharakaMeru \\
 & + \alpha_{10} + \alpha_{11} Acres \\
 & + \alpha_{12} Employees + \alpha_{13} Othincome \\
 & + \alpha_{14} Peoplehome + \alpha_{15} Noothact \\
 & + \sum_{l=1}^5 \gamma_l Cattle_l + \alpha_{16} Ftrade + \varepsilon_i
 \end{aligned}
 \tag{7.1}$$

$$\begin{aligned}
 Ftrade_i = & \beta_0 + \beta_1 Income + \beta_2 Workyears \\
 & + \beta_3 Male + \beta_4 Birth + \beta_5 Married \\
 & + \beta_6 Schoolyears + \beta_7 Famsize \\
 & + \beta_8 Catholic + \beta_9 Tharaka + \beta_{10} Meru \\
 & + \beta_{11} Acres + \beta_{12} Employees + v_i
 \end{aligned}
 \tag{7.2}$$

In the two equation system, (v) and (ε) are bivariate normal random variables with zero mean and covariance matrix $\begin{bmatrix} \sigma & \rho \\ \rho & 1 \end{bmatrix}$. The likelihood function for the joint estimation of (7.1) and (7.2) is provided by Maddala (1983) and Greene (2003).

Among considered variables, *Perform*, a selected performance indicator, is the dependent variable of the first equation, while *Ftrade* (affil-

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Table 7. Effects of FT affiliation on nutritional quality and living condition satisfaction when controlled for the FT selection bias

Dep. Var.	QUALCONS		FTRADE		Dep. Var.	LIVSAT		FTRADE	
	coeff.	s.e.	coeff.	s.e.		coeff.	s.e.	coeff.	s.e.
Workyear	0.038**	[0.021]			Workyear	0.039**	[0.018]		
Income	0.0009**	[0.0003]	0.0007	[0.0007]	Income	0.0008**	[0.0003]	0.0006	[0.0008]
Male	0.213	[0.301]	-0.504	[0.208]	Male	-0.042	[0.315]	-0.463	[0.254]
Birth	0.006	[0.006]	-0.009	[0.009]	Birth	-0.005	[0.008]	-0.009	[0.032]
Married	0.008	[0.141]	0.028	[0.221]	Married	-0.032	[0.153]	0.025	[0.264]
Schoolyears	0.032*	[0.016]	0.035	[0.028]	Schoolyears	-0.021	[0.032]	0.036	[0.033]
Famsize	0.013	[0.093]	-0.023	[0.027]	Famsize	-0.032	[0.031]	-0.063	[0.076]
Catholic	0.103	[0.214]	[0.058]	[0.151]	Catholic	0.201	[0.188]	0.097	[0.356]
Embu	-0.813	[0.231]	-0.203	[1.035]	Embu	-1.415*	[0.707]	-0.463	[1.035]
Meru	0.214	[0.241]	-0.425	[0.253]	Meru	-0.054	[0.320]	-0.352	[0.362]
Tharaka	-0.842	[0.243]	0.153	[0.215]	Tharaka	-0.454	[0.325]	0.463	[0.953]
Acres	0.007	[0.006]	0.032	[0.021]	Acres	0.015	[0.013]	0.046	[0.047]
Employees	0.040	[0.031]	0.393**	[0.135]	Employees	0.121	[0.143]	0.332**	[0.136]
Othincome	0.093	[0.124]			Othincome	0.894**	[0.244]		
Peoplehome	-0.053	[0.045]			Peoplehome	-0.053	[0.025]		
Noothact	0.240*	[0.201]			Noothact	-0.194	[0.223]		
Chicken	0.104	[0.204]			Chicken	0.104	[0.204]		
Sheep	-0.096	[0.392]			Sheep	-0.096	[0.392]		
Cows					Cows	0.194	[0.204]		
Goats				Goats	-0.612*	[0.321]			
Pigs					Pigs	1.043	[0.942]		
FTRADE	-0.302	[0.304]			FTRADE	-0.423	[1.354]		
Constant	-1.395	[10.314]	12.214	[21.251]	Constant	10.594	[19.305]	3.943	[6.436]
No. of observations			106					106	
Log L				-194.213					-199.325

Legend: the two equation treatment regression model is described in Section 6 (Eqns. (7.1) and (7.2)). Variable legend: see Tables 5 and 6.

* 90% significance.
** 95% significance.

iation to FT) is the treatment variable which is both a regressor in the first equation and the dependent variable of the second equation. Since we focus on the Meru Herbs affiliation selection bias, our treatment variable is equal to one if the farmer belongs to the Bio or Conversion groups and zero otherwise.

It should also be noted that, to evaluate the dynamic impact of the project over time, in the first equation we add the *Workyears* variable indicating the years of affiliation to FT.

Selected results of treatment regression estimates are presented in Table 7. These findings show that for two performance variables (nutritional quality and satisfaction in living conditions), years of FT affiliation remain positive and significant, even after controlling for both FT and Meru Herbs selection biases.²¹ It should be noted that the only other variable which is significant in the second equation is the number of employees hired in the harvesting season. This finding implies that this variable affects the process of participant selection in the FT project.

7. CONCLUSIONS

Over 4,000 small-scale producer groups in more than 50 developing countries participate in fair trade supply chains. More than five million people in Africa, Latin America, and Asia benefit from fair trade terms (Fair Trade Advocacy, 2005b).

It is therefore not appropriate to draw general conclusions about the impact of FT from an analysis carried out on just one of these projects. Findings from this paper may, at most, give an indication on whether the partnership with Meru Herbs was a good choice for FT and whether the joint impact of FT criteria and Meru Herbs activity has had a positive influence on affiliated farmers. However, we believe that our results, though project-specific, provide interesting evidence to the fair trade debate and develop a methodological approach which can be successfully replicated and implemented (i.e., with a "difference in difference" approach based on two analyses repeated at a later date) on a larger scale in similar projects.

In the case of the observed Kenyan farmers, our main conclusions are that fair trade affiliation seems to be associated with superior capabilities, economic and social well-being, but also that more can be done on the human capital side. Fair trade is definitely responsible for the

creation of an additional trade channel, crop diversification, and provision of in-kind services including technical assistance. Fair trade and Meru Herbs affiliates also have higher price satisfaction, food consumption expenditure, and dietary quality. Another interesting result is the remarkable difference between fair trade affiliated and control farmers in terms of income satisfaction. Such difference is not only due to the higher earned income, but also to a relatively lower desired income which is likely to be determined by a higher supply of complimentary (or cheaper) goods, services, lower trade risk, and technical assistance.

Among these findings, those of higher satisfaction of living conditions and superior nutritional quality seem to be the most robust since the two variables are positively related to the duration of FT affiliation and are robust to controls for the FT selection bias in a two equation treatment regression model.

A less clear cut result is related to the impact of fair trade on human capital investment. We note in this case the negative association between affiliation to the younger Conversion project and child labor, but no significant association between incidences of child labor and affiliation to the other groups.

Overall, our findings indicate that FT works in directions which seem to directly contribute to the improvement of farmers' well-being, but also that one aspect (support for human capital investment) may be improved.²² It should be remembered, however, that in our analysis the composition of the Control group is quite similar to the other three, since all four groups share the same geographical area, basic infrastructure, and equal access to any positive FT externality affecting the whole region. Our analysis of the impact of FT is more severe given this homogeneity and the reduction of confounding factors. Moreover, the survivorship bias caused by the most successful farmers leaving the project may also contribute to an underestimation of the effects of FT.

We observe that the fair trade impact on farmers is crucially determined by the application of certain criteria, specifically price premium, price stabilization, and in-kind benefits, including technical assistance plus an additional one not directly included in formal criteria (product diversification). This combination reduces farmers' risks and seems to generate positive effects on price, living condition satisfaction, and other relevant socio-economic indicators.

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NOTES

- 1229 1. Redfern and Snedker (2002) ILO working paper summarizes fair trade success in recent years, noting that
 1230 FT: “(i) has created a growing US \$500 million network of
 1231 businesses that seeks to push the benefits of that trade to the
 1232 poorest; (ii) has provided a wide range of embedded services
 1233 to producers who would not have been able to source or afford
 1234 them locally; (iii) has provided market access to groups
 1235 whose mainstream business was not interested in trading
 1236 with; (iv) has facilitated or influenced the increasing number
 1237 of fair trade products on supermarket shelves; (v) has
 1238 successfully campaigned at many levels of policy making to
 1239 bring real pro-poor changes in legislation; (vi) has raised the
 1240 issue of trade with millions of consumers—particularly across
 1241 Europe—changing attitudes to business and development;
 1242 (vii) has been a significant catalyst in the development of
 1243 ethical issues within mainstream trade and business practices,
 1244 influencing the development of Corporate Social Responsibility,
 1245 approaches like Social Accounting and the development
 1246 of the Ethical Trade Initiative in the UK”.
- 1248 2. For the theoretical debate concerning the role and
 1249 impact of fair trade at micro and aggregate level, see
 1250 Becchetti and Rosati (forthcoming), Hayes (2004) and
 1251 Leclair (2002), Maseland and De Vaal (2002), Moore
 1252 (2004).
- 1253 3. The sample of the 120 farmers is randomly selected
 1254 on the list of the overall population of the 479 farmers
 1255 living in the irrigation area. Sizes of the four groups are
 1256 representative of the shares in the population, which are
 1257 close (though not exactly equal) to 25%. The Bio share is
 1258 actually slightly lower than the Control group one
 1259 (around 20%), but since farmers with long-term relation-
 1260 ship with fair trade are the direct object of our work,
 1261 we choose to over represent them.
- 1262 4. Full details of the questionnaire are omitted for reasons
 1263 of space. They are, however, available upon request.
- 1264 5. The research has been developed according to the
 1265 following timetable: (i) 1st of February 2005—Meru
 1266 Herbs, Nairobi office: research beginning; (ii) 2–11th of
 1267 February 2005—Meru Herbs Base Camp: community
 1268 analysis and provisional questionnaire checking; (iii) 12–
 1269 20th of February 2005—Meru Herbs, Nairobi office:
 1270 data collection for the indirect impact study; (iv) 21st of
 1271 February–15th of March 2005—Meru Herbs Base
 1272 Camp: interviews using questionnaires (direct impact
 1273 study); (v) 15th–18th of March 2005—Meru Herbs,
 1274 Nairobi office: research ending.
- 1275 6. Papaw, mango, french beans, okra, karkadé, cam-
 1276 omile, lemongrass, tobacco, banana, potatoes, soya
 beans, maize, sorghum, millet, tomatoes, pilipili, guava,
 lemon.
7. More specifically, non-zero export or distant domestic
 market sales of FT farmers via traditional intermediaries
 are documented in Oxford Policy Management
 (2000), Nelson and Galvez (2000), Bacon (2005), Hop-
 kins (2000), and Ronchi (2002), without providing
 explicit statistics. Sales to local market and self-con-
 sumption are also mentioned in Castro (2001a), Castro
 (2001e), Castro (2001b), and Pariente (2000), in addition
 to all of the previously mentioned studies.
8. Amongst these, Karkadé was not previously culti-
 vated in the country (it comes from Sudan) and is
 explicitly introduced with this project. It should also be
 considered that since 2006 (after our survey in 2005), FT
 importers have introduced additional products such as
 passion fruit and bananas, as well as onions, tomatoes,
 and garlic for the preparation of sauces.
9. Under the current OECD rule, earnings are divided
 by a scale factor A , where $A = 1 + 0.5(N_{adults} - 1) +$
 $0.3N_{children}$. However, in our sample, a large part of
 consumption is food consumption. It is therefore advis-
 able to reduce the extent of economies of scale by
 increasing weights in the equivalence scale. The standard
 suggestion is to give unit weights to each member (for a
 discussion of the methodological problems in creating
 equivalence scales see Deaton & Paxson, 1998).
10. While Meru Herbs does not create access restric-
 tions for membership, a process of self-selection may
 nonetheless arise if the opportunity to affiliate is taken
 by farmers with greater “enterprise initiative” and if
 such a variable is related to socio-economic indicators.
11. Externalities may arise because (i) local knowledge
 assimilated by affiliated farmers via technical assistance
 may spread through verbal communication to control
 group farmers, (ii) the presence of Meru Herbs may
 increase both the attraction of remaining independent
 and the bargaining power of non-affiliated farmers since
 the latter may ask for better price conditions from
 traditional intermediaries under the threat of affiliating
 with Meru Herbs. General points concerning the effect
 of externalities in impact analyses are well discussed by
 Armendariz de Aghion and Morduch (2005).
12. If control farmers’ non-participation in these
 product markets is involuntary (i.e., they would like to
 diversify and sell these products but cannot since they do
 not have access to the relative trade channels), the

THE EFFECTS OF FAIR TRADE

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- 1324 standard choice of assigning them missing values would 1375
 1325 therefore downweigh the positive effect of FT on sale 1376
 1326 conditions. 1377
- 1327 13. The dependent variable has an upper limit of three 1378
 1328 and a lower limit of zero. We therefore perform a Tobit 1379
 1329 estimate to keep the characteristics of its distribution 1380
 1330 into account. Consider also that in estimates like ours, 1381
 1331 the choice of regressors always entails some degree of 1382
 1332 arbitrariness. Our point is that we want to control our 1383
 1333 results on the effects of Meru and fair trade affiliation for 1384
 1334 all possible composition effects. With regard to our 1385
 1335 dependent variable, even though prices are hardly 1386
 1336 affected by demographic variables, price satisfaction 1387
 1337 can, since the recent “economics of happiness” literature 1388
 1338 (surveyed, among others, by Frey & Stutzer (2002) & 1389
 1339 Clark *et al.* (2006)) tells us that various measures of 1390
 1340 satisfaction are affected by demographic factors and by 1391
 1341 inherited psychological traits related to them. This is 1392
 1342 why we include all demographic variables in this 1393
 1343 specification and in those which follow. 1394
- 1344 14. We compute the correlation matrix of regressors 1395
 1345 and find that the multicollinearity problem is not severe 1396
 1346 in our estimates (the highest pairwise correlation is 1397
 1347 between sons and birth -0.46). However, a problem of 1398
 1348 multicollinearity may arise when the covariance of one 1399
 1349 of the regressors against all of the others is strong even if 1400
 1350 pairwise correlations are low. We therefore calculate the 1401
 1351 VIF factor (Marquardt, 1970), which uses the R^2 of the 1402
 1352 regression in which one of the independent variables is 1403
 1353 regressed on all the others. We never obtain a VIF 1404
 1354 higher than 1.5, which shows that multicollinearity is not 1405
 1355 an issue. 1406
- 1356 15. We perform a robustness check on this indicator by 1407
 1357 modifying the weight given to the different types of 1408
 1358 answers (one for much, enough and a few price 1409
 1359 satisfaction and zero otherwise). Results are substan- 1410
 1360 tially unchanged and available from the authors upon 1411
 1361 request. 1412
- 1362 16. We perform a robustness check and find that our 1413
 1363 results are still valid under a different approach used for 1414
 1364 building our dietary quality synthetic index (i.e., pre- 1415
 1365 sumed number of times food items consumed per week). 1416
 1366 Results are omitted for reasons of space and available 1417
 1367 upon request. 1418
- 1368 17. We further focus on the frequency of consumption 1419
 1369 of fish and greens (as additional indicators of dietary 1420
 1370 quality) and observe that the negative effect of affiliation 1421
 1371 to the control sample is strong here again. The regres- 1422
 1372 sion on the determinants of fish consumption also shows 1423
 1373 the expected signs for the number of people living in the 1424
 1374 household (negative) and the presence of additional
- sources of income (positive). These estimates are omitted 1375
 for reasons of space and are available from the authors 1376
 upon request. 1377
18. The question is: *Are you satisfied with your house- 1378
 hold's living conditions?* The qualitative answers have 1379
 been given the following points: very much = 3, 1380
 enough = 2, a few = 1, not at all = 0. 1381
19. On the role of income among determinants of child 1382
 labor see, among others, Basu (1999), Basu and Van 1383
 (1998), Baland and Robinson (2000), and Becchetti and 1384
 Trovato (2005). 1385
20. On this point consider the following quotation from 1386
 Marshall (1920), “*The less fully children's faculties are 1387
 developed, the less will they realise the importance of the 1388
 faculties of their children, and the less will be their power of 1389
 doing so. And conversely any change that awards to the 1390
 workers of one generation better earnings, together with 1391
 better opportunities of developing their best qualities, will 1392
 increase the material and moral advantages which they have 1393
 the power to offer to their children*” and, among recent 1394
 literature contributions, those of Haddad and Hodinott 1395
 (1994), Manser and Brown (1980) and Cigno (1991). 1396
21. When estimating the two equation model with other 1397
 performance indicators such as weekly household food 1398
 expenditure and price satisfaction, we do not find the 1399
 same significant results on the impact of years of project 1400
 affiliation. Consider, however, that a typical problem of 1401
 tests of selection bias with a limited number of observa- 1402
 tions is that there may be many “false positive” cases 1403
 (Greene, 2003), that is, in our case, insignificance of the 1404
 FT effect after controlling for the bias, due only to the 1405
 weakness of the test power. Following this line of 1406
 approach, we interpret the robustness of our FT impact 1407
 to the test as a signal of stronger effect and do not consider 1408
 the cases of non-robustness as necessarily invalidating our 1409
 previous results. More specifically, the somewhat more 1410
 robust effect of affiliation on dietary quality rather than on 1411
 consumption expenditure probably depends on the fact 1412
 that product diversification through self-consumption 1413
 adds, *per se*, an additional positive impact on the 1414
 dependent variable. Product diversification and increased 1415
 self-consumption may generate positive effects on the 1416
 quantity of food consumption that are not captured by 1417
 food expenditure. In the same way, the price satisfaction 1418
 finding may also be weaker because of the absence of a 1419
 price premium on the products sold on the local market. 1420
22. It should be noted that in 2006 Meru Herbs created 1421
 a system of scholarships for children of affiliated 1422
 farmers. The effects of this decision cannot obviously 1423
 be captured in our analysis. 1424

- 1426 Armendariz de Aghion, B., & Morduch, J. (2005). *The* 1479
 1427 *economics of microfinance*. Cambridge, Massachus- 1480
 1428 sets: MIT Press. 1481
- 1429 Bacon, C. (2005). Confronting the coffee crisis: Can fair 1482
 1430 trade, organic, and specialty coffees reduce small- 1483
 1431 scale farmer vulnerability in Northern Nicaragua?. 1484
 1432 *World Development*, 33(3), 497–511. 1485
 1433 Baland, J. M., & Robinson, A. (2000). Is child labor 1486
 1434 inefficient?. *Journal of Political Economy*, 108(4), 1487
 1435 663–679. 1488
- 1436 Basu, K. (1999). Child Labor, cause, consequence and 1489
 1437 cure, with remarks on international labor standards. 1490
 1438 *Journal of Economic Literature*, 37(3), 1083–1119. 1491
- 1439 Basu, K., & Van, P. H. (1998). The economics of child 1492
 1440 labor. *American Economic Review*, 88(3), 412–427. 1493
- 1441 Becchetti, L., & Rosati, F. (2006). Globalisation and the 1494
 1442 death of distance in social preferences and inequity 1495
 1443 aversion: empirical evidence from a pilot study on 1496
 1444 Q4 fair trade consumers, *The World Economy*. 1497
- 1445 Becchetti, L., & Trovato, G. (2005). The determinants of 1498
 1446 child labour: The role of primary product specializa- 1499
 1447 tion. *Labour*, 19(2), 237–271. 1500
- 1448 Castro, J. E. (2001a). *Impact assessment of Oxfam's fair* 1501
 1449 *trade activities. The case of Productores de miel Flor* 1502
 1450 *de Campanilla*. Oxford: Oxfam. 1503
- 1451 Castro, J. E. (2001b). *Impact assessment of Oxfam's fair* 1504
 1452 *trade activities. The case of COPAVIC*. Oxford: Oxfam. 1505
- 1453 Cigno, A. (1991). *Economics of the family*. New York 1506
 1454 and Oxford: Clarendon Press and Oxford University 1507
 1455 Press. 1508
- 1456 Clark, A. E., Frijters P., & Shields, M. A. (2006). Income 1509
 1457 and happiness: Evidence, explanations and economic 1510
 1458 implications, PSE working paper no. 24. 1511
- 1459 Deaton, A., & Paxson, C. (1998). Economies of scale, 1512
 1460 household size and the demand for food. *Journal of* 1513
 1461 *Political Economy*, 106(5), 897–930. 1514
- 1462 Fair Trade Advocacy Office (2005a). Fair trade rules! 1515
 1463 <http://www.ifat.org/downloads/advocacy/Fair-TradeRules_oct%202005.pdf>. Brussels. 1516
- 1464 Fair Trade Advocacy Office (2005b). Fair trade in 1517
 1465 Europe 2005. <<http://www.fairtrade.net/uploads/media/FairTradeinEurope2005.pdf>>. Brussels. 1518
- 1466 Frey, B., & Stutzer, A. (2002). What can economists 1519
 1467 learn from happiness research. *Journal of Economic* 1520
 1468 *Literature*, 40, 402–435. 1521
- 1471 Greene, W. H. (2003). *Econometric analysis* (5th ed.). 1522
 1472 Upper Saddle River, NJ: Prentice-Hall. 1523
- 1473 Haddad, L., & Hoddinott, J. (1994). Women's income 1524
 1474 and boy-girl anthropometric status in Cote d'Ivoire. 1525
 1475 *World Development*, 22(4), 543–553. 1526
- 1476 Hall, R. E. (1978). Stochastic implications of the life cycle- 1527
 1477 permanent income hypothesis: Theory and evidence. 1528
 1478 *Journal of Political Economy*, 86(6), 971–987. 1529
 1530
 1531
 1532
 1533
- Hayes, M. (2004). Strategic management implication of the ethical consumer. <<http://www.fairtraderesearch.org>>. 1479
- Hopkins, R. (2000). *Impact assessment study of Oxfam fair trade*. Oxford: Oxfam. 1480
- Khan, A. H. (1987). Aggregate consumption function and income distribution effect: Some evidence from developing countries. *World Development*, 15(10–11), 1369–1374. 1481
- Leclair, M. S. (2002). Fighting the tide: Alternative trade organizations in the era of global free trade. *World Development*, 30(7), 1099–1122. 1482
- Maddala, G. S. (1983). *Limited-dependent and qualitative variables in econometrics*. Cambridge: Cambridge University Press. 1483
- Manser, M., & Brown, M. (1980). Marriage and household decision making: A bargaining analysis. *International Economic Review*, 21(1), 31–44. 1484
- Marquardt, D. W. (1970). Generalised inverses, ridge regression, biased linear estimation, and nonlinear estimation. *Technometrics*, 12, 591–612. 1485
- Marshall, A. (1920). *Principles of political economy* (8th ed.). London: Macmillan. 1486
- Maseland, R., & De Vaal, A. (2002). How fair is fair trade?. *De Economist*, 150(3), 251–272. 1487
- Moore, G. (2004). The fair trade movement: Parameters, issues and future research. *Journal of Business Ethics*, 53(1–2), 73–86. 1488
- Mosley, W. H., & Chen, L. C. (1984). An analytic framework for the study of child survival in developing countries. *Population and Development Review*, 10, 25–45. 1489
- Nelson, V., & Galvez, M. (2000). *Social impact of ethical and conventional cocoa trading on forest-dependent people in Ecuador*. University of Greenwich. 1490
- Oxford Policy Management (2000). Fair trade: Overview, impact, challenges. <www.opml.co.uk/docs/ACF3C8C.pdf>. 1491
- Pariente, W. (2000). *The impact of fair trade on a coffee cooperative in Costa Rica. A producers behaviour approach*. Université Paris I Panthéon Sorbonne. 1492
- Redfern, A., & Snedker, P. (2002). *Creating market opportunities for small enterprises: Experiences of the fair trade movement*. Geneva: ILO. 1493
- Rao, B. B. (2005). Testing Hall's permanent income hypothesis for a developing country: The case of Fiji. *Applied Economics Letters*, 12(4), 245–248. 1494
- Ronchi, L. (2002). *The impact of fair trade on producers and their organizations: a case study with Coocafè in Costa Rica*. University of Sussex. 1495
- Wang, L. (2003). Environmental determinants of child mortality: Empirical results from the 2000 Ethiopia DHS World Bank, Washington, DC. 1496