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An Economic Exploration of Smallholder Value Chains: Coffee Transactions in Chiapas, Mexico

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Abstract

Fair trade and vertical integration represent two popular approaches for enhancing the incomes of organized farmers in a volatile coffee market as compared to the uncertain plight of independent, non-affiliated growers. A mixed method approach, utilizing informal interviews and a household survey in Chiapas, Mexico, analyzed three coffee trading regimes: independent, non-affiliated farmers, and growers in cooperatives pursuing a fair trade or vertical integration strategy. Survey and econometric results indicate that concentration on specialty coffee production with a portfolio of foreign contracts is economically preferable to a vertically integrated cooperative, which in turn produces more favorable coffee prices for smallholders than the non-affiliated conventional, *coyote*-dominated trading system.

Keywords: coffee, smallholder agriculture, fair trade, vertical integration, Chiapas

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Introduction

Concerns surrounding the future of smallholder agriculture have emerged, again, in discussions among development, business, and governmental leaders (Wiggins et al. 2010, Fan et al. 2013). With smallholders representing two billion rural residents and producing eighty percent of the world's food supply, the commercial viability of small-scale farms represents a critical challenge for the global economic system.

Smallholder farmers struggle because of their limited access to inputs (e.g. credit, technology, information) while working on low-productivity land located far distances from output markets via an inadequate, high-cost road system. Efforts to link smallholders to the agrifood value chain must first recognize the importance of strict quality standards, high volume requirements, and dependability (e.g. preference for irrigated farms with access to paved roads) by buyers. Secondly, these linkage-building activities must stress vertical and horizontal coordination, group lending, enhanced organizations (i.e. marketing cooperatives, producer associations), and value-adding enterprises. Given the buyer-driven nature of global food and commodity chains, local value-added investments of time and money face a daunting, but not insurmountable, challenge (Kaganzi et al. 2009, Fischer and Qaim 2012). Successfully developed and maintained linkages build greater resilience in smallholder agriculture in volatile world markets.

Coffee, one of the most valuable traded commodities in the world, represents a critical source of income for smallholder farmers and their farm workers (Lewin et al. 2004). Fridell (2007) estimates that seventy percent of the coffee produced worldwide is grown on farms of less than ten hectares. Price volatility, a normal feature of the coffee market since 1989, places smallholder farmers on an economic rollercoaster. Supply-side shocks to the coffee trading system occur with weather events (e.g. droughts, hurricanes) and market entry. On the demand-side, more gradual but still shock-like change is due to increasing buyer concentration, evolving Arabica and Robusta substitutability and complementarity, and the continuing emergence of the specialty coffee sector (Calo and Wise 2005, Petchers and Harris 2008).

Most of the value-added in the coffee value chain (roasting, distribution, retailing) occurs in the consuming countries. Efforts to capture additional value closer to the smallholder level have centered on production and marketing strategies that feature fair trade, sustainability, organic certification, shade-grown coffee (Giovannucci and Koekoek 2003, Daviron and Ponte 2005). Less frequently documented attempts to capture value involve vertical integration--smallholders integrating downstream in an attempt to capture a larger income share for their coffee production (Talbot 2002).

Our initial research question was "Are smallholder coffee producers better off economically when they participate in value-added activities, specifically vertical integration?" We explore this question by comparing and contrasting three coffee trading regimes in Chiapas, Mexico: non-affiliated conventional, fair trade, and vertical integration. The smallholder and the smallholder farming system serve as the units of analysis in this unique three-way comparison. The next section of the paper provides an overview of the potential benefits of value chain interventions, focusing on fair trade and vertical integration. An explanation of our research design, including data sources and methods, follows with a detailed description of the three

alternative trading regimes. We discuss the results of our mixed method analysis and draw relevant conclusions for managers in, and scholars of, the global agribusiness system.

Value Chain Interventions

Background

Arabica and *Robusta* coffee varieties account for nearly all the 2.5 billion cups of coffee consumed on a daily basis. *Arabica* production requires higher elevations (1000-2000 meters), fertile soils, more intensive maintenance, is more susceptible to disease and insects (e.g. rust, borer), less resistant to adverse weather, and predominately is hand harvested while *Robusta* is a hardier plant that can be harvested mechanically. As a result, *Arabica* coffee production costs are 50-80 % higher than *Robusta* (Dicum and Luttinger 1999, Tuvhag 2008). *Arabica* beans are better quality, have superior aroma and taste, and contain less caffeine (0.8-1.4% for *Arabica* and 1.7-4.0% for *Robusta*).

While coffee is grown throughout the tropical and subtropical regions of the globe, most coffee is consumed in northern latitude countries (Brazil is the exception). With the deregulation of the coffee market in 1989, price volatility became a key feature of coffee markets where market power shifted to oligopoly-like buyers in consuming countries and away from producers. New producing countries entered the market (e.g. Vietnam) and others increased their coffee acreage (e.g. India and Uganda). Smallholder risk increased dramatically in these new boom and bust coffee cycles. The difference between the retail price of coffee and the price paid to growers increased 50% with the change largely favoring the value-added sector (i.e. roasting, wholesaling, retailing). In 2001, when real coffee prices fell to their lowest levels in 100 years, Jaffee (2007) reports that Mexican smallholder incomes declined by 70%, forcing smallholders to abandon their coffee plots and migrate out of coffee-producing regions, often to the United States.

Historically, traditional coffee products were regular, decaffeinated, and instant coffees. Demand was stagnant with roasters supplying customers with low-priced, low-quality homogenous coffee (Lewin, Giovannucci and Varangis 2004). Post deregulation the demand side of the coffee market began to undergo dramatic changes that are ongoing, particularly with specialty coffees. Specialty coffee provided a “third place” (i.e. not home or work) where consumers could meet their consumption and relational needs. The specialty market provided quality coffee where the product’s origin and cultivation method was taken into account at the retail level. Although high quality *Arabica* beans are associated with specialty coffees, lower-cost *Robusta* beans, used in espresso-based coffees such as lattes and cappuccinos, became a dominant player in global coffee markets. Improved processing technologies for *Robusta* beans captured the interest of large food companies (e.g. Kraft, Sara Lee, Proctor and Gamble, Nestlé) who successfully developed more blended coffees.

Specialty coffees increased consumer awareness about the environmental and economic conditions and practices in the coffee industry. Media exposure, revealing questionable corporate practices in growing and consuming countries, stimulated the growth of socially conscious products. Coffees that promoted long-term environmental, social and economic sustainability,

and that are certified by an accredited third party, became known as sustainable coffees. Organic, shade-grown (or eco-friendly), and fair-trade coffees are all sustainable coffees, earning price premiums (Giovannucci and Koekoek 2003, ITC 2011). Research repeatedly has shown that out-of-home coffee buyers, particularly “ethical consumers”, are willing to pay higher prices for sustainable coffees—their demand is inelastic in comparison with conventional coffee products (Arnot et al. 2006, Hainmueller 2014). Into this dynamic and challenging market environment, smallholders may introduce competitive strategies for their coffee beans in an effort to capture a portion, or all, of the accessible value-added beyond their farm gate.

Fair Trade

Fair trade, the market-based effort to connect producers and consumers through the use of social standards and price floors, emerged after World War II as faith-based groups and international relief agencies organized alternative trading organizations to sell handicrafts from recovering war-ravaged communities in Europe (Raynolds et al. 2007). For the next five decades, the network of these alternative-trading organizations challenged the conventional, “unequal and unethical” south-north trading relationships by promoting producer empowerment and poverty alleviation (Fridell 2004).

The Fair Trade Labeling Organization International (FLO) was established in 1997 to offer mainstream, conventional importers, processors and distributors access to an “ethical market” through the fair trade label. Although FLO is the largest and most widely recognized certification organization, other labeling initiatives that certify sustainable coffees include organic certification and Rainforest Alliance. To participate as certified fair trade coffee producers, smallholders are required to organize themselves into producer associations, usually cooperatives, and (1) have agricultural and environmental practices that are safe and sustainable, (2) conform to the conventions of the International Labor Organization, and (3) have democratic structures and transparent administration in place to ensure direct benefits to farmers (FLO 2011a, 2011b, 2011c). In return, smallholders are guaranteed a minimum price (i.e. price floor) for their coffee at \$1.40 per pound and an additional premium (\$0.30) is paid for organic-certified coffee (FLO 2012). In addition to the coffee price, FLO requires traders to pay a fair trade premium of \$0.20 per pound with at least \$0.05 per pound invested—at the individual or cooperative level—to improve productivity and/or quality. Fair trade coffee remains a small percentage of total coffee traded with most fair trade certified coffee not sold as a fair trade certified product at the retail level (FLO 2011b).

Analyses of fair trade coffee regimes range from widely enthusiastic to severely critical. Bacon (2005) found that participation in alternative coffee trade networks (e.g. eco-labels, organic, fair trade, specialty) reduced smallholders’ vulnerability to low coffee prices. Enhanced awareness of management strategies for reducing vulnerability encouraged Nicaraguan producers to diversify their farming activities and respond to market opportunities (e.g. emphasis on quality). Wollni and Zeller (2007) found in their research in Costa Rica that coffee growers participating in the specialty markets (i.e. gourmet, estate, organic, shade-grown, fair trade coffees) receive higher farm gate prices than they would through conventional channels. If smallholders participated in coffee cooperatives they were more likely to participate in specialty markets and hence experience the benefits of price premiums. Murray et al. (2006) argue that fair trade coffee

enterprises mitigate migration off smallholder farms and provide opportunities for rural economic development throughout Mexico and Central America. However, these benefits will occur only when the dilemmas of a slow-growing Northern coffee market, substandard bean quality and lower than anticipated participation in fair trade networks by producers and buyers are overcome. Other analyses find little evidence that fair trade has significant impact on farmers' living standards (Ruben et al. 2009, Johannessen and Wilhite 2010). Data-driven doubts arise about the ability of fair trade cooperatives to efficiently and effectively replace existing players in the coffee value chain. Fair trade benefits largely accrue to retailers through higher prices with smallholders only receiving 5-15% of the retail price for a cup of fair trade coffee. Any direct smallholder benefits attributable to fair trade are modest, or non-existent, and largely are due to the price floor. The most significant economic gains may be the development of stronger cooperative organizations in rural areas.

Vertical Integration

The coffee trading system is a complex network of producers, traders, exporters, importers, roasters, wholesalers, retailers and consumers (Fitter and Kaplinsky 2001, Daviron and Ponte 2005). Coffee cherries on the tree have no economic value so each activity, from harvesting to retail sales, adds value to the product. The decision by the smallholders to dry or wet process their coffee cherries determines the value of green coffee. With the dry process all cherries are harvested, sorted, cleaned and dried and sold at the farm gate as dry cherries. The wet process involves sorting, cleaning/floating, de-pulping, fermenting, washing, and drying—the resulting beans are sold as parchment coffee at the farm gate and receive a higher price than dry cherries. The highest value added in the coffee value chain occurs at the roaster stage where green coffee is blended, roasted, ground, and packaged into a wide variety of coffee products, including instant coffee. Roasting generally takes place near or in the importing country. Retailing represents the second most value added stage in the value chain.

Because the smallholder coffee producer receives, at the farm gate, only 5-15% of the retail price for a cup of coffee, their incentive is to investigate activities that will capture some or all of the value added beyond the farm gate (Wilson et al. 2013). Perceived gains from vertical integration emerge from the analysis of transactions along the supply chain, assuming that markets fail at most if not at all stages. Monopsony and monopoly power throughout the trading regime, often referred to as multiple marginalization, implies that coffee producers will receive a lower price, and coffee consumers will pay a higher price, than would exist in more competitive transactions (Joskow 2010, Vettas 2010). A single firm, at least conceptually, could enter this supply chain and capture all the profit and deadweight losses associated with these market failures. In contrast, Williamson (1985) argues that firms with a high level of asset specificity will vertically integrate when the transaction costs associated with working in the conventional supply chain threatens their overall cost structure and competitiveness. Coffee trees have asset specificity “locked-in” characteristics. Therefore, incentives exist for coffee growers to seek organizational structures that allow them to maintain some control of their commodity downstream. Possibly the most famous example of successful vertical integration by a federation of small cooperatives is the *Federación Nacional de Cafeteros de Colombia* (the Juan Valdez marketing campaign) that grew, over nearly a century, into a major competitor in the international coffee market (www.federaciondecafeteros.org).

Evaluations of smallholder vertical integration remain rare in the academic literature. Murekezi et al. (2012) report that Rwandan coffee farmers selling to their cooperatives failed to gain any incremental benefits over selling their crop to private processing plants. Private buyers operated in a competitive market environment with little empirical evidence of monopsony power in the transactions. The key to success in either regime, according to the authors, was maintaining a high quality product that met the demands of the buyer-driven value chain. Other researchers argue that vertical coordination, rather than vertical integration, holds the greatest promise for smallholder producers (Muradian and Pelupessy 2005). A farm gate price premium is realistic by working closely with non-governmental organizations and corporate buyers to develop a branded product. These premiums increase smallholder incomes, enable on-farm investments, finance the educational expenses of children, and may, in the case of cooperatives, contribute to social improvements in the community.

Data Sources and Analytical Methods

Mexico occupies the 8th place in global coffee production, 3rd in *Arabica* production, 3rd in organic-fair trade coffee certified, 10th in coffee exports, and 13th in coffee consumption (SAGARPA 2010). Chiapas, in southern Mexico along the Guatemalan border, ranks first among Mexico's states in coffee production. About 77% of Chiapas' population falls below the poverty line, with many citizens having limited access to basic human needs such as education, health, and nutrition (CONEVAL 2009). Therefore, Chiapas represents a fertile environment to explore the role alternative coffee trading regimes play in smallholder incomes and in the development their families and communities. Three regimes are analyzed: smallholders as members of a fair trade cooperative, growers participating in a vertically integrated cooperative, and conventional, non-affiliated growers.

*Fair Trade Cooperative (FT): Campesinos Ecológicos de la Sierra Madre de Chiapas (CESMACH)*¹

The cooperative CESMACH, located in Jaltenango, was founded in 1992 when a group of twenty-five coffee farmers, concerned about low coffee prices, attended a community education program that offered workshops on quality control, environmental literacy, community development, and organic coffee production. In 1994 CESMACH received its legal registration and two years later the cooperative acquired its first organic certification; today the cooperative has five organic certifications. CESMACH's 478 members grow *Arabica* coffee exclusively in the buffer zone of the Biosphere Reserve "El Triunfo" in the Sierra Madre de Chiapas at an elevation of 1000-1400 meters.

From 1999 to 2002, CESMACH collaborated with Conservation International (CI) to commercialize its organic, shade-grown coffee in Starbucks locations in the United States. CESMACH and other groups supplied the coffee and *Agroindustrias Unidas de Mexico* (AMSA) processed the coffee for Starbucks. Although Starbucks guaranteed that they would buy the entire coffee harvest at good prices, in 2002 CI began to demand larger quantities of coffee that CESMACH could not meet without increasing yields by using commercial fertilizer. Proposals to source coffee from other cooperatives, vertically integrate (i.e. eliminate AMSA in the value

¹ (www.cesmach.com.mx)

chain), or sell directly to Starbucks all failed to materialize. CESMACH obtained fair trade certification in 2002, walked away from the CI-AMSA-Starbucks partnership, and today the cooperative partners with twenty importers from the United States, Europe and Japan who buy its high quality, shade-grown, organically certified, fair trade coffee.

Vertically Integrated Cooperative (VI): Café Justo²

The cooperative Café Justo grew out of the vision that smallholder coffee growers would have no incentive to migrate to other parts of Mexico or to the United States if they had a sustainable source of income in their local communities (Adam and Bassett III 2009). In 2000, during a period of low coffee prices and in the aftermath of Hurricane Mitch, coffee growers in the small community of Salvador Urbina (near Tapachula), with technical and financial assistance from the Presbyterian Church in the United States, designed and implemented a business plan to capture the entire value-added in the supply chain for their coffee. Café Justo received its legal registration in 2002 and in 2005 obtained organic certification and became a member of the Fair Trade Federation. However, Café Justo could not use the fair trade label because the cooperative failed to meet the export green coffee requirement; the cooperative exports processed, packaged coffee in whole bean or ground form, both *Arabica* and *Robusta*. With recent changes in fair trade regulations overcoming this issue, in 2012 Café Justo received permission to utilize the fair trade label but has yet to make a change in their packaging, choosing to use the words “fair trade” but not the label. Sixty growers in three communities participate in the cooperative.

Café Justo members, through the cooperative structure, maintain control of their coffee from their farms until it is sold at the retail level in the United States (Figure 1). Member growers take their dry cherry or parchment coffee to the cooperative’s factory in Salvador Urbina where the coffee is hulled, cleaned, sorted, and bagged into 60kg sacks of green coffee. The farmer-owned factory roasts and grinds some coffee for the local market but most green coffee is sent by bus to Café Justo’s main roasting facility in Agua Prieta, Sonora, a border community near Douglas, Arizona. Here the coffee is roasted and processed into a variety of coffee products. Packaged coffee is sold on-line to individuals, organizations, and churches in the United States. Cooperative members also participate in coffee tourism when delegations from the United States travel to Salvador Urbina to learn about the production of fair trade coffee. Visitors lodge and eat with Café Justo members at the cost of \$20/person/day, which represents an important additional source of income for these families.

² (www.justcoffee.org)

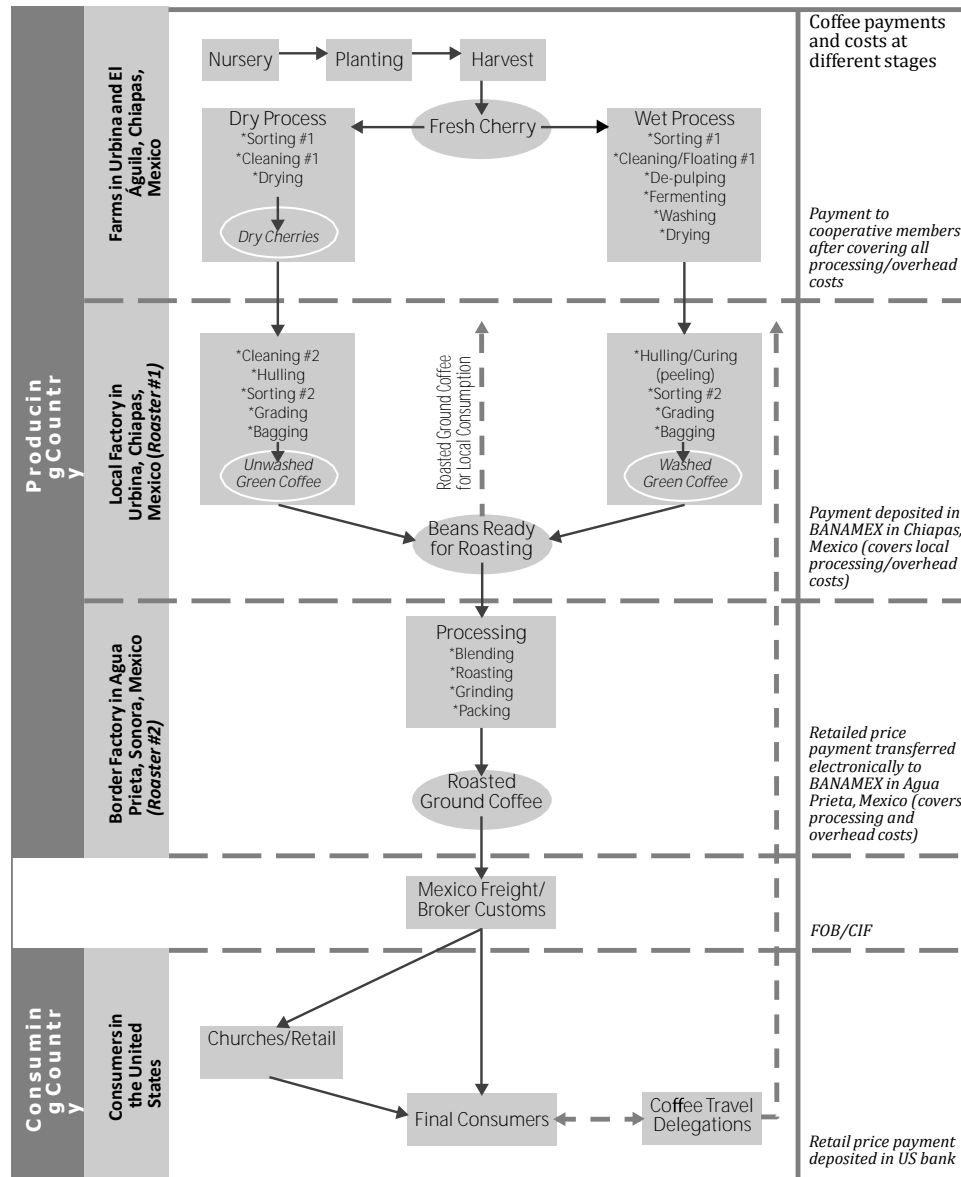


Figure 1. Café Justo’s Value Chain
Source. Bassett 2012

Non-Affiliated Coffee Growers (NA)

The independent, smallholder coffee growers who sell coffee directly into the conventional supply chain at the farm gate represent the baseline for this study. These growers sell their coffee as dry cherries or parchment to local *coyotes*, middlemen or intermediaries, who serve the value chain both as buyers and credit providers. Most *coyotes* have the resources (i.e. equipment and cash) to add value by transporting, hulling, cleaning, sorting, grading, and sacking green coffee for export. Others resell the unprocessed coffee cherries or beans to local processors. The key competitive advantage *coyotes* have over cooperatives is their ability to pay full, but low prices at the farm gate and provide growers with financing, particularly during “*los meses flacos*” (skinny months) of June to September when growers have low financial reserves and no food

crop production due to the heavy rains. Although smallholders are only required to liquidate their credit balances with a portion of their harvest, often the operating assumption is that farmers must sell their entire harvest to the credit provider (*coyote*) as a sign of loyalty and to insure future credit availability. Non-affiliated farmers with financial reserves can negotiate higher prices at the farm gate because of their coffee storage capabilities and their ability to force *coyotes* to compete with each other on the farm gate price.

Mixed Method Analysis

The analysis of the FT, VI and NA trading regimes utilized a mixed method approach where qualitative and quantitative data was collected through semi-structured interviews, participant observation, and a household survey. Preliminary discussions with CESMACH and Café Justo leadership began in April of 2011 when the research project was introduced; a preliminary site visit and pre-test of the household survey was conducted in December 2011 in Salvador Urbina. With a trustworthy working relationship established, a two-person team conducted the fieldwork in January 2012.

Interviews were conducted with key leaders in these coffee-trading regimes: a *coyote*, the manager of FT, and the founder and multiple managers of VI. These individuals provided the research team with valuable historical and current competitive information on the local coffee economy, their organizations, and the global coffee market. The FT and VI respondents shared selected data from their operations.

Participant observation involved immersing the research team in the local community by living with a smallholder coffee producing family. Conversations provided useful insights on the history of the communities, the development of the local coffee industry, and concerns smallholders share about the local economy. The research team attended multiple FT and VI meetings where coffee production, sales, prices, overall economic performance, fair trade premium use, and payment arrangements were discussed openly.

The principal data-gathering tool was a household survey administered to the key person in the family with decision-making responsibilities. The survey consisted of two parts. First, the respondent was asked questions quantifying coffee production, coffee prices, farming system, and quality of life (e.g. house size, source of water, etc.). These questions were asked for the 2007/08 and 2011/2012 crop years in an effort to measure and explain the change in smallholder welfare over that period of time using a multiple regression model. The second part of the survey asked FT, VI and NA participants to identify the advantages and disadvantages associated with their participation in their respective trading regime (internal evaluation), followed by a complementary line of questioning that asked FT and VI participants to evaluate the NA regime and vice versa (external evaluation).

The results are based on a non-random, purposive sample of 118 smallholders. Forty smallholders from FT (8% of total membership), thirty-nine households from VI (65% of total membership and 100% of active membership), and thirty-nine NA growers were interviewed. The participation of NA respondents was obtained using the snowball method of field surveying; VI participants recommended their NA neighbors who in turn introduced the research team to

other NA neighbors. The fact that both field team members were native Spanish speakers was influential in gaining participants' trust. Time to conduct each survey averaged 45 minutes with a range from ten minutes to over three hours.

We recognize the statistical limitations (i.e. selection bias) of our non-random sampling approach, but given that we had no functional list of growers in any of the three groups, a random sample was infeasible. For this reason the internal/external analysis (Appendices 1 and 2) of the three groups of growers is valuable to our understanding of how the farmers perceive and experience these three value chains.

Results and Discussion

Comparative Statistics

The households participating in the three trading regimes over the two time periods of this study, 2007/08 and 2011/12 reveal valuable comparisons (See Appendix 1). FT growers are, on average, younger, less educated, have larger households, and have fewer female-headed households than the VI or NA smallholder households. VI farmers have the largest percentage of married household heads (81%) followed by the FT households (78%) and the NA (69%) households. Married heads of households declined significantly between the two crop years in NA and VI. NA grower households, on average, have larger houses (an indicator of wealth) than the other two groups. A small decline in total land area across the three trading regimes reflects the reality of the *ejido* system where parents transfer land to the oldest son and daughter as an inheritance, thereby reducing the household's land holdings.

FT household responses reveal a greater degree of self-sufficiency in food crops (beans, corn). Historically, the VI and NA households (located in communities near Tapachula) grew basic crops to survive *los meses flacos* (skinny months) of diminished coffee income reserves. However, VI and NA respondents report that young men have begun to steal cash crops (bananas) and livestock (pigs, chickens) from these smallholders. Smallholders speculate that these men have recently returned from the United States or U.S.-Mexico border communities where they were unsuccessful in finding or maintaining employment. Upon return to their home communities they have struggled to integrate back into an agricultural economy. Because "the time, energy and money spent cultivating these crops is enjoyed by thieves", many VI and NA households have reduced land areas devoted to these activities. This phenomenon was unreported by the FT households.

An important finding centers on the *Arabica-Robusta* mix in the VI and NA households. Both groups produced more *Robusta* than *Arabica* coffee over the study period with declining yields, while as noted earlier the FT smallholders specialize in *Arabica* coffee. This changing crop mix is due to (1) the increase in coffee berry borer (*broca*) and coffee rust (*rolla*) that attack *Arabica* trees more than *Robusta* plantings, and (2) hurricane Stan in 2005 that damaged *Arabica* plantations more than *Robusta* trees. FT growers' *Arabica* trees, although suffering losses from Stan, received greater protection from the diverse/complex overhead vegetation of the reserve that protected their coffee plants.

As expected, FT smallholders sell virtually all their coffee to CESMACH while by definition NA growers sell all their coffee production to *coyotes*. But unexpectedly, VI farmers sell a high percentage of their coffee to *coyotes* as well. *Café Justo* does not have the capacity to process all of its members' *Robusta* and the cooperative did not buy *Robusta* until 2011. Although VI farmers produce more *Robusta* than *Arabica*, *Café Justo* does not have a large demand in their United States market for *Robusta* coffee. In addition, VI growers diversify their coffee commercialization between the cooperative and *coyotes* because *coyotes* buy their *Robusta* and provide credit for the grower's business and household. Finally, a small percentage of growers in all three trading regimes complement their coffee incomes with some off-farm income or with other entrepreneurial activities (e.g. their own business).

Internal Evaluation

Smallholders were asked to evaluate their coffee-trading regime (advantages, disadvantages, improvements) (See Appendix 2). FT growers rank the availability of credit as a key advantage. CESMACH obtains credit for its members through (1) importer pre-financing, (2) bank loans to the cooperative, and (3) self-capitalization from the small contribution made to the loan fund for each kilogram of coffee sold to the cooperative. High and known coffee prices are an important advantage. Because FT growers are members of a legally recognized organization, they and their organization are eligible for a wide range of government programs (e.g. subsidies, education, health care) that are not as accessible by the NA growers. The encouragement for organic production practices, access to machinery, the social premium, and commercial and social networking all received favorable mention by the FT smallholders. Only the fact that coffee revenues are paid to growers in installments during the crop year was listed as a major disadvantage. All FT growers would like the cooperative to take on more commercial and community development projects.

Like FT farmers, the VI growers appreciate higher prices for the coffee they sell to the cooperative. They also appreciate access to government services and programs due to their membership in a legally recognized organization. Interestingly, a third of the VI smallholders viewed the installment payment system as an advantage because it forced them to budget household and business expenses throughout the year yet over 50% of the respondents regarded the installment system as a disadvantage of the VI trading regime. A majority of the VI coffee growers noted that the cooperative could be managed more efficiently and effectively, increasing the final price received by the growers. The lack of credit was a major problem for nearly half the VI respondents.

Independent growers responded that full and prompt cash payment at the farm gate and the availability of credit were the two most important advantages of the NA system. Low coffee prices, the lack of any market control, inaccurate scales, and no proof of sale represent the major disadvantages of the regime. Without a proof of sale, NA growers cannot participate in the *Fomento Productivo* program of AMECAFE (the Mexican Association of the Coffee Production Chain) or the *Fondo de Compensacion de Precios de Café* (Coffee Prices Compensation Fund) that increase farmer incomes via coffee buyer rebates or price floors. Most *coyotes* are not registered buyers with AMECAFE because of they do want to pay the yearly fee and see no personal benefit. NA farmers list low-cost credit as the most desired improvement and ironically expressed a need for a coalition of NA growers, organized by the government, to counter the buying power of the *coyotes*.

External Evaluation

As noted earlier, researchers have found some evidence that active participation in a well-managed cooperative can produce pecuniary and non-pecuniary benefits to its members. As a validation check on the internal evaluation responses, each respondent was asked to evaluate the other trading regime (Table 1). In this case the two cooperative-based regimes (FT and VI) were combined and compared to the non-affiliated, independent growers (NA). NA smallholders list higher prices, credit in the case of CESMACH, pooled resources and other economic services (input supply) as advantages of the cooperative system. As expected, the cash flow challenge associated with payment installments is not appealing to NA growers. A surprising external criticism from NA farmers is that not all cooperative members are committed to the cooperative principles and operational philosophy. Members sell their coffee to the cooperative when prices are low and to the *coyotes* when prices are high thereby placing in jeopardy the supply chain for the cooperative. Relatedly, NA farmers are averse to the joint liability characteristic of cooperatives. One NA smallholder remarked “*en las cooperativas pagan justos por pecadores*” (in cooperatives good people pay for the sins of others).

Table 1. Advantages and Disadvantages from Outside Viewers on Non-Affiliated and Alternative Coffee Trading Systems

Non-Affiliated Growers' (NA) Perspectives on Cooperatives (FT and VI) (n=39)			
Advantages	%	Disadvantages	%
better price	49	payment installments	33
credit	31	low member commitment	13
pooled resources	26	favoritism	8
economic services	18	low buying capacity	8
access to government programs	10	restrictive production practices	8
direct exports	8	entry/entrance barriers	none
none	3	must find their buyers/importers	3
Cooperative Members' (FT and VI) Perspective on Non-Affiliated (NA) Coffee Trading System (n=79)			
Advantages	%	Disadvantages	%
cash payment	30	fluctuating/low prices	65
credit	20	no proof of sale	18
non-selective coffee buying	8	conveniently-calibrated scales	16
high price for quality coffee and/or large quantities	6	little/no credit	11
non-restrictive production practices	4	no control in value chain	6
none	16	no access to machinery	4
		no projects	1
		locked-in relationship	1

Cooperative members (FT and VI) note that two major advantages of the NA trading regime is the immediate full cash payment and the availability of credit from the *coyote*. Significant disadvantages of the NA system, from the perspective of cooperative members, are low and variable prices, no proof of sale, and inaccurate scales for weighing coffee.

Farm Gate Price Determinants

A weighted average farm gate coffee price (WP) represents the chosen measure of smallholder benefit across the three trading regimes. WP captures the varying total coffee production across all farmers and the price received for each coffee variety (*Arabica*, *Robusta*). Both specialization and variety drive smallholder incomes in Chiapas. WP is:

$$1) \ln(WP) = \ln [(P_{A_coop} * (Q_{A_coop} / Q_T)) + (P_{R_coop} * (Q_{R_coop} / Q_T)) + (P_{A_coy} * (Q_{A_coy} / Q_T)) + (P_{R_coy} * (Q_{R_coy} / Q_T))]$$

where Q_{A_coop} , Q_{A_coy} , Q_{R_coop} , and Q_{R_coy} represent the quantity of *Arabica* and *Robusta* coffee sold to the cooperative or *coyote*. P_{A_coop} , P_{A_coy} , P_{R_coop} , and P_{R_coy} are the prices paid by the cooperative or *coyote* for *Arabica* and *Robusta* coffee. Total coffee production, represented by Q_T , includes *Arabica* and *Robusta* coffee production sold to both buyers (e.g. $Q_T = Q_{A_coop} + Q_{A_coy} + Q_{R_coop} + Q_{R_coy}$). The natural log of WP was taken to better simulate a normal distribution and to correct for skewness in the error distribution. The descriptive statistics of the WP dependent variable indicate that FT farmers clearly have, on average, a higher WP than VI and NA smallholders (Table 2). VI smallholder benefit surpasses that of the NA grower but the WP price differential is smaller than the FT vs. VI differential.

Table 2. Descriptive Statistics for Weighted Average Price

An ordinary least squares (OLS) multiple regression model analyzes the key determinants for these price differentials. Age of the household head was hypothesized to have a positive effect on WP as older farmers have gained experience with production techniques that may improve the quality and therefore the price of their coffee. Education (*educ*), defined as the years of education

		Mean	Median	Min	Max
NA	2007	1.15	0.96	0.27	5.57
n=39	2011	1.80	1.53	1.21	3.73
FT	2007	3.18	3.15	1.91	4.46
n=40	2011	3.75	3.78	3.25	3.81
VI	2007	1.40	1.40	0.36	2.84
n=39	2011	2.16	1.87	1.39	4.34

completed, is expected to have a positive effect on economic benefit because the literature has shown that more educated farmers have higher unobserved managerial competencies and cognitive capacity that enable them to strategically make on- and off-farm decisions to improve their economic welfare. In addition, because education enhances the ability of farmers to receive, interpret and understand new information, educated farmers are more likely to adopt new technology and boost productivity. The effect of gender, that is being a female household head, is ambiguous reflecting the ambiguity in the research literature on prices received for farm commodities based on gender. The influence of coffee specialization (*coffee_ha*), measured by the hectares of coffee cultivated with respect to total productive land (e.g. farm size), also is ambiguous. Coffee specialization can have a positive effect on the farmers' economic welfare to the extent that coffee production is a profitable practice, however full specialization can also increase the farmers' vulnerability to climatic and market shocks. Both *Arabica* coffee yield (*arabica_yld*) and the percentage of *Arabica* coffee sold to the cooperative (*coop_arabica*) are

expected to have a positive effect on WP. The *coop_arabica* variable is defined as the percent of *Arabica* coffee sold to the cooperative with respect to the total coffee production. The size of the house (*home_size*), measured in squared meters, was used as a wealth indicator and it is expected to have a positive effect on WP because households with greater wealth (e.g. larger homes) can afford agricultural inputs that increase the quality and quantity of their coffee plantings. FT and VI (categorical variables) represent the farmers' participation in a fair trade and vertically integrated cooperative and are hypothesized to have a positive effect on the farmers' farm gate price.

Provided that off-farm income can be an important source of income for many small-scale farmers, off-farm employment (*employment*) and business ownership (*business-owner*) were included in the analysis. The effect of these two off-farm income variables is ambiguous. Off-farm income can be a strategy for meeting subsistence needs, smooth household consumption, absorb shocks to agricultural income, and ease credit constraints. In addition, off-farm income can increase the household capacity to purchase farm inputs and make investments to improve yield and labor productivity. Smallholders with off-farm income will not sell or harvest their crops before they are fully ripe for the purpose of meeting urgent household cash needs, thereby receiving a higher price. On the other hand, off-farm income can have a negative effect on the farmers' well-being to the extent that off-farm wages are low and unstable, and constitute a high opportunity cost of household labor (i.e. less available time to work on the farm).

The results from three OLS models reveal the key determinants of WP for this data set (Table 3). Only data for the crop year 2011/12 is reported because efforts to explain change in WP between the two crop years produced inconclusive results due to a lack of variability over the two periods. All three models indicate that age, education, gender, specialization and wealth (house size) have no statistically significant influence on WP when comparing the three trading regimes. In Model A, the percent of *Arabica* coffee sold to a cooperative has a strong, positive influence on WP. This result is confirmed in Model C. Model B's results complement the other two models by indicating that participating in the FT or VI trading regimes positively impacts the WP. FT smallholders are better off because they sell all specialty coffee (*Arabica*, organic, rain forest, eco-label) to CESMACH while VI growers only sell twenty-seven percent of their coffee to Café Justo with the remainder, a blend of *Arabica* and *Robusta* green coffee, sold to *coyotes*.

Off-farm employment negatively affects WP. The qualitative analysis indicated that non-agricultural employment involves opportunity costs for farm work. The level of maintenance of the coffee plantation and the processing method used by the farmer are direct indicators of the price farmers receive for their coffee. Smallholders who keep their coffee trees in excellent condition and use appropriate processing equipment produce higher quality coffee, which translates into higher prices. However, off-farm employment improves the risk position of the smallholder by stabilizing the cash income for the family.

Table 3. Ordinary Least Square Estimation: Log of Weighted Average Price (WP)

Explanatory Variables	(A)		(B)		(C)	
	Beta	s.e.	Beta	s.e.	Beta	s.e.
constant	0.471***	0.116	0.419**	0.138	0.425**	0.108
age	0.001	0.002	0.001	0.002	0.001	0.001
educ	-0.008	0.006	-0.010	0.007	-0.007	0.006
female	-0.071	0.064	-0.086	0.067	-0.069	0.062
coffee_ha	0.073	0.072	0.125	0.088	0.089	0.070
home_size	-0.00003	0.000	-0.00002	0.000	-0.00002	0.000
Arabica_yld	0.0001	0.000	0.0001*	0.000	0.0001	0.000
coop_Arabica	0.971***	0.102			0.809***	0.054
FT	-0.181	0.117	0.734***	0.067		
VI	-0.022	0.057	0.169**	0.064		
employment	-0.059*	0.028	-0.087**	0.033	-0.064**	0.027
business_owner	0.129+	0.074	0.080	0.080	0.123+	0.074
N	118		118		118	
R ²	0.7885		0.6935		0.7850	
F-statistic	35.92***		24.21***		43.82***	

Significant at levels: *** <.01% , ** 1% , * 5% , + 10%

Conclusions

Policies and programs promoting the economic development of smallholder agriculture confront the competitive reality of local, regional, and global markets. As the fourth most traded commodity in the world and the main source of income for twenty-five million smallholders and their harvest workers, coffee-trading regimes represent a compelling area of study. This mixed method research approach in Chiapas, Mexico first reveals that product differentiation matters for smallholder agriculture. Due to geographical location, the members and management of CESMACH (FT) have captured a wide range of price premiums for their *Arabica* coffee. A portfolio of differentiable labeling such as organic, fair trade, and rain forest has enabled CESMACH, over time, to develop, maintain, and grow positive trading relationships with importers in the United States, Europe and Japan willing to pay a premium price for this coffee. Café Justo enjoys a similar environment but on a much smaller and less diversified scale. These results imply that vertical integration produces a smaller benefit at the farm gate than specialized coffee labeling.

Secondly, scale matters for the smallholder organization (Meskela and Teshome 2014). Trading volume enables the grower or the cooperative to negotiate from a stronger position with importers and profitably move down the value chain. CESMACH specializes in *Arabica* coffee but has the wherewithal to purchase all of its members' coffee and market it throughout the world. Café Justo has a much smaller market and even though it now sells both *Arabica* and *Robusta* coffee in the U.S. market, Café Justo can only sell approximately one-third of its members' coffee production.

Thirdly, because smallholders affiliated with a coffee cooperative receive higher farm gate prices than NA growers, organization matters (Lyon 2007, Kaganzi 2009). Granted, independent coffee growers with storage capacity, financial and credit reserves, and high quality production garner higher than average prices from *coyotes*. But our sample of smallholders benefited from well-managed organizations that represented and advocated for their members in the marketplace and with the government. Higher farm gate prices were the result of an affiliation as well as access to a wider range of private sector inputs (i.e. credit), long-term buyer loyalty (i.e. Green Mountain Coffee Roasters), and government programs and services (i.e. health care). Organizations provide an educational venue for technical/managerial training and classes on how to compete in a consumer-oriented, global market.

Finally, few coffee-dependent smallholders have the financial and credit reserves to carry their families through a crop year. *Los meses flacos* are an economic reality and growers are willing to accept lower farm gate prices for the production and consumption financing throughout the year that *coyotes* willingly provide. Business organizations promoting the economic development of smallholder agriculture must efficiently and effectively support grower cash flow stability with affordable credit programs.

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Appendix 1. Descriptive Statistics by Group (*means)

Variable	Mnemonic	Unit	NA (n=39)		FT (n=40)		VI (n=39)		POOLED GROUP (n=118)	
			2007/08	2011/12	2007/08	2011/12	2007/08	2011/12	2007/08	2011/12
Household Characteristics										
Age of household head	age	Years	53.44	58.44	41.05	46.05	52.79	57.79	49.03	54.03
Education of household head	educ	No. years	5.18	5.18	4.20	4.20	5.95	5.95	5.10	5.10
Gender of household head	female	% of females	0.23	0.23	0.08	0.08	0.10	0.10	0.14	0.14
Household size	Hh_size	No. people in house	5.15	5.36	6.45	6.08	5.59	4.69	5.74	5.38
Marital status of household head	married	% of married	0.87	0.69	0.68	0.78	0.85	0.81	0.81	0.77
Wealth Indicator										
Home size	home_size	m ²	134.59	143.63	72.63	90.68	135.31	149.14	113.82	127.50
Diversification										
Total productive land	total_land	ha	2.90	2.99	9.01	9.24	4.44	4.03	5.48	5.45
Hectares cultivated with coffee	coffee	ha	2.32	2.49	4.23	4.91	3.43	3.18	3.36	3.54
Hectares cultivated with basic crops	basic_crop	ha	0.09	0.01	0.66	0.67	0.15	0.04	0.30	0.24
Hectares cultivated with (non-coffee) cash crops	cash_crop	ha	0.34	0.42	0.18	0.06	0.56	0.54	0.36	0.33
Fallow land	fallow	ha	0.14	0.08	3.94	3.60	0.31	0.27	1.48	1.34
Productivity										
Percentage of cultivated Arabica coffee	arabica_pct	% of coffee area	0.24	0.17	1.00	1.00	0.42	0.30	0.56	0.50
Percentage of cultivated Robusta coffee	robusta_pct	% of coffee area	0.76	0.83	0.00	0.00	0.58	0.70	0.44	0.50
Yield of Arabica coffee	arabica_yld	kg/ha	194.35	81.79	549.99	550.33	315.88	169.65	355.07	269.66
Yield of Robusta coffee	robusta_yld	kg/ha	1062.24	1034.03	0.00	0.00	820.20	732.30	622.16	583.79
Market										
Percent of total Arabica coffee sold to the cooperative	coop_arabica	%	N/A	N/A	0.92	0.97	0.2	0.20	0.39	0.40
Percent of total Robusta coffee sold to the cooperative	coop_robusta	%	N/A	N/A	0.00	0.00	0.00	0.10	0.00	0.03
Percent of total Arabica coffee sold to the coyote	coyote_arabica	%	0.23	0.16	0.08	0.03	0.20	0.10	0.16	0.09
Percent of total Robusta coffee sold to the coyote	coyote_robusta	%	0.76	0.83	0.00	0.00	0.60	0.60	0.45	0.48
Off-Farm Income										
Household head out of farm employment	employment	% of farmers employed	0.36	0.15	0.08	0.18	0.10	0.13	0.18	0.15
Household head business owner	business_owner	% of business owners	0.08	0.15	0.10	0.10	0.08	0.15	0.08	0.14

*Means. The variables female, married, employment, business_owner are binary variables for which percentages are presented. The rest of the variables are continuous variables presented with their means N/A = Not Applicable

Appendix 2. Advantages, Disadvantages and Suggested Improvements (percentage of respondents)

		NA (n=39)			FT (n=40)			VI (n=39)									
Advantages	%	Disadvantages	%	Improvements	%	Advantages	%	Disadvantages	%	Improvements	%						
Prompt cash payment	38	fluctuating-low prices	54	credit at low/no interest rates	38	credit with low interest rate	85	payments by installments	18	increase projects	10	higher/fixed price	87	payments by installments	56	Restructuring	79
credit	36	no control after farm-gate level	15	form a coalition	36	higher/fixed output prices	55	High commitment levels	8	higher prices	30	social security	41	no credit	13	provide credit/pre-financing	46
non-selective coffee buyer	26	no proof of sale	15	higher output prices	31	access to government programs	45	selective coffee buying	5	restructuring	28	better money administration due to payment system	31	unequal benefits (social security)	13	higher prices	31
If not indebted, liberty to sell to highest bidder	15	conveniently-calibrated scales	15	provide proof of sale	10	organic production practices	30	Disconnection between staff & farmers	3	increase credit with low/no interest rate	13	access to government programs	23	transportation cost	5	Prompt cash payments	23
no transportation cost	10	high interest rate	13	more equitable trading terms	10	access to machinery	23	no social security	3	increase buying capacity	8	direct trading partnerships	20	disconnection between roaster & farmers	3	increase membership base	21
		Damage farmers' coffee sacks	7			price/social premium	23	low prices	3	awareness on organic production environment & sustainability	3	access to machinery	18	Low commitment	3	Increase projects	18
						sustainable & direct trading relationships	21	None	43			organic production practices	10	selective coffee buyer	3	Increase Robusta buying capacity	8
						better money administration due to payment system	18					community network	5	None	21	equal benefits (social security)	5
						pre-financing	13					democratic & transparent practices	3				
						democratic & transparent practices	13										

