

**“Fairtrade” and Market Failures  
in Agricultural Commodity Markets\***

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**Abstract**

This paper concerns an NGO intervention in agricultural commodity markets known as “Fairtrade”. Fairtrade pays producers a minimum unit price and provides capacity building support to member cooperative organizations. Fairtrade’s organizational capacity support targets those factors believed to reduce the commodity producer’s share of returns. Specifically, Fairtrade justifies its intervention in markets like coffee by claiming that market power and a lack of capacity in producer organizations ‘marks down’ the prices producers receive. As the market share of Fairtrade coffee grows in importance, its intervention in commodity markets is of increasing interest. Using an original data set collected from fieldwork in Costa Rica, this paper assesses the role of Fairtrade in overcoming the market factors it claims limits producer returns. Features of the Costa Rican input market for coffee permit a generalization of the results. The empirical results find that market power is a limiting factor in the Costa Rican market and that Fairtrade does improve the efficiency of cooperatives, thereby increasing the returns to producers. These results do not depend on the minimum price policy of Fairtrade and therefore can inform on its organizational support activities. Finally, the results also suggest that producers selling to vertically integrated, multinational coffee mills face lower producer price ‘mark-downs’ compared with domestically owned non-cooperative mills. This result contradicts the popular view that the increasing concentration of vertically integrated multinational firms accounts for a decline in producers’ share of coffee returns.

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## I. Introduction

### *Fairtrade*

Since the original Oxfam 'Fairtrade' shop opened in the UK in 1964, Fairtrade organizations trading in everything from textiles to coffee grew to achieve global retail sales of over US\$83 million in 2003 (NEWS 2005). Agricultural commodities traded under Fairtrade auspices include coffee, cocoa, tea, rice, sugar, honey and fresh fruit. Fairtrade enjoyed average annual growth rates of 3.3% throughout the 1990s (EFTA 2001) and by 2005, the net value of all Fairtrade products sold in Europe had increased by over 150% (FINE 2005). Although the total value of Fairtrade accounts for little over 0.01% of global trade, Fairtrade continues to grow in importance in individual commodity markets, particularly that of coffee. Fairtrade coffee accounts for an average of 0.5% of the US market, the world's largest coffee market (Raynolds 2004). Market share in some European countries is much higher: In 2005, roughly 6% of the Swiss coffee market was Fairtrade and in the UK, Fairtrade now accounts for fully 20% of the market (FINE 2005). The demand for Fairtrade coffee has consistently grown at a faster rate than that of conventional coffee for a number of years. This is as true for older markets in Europe (where annual average growth of the European Fairtrade coffee market was almost seven percent throughout the 1990s (Max Havelaar 1998), as it is for younger markets: The average growth rate of the Fairtrade coffee market is 65% and 47% for the Canadian and US markets, respectively, since the introduction of Fairtrade coffee in North America in 1998.

While clearly capturing the imagination of consumers, the advent of Fairtrade on the agricultural commodity scene can actually be traced to its concern for the *producer* side of the market. The intervention of Fairtrade with commodity producers is based on a number of perceived market failures that are claimed to lower the return to farmers and expose them to a high degree of volatility. In this, the Fairtrade position is far from new: Commodity policy research has diagnosed, examined and prescribed policy in the face of falling and volatile prices for decades. This has been particularly true for the coffee market, which has known several crises since the 1960s. The most well-known interventions in coffee markets have been the supply retention schemes aimed at supporting and stabilizing prices through international commodity agreements (ICAs).

### *Fairtrade and Commodity Policy in Coffee*

The global causes for the most recent crisis in coffee, dating from at least the early 1990s, include structural changes to supply and demand. These factors, combined with the effective demise of (US and Brazil-backed) coffee ICAs in 1989, have led coffee commodity policy in new directions. In particular, much of the new policy is aimed at increasing the share of existing returns to coffee producers through improved efficiency and access to higher valued markets. The volatility issue is addressed with market-based price risk management tools. It will be seen that the effectiveness of this policy strategy depends critically on delivering the associated price risk management and marketing tools to producers. This delivery can be limited by the difficulty in reaching many small, non-organized producers. It can also be limited by imperfect market structures, where market power and failures in information can prevent higher returns from reaching farmers. Furthermore, whereas improved efficiency is touted by 'new' commodity policies as a means to alleviate the current crisis for farmers, it is

not always clear where the scope for efficiency improvement lies. Fairtrade, with its similar focus on producer organizations and higher valued markets, should also face these same limitations. On the contrary, Fairtrade has enjoyed sustained growth and maintained its intervention in coffee—a phenomenon that came to draw increasing attention in commodity circles.<sup>1</sup>

### *Fairtrade and Development*

Since over 40% of all agricultural workers worldwide are engaged in agricultural commodity production, the crisis in commodities affects over one billion producers. Fully one-quarter of these commodity producers are engaged in coffee production in less developed countries (LDCs). A ‘coffee crisis’ is therefore a crisis of development. To face this development issue, Fairtrade intervenes in coffee markets to increase the returns to coffee producers. They do this directly through the provision of a minimum price for a portion of the harvest, but they also engage in a range of development activities aimed at removing the factors that mark down producer prices for coffee. These factors include the market power of coffee buyers in local input markets, the inefficiency of cooperative producer organizations with which they work, and the limited direct access of producers to export markets.

In light of the resonance of Fairtrade activities within the wider policy context, it is worthwhile to assess the role of Fairtrade in overcoming these factors in commodity markets. Nevertheless, despite a burgeoning analytical literature on Fairtrade in development studies circles (Leclair 2002; Murray, Raynolds, and Taylor 2003; Raynolds 2004; Renard 2003; Strong 1997; Tallontire 2002), the fundamental premises justifying Fairtrade intervention have never been empirically examined. This paper therefore undertakes to inform on the following research question: *What is the role of Fairtrade in overcoming the market factors claimed to limit producer returns in internationally traded agricultural commodities like coffee?*

The paper will first discuss the nature and extent of Fairtrade intervention in agricultural commodity markets (Section II), with a particular focus on the coffee market. Section III then briefly summarizes recent developments in international commodity policy more broadly. Section IV reviews the key features of Costa Rica as a case study. The theory and data used to approach the above research question form the topics of Sections V and VI, respectively. Section VII undertakes an econometric analysis to identify the presence of market failures limiting producer returns. This section also analyses the impact of Fairtrade and other agents in the Costa Rican coffee market on producer returns. Section VIII discusses the policy implications of the econometric findings before concluding with a summary and directions for future research.

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<sup>1</sup> The commodity price risk management group of the World Bank, for example, consulted heavily with Fairtrade organizations in its early work and Fairtrade coffee cooperatives continue to be their primary clients.

## II. Fairtrade

### *Defining Fairtrade*

Broadly speaking, 'Fairtrade' refers to a trademarked trading relation between organizations of smallholder producers<sup>2</sup> in LDCs and consumers in the North.<sup>3</sup> While Fairtrade takes place with both agricultural commodities and other goods (e.g. handicrafts) this analysis deals exclusively with Fairtrade in commodities.<sup>4</sup> Final products like roast and ground coffee (e.g. Cafédirect, Equal Exchange), tea bags (e.g. Clipper Fairtrade) and chocolate (e.g. Green&Blacks, Divine Chocolate) made from primary commodities purchased under Fairtrade conditions are identified to the consumer with a Fairtrade trademark.<sup>5</sup> These Fairtrade conditions, as spelt out by the Fairtrade Labelling Organizations International (FLO), include: purchase from cooperatively organized producer groups only; the payment of a minimum 'Fairtrade' price; long-term trading relations; the advance of credit and a transparent use of Fairtrade premiums on the part of the producer organization.<sup>6</sup>

To use the trademark, buyers (which are a mix of Fairtrade non-governmental organizations (NGOs) and private firms) must (i) purchase their primary commodity input under Fairtrade conditions from the FLO register of approved smallholder farmer organizations and (ii) pay a license for the trademark. On the supply side, in order to provide quality products in sufficient quantity and in a timely fashion, the cooperative farmer organizations receive capacity building support from NGO 'Fairtrade organizations' operating in the South. These Fairtrade NGOs also often have a 'trading arm' through which they behave as buyers. Fairtrade organizations, their producer partners and private firms participating in the trademark system together constitute 'Fairtrade'.

### *Fairtrade: Tools and Approaches*

Fairtrade is a trading relationship structured with the objective of alleviating the poverty of agricultural commodity producers in LDCs "by offering better trading conditions for producers and workers in developing countries" (Transfair 2004). Those trading conditions that Fairtrade proponents believe limit returns to farmers

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<sup>2</sup> Recently (2003) Fairtrade trademarked goods have come to include trade in goods produced by organized workers (e.g. on plantations). This is a development outside the time frame of analysis of this paper, and in any event, remains a very small portion of Fairtrade activity.

<sup>3</sup> It is important to acknowledge that, with the growing success of Fairtrade in Northern markets, a number of initiatives such as 'ethical trade', 'community trade', and non-trademarked 'fair trade' have arisen. These are separate from the main Fairtrade movement described here.

<sup>4</sup> This is done without any loss in generality: The same development principles underlie Fairtrade in both commodities and handicrafts. Furthermore, commodities account for the majority of Fairtrade activity in both value and volume terms (Piepel, Koppe, and Spiegel 2000).



<sup>5</sup> The Fairtrade trademarks, which identify a product on the supermarket shelf as having met a specific set of 'Fairtrade' criteria, as spelt out by the Fairtrade Labelling Organization (FLO).

<sup>6</sup> See the FLO website for a complete set of Fairtrade standards and criteria. [www.fairtrade.net/pdf/sp/english/Generic%20Fairtrade%20Standard%20SF%20Dec%202005%20EN.pdf](http://www.fairtrade.net/pdf/sp/english/Generic%20Fairtrade%20Standard%20SF%20Dec%202005%20EN.pdf)

(and foster poverty) include the low and variable output prices of world markets and low and imperfectly competitive input prices paid to farmers by middlemen (Barrat-Brown 1993;EFTA 1995;EFTA 2001). From this comes the ideological support of cooperative organizations. The idea is to support cooperatives so that they are transparent, accountable and efficient. Such support then creates viable alternative trading channels for smallholder farmers to sell their coffee. This is important as low returns are often blamed on monopsonistic intermediaries. In sum, selling to cooperatives is meant to raise the returns to farmers by increasing their share of the prevailing world price. Further improvements to producer returns motivate further capacity building, technical support and efficiency work with cooperatives from Fairtrade NGOs that work directly with producer groups in the South.

In addition to this capacity building by Fairtrade *organizations*, licensed *buyers* in the North pay a fixed minimum price for the primary commodity purchased from these producer groups (e.g. US\$1.26/lb for Arabica coffee). The intention of the fixed price mechanism is to reduce producer exposure to volatility and low world prices. The extent to which it does, of course, is limited by the proportion of the producer groups' harvest sold to the Fairtrade market, which is rarely 100% of the harvest, and is in most cases well below 50%.

In sum, it is important to stress that Fairtrade utilizes a two-pronged strategy to assist commodity producers: Price support through the minimum 'fair' price *and* producer organizational support.

### *Fairtrade Intervention in Coffee*

In many ways, the story of Fairtrade can be told in terms of coffee. Although Fairtrade in other agricultural commodities has achieved significant market share, coffee has remained the single most important Fairtrade product in terms of both value and volume since the first Fairtrade coffee activities in 1973 (EFTA 1995;EFTA 2001;Piepel, et al. 2000;Raynolds 2004). Coffee is not only important for growth in value, but in the mainstreaming of Fairtrade more generally. For example, it was in response to a call from coffee producers that Fairtrade criteria were harmonized under one trademark organization (Murray, *et al.* 2003) and the mainstream distribution of Fairtrade products in supermarkets was pioneered by coffee in the late 1990s.<sup>7</sup> It is also through coffee that the current two-pronged model of Fairtrade intervention in commodity markets was originally developed.

For most people, Fairtrade is usually synonymous with a 'fair price'. The minimum price is the central and most contentious<sup>8</sup> criteria of the Fairtrade conditions governing coffee. It is certainly the most well-known. Table 1 indicates the minimum price for different coffee origins. In times of low prices, the Fairtrade price difference can be considerable: For example, in the crisis of the early 1990s, the Fairtrade price for Central American washed Arabica was on average 38 US cents/lb higher than the prevailing world price (as measured by the New York 'C' price). When the relevant

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<sup>7</sup> Until then, distribution of Fairtrade products had been channeled through so-called 'World Shops' and through church groups and catalogues.

<sup>8</sup> The fair price can be contentious because it is rather arbitrarily determined. There are references made to covering costs of production and basic needs, but little in the way of specifics. For example, the minimum price schedule of Table 1 has been unchanged for 15 years i.e. no adjustment for inflation.

world price rises above the Fairtrade minimum price, the Fairtrade price becomes: the world price plus US\$0.05/lb. Finally, note from Table 1 that not all Fairtrade coffee is organic, but a higher minimum price prevails if it is.

**Table 1 The Fairtrade Minimum Price for Coffee (US cents/lb)**

Type of Coffee	Conventional (US cents/lb)		Certified Organic (US cents/lb)	
	Central America, Mexico, Africa, Asia	South America, Caribbean	Central America, Mexico, Africa, Asia	South America, Caribbean
washed Arabica	126	124	141	139
non-washed Arabica	120	120	135	135
washed Robusta	110	110	125	125
non-washed Robusta	106	106	121	121

*Source: Adapted from FLO 2004*

The minimum prices in Table 1, along with a commitment to trade for more than one season and the advance of credit, stipulate the requirements of *buyers*. Producers, or rather their organizations, are required to retain US\$0.05/lb out of the minimum price (referred to as the ‘Fairtrade premium’) and to “administer the Fairtrade premium in a way which is transparent for beneficiaries and FLO. Decisions on the use of the premium are taken democratically by the members” (FLO 2004, p.4). In practice, producer organizations can decide to retain more than US\$0.05/lb and tend to spend this on organizational capacity building, social programs, services for members, specific infrastructure projects and/or quality programs (Ronchi 2002a; Ronchi 2002b).

The formal standards for Fairtrade coffee (see footnote 6) make it clear that producer organizations must meet a further host of labor and quality standards.<sup>9</sup> In turn, Fairtrade organizations like Twin, Equal Exchange, Oxfam (until 2003), Traidcraft and others, provide a large variety of producer support activities in order to help producer groups meet the quantity and quality requirements for export, not only to Fairtrade markets, but to conventional markets as well. This reduces their dependence on limited Fairtrade coffee demand<sup>10</sup> and enables them to access conventional premium markets as well (e.g. organic).

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<sup>9</sup> These requirements provoke critics of the Fairtrade system to point out that Fairtrade seems to be reserved for smallholder producer organizations that are already strong and independent. The system is endogenous, however: Many of the FLO-registered producer organizations can meet the stringent criteria only as a result of the capacity building and producer support they receive from NGO Fairtrade organizations, as described above.

<sup>10</sup> There is an excess producing capacity of Fairtrade coffee of some 80% (Giovannucci, *et al.* 2003).

### III. 'Fairtrade' and Commodity Policy

#### *Agricultural Commodities in Crisis*

Coffee is a commodity whose real price has displayed above-average volatility and a general decline that culminated, in 2000, to the lowest price (in real terms) in almost 100 years (Varangis, Siegel, Giovanucci and Lewin 2003c). In addition to being the single most valuable agricultural commodity and the second most valuable traded commodity (after oil) in the world for most of the latter half of the 20<sup>th</sup> century (Ponte 2002b), coffee carries a great weight in terms of employment and poverty. This is partly because coffee is one of the few agricultural commodities dominated by small producers: Some 10 million small<sup>11</sup> coffee farmers produce 70% of the world's coffee (CFC 2001).

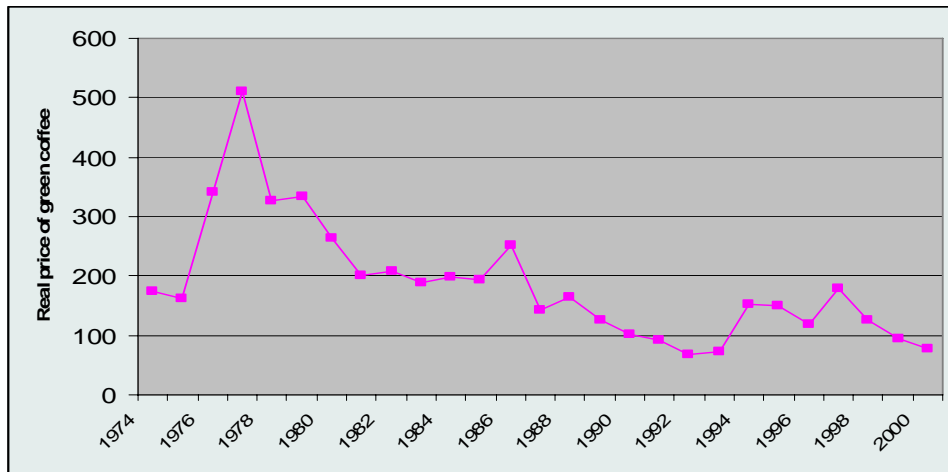
In response to 'crises' characterized by a persistent negative trend and increasing volatility of prices, most agricultural commodity markets have known some form of international, national or local intervention over the course of the last century. These policies have often had mixed objectives with respect to downward price trend and high volatility. This ambiguity over precise objectives is closely linked to the controversies that exist in the large body of research on agricultural commodity markets. Commodity policy research has been characterized by less than perfect agreement over the long run trend of prices, as well as over its volatility over time. The detection of a downward trend in prices has been hotly disputed, primarily due to weaknesses in the statistical tests for trend (Grilli and Yang 1988, Cuddington and Urzua 1989, Powell 1991, Gilbert 2003, Leon and Soto 1997, Cashin and McDermott 2001, Cashin, *et al.* 2003). Similarly, while the detection of commodity price *volatility* in the literature is not controversial, debate does exist over whether that volatility has been increasing over time or not, as well as its underlying causes (see, for example, Cashin, *et al.* 2001; Varangis, *et al.* 2003c, Gilbert 2003; Hazell, Jaramillo, and Williamson 1990; Scandizzo and Diakosawas 1987).

Although there is no consensus on the negative trend and increasing volatility in agricultural commodity prices in general, there is little ambiguity in the literature over the negative trend and increasing volatility of *coffee* prices in particular. (see Cashin, *et al.* 2000, 2003 for trend and Gilbert 2003, Hazell, *et al.* 1990 for volatility). Even the most casual observation of Figure 1 shows that both features of interest, downward price trend and high volatility, are markedly present in the coffee market.

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<sup>11</sup> By 'small' is meant coffee farmers producing on less than 10 hectares of land.

**Figure 1 Real Price of Green Coffee, US cents/lb, constant 1995 dollars<sup>12</sup>**



Source: ICO, WDI; author's own work

In light of the dramatic behavior of coffee prices and the significance of agricultural employment in the commodity, it is unsurprising that a wide range of policy interventions have been conceived and applied to coffee. These span international commodity agreements (ICAs), marketing boards, stabilization funds and national price controls.

#### *Traditional Commodity Policies in Coffee*

Coffee has known a series of ICAs since the negotiation of the first in 1962. The ICAs were supply retention schemes aimed at maintaining and stabilizing coffee prices within a determined band of prices. The agreement included both producing and consuming countries and, unlike other major commodity agreements such as those for tin, cocoa and rubber that used buffer stock schemes, it functioned via a system of export quotas based on export volume and stocks of the producing countries. Quotas were activated when a composite average price calculated by the International Coffee Organization (ICO) dropped below a series of specified trigger prices. It was, in fact, disagreement about the size and distribution of these quotas that led to a suspension of the first ICA in 1972. In the face of depressed prices induced by supply responses to the post-1976 frost plantings and the failure of other unilateral initiatives at retaining supply, a new ICA was negotiated that took effect in 1980. Interrupted only by temporary price-induced suspensions, this agreement held until its final collapse in 1989. A further effort at an agreement took place with a much reduced membership and no retention clauses in 1994, but the US refused to join even this toothless coffee ICA. At the same time, some coffee producers formed the Association of Coffee Producing Countries (ACPC), which initiated a number of supply retention initiatives in the second half of the 1990s. The most recent supply management measure in effect is the 5% poor quality retention plan of Costa Rica, El Salvador, Guatemala, Honduras, Nicaragua and Colombia.

<sup>12</sup> Real price index constructed using annual average ICO indicator prices for the 'Other Mills' category, deflated by WDI (*World Development Indicators*) US price deflator.



While some studies found stabilizing effects for the earlier coffee ICAs (Akiyama and Varangis 1990), their main success appears to have been in supporting prices (although the role of supply shocks in Brazil on price peaks were arguably just as important). These gains, however, have been qualified by studies that claim that despite unmistakable price stability, the coffee ICA in effect before the 1985 drought dampened the subsequent price peaks with its accumulated stocks (Akiyama, *et al.* 1990). Furthermore, theory and evidence on rent-seeking activity induced by intra-country quota distribution indicate that there are welfare losses that mitigate ICA price gains (Bohman, Jarvis, and Barichello 1996). These rent-seeking activities, in combination with the internal quota distribution systems within countries that tended to favor large producers (Akiyama, *et al.* 1990) and facilitate the exercise of market power (Lopez and You 1993), called into question whether small coffee producers actually enjoyed any of the ICA-induced boost in price and coffee revenues (Gilbert 1995; Oxfam 2001a). This essentially casts doubt on the agreements' effectiveness in raising producer incomes.

In addition to the international supply retention schemes, individual countries adopted a number of domestic policies in an attempt to dampen volatility and support prices in coffee markets. These efforts included the formation of quasi-governmental institutions, marketing boards and *caisses de stabilisation*. Marketing boards, most commonly parastatal organizations with a legal monopsony on the purchase of coffee, completely controlled the sector and guaranteed a fixed producer price, which usually averaged the return over all producers. Marketing boards may also have a stabilization fund built in or the stabilization fund can be the unique policy instrument, whereupon the system is described as a *caisse de stabilisation*. The *caisse de stabilisation* does not trade in the commodity but determines the prices and mark-ups for all actors in the marketing chain. The division of rents usually includes a portion for the government and for a stabilization fund that is used to support producer prices in times of low prices and is financed by surplus years (EIU 1991). While marketing boards and stabilization funds were often effective in stabilizing prices, the cost in terms of depressed producer prices was found to be excessive. Evidence of this includes the almost universal rise in producer prices after market liberalization from marketing board control (Akiyama, *et al.* 2001; Dorin 2003). The inefficiency of marketing boards led them in some cases to administer producer prices that were further below the free market price by more than the amount producers would have been willing to pay to avoid risk in the free market in the first place (McIntire and Varangis 1999).

The wider context of market liberalization programs in LDCs from the 1980s onward led to a reduction in the role of government in all areas of the economy, including in commodity policy. In this context, commodity markets were restructured, inefficient marketing board practices were eliminated, high export tax formulas were revised or removed, as were consumer (domestic) price distortions (World Bank 1990). Following the collapse of the coffee ICA in 1989, however, the release of retained stocks of coffee onto the market precipitated a further dramatic and persistent fall in prices in the early 1990s. In the face of this deepening crisis, national policy initiatives initially reverted to include known measures. These included price support through the establishment of emergency funds; the restructuring of producer debts, and the provision of credit for both coffee and diversification activities. Despite these efforts, however, at the end of the last millennium, the average volatility of coffee

prices<sup>13</sup> was still among the highest of all agricultural commodities (Gilbert 2003) and by 2003, coffee prices had remained below the cost of production for most of the world's 25 million coffee producers for the third harvest in a row (TechnoServe 2003).

### *The 'New' Commodity Policy Context*

The apparent unsustainability of the ICAs, the observed inefficiency of many marketing boards and the limited success of domestic interventions in raising producer prices and reducing their exposure to volatility led commodity policy in new directions. Increasingly, in the place of traditional commodity policies, came a new generation of policy prescriptions that accepted the failure of efforts to support or increase the size of coffee returns and to stabilize its volatility. The policy focus shifted instead to market-based coping strategies for its persistent price volatility and to the distribution of existing revenues. In this emphasis on redistribution, the 'new' commodity policy is supported by a burgeoning literature from the 'value chain' perspective.

Value chain analysis has been widely applied to coffee (de Graff 1986;Fafchamps, Vargas Hill, Kaudha, and Nsibirwa 2002;Fitter and Kaplinsky 2001;Kaplinsky 2003;Losch 1999;Mendoza 1996;Pelupessy 1999;Pelupessy and van Tilburg 1994;Ponte 2002a;Ponte 2002b;Talbot 1997a;Talbot 1997b). Broadly speaking, value chain analysis concerns itself not only with a description of the input-output structure and geographical coverage along a (productive) chain, but also with the general institutional and governance context in which the chain exists (Gereffi 1994). As part of this wider analysis, value chain studies of coffee will often break down the final (retail) price of a unit of coffee into 'shares' of either income or profit, depending on the data available. Since the most readily available data pertains to income as opposed to profit (due to the sensitivity of cost data), most value chain analyses draw policy conclusions about the distribution of *income* along the chain. With few exceptions, these analyses of the coffee chain find that the farmer's share of total income generated along the chain has been falling over time.<sup>14</sup> As long as income data is used, it is not possible to empirically distinguish costs and therefore, to identify factors such as market power or changing cost structures. This is probably why value chain analyses largely rely on the correlation or coincidence of these income shares with factors such as market structure (usually in the form of concentration figures). This has led much of the value chain literature on coffee to single out the rise of large, vertically integrated multinational firms as the primary cause for the decline in producer shares of coffee income.

In addition to this preoccupation with distribution and shares of coffee rent, the new policy initiatives aim at coping with *volatility* by drawing on an existing menu of price risk management tools such as swaps, forward contracts and options on the

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<sup>13</sup> Volatility is measured in Gilbert (2003) as the standard deviation of the annual changes in the log of the deflated prices for coffee.

<sup>14</sup> This conclusion is mostly drawn from deterministic measures of income, not profit, and can be derived either over many years from data averaged across importing and exporting countries (so that what is obtained is necessarily an average distribution across many, potentially different, actors) or within a specific country, but over a shorter period of time (see, for example, Fafchamps, *et al.* (2002), Pelupessy 1999, de Graff 1986, Mendoza 1996).

futures markets. Unfortunately, price risk management tools such as futures market-based instruments can require prohibitively large volumes, entail high transaction costs and certainly require a specialized level of expertise. As such, the single most important limitation to recent commodity risk policies is the lack of organization among producers (Dehn, Gilbert, and Varangis 2003; Gilbert 2003). This is, in fact, a recurring limitation to the application of the 'new' commodity policies. In the case of price volatility strategies, this limitation is confirmed by test cases conducted by the World Bank: Technical assistance and training are cited as one of the basic prerequisites for the effective implementation of the new price risk management policies, but providing these to producer organizations can be prohibitively time consuming and costly (Varangis and Lewin 2003b).

In terms of the downward trend in coffee prices, commodity policy came to rely largely on market-based measures and interventions that aim to raise the returns to coffee through improved profitability and competitiveness (Varangis, *et al.* 2003c, p.26) or to diversify those who can no longer participate in the coffee market. Policy measures aim either to increase returns to producers through the earning of premiums (profitability) or through the reduction of production and transaction costs (competitiveness). First, the measures for adding value through premium earnings include: improving the quality of coffee to access specialty niche markets such as the gourmet and organic markets, and improving the marketing, reputation and brand management of different origins (IADB, The World Bank, and USAID 2002). The improvement of quality as a major policy initiative can also be seen in the ICO's Coffee Quality-Improvement Program, which establishes minimum quality standards for both Arabica and Robusta. In addition to improving returns, quality improvement has also been shown to stimulate domestic coffee consumption and thereby boost demand (see the example of Brazil in Varangis, *et al.* 2003c). Second, competitiveness is encouraged through policies aimed at cost reduction, primarily through productivity advances and the reduction of transaction costs through more direct trade. More direct trading relations, however, again require greater organizational development of producers in order to permit more direct access to retailers and traders. Third, in acknowledgment that some producers will not be able to achieve greater competitiveness or access higher quality/higher profitability niches of the market, a related strand of policy focuses on diversification efforts from the coffee activity. The role for government in assisting diversification strategies is here identified: market research, technical assistance, improving labor mobility and providing credit support would assist the effective implementation of diversification policy. Finally, institutional reform is recommended for the provision of 'safety nets' for poor producers and, importantly, coffee laborers (Varangis, *et al.* 2003c).

### *Commodity Policy and Fairtrade*

There are three important limiting factors to the new wave of commodity policy, particularly as it pertains to coffee. First, with respect to increasing the returns to producers through a reduction in costs (as opposed to price support) it does not provide any insight on what the scope for these gains might be. Many coffee producing countries (e.g. Brazil and Costa Rica) are already highly mechanized and/or have seen important productivity gains with agro-chemical and technology packages. It is not clear where further gains are to be had.

Second, while it learns from the failure of supply retention and price support schemes to sustainably raise the returns to coffee, the prescribed avenue of increasing farmer incomes through quality premiums relies, at least on the second order, on perfect input markets. This has been recognized in agricultural commodity policy more generally: Models for the incomplete price transmission of tariff policies and market reforms in the presence of market power have already been developed and applied to a variety of agricultural commodity markets (MacMillan, Rodrik, and Welch 2002;McCorrison 2003;McCorrison and Sheldon 1996). Its relevance to the new breed of coffee commodity policy is clear: Strategies aimed at improving the returns to coffee through quality premium earnings can address the ‘crisis’ of low incomes for producers only to the extent that price transmission is complete.<sup>15</sup> Incomplete price transmission is often the consequence of imperfect competition in the marketing chain. The issue of market power is, in fact, acknowledged in policy documents: One of the benefits of quality improvement policies is to strengthen the bargaining position of exporters and to “increase their ability to negotiate prices...” (Varangis, *et al.* 2003c, p.25). A World Bank study on linking smallholder farmers to markets identifies the potential of market power as a key characteristic of agricultural commodity markets (Bienabe, *et al.* 2004). In sum, all of the activities aimed at increasing the premiums earned on coffee production rely on efficient price transmission to producers. While this is acknowledged, (“...it is vital that promotional policies focus on the local benefits – rather than the price premium or market benefits” (Varangis, *et al.* 2003c, p.31)), the consequence for policy in markets characterized with market power are not explored or addressed in the new commodity policy context.

Third, the application of market-based price risk management strategies to dealing with price volatility depends critically on the organizational development of producers (Bienabe, *et al.* 2004;Varangis, *et al.* 2003c). This is also true for new policies aimed at raising producer returns through the reduction of transaction costs by eliminating middlemen and increasing direct dealing with retailers (Varangis, *et al.* 2003a). Producer organizations such as cooperatives have been identified as critical prerequisites for both strands of policy. One of the limitations of such policies is the cost associated with building the capacity to the high level of quality and quantity demanded by the market. It is precisely the perceived difficulty of delivering the necessary organization and capacity to producers that has proved to be a limitation to the ‘new’ commodity policies (Gilbert 2002;TechnoServe 2003;Varangis, *et al.* 2003a):

Many producer organizations often do not have the skills, capital, or dedicated personnel to take on the market oriented roles of middlemen. Although training individuals in such organizations may be helpful in terms of achieving market

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<sup>15</sup> Empirical work on price transmission has tended to refer to the transmission of variability (Hazell, Jaramillo, and Williamson 1990) and is often used to assess the success or failure of stabilization schemes (for an example, see Cardenas 1994). If the price intervention is constant, such as constant export taxes or consistent market power mark-downs, these studies would still permit perfect price transmission of price variability. So for example, Cardenas finds perfect price transmission in Costa Rica, where stabilization schemes are not in effect, but where market power may be present. For coffee, in particular, studies have found that price transmission from world to domestic (producer) prices to be low, both relative to other commodities (Mundlak and Larson 1992), and in absolute terms (Quiroz and Soto 1995).

transparency, it is often a difficult and lengthy process for them to become effective at other market intermediation roles (Varangis, *et al.* 2003a, p.27)

In fact, in a survey of the ‘new’ coffee crisis policy menu, TechnoServe discards the policy initiatives that require producer organization as too difficult to implement (TechnoServe 2003). Policy makers like the World Bank, however, have found the expertise and experience required to do so in the NGO community.<sup>16</sup> This has been particularly true of ‘Fairtrade’ organizations.

NGO experience in commodity markets has been extensive and varied. While many NGOs still actively work to revive defunct policy tools such as ICAs and price support schemes, some, including Fairtrade NGOs, engage in activities that are key to the new generation of policies aimed at managing risk, improving market access and promoting diversification from coffee (Bebbington, *et al.* 1993; Bienabe *et al.* 2004). Fairtrade organizations based in developed and developing countries alike are found to be working in the organization and strengthening of agricultural producer organizations, particularly in coffee (Oxfam 2001b; Villasenor 2000). Fairtrade grassroots support of farmers has included: Organizational and marketing capacity building for rural producer organizations, technical assistance for improving quality and developing organic capacity, agricultural diversification, gender and environment programs (Oxfam 2001b). In brief, Fairtrade organizations had already developed many of the ‘delivery vehicles’ required for the new policy tools described in this section.<sup>17</sup>

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<sup>16</sup> Varangis, P., World Bank, personal communication.

<sup>17</sup> Varangis, P. World Bank, personal communication.

#### IV. ‘Fairtrade’ and Market Failures

It was seen that the demise of international price support arrangements has led coffee commodity policy in new directions; focusing less on the support and stabilization of low and volatile prices, and more on enabling producers to increase their share of existing returns and to cope with volatility. Coffee commodity policy has increasingly turned to market oriented solutions in helping producers to cope with low and volatile coffee prices. These solutions, however, have been seen to depend on (i) an appropriate scope for efficiency improvements; (ii) the structure of the market (for pass-through of higher returns to farmers); and (iii) the availability of producer organizations to deliver the policy tools described in the section above. In these respects, the new commodity policies reflect something of the motivation and *modus operandi* of the ‘Fairtrade’ intervention in commodity markets like coffee. They also reflect a *market failures* approach to development.

##### *Market Failures in Development*

Assessing the role Fairtrade in commodity input markets is one that is rooted in the ‘information theoretic’ strand of development economics. This strand centers on the role of market failures in development, underdevelopment and policy formation. By ‘market failure’ is simply meant the failure of the market to achieve efficient allocation: There are some gains from trade that are not realized. There are many sources of market failure, including market power, increasing returns to scale, externalities, missing markets and matching and coordination problems (Milgrom and Roberts 1992). In the literature on development and market failures, Stiglitz assigns a central role to the missing or imperfect market for information as the source of most market failures (Stiglitz 1989).

Market power is one of the most important market failures cited for agricultural markets. Consolidation and increased concentration in the food industry have been carefully documented for both the U.S. (Sexton 2000) and Europe (McCorrison 2002). From early days, observations on market structure downstream from agricultural production have motivated empirical and theoretical attention to the issue of market power in agriculture (Hoffman 1940; Nicholls 1941). In addition to market structure concerns, Sexton and Rogers argue forcefully that several typical characteristics of raw agricultural commodity markets should make the analysis of imperfect competition in these markets routine. These characteristics include the bulky and perishable nature of agricultural products, producers’ geographic immobility, and the sunk cost aspect of specialized crops (Rogers and Sexton 1994, p.1143). This is not to say that market power should be presumed in these markets. Rather, the point made by Sexton and Rogers is that policy for and analyses of agricultural markets must establish something about competition: In brief, that “imperfect competition matters to agricultural economists” (McCorrison 2002). Notably, imperfect competition consistently figures in any discussion of the crisis facing coffee producers.

In examining the role, if any, of Fairtrade in overcoming market failures in commodity trade, the analysis identifies and rests on the two central tenets of an information theoretic approach to development policy: First, market imperfections naturally give rise to a variety of interventions; and second, these interventions must be based on an accurate understanding of the underlying cause of the problem in order

to be effective (Hoff, Braverman, and Stiglitz 1993). As a result, the empirical analysis of Section VII attempts to detect the presence of market failures that are blamed for low producer returns (e.g. market power) and identify any role of Fairtrade in overcoming these and other market factors that limit the returns to producers in agricultural commodity markets (e.g. inefficiency).

#### *Measuring Market Power as a Market Failure*

Market power is defined as deviations from marginal cost pricing. Since Bain's seminal work on market structure, conduct and performance (SCP) (Bain 1951), empirical work concerning market power and imperfect competition has commanded much attention in the industrial organization literature. In the SCP paradigm, the measurement of market power was linked to the structure of the particular market and some measure of performance in that market. The SCP paradigm was criticized on a number of fronts, but most importantly by Demsetz (1974). Demsetz asked whether industries become concentrated because of efficiency advantages of some firms over others: Higher profitability margins (however unreliably these are measured) may therefore be due to lower costs, rather than marked up prices. New modeling efforts arose in response to this and other critiques of the SCP paradigm. There was a move away from establishing concentration as the determinant of market power and towards structural efforts at accurately measuring market power itself. These efforts became known as the new empirical industrial organization (NEIO) literature.

In its recognition that price-cost margins are not often observable from accounting data, the NEIO instead estimates behavioral equations with parameters intended to reveal industry conduct. From early days, most of the theoretical and empirical NEIO work focused on output markets (Appelbaum 1982; Braverman and Gausch 1986; Bresnahan 1981; Bresnahan 1982; McCorriston 1993; Sumner 1981). The extension to input markets was largely due to the work of agricultural economists (Azzam 1997; Durham and Sexton 1992; Hyde and Perloff 1994; Just and Chern 1980; Lopez, *et al.* 1993; Wann and Sexton 1992). In simplest terms, the theoretical underpinnings of the structural NEIO models draw on oligopoly/monopoly theory to estimate a parameter whose value reveals if the firm or industry is exhibiting market power. The parameter is estimated from the first order condition of the profit function. Consider total revenue (TR)

$$TR = P \times Q$$

then,

$$MR = \frac{\partial TR}{\partial Q} = P + \underbrace{\frac{\partial P}{\partial Q} Q}_{h(.)} \quad (1)$$

Clearly, if the firm is perfectly competitive,  $\frac{\partial P}{\partial Q}$  is equal to zero. If it is allowed that the seller may have some market power, equation (1) may be more generally written as perceived marginal revenue ( $MR_p$ ):

$$MR_p = P + \lambda h(.) \quad (2)$$

where  $h(\cdot)$  includes all the demand side parameters and exogenous variables that might affect marginal revenue (Bresnahan 1982) and  $\lambda$  is a new parameter indexing the degree of market power. At equilibrium, the profit maximizing firm equates (perceived) marginal revenue with marginal cost ( $c'(\cdot)$ ):

$$P + \lambda h(\cdot) = c'(\cdot)$$

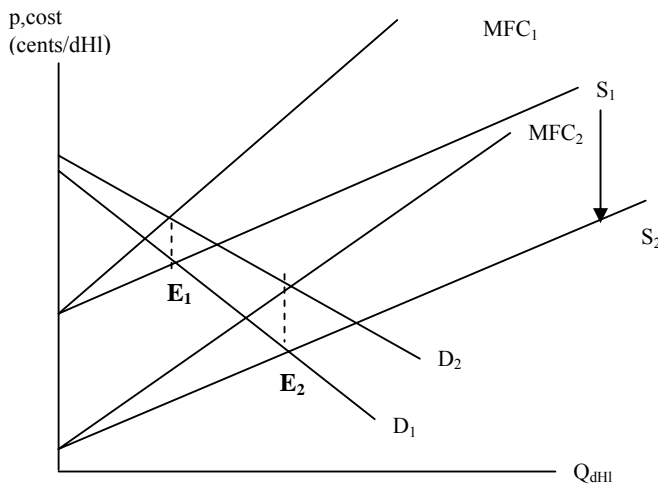
$$P = c'(\cdot) - \lambda h(\cdot) \quad (3)$$

The parameter  $\lambda$  is obtained by jointly estimating an equation like (2) with the competitively determined demand equation for the firm's output. Both the demand function and the supply relation underlying the cost function in (3) must assume a specified functional form, whence the use of 'structural' in describing NEIO models.

While this section does not pretend to summarize the vast NEIO literature, it can serve to flag for the analysis critical issues in identifying market power. Consider the market power parameter  $\lambda$  in (3) as an industry average conduct parameter (although it can be made firm specific to facilitate price leadership models, etc.). In its general form of (3), if  $\lambda = 0$ , this implies perfect competition, and if it were equal to 1, it would indicate monopoly. This intuitive understanding of the NEIO approach is incomplete without an identification procedure for  $\lambda$ . Econometrically, in a simultaneous set of supply and demand equations, this is the problem of rendering  $\lambda$  separately estimable. *Economically*, this is the problem of distinguishing between market power and efficiency.

An excellent algebraic exposition of the identification problem can be found in Bresnahan (1982), but a visual intuition can be had from Figure 2 below. In particular, the figure illustrates the difficulty in observationally distinguishing between an equilibrium with a perfectly competitive, but less efficient firm from an equilibrium characterized by a more efficient but *imperfectly* competitive firm. Figure 2 is a monopsony adaptation of Bresnahan (1982).

**Figure 2 The Difficulty in Distinguishing Between Market Power and Efficiency**





Suppose that perfectly competitive firms and a monopsonistic firm had different linear<sup>18</sup> demand ( $D_1$  for the less efficient firm and  $D_2$  for the more efficient firm) and supply curves positioned such that the same set of price and quantity ( $E_1$ ) could be a result of monopsony or perfect competition. If supply were to shift outward ( $S_1$  to  $S_2$ ), and the equilibrium were to move from  $E_1$  to  $E_2$ , the two structures would still be observationally equivalent. Figure 2 illustrates the central difficulty in all empirical attempts to measure market power when marginal cost is not directly observable. The NEIO literature therefore measures market power through the econometric identification of the  $\lambda$  parameter.<sup>19</sup>

NEIO models have been applied to both monopoly and monopsony (Azzam and Pagoulatos 1990; Azzam and Schroeter 1991a; Durham, *et al.* 1992; Just, *et al.* 1980). They have been extensively refined to include dynamic theories of noncooperative behavior (Green and Porter 1984; Rotemberg and Saloner 1986); to test for both input and output market power simultaneously (Atkinson and Kerkvliet 1989; Azzam, *et al.* 1990; Schroeter 1988); and at estimating market power in multiple markets (Hyde and Perloff 1998; Raper, Love, and Shumway 2000), thereby permitting the detection of market structures like cooperative bilateral monopoly (Raper, *et al.* 2000). Finally, structural models have also been developed for industries that deviate from the perfectly competitive framework by permitting differentiated products (Allen 1998) and output price uncertainty (Azzam and Schroeter 1991b). In contrast to the extensive refinement of NEIO market power measurement, empirical work on the *determinants* of market power has received less attention in the NEIO literature. This was identified early on as an important field of further research: "...although the NEIO has had a great deal to say about measuring market power, it has had very little, as yet, to say about the causes of market power" (Bresnahan 1989, pp.1053-1054).

NEIO studies that do examine the determinants of market power typically estimate values for the market power parameter and then use their estimates as the dependent variable in a regression model. In much of this work the 'causes' of market power are often linked back to market structure, either explicitly through the inclusion of market structure variables as independent variables (Gallet 1996; Luo 2002) or implicitly by examining market power in input and output markets simultaneously. A few studies, however, do conduct a wider investigation (Buschena and Perloff 1991; Lopez, *et al.* 1993). In a study of monopsony market power for Haiti, for example, Lopez and You specify the growers' supply curve and the demand curves for domestic and export markets and estimate a single term,  $\lambda$ , for each year. This parameter serves as a dependent variable that is then regressed on exogenous variables that include institutional policy factors, coffee ICAs, the number and size of exporters and general state-of-the-nation variables. Interestingly, they found that concentration ratios and association formation did not effect the NEIO market power measures, whereas effective periods of ICA quota (that is, those periods where the quota was binding)

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<sup>18</sup> The exposition holds even if demand/supply curves are not linear; Lau derives the extensive demand and cost conditions under which  $\lambda$  is identified (Lau 1981).

<sup>19</sup> For monopoly, the use of a supply side exogenous variable that interacts with price (the slope of the supply curve) as well as entering into the estimated equation on its own (as a shifter) makes the  $\lambda$  parameter identifiable and estimable (Bresnahan 1982).

did appear to lead to greater collusion among exporters, resulting in lower producer prices.

Each of the NEIO models described assumes a functional form for demand and cost curves and derives the various tests for market power ( $\lambda$ ) based on first order profit maximizing conditions. The reliance of all these studies on the functional forms they assume provide the main thrust of criticism of the structural NEIO models, as the results have often been found to be sensitive to the functional form assumed ( Bulow and Pfleiderer 1983, Herrmann and Sexton 1999, Hyde, *et al.* 1994, Tyagi 1999). Arguably, the functional form critique can be attenuated by adopting flexible functional forms (for an example, see Bettendorf and Verboven 2000) or by modeling the demand and cost relationship more carefully. Nevertheless, the consequences of any misspecification, no matter how carefully minimized, have been found to be significant. Varian characterizes the problem as one of a joint hypothesis: “whatever one wants to test plus the maintained hypothesis of functional form” (Varian 1983, p.99).<sup>20</sup>

While efforts at avoiding functional form specification have been extensively developed (Afriat 1972, Driscoll, Kambhampaty, and Purcell 1997; Hall 1988; Hanoch and Rothschild 1972; Hyde, *et al.*; Roeger 1994; Varian 1984; Varian 1985), in non-structural and nonparametric models, these models also suffer from the identification problem illustrated in the NEIO discussion of Figure 2. Broadly speaking, non-structural models (Hall 1988; Hyde, *et al.* 1994; Roeger 1995) estimate a parameter that measures the mark up of monopoly price over marginal cost. These parameters are estimated from any deviation between the observed growth in (normalized) output and the expected growth, given the observed growth in (normalized) labor input. In contrast, based on its use in production theory (Afriat 1972; Hanoch and Rothschild 1972; Varian 1985), nonparametric tests for market power use the comparative statics of different observations within a revealed preferences framework. By relying on the evaluation of differences between observations, the non-structural analyses must somehow control for any other changes (besides those which would identify market power) between observations. Using Monte Carlo experiments, nonparametric models were tested for their ability to correctly detect the presence of market power. Unsurprisingly, only those models that control for structural shifts, explicitly include costs and permit technical change, were found to correctly identify market power. Unfortunately, even when this class of models is compared to structural models for market power, they are found to be “more prone to misspecification of market power direction and are not as accurate at detecting market power magnitude as their parametric counterparts (Raper, *et al.* 2000, p.2273).

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<sup>20</sup> Concerns have also been raised over possible misspecification when non-competitive behaviour is specified for only one side of the market (Azzam and Pagoulatos 1990). In Monte Carlo simulations, one-sided NEIO models were recently found to correctly estimate no market power on the side of the market they analyse, even when imperfect competition occurs on the other side (incorrectly assumed to be competitive) (Raper *et.al.* 2000). In other words, one-sided models may miss the boat by restricting imperfect competition to one side of the market, but the misspecification does not affect market power parameter estimated. In fact, Raper *et. al.* have found that nonparametric models are more prone to this source of misspecification than their structural counterparts in the NEIO (see below) (Raper and Noelke 2004).

The empirical measurement of market power is the subject of a vast literature and much intellectual effort, yet it highlights the difficulties inherent in measuring market failures. It is unsurprising, therefore, that the information theoretic approach to development, centered as it is on market failures, has more extensive theoretical treatments than empirical studies. Nevertheless, empirical examples cited in the literature consistently indicate that development policies ostensibly aimed at correcting for failures in the market must be carefully aimed at the specific market failure. This, in turn, calls for an identification of the failure, which is not always empirically straightforward. Nevertheless, given the recent thrust of commodity policy and the growing importance of Fairtrade as a development intervention in commodity markets, some empirical quantification of the market factors claimed to limit producer returns is called for in an assessment of Fairtrade as a development tool.

## V. Fairtrade and Costa Rican Coffee: An Empirical Case Study

### *Costa Rica as a case study*

There are three reasons for choosing Costa Rica as a case study for the assessment of Fairtrade intervention in agricultural commodity markets. First, at the time of case study selection (1999) Costa Rica was one of the few countries in which Fairtrade intervention had been present in a systematic way for a relatively substantial period of time. Although Fairtrade had engaged in sporadic projects and interventions in Latin America since the late 1960s, Costa Rica was one of the first countries to enjoy a concerted Fairtrade intervention effort from at least 1989 onwards.

Second, Costa Rica has enjoyed a long history of political stability since the conclusion of its 40-day civil war in 1948. This makes a time series analysis ‘cleaner’ in terms of noise within the observations.

Third, Costa Rica introduced legislation (Law 2762) with the explicit intention of protecting the coffee farmer from potentially ‘exploitative’ practices related to market power. Furthermore, Costa Rica’s institutions and regulations are widely considered to be healthy, with strategies and programs for the sector that are relatively clear and strong (Varangis, et al. 2003c). If evidence is found that there is a ‘Fairtrade effect’ in Costa Rica, where the regulatory framework exists to overcome market power and market policies are generally considered favorable for producers, then the analysis becomes informative for intervention in countries where social and farmer protection is non-existent, or at least not up to the levels of Costa Rica.

### *Coffee in Costa Rica*

Costa Rica is known for its high quality Arabica coffee and usually enjoys positive quality differentials on top of the New York ‘C’ futures price. Historically, coffee in Costa Rica has been very important, both in terms of GDP and in the wider development of the country. It was the sole export between 1840 and 1890 and funded everything from schools to roads since the Costa Rican declaration of independence in 1848 (EIU 1998). In the 1980s and first half of the 1990s, coffee accounted for an average of 20% of exports and five percent of GDP (ICO 1997). By the dawn of the new millennium, coffee’s share in export revenue had fallen to five percent, some 1.3% of GDP (Varangis, et. al. 2003c). This limited macro significance, however,

believes the important sectoral and rural impact of coffee: Small producers have always constituted the vast majority of coffee producers in Costa Rica. In 2000, 92% of coffee farmers had fewer than 5 ha of land, producing 45% of the nation's coffee. The average farm size in Costa Rica is small: 1.4 ha (ECLAC 2001). Even as banana replaced coffee as Costa Rica's primary export earner in the 1980s, coffee remains the most important sector for employment in agriculture (EIU 1998). In 2000, even after coffee production had fallen due to the prolonged crisis of the 1990s, 28% of the rural labor force was still employed in coffee (Varangis, et al. 2003c).

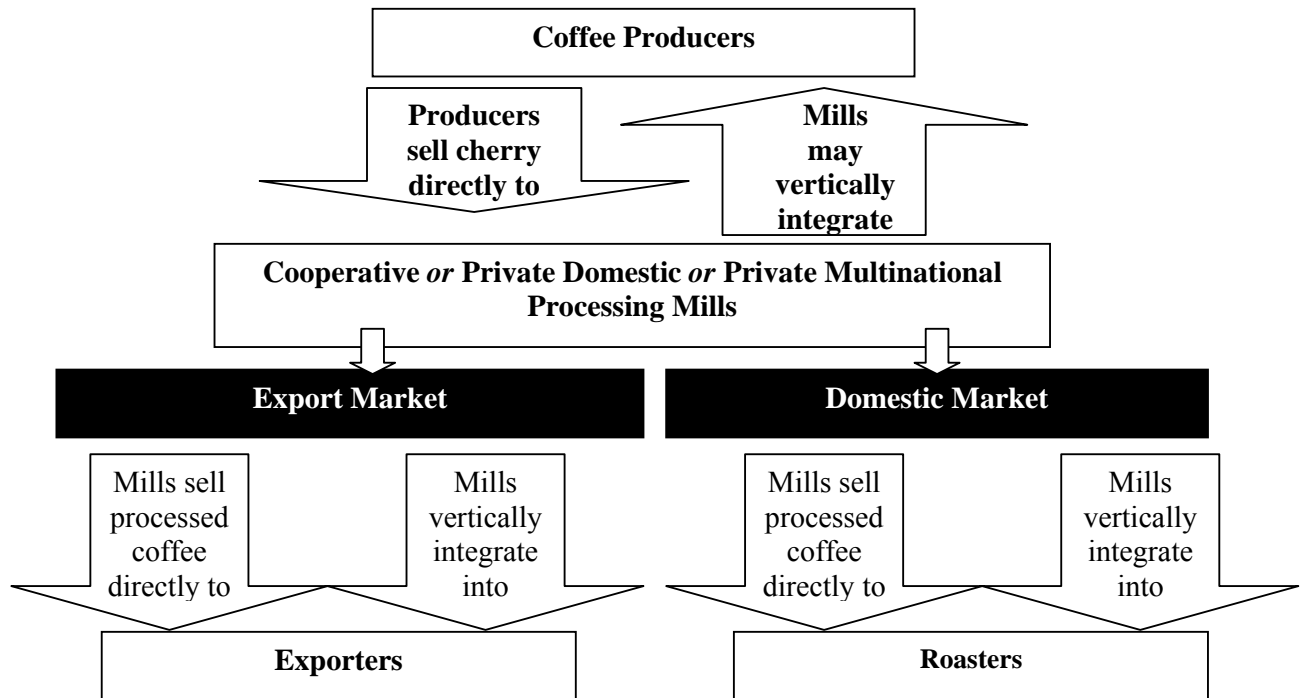
Since the early 1980s, Costa Rica has among the highest yields in the world due to the use of a 'technological package' including dwarf trees and intensive use of agrochemicals. It also, however, has the highest costs of production in Central America (Varangis, et al. 2003c), owing in part to its highly technical source of productivity, and partly to high costs of labor in socially protective Costa Rica. The capital-intensive primary processing sector in Costa Rica is organized into modern wet processing mills that further contribute to the consistency in quality of Costa Rican coffee.

Law 2762 regulates the production and sale of coffee in Costa Rica. The law is executed by the research and regulatory body, Icafé (*Instituto de Café de Costa Rica*). Icafé is officially independent from the government, but does receive revenue support from the government and collects income tax on coffee for the Ministry of Revenue. For the purposes of agricultural research, Icafé classifies coffee within Costa Rica according to a mix of geographic, altitudinal and quality criteria. This results in seven Icafé grades of bean: Low Grown Atlantic (LGA), High Grown Atlantic (HGA), Hard Bean (HB), Medium Hard Bean (MHB), Good Hard Bean (GHB), Pacific (P) and Strictly Hard Bean (SHB). Given the quality of Costa Rican coffee, the international market assigns each grade to one of two types (or 'origins') of beans from Costa Rica: HB and SHB. The various bean grades are grown across the country, in one of nine coffee growing regions (see Figure 4 below).

Coffee cherries are sold as fruit in volume units of double hectoliters (dHL). Mills process cherries into kilograms of 'green coffee'. It is largely green coffee which is exported to be roasted and packaged in importing countries. By law in Costa Rica, producers must sell their coffee cherries to an Icafé-registered processing mill within 24 hours of harvesting. This reinforces the geographic segmentation of the Costa Rican market in transportationally challenged areas outside the Central Valley. The 100 or so active mills across the country can, in turn, only buy cherries from farmers (as opposed to buying from middlemen), or they may produce part of their harvest on their own plantations.

The vast majority of mills employ a wet processing system in a sophisticated industrial plant with maximum processing capacities per harvest ranging from 15 000 to 350 000 dHL of coffee cherries. The mills may be domestically owned, form part of a multinational firm or may be cooperatively owned by farmers. At the time of the case study, there are roughly 50 exporters in Costa Rica, many of which are vertically integrated with the mills (see Figure 3). There are some 30 roasters who produce predominantly for the domestic market. Costa Rican exports of roasted coffee are well below one percent of its green coffee exports.

**Figure 3 Coffee Marketing Chain in Costa Rica**



Law 2762 regulates the selling process: Farmers are asked to produce their identity papers with every deposit of cherries at a mill and they must receive a receipt for it. In this way, there is a record of all coffee sold to a mill. After processing the cherries, mills must then register all sales contracts for green coffee, whether for export or domestic sale, with Icafé. They must register the sale of coffee even if the mill is also the exporter or roaster. The quantities from the registered sales contracts can then, if necessary, be verified by the recorded (receipted) quantity of coffee sold by farmers to mills. In theory, this verification can control for mills trying to sell coffee that was purchased ‘under the table’ from (illegal) middlemen. According to Law 2762, mills should also provide agricultural input services such as limited credit and/or input acquisition facilities to all producers, although in practice, this only occurs for large producers.

Several factors contribute to a competition for volume of cherries among mills in the Costa Rican coffee market, so that at first glance, the reasons for hypothesizing imperfect competition at the farm-gate in Costa Rica are not apparent. First, in the general context of an international market characterized by a move towards last minute production by roasters requiring large and ready volumes of coffee, mills and exporters in Costa Rica, as elsewhere, benefit from size. Second, by centralizing the processing of coffee off-farm, mill processing in Costa Rica takes place in industrial plants that clearly have a cost-minimizing efficiency point of production. In actual fact, a recent study identifies that most processing mills in Costa Rica are operating on the increasing returns to scale (IRS) portion of their long run average cost curves (Mosheim 2002). This simply supports the oft-made observation that Costa Rica has an over-capacity in coffee processing. Finally, in the years with binding ICA quotas, Icafé allocated Costa Rica’s quota to mills according to the average size of the last two harvests, providing further incentive to compete for volume of coffee cherries.

A number of key factors limit the benefits of mill competition for farmers. First, the use of modern mills with minimum volume requirements implies that some regions of the country may only be able to support a limited number of mills (natural monopsony). These regions, if outside the Central Valley, may also be geographically segregated markets due to poor transportation infrastructure, thereby further limiting the competition for coffee cherries that might otherwise take place if mills (or farmers) were to travel. Second, competing for coffee cherry output requires a high liquidity, since payments in advance of the harvest must be made to producers in order to secure volumes. Historically, this has been a problem for cooperatives, whose social activities limit their available capital. The liquidity issue was exacerbated for mills more generally with an end to special arrangements with the banks for financing the coffee sector in the 1980s. The liquidity constraint on the advance payment system clearly has implications for competition: More liquid firms can secure volume, not by bidding up the price, but by advancing higher portions of the final price. On the one hand, this may amount to a desirable provision of credit for farmers. On the other hand, interview evidence and independent studies of the Costa Rican coffee market (Garro 2000; Hazell 2000) concur that large advances are taken by farmers to imply higher final prices. This expectation of higher prices based on higher advances, however, does not always materialize.

In addition to the technological and financial factors that may potentially limit competition in the market for coffee cherries, the geography and infrastructure of the country also play a role. Some 44% of the national coffee growing area is in the hands of smallholder farmers: 92% of producers have coffee farms under five hectares in size whilst the two percent that have farms of more than 20 hectares account for 35% of the coffee growing area (ICO 1997). These large farms are almost all located in and around the Central Valley (Ardon 1980), leaving the more remote regions of the country's coffee growing to smallholders. This is potentially problematic due to the limited access to transportation available to these regions. In 1995, only 17% of roads in Costa Rica were paved and the national number of cars per 1000 households (urban and rural) was 114.<sup>21</sup> On the other hand, it should be noted that coffee grown in the Central Valley does benefit from the infrastructure centered on the nation's capital, which is located there; almost 50% of the nation's coffee is grown in the Central Valley, including the high altitude Los Santos regions (see Figure 4).

#### *Producer prices in Costa Rica*

In addition to regulating the roles of different actors in the coffee market, Icafé also undertakes the annual calculation of farm-gate prices. Farm-gate prices refer to the price that each mill must pay farmers for every unit of coffee cherry purchased. As mentioned, the pricing policy of Icafé, as stipulated in Law 2762 came about in response to concern over potential market power abuse by mills.<sup>22</sup> While recognizing that Costa Rican processors/exporters are perfectly competitive in the output market (that is, they are price takers in the international coffee market), the fear was that input prices for cherries were being paid below their value marginal product at a monopsonistic price. Icafé therefore regulates the marketing margin of processed green coffee to ensure an input price for farmers exactly equal to their value of

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<sup>21</sup> World Bank Development Indicators (WDI Online), 2006.

<sup>22</sup> Jimenez, A. University of Costa Rica, personal communication.

marginal product. They do this by calculating the average processing costs (APC) for different sized mills in different locations. Mills may deduct only these (non-cherry costs) from their output contract prices. By assuming that all mills are operating at the minimum of their long run average cost curves (where APC is equal to marginal processing costs—see next section), Icafé attempts to ensure that mills earn strictly normal economic profit.

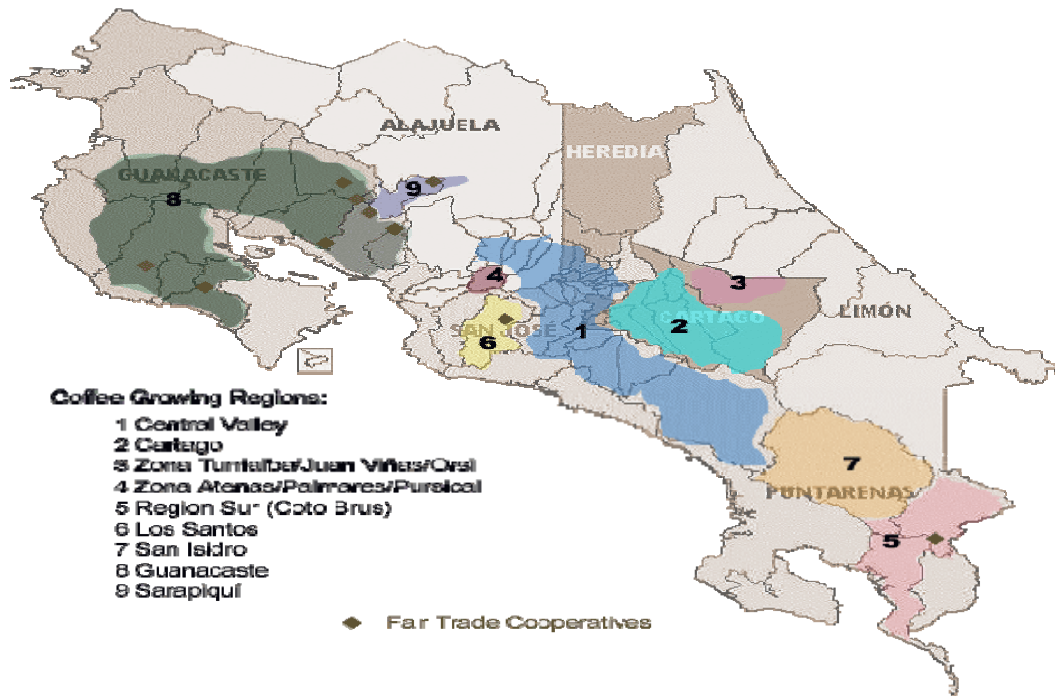
The farm-gate prices thus calculated are then published in the leading national newspaper, *La Nación*. These are the minimum farm-gate prices that must be paid within two weeks of their publication. As explained, mills will have already paid a portion of this price in a first, and possibly, second installment on the promise of paying a final installment to the level of the published price (and not necessarily the price promised to producers at the beginning of the harvest). Public knowledge of these prices tends to ensure their payment.

### *Fairtrade in Costa Rica*

Fairtrade intervention in Costa Rica takes place through nine cooperatively owned mills in three geographically distinct regions of the country. As Figure 4 shows, Fairtrade intervention is concentrated in and around the marginal region of Guanacaste, where seven of the cooperatives are located. One cooperative is located in the far south of the country and the remaining cooperative is the only one to be located near the infrastructurally blessed Central Valley, where almost 50% of the nation's coffee is grown.

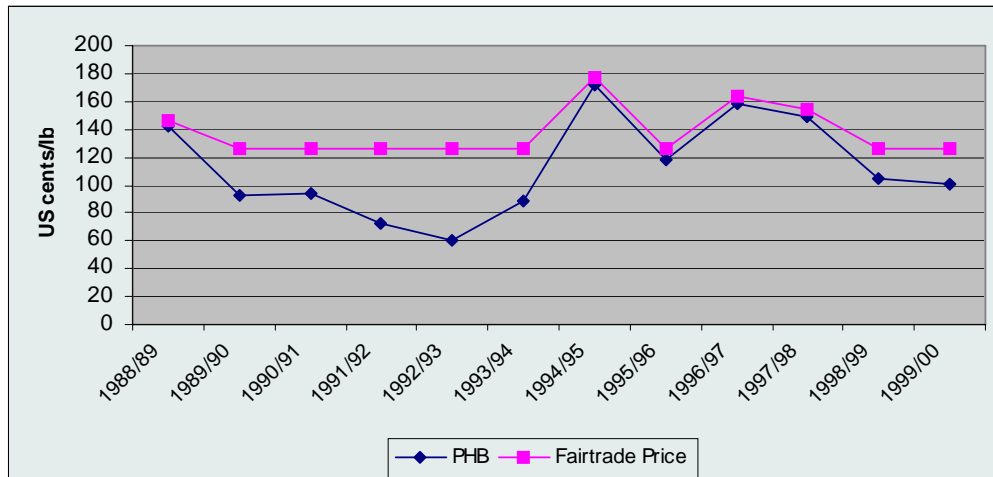
The story of Fair Trade in Costa Rica began with coffee as a partnership between the Fairtrade organization, S.O.S. Werelhandel, and the tiny cooperative CERRO AZUL. Today, the Costa Rican coffee Fairtrade partnership has expanded to include eight other cooperatives besides CERRO AZUL, forming a secondary level, service-rendering exporting association, Coocafé (El Consorcio de Cooperativas de Caficultores de Guanacaste y Montes de Oro R.L). There are therefore two levels of producer organizations on the Fairtrade coffee scene in Costa Rica: Coocafé as a consortium and the nine primary level cooperatives that own and control it. The nine cooperatives are small, collectively accounting for 2.5% of Costa Rica's national output in coffee.

Figure 4 Fairtrade and Coffee in Costa Rica



For almost half of the period of Fairtrade intervention in Costa Rica (1989-2000), the world price rose above the minimum Fairtrade price of US\$1.26/lb, so that the Fairtrade price was only US \$0.05/lb over the prevailing market price.

Figure 5 Fairtrade and World Price for Costa Rican HB (PHB) 1989-2000



Source: author's own work

The low prices of the early 1990s mean that Coocafé has owed a considerable portion of its revenues to the Fairtrade market. Although data is not available for the full 11



years of Coocafé's activity, cross-referenced data for seven harvests from 1993-2000 confirm that an average, in volume, of 50% of Coocafé's coffee was exported to Fairtrade markets. These figures are higher in value terms. In 1997-98, for example, Fairtrade exports amounted to some 67% of their green coffee export revenue.

**Table 2 Proportions of Coocafé Exports to Fairtrade and Conventional Markets**

Harvest Year	Fairtrade	Conventional
1993-94	55%	45%
1994/95	57%	43%
1995/96	52%	48%
1996/97	48%	52%
1997/98	49%	51%
1998/99	58%	42%
1999/2000	29%	71%

*Source: Coocafé, author's own work*

The difference between the Fairtrade and world price earned on a portion of the cooperatives' combined harvest is divided equitably among the nine cooperatives: Half of the coffee destined for Fairtrade markets is divided into nine identical 'solidarity quotas'. In addition to their solidarity quota, the remaining half of the volume exported to the Fairtrade market is distributed to the cooperatives in ratios based on their average volume of production of the last three harvests. Exactly 30% of Fairtrade premiums go to a capitalization fund from which the cooperatives can borrow, and the remaining 70% goes to the Producers' Fund. Over the ten years of operation between 1989 and 1999, the producer's fund has distributed over US\$1.25 million of Fairtrade green coffee export revenues to some 4 000 affiliated small coffee producers and their families (Ronchi 2002a).

As with all Fairtrade interventions, the impact of Fairtrade on Coocafé and its nine cooperatives can be divided between the price effect (of Fairtrade premiums) and the impact due to its capacity building activities and producer support (Ronchi 2002a; Ronchi 2002b). Perhaps the most important impact of non-price Fairtrade producer support is the development and establishment of Coocafé's own export arm. It was seen that commodity policy is increasingly concerned with facilitating more direct trading relations for coffee producers. Exporting to the conventional market, however, requires consistency in quality, efficiency, market access and professional trading capacity within a producer organization. Through extensive training and capacity support with the UK-based Fairtrade NGO, Twin, Coocafé achieved independence in 1997 from the Costa Rican exporters it had hitherto relied upon.

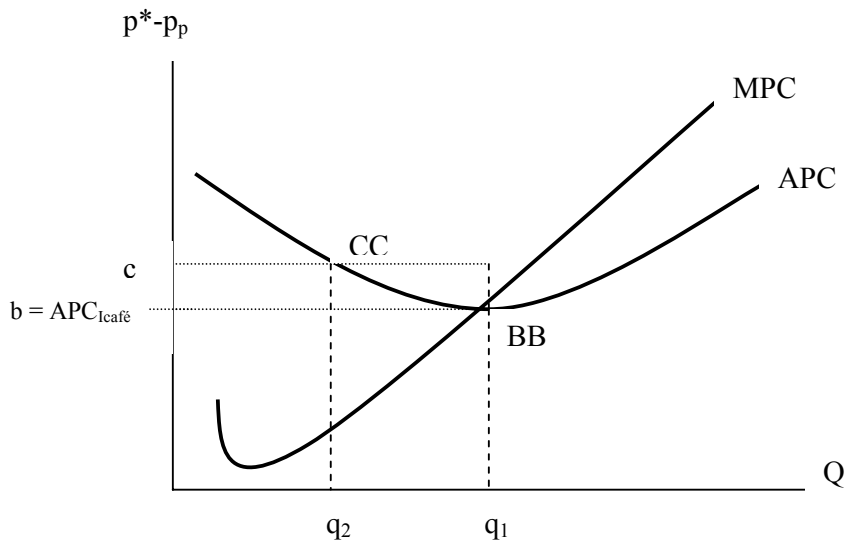
## **VI. The Model**

Fairtrade intervention in commodity markets takes the form of capacity-building for producer cooperatives and 'fair price' contracts for the commodity. From an information theoretic approach to development, successful intervention must be targeted to specific market failures. At the microeconomic level, the Fairtrade movement claims that factors such as market power and weakness or inefficiency in producer organizations contribute to low producer prices and poverty. This section outlines the model that will be used to test for the presence of the market factors used to justify Fairtrade intervention in the Costa Rican coffee market. The model provides three testable hypotheses that are then econometrically tested in the following section.

*Icafé, mill marketing margins and producer prices*

In its supervision of the coffee market in Costa Rica, Icafé recognizes that Costa Rican processors/exporters are perfectly competitive in the output market (that is, they are price takers in the international coffee market) but embodies a concern that input prices for cherries can be paid below their value marginal product at a monopsonistic price. Icafé therefore regulates the marketing margin (the difference between the price received by mills/exporters and that received by farmers) of processed green coffee to ensure an input price for farmers exactly equal to their value of marginal product, ensuring that mills earn only a normal economic profit. Figure 6 heuristically illustrates the Icafé approach.

**Figure 6 Mill Processing Cost Curves and Margins**



$APC_{Icafé}$  represents the total marginal processing (i.e. non-cherry) cost at the mill's cost-minimizing point of its long run average processing cost curve. Icafé explicitly assumes that all mills have had the opportunity to adjust all inputs, including their level of fixed capital (the mill itself), and calculates the costs of different sized mills<sup>23</sup> at the minimum point<sup>24</sup> of their (long run) average processing cost curve. The variable  $p^*$  is the perfectly competitive international benchmark price for green coffee from Costa Rica. The variable  $p_p$  is the producer price paid by the mill to the farmer for coffee cherry. The expository framework of Figure 6 closely follows the approach of Stiegert et. al. in their NEIO study of the US beef packing industry (Stiegert, Azzam, and Brorsen 1993). In that study, the authors assume a fixed proportional relation between the agricultural input and processed output and illustrate their

<sup>23</sup> In calculating processing costs, Icafé does not assume that all mills have the same long run average cost curves, but that each mill is at MES of its respective cost curve.

<sup>24</sup> Icafé is explicit about calculating  $APC_{Icafé}$  at the MES point, in order for the cost study to serve as an efficiency guide for mills (Torres 1978; Torres 1982; Torres 1983) and to ensure that mills are operating in such a way as to guarantee that farmers are receiving their value marginal product (VMP). This is why  $APC_{Icafé}$  is often referred to as 'minimum costs' in their literature (Icafé 1991; Icafé 1976; Icafé 1977; Icafé 1978; Icafé 1980; Icafé 1983; Icafé 1984; Icafé 1985; Icafé 1986; Icafé 1987; Icafé 1988; Icafé 1990).

argument by graphing the ‘marketing margin’ of processing firms.<sup>25</sup> The difference between the green coffee output price and cherry input (producer) price is the marketing margin ( $p^* - p_p$ ), which is measured on the y-axis. Quantity of cherries is measured on the x-axis. The long run marginal processing cost (MPC) and average processing cost (APC) curves in Figure 6 refer to all processing costs from farm-gate to port, exclusive of the cost of cherries.

For as long as the mill is operating at its cost-minimizing level (BB at quantity of cherries,  $q_1$ ), the long run APC calculated by Icafé ( $APC_{Icafé}$ ) is also the mill’s long run MPC. As such, at point BB, the marketing margin,  $b$ , is exactly equivalent to the minimum average processing cost,  $APC_{Icafé}$ , and more importantly at that point, to the MPC. Since point BB is at a point of constant returns to scale (CRS), at point BB, Icafé can be sure *that deducting minimum long run average processing costs results in farmers receiving no less than the value of marginal product (VMP)*:<sup>26</sup>

$$p^* = MPC + VMP$$

$$\Rightarrow p^* - MPC (=APC_{Icafé}) = VMP$$

Consequently, Icafé only permits the deduction of  $APC_{Icafé}$  from the output price, received by a mill for their coffee. Mill/exporters cannot avoid this as it is done for them by Icafé: It is always the fixed, mill-specific  $APC_{Icafé}$  that is deducted from contract prices,  $p^*$ .

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<sup>25</sup> The specific analysis of Stiegert *et. al.* relies on the assumption of a fixed proportional relation. While this is not an unreasonable assumption (it is commonly used in agricultural price analysis, although it is true that for those processed products with a high degree of substitutability between the farm and the marketing inputs, this assumption may not hold (Tomek and Robinson 1990). This is not the case for coffee: The farm input is the coffee cherry and the ‘marketing’ input is the milling process. Green coffee, the processed output, is essentially a de-pulped cherry. There are two beans to a cherry. No conceivable variation of a processing input could ever extract more than two beans from one cherry. Robinson and Tomek suggest that increasing labour as a marketing input may reduce wastage and introduce some degree of substitutability in some agricultural products, but there is very little scope for substitutability in Costa Rica’s sophisticated and highly mechanised milling process. There is, moreover, some evidence to support this argument: If there were an important degree of substitutability between the marketing (processing) input and coffee cherries, then we would expect to see a higher conversion ratio of coffee cherries to green beans in years of high prices. In fact, the correlation coefficient between the conversion factor of cherries to green coffee and world price for the period 1974-2000 is statistically insignificant, despite historic price peaks for coffee during this period.), it is not central to the analysis here (see footnote 26).

<sup>26</sup>This can be seen to hold simply through Euler’s Theorem. Euler’s Theorem states that if a function is homogeneous of degree 1 (e.g. at the point of constant returns to scale in a production function), then we can express it as the sum of its arguments weighted by their first partial derivatives (CEPA 2004). In economics, the marginal productivity theory of distribution states that each factor of production is paid their marginal wage. If the assumption of CRS holds, then Euler’s Theorem implies that the total marginal cost of the factors of production exactly exhaust the output price. That is, that cherry inputs are paid their VMP at BB. In their discussion of market power, Steigert *et. al.* rely, rather, on the assumption of fixed proportions (presumably in the ratio prevailing at CRS) to indicate deviations from marginal cost pricing at any point along the long run average processing cost curve. The central propositions of the theoretical and empirical measure here described do not rely on the fixed proportions assumption; this was adopted only for the convenient expository framework offered by Figure 6. Nothing more than Euler’s theorem is evoked to develop the market power and mark-down analysis in the paper.

Icafé, however, does not necessarily have  $p^*$ , the true output price received by mills for their coffee. Rather, they have the contract price *reported* by the mill/exporter,  $p_R^*$ . As explained in the previous section, mills must register their output sales contracts with Icafé. The price reported on these contracts is  $p_R^*$ . The mill-specific  $APC_{Icafé}$  is deducted from reported contract prices, to yield the mandatory producer prices published by Icafé. That is:

$$p_R^* - APC_{Icafé} \equiv p_p$$

Rearranging,

$$p_R^* \equiv APC_{Icafé} + p_p \quad (4)^{27}$$

If the mill reports the true output price, then

$$p^* - p_R^* = 0 \quad (5)$$

If, however,

$$p^* - p_R^* > 0 \quad (6)$$

and  $APC_{Icafé}$  is constant, then for the same  $p^*$ , clearly the producer price that results from (6) is less than that which results from (5). Formally,

*Proposition 1:  $(p^* - p_R^*) > 0$  measures the margin that a mill/exporter has earned above its minimum long run average processing costs,  $APC_{Icafé}$ .*

Proof

$$p^* - p_R^* > 0 \quad (6)$$

Substituting (4), this becomes

$$p^* - APC_{Icafé} - p_p > 0$$

this can be rewritten as

$$p^* - p_p > APC_{Icafé}$$

and the mill/exporter has extracted a marketing margin greater than the minimum of their long run average processing cost.  $\square$

This establishes that the measure  $(p^* - p_R^*) > 0$  is a measure of mill/exporter marketing margins greater than  $APC_{Icafé}$ . This is the first important result and links the intuitive exposition of Figure 6 to the empirical measure  $(p^* - p_R^*)$  used in the next section.

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<sup>27</sup> For a detailed exposition on the identity  $p_R^* \equiv APC_{Icafé} + p_p$ , see the data description of Icafé producer price calculations in Ronchi (2005).

It is always true that producer prices are highest if a firm extracts strictly the margin  $APC^{Icafé}$ . This is only, however, a measure of market power if the assumption of CRS is maintained. In that case, equations (4) and (6) together imply:

*Proposition 2:*

*For as long as  $APC^{Icafé} = MPC$  if  $(p^* - p_R^*) > 0$ , then it must be true that  $p_p < VMP$ .*

Proof

$$p^* - p_R^* > 0 \quad (6)$$

Substituting (4), this becomes

$$p^* - APC^{Icafé}(=MPC) - p_p (= VMP) > 0$$

If  $APC^{Icafé} = MPC$ , then this is rewritten as

$$p^* - MPC - p_p > 0$$

This can only be true if the output price has not exhausted the marginal value products of the inputs. Since the processing margin is exactly MPC, this implies that  $p_p < VMP$ . □

Therefore, under the assumptions that  $APC^{Icafé} = MPC$ , the measure  $(p^* - p_R^*)$  is a measure of market power as it measures deviations from marginal cost pricing. If the assumption of CRS were to be maintained for the analysis, then  $(p^* - p_R^*)$  always uniquely measures market power.

Maintaining the assumption of CRS, however, is unrealistically (and, it will be seen, unnecessarily) restrictive for Costa Rica. Interview data consistently indicated that mills struggle to obtain their '*punto de equilibrio*', their cost-minimizing scale due to the competition for cherries described in the previous section. This is confirmed by a cost study of the Costa Rica milling sector over five years (1988-1993), where it was estimated that only 31% of mills operate at the cost-minimizing point of their long run average cost curves, whilst 56% of mills in Costa Rica operate at a point like CC in Figure 6, on the IRS portion of their long run average processing cost curve (Mosheim 2002). Relaxing the assumption of CRS implies that the mill-specific variable  $(p^* - p_R^*)$  measures either its inefficiency, when this is measured by deviations from their cost-minimising point of operation (scale inefficiency), or market power, or both. Given this ambiguity,  $(p^* - p_R^*)$  will simply be called the 'mark-down' measure.

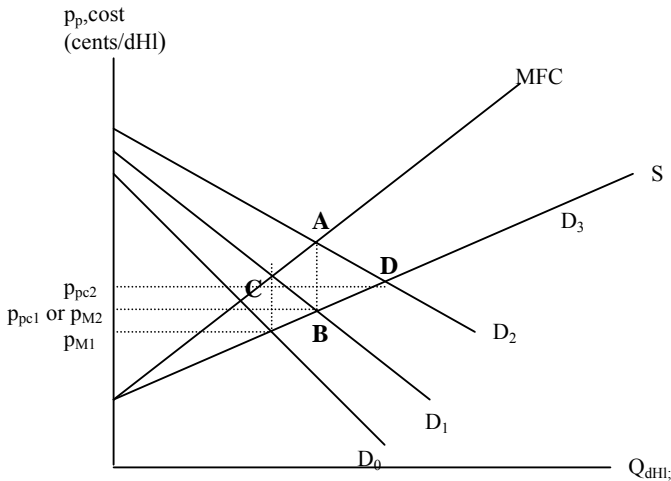
The mark-down measure  $(p^* - p_R^*)$  can be understood simply as a variation of the familiar identification problem from the market power literature reviewed in Section III: Returning to Figure 6, consider a measure  $(p^* - p_R^*)$  that is equal to (c-b).<sup>28</sup> A measure equal to (c-b) either measures market power if the mill/exporter is operating

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<sup>28</sup> Recall that  $(p^* - p_R^*)$  is equivalent to (c-b) due to *Proposition 1*.

at BB, or it measures (scale) inefficiency if the mill is operating at CC.<sup>29</sup> (In both cases, however, the mill is able to extract a higher margin, to the detriment of the producer relative to the margin prevailing at the MES point). So, for example, modifying the figure that illustrated this critical issue of identification in Section IV, the identification difficulty inherent in (c-b) in Figure 6 can be seen in more familiar terms in Figure 7 below,<sup>30</sup> where the mark-down margins ( $p^* - p_R^*$ ) (or (c-b)) must be inferred from observed producer prices on the y-axis :

**Figure 7 The Coffee Cherry Input Market**



Suppose that input demand curve  $D_1$  belongs to a mill/exporter such as that operating at point CC in Figure 6. Let input demand curve  $D_2$  belong to a more efficient mill/exporter operating at point BB in Figure 6. In this diagram, mill/exporters set profit maximizing prices at the intersection of their input demand curves ( $D_1$  or  $D_2$ ) and either the supply curve (in perfect competition) or along the marginal factor cost curve (if imperfectly competitive). If the mill/exporter is perfectly competitive, but inefficient ( $D_1$ ), it would operate at a point like B and the input price paid to farmers would be  $p_{pc1}$  (let the subscript 'pc' refer to perfectly competitive price and 'M' refer to the price that prevails with market power). If however, the mill/exporter were more efficient ( $D_2$ ), but exercised market power, it would operate at a point like A and the observed input price  $p_{M2}$  would be observationally indistinct from  $p_{pc1}$  (the observed margin,  $(p^* - p_R^*)$ , however, is the same in both cases). If on the other hand, mills were productively inefficient ( $D_1$ ) and exercising market power, they would operate at a point like C and pay an input price of  $p_{M1}$ . The observed margin  $(p^* - p_R^*)$  in that case would be larger than if the firm were not exercising market power. Then again,

<sup>29</sup> Steigert *et al.* point out that if the firm is at CC due to an unexpected agricultural supply shock, say, then technically, the ensuing mark-down to recover costs is market power as the firm 'sets the price' (Stiegert, *et al.* 1993, p.550), thereby distinguishing this market power from a strictly usurious one. This is only strictly true under the fixed (CRS) proportions assumption maintained by the authors, whilst here, that assumption was maintained only for the expository purposes of using Figure 6. The present analysis does not depend on assumptions of CRS.

<sup>30</sup> The switch from the expository framework of Figure 6 to the more familiar one of Figure 7 is possible if it is assumed (for this exposition only) that all mills operate on the same long run APC, so that differences in efficiency, as represented by different demand curves in Figure 7 correspond to scale efficiency as represented by different points on the APC curve in Figure 6.

input price  $p_{M1}$  could be observed for a perfectly competitive mill/exporter even more inefficient than that of  $D_1$  ( $D_0$ ) and so on.

*The institutional identification of market power*

It has been shown that deviations between  $p^*$  and  $p_R^*$  measure a wedge between producer prices paid and the producer price prevailing at minimum efficiency scale (MES) under perfect competition. Under the restrictive assumption of constant returns to scale (CRS), where the mill/exporter is operating at MES, this wedge is a measure of pure market power, as defined as deviations from marginal cost pricing. Relaxing this assumption, it was shown that the measure  $(p^* - p_R^*)$  measures both market power and inefficiency. Unlike SCP analyses that did not uniquely identify market power and NEIO models that use structural estimates to identify market power, this paper will use features of the institutional reality in Costa Rica to distinguish between market power and efficiency in the mark-down measure  $(p^* - p_R^*)$ .

As seen in the brief market power NEIO literature review of Section IV, for  $(p^* - p_R^*)$  to evidence strictly market power, it is essential to identify in Figure 7, on which demand and supply curves mills are operating. This is undertaken using Costa Rican specific institutional norms. The exercise of market power is evidenced by a price,  $p_M < p_{PC}$ , below the VMP (demand curve). This is easily observed in Figure 7, where the demand curves are laid out. The difficulty is, without knowing which mill/exporter is relatively more scale efficient (closer to the MES), the same measure  $(p^* - p_R^*)$  would indicate market power for the mill/exporter at point D or the relative scale inefficiency of the mill/exporter at point B.

The analysis does not propose to formulate structural demand equations capable of distinguishing between these two outcomes, as in the NEIO. Instead, let the demand curve  $D_1$  belong to the least efficient mill/exporter.<sup>31</sup> The analysis proposes to institutionally identify point B, the perfectly competitive input market behavior for the least efficient firms: Let point B represent the point of operation of cooperative mills in Costa Rica. This is essentially a two-pronged claim: First, it claims that cooperatives are less scale efficient than other mills, i.e. on a lower demand curve. Second, it claims that cooperative mills do not exercise market power vis-à-vis farmers. If these two claims hold, then any  $(p^* - p_R^*)$  greater than that observed for cooperative mills (seen as a further mark-down in Figure 7 to a level such as  $p_{M1}$ ) is taken as evidence of market power in the input market for cherries in Costa Rica. Before providing support for these claims, note that the wider analysis of market failure for producers (and the role of Fairtrade therein), namely mill inefficiency and

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<sup>31</sup> Recall that conclusions about scale efficiencies are drawn from the relative positions of the demand curves in Figure 7 on the assumption that mills have the same long run average processing curve. This assumption was made for expository purposes, but is unnecessarily restrictive. It is also maintained here for the sake of exposition, although it is relaxed below. Note, furthermore, that it is theoretically possible that a mill be on a lower demand curve if it is more scale efficient than a cooperative, but on a higher long run average processing cost curve. As this is not a likely outcome, it is assumed throughout that non-cooperative mills are at least as cost efficient as cooperative mills. This is supported by cost studies of mills in Costa Rica (Mosheim 2002). In that case, the exposition of Figure 7 holds.

producer prices, do not depend on these claims, only the specific identification of market power (i.e. separation of efficiency from market power) does.

That cooperatives are less (scale) efficient than other mills is not controversial. It has already been alluded to in Section V, where the liquidity constraints particular to cooperatives are binding in their ability to contract sufficient quantities of coffee early in the harvest. As was seen there, the extra services offered by cooperatives reduce the operating capital they might otherwise use as lucrative advance payments. In Costa Rica, the services offered by cooperatives can be extensive, including agro-technical advice, health services, community shops, etc. (for a fuller description of cooperative services, see Ronchi 2002a). Non-cooperative mills have higher liquidity and therefore can afford to pay producers higher advance payments. These higher payments provide incentives to farmers to sell to the non-cooperative mill, either because their financial need is great at that moment or because they believe the ultimate harvest price will be higher (which, often, it is not). Furthermore, since the time of fieldwork for this paper, where this information about cooperatives was gathered through interviews, a cost study for Costa Rican mills explicitly evaluated the scale efficiency of cooperative mills vis-à-vis non-cooperative mills from 1988-1993 and found that cooperative mills are, in fact, less scale efficient than non-cooperative mills (Mosheim 2002).

The second claim, that cooperative mills operate on the supply curve and not the marginal factor cost curve, is the claim that cooperatives never exercise market power. At some level, this is almost a tautology: Cooperatives are owned by members, so 'the mill' and 'the farmer' are conceptually indistinct. For the exercise of market power, collusion between the cooperative and exporter is required. The cooperative, at this level, cannot cheat itself. At a different level, this claim may be contested on the grounds that it is not the collective membership that enters into contract with the exporter, but the cooperative leader (manager). If there is corruption, cooperative margins ( $p^* - p_R^*$ ) may well reflect market power. It is argued here, not that corruption never happens in Costa Rica, but that this outcome is unlikely to affect the empirical measures used in this paper. During the course of six months spent on fieldwork in Costa Rica, actors from different parts of the industry attested to the high level of accountability in cooperatives. Tellingly, this testimony did not just come from cooperative leaders, who can be expected to claim this, but from farmers and from Icafé as well. In the first instance, farmers have memory of having deposed corrupt cooperative leaders. Such events were rare, but were scandalous and high profile. When undertaking interviews at Icafé while assembling the data set for this paper, the author made inquiries concerning cooperatives whose time series suddenly ceased or whose status changed to private hands. In the few occasions that this occurred, it was matter-of-factly communicated that the producers had fired the cooperative manager and dissolved the cooperative. This level of pro-activity is unsurprising knowing the solidarity history in Latin America. It is therefore not deemed problematic to maintain that cooperatives are unlikely to 'cheat' themselves. Furthermore, there is precedence of this treatment of cooperatives in the literature (see for example, Sexton 1990).

While it is acknowledged that this identification procedure for market power is not universally applicable in all markets, in light of the disagreement surrounding the inference of market power from SCP, structural and nonparametric models, the



approach of Occam's Razor<sup>32</sup> is applied to the case of coffee in Costa Rica. Finding 'experiments in the data' (Bresnahan 1982) that distinguish market power from efficiency effects in  $(p^* - p_R^*)$  has been the central issue in the empirical market power literature reviewed in Section IV. From a development perspective, however, what is critical about a margin like (c-b) in Figure 6 is that it measures a mark-down of producer prices other than that which would prevail if mills were operating at MES with no market power, and therefore imposes a cost on producers, so important to the 'new' commodity policy context. Although the econometric analysis of the following section does, in fact, use institutional norms in Costa Rica to distinguish between market power and inefficiency in  $(p^* - p_R^*)$ , it will be seen that  $(p^* - p_R^*)$  as a measure permits a broader assessment of the exact role of Fairtrade in the Costa Rican coffee sector. The identification of market power through institutional norms in Costa Rica leads to three testable hypotheses.

### *Testable hypotheses*

Testing the hypothesis of market power is undertaken by ascertaining the location of cooperative mills in the data relative to non cooperative mills. This provides the first stylized testable hypothesis for the analysis:

- i)  $p(B) \neq p(C)$ , which means that input price and therefore the margin  $(p^* - p_R^*)$  at point B is different from the margin at point C.

Note that this hypothesis only informs on the presence of market power in the input market in Costa Rica for those mill/exporters with margins strictly larger than cooperative mills. That is:

- ii)  $p(C) < p(B)$ , which means that the margin at point B is smaller than the margin at point C.

This follows from the same identification issue discussed above: It is possible for a mill/exporter to have the same margin  $(p^* - p_R^*)$  (same  $p_p$  in Figure 7) and to be operating on a more efficient demand curve, thereby exercising market power. Such a scenario is not identifiable by the procedure suggested. That is, it cannot identify every incidence of market power, rather, it informs strictly on the mere presence of *any* market power in Costa Rica's coffee input market. A further limitation to this identification procedure concerns assessing the role of Fairtrade in overcoming a market failure in market power. Note that if it is maintained that cooperatives do not exercise market power, and all Fairtrade mills are cooperatives, then any empirical 'Fairtrade effect' found does not inform on the effect of Fairtrade in overcoming a market failure in market power. Through the identification procedure described above, that is now true by assumption (that cooperatives do not exercise market power). Rather, any role of Fairtrade in overcoming market power must be assessed indirectly through the empirical identification and interpretation of a (non-cooperative) 'Fairtrade effect' should one exist. This is explicitly addressed in the interpretation of results in the next section.

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<sup>32</sup> "One should not increase, beyond what is necessary, the number of entities required to explain anything".

As a result, the identification exercise proposed also permits the testing of a hypothesis about Fairtrade intervention. In the discussion on the data used in the following section, it is indicated that the Costa Rican price data used in the analysis *does not include* the famous Fairtrade premium floor price of US\$1.26/lb. Furthermore, all Fairtrade mill/exporters are also cooperatives. If there is any Fairtrade ‘effect’ separate from the fact of simply being a cooperative,<sup>33</sup> then a different margin would be observable for Fairtrade mills. That is, a Fairtrade ‘effect’ can be seen only if Fairtrade mills are operating on a relatively more efficient demand curve, somewhere to the right of  $D_1$ . So, for example, in terms of Figure 7:

- iii)  $p(D) > p(B)$  which implies that the margin at point D is lower than the margin at point B

This last hypothesis permits the empirical analysis of what are commonly treated as the ‘intangible’ effects of capacity building and non-price support of Fairtrade. In sum the stylized testable propositions (i) and (ii) can inform on the presence of market power in Costa Rica and (iii) informs on any Fairtrade ‘effect’ on the (cooperative) producers with which it intervenes.

## VII. Empirical Analysis

In the theoretical discussion above, it was seen that the variable  $(p^* - p_R^*)$  measures the mark-down of producer prices from the perfectly competitive MES level. While a vast quantity of detailed data was mobilized to construct annual mill-specific  $(p^* - p_R^*)$ , it is almost certainly simplistic to assume that it is measured entirely without error. For example, world price  $p^*$  for Costa Rican will differ based on the destination market (e.g. US or EU). Since destinations of each contract for each mill cannot be known, average proportions are applied to each mill based on the national average proportions of coffee sent to the EU or the US. Any specific mill may, of course, export its coffee to the EU or the US in proportions that differ from the national average. In a fixed effects regression context, for example, the stable nature of these proportions (see Ronchi (2005) ) means that this potential source of error can be controlled for in the estimated fixed effect term; something that is not possible in deterministic, value-chain type measurements.<sup>34</sup> Furthermore, given that market power in particular is to be detected by analyzing variations in the data relative to a particular class of mills (cooperatives), it is of interest to move beyond a simple deterministic measure of ‘mark-down’ and into a regression context. The econometric analysis in this section estimates a reduced form equation to test for the presence of market power (hypotheses (i) and (ii) above) and for the presence of any ‘Fairtrade effect’ (hypothesis (iii) ). It also analyzes the possible determinants of any general mark down behavior detected in the Costa Rican market.

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<sup>33</sup> The non-price aspects of Fairtrade intervention were covered in Section II.

<sup>34</sup> Ronchi (2005) undertakes a detailed sensitivity analysis of the dependent and independent variables used in the data set for this exercise.

*The dependent variable ( $p^* - p_R^*$ )*

The variable ( $p^* - p_R^*$ ) was constructed as an annual average for all mills individually (i.e. the measure ( $p^* - p_R^*$ ) is *mill-specific*) over 26 years from 1974/75 to 1999/2000. Recall that  $p^*$  is the perfectly competitive international benchmark price for different Costa Rican origins. It follows that individual mills will have individual annual average  $p^*$  based on the composition of different origins (bean types) in their harvest. Mill-specific  $p^*$  was therefore calculated using Icafé data on the proportions of different bean types in a mill's harvest, and then applying the specific Costa Rican price series to the harvest for those bean grades. The price series were constructed from data collected from the ICO, the New York Coffee, Sugar and Cocoa Exchange (CSCE) where Arabica futures are traded, and using quality differentials obtained from private traders in Switzerland and London.<sup>35</sup> The variable  $p_R^*$ , the annual average mill-specific price reported by mills to Icafé, was collected during six months of field work in Costa Rica with coffee producers, mills and the relevant staff at Icafé. This careful data work permitted the construction of a series of continuous mark-down measures ( $p^* - p_R^*$ ), which differ across mills and across years.

*Independent variables*

It has been seen that ( $p^* - p_R^*$ ) indicates to what extent (if any) the market, through its structure, its actors and other factors, reduces the returns to the Costa Rican coffee producer from the perfectly competitive MES level. In addition to locating cooperatives and Fairtrade mills in the data to test hypotheses (i) to (iii), any variations in the mark-down induced by market power can be understood in terms of simple rotations and shifts of the demand and supply curves (see Figure 7). Shifts in demand represent movements along the supply curve. These affect the size of the deviation between  $p_M$  and  $p_{PC}$  (the size of the margin ( $p^* - p_R^*$ ) when this is due to market power) since the wedge between supply and MPC differs along the supply curve.<sup>36</sup> Input factor demand,  $D$ , is:

$$VMP = p^* \times MP_{\text{cherries}},$$

since Costa Rican coffee mills are not unreasonably assumed to be price takers in the output market. The demand shift factors that affect the VMP therefore include changes in the output price (world price for coffee,  $p^*$ ) and/or changes in their marginal product, including determinants of mill specific costs, such as bean types or changes in downstream technology.

In addition to demand shift factors, the variation in the degree of exercise of market power across mills and across years may be affected by shifts in supply, for example, due to natural disasters or changes in farmer technology. Variation in the exercise of

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<sup>35</sup> For a detailed description of the data set construction used for the analysis, see Ronchi (2005).

<sup>36</sup>  $MPC = \frac{\partial TC}{\partial Q} = \frac{\partial AC}{\partial Q} Q + AC$  (since  $TC = AC \cdot Q$ ). Supply is  $AC$ , which differs from  $MPC$  by  $\frac{\partial AC}{\partial Q} Q$ , which clearly grows with  $Q$ .

market power can also be explained by factors that affect the degree of market power, or the elasticity of the supply curve facing the mill/exporter. Some commonly hypothesized factors affecting the steepness of the supply curve facing buyers include the amount of time required for supply reactions, which are obviously low for annual crop products like coffee, but are not perfectly inelastic: In response to incentives, output can be affected by the application of care to the crop, including fertilizer, weeding and pest control. Within the general context of low agricultural elasticities, other factors affecting the elasticity of supply include geography, the degree and quality of competition faced by mills/exporters and any market power conferred by variations in the quality of coffee beans processed.

Further to the above factors affecting supply and demand, in a regulatory framework, the measure of market power ( $p^* - p_R^*$ ) is clearly impacted by the efficacy of the regulatory body in enforcing the payment of the perfectly competitive price. Factors that impede effective monitoring of registered prices will contribute to the market power source of variation in the measure. These include general political or economic instability and natural shocks such as hurricanes, floods and earthquakes. Unusual volatility in world prices and upheavals in world markets can also be potential factors. The ability for mills to by pass the checks and balances used by Icafé when a milling firm owns multiple plants is another potential obstacle to effective contract monitoring. Finally, the regulatory resources at the disposal of Icafé will also impact the monitoring of registered contracts and their prices. These potential determinants of market power and general mark-down behavior informed the body of explanatory variables used in the empirical analysis and collected during desk research and field work:

**Table 3 Variable List**

Variable Name	Variable Description
Mill	indicator variable assuming different integer values for the 157 mills in the sample
$(p^* - p_R^*)_{jt}$	The continuous mark-down measure for mill $j$ in harvest year $t$
$zmc_j$	A dummy variable = 1 if mill $j$ is located in the Central Valley
$zcar_j$	A dummy variable = 1 if mill $j$ is located in Cartago
$ztur_j$	A dummy variable = 1 if mill $j$ is located in Turrialba/Juan Viña/Orsi
$zaten_j$	A dummy variable = 1 if mill $j$ is located in Atena/Palmalares/Pursical
$zcot_j$	A dummy variable = 1 if mill $j$ is located in Region Sur (Coto Brus)
$zsan_j$	A dummy variable = 1 if mill $j$ is located in Los Santos
$zgen_j$	A dummy variable = 1 if mill $j$ is located in San Isidro (El General)
$zgua_j$	A dummy variable = 1 if mill $j$ is located in Guanacaste
$zsar_j$	A dummy variable = 1 if mill $j$ is located in Sarapiquí
$ft_{jt}$	A dummy variable = 1 if mill $j$ is a Fairtrade cooperative in harvest year $t$ , 0 otherwise <sup>37</sup>
$coop_{jt}$	A dummy variable = 1 if mill $j$ is a cooperative in year $t$ , 0 if the mill is not a cooperative
$ftcomp_{jt}$	A dummy variable = 1 if mill $j$ competes with a Fairtrade mill in $t$
$own_{jt}$	A dummy variable = 1 if mill $j$ is foreign owned in time $t$ , 0 otherwise

<sup>37</sup> Note that all Fairtrade mills are cooperatives. They are therefore all coded as cooperatives and then coded as Fairtrade mills to separate any 'Fairtrade effect' from a cooperative effect.

Variable Name	Variable Description
multi <sub>jt</sub>	A dummy variable = 1 if mill <i>j</i> owns more than one mill location in time <i>t</i> , 0 otherwise
1974/75 <sub>t</sub> to 1999/2000 <sub>t</sub>	A series of dummy variables for each year between 1974/75 to 1999/2000, taking the value of 1 if it is the year and 0 if not
nyears <sub>jt</sub>	A variable indicating the length of time (years) that mill <i>j</i> is in the sample at time <i>t</i>
hb <sub>jt</sub>	the proportion of mill <i>j</i> 's harvest accounted for by HB in <i>t</i>
hbl <sub>jt</sub>	the proportion of mill <i>j</i> 's harvest accounted for by HBL in <i>t</i>
shb <sub>jt</sub>	the proportion of mill <i>j</i> 's harvest accounted for by SHB in <i>t</i>

Using a panel data set for the 157 mills that have been operational in Costa Rica over the 26 year period between 1974/75 and 1999/2000, the analysis of this paper attempts to identify the existence of mark-down behavior, market power, a 'Fairtrade' effect and to examine the determinants of any mark-down of producer prices observed. The panel is unbalanced as not all mills are present for each of the 26 years, although a full time series for many mills was possible due to fieldwork and interviews that tracked mills over time, even as they changed names.

### *The model*

The explanatory variables listed in Table 3 are included in reduced form regression equation (7) below<sup>38</sup>, estimated using a fixed effects formulation. The fixed effects model exploits the panel dimension of the data to control for any omitted factors in the model. Omitted factors may include the size of the mill, the degree of vertical integration with the exporter, the relationship of the mill with Icafé and any other mill characteristics on which the data to hand could not directly inform.<sup>39</sup>

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<sup>38</sup> The model of (7) was built up from a basic 'core' model, augmented to include the effects of geography and those of time. Earlier specifications of the reduced form equation (7) also included variables for which data and proxies were either unavailable, of insufficient quality or suffered from collinearity. For example, there was insufficient data to measure the intensity of contract monitoring by Icafé. Collinearity of inflation with time dummies led to inflation being dropped, etc.

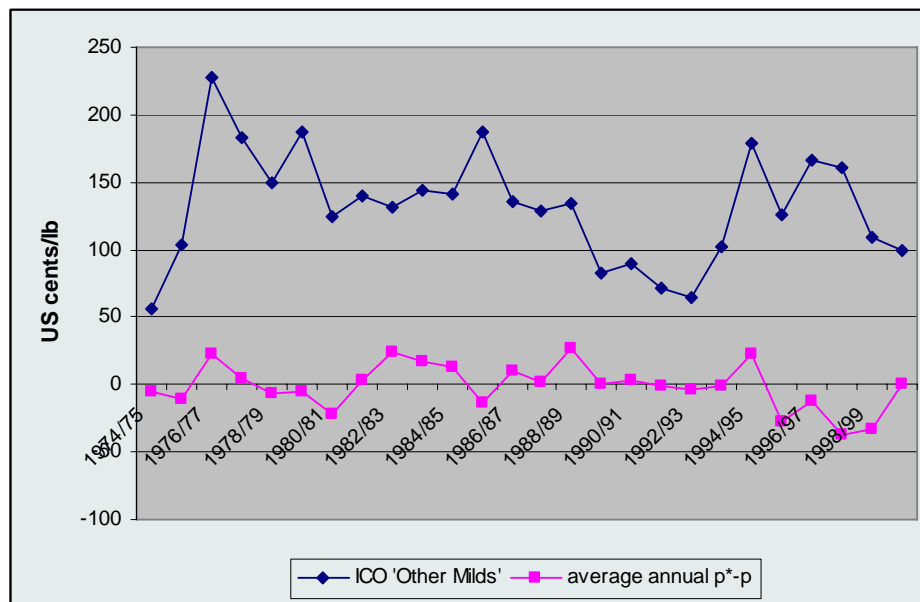
<sup>39</sup> In addition to estimating (7) with a pooled OLS and a 'between estimator' formulation, a random effects model was also estimated, but considered inferior to the fixed effect formulation. *A priori*, the usefulness of the random effects model is questionable since the ultimate choice of estimation procedure should rest upon the appropriateness of the model for the application at hand (Hsiao and Sun 2000). In fact, there is reason to doubt the suitability of the random effects model in this application: In this analysis, the entire population of mills in Costa Rica is used, rather than a random sample drawn from a population of mills. It is therefore difficult to conceive, as one must in a random effects context, of omitted factors as randomly distributed across mills. In addition to this theoretical objection, the random effects estimators were found to be inconsistent. The Breusch-Pagan for unbalanced panels and Hausman tests were conducted to determine the presence of random effects and their independence from the explanatory variables, respectively. While the Breusch-Pagan test rejects the null of no random effects, the Hausman test informs on whether these random effects are independent of the explanatory variables. If they are not, then the random effects estimator is inconsistent and the model is misspecified. The Hausman Test rejects the null of independence of the random effects from the explanatory variables for (7) at the five and 10% levels, although it does not reject it at the one percent level. The evidence for the independence of the omitted random effects from other explanatory variables is, at best, inconclusive and at worst, negative. As the independence assumption is essential for the consistency of estimated coefficients, the failure of the Hausman test to provide a robust result in favor of independence provides a compelling reason to believe that fitting a random effects model to the data results in misspecification.

$$(p^* - p_R^*)_jt = \alpha_j + \beta_1 hbl_{jt} + \beta_2 hb_{jt} + \delta_1 ft_{jt} + \delta_2 ftcomp_{jt} + \delta_3 own_{jt} + \delta_4 multi_{jt} + \delta_5 nyyears_{jt} + \gamma_1 1975/76_j + \dots + \gamma_{25} 1999/2000_{jt} + e_{jt} \quad (7)$$

The model of (7) uses harvest year dummies to control for variation over time. The omitted category is 1974/75, so that the interpretation of time dummy variable coefficients is relative to this base year.

The use of time dummies is found to be preferable to the ad-hoc inclusion of individual dummy variables for natural disasters, for weather, for policy changes, price spikes or for other time variant events. This is because the potential sources of time-related variations are numerous, interrelated and complex. For example, while the overall correlation between the mark-down measure  $(p^* - p_R^*)$  and world coffee prices in insignificant,<sup>40</sup> it is not unreasonable to think that dramatic price spikes and natural disasters can affect the mark-down measure. In Figure 8, there are three years in which the international market exhibited modest to major price spikes, largely due to adverse climatic conditions. The spike in 1976/77, for example, was caused by the (southern hemisphere) winter frost in Brazil, and those of 1985/86 and 1994/95 were due to a drought in Brazil in 1985/86 with minor frosts and low rainfall in Central America in both 1985/86 and 1994/95 (Gilbert 1995).

**Figure 8 The ICO 'Other Milds' World Coffee Price Series**



In addition to generalized price responses to adverse climatic conditions, variations observed in either or both series in Figure 8 can be due to changes in national or international policy. For example, the introduction of a binding coffee ICA in the 1982/83 harvest or its final suspension in 1989 might have an effect on mark-down behavior. So might the natural disaster history of Costa Rica, Central America and the

<sup>40</sup> The Pearson correlation coefficient,  $r_{xy} = 0.18$  with a t-stat of 0.84.

Caribbean found in Table 4 and Table 5, important in understanding the role of supply shocks in these years:

**Table 4 Natural Disaster Profile for Costa Rica**

Date	Disaster	Population Impact
February 1976	Volcano	70,000 affected
April 1983	Earthquake	10 killed
October 1988	Hurricane Joan	127,500 affected; 28 killed
April 1991	Earthquake	51 killed, 19700 affected
August 1991	Flood	185,021 affected
November 1993	Flood	38,451 killed
February 1996	Flood	20,000 affected
July 1996	Hurricane Cesar	Affected 500,000; 51 killed
October 1996	Wind Storm	216,000 affected
October 1998	Hurricane Mitch	16,700 affected, 4 killed

Source: (CRED 2004; ECLAC and IBD 2000); author's own work

**Table 5 Natural Disaster Profile for Central America and the Caribbean**

Date	Country	Disaster
1976	Guatemala	Earthquake
1978	Honduras, Belize	Hurricane Greta
1979	Dominica	Hurricane David
1979	Dominican Republic	Hurricanes David/Frederic
1980	Haiti	Hurricane Allen
1982	Nicaragua	Hurricane Alleta
1986	El Salvador	Earthquake
1987	Dominican Republic	Hurricane Emily
1988	Jamaica	Hurricane Gilbert
1988	Nicaragua	Hurricane Joan
1989	Antigua/Guadalupe	Hurricane Hugo
1991	Costa Rica	Earthquake
1992	Nicaragua	Tsunami
1993	Nicaragua, Honduras	Tropical Storm Gert
1995	Nicaragua	Heavy Rains
1996	Costa Rica, Nicaragua	Hurricane Cesar
1996	Nicaragua	Eruption Maderas Volcano
1998	Dominican Republic, Haiti	Hurricane George
1998	Honduras, Nicaragua, Costa Rica	Hurricane Mitch

Source: (Martine 1999)

Any of these factors, *and any which might be omitted*, can be related to variations in the mark-down measure and to the potential exercise of market power. For example, mills/exporters, in non-spike years, may be less tempted to deflate  $p_R^*$  with a deliberate 'cheating' factor since Icafé, in theory, investigates any contract price that is suspiciously deviant from the international  $p^*$ . In interviews there seems to be an awareness of a lower limit below which suppressing the reported  $p_R^*$  is likely to be detected (see also Garro 2000). In times of extreme price movement, however, Icafé will not have full information on  $p^*$  and will have greater difficulty in monitoring  $p_R^*$ . More generally, upheavals in the world market, including the suspension of coffee

ICAs in 1988/89 or natural disasters, makes it difficult for Icafé to compare reported prices to an international benchmark and mills/exporters may add an extra deviation to their imperfectly competitive input price with less fear of detection. The plausibility of this information failure at Icafé is supported in interviews of key informants in Costa Rica, who consistently hinted at the limitations of contract price monitoring at Icafé.

Whereas unpicking the time effects may be an issue of separate interest, the data requirements to do so in a rigorous fashion are heavy. While data are clearly available on natural disasters, production and ICA policy variables, if these do not account for the whole of the variation observed over time in the Costa Rican data, a clean interpretation of their estimated coefficients is rendered difficult. Second, if they do not account for the whole of the variation observed over time, then they do not even serve the primary objective of controlling effectively for time to estimate clean Fairtrade and cooperative effects necessary for the identification of market power and ‘Fairtrade effects’.

#### *Estimating time-invariant factors*

Fixed effects estimators are also called ‘within’ estimators because it transforms the data into deviations from its mean over time. As such, time-invariant variables drop out of a fixed effects regression. This includes time-invariant mill characteristics such as geographical location and cooperative status.<sup>41</sup> The explanatory value of time invariant variables must be explored in a second stage weighted least squares (WLS) regression model (8):

$$\begin{aligned} \hat{fe}_j = & \alpha + \delta_1 \text{coop}_j + \phi_1 \text{zcar}_j + \phi_2 \text{ztur}_j + \phi_3 \text{aten}_j + \phi_4 \text{cot}_j + \phi_5 \text{san}_j + \phi_6 \text{zgen}_j + \phi_7 \text{gua}_j \\ & + \phi_8 \text{sar}_j + e_j \end{aligned} \quad (8)$$

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<sup>41</sup> With the exception of two out of 26 cooperative mills, cooperatives in Costa Rica did not change their cooperative status in the time period under analysis. The estimation of a coefficient for the cooperative dummy variable (coop) in (7) would therefore be driven entirely by the two cooperatives that did change status in the data set. It would be difficult to generalize about cooperatives based on two observations. If, however, the two mills are dropped from the sample, then the remaining cooperatives are all time invariant and their explanatory effect can only be examined in a second stage equation, along with the geographic variables. To ensure the results are not sensitive to the removal of the two status-changing cooperatives, the full model (7) was re-estimated, this time including the two cooperatives in the data set. No difference in size or significance of the independent variables was found. This satisfies any concern that estimates of (7) are sensitive to the presence or removal of these two mills. Their removal does permit a ‘clean’ estimation of cooperative effects with the other time invariant (geographic) explanatory variables in a second stage weighted least squares regression (8). Although the inability of a fixed effects model to estimate time invariant coefficients in a first stage is often cited as a drawback of the procedure, it is not sensible to force that first stage estimation of the cooperative variable on the strength of two potentially anomalous observations.



In (8), the estimated mill-specific fixed effects from the fixed effects regression in (7) ( $\hat{fe}_j$ )<sup>42</sup> become the dependent variable and the cooperative and geographic dummy coefficients serve as explanatory variables. Note that the Central Valley is the omitted category so that the interpretation of geographic dummy variable coefficients is relative to the Central Valley region.

### *Econometric Results*

Estimating (7) using the panel data set on the Costa Rican coffee market yields the following results:

**Table 6 Fixed Effects Estimates for (7)**

Variable/Statistic	Coefficient [std. error]
hbl	-0.080 [9.072]
shb	-0.070* [3.725]
ft	-5.631* [2.997]
ftcomp	2.289 [3.347]
Own	-19.271*** [5.299]
multi	10.654* [5.603]
nyears	-0.424* [0.222]
_1975_76	-11.654*** [2.142]
_1976_77	64.201*** [4.535]
_1977_78	22.457*** [3.243]
_1978_79	-1.433 [2.028]
_1979_80	4.135 [2.596]
_1980_81	-34.877*** [3.443]
_1981_82	22.092*** [2.378]

<sup>42</sup> The mill-specific fixed effects are recovered from the data by  $\hat{\alpha}_j = \bar{y}_j - \bar{x}_j \hat{\beta}$  where  $y_j$  is the dependent variable and  $\hat{\beta}$  is the vector of estimated coefficients. STATA, however, calculates the fixed effects as  $\hat{\alpha}_j = \bar{y}_j - \bar{\alpha} - \bar{x}_j \hat{\beta}$ , where  $\bar{\alpha}$  is the overall constant term for the regression (the average value of all fixed effects). Programming with matrices within STATA does, however, permit the estimation of correct mill fixed effects ( $\hat{\alpha}_j = \bar{y}_j - \bar{x}_j \hat{\beta}$ ) ‘by hand’, as it were. All mill specific fixed effects referred to in the thesis are calculated this way and double checked against STATA estimates. This also permits the calculation of a full set of variances for the fixed effects (not possible with an unbalanced data set in STATA) with which to perform a WLS in the second stage regression.

Variable/Statistic	Coefficient [std. error]	
1982_83	67.751*** [2.460]	
1983_84	52.307*** [2.583]	
1984_85	43.122*** [2.768]	
1985_86	-15.244*** [3.987]	
1986_87	38.746*** [3.389]	
1987_88	23.130*** [3.306]	
1988_89	77.938*** [3.569]	
1989_90	17.989*** [3.741]	
1990_91	25.822*** [3.802]	
1991_92	17.885*** [4.102]	
1992_93	10.525** [4.181]	
1993_94	17.658*** [4.765]	
1994_95	70.943*** [4.986]	
1995_96	-38.526*** [5.218]	
1996_97	-4.783 [5.851]	
1997_98	-61.079*** [5.504]	
1998_99	-50.104*** [5.668]	
1999_00	24.010*** [5.648]	
Observations	2375	
R <sup>2</sup>	(within)	0.775
	(between)	0.358
	(overall)	0.684
std. error regress.	[19.94]	
White's Test for Heteroskedasticity	$\chi^2(42) = 349.60$ Prob > $\chi^2 = 0.00$	
F-tests	F(32,2188) = 235.87 (3,2221) = 3.49	
Ramsey Reset Test	Prob > F = 0.02	

Robust standard errors in brackets<sup>43</sup>

\*significant at 10% \*\* significant at 5%; \*\*\* significant at 1%

<sup>43</sup> The F-test performed in a regression with White corrected variance-covariance matrix is actually a Wald test. The econometric package used (STATA), however, converts the Wald value to an F-test value, which it then reports, as in Table 6 above.

The fixed effects estimators explain 68% of the overall variation in the mark-down measure across mills and over time. Controlling for mill-specific effects, the model also explains some 35% of the variation in market power measures *between* mills and 78% of the variation *within* mills.<sup>44</sup> The fixed effects specification does not reject the null of no omitted variables. The presence of heteroskedasticity is confirmed. This latter problem is overcome by reporting robust standard errors for the fixed effects model's estimated coefficients in Table 6.

The proportion of low quality bean (hbl) in the harvest is insignificant, while the proportion of high quality bean (shb) has the (anticipated) negative sign, significant at 10%. That is, on average and *ceteris paribus*, a one percentage point increase in the proportion of SHB in a mill's harvest leads to a fall in the mark-down measure by 0.07 US cents/kg. The estimated coefficient for the Fairtrade competition dummy is not significant. The estimated coefficient for foreign ownership is negative and significant in (7): A mill that is foreign owned records, on average and *ceteris paribus*, mark-down measures over 19 US cents/kg lower than domestically owned mills. The coefficient for multiplant ownership is significant and positive, albeit at the 10% level only: Those mills with more than one plant have almost 11 US cents/kg higher mark-down measures than those who do not have more than one plant. The coefficient for the age of the mill in the sample (nyears) is also significant at the 10% level in (7), such that for every year longer a mill is in the sample, holding all else equal, the market failure measure falls by 0.42 US cents/kg.

Most time dummy coefficients are significant, but can only partly be explained by the policy, weather and natural disasters discussed above. For example, the historic price spike years of 1976/77 and 1994/95 have the anticipated significant positive coefficients, a result commensurate with the idea of market power being exercised with greater ease in times of unusual volatility. On average, mills in 1976/77 record mark-down measures some 67 US cents/kg higher than in the base year and mills in 1994/95 record mark-down measures 64 US cents/kg higher than mills in the base year. When compared to the size of the price spike over the price level of the base year (377 US cents/kg and 269 US cents/kg), the magnitude of the estimated coefficients is entirely plausible.<sup>45</sup> While some time dummy coefficients have signs and significance that can be understood in terms of what is known about those years, this is not universally true: Despite the fall in prices at the collapse of the ICA in 1989, the coefficient for that harvest year is still significantly positive. This suggests that the use of time dummies to clean up the estimation and interpretation of the other explanatory variables may be preferable than trying to capture each and every time-variant factor as individual variables.

Of the seven (non-time dummy) explanatory variables included in model (7), only two (hbl and fcomp) are poorly determined. Based on the stated objective of the Fairtrade movement to mitigate 'cheating' of farmers by middlemen, helping in their

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<sup>44</sup> The fixed effects estimators hold stronger explanatory power than the between model and comparable, if not superior, explanatory power to the pooled OLS estimators of (7), when the within variation is taken into account.

<sup>45</sup> Note that the dummy variable for 1981/82 has been dropped by the estimation software. This is most likely due to collinearity with the inflation rate, which soared to 92% in Costa Rica in 1981/82. This issue is returned to below.

efficient organization, and its ideological preference for cooperatives as a vehicle for this intervention, it is not unreasonable to anticipate that the dependent variable have a negative relationship with Fairtrade participation.<sup>46</sup> In fact, the Fairtrade coefficient in (7) is significant: Fairtrade mills record mark-down measures that are almost six US cents/kg lower than non-Fairtrade mills.

The included regressors explain 68% of the overall variation in the mark-down measure. Some 41% of the variance in the model of (7), however, is due to the mill-specific 'fixed effects' constant terms ( $\alpha_j$ ). A closer analysis of these fixed effects is therefore desirable. This analysis is ideally performed using a weighted least squares (WLS) procedure in which less weight is given to those fixed effects that are less precisely estimated (Saxonhouse 1977). In a second stage WLS regression, the (155) estimated mill-specific fixed effects from the fixed effects regression become the dependent variable and the cooperative and geographic dummy coefficients serve as explanatory variables. The mill-specific fixed effects and their variances were recovered from STATA (see footnote 42). Estimating (8) using the weighted least squares (WLS) procedure reveals that the cooperative status and geographic location of mills explains over 40% of the variation in estimated fixed effects across mills.

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<sup>46</sup> This may potentially raise an endogeneity issue in the model if Fairtrade status is a function of market power exercise or if Fairtrade targets the weakest mills. Econometrically, testing and correcting for this requires instruments that are not available in the data at hand, however, the stated belief of the Fairtrade movement that the 'exploitation' of farmers is a general phenomena somewhat attenuates this concern. In fact, similar exercises recently conducted that explicitly control for possible endogeneity bias, also find that prices received by farmers are higher (or less marked down) in specialty markets like Fairtrade (see Wollni (2006)).

**Table 7 Second Stage Fixed Effects Regression (8)**

Variable	Coefficient [std. error]
Coop	-13.109*** [2.639]
Zcar	15.244*** [4.139]
Ztur	10.880*** [3.936]
Zaten	-3.567 [5.151]
Zcot	17.480*** [4.140]
Zsan	3.832 [3.344]
Zgen	20.472*** [4.900]
Zgua	1.61 [4.427]
Zsar	32.456*** [4.968]
Constant	-10.361*** [1.609]
Observations	155
R-squared	0.46
White's Test for Heteroskedasticity	$\chi^2(9) = 3.10$ Prob $> \chi^2 = 0.93$
F-test	F(9,145) = 10.76
Ramsey Reset Test	F(3,142) = 0.02 Prob $> F = 0.99$

Robust standard errors in brackets

\*significant at 10% \*\* significant at 5%; \*\*\* significant at 1%

The included regressors explain almost half of the variation in mill-specific fixed effects and almost every explanatory variable in the model of (8) is well-determined.<sup>47</sup> The estimated coefficient for the cooperative status dummy is significantly negative: On average and *ceteris paribus*, cooperative mills record fixed effect mark-down measures over 13 US cents/kg lower than non-cooperative mills. Note that the omitted category is all non-cooperative mills, including foreign-owned mills that were seen to have *smaller* mark-down measures than the omitted category of domestic owned, non-cooperative mills. Even with the presence of these mills in the omitted category of (8), the coefficient on cooperative mills is negatively significant. Mill-specific fixed effects represent the omitted characteristics of the mills that are discernable thanks to the panel dimension of the model. The negative coefficient on the cooperative dummy variable confirms that there is something structural about cooperative mills that lead them to have very low mark-down measures relative to the fixed effects of all other mills.

<sup>47</sup> Note that the standard diagnostic tests (White's Test, F-test, Ramsey Reset Test) reported in earlier tables are also included in Table 7, but the distribution of the diagnostic tests in a WLS framework is not known, so the interpretation of such should be treated with caution. Note also that the reported  $R^2$  is here calculated as the squared correlation coefficient between the actual and predicted values, using the original un-weighted data and WLS coefficient estimates.

Returning to Table 7, the regions of Coto Brus (zcot), San Isidro/El General (zgen), and Sarapiquí (zsar) (see Figure 4 for a map of the regions) all have significantly positive coefficients implying that mills located in these more remote regions do indeed record mill-specific mark-down measures that are 17, 20 and 32 US cents/kg greater than mills in the Central Valley, respectively. The same is true for Cartago (zcar) and Turrialba (ztur). Apart from Cartago, where mills located there record fixed effect mark-down measures over 15 US cents/kg higher, the regions adjacent to the Central Valley have coefficients that are insignificant, implying that their mill specific mark-down measures are not statistically different from mills in the Central Valley. This is also true for the most remote coffee growing region, Guanacaste, where Fairtrade intervention is concentrated. The estimated coefficient for the Guanacaste regional dummy (zgua) is not significantly different from zero implying mills located there do not have mill specific fixed effect measures of market failure significantly different from those of the Central Valley, despite its isolation and monopsonistic potential. It may be tempting to see this as a ‘Fairtrade effect’, as six of the 10 mills located in Guanacaste became Fairtrade mills. Recall, however, that Fairtrade effects are already controlled for in the estimated fixed effects from the first stage equation of Table 6. It is therefore unsurprising that, when calculated for the period before and after Fairtrade intervention, the mill specific fixed effects for the Guanacaste mills as a group are not statistically different pre and post Fairtrade.<sup>48</sup> A more likely explanation of the poorly determined Guanacaste coefficient is a correlation with the cooperative dummy: Six out of 10 Guanacaste mills are (Fairtrade) cooperatives.

### *Summary of empirical results*

In demeaning the data, the fixed effects formulation eliminates the geographic and cooperative dummies, making a second stage WLS regression necessary to retrieve these effects. The overall picture that emerges is that vertically integrated foreign owned firms (own), Fairtrade mills (ft) and cooperative mills (coop) all have the effect of lowering the mark-down measure for mills, to the tune of 5 to 20 US cents/kg. A similar, but smaller impact is true for the proportion of SHB in the harvest and the age of the mill in the sample. Milling firms with multiple mills across the country record higher mark-down measures than their counterparts and, with the exception of Guanacaste, more remote mills record higher mark-down measures than those of the Central Valley.

A starting point to the policy consequences to be drawn from the empirical analysis above, lies in the testing the stylized hypotheses introduced in Section VI. First, stylized hypotheses (i) and (ii) imply that non-cooperative mills with mark-down measures greater than cooperative mills (or, conversely, smaller mark-down

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<sup>48</sup> The t-statistic for the difference between two means upholds the null of no differences in average fixed effects for Guanacaste mills at -0.15. More complete tests, such as the Chow Test, for separability are not conducted for two key reasons: First, the null of non sample separation of the data could not be consistently rejected in earlier estimations. Second, in addition to the fact that the simple Chow test for separability is inappropriate for variance component models like the fixed effects models, separating the data along Fairtrade lines, for example, would render the Fairtrade policy variables time invariant in the post-Fairtrade period and would not be estimated by the fixed effects model in any event.

measures for cooperative mills) evidence the exercise of market power. Formally, this is equivalent to a test of:

*Hypothesis Test 1*

$$H_0: \hat{\beta}_{\text{coop}} = 0$$

$$H_a: \hat{\beta}_{\text{coop}} < 0$$

From Table 7, it can be seen that the estimated coefficient  $\hat{\beta}_{\text{coop}}$ , is statistically significantly less than zero.<sup>49</sup> That is, the null hypothesis that cooperative and non-cooperative mills have the same mark down measure is robustly rejected in favor of the alternative that on average and *ceteris paribus*, cooperative mills have lower mark-down measures than non-cooperative mills. According to the institutional framework for identifying market failure explained in Section VI, this is taken as evidence that despite the best efforts of Icafé and Law 2762, *market power is exercised by some mills in Costa Rica*.

The second key result refers to the stylized hypothesis about a Fairtrade efficiency effect. The estimated coefficient for the Fairtrade status dummy variable is significant in (7).<sup>50</sup> Recall that all Fairtrade mills are also cooperatives. Since the cooperative dummy is not in the first stage fixed effect, the interpretation of the fixed effects estimator for Fairtrade is that, on average and *ceteris paribus*, Fairtrade mills record mark-down measures that are almost six US cents/kg lower<sup>51</sup> than non Fairtrade, non-foreign owned, single plant mills, *including other cooperatives*. If it is maintained that cooperatives do not exercise market power, then a separate Fairtrade effect has an efficiency interpretation. This is returned to below. Finally, it is notable that only once a number of unknown mill characteristics are controlled for in the fixed effects formulation is the Fairtrade effect discernable (see footnote 50). This result is intuitive—there is a lot of mill-specific information that is simply unknown, including proportions of zoned coffee, exact destination markets, access to niche markets, proportion of unripe coffee, role of other NGOs and other interventions, etc. It is for this reason that the fixed effects formulation is so very useful: Claims of the benefits of Fairtrade are notoriously difficult to attribute to Fairtrade in commodity markets with many actors and many factors (Ronchi 2002b), many of which are unknown. Controlling for them is the only way to isolate a Fairtrade effect.

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<sup>49</sup> This result is robust across all version of (7) and (8) estimated using pooled OLS, between and fixed effect estimators (see Ronchi (2005) for a complete set of results).

<sup>50</sup> This result is only true only once mill-specific fixed effects are controlled for in the fixed effects formulation of (7). Pooled OLS and between estimators for the Fairtrade coefficient (see Ronchi (2005) ) are not significant.

<sup>51</sup> It is important to recall that this fall in the mark-down measure is not due to the oft-superior Fairtrade price (US \$1.26/lb) as the data for  $p_R^*$  in  $(p^* - p_R^*)$  do not include the Fairtrade premium. Any effect must be attributable to the other Fairtrade effects such as capacity building, export technical assistance, organizational support, liquidity, credit, etc.

There is a third result from the econometric analysis of the chapter that may be important for policy, both generally and in characterizing the role of Fairtrade in terms of an ‘efficiency effect’. This has to do with the robust and consistently negative estimated coefficient for the foreign-ownership dummy. In the fixed effects estimation of (7), on average and *ceteris paribus*, foreign owned mills record mark-down margins that are almost 20 US cents/kg lower than domestically owned, single-plant, non-Fairtrade mills. Without knowing (or estimating) the input demand curve for foreign owned firms, it is impossible to conclude that foreign-owned mill/exporters are not exercising market power, but it is clear that producers receive lower mark-downs from these firms than from the control group described. It is not inconceivable that much of this can be attributed to the superior efficiency of these firms. This is interesting because it contradicts the oft-made conclusion in value chain analyses of coffee that multinationals are responsible for the shrinking shares and falling returns of coffee farmers. Furthermore, the Fairtrade effect can be contextualized with respect to this result and that of the estimated coefficient of cooperatives. Specifically, if the estimated coefficient on cooperatives is seen as the ‘no market power effect’ then one way to understand the role of Fairtrade as a development policy is to test whether the ‘Fairtrade effect’ is one of bringing levels of efficiency for cooperatives only enjoyed in this analysis by vertically-integrated foreign owned mills. Consider the following hypothesis:

*Hypothesis 2*

$$H_0: \beta_{ft} + \beta_{coop} - \beta_{own} = 0$$

$$H_a: \beta_{ft} + \beta_{coop} - \beta_{own} \neq 0$$

The relevant F-test is  $F(1,2221) = 0.11$  and the null hypothesis cannot be rejected. It would appear that the effect of Fairtrade on cooperatives is exactly equivalent to the effect of vertical integration and foreign ownership on domestically-owned non-cooperatives.

## VIII. Policy Consequences

The interface of Fairtrade NGO activities with other policy making spheres makes the assessment of the role of Fairtrade in overcoming the market factors limiting producer returns in internationally traded commodities like coffee, an informative one. Using an original data series collected from fieldwork, the paper assesses the market power justification and wider Fairtrade effect of Fairtrade intervention in the Costa Rican input market for coffee cherries. This assessment takes place in the context of the information theoretic approach to development, which places the underlying causes of the observed crisis facing producers at the heart of corrective policy. Having identified market power and a lack of capacity with producer organizations at the heart of the low share of producers in coffee prices, Fairtrade is therefore assessed by establishing the extent to which these underlying problems are seen to exist in Costa Rica and to measure the effect of Fairtrade in overcoming these. The econometric results of this assessment also imply policy consequences for the Costa Rican government and similar initiatives, as well as informing on the potential effectiveness of the international donor group commodity policies. This section discusses the implication of the empirical results with these three areas of policy.



### *Policy Implications for Costa Rica*

The data work briefly described above permitted the construction of a series of continuous variables,  $(p^* - p_R^*)$ , that measure the mark-down of producer prices from the level that prevails at the point where average processing costs are minimized in perfect competition. As such, the measure potentially informs on both scale inefficiency and market power. In maintaining the not unreasonable assumptions that cooperatives do not exercise market power, are strictly more scale inefficient and at least as (productively) inefficient as non-cooperative firms, the existence of any mill/exporters with mark-down measures higher than those of cooperatives is taken as evidence of market power. The results of the previous section indicate that cooperative mills do in fact have robustly statistically significant lower mark-down measures than domestically owned, non-cooperative, single-plant mills. In other words, that despite legislative best efforts, it appears that mill/exporters in Costa Rica can still exercise market power.

One of the contributions of the analysis, then, is to reveal the existence of a group of mills that are able to mark producer prices down below levels that can be explained by scale inefficiency and cost recovery. This is not to say that mill mark-down behavior conducted in order to recover costs is not detrimental to producers. Rather, in the first instance, it justifies the preoccupation of both national legislation and Fairtrade intervention with mill market power. This identification of market power using cooperative mills is necessary to evaluate the performance of government and the intervention of Fairtrade in this respect. The market power identification procedure used in this paper does not permit the identification of every incidence of market power (for example, it is entirely feasible that there are mills of superior efficiency whose market power margin is less than the relative inefficiency of cooperatives and therefore not identifiable in the analysis), but only that it generally exists among at least one specific group of mills, on average and *ceteris paribus*. As such, the results cannot guide Icafé in mill-targeted corrective measures; it can only indicate the broad mill characteristics that appear conducive to the exercise of market power. The robustly significant time dummy coefficients also provide a clue as to the factors that contribute to mark-down behavior. Specifically, the higher mark-downs that occur in times of upheaval (e.g. price spike years) indicate that at the heart of the ‘government failure’ to mitigate market power, may lie information.

It has been asserted that observed mark-downs might also occur as firms attempt to recover costs which are above the level prevailing at MES. Regardless of the reasons that mill/exporters may mark down producer prices, the mechanism by which they do so, by registering low valued contracts, indicates that whilst the market power motivation behind the original design of Law 2762 was justified, the reasons for that market power were not addressed. It has been seen that over the period of study Icafé simply does not have the resources or information to monitor contract prices for authenticity, in the exact same way that fieldwork with farmers indicated that they did not have the market information to monitor the prices their harvest was being sold for. In some way, the primal role of information was recognized, only recently, by Icafé with the development of new, more sophisticated, monitoring tools based on up-to-date market information. Finally, in promoting foreign direct investment in the coffee sector and exercising a comparatively light touch in commodity regulation, Costa Rica has got it right: The econometric analysis indicates that multinational

mill/exporters have mark-down measures, on average and *ceteris paribus*, some 20 US cents/kg lower than the control group of domestically owned, single plant non-cooperative firms.

The Costa Rican regulatory system is costly in its reliance on annual studies and extensive contract registration and producer price calculation procedures. It could be argued that if information is essentially at the heart of the exercise of market power and the mark-down of producer prices, then perhaps legislative resources are better spent in providing greater market information to producers and promoting their mobility for harvest sales. On the other hand, the paper does not (and cannot) inform on producer price mark-down behavior in the absence of Law 2762 altogether. What is certain is that, whether to check market power or to prevent the subsidization of inefficient mills by producers, better contract price information to limit the mark-down on producers would improve the effectiveness of Costa Rica's coffee policy.

### *Policy Implications for Fairtrade*

What is the role of Fairtrade in overcoming the market factors limiting producer returns in internationally traded commodities like coffee? The results of the previous section inform on the key research question in two important ways: First, until now, in the absence of empirical evidence, it has been difficult to assess, on non-ideological grounds, the effectiveness of Fairtrade support for cooperatives. Using the information theoretic approach as a starting point, Fairtrade support for cooperatives as a policy is effective only if doing so corrects for the underlying causes of the problem of low shares for producers in commodity markets. Specifically, Fairtrade intervention with cooperatives in the coffee market is partly aimed to mitigate market power. Since it is argued above that, by definition, cooperatives do not exercise market power, the only way to assess the Fairtrade role in mitigating market power is to ascertain if there is any evidence that market power exists at all. If there is no evidence for market power in the market, then (unless it is maintained that Fairtrade corrected for market power in the national market as a whole) this conclusion could not be drawn. The provision of qualified evidence for the exercise of market power in Costa Rica justifies the Fairtrade intervention on the grounds of market power. Since a Fairtrade mill is by definition a cooperative mill, and it is relative to cooperatives that market power has been identified, a stronger statement may be tautological. What is clear is that smallholder coffee farmers face market power at the farm-gate, *even in socially protective Costa Rica*. It is this that permits a generalization of the results to commodity producers in countries with weaker (cooperative and legislative) contexts than Costa Rica. The extent to which cooperatives are operating accountably (and in countries with a weaker solidarity context, this is partly endogenous to Fairtrade efforts) determines the extent to which Fairtrade is effective in tackling one of the problems underlying poor returns for producers.

The second important result concerns the identification of a statistically significant 'Fairtrade effect', separate from the cooperative effect. The fixed effects coefficient for Fairtrade mills estimated provides evidence that, *ceteris paribus* and on average, the mark-downs associated with Fairtrade mills are smaller than those of domestically-owned, single-plant mills, including other cooperatives. That is, there is a separate Fairtrade effect. On the maintained assumption that cooperatives cannot cheat themselves, and Fairtrade mills are cooperatives, one interpretation of this result is that Fairtrade support for cooperatives in Costa Rica results in an improvement in

their (scale) efficiency that reduces the mark-downs of producer prices. For example, one of the main determinants of scale efficiency in Costa Rica is the early assurance of a sufficient harvest from producers. Although the Fairtrade premium was not included in the price series used for the analysis, the retention of a portion of that premium by Coo café and its member cooperatives (see Section V) may provide the liquidity other cooperatives desperately need to secure volumes. Similarly, the social and welfare projects initiated and supported by Fairtrade cooperatives may command loyalty from producers that other cooperatives cannot. What is apparent is that producers organized in Fairtrade cooperatives face lower mark-downs to their prices than domestically owned, single-plant mills of both cooperative and non-cooperative structure.

### *Commodity Policy Implications*

The policy implications for Costa Rica and for the Fairtrade movement also inform on the ‘new’ commodity policy for coffee described in Section III in four key ways. First, it is clear that policies aimed at improving the premiums earned by producers are only effective to the extent to which those premiums are passed on. Second, the evidence of mark-downs from the level of producer prices that would exist if all mill/exporters were operating at their minimum efficiency scales supports the new policy emphasis on efficiency and reducing costs. It is important to note however, that the evidence in Costa Rica indicates that it is not necessarily *farmers* that are the inefficient agents. Third, the existence of a separate ‘Fairtrade effect’ indicates that it is, in fact, possible to develop relatively efficient and organized producer groups. This, it will be recalled, was one of the main challenges and critiques of the new commodity policy. For example, how to deliver market-based price risk mitigation tools to disparate small producers. The result from the previous section that the combined cooperative and Fairtrade effects is statistically equivalent to the multinational effect can be interpreted that Fairtrade does for cooperatives what multinationals do for non-cooperatives. In this sense, Fairtrade has potentially an important role in the new commodity policy context and its search for ‘delivery vehicles’ for its policy tools. Finally, the result concerning the superior returns, *ceteris paribus*, accruing to producers who sell to vertically integrated multinational firms in Costa Rica lends support to the new policy emphasis on partnerships (...achieving quality based competitiveness takes time. This process is greatly aided by partnerships and match making arrangements with the private sector (including foreign firms)..” (Varangis, *et al.* 2003c, p.45). Furthermore, the sizeable and significant coefficient on multinational mill/exporters in Costa Rica indicate that contrary to the policy advice emanating from the value chain literature, vertical integration of highly concentrated trading firms into processing in Costa Rica has in fact increased the returns accruing to coffee producers.

## **IX. Conclusion and Future Directions for Research**

Falling and volatile real prices for coffee entail a crisis of development for fully one-quarter of the world’s agricultural commodity producers. The global causes for the most recent crisis in coffee include permanent structural changes to supply and demand. With the demise of international price support arrangements, this has led coffee commodity policy in new directions. Specifically, it has been seen that policy

has come to focus less on trying to ‘fix’ low and volatile prices, and more on enabling producers to increase their share of existing returns and to cope with the volatility. In addition to developing safety nets and promoting diversification out of coffee, therefore, policy prescriptions emanating from the multilateral donors and major industry bodies rely on market risk management tools. They also aim to increase the returns to producers through a reduction in their costs and an increase in their access to premium markets.

The Fairtrade movement also recognizes a number of factors that reduce the returns to producers and bases its justification for intervention in commodity markets on these. At the level of LDCs, these factors include market power at the farm-gate, a lack of capacity in producers and their organizations for direct market access and other capacity and information failures. That Fairtrade justifies its intervention on the basis of these is seen not only through their rhetoric, but in their active and targeted support of cooperative producer organizations. In its motivation and *modus operandi*, then, Fairtrade reflects elements of both the new international commodity policies, as well as of the older national commodity market policies of LDCs. As an example of the latter, the preoccupation with market power had been the impetus for numerous marketing board and producer price arrangements in the South. It was certainly the motivating force behind the elaborate regulatory system of Law 2762 in the Costa Rican coffee industry. This question is addressed through a case study of the Costa Rican coffee market. Using an original data series collected from fieldwork, this paper preliminarily assesses the market power justification and wider Fairtrade effect of Fairtrade intervention in the Costa Rican input market for coffee cherries. The results of the analysis simultaneously inform on the role of Fairtrade and, where this interacts with national and international policy tools, on the wider coffee commodity policy environment.

#### *Future research*

The analysis creates and makes available a firm-level panel data set of 21 variables over 26 years for the Costa Rican coffee sector. The data set includes price, quantity and cost data and a variety of mill-specific characteristics including size, geography, bean type and industrial organization variables, as well as tax and policy variables. The process of collecting a coherent series provides a wide scope for further research in the Costa Rican coffee sector. The work undertaken for this analysis rendered the data set usable and provided an overview look of farm-gate pricing behavior in a selected commodity market, and the determinants of such.

Recall that the research question addressed here had a wider scope than the measurement of market power. As such, the measure used only informs broadly on the market power question. Future research specifically aimed at the measurement of input market power in Costa Rica is desirable, not only in its own right, but to inform on the methodological identification procedure used in this application (namely, the reliance on cooperatives as the inefficient but honest benchmark).

Other directions of future research include explicitly modeling the process by which Fairtrade cooperatives are chosen. Although the empirical work of the paper establishes a baseline result and methodology for assessing Fairtrade intervention, it is worthwhile thinking whether the selection of Fairtrade cooperatives can be

characterized and, importantly, whether doing so matters for the assessment of Fairtrade (see also footnote 46).

Finally, the extension of the approach used in this paper to other coffee markets, or indeed, to other commodity markets, is desirable, particularly if the data supports the identification of multinational firms. This is to test the generalizability of the results found in Costa Rica concerning how producers fare in trade with multinationals. Certainly Fairtrade and multinationals make strange bedfellows, but the evidence suggests that value chain opposition to vertically integrated multinational firms in coffee on the grounds of producer welfare may be misguided.

### *Conclusion*

In sum, underdevelopment is not simply a question of insufficient resource endowment, but rather about the organization of the economy generally and the functioning of its markets in particular. By placing the organization of the economy (rather than the specific level of resources) at the center of development analysis, the information theoretic approach to development calls for "...a better understanding of the *microeconomics* of LDCs" (Stiglitz 1989, p.202). That is, if development is impeded by failures in the functioning of the market, only policy that specifically addresses those failures can lead to development.

The paper empirically evaluates the role of (non-Fairtrade price) Fairtrade intervention in international commodity markets. The failure of market power and low producer capacity in coffee markets in LDCs are identified as underlying causes of the low share of coffee returns faced by producers. In these respects at least, the role of Fairtrade is effective. Its support for cooperatives in mitigating market power is found not to be misplaced in Costa Rica. Fairtrade mills also improve the returns to farmers through the improved efficiency of their organizations. Finally, the result that the sum of the coefficient quantifying the impact of cooperative organization on mill fixed-effect mark-downs and the separate 'Fairtrade effect' on mark-downs is not statistically distinct from the estimated coefficient on the effect of multinational firms, is an interesting one. One interpretation is that Fairtrade does for cooperatives what vertical integration into multinational firms does for the non-cooperative domestically owned firm. If that interpretation is accepted, then the decision to support Fairtrade or foster further foreign direct investment requires other information about the costs and benefits of Fairtrade. This may be the topic of a wider study on the role of Fairtrade in internationally traded commodities like coffee.

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