Quality Incentives and the Development of High-value Agrifood Markets: Ecuador's Cacao Marketing Chain

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(Abstract)

This thesis explores constraints to the development of markets for high quality cacao in Ecuador. It focuses on the role of market level constraints, particularly the transmission of quality incentives along the marketing chain and their effects on farmers' incentives to invest in quality production. Chapter 1 introduces the reader to the problem, demonstrating that Ecuadorian farmers are not responding to international incentives to produce high quality cacao, and outlines the objectives, hypotheses, and structure of the thesis. Chapter 2 provides background to the market, detailing Ecuador's role in world commodity and high-value cacao markets and gives a detailed description of the cacao market in Ecuador. Chapter 3 uses a subsector analysis to develop and test hypotheses that specific market level constraints, such as transaction costs, market power, and institutional constraints, impede the transmission of incentives to produce quality to farmers. The subsector analysis failed to support the hypotheses that intermediaries are able to exert market power but found that transaction costs and weak institutions presented significant constraints to the transmission of quality incentives. Chapter 4 examines the determinants of farmers' market channel choice and the prices that they receive. In addition to determinants that are commonly found in the literature, such as the characteristics of the transaction and farmer's characteristics, hypotheses testing of quality incentives makes a unique contribution. Analysis of survey data of Ecuadorian farmers found minimal transmission of quality incentives to farmers—only the cultivar *Nacional* as a quality indicator was found to affect the farmers' market channel choice out of six indicators selected to represent quality. The quality indicators selected were pre- and post-harvest practices, variety, having received technical assistance, credit, belonging to a cacao association, and discounts at sale by the buyer. Also, pre- and post-harvest practices, having received credit, and belonging to a cacao association out of similar quality indicators were found to affect the price paid to the farmer. Finally, Chapter 5 summarizes the main points discovered through the research, discusses policy implications, and proposes further research needs.

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Chapter 1. Introduction

"The food of the gods," as cacao was called 500 years ago when the Spanish came upon it in South America, remains a precious commodity in the world. As news of chocolate's health benefits has spread and gourmet interest has piqued, demand for cacao, particularly of the highest quality, has likewise expanded. There are two broad categories of cacao beans in the world market. One is "high quality" cacao, a differentiated product known among chocolate specialists as "fine cacao." The second is a "commodity" cacao, a standardized but not quality-differentiated product that tends to come from modern varieties developed for high yield, low cost, and other attributes at the expense of the unique quality attributes, which are in demand among differentiated cacao consumers (ICCO 2003).

Cacao was Ecuador's most important agricultural product and an emblem for the country until the 1930s when Witches Broom (*Crinipellis perniciosa*) disease killed the majority of the plantations. Today, cacao continues to play a crucial role in Ecuador's economy, contributing to: 1) foreign exchange earnings, as cacao is one of Ecuador's top five agricultural exports and contributes between 3% and 5% of total export earnings (Collinson and Leon 2000) and 2) the livelihood of approximately 90,000 cacao farmers, most of whom are resource poor and operate on less than 10 hectares (according to representatives from PRONORTE a USAID project and the non-governmental organization (NGO) *Conservación y Desarrollo*). Nevertheless, the economic role of cacao in Ecuador is marginal compared to its potential, and the need to increase the quality and productivity of the country's cacao sector is broadly appreciated. In other words, there is a market for high quality (fine) cacao, but Ecuador is not fulfilling its potential as a producer of high quality cacao as reflected by the International Cocoa Organization's[1] (ICCO) decision to downgrade its quality rating on world markets in 2005 (Crouzillat et al 2000, Rosero 2002). This downgrading has implications for cacao markets since Ecuador produces more than 50% of the fine cacao in the world (Rosero 2002), for rural development, and particularly for

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[1] The International Cocoa Organization monitors the world market and administers the Cocoa Agreements concluded among the governments of cocoa-producing and cocoa-consuming countries, under the auspices of the United Nations. ICCO is a global organization, established in 1973 to put into effect the first International Cocoa Agreement which was negotiated in Geneva at a United Nations International Cocoa Conference. There have been six Agreements. The Sixth International Cocoa Agreement was negotiated in Geneva in 2001 and came into force provisionally on October 2003. On November 2005 the Agreement was definitively into force (ICCO 2007a).

small farmers' welfare, as small farmers are responsible for 75% to 95% of Ecuador's cacao production (representatives from the German Cooperation Agency (GTZ) and NGO *Conservación y Desarrollo*). Opportunities are available for small farmers to increase their incomes through the production of high quality cacao, which receives premium prices on the world market. Ecuador's failure to produce to its potential is superficially attributable to small farmers' lack of investment in production and poor pre- and post-harvest management practices. Considerable documentation shows the low productivity of cacao plantations and that Ecuador is the lowest yielding cacao producing country in the world. USAID (2006) estimates yields of 200 pounds of dried cacao per hectare, while SICA (2003) is more optimistic with estimated yields of 500-600 pounds per hectare per annum. These low yields are caused at the farm level by a combination of factors including lack of training, limited technology transfer, no access to loans, limited use of inputs due to the high cost of fertilizers and labor, poor crop management practices, old plantations, and the prevalence of diseases such as Monilia (*Monilia roreri*) and Witches Broom (SICA 2003, INIAP 2006, Rosero 2002). In fact, most farmers would more correctly be characterized as gatherers of cacao, rather than cultivators.

Farmers can increase their yields and enhance the quality of their product by following crop management practices such as pruning for disease control, plantation maintenance and plant recovery; fertilization, irrigation, and replacement of old trees; and by undertaking post-harvest practices such as fermentation and drying (NGO ACDI-VOCA 2006). Fermentation and drying involve relatively simple technologies and specific, but easily mastered techniques. For example fermentation, which must be completed before drying, can be adequately performed using wooden boxes that are ventilated, drained, and protected from rain and wind. Likewise, drying can take place on a clean, protected concrete or wooden surface. In reality, however, inadequate and highly variable post-harvest management practices are the norm. For example, when one travels Ecuador's roads in the cacao producing regions, it is very common to see cacao being dried on the pavement at the side of the road with no protection from pollution by cars, animals, and people who might be passing through. Likewise, many farmers are simply unaware of the need to ferment cacao before drying it and dry it without any fermentation which has direct implications for quality. In addition to the pre- and post-harvest management practices that farmers can use, they clearly prefer the variety *Nacional* or *Arriba,* which is considered to have a superior quality and is the subject of worldwide demand for high quality cacao. It is important to

observe, however, that there is room for both hybrid (ordinary) and fine cacao varieties in the world market but that segregation of the varieties is key to improving the quality reputation and competitiveness of Ecuador's cacao sector (Exports and Investment Promotion Corporation—CORPEI 2006a).

The proposition of the current thesis is that the failure of small farmers to respond to the market by investing in production of high quality cacao could be due to constraints along the marketing chain: impediments to the transmission of quality incentives, specifically price incentives for high quality cacao, to farmers. Therefore, the objectives of this research are to: a) develop hypotheses that quality incentives are not transmitted along the marketing chain and test those hypotheses using qualitative subsector analysis, and b) test hypotheses that quality does not affect the farmers' market channel choice or the price farmers received by using econometric analysis of survey data.

Field research was carried out in two phases from May to August 2006. First, qualitative research techniques were employed in the implementation of a subsector analysis that was used to gain a broad understanding of the market and identify and develop hypotheses. The subsector analysis included rapid reconnaissance techniques to gain a broad understanding of the cacao subsector, identification of key informants, and 38 in-depth semi-structured interviews conducted with 46 people along the marketing chain. Second, as the qualitative portion of the field research was concluded, a farmer survey was developed and pre-tested then implemented with farmers in the three major cacao producing provinces of Ecuador. A total of 327 surveys were conducted during the field research period with cacao farmers from: Los Ríos, Manabí, and Guayas. These provinces together account for 72% of Ecuador's total cacao production (INEC 2006). The farmer survey collected data on the farmers' most recent cacao sale, their farm and household characteristics, their cacao production activities, and their exposure to outside influences that might affect their production and market choices, such as technical assistance programs.

In addition to the farmer survey, an intermediary survey was conducted in the same areas where farmers were surveyed. The sample size for the intermediary survey was 33. The intermediary survey results were used primarily to contribute to the researchers' understanding of the market and for descriptive statistics and the data were not included in the econometric analysis.

The thesis consists of four main chapters which report on separate phases in the research undertaken to address the objectives. Chapter 2 presents a background on Ecuador's cacao market. It is based on a review of literature and preliminary analysis of secondary data on the role of Ecuador in the world commodity cacao market and in the high quality cacao market. The literature review presented in Chapter 2 gave insight into the structure and organization of the market and current knowledge about its performance, which, in turn, guided the field research. It also provided the background to the market that inspired hypotheses about potential constraints to cacao market development that were explored in Chapter 3. Chapter 4 builds on the results of Chapter 3 to address specific issues that the qualitative field research indicated needed further research. The specific focus in Chapter 4 is on farm-level behavior. A particular contribution of this chapter is the exploration of how quality incentives affect market channel choice and the price received by the farmer. Chapter 5 presents conclusions to the thesis research, synthesizing the results of the previous chapters. It also provides some recommendations that may be of interest to policy makers interested in strengthening agri-food marketing chains through incentives for quality production.

Chapter 2. Background: The Cacao Market in Ecuador

2.1. Ecuador's Role in the International Commodity Cacao Market

Ecuador is the seventh largest cacao producer in the world by volume of cacao beans (FAOSTAT 2007). Considering all cocoa products' exports, it is in the top ten as it is displayed in Table 2.1.

Table 2.1. Countries' ranking of the value of exports of cocoa products

Countries	Average annual value of exports, 1994-2004, thousands of dollars (real)
Côte d'Ivoire	1,579,945
Netherlands*	1,009,312
Ghana	442,931
Indonesia	425,681
France*	276,754
Cameroon	167,666
Brazil	157,762
Germany*	136,644
Belgium*	124,151
Ecuador	112,016

Source: United Nations Conference on Trade and Development (2005).

*Netherlands, France, Germany and Belgium are not producers.

Ecuador cacao bean exports are increasing as shown in Figure 2.1 with the exception of 1997/1998 season which coincides with El Niño weather conditions that caused excess humidity, flooding, and transportation problems affecting cacao exports (University Corporation for Atmospheric Research 2007). This tendency follows the world consumption (measured by total world grindings of cacao beans), which between 1997/98 and 2006/07 generally followed an upward trend, growing at an average rate of 2.6% per annum (ICCO 2007b).

Figure 2.1. Ecuador cacao exports, 1990-2005.
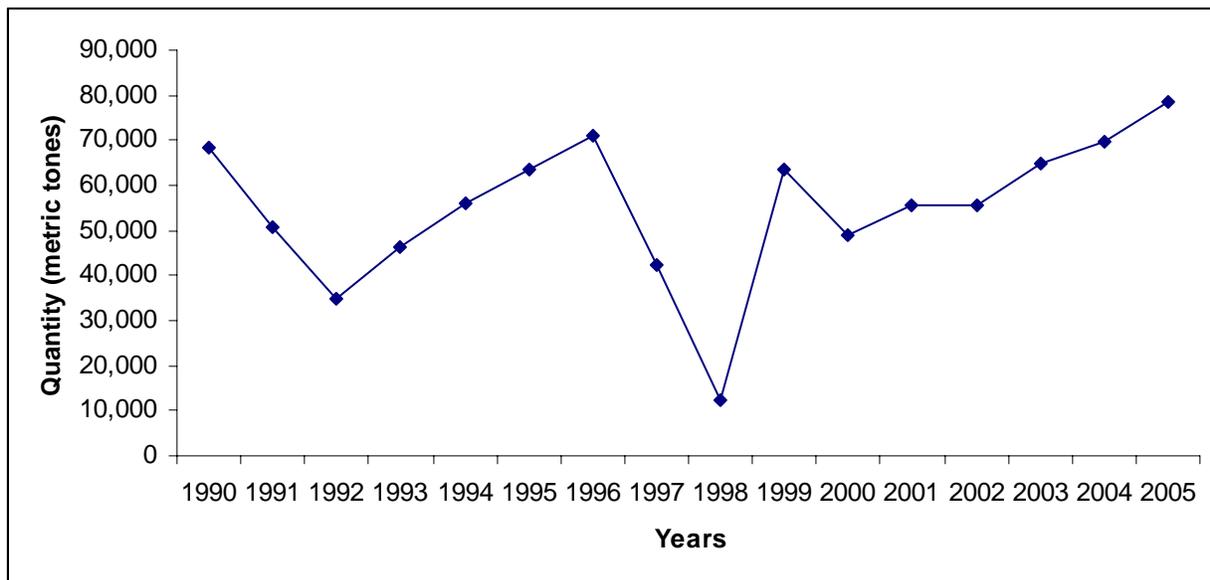
Source: FAOSTAT data.

The real value of the Ecuadorian cacao exports follows a similar trend as the quantity exported and is presented in Figure 2.2, with the exception of the low value of exports in 1999/2000, which reflected low world prices due to a world surplus of cacao in 1998/99 and 1999/2000 (ICCO 2007b).

Figure 2.2. Real value of exports of Ecuadorian cacao beans, 1990-2005.
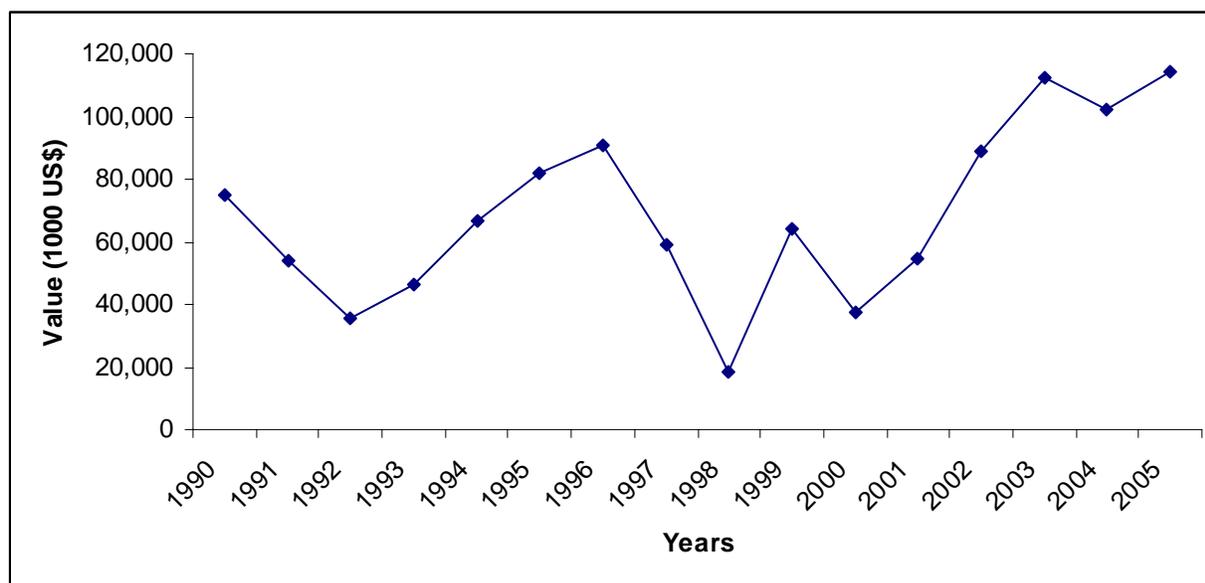
Source: FAOSTAT data.

The major buyers of Ecuadorian cacao are the United States, Japan, the Netherlands, Germany, Italy, France, the UK and Switzerland (CORPEI 2006b).

2.2. Price Determination and Quality Incentives on the World Cacao Market

Following the liberalization of marketing systems in the nineties, farm-gate prices in most cacao producing countries are now largely determined by international prices. As a result, farm-gate prices have shown greater fluctuations in most cacao producing countries reflecting: changes in international cacao prices, variations in the international value of the domestic currency, and specific local market structures and conditions, including taxation, competition, distance from port, and quality (ICCO 2007b). Worldwide, nominal farm-gate prices have tended to decline since the late 1990s; however, Ecuador and Ghana are exceptions to this tendency as nominal prices increased until 2002/03 and 2003/04, respectively, partly reflecting strong domestic inflationary pressures over the period (ICCO 2007b).

Cacao export prices are determined by the New York and London stock markets and fluctuate with them. According to the New York Board of Trade (NYBOT 2004) the difference between the specific futures contract price and the cash price for the commodity at the local

delivery point is called the "basis." Normally, the futures price (in the case of a physical commodity) should be equal to the present cash price plus the amount of storage, insurance, etc. (carrying charges) necessary to carry the commodity to the delivery month of the contract, as well as expectations about market conditions at the time of contract maturation. In addition, basis pricing can also reflect the location (port of delivery) and the quality of the commodity. For example, a particular cacao from a specific country might trade at a negotiated premium or discount to the futures price. In other words, physical cocoa contracts incorporate the different national characteristics of the cacao bean quality to calculate premiums and discounts based on the country of origin (Abott et al 2005).

Ecuador's cacao exports have historically earned a premium on the New York Stock Exchange (NYSE) price due largely to the indigenous variety (*Nacional* or *Arriba*) from which it is produced. Since the 1930s, however, there has been a gradual increase in the use of hybrids formed from Trinidad and Venezuelan clones that are selected for resistance to Witches' Broom disease. As the number of trees planted from these hybrids has increased, the quality of cacao being exported has declined due to the mixing of beans of different varieties and quality levels. This mixing has led to a reduction in the perceived quality of Ecuador's cacao exports, as reflected by the International Cocoa Organization's (ICCO) 2005 decision to reduce Ecuador's export rating from 100% to 75% fine or flavor cacao. This downgrading was accompanied by a threat to reduce the rating even more, towards 50%, in the future. This downgrading has been observed to be both a cause and effect of a decline in the status of Ecuador's cacao sector—it is an effect in that it is the result of a general decline in quality as high quality cacao becomes scarcer. It is also a cause as the downgrading negatively affected prices received by exporters (Crouzillat et al 2000, Rosero 2002).

CCN-51 is a hybrid variety that plays a small, but gradually increasing, role in Ecuadorian cacao market, which shows the relative contribution of *Nacional* and CCN-51 varieties to Ecuador's cacao exports over the past nine years (Figure 2.3). CCN-51 produces higher yields; however, according to the National Autonomous Agricultural and Livestock Research Institute (INIAP) and to the NGO ACDI-VOCA, to produce CCN-51 more investment is needed than to produce *Nacional*. This cost increase is confirmed by the farmer survey, which showed that farmers cultivating CCN-51 spent on average 77% more on pesticides applications and labor than farmers cultivating only *Nacional*.

Figure 2.3. Ecuadorian exports in metric tones by variety from 1998 to 2006
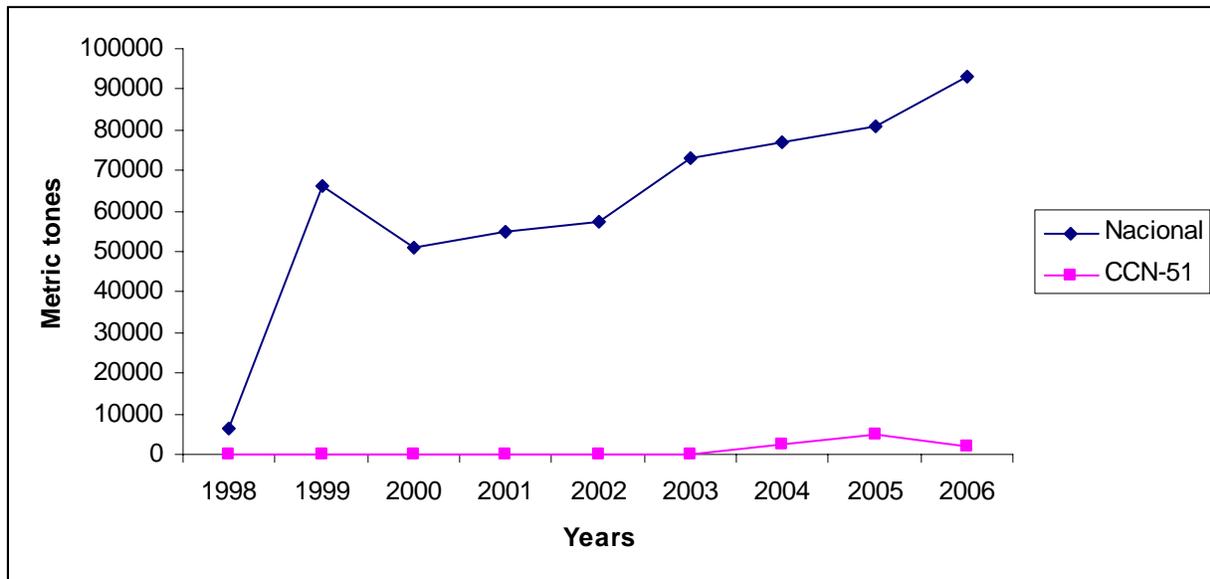
Source: Data provided by the National Cacao Exporters Association-ANECACAO

CCN-51 has high yield potential and resistance to common diseases such as Witches Broom and Ceratocytis wilt (*Ceratoystis fimbriata*), making it an acceptable alternative to produce cacao for bulk use in most cocoa products and chocolate formulas. The hybrid can also compete in higher quality markets with careful post harvest care and fermentation, although it does not have the floral aroma that the *Nacional* variety has (Espinoza et al 2006, APROCAFA 2007, USAID 2006). CCN-51 can compete in the world market because its high fat content makes it ideal for the extraction of butter; and consequently, industrial uses of cacao (CORPEI 2006b). In fact, there is market demand for CCN-51 to be used to produce other cocoa products besides chocolate bars (USAID 2006).

According to USAID (2006) the Ecuadorian market does not differentiate price between *Nacional* and CCN-51 varieties, nor is there an effective institutionalized means to segment them as they move along the marketing chain. Thus, despite CCN-51 belonging to a lower quality market, the lack of a price discount for it and the fact that it is higher yielding (for farmers who can pay to invest in it) results in considerable incentive to invest in its production.

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2.3. Ecuador's Role in the International High-value Cacao Market

Fine or flavor cacao is recognized for its unique flavor and color and is produced in countries designated in the International Cocoa Agreement (United Nations Conference on Trade and Development 2001). Markets for fine or flavor cacao, referred to here as "high quality" cacao, are differentiated with respect to varieties, production management, post-harvest processes, etc. that distinguish them from the traditional commodity cacao market.

Although Ecuador is responsible for only 3% of the world production of cacao (World Cocoa Foundation 2006 and FAOSTAT 2006), Ecuador is the largest producer of fine or flavor cacao, accounting for more than 50% of world production (Rosero 2002). Currently, fine or flavor cacao constitutes only 4% of world cacao production (ICCO 2003). High quality cacao forms the basis of Ecuador's cacao markets, constituting 95% of its exports according to a representative from the Cocoa National Exporters' Association— ANECACAO.

2.3.1. Major Buyers

Ecuadorian cacao has a special and unique flavor, highly appreciated by the United States, European, and Asian chocolate industries such as M&M Mars, Nestle Food Corporation, Ferrero, among others (SICA 2003). The appreciation of the unique qualities of Ecuador's cacao, particularly of *Nacional*, has increased (exporter from COFINA and a representative from PRONORTE, a USAID project). Ecuadorian cacao exports classified according to their destination are presented in Figure 2.4. The European Union is considered to be a fine chocolate consumer, and it has the highest share of imports of high quality Ecuadorian cacao compared to other regions (ICCO 2007b). Ecuador's exports to the European Union are upward trending. For instance, Europe has increased its cocoa consumption by 21% from 1995 to 2005 (ICCO 2007b). It is important to mention that Ecuador also produces specialty cacao such as organic, Fair Trade, and Rain Forest Alliance. Although these markets exist, they represent only a small part of the country's production and are not the subject of this thesis.

Figure 2.4. Ecuadorian cacao exports by regions from 1998 to 2006
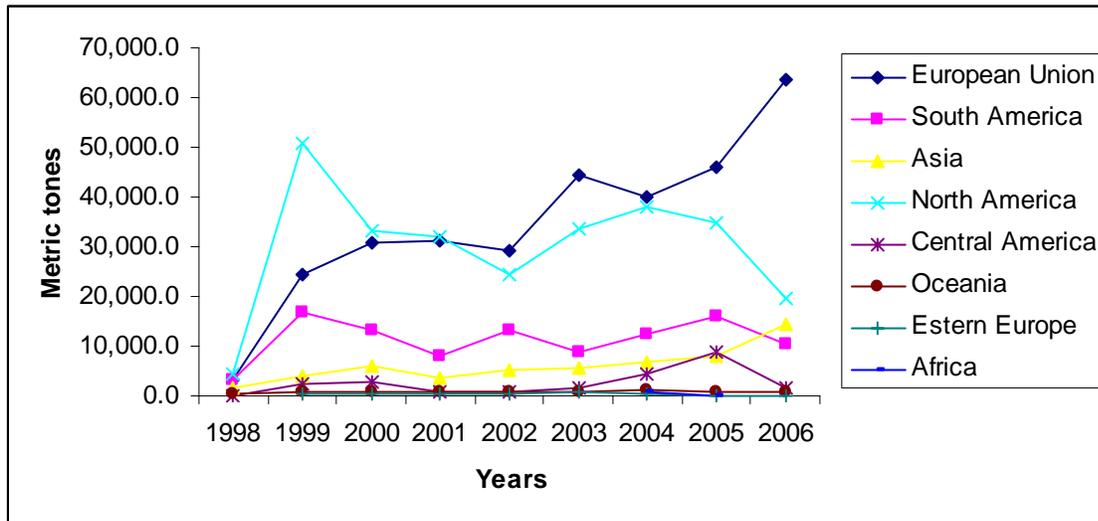
Source: Data provided by the National Cacao Exporters Association- ANECACAO

The global dark chocolate market which is the specific market that consumes fine or flavor cacao is estimated to represent between 5% and 10% of the total market, with a higher share in Continental Europe than in the United States and the United Kingdom (ICCO 2007b). According to Rosero (2002), the major consumer countries of fine or flavor cacao are concentrated in Western Europe including Belgium, Luxemburg, France, Germany, Italy, Switzerland, and the United Kingdom. Japan and the United States also consume this type of cacao. The pace of introduction of new premium chocolate products across the mature markets (Europe, the United States, and Japan) shows that this market has expanded very dynamically during the last ten years. A survey conducted by Ipsos for Barry Callebaut, one of the major high quality chocolate manufacturers in the world, in November 2006 in five European countries (Belgium, France, the United Kingdom, Germany, and Switzerland), with approximately 1,000 individuals per country, showed that between 35% and 57% of the respondents in each country consume dark chocolate (ICCO 2007b, Barrey Callebaut 2006). The growth in the consumption of premium chocolate products is mainly driven by a taste for higher quality flavors as well as increased consumer concern over health and nutrition (ICCO 2007b).

Research conducted on the health and nutritional attributes of cacao and chocolate indicates that some components of cacao, specifically the flavonoids, may decrease low-density-lipoprotein (LDL or "bad" cholesterol) oxidation, helping to prevent cardiovascular diseases. Its

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high content of antioxidants, which surpasses those found in wine and tea, has been proven to reduce the risk of cancer. Subsequently, the demand for dark and high cocoa content chocolate, in particular, has surged in response to these positive findings. Chocolate manufacturers have noticed the changing tastes and even companies traditionally known for milk chocolate products have been introducing new high cocoa-content chocolate products. According to Datamonitor, 33% of all chocolate candies launched in 2006 were dark chocolate products. In the United States, sales of dark chocolate increased by 9% per annum on average between 2001 and 2005 and sales of high cocoa-content dark chocolate increased by 24% according to data published by ACNielsen (ICCO 2007b).

2.3.2. Prices

Chocolate products such as organic, Fair-trade, with denomination of origin, reduced sugar and dark and high cocoa content chocolates command a price premium in the stock markets and can be considered as premium chocolate (ICCO 2007b). High quality cacao, *Nacional* or *Arriba* in Ecuador, accounts for 95% of Ecuador's cacao exports and receives a premium of 20 to 30% over the NYSE cacao price (Nestle marketing representative and large producer and exporter from ORECAO). This premium for Ecuadorian cacao is attributable to a worldwide increase in demand for high quality cacao discussed above (ICCO 2005).

In relation to prices received by farmers, a representative from PRONORTE (USAID project) asserted that unless a farmer sells a clearly differentiated cacao product (for example, organic or Fair Trade certified) the farmer receives approximately 20% of the NYSE price. Farmers who sell certified cacao, on the other hand, can receive prices as high as 70% to 75% of the stock market price.

2.3.3. High Quality Attributes

The findings of a study of the chemical components of *Nacional* cacao support the idea that the sensory quality of cocoa, determined by bitterness, astringency, acidity, cocoa flavor intensity, fruity, floral, and green notes, is the result of both a genotypic contribution and the conditions of several constituents, which are modified during post-harvest processing (fermentation and drying) and roasting (Luna et al 2002). In addition to the genotypic

contribution and to the post-harvest practices and roasting, Rosero (2002) mentioned that crop management practices affect cacao quality, especially the environment where the crop is cultivated, as well as location.

Little information is available at the international or Ecuadorian level about fine or flavor cacao. In fact, according to the World Cocoa Foundation (WCF 2005) there is a project from the Common Fund for Commodities (CFC), ICCO and INIAP on cocoa flavor. Data analysis is underway to combine results from four fine or flavor cacao producing countries (Ecuador, Papua New Guinea, Trinidad, and Venezuela). Flavor profiles of cocoa liquors emphasize the distinct character of fine or flavor cacao from each country and suggest an important environmental effect on flavor as well as a strong genetic influence.

2.4. Marketing Chain Structure, Organization, and Characteristics of Players

2.4.1 Distribution of Production and Structure of the Marketing Chain

Ecuador's 90,000[2] cacao farmers devote approximately 360,000 hectares to cacao cultivation (INEC 2006). Cacao production is primarily concentrated in the coastal-plain region with 85% of the country's total production. The three most important provinces, Guayas, Los Ríos, and Manabí, together account for 72% of total cacao production (INEC 2006) (Figure 2.5).

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[2] 58,466 according to the national agricultural census in 2000, but 80,000 currently according to an exporter from Tulicorp, and 100,000 according to a representative from NGO ACDI-VOCA.

Figure 2.5. Ecuador's cacao area by provinces in 2005
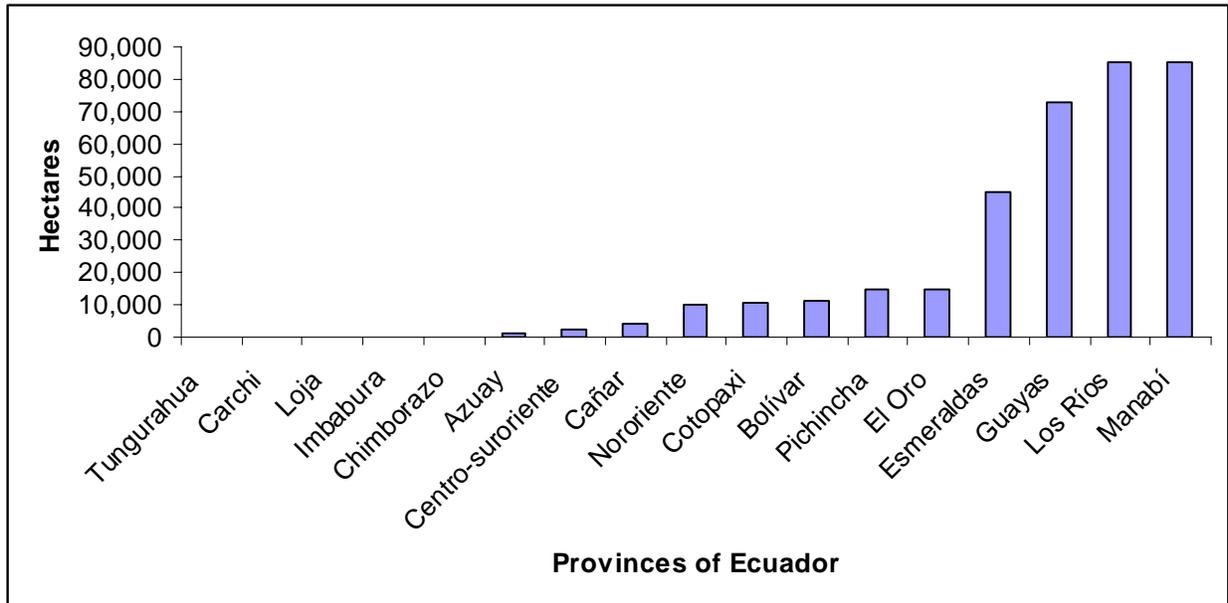
Source: Data from INEC (2006).

There are numerous stages of cacao movement and transactions along the marketing chain. Small farmers in Ecuador typically have poor access to markets (Collinson and Leon 2000), and the majority are unorganized (Menter 2005). They are usually subject to the full marketing chain as opposed to large cacao farmers who are typically able to by-pass intermediaries and sell directly to exporters. That is, small farmers can sell at the farm-gate, or they can travel to the nearest town or city to sell to the local intermediary. In general, farmers prefer to carry their cacao to the buyer than to wait for the buyer to come to their farm, because a) they get a better price and b) few intermediaries are willing to go to the farms to buy cacao due to the expense and risk involved. Expenses include not only the cost of transport but also time and vehicle wear given poorly maintained roads. Risk includes, in particular, car hijacking and robbery as intermediaries travel isolated roads with significant amounts of cash to use to pay for the cacao. In general, buying at the farm gate is not common. In fact, most farmers (70% according to the farmer survey) sell cacao to local intermediaries who are located in nearby community centers or towns, while only 13% sell at the farm gate.

The large number of intermediaries reflects the need to assemble cacao beans in rural areas (Collinson and Leon 2000). Cacao can be collected by traders as they travel along roads

and rivers. These traders collect different quantities of cacao depending on what is available from each farmer and are not known to differentiate price on the basis of quality. The traders' main aim is to acquire sufficient volume to sell to the city. In contrast, the large traders in the towns (wholesalers) are interested in the quality of the cacao that they buy. However, they are mostly interested in the moisture content of the cacao because this can cause transport problems. Secondly, the level of infestation by pest or diseases is of concern. The grain size is left to the export traders (Nelson and Galvez 2000).

Commercial transactions between the traders and smallholders include the *regateo* (bargaining) and the *fiado* (buying on trust/credit). Negotiation occurs over the price and the weight of the product. Generally, the trader has to offset risks and transaction costs[3]. Farmers' most common form of sale is selling cacao in small quantities, which means that they are in a weak bargaining position in relation to the trader. If farmers do not accept the price and weight determined by the trader, they lose the option to sell their cacao. At the same time, the farmers may lose access to the places where they trade (the shops are important sources of market information and contacts) (Nelson and Galvez 2000).

Information relevant to the cacao sector is readily available through newspapers, and radio and television broadcasts. It extends beyond just prices to cover items on production techniques and market conditions. However, as with almost any marketing system in developing countries, the wealthy marketing chain participants typically have the greatest access to high quality information. This information asymmetry disadvantages smallholder producers in price negotiations with traders. In the more remote areas, farmers with limited quantities of product to sell have even less bargaining power because of the scarcity of buyers (Collinson and Leon 2000).

In general, the market for conventional cacao is unstable with respect to prices and quantities. However, the improvement of information technology and transportation networks has played a major role in market stabilization during the last ten to fifteen years. Hence, prices are more consistent and stocks can be kept at much lower levels than before. However, the

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[3] These include poor roads, lack of transport, inclement weather affecting the bought product; delay in the sale of the product which can cause losses due to fluctuations in prices and can lead to loss of moisture content and loss of product weight (Nelson and Galvez 2000).

cyclical fluctuations of the market are still its largest drawback. Political turmoil and weather conditions play an enormous role in this price instability (Menter 2005).

Over the last two decades, there has been a shift in the structure of the conventional cacao trade channel. This shift is reflected in Figure 2.6, which depicts two different marketing channels, one traditional and one specialized. As can be deduced from Figure 2.6, the specialized chain has fewer intermediate steps than the traditional chain. The specialized chain reflects an innovation in chain organization. Traditionally, most of the world's cacao supply passed from the hands of a local exporter to a national importer through large trading houses in London and New York. However, this use of independent local traders and importers has been made largely obsolete through the vertical integration of multinational cacao processors. These multinational firms have begun to expand control over the supply chain from transportation and exportation to cacao processing and marketing. They have begun to create informal partnerships with specific producer groups to expand control over the supply chain, better regulate quality of beans, and guarantee consistent supply. If carried out properly, this integration could mean greater margins for cacao producers. By eliminating the local exporter, the intermediary is eliminated and the price farmers get paid for their products is better protected. However, historically, in areas with low barriers to entry for these buyers or traders, farmers have been subject to tight markets and low profit margins (Menter 2005).

Figure 2.6. Traditional and specialized cacao marketing chains in Ecuador

Traditional chain

Specialized chain

International clients (95%)	National consumption (5%)

Exporters

Wholesale intermediaries

Small intermediaries

Itinerant trader

Producers

International clients

Producers' Association

Producers
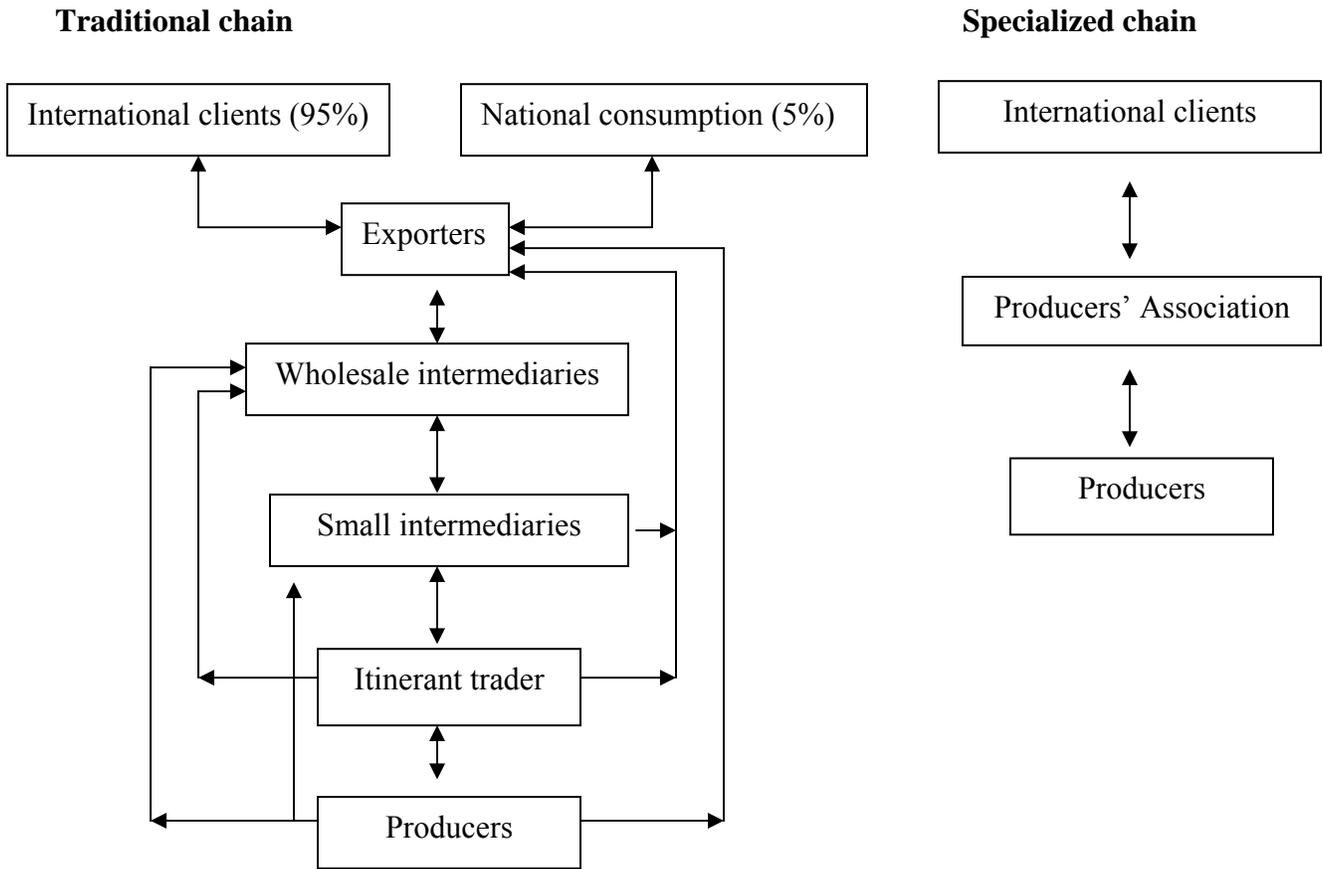
2.4.2 Organization of Transactions

Buying *'al fiado'* (on credit/trust) is a commonly used mechanism by which the trader provides products for the farmer in return for a promise of future payment. *Al fiado* is different from formal credit. Formal credit involves explicit interest rates, and liquidating the credit concludes the contractual relationship. In the *'al fiado'* system, financial implications are seldom explicit; rather a social obligation is created that can result in a more onerous deal for the farmers from whom product will be demanded. In this way, a relationship of dependency is established. In many cases, this mechanism means that farmers remain in a state of continual indebtedness, which places the trader in a position to sell products and buy cacao under increasingly favorable conditions (Nelson and Galvez 2000).

Local traders have relative control of the areas of the cacao producing zones where they operate. In the larger cities—parish capitals— it is possible to find three or four traders, who together control a whole area of production, but each one has a specific route and as a result competition is not very intense (Nelson and Galvez 2000).

Transaction transparency is perceived to suffer as a result of the practices that many cacao traders employ. Scales often understate the true weight of cacao sacks, and discounts for high moisture content and extraneous matter are often higher than they should be (Collinson and Leon 2000).

Chapter 3. The Cacao Marketing Chain in Ecuador: Analysis of Chain Constraints to the Development of Markets for High quality Cacao

3.1. Objectives

This chapter builds on background information gathered about Ecuador's cacao marketing chain and uses qualitative field research to develop and test hypotheses about market level constraints that impede the transmission of quality incentives along the marketing chain. The market constraints analyzed are market power, transaction costs, and institutional constraints.

3.2. Conceptual Framework

In a perfectly competitive market environment, an increase in high quality cacao demand would stimulate an increase in high quality cacao production by farmers. Thus, the question implicit in the observation that the increase in demand for high quality chocolate has not stimulated a high quality supply response by farmers is: what violation(s) of the assumptions underlying the perfectly competitive market impede this reaction?

The assumptions underlying the perfectly competitive market are outlined, and evidence from the literature on agriculture market development in general, and Ecuador's cacao market in particular, is drawn to generate hypotheses for empirical testing.

In a perfectly competitive cacao market, cacao farmers are assumed to face homogeneous products and factors of production, the existence of perfect information, no barriers to market entry or exit, and perfect mobility of resources. The perfectly competitive market also assumes a given distribution of resource ownership, well-defined property rights, absence of market externalities, and institutions that are considered fixed (or ignored). In addition, the decision agent is considered to act rationally in pursuit of her/his goal to maximize profits or utility.

Possible explanations for the lack of high quality productive investment in the development of the cacao market can be found at both individual-level and market-level. For example:

a) even if small farmers are profit maximizers, cacao may not be the best investment choice due to factors such as high investment requirements in crop management, post-harvest practices, etc., or simply the availability of relatively more profitable enterprises;

b) even if cacao production were a highly profitable investment choice, there might be constraints on the investment side such as limited access to inputs, human capital, financial capital, etc; and

c) even if the assumptions of profit maximizing farmers with unconstrained access to investment resources were true, there may be impediments to the realization of profit potential, due to market failures or market level constraints.

The farm-level survey data showed that on average 44% of the household income comes from cacao. Therefore, it is assumed that cacao farmers are profit maximizers and that cacao is a highly profitable investment choice. Thus, production of high quality cacao might be impeded: 1) at the farm level due to constraints on the investment side such as limited access to inputs, human capital, financial capital, etc. (that is, the assumption of free mobility of resources underlying a perfectly competitive market is violated); and/or 2) at the market level due to market failures that result in the inefficient allocation of resources and impede the realization of profit premiums for high quality cacao production (Eatwell et al 1987). Examples of market failures are market power, transaction costs, and institutional constraints.

3.2.1. Market Power

Market power is the ability to influence prices, incomes, and other results in particular markets. It is a result of one's large market share and/or product differentiation (Jaffee and Morton 1995). It implies high levels of industry concentration, economies of scale, and significant degrees of product differentiation. However, these characteristics do not automatically imply market inefficiency. For example, over the past years many industries have experienced significant consolidation, but this change could have spawned more efficient firms

even as markets became more concentrated (Hatirli et al 2006). Indeed, Persaud and Tweeten (2002) mentioned that agribusiness markets are imperfectly competitive, but cost efficiencies resulting from greater concentration exceed losses from market power distortions, causing a net improvement in economic welfare. However, these benefits of efficiency gains are passed on to consumers rather than to farmers. Farmers will reap normal profits if farm resources adjust. Economic theory predicts that farmers will operate further down on their supply curve—lower commodity prices and quantities—than they would when facing a perfectly competitive agribusiness sector.

Existing research on cacao markets in Ecuador, as outlined in Chapter 2, points to intermediaries as holders of market power who extract rents from farmers by exercising market power. This market power is argued to have two underpinnings: a) spheres of influence in the market and exclusive rights to buy in specific areas, and b) farmers' dependency on intermediaries for credit to get through the low season[4] and fund crop production, which obligates farmers to sell to those intermediaries who extended credit, thus subjecting them to non-competitive market conditions (Nelson and Galvez 2000). Where credit provision is provided by the intermediary and the farmer sells to the same intermediary, price negotiation is influenced and farmers have less bargaining power than the ones that do not have any commitment. Despite observational and anecdotal indications of market power, no explicit effort is known to have been made to evaluate these arguments.

Hypothesis 1: Market power constrains the transmission of price incentives to farmers, particularly with respect to incentives to produce high quality cacao.

Hypothesis 1.1: Intermediaries are able to exert market power due to the existence of spheres of influence that grant them exclusive buying rights in specific geographic areas.

Hypothesis 1.2: Intermediaries are able to exert market power because farmers are obligated to sell to the intermediary who provided credit.

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[4] The cacao tree generally produces in Ecuador for 8 months and 4 months have almost no production, these months are called the low season.

3.2.2. Transaction Costs

Transaction costs include *ex ante* costs of determining whether an exchange is advantageous, cost of carrying out the exchange such as finding buyers or sellers, and cost of transportation, and where applicable, *ex post* costs of ensuring that all requirements of the exchange were met (Scott 1995). Transaction costs are present every time that there is a trade or a marketing transaction. The theory of transaction costs holds that some agents might behave opportunistically, which implies that contracts must consider safeguards, when possible, or introduce monitoring costs. It also assumes the impossibility of building complete contracts due to the limited capacity of agents to anticipate all the possible outcomes or the future alternative status of complex systems. This concept recognizes that economic behavior of agents is intended to be rational but that they can only partially attain this intention (Zylbersztajn 1996). Transaction costs also imply imperfect knowledge of market opportunities, prices, buyers, quality grades and standards, among others. Together with information asymmetry[5], these factors increase the cost of information. When transaction costs are large, total costs (the combined sum of production and transaction costs) can exceed total revenue, resulting in "market failure" which means that firms forgo investments that would otherwise be profitable.

In Ecuador's cacao market, indications of transaction costs reported in the literature include information asymmetry, by which transaction transparency was negatively affected as a result of the practices that many intermediaries employ when trading their product. This lack of transparency is asserted to permit traders to extract price premiums by impeding accurate grading of high quality cacao. For example, Nelson and Galvez (2000) state that scales often understate the true weight of cacao sacks, and Collinson and Leon (2000) assert that discounts for high moisture content and extraneous matter are often higher than they should be.

Hypothesis 2: Transaction costs, specifically transaction transparency, constrain the transmission of price incentives to farmers, particularly with respect to incentives to produce high quality cacao.

Hypothesis 2.1: There is a lack of objective methods/tools for quality testing; therefore, the intermediary takes advantage of the farmer by downgrading cacao measures.

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[5] Information asymmetry exists when one party to a transaction has more or better information than the other party.

Hypothesis 2.2: There is a lack of information about market conditions including prices.

3.2.3. Institutional Constraints

According to North (1991) institutions are the humanly devised constraints that structure political, economic, and social interaction. They include both informal (sanctions, taboos, customs, traditions, and codes of conduct) and formal rules (constitutions, laws, property rights). From the transactions cost perspective, institutions reduce transaction and production costs of exchange (North 1991). Institutions that are key to the functioning of markets include the legal system, the organizational environment, political institutions, and cultural norms (Zylbersztjan 1996).

In the Ecuadorian context, intermediaries are thought to impede the grading of high quality cacao and, consequently, deny premiums to farmers (Nelson and Galvez 2000). Intermediaries' actions can represent a lack of institutions because of a lack of adequate grades and standards and/or a lack of enforcement of those grades and standards is a primary factor leading to the exacerbation of transaction costs. In general, grades and standards that are related to quality attributes of the products include metrics such as weight and measures, and aesthetics such as appearance, color, cleanliness, and uniformity (Bawden et al 2001). Thus, the absence or weakness of institutions implies in the Ecuadorian context: a) a lack of rules or inadequate grades and standards, and b) lack of enforcement of those rules throughout the marketing chain.

Hypothesis 3: A lack of institutions impedes the transmission of price incentives to farmers, particularly with respect to incentives to produce high quality cacao.

Hypothesis 3.1: A lack of adequate rules, including grades and standards throughout the marketing chain affect quality incentives transmission.

Hypothesis 3.2: Grades and standards throughout the marketing chain lack monitoring.

3.3. Methods and Data

The research was approached through a subsector analysis. A subsector is an economic unit of analysis specific to a particular commodity or commodity group. It encompasses a meaningful grouping of economic activities linked horizontally and vertically by market relationships (Morris in Scott 1995). Subsector analysis involves the study of relations in the production, marketing, distribution, and consumption of a commodity (Loveridge in Scott 1995). According to Staatz (1997), a subsector analysis is a way of viewing a vertical slice within food systems matrix. In other words, the subsector approach examines how production and distribution activities for a commodity are organized within the economy and asks how the productivity of those activities can be increased.

The subsector approach can be particularly useful for the study of agricultural marketing issues because it ensures that problem diagnosis is undertaken in a comprehensive, system-wide context (Morris in Scott 1995). Subsector analysis is particularly useful to identify system dynamics, linkages, and overall problems. Once armed with a system-wide perspective, an analyst is more likely to formulate policy prescriptions that are both realistic and workable (Loveridge in Scott 1995) and is better able to formulate hypotheses that are meaningful to the empirical context.

Methods commonly used in subsector analysis include rapid reconnaissance techniques, which, according to Holtzman (1986), give a broad and preliminary overview of the organization, operation, and performance of a food system and are intended to identify system constraints and opportunities. Specific methods utilized included identification of key informants in the marketing chain, in depth semi-structured interviews applied to key informants along marketing chain, and a farmer survey.

The field research in Ecuador was guided by a subsector analysis approach which sought to: a) describe and understand the functioning of the subsector structure, b) analyze the reasons that gave rise to that structure, and c) analyze the implications of the structure for the economic performance of the cacao market in Ecuador.

The field work was carried out in Ecuador from May to August 2006 and included a total of 38 interviews conducted with 46 key informants categorized in Table 3.1, including farmers, intermediaries, exporters, as well as representatives of producers' associations, NGOs, cacao

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processing plants, and the government (see Appendix A for detailed key informant interview guideline).

Table 3.1. Number of interviewees per category

Farmer organization leaders	Intermediaries (surveyed + interviewed)	Exporters	Service providers*	Government	Processing plant
4	33+6	8	20	6	3

*Includes: 11 NGO representatives, 2 representatives from a shipping company, 6 from the National Association of Cacao Exporters (ANECACAO) including 5 technicians, and 1 broker. Note that one exporter is also a cacao processor so he was counted twice.

To develop the analysis, hypotheses were drawn from the literature review. The analysis sought to find supporting and disproving evidence for the hypotheses. The gathered information was cross-checked, i.e. triangulated, by asking similar questions to diverse participants in the chain, such as buyers and suppliers, representatives of farmer associations and technicians, etc. whose responses would be guided by different perspectives and motivations.

The interviews were conducted with previous verbal consent from the interviewees and under confidentiality. A "naive" approach to asking was adopted to keep answers non-judgmental and unbiased by asking, for example, about the respondents' role in the market and the role of others, quality issues, perspectives on market constraints and opportunities, the causes of those constraints, and what can be done to pursue those opportunities. The main topics covered in the key informant interviews were: 1) product attributes, 2) transaction attributes, 3) determinants of the capacity of agents to meet the product and transaction attributes, 4) legislative function that refers to the formulation and approval of the rules related to the product and transaction attributes, 5) judicial function that refers to the monitoring and enforcement in the marketing chain, 6) executive function that is the support for the implementation and compliance of all the other functions, and 7) market power issues. A summary of the type of questions asked within each topic is presented in Table 3.2 (for detailed questions refer to Appendix A).

Table 3.2. Summary of questions categorized by topic

Topic	Selected questions
1) Product attributes	• What determines the quality of the cacao you buy/sell/produce? • Are there specific grades and standards that set the quality parameters? • How are the grades and standards applied/enforced? • How do you compare these requirements with the alternative buyers?
2) Transaction attributes	• Who and where do you buy/sell to/from? • What are the characteristics of the transaction? E.g. location, number of buyers/sellers/producers, volume, etc. • Are there any alternative buyers/suppliers of your product? • How do you collect/supply, pay/get paid, and test for quality of the product? • How is the price determined? • What price do you receive from each of your buyers? • What services do you require/provide? • What are the different services and benefits comparing buyers/suppliers? • What constraints do you face in the cacao procurement/sale? • Do any of your buyers/suppliers demand/provide exclusivity in sales? • Do you have contracts with your buyers/suppliers?
3) Capacity determinants	• Are there any technological, organizational, managerial, and/or financial requirements for complying with the product and transaction attributes? • Compare them among different marketing channels
4) Legislative function	• Who and how are the grades and standards and their degrees defined? • For whom in the marketing chain are these grades and standards valid/implemented?
5) Judicial function	• Is there any sanction/reward for non/good compliance of grades and standards? • Who monitors and ensures the rules compliance? • With respect to whom is this function developed (target)?
6) Executive function	• What are the characteristics of the available services? E.g. production, post-harvest, training, coordination, managerial, financial services and development.
7) Market power	• What is the number of buyers/suppliers at your level in the marketing chain? What is your share of the market (in comparison to your competition)? • How many enterprises/individuals do you supply? • How much do you supply to each buyer? (percentage)

3.4. Results and Discussion

The market level constraints that impede the development of markets for high quality cacao supported several, but not all, of the hypotheses that were proposed.

3.4.1. Market Power

The analysis failed to support the two arguments (sub-hypotheses) of the hypothesis that market power inhibits farmers' incentives to invest in high quality cacao: that intermediaries exert market power through spheres of influence, and that credit obligations oblige farmers to sell to certain intermediaries.

The analysis that lead to the formulation of the hypotheses suggested that along the marketing chain there were market power issues among intermediaries. Even though the major producing areas have numerous choices for marketing (intermediaries), the more isolated areas have few marketing choices, which are determined by spheres of influence due to economies of scope/network economies leading to "natural" monopoly, i.e. high fixed costs of establishing and collecting cacao among many small, dispersed farmers, each of whom has relatively low volume per pickup. There are initial indications that going to the farms to pickup cacao plays a minimal role. Instead, the farmers commonly bring their harvest to the intermediaries, and often to the same intermediary with whom they create informal relationships but no obligation. Thus, farmers do have alternative markets by bringing cacao to some nearby town, and any significant price difference between the farm-gate and the local market is a service premium charged by intermediaries, because when they travel to pickup cacao at the farm-gate they face risk of theft. Therefore, no support was found for hypothesis 1.1.

Credit is key to farmers in financing production and getting through the low-season; however, its offering by intermediaries is not widespread and is decreasing due to default by farmers. Indeed, there are perceptions among intermediaries of a cultural shift between generations in which younger farmers are lacking commitment. It is relevant to note that there is no entity that lends money to small farmers in Ecuador. Hence, even though an obligation is intended, the farmers do not feel obliged because they can still sell elsewhere even when they have taken credit. Therefore, hypothesis 1.2 does not hold.

3.4.2. Transaction Costs

The field research supported the sub-hypotheses that there is a lack of objective methods/tools for quality testing; therefore, the intermediary takes advantage of the farmer by

downgrading cacao measures (hypothesis 2.1), and that there is a lack of information about market conditions including prices (hypothesis 2.2).

There is a lack of transparency in determining quality at all levels of the marketing chain. For example, at the export level, it can be stated that the world and the National Exporters' Association (ANECACAO) standards, guided by the Normalization Ecuadorian Institute (INEN) standards, are based on physical attributes such as variety, moisture content, seed weight, level of fermentation, fungus, and defects. However, according to an exporter from COFINA, there are no devices for measuring some of those attributes; for example, moisture content can only be measured with an apparatus if it is lower that 10% to 15%, and usually farmers sell their cacao with that moisture percentage or more.

Likewise, along the conventional marketing chain, there is a lack of price differentiation to reflect differentiated (high quality) attributes sought on the world market (UNOCACE and FEDECADE— Second Level Producers' Associations). Transactions are based on weight, moisture content, impurities and defects, including diseases, determined by the buyer experience and "eyeball" quality standards. Indeed, there is an extraction of price premiums by intermediaries through downgrading high quality cacao and, consequently, denying premiums to farmers. Therefore, at the farmer level, there is no reward for investing in quality and post-harvest activities, thus blending—with respect to varieties, fermentation, moisture content, and diseases—takes place. It is important to mention that there is some level of sorting at export or wholesale intermediary stages (the local intermediaries only dry the cacao that they buy), but it is inadequate to "create" quality, if quality has not already been created at the farm level and maintained through the marketing chain. For example, if the farmer has not used an adequate fermentation process, it is impossible to recover from that afterwards!

At the farmer level, there is a lack of incentives to produce high quality cacao influenced by lack of information about prices (Cacao National Exporters' Association). Indeed, there is no price differentiation for quality produced in the conventional marketing chain, which is defined according to the Normalization Ecuadorian Institute (INEN) (detailed below), caused by lack of transparency at the intermediary level. Consequently, there are no price incentives to produce high quality within the conventional marketing chain. The only price differentiation that exists is at the export level. Exporters are the ones that receive the world market premium, and they are responsible for sorting for quality.

There is also a lack of information about markets and quality grades and standards, all of which exacerbate issues of information asymmetry. For instance, the farmer thinks that if they do not accept the deal that the intermediaries, usually in the nearest town, offer—which usually includes a lot of discount (20% approximately) for moisture, impurities, defects, including diseases, and at times, fermentation— then they will not be able to sell their cacao harvest anywhere else, which generally is not the case. The lack of information with respect to quality standards is reflected in the fact that usually the farmers do not know the quality of the cacao that they are selling so that they do not have the tools/information to discuss the price using sound arguments with buyers. The lack of information about prices is also critical because farmers usually only know the prices that the intermediaries are paying in the nearest town. In addition, there is a lack of understanding of the farmer's role in the larger market context, since the creation of value begins at farm level.

3.4.3. Institutional Constraints

The subsector analysis results supported the sub-hypotheses of weak institutions constraining the incentives to invest in high quality cacao: lack of adequate grades and standards (hypothesis 3.1) and monitoring of those grades and standards (hypothesis 3.2).

The differentiated world market for cacao (high quality vs. commodity), is not reflected in INEN standards. In other words, there are niche markets that care about organoleptic attributes such as aromas and flavors which are subjectively determined and special production such as organic, fair trade, and so forth. However, at the national level these attributes are not considered. For instance, according to a large producer and exporter from ORECAO, only 3 or 4 exporters, who are responsible for approximately 15% of Ecuadorian cacao exports, know how to taste cacao. These attributes determine differences in sales value. In addition, another attribute that is not included in the norms is that each production location has its own characteristics— aromas and flavors, but there is a lack of knowledge about these characteristics. Ecuador has no national policy that promotes the production of high quality cacao. For instance, there is no monitoring system at the national level that enforces the homogenization of cacao quality or the segregation of different qualities. In fact, one of the interviewees mentioned that there are enterprises in Ecuador that are selling the hybrid variety beans as if they were the fine cacao

variety beans and that there are no regulations with respect to this matter. In fact, although there was a law decree issued by the government on this subject more than a year ago, no action has been taken on the matter.

This lack of monitoring system is transmitted along the marketing chain until it reaches the farmer. There is a monitoring system for cacao quality at the export level as it is explained in the next section.

3.4.4. Exceptions to Generalized Market Performance

Although in general there are failures in the market such as transaction costs and institutional constraints, some institutional innovations bear further investigation, such as small farmer organizations and some exporter innovations.

The small farmer organizations are part of the specialized chain presented in Figure 2.6. They export directly to or directly supply an exporter. For example, there are at least two second level farmer associations, FEDECADE and UNOCACE. FEDECADE has 556 active members organized in 10 associations and has exported cacao with Rainforest Alliance, Fair Trade, and organic certifications since 2000 to Germany, the United States, and Italy. UNOCACE has 745 members organized in 12 associations. They have exported organic cacao to France since 2002. The farmer associations constitute an exception to the lack of monitoring observed along the marketing chain. Ten to 15% of the cacao farmers in Ecuador are organized (representatives of the NGOs ACDI-VOCA and GTZ). In fact, some NGOs are promoting farmers' organization, for example, CORPEI, ACDI-VOCA, and *Conservación y Desarrollo*, among others. The organized farmers must achieve certain quality requirements, for example, certain number of fermentation days, of drying days, but it is more for cooperatives to require the cacao to be marketed fresh, that is without fermentation, or drying, in order to achieve certain homogeneity in the post-harvest processes. For example, the *Fortaleza del Valle*[6] a second level producer association, only accepts fresh cacao. Why, then, are not all farmers marketing fresh cacao? The reasons are: 1) price since fresh cacao is paid at a lower price than dried, 2) additional costs such as transportation (more volume, heavier, etc.) and time since fresh cacao should be marketed immediately after harvest, and 3) lack of availability of organizations to buy fresh cacao.

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[6] *Fortaleza del Valle* is a second level producer association located in the province of Manabí having 417 members. It was formed in January 2006 and in the last week of May 2006) did its first Organic export to Switzerland.

The other exceptions to the poor market performance are implemented by some exporters. As was mentioned before, exporters are the ones that have to face the cost of sorting for quality. To reduce this cost, some of them have specific grades and standards for their suppliers. For example, Nestle has specific quality requirements[7] for its cacao purchases, provides training to their suppliers to help them achieve their quality standards, and pays a premium of approximately 2% to those suppliers who comply with their requirements. Also, some exporters are considering adding criteria for subjectively determined organoleptic attributes such as flavor and aromas for their future purchases. For example, an exporter from COFINA is working on a laboratory for tasting to create a flavor profile of the Ecuadorian cacao. In addition, the marketing representative for Nestle mentioned that after buying cacao, they analyze it in laboratories where they know the different flavors and aromas that characterize each producing area.

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[7] Nestle requirements: cacao with maximum of 15% of moisture content, no blends with cacao that has fungus (for example, Monilia— *Monilia roreri*—), no smoke contamination (this problem appears sometimes when the cacao is dried using certain fuels), no less that 70% of fermentation, usage of *cabulla* or *fique* (American Agave) bags of 150 pounds made without mineral oils, and they require traceability but only from the supplier level (85% of their suppliers are intermediaries).

Chapter 4. Quality Incentives in Market Channel Choice: The Case of Cacao in Ecuador

4.1. Objectives

The previous Chapter supported preliminary hypotheses that constraints along the marketing chain impede the transmission of quality incentives to farmers. The current Chapter looks at this same problem but from a farmer-level perspective.

The determinants and welfare implications of market channel choice are key issues for farmers' livelihoods in developing countries (Mainville 2004, Flores 2004, Fafchamps and Vargas-Hill 2005). Recent literature examines market choice focusing on different factors driving that choice. Bellemare and Barrett (2006) drew evidence from Kenyan and Ethiopian livestock markets to test whether rural households in developing countries make market participation and volume decisions simultaneously or sequentially; Fafchamps and Vargas-Hill (2005) focused on how transaction characteristics, household characteristics, and self-discipline motivations affected Ugandan coffee farmers market channel decisions; Key, Sadoulet and de Janvry (2000) looked at how proportional and fixed transactions costs affected Mexican corn farmers' production and marketing decisions; in a developed country context, Hobbs (1997) estimated the influence of various transaction costs and farm characteristics variables for market channel choice using data from U.K. beef farmers; and Boger (2001) looked into Polish hog farmers' choices between institutional alternatives such as contracts and grading. This last study also introduced quality incentives into the discussion, investigating these incentives in a developed market context where typically one can find large farms, adequate institutions, and infrastructure. What has not been investigated, however, is the role that quality incentives play in driving farmers' market channel choice and its welfare implications in developing countries.

Specifically this chapter looks for linkages between cacao farmers' market channel choice and the prices received by the farmers for their product in two different models including determinants such as quality incentives, household characteristics, and transaction characteristics.

4.2. Conceptual Framework

4.2.1. Market Channel Choice without Quality Incentives

Our model of market channel choice builds on the Fafchamps and Vargas-Hill (2005) model of market channel choice for Ugandan coffee farmers, in which market channel choice is seen as the result of a rational decision where the farmer seeks to maximize utility given the constraints that are common in developing countries such as producing small amounts, geographic isolation, and the absence of formal market institutions. Transaction costs are depicted as endogenous to the type of market chosen. This chapter follows the same assumptions and explores market channel choice and price paid to the farmer but includes the role that quality plays in driving that choice and its effect on the price. Table 4.1 summarizes the variables used and Table 4.2 presents the formulas and a brief explanation.

We generalize the existence of three types of market outlets for a farmer's cacao—the itinerant trader, the local intermediary, and the major intermediary or exporter. Formally, let the itinerant trader price paid to the farmer be P_f, the local intermediary price paid to the farmer be P_l and the major intermediary or exporter price be P_m. We assume that $P_f < P_l < P_m$. This assumption is reasonable given the structure of Ecuador's cacao marketing chain as described in the background (Chapter 2). The cost incurred by farmers to transport and transact their cacao per sale to the local intermediary is denoted as C_{fl}, the cost to transport it to the major intermediary is denoted as C_{fm}, the cost incurred by the intermediary to transport cacao from the farm-gate to the local market is denoted as C_{il}, and from the local to the major market is denoted as C_{im}. We assume that $C_{fl} > C_{il}$ and that $C_{fm} > C_{im}$ as the intermediary is specialized in transporting cacao and so benefits from specialized equipment such as delivery trucks, as well as economies of scope. An exception to this assumption is when a farmer brings cacao to the local or major market as part of a trip that was planned for other purposes, in which case C_{fm} would only equal the marginal cost added by adding the cacao stop to the trip.

Table 4.1. Summary of theoretical model variables

Name of variable	Description
P_f	Price paid to the farmer at the farm-gate
P_l	Price paid to the farmer at the local market
P_m	Price paid to the farmer at the major market
C_{fl}	Cost of the farmer of transporting cacao to the local market

C_{fm}	Cost of the farmer of transporting cacao to the major market
C_{il}	Cost of the intermediary of transporting cacao to the local market
C_{im}	Cost of the intermediary of transporting cacao to the major market
M	Market channel choice where M=1 means sell at the major market
MM	Marketing margin earned by the intermediary
PM	Profit margin earned by the intermediary
D	Difference between MM and C_{fm}
D*	Same as D plus an error term
d	Distance to market
q	Average sales volume
t	Means of transport
j	Joint errands
C_t	Farmer's cost of time
α	Time required to travel one unit of distance
σ	Allows for the possibility that the unit transport cost varies with the quantity transported
g	Cost of fuel when using a motorized transport to travel to market
y	Farmer's wealth
Q	Quality where Q=1 stands for high quality
I	Decision to invest in quality (I = 1)
o	Organizational capital
h	Human capital
f	Financial capital

Table 4.2. Summary of theoretical model formulas

Number	Formula	Description
(1)	$P_l < P_m - C_{im}$ and $P_f < P_l - C_{il}$	Not perfectly competitive market and major market more competitive than local
(2)	$C_{im} + PM \leq C_{fm}$ or $C_{il} + PM \leq C_{fl}$	Intermediary offers a price to the farmer so as to cover its costs and accrue a positive economic profit
(3)	$P_l \leq P_m - C_{im} - PM$ or $P_f \leq P_l - C_{il} - PM$	Intermediary offers a price to the farmer so as to cover its costs and accrue a positive economic profit
(4)	$C_{ij} + PM = MM$, j= m, l	Definition of marketing margin
(5)	$MM - C_{fm} = D$ or $C_{im} + PM - C_{fm} = D$	Definition of D
(6)	$\partial C_{fm} / \partial d > 0$	C_{fm} increases with distance
(7)	$C_{fm} = \alpha d C_t / q^\sigma$	Unit transport cost to the farmer related to travel time and distance
(8)	$\partial C_{fm} / \partial q = -\sigma \alpha d C_t / q^{\sigma+1} \underset{<}{^>} 0$ if $\sigma \underset{<}{^>} 0$	Marginal unit transport cost of the farmer's cacao with respect to quantity

If the cacao market is perfectly competitive, the difference between P_l and P_m equals C_{im}, such that $P_l = P_m - C_{im}$ or the difference between P_f and P_l equals C_{il}, such that $P_f = P_l - C_{il}$. If, however, the market is not perfectly competitive due to the presence of market power among intermediaries, transaction costs, or institutional constraints, and assuming that the major market is more competitive than the local then we can expect that,

(1) $P_l < P_m - C_{im}$ and $P_f < P_l - C_{il}$, i.e. intermediaries incur positive economic profit over cost.

We expect that the local itinerant trader, who is responsible for purchasing the cacao either at the farm-gate or local community center, offers a price to the farmer to cover its costs and accrue a positive economic profit. This profit is possible due to imperfect competition among traders and the fact that the trader can transport cacao at a lower cost than the farmer. It follows that,

(2) $C_{im} + PM \leq C_{fm}$ or $C_{il} + PM \leq C_{fl}$, where PM stands for profit margin. Therefore,

(3) $P_l \leq P_m - C_{im} - PM$ or $P_f \leq P_l - C_{il} - PM$

Note that,

(4) $C_{ij} + PM = MM$, where MM denotes marketing margin and j= m, l. Let us denote D as the difference between MM and C_{fm}, such that

(5) $MM - C_{fm} = D$ or $C_{im} + PM - C_{fm} = D$

Hypothesis 1: Decision of where to sell cacao
The farmer will sell to the major market if $MM - C_{fm} > 0$, i.e. if D > 0. Otherwise, the farmer will sell to the local market or at the farm-gate, i.e. if D ≤ 0.

To empirically test the model, let M be the decision of how to sell, with M=1 if the farmer sells to the major market/exporter and M=0 if the farmer sells at the local market or farm-gate. This decision depends on the variable $D^* = D + u$ where u is an error term. Then, we have $M = 1$ if $D^* > 0$ and $M = 0$ otherwise.

Hypothesis 2: Determinants of Farmers' Transport Cost

The cost of the farmer C_{fm} is a function of distance to market "d", average sales volume "q", mean of transport "t", and joint errands "j", i.e.

$$C_{fm} = f(d, q, t, j)$$

We will test sub-hypotheses on how each of these factors affects the C_{fm}.

Effects of distance (*d*) on transport cost

We now examine the effect of distance from the market *d* on C_{fm}. We assume that C_{fm} increases with distance, i.e.

(6) $\partial C_{fm} / \partial d > 0$

Hypothesis 2.1: Farmers located near the major market sell their cacao there, while farmers located far from the major markets sell their product to the local market. The more isolated farmers sell cacao at the farm-gate.

Effects of transaction volume (*q*) on transport cost

Since the travel time, is more or less proportional to distance, the unit transport cost to the farmer is approximately,

(7) $C_{fm} = \alpha d C_t / q^\sigma$ in the case of using a non-motorized transport or

$C_{fm} = \alpha d C_t \, g / q^\sigma$ in the case of using a motorized transport,

where q is the quantity transported, α is the time required to travel one unit of distance, σ allows for the possibility that the unit transport cost varies with the quantity transported, and g is the cost of fuel.

Therefore, it follows that,

(8) $\partial C_{fm} / \partial q = - \sigma \, \alpha dC_t / q^{\sigma+1} \overset{>}{_<} 0$ if $\sigma \overset{>}{_<} 0$ or
$\partial C_{fm} / \partial q = - \sigma \, \alpha dC_t \, g / q^{\sigma+1} \overset{>}{_<} 0$ if $\sigma \overset{>}{_<} 0$

Hypothesis 2.2: If the farmer's unit transport cost does not increase with the cacao quantity transported, i.e. $\sigma > 0$, the farmer is more likely to travel to the major market if the quantity sold is large, to the local market if the quantity is not so large, and sell at the farm-gate if the quantity is small.

Since the quantity sold usually is small enough that only one trip is required, which is common for cacao sales in Ecuador, C_{fm} does not depend on the quantity transported. In this case, the unit shadow cost is inversely proportional to the quantity sold q and $\sigma = 1$. More generally, transport cost may increase with quantity, so that transport time increases more than proportionally with quantity, the farmer's unit transport cost increases with quantity and $\sigma < 0$.

Effects of transport type (t) on transportation cost

Traveling to the market by a faster means reduces α (transport time) increasing D and thus the likelihood of selling to a major market.

Hypothesis 2.3: We hypothesize that, in general, if farmers transported their product by a faster means, such as motorized transport, then farmers are more likely to sell to a major intermediary or exporter than to the other groups.

Effects of joint errands (j) on transportation cost

Up to this point, we have assumed that the farmer goes to the market only to sell cacao, but this may not be the case. It could be that the farmer travels to the market to purchase consumption goods, which in Ecuador happens very often.

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Hypothesis 2.4: We consider that if there is a joint errand, we allocate part of the transport cost to the other errand. Therefore, the probability of traveling to the major market is higher than if farmers do not do joint errands when they sell cacao.

Hypothesis 3: Wealth Effects on Market Channel Choice
The following hypotheses will explore the possible effects of wealth on the decision of where to sell cacao.

Hypothesis 3.1: Wealthy farmers have better transport infrastructure and do other errands while in the major market so $P(M=1)$ increases with higher income (y).

Hypothesis 3.2: Assuming that $\sigma > 0$, which means that as the quantity sold increases the marginal cost of transporting it decreases, wealthy farmers are more likely to sell to the major market as the quantity sold increases.

After testing for the determinants of C_{fm} we will test for:

$$P(M=1) = g(C_{fl}, C_{fm}, P_f, P_l, P_m, y)$$

4.2.2. Quality Incentives in Market Channel Choice

Departing from Fafchamps and Vargas-Hill model, we consider quality to be a relevant variable that influences farmers' decision of where to sell cacao. First we define quality. Quality, in the case of chocolate, is a highly subjective experience among differentiating consumers; however, before processing cacao, objective measures of quality exist such as moisture content, degree of fermentation, absence of pests and diseases, and variety. The level of quality achieved is the result of production and investment decisions made by the farmer, as well as exogenous factors such as the location of production as well as a stochastic element that can be represented by an error term. Production and investment decisions that determine quality include pre- and post-harvest practices, variety, and location. Since there is a lack of information at the national

level about the relation between location, for example, province, county or community, and quality we will not consider this variable as one describing quality in our model, thus focusing on the other two characteristics. Crop management practices and the production environment that affect quality include pruning, fertilization, irrigation, the age of the cacao plantation, and the presence of pests and diseases. Post-harvest practices include fermentation and drying and the technology used for them, as well as the segregation of different qualities. Variety can be generalized to two categories: fine (*Nacional*) and ordinary or commodity varieties which include hybrid varieties such as CCN-51. The first is generally associated with high quality cacao and the latter with commodity cacao, but management practices have an interactive effect so that fine variety cacao can have a bad quality if not managed well and vice versa.

Hypothesis 4: Quality Effects on Market Channel Choice

We will explore the relation between quality and market channel choice and between quality and price paid to the farmer.

Hypothesis 4.1: The major intermediary and exporter channel rewards quality; the local intermediary and itinerant trader do not.

This hypothesis follows from the preliminary field research which showed that, in general, producers prefer to carry their cacao to the buyer rather than to wait for the buyer to come to their farm, because they get a better price in the market. This scenario is reflected in $P_f < P_l < P_m$, holding costs constant (recall equation 3). Part of these differences means that the farmer that produces quality is hypothesized to have a higher probability of selling to the major market $P(M = 1)$.

To empirically test the model, we denote Q as quality, where $Q = 1$ is for high quality and $Q = 0$ is for commodity or ordinary quality. An empirical estimation of quality can be defined from either a supply or demand perspective. From a supply perspective, quality is determined by the mix of factors that determine whether a high quality product is produced or not.

$Q = r$ (variety, pre-harvest, and post-harvest practices)

From a demand perspective, on the other hand, quality can be reflected by discounts that are taken on the basis of quality failures from the base market price at the moment of sale.

Q = s (discounts at the moment of sale),

where r and s are functions of variables that represent quality. We will determine which of these factors affect market channel choice.

Our empirical model will test for P (M = 1/ Q = 1) and P (M = 1/ Q = 0) for each of the types of qualities defined {Q = r(.) and Q = s(.)} simultaneously.

Hypothesis 5: Determinants of Quality

Quality may be influenced and constrained by organizational capital, human capital, and financial capital. By organizational capital, we mean that the farmer belongs to a cacao farmers' association. From the preliminary field research, we realized that many of the associated farmers have their own grades and standards driven by the buyers' requirements, usually exporters. In an association with limited members, it is much easier to monitor the grades and standards' compliance. Also, since they are generally supplying to exporters, they are more likely to sort their product by quality to keep the marketing relation with their buyers. With respect to human capital, we mean that the farmer receives educational/technical support from some NGO, the government, an association, or other source. If farmers receive some technical support, they acquire additional human capital that they can apply to their cacao plantation. If the technical support is appropriate and the farmer applies what is taught, there is a higher probability of investing in producing high quality cacao. Finally, by financial capital, we mean that the farmer receives credit from the buyer or other entity. It is important to keep in mind that properly functioning rural financial institutions are essential to improving economic efficiency, reducing income risk, and meeting income distribution goals (Norton and Alwang 1993). The importance of access to credit has also been widely studied as an important policy to increase productivity of small farmers, and productivity is directly linked to welfare in rural areas (Udry 1994, World Bank 2004, and De Janvry and Sadoulet 2005). If financial capital increases economic efficiency and reduces income risk, there is a higher probability that the farmer invests in producing high quality cacao.

Therefore, we will denote the decision to invest in quality as $I = 1$, and $I = 0$ otherwise. So,

$$P (I = 1) = k (o, h, f) ,$$

where "o" denotes organizational capital, "h" stands for human capital, and "f" is financial capital. If $I = 1$, then $Q = 1$.

Hypothesis 5.1: If quality is affected by organizational capital, human capital, and financial capital, we hypothesize that these factors also affect the decision of where to sell and the price received by the farmer for her/his cacao.

4.3. Data, Methods and Empirical Models

As the qualitative portion of the field research was concluded, a farmer survey was developed and pre-tested, then implemented with farmers in the three major cacao producing provinces of Ecuador: Los Ríos, Manabí, and Guayas. A total of 327 surveys were conducted during the field research period. A stratified sampling was carried out. First, we identified the most important cacao producing areas of the country. Second, within those areas, we selected communities with access to three levels of market infrastructure: the first level having better access to market infrastructure, for example, with a higher number of buyers and sellers, nearer to a major cacao market, etc; the second with a medium level of market infrastructure; and the third level having poor access to markets. Within those communities, we selected farmers with the help of an NGO that was active in providing technical assistance to cacao producers in these communities. Therefore, true random sampling was not possible, although efforts were made to get as representative a sample as possible by targeting some potential respondents who did not receive technical assistance from the NGO. Survey respondents were recruited by offering local workshops on crop management with data collection being done in conjunction with the workshops.

The farmer survey collected data on the farmers' most recent cacao sale, their farm and household characteristics, their cacao production activities, and their exposure to outside

influences that might affect their production and market choices, such as technical assistance programs.

In addition to the farmer survey, an intermediary survey was conducted in the same areas where farmers were surveyed. The sample size for the intermediary survey was 33. The intermediary survey results were used primarily to contribute to the researchers' understanding of the market and for descriptive statistics. English versions of the farmer and intermediary surveys are provided in Appendices B and C, respectively.

Descriptive statistics from the data that were collected are presented in Table 4.3. Reported values are based on 327 observations. Descriptive statistics of the last cacao sale are presented followed by statistics on the cacao farmers' characteristics.

Table 4.3. Descriptive statistics on characteristics of cacao sale and cacao farmers

Variables	Unit	Median	Mean
Characteristics of cacao last sale			
Quantity sold	Kilo	68.04	116.27
Price of sale	US$/Kilo	1.33	1.36
Type of market	1= major		17%
	2= local		70%
	3= farm-gate		13%
Distance to nearest cacao market	Miles	4.35	6.71
Distance to paved road	Miles	2.49	3.57
Transport mean used	1= motorized		69%
Other errands	1= other errands		13%
Total transport cost	US$	1.00	2.36
Discount (proxy)	US$ per Kilo	0.26	0.34
Characteristics of farmer			
Wealth- head of family	US$/year	2220.00	3567.80
Farm Size	Hectares	8.65	15.04
Owns a non-motorized transport	1= Household owns a non-motorized transport		78%
Owns a motorized transport	1= Household owns a motorized transport		27%
Cacao area	Hectares	4.00	6.88
Household size	Number	4.00	4.53
At least one household member is wage earner	1= At least 1 household member is wage earner		50%
Practices pre- and post-harvest activities	1 to 10 ordinal variable; percentage over median	5.00	
Variety *Nacional*	1= cultivates *Nacional* cacao		93%
Technical assistance	1= received technical assistance		72%
Cacao association	1= belongs to a cacao association		31%
Received credit	1= received credit		6%
Location dummies			
Los Ríos	1= Los Ríos		30%
Manabí	1= Manabí		36%
Guayas	1= Guayas		28%
Other province	1= Other province		5%

We found that the average total round-trip cost of transporting cacao for the last sale was $2.36. This cost includes non-motorized and motorized transport means. Non-motorized includes transporting the cacao on foot, by bicycle, and by horse or mule. Motorized transportation consists of transporting the cacao by motorcycle, pick-up truck, car, truck, and bus. Sixty-nine percent of the farmers transported the cacao by motorized transport. Disaggregating the means of transport for the last sale showed 27% transported the cacao by pick-up truck, another 27% by car, and 24% by horse or mule. However, only 27% of the farmers reported owning a motorized vehicle; the most logical explanation for this discrepancy is that they rent a motorized vehicle to transport their cacao or they borrow it. We do not have data to support those arguments.

The average quantity that farmers sold in a single transaction was 116 Kg, although this average hides a lot of variation since the median is 68 Kg. This explains why the majority of the cacao farmers transported their cacao by motorized transport. Seventy percent of the farmers sold their cacao at the local market, which includes the nearest town or city and the nearest assembly center, compared to the 17% and 13% at the major and farm-gate markets, respectively. The average distance to this market, considering all the 327 farmers, was 7 miles. At the sale, the buyer usually applies some discount on the basis of aspects such as moisture content, presence of fungus (*Monilia*), impurities, and fermentation, among others (Table 4.4). One final characteristic of the cacao sale is that some farmers (13%), when traveling to sell their product, use the same trip to do other errands.

In addition to the characteristics of the last cacao sale, some characteristics of the farmer were included, for example, the farmer's income per year with an average of US$3,568. The farm size average is 15 Ha. Cacao averaged 7 Ha with a median of 4 Ha, which confirms that the farmers are small-sized cacao farmers. Also, the median household size is small—only 4 members.

Furthermore, we considered some additional variables that may affect the decision of where to sell cacao. One of them is the availability of credit, to which not many farmers have access. In fact, only 6% of the surveyed farmers received credit. An explanation for this low level of borrowing may be that there is less availability of credit from the buyers because of defaults by farmers. Also, banks may not be lending to small farmers or if they do, the interest rate is so high that it is unaffordable for the farmers. Nevertheless, the intermediary survey

shows that 82% of the intermediaries interviewed provide credit to at least some of the farmers they purchase from (Table 4.5).

We also considered some variables that reflect quality, such as the application of pre- and post-harvest practices, the variety, membership in a cacao association, and receipt of technical assistance for cacao. Almost every farmer surveyed (93%) cultivates the *Nacional* variety. Thirty-one percent of the farmers interviewed belonged to an association, and 72% of the farmers interviewed received technical support.

Table 4.4. Reasons for discounts as reported by intermediaries

Discounts	Variety	Moisture content	*Monilia* (fungus)	Other diseases	Impurities	Fermen-tation	Seed size
Percent intermediaries who reported discounting on basis of quality	12.1	97.0	90.9	27.3	81.8	42.4	9.1

Number of observations: 33

Table 4.5. Credit provision to farmers as reported by intermediaries

	Frequency	Percent
Intermediaries who reported providing credit to at least some farmers	27	81.8

Number of observations: 33

A Multinomial logistic (MNL) model using maximum likelihood estimation was the most appropriate model to estimate the farmers' discrete decision to sell at the farm-gate, at the local market, or at the major market using the farm-gate as base for comparison. Then a normal regression model was used to estimate the effects of quality incentives on the price received by the farmers for their last cacao sale.

The MNL model yields the probability with which farmer i chooses one of the given types of buyers j. The MNL is specified as follows (Cameron and Trivedi 2005):

$$(12)\ \Pr[y_i = j] = P_{ij} = \exp(x_i'\beta_j) / \sum_{k=1}^{3} \exp(x_i'\beta_k),\ \ j = 1, 2, 3$$

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where y_i denotes the total choice set including all channels; x_i is a vector of transaction variables, characteristics of the farmer and quality variables; β_j is the vector of coefficients associated with the jth category. The MNL probabilities exhibit the following properties. First, P_{ij} is necessarily between zero and one, as required for a probability. The probability for an alternative is never exactly zero. If the researcher believes that an alternative actually has no chance of being chosen by a decision maker, the researcher can exclude that alternative from the choice set. A probability of exactly 1 is obtained only if the choice set consists of a single alternative. Second, the choice probabilities for all alternatives sum to one; the decision maker necessarily chooses one of the alternatives (Train 2003). According to Greene (2003), the estimated equations provide a set of probabilities for the j +1 choices for a decision maker with characteristics x_i. Greene also stated that an indeterminacy ought to be removed from the model. If we define $\beta_j^* = \beta_j + q$ for any vector q, re-computing the probabilities defined below using β_j^* instead of β_j produces the identical set of probabilities because all the terms involving q drop out. In other words, since we know the probabilities necessarily sum to one, we do not need to estimate the coefficients for each choice. We select one choice as the base and set those coefficients to zero. This allows for a normalization to make comparisons of the coefficients readily interpretable. We chose the farm-gate market channel for normalization, so that in our model $\beta_3 = 0$. Thus, a vector β_j for each probability except for the normalized channel is obtained. As the meaning of the coefficients is not straightforward, the marginal effects provide a better interpretation of the model results (Greene 2003, Boger 2001). These were calculated as (Train 2003),

$$(13) \quad \beta_j^* \, P_{ij}^* \, (1 - P_{ij})$$

A normal linear regression using ordinary least squares estimation for the price paid to the farmer in the last cacao sale was also estimated using similar independent variables to the previous model, i.e. transaction characteristics, farmer characteristics, and quality variables. All the variables utilized for both models are described in Table 4.6.

Several variable specifications need to be mentioned. First, because quality itself could not be measured, indicators for quality were used instead. These indicators are factors that are argued to improve the quality of production, including specific pre- and post-harvest, variety,

having received technical assistance, belonging to a cacao association, and having received credit. An estimate of the level of discounts taken at the sale was also included. This estimate was based on the difference between the price received by the farmer and the NYSE price. The price differential also includes the effects of distance from market and stage of the marketing channel at which point the cacao is sold. There were some positive values when subtracting the stock price from the actual price of sale, but those were treated as zero in the analysis since there was no discount applied to that product. Second, income was not included directly as a variable in the models, since more than one-third of the observations were missing (not reported by the farmer or not asked by the enumerator). Therefore, we chose the farm size as a proxy for the household wealth. Third, the pre- and post-harvest practices were aggregated in one ordinal variable that takes values from 0 (no practice) to 10 (all the production practices included in the survey). Finally, the variety variable corresponds to *Nacional* or *Arriba* cacao that is the fine variety of Ecuador versus other varieties.

Table 4.6. Independent variables, description and hypothesized variables they represent

Variable	Description	Hypothesized variable
UVCMPAG3	Market channel 1= major market, 2= local market, and 3= farm-gate	Market channel choice (farm-gate, local, or major)
LUVPRVNKG	Log (price paid to farmer in last sale)	Price paid to the farmer (P_f, P_l, and P_m
PRPREPOS	Pre- and post-harvest practices	Quality variable (Q): pre- and post-harvest practices
VARNC	Variety *Nacional*	Quality variable (Q): variety
LUVKG	Log (quantity sold)	Average sales volume (q)
OTRERRN	Other errands in last sale	Joint errands (j)
INFRMT	Motorized transport infrastructure ownership	Wealth (y) and transport mean (t)
METRNUVAG	Transport mean for last sale (1=motorized)	Transport mean for last sale (t)
CSTTRNTT	Total transportation cost for last sale (US$)	Distance to market (d)
LAREAFINC	Log (farm size)	Wealth (y)
ASISTEC	Received technical assistance	Human capital (h)
ASOCAC	Membership in a cacao association	Organizational capital (o)
RECCRED	Credit receipt for production or for low cacao season	Financial capital (f)
DIFPRUVANE	Price difference between last sale and New York Stock Exchange price (US$)	Quality variable (Q): discounts applied by buyer

LPRPROKGANE	New York stock exchange price per Kg (US$)	Price paid to major buyer
DISCACAML	Distance to nearest cacao market (Miles)	Distance to market (d)
DISPAVML	Distance to nearest paved road (Miles)	Distance to market (d)—level of isolation
LAFININFRMT	Interaction log(farm size)* motorized infrastructure ownership	Interaction wealth (y) and transport mean (t)
LAFINOERR	Interaction log(farm size)* other errands	Interaction wealth (y) and joint errands
UVCMPAGMJ	Last sale market (1= major)	Market channel choice
UVCMPAGLC	Last sale market (1= local)	Market channel choice

4.4. Results and Discussion

The maximum-likelihood results of the MNL model estimation are presented in Table 4.7. They demonstrate that market channel choice is a function of transaction characteristics, farmer characteristics, and only one quality variable—*Nacional* variety. This variable is significant out of the six hypothesized to represent quality. The same model was re-estimated including some additional explanatory variables to see if there was an effect of wealth interacting with transport infrastructure and with joint errands at the last sale. To distinguish them, one is referred to here as the first model and the latter is referred as the second model. The likelihood ratio test statistic (χ^2) indicates that both models are significant at 0.00 % significance level.

Selling *Nacional* cacao beans significantly increases the probability of marketing to the major or local markets by 4% compared to the farm-gate (Table 4.8, marginal effects of the first MNL model). This confirms part of hypothesis 4.1, which states that quality depends on certain indicators, variety being one of them. Ecuador has gained some international recognition because of the quality of its cacao. This recognition is due to the quality of *Nacional* (*or Arriba*), which is Ecuador's fine cacao variety; therefore, its significance when choosing a market is expected. This variable has a positive coefficient which means that if farmers cultivate fine cacao, they are more likely to sell at the major or local markets.

Pre- and post-harvest practices applied to the cacao by the farmer do not affect the market channel selected by the farmer.

The quantity sold significantly decreases the probability of selling to the local market by 6% as compared to the farm-gate. In other words, an increase in the quantity sold decreases the probability of transporting cacao to the local market. This rejects hypothesis 2.2 since the farmer

is less likely to travel to the local market if the quantity sold is large, and quantity does not affect the decision to sell at the major market compared to the farm-gate. This result also rejects hypothesis 3.2 which assumes that $\sigma > 0$, that is as the quantity sold increases the marginal cost of transporting it decreases. Some explanations for these results may be that the farmer does not have access to the necessary means of transport (motorized transport) to carry the cacao to the local market or that the farmer lives in an isolated area. Indeed, the means of transport utilized for the last cacao sale is significant at 1% significance level when comparing the local market with the farm-gate, and it is positive. Thus, if the farmer transports cacao by a motorized transport, the probability of selling at the local market is higher by 2%. The same happens when comparing the major market with the farm-gate, but for this comparison, the probability of selling at the major market is higher by 10% when cacao is transported by motorized transport for the last sale. This confirms hypothesis 2.3 that indicates that farmers that transport cacao by a faster means are more likely to sell the product at the major market than at the farm-gate. However, the ownership of a motorized transport does not affect the farmer's decision. Furthermore, if the farmer lives in isolated areas where the distance to a paved road is long, the probability of selling cacao at the local market is lower by 0.4% than selling at the farm-gate. This variable is significant only in the model that does not include the wealth interaction variables. This confirms hypothesis 2.1 that stated that isolated farmers are more likely to sell at the farm-gate. However, the decision to sell at the major market is not affected by the proxy for isolation. In addition, the total cost of transporting cacao, a proxy for distance traveled to the market, turned out not to be significant for deciding where to sell the product. The data for this variable could have been inaccurate since the farmer had to estimate it for example, calculating the cost of fuel for the trip in the case of transporting cacao by a motorized transport. The distance to the nearest market is also insignificant for every market outlet.

Doing joint errands while at the market does not affect the decision of where to sell cacao; thus, hypothesis 2.4 is rejected. The price paid to the farmer for her/his cacao is not significant either, so the farmer does not choose the market outlet based on price. This is a surprising result and it will be discussed later in the analysis of the price paid to the farmer.

Farm size, a proxy for wealth, is significant and positive for the major and local markets compared to the farm-gate; therefore, the farmer's wealth affects the marketing decision. In other words, being wealthier increases the probability of supplying to the major market by 4% and to

the local market by 2% compared to selling at the farm-gate. It could be that wealthier farmers have better knowledge of their market alternatives, influencing their decisions. The only exception appears in the MNL model that included the interaction variables between wealth and transport infrastructure ownership and wealth and doing joint errands while at the major market. The results showed neither of the interaction terms to be significant thereby rejecting hypothesis 3.1. While the addition of these terms had no effect on the significance of the model as a whole, apparently they capture the variation of the farm size when comparing the major market and the farm-gate making it insignificant. In fact, in the MNL model that does not include these interactions, farm size is significant for every market outlet decision.

From the perspective of market channel choice, hypothesis 5.1 is rejected since belonging to an association (organizational capital), having received technical assistance (human capital), and having received credit for production or low cacao season (financial capital) are insignificant variables. The proxy for discounts at sale is also insignificant when choosing market channel, rejecting part of hypothesis 4.1. The rest of this hypothesis will be tested with the price normal regression model.

Table 4.7. Multinomial logistic estimation results for market channel choice

Dependent variable: Market channel choice	First Major market	First Local market	Second Major market	Second Local market
Pre- and post-harvest practices	0.1686 (0.1866)	0.1996 (0.1806)	0.1633 (0.1908)	0.1897 (0.1845)
Nacional variety	4.2889 (2.1714**)	3.5547 (1.9328*)	4.8656 (2.3164**)	3.7861 (2.0799*)
Log (quantity sold in last sale)	-0.6605 (0.5114)	-0.9001 (0.4872*)	-0.5585 (0.5232)	-0.8291 (0.4973*)
Other errands in last sale	-0.3351 (1.1226)	-0.5067 (1.0339)	0.5333 (2.2776)	0.0951 (2.1097)
Motorized infrastructure ownership	0.5077 (1.2743)	-0.3113 (1.2546)	-4.0555 (3.2050)	-2.6471 (3.0460)
Mean of transport for last sale	4.0851 (1.8052**)	5.3196 (1.7874***)	4.2115 (1.8448**)	5.4477 (1.8214***)
Total transport cost	-0.0606 (0.0926)	-0.0742 (0.0904)	-0.0502 (0.0908)	-0.0755 (0.0885)
Log (price in last sale)	-3.6155 (3.3415)	-1.7317 (3.2335)	-3.6594 (3.4350)	-1.8168 (3.3306)
Log (farm size)	1.0529 (0.5036**)	1.1033 (0.4781**)	0.7189 (0.5724)	1.0934 (0.5371**)
Technical assistance	-0.5212 (0.8658)	-0.4262 (0.8170)	-0.6075 (0.9089)	-0.4831 (0.8612)
Cacao association	0.0873 (0.9479)	-1.1622 (0.9177)	0.0309 (0.9661)	-1.2485 (0.9324)
Credit	-0.6934 (1.8621)	-0.6365 (1.7321)	-0.8597 (1.9023)	-0.7976 (1.7818)
Price difference with stock market	-1.8400 (2.2078)	0.4075 (2.1790)	-1.8797 (2.2396)	0.2972 (2.2120)
Distance to nearest cacao market	0.0588 (0.0778)	0.1001 (0.0741)	0.0595 (0.0802)	0.1059 (0.0756)
Distance to the nearest paved road	-0.0618 (0.0394)	-0.0588 (0.0332*)	-0.0654 (0.0411)	-0.0579 (0.0325*)
Log (farm size)* motorized infrastructure			2.0363 (1.6325)	1.1684 (1.6001)
Log (farm size)* other errands			-0.5568 (1.2122)	-0.4424 (1.1406)
Constant	-2.0851 (3.6376)	-0.3671 (3.4256)	-2.2902 (3.7538)	-0.7228 (3.5308)
LR χ^2 (32, 1st & 34, 2nd)	75.47***	75.47***	81.90***	81.90***
Pseudo R^2	0.2380	0.2380	0.2583	0.2583
Number of observations	248	248	248	248

*** Denotes significance at 1% significance level, **significant at 5%, and *significant at 10%.

Note: 1) the number of observations is smaller than 327 due to missing data in some variables
2) farm-gate is the base group for comparison

The marginal effects of the first MNL model are presented in the Table 4.8.

Table 4.8. Marginal effects of the first MNL model on market channel choice

Dependent variable: Market channel choice	Major market	Local market	Farm-gate
Pre- and post-harvest practices	0.0391	0.0393	-0.0784
Nacional variety	0.1960	0.2191	-0.4151
Log (quantity sold in last sale)	-0.1045	-0.0547	0.1592
Other errands in last sale	-0.0602	-0.1189	0.1791
Motorized infrastructure ownership	0.1086	-0.0491	-0.0595
Mean of transport for last sale	0.0957	0.0159	-0.1116
Total transport cost	-0.0151	-0.0180	0.0331
Log (price in last sale)	-0.7273	-0.4183	1.1456
Log (farm size)	0.0375	0.0227	-0.0602
Technical assistance	-0.1291	-0.1021	0.2313
Cacao association	0.0059	-0.1894	0.1835
Credit	-0.1428	-0.1303	0.2730
Price difference with stock market	-0.4434	0.0514	0.3920
Distance to nearest cacao market	0.0146	0.0145	-0.0291
Distance to the nearest paved road	-0.0064	-0.0041	0.0105

The results of the normal regression for the price paid to the farmer in the last sale are presented in Table 4.9. Quality variables such as pre- and post-harvest practices, membership in a cacao association, and receipt of credit for production or for the low cacao season are relevant variables that affect the price paid to farmers, thus quality is rewarded in the market! This confirms part of hypotheses 4.1 and 5.1. However, the farmer does not take into account these variables when making the decision of where to sell the product. Indeed, variables for selling at the major and local markets that were included in this model are not significant in explaining the price paid to the farmer. Therefore, quality indicators such as the three mentioned are rewarded no matter where the product is sold. However, quality indicators such as *Nacional* variety and the receipt of technical assistance do not affect the price paid to the farmer.

Pre- and post-harvest practices have a positive and significant role (5% significance level) in explaining the price paid to the farmer. Farmers applying one additional pre-or post-harvest practice receive a 1% higher price.

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Membership in a cacao association also plays a significant positive role (1% significance level) in explaining the price paid to the farmer at the last sale, which means that if a farmer belongs to a cacao association, the farmer's cacao has 10% higher price. This confirms part of hypothesis 5, which suggests that organizational capital increases the probability of investing in high quality production. It is important to mention that the 17% of sales to the major market from the descriptive statistics Table (4.3) include the farmers who sold to an association in addition to those who sold to an exporter; thus, the results for this variable may be misleading. Nevertheless, from the qualitative field research, it can be asserted that the people that belonged to a cacao association were producing better quality cacao since associations usually have internal grades and standards to monitor product quality.

Another quality variable that is positive and significant at 5% significance level is credit receipt for production or for low cacao season. If the farmer received credit, the price is 16% higher than without credit. A possible explanation is that the buyers who provided the credit want to maintain the informal relationship with the customer/farmer; therefore, they pay a higher price to the clients. In theory if the buyer provides credit to the farmer, a credit obligation is created, which means that the farmer has to provide cacao to the buyer who provided the credit. However, in reality, according to all the intermediaries interviewed, this does not commonly occur because of defaults by farmers in paying back the loans. Therefore, it could be the case that the buyer to avoid this payment default, pays a higher price to the farmer who received credit. In addition, farmers interviewed who received credit were few, as shown in the descriptive statistics in Table (4.3), although 82% of the intermediaries interviewed declared that they provided credit to at least some of the farmers that supplied cacao to them (Table 4.5). A potential explanation for this discrepancy is that the default in paying the credits by farmers has increased according to all the intermediaries interviewed; so many farmers may have avoided declaring credit provision because of these defaults.

It may appear to be contradictory that having received technical assistance is not significant explaining the price when pre- and post-harvest practices are significant. However, the question about whether the farmer received technical assistance does not include information on whether the farmer applied what was taught. It could be that farmers received technical assistance, but they did not apply it for some reason, such as cost or not fully understanding what was taught, among other reasons.

Even though cacao variety is a significant variable when deciding where to sell the product, it is not rewarded in the market. This result is confirmed by the intermediary survey. Some of its results are shown in Table 4.4 and indicate that variety type is not a reason for applying a discount in the price; therefore, it can be deduced that, in general, buyers do not reward or apply a discount to the farmers for supplying one variety or another. It could be the case that at the exporter level this variable is rewarded but since only 17% of the farmers surveyed sold at the major market, there could be insufficient variation to make variety a significant variable.

In relation to the characteristics of the transaction, the variables that are significant in explaining the price paid to the farmer are the motorized transport ownership (positive at 10% significance) and having transported the cacao for the last sale in a motorized transport (positive at 1% significance). Also the New York Stock Exchange price is relevant and has a positive effect in explaining the price paid to the farmer. If the stock price increases by 10%, the price paid to the farmer increases by 4%. Distance to the nearest cacao market and distance to a paved road are insignificant in explaining the price paid to the farmer.

The proxy for wealth is also insignificant in explaining the price received by the farmer. This is surprising since it was reasonable to expect that being wealthier affected the farmer's bargaining power because of potential higher information accessibility, thus the farmer could better negotiate the price. This indicates that other factors are more relevant in explaining the price paid to the farmer.

Table 4.9. Normal linear regression results for price paid to the farmer in the last cacao sale

Dependent variable: log (price paid to farmer in last sale)	Coefficient (Standard error)
Pre- and post-harvest practices	0.0138 (0.0062**)
Nacional variety	0.0723 (0.0768)
Log (quantity sold in last sale)	0.0091 (0.0172)
Motorized infrastructure ownership	0.0664 (0.0391*)
Mean of transport for last sale	0.0955 (0.0370***)
Log (farm size)	0.0087 (0.0175)
Technical assistance	0.0071 (0.0366)
Cacao association	0.0977 (0.0367***)
Credit	0.1569 (0.0749**)
Distance to nearest cacao market	0.0032 (0.0024)
Distance to the nearest paved road	-0.0023 (0.0018)
New York Stock Exchange price	0.3830 (0.1599**)
Last sale market (1= major)	0.0235 (0.0770)
Last sale market (1= local)	-0.0192 (0.0685)
Constant	-0.2414 (0.1505)
$F_{(14, 249)}$	3.39***
R^2	0.1603
Adjusted R^2	0.1131
Number of observations	264

*** Denotes significance at 1% significance level, **significant at 5%, and *significant at 10%.
Note: 1) the number of observations is smaller than 327 due to missing data in some variables

Chapter 5. Conclusion

In the context of increasing world-wide demand for high quality cacao and a shortage of production, Ecuador could potentially increase its foreign exchange earnings, promote rural development, and improve the livelihoods of small farmers through improving the production of high quality cacao. Nevertheless, incentives to produce quality, in the form of price premiums, are not transmitted effectively along the marketing chain to the farmer.

Market constraints explain the impediment of the development of markets for high quality cacao. The country could develop its potential as a high quality producer by surmounting these market level constraints. The qualitative field research, reported in Chapter 3, analyzed the nature of these constraints and identified key areas which need to be addressed. The subsector analysis (Chapter 3) failed to support the hypotheses that intermediaries are able to exert market power due to: 1) the existence of spheres of influence that grant them exclusive buying rights in specific geographic areas, and 2) farmers' credit obligations. Furthermore, it is relevant to note that the role of the intermediary in the marketing chain is important since they fill the lack of credit market for small cacao growers and they are the ones that buy cacao in very isolated areas where is very difficult for farmers to carry their production to the nearest town. Thus, efforts to improve the efficiency of the marketing chain should not be biased against intermediaries, rather those efforts should include the important roles that intermediaries play and seek to improve their contribution in these areas and overcome impediments to their contributions in other areas. Specifically, intermediaries were shown to be weak on transaction transparency, creating transaction costs impediments and reducing the transmission of price incentives to farmers, particularly with respect to incentives to produce high-quality cacao. Also, there is a lack of objective methods/tools for quality testing; therefore, the intermediary takes advantage of the farmer by downgrading cacao. In addition, institutional constraints were found, such as a lack of adequate grades and standards and monitoring of those grades and standards throughout the marketing chain. Chapter 4 further delved into the quality issue, showing that price premiums exist for only some quality parameters.

The incentive of price recognition for quality production is fundamental to promote high quality production starting at the farm level. But this incentive must be transmitted through every level of the marketing chain. Some farmers' associations have achieved this result by

circumventing the intermediaries and selling directly to an exporter or exporting directly, getting much better prices, thus creating incentives to produce high quality cacao. Farmers need external support—technical training and financial aid—to make the most of this opportunity though.

In the future, the national standards to approve the cacao exports (INEN norms) should be modified to include not only physical characteristics of the product such as moisture content, fermentation, absence of diseases, and so forth, but also organoleptic (aromas and flavors), production location, and specialty cacao attributes. In some ways, however, this is a premature recommendation since there is no consistent application of grades and standards for physical attributes in addition to the minimal technology available to enable measurement of those attributes along the marketing chain. If grades and standards are applied consistently for those attributes, the INEN norms may be modified, resulting in exporters being more demanding with respect to quality from the wholesalers who will transmit these requirements to the local intermediaries and finally to the farmers. In order to apply those grades and standards consistently, Ecuador needs an entity to certify the quality grading process at all levels of the marketing chain, especially at the intermediary level, including quality segregation as part of its main objectives. That certification process, combined with training for farmers on quality grading issues, can help to improve the overall cacao quality and the small farmers' bargaining power to better negotiate the price they receive for their product.

In addition, a flavor profile of Ecuadorian cacao must be developed soon in order to promote Ecuadorian chocolate from different locations and to develop a denomination of origin certification. This ought to be achieved soon to fulfill international demand for high quality cacao from Ecuador and protect the integrity of Ecuador's reputation for unique, high quality cacao to the extent that it exists and can be further developed.

Further research is needed to explore not only market level constraints, but farm level constraints such as limited access to inputs, human capital, financial capital, and so forth. This research demonstrates that the determinants that affect market channel choice include not only transaction-related variables such as quantity sold and means of transport, and farmer characteristics' variables such as wealth and level of isolation, but also one factor associated with the quality of production: the variety cultivated. In terms of the effects of wealth in market channel choice, the interaction between being wealthy and owning a means of transportation

does not play an important role, nor does the interaction between wealth and doing joint errands while at the market.

The factors that affect the price paid to the farmer also include transaction variables such as having transported cacao for the last sale by a motorized vehicle, the NYSE price, and motorized infrastructure ownership; and quality indicators such as the application of pre- and post-harvest practices, membership in a cacao association, and credit receipt for production or low cacao season. It is interesting to find that there is no price differential between markets when comparing the major or the local market with the farm-gate. Indeed, the market channel does not affect the price received by the farmer and vice versa. It is also surprising to find that the farmer's wealth does not affect the price because it was expected that a wealthy farmer has better bargaining power to negotiate the price.

Variety is a relevant variable in explaining the farmer's market supply choice, but it is not rewarded in the market with a price premium at the farm level. Therefore, from the farmer's perspective, production costs and yields will determine what variety to produce. However, from the country's viewpoint producing *Nacional* or *Arriba* makes a huge difference for promoting fine cacao from Ecuador to the rest of the world.

Pre- and post-harvest practices do not play a significant role in choosing where to sell cacao, however, they are rewarded in the market therefore more emphasis needs to be put on these practices to improve cacao quality and farmer's welfare. It might be the case that some practices are more relevant than others to affect quality, although no information was collected in relation to these possible differences. Further research needs to be done to address these potential differences.

An unexpected result is that technical assistance does not explain market choice nor the price paid to the farmer. The possible explanation about why this variable does not affect market channel choice is that technical assistance has traditionally been related to the production and post-harvest practices applied to the crop. These pre- and post-harvest practices were found to not be significant when choosing market but were significant in explaining the price received by the farmer. This result is somewhat contradictory. A possible explanation is that this study did not include whether the technical assistance was applied by the farmer. Therefore, further research is needed to explore the relation between technical assistance and the price received by the farmer, including the application of what was taught and the nature of the technical assistance

provided. Indeed, some NGOs are trying to change the nature of the technical assistance towards more comprehensive objectives such as marketing, organizational, social, and environmental issues. Therefore, if these changes are implemented it would be important to study their effects on market channel choice and on the farmer's welfare. Also, to improve the nature of the technical assistance provided to small farmers, further research is required to answer the question about how specific pre- and post-harvest practices affect cacao quality.

Since belonging to an association turned out to be a relevant variable that affects the price paid to the farmer, more emphasis needs to be put on understanding what specifically it is about associations that brings the improvement and replicating this, whether through the creation of associations or through other means.

This research also supports the relevance of rural credit markets. Although, the importance of this topic has been widely studied as mentioned previously, further research needs to be done specifically with Ecuadorian cacao farmers. In fact, specific research is needed to relate the price paid to the farmer and the credit relationship with the buyer. Even though we studied part of that relationship, the question about the informal relationship maintenance between the buyer and the farmer needs further research since we do not know if the farmer that received the higher price because of having received credit sold cacao to the same buyer that provided the credit to the farmer.

Finally, the findings that market level constraints restrict the development of markets for high quality cacao and that quality of output influences the farmers' choice of market outlet and the price paid to the farmer, point to the importance of extending the discussion of quality incentives in market development, especially in less developed markets.

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Appendix A: Key Informant Interview Guideline

The relevant topics to be covered in the key informant interviews are:
1. Product attributes
2. Transaction attributes
3. Determinants of the capacity of agents to meet the product and transaction attributes
4. Legislative function (rule-making) in the marketing chain
5. Judicial function (monitoring and enforcement) in the marketing chain
6. Executive function (support to implementation and compliance) in the marketing chain

The following table can be used as a rapid checklist during interviews to make sure that all relevant topics have been covered.

Issues / Actors	Small farmers	Organization leaders	Interme diaries	Whole salers	Alternative retailers	Exporters	Service providers	Govern ment
Product attributes	X	X	X	X	X	X	X	X
Transaction attributes	X	X	X	X	X	X	X	X
Capacity determinants	X	X	X	X	X	X	X	X
Legislative function	X	X	X	X	X	X	X	X
Judicial function	X	X	X	X	X	X	X	X
Executive function	X	X	X	X	X	X	X	X

For cacao producers and organization leaders:

Which are your different cacao buyers? (as a part of transaction attributes)

Product attributes

Which are the quality grades and standards for your cacao product required by your buyers? Specifically:
- Appearance: steins, defects, size, dryness, variety, quality certification, color, locality or region of origin, among others
- Inocuity: understanding this as any condition that has the potential of causing harm to the farm workers' health or in any other point of the marketing chain, or has the potential to cause harm to the consumers including biological and chemical pollutants

Do any of your buyers (specify which) require any specific production or post-harvest technologies? If yes, what type of technology?

Are there any <u>alternative buyers</u> of your product? If yes, how do you <u>compare</u> these <u>requirements</u> with your alternative buyers?

Transaction attributes

How is the <u>consistency in the supply</u>- throughout the year- to these buyers?

Is there any <u>post-harvest process</u> that is required by your buyers? (specify process and buyer), for example, selection, packaging, labeling.

Is there any <u>certification process</u>? (describe)

Is there any <u>quality control, samples, laboratory analysis</u>?

Is there any <u>rejection</u> of your product? (approximated %)

Does any buyer give you any <u>service</u>, for example, financial service, inputs for cacao production, technical assistance, etc? specify:
- Type of buyer
- Type of service (if a service is finding buyers or suppliers…ask how much this cost?)
- Responsibilities with the buyer
- If there is a loss in production, would the buyers that give financial services give it again for the next season?
- Has this happened before?

Does any buyer require specific <u>infrastructure or equipment</u>?
- Which buyer?
- What are the requirements?
- How do these requirements have changed through time?

What <u>proportion of the product stays in the production zone, is sell out of the region, is exported</u>? (%)

Do you have your <u>own brand</u>? If yes, what is its name?

What is the <u>type of payment</u> (cash, check, bank letter, consignment, other)?

What <u>percentage of the sales</u> to each buyer is <u>in cash</u>? (immediate payment)
(Don't ask next question if the entire product is sold in cash)

What are the <u>average payment frequency</u> (days) <u>and regularity</u> (if the buyer comply with the frequency agreed)?

Is there any <u>sanction or reward</u> for non- or good-compliance of the agreements with the buyers? For example, discounts, economic incentives, etc.

Do any of your buyers demand <u>exclusivity in sales</u>?

Do you have <u>contracts</u> with your buyers? Which <u>type</u> (informal, formal)? If yes, how are the <u>contract terms negotiated, by whom and how often</u>?

Do the <u>prices paid</u> for your product <u>differ</u> for different buyers? If yes, <u>by how much</u>? (local currency)

<u>When</u> is the <u>price determined</u>? (When they ask for the sale, in the deliver, at the beginning of the harvest, at the beginning of the plantation or after the final sale)

According to what <u>parameters</u> is the <u>price determined</u>? (table of prices, bargaining, pre-fixed price, quality at delivery, quality at reception, etc)

Where and how do you <u>deliver</u> your product? If the product is not purchased in the farm, <u>who pays for the transportation</u>? And how much?
Do you need <u>additional materials to transport</u>, for example, boxes? If yes, does the buyer provide them?

What sorts of <u>problems</u> do you have with your buyers?

When there are problems with your buyers, which are the <u>mechanisms to resolve them</u>?

Is there any <u>additional function or obligation</u> that you have to comply with the buyers different than the ones already mentioned?

Determinants of the agents' capacity to comply with the products and transaction attributes

a) <u>Technological:</u> <u>access</u> to specific knowledge and technological practices, inputs, equipment, machinery, infrastructure.
Which are the <u>technological changes</u> required to <u>start supplying or to comply</u> with these channels?
Which are the <u>costs</u> of these technologies <u>comparing between the different channels'</u> requirements?

b) <u>Organizational:</u> <u>relations with agents or individuals</u> of a same level of the marketing chain (for example, with other producers) or with other levels (i.e. producers associated with an enterprise).
Which are the <u>organizational changes</u> made in order <u>to comply or supply</u> to these channels?
Which are the <u>costs</u> of the organizational practices <u>comparing between the different channels'</u> requirements?

c) <u>Management</u>: <u>planning, control and coordination of the processes</u> from the inputs acquisition up to the post-sell services, tracking and evaluation, etc.
Which are the <u>management changes</u> done in order <u>to supply or comply</u> with the different channels?
Which are the <u>costs of these management practices comparing between channels</u>?

d) <u>Financial</u>: <u>capital and investments</u> required for all the previous determinants.
Which are your <u>investments and its costs</u>?
Which are your <u>financial sources</u>?

Legislative Function- function associated to the <u>formulation and approval of the rules</u> related to the product and transaction attributes

a) <u>Who defines the rules</u> and its <u>degrees</u>?

b) <u>For whom</u> in the marketing chain <u>are these rules valid</u>?

c) <u>How are the rules defined</u>? Including the process of decision making, the analysis of alternative rules, the rule modification process (when and how are the rules modified?), and the antecedents that are considered to define a rule or its degree

(The issues related to contracts, prices establishment, incentives and sanctions were described in the transaction conditions, but are also part of the legislative function).

Judicial Function- function of <u>monitoring and ensuring the rules compliance</u>

a) <u>Who monitors and ensures the rules compliance</u>? And with respect to whom is this function developed (who is the <u>target</u>)?

b) <u>How is this function accomplished</u>? (procedures)

A relevant issue here is the <u>delivery compliance</u>, specifically with respect to <u>volume, consistency and quality</u>:
- Under what (market or not) conditions will you <u>sell your products out of the established agreement-contract</u>? (specify incentives, to whom and frequency)
- Are there any <u>sanctions because of that</u>?
- <u>Who monitor the quality</u> of the product?
- Which is the <u>method</u> used?
- <u>Frequency</u>?
- <u>Cost? And who pays for it</u>?

Executive Function- function that <u>supports the rules compliance</u>. It considers the systems that exist throughout the marketing chain to help agents with rule compliance.

a) <u>Characteristics of the available services</u> in: production, post-harvest, training, coordination, managerial, financial services and development. Considering:
Contents, methods, costs of each service, who provides the services, and who pays for each service.

b) <u>Power of the services providers</u>

- Who chooses and decides about the services supply?
- How is this decided?
- How have the services supply changed through time?
- How have the costs and payment terms have changed through time?
- Does the service provider help in the problem resolution? Or have interest conflicts between buyers and suppliers? (for example, participate in the price establishment or negotiation, in the quality control, etc)

Additional Information

a) Market power
- How many buyers do you have?
- How much do you supply to each buyer? (percentage)
- How many suppliers do you have?

b) Marketing margins
- What price do you receive from each of your buyers?

For cacao buyers (intermediaries, wholesalers, alternative retailers, and exporters), service providers, and the government:

Product attributes

Which are the quality grades and standards required for the cacao product? Specifically:
- Appearance: steins, defects, size, dryness, variety, quality certification, color, locality or region of origin, among others
- Innocuity: understanding this as any condition that has the potential of causing harm to the farm workers' health or in any other point of the marketing chain, or has the potential to cause harm to the consumers including biological and chemical pollutants

Do you require any specific production or post-harvest technologies? If yes, what type of technology?

What production and/or post-harvest technologies will you require in the future?

How do you compare these requirements with the alternative buyers (competitors)?

Transaction attributes

Who are your cacao providers?

Why did you choose them to provide you? Or what benefits (and services) do you gain from buying from them? And what are the differences comparing to other suppliers?

How is the consistency in the supply- throughout the year- from these producers (or suppliers)?

Is there any <u>post-harvest process</u> that you require to your suppliers? (specify process and supplier), for example, selection, packaging, labeling.

Is there any <u>certification process</u>? <u>if no</u>, do you think there will be <u>in the future</u>? (describe)

Is there any <u>quality control, samples, laboratory analysis</u>?

Is there any <u>rejection</u> of the product? (approximated %)

Do you <u>give any services</u> to the producers, for example, financial service, inputs for cacao production, technical assistance, etc? specify:
- Size of producer
- Type of service (if a service is finding buyers…ask how much this cost?
- Responsibilities that the producers have with the buyer
- If you provide financial service and if there is a loss in production, would you give it again for the next season?
- Has this happened before?

Do you require specific <u>infrastructure or equipment</u>?
- What are the requirements?
- How do these requirements have changed through time?

<u>Do you sell the product that you buy</u>? If yes, <u>to whom</u>? (%)

Do you have your <u>own brand</u>? If yes, what is its name?

What is the <u>type of payment</u> (cash, check, bank letter, consignment, other)?

What <u>percentage</u> of the sales is <u>bought in cash</u>? (immediate payment)
(if the entire product is bought in cash, then do not ask the next question)

What is the <u>average payment term</u> (deadline)? (days)

Do the <u>prices that you pay</u> for the product <u>differ considering different suppliers</u> (if there is more than one)? If yes, <u>by how much</u>? (local currency)

<u>When is the price determined</u>? (When they ask for the sale, in the deliver, at the beginning of the harvest, at the beginning of the plantation or after the final sale)

According to what <u>parameters</u> is the <u>price determined</u>? (table of prices, bargaining, pre-fixed price, quality at delivery, quality at reception, etc)

Do you <u>purchase the product in the farm</u>?
If not, <u>how does the product gets to you</u>?
<u>Who pays</u> for the <u>transportation</u>? And how much?

Are there <u>additional material</u>s needed for transportation, for example, boxes? If yes, who provides them?

What <u>proportion of the product stays in the production zone, is sold out of the region, is exported</u>? (%)

Is there any <u>sanction or reward for non- or good-compliance</u> of the agreements with the suppliers? For example, discounts, economic incentives, etc.

Do you demand <u>exclusivity in sales</u> to any of your suppliers?

Do you have <u>contracts</u> with your suppliers? Which <u>type</u> (informal, formal)? If yes, how are the <u>contract terms negotiated, by whom and how often</u>?

What sorts of <u>problems</u> do you have with your suppliers?

When there are problems with your suppliers, which are the <u>mechanisms used to resolve them</u>?

Is there any <u>additional function or obligation</u> that you have require from your suppliers different than the ones already mentioned?

Determinants of the agents' capacity to comply with the products and transaction attributes

a) <u>Technological</u>: <u>access</u> to specific knowledge and technological practices, inputs, equipment, machinery, infrastructure.
Which are the <u>technological changes</u> required to <u>start supplying or to comply</u> with your requirements?
Which are the <u>costs</u> of these technologies <u>comparing between the different channels'</u> requirements?

b) <u>Organizational</u>: <u>relations with agents or individuals</u> of a same level of the marketing chain (for example, with other producers) or with other levels (i.e. producers associated with an enterprise).
Which are the <u>organizational changes</u> made in order <u>to comply or supply</u> to these channel?
Which are the <u>costs</u> of the organizational practices <u>comparing between the different channels'</u> requirements?

c) <u>Management</u>: <u>planning, control and coordination of the processes</u> from the inputs acquisition up to the post-sell services, tracking and evaluation, etc.
Which are the <u>management changes</u> done in order <u>to supply or comply</u> with the different channels?
Which are the <u>costs</u> of these management practices <u>comparing between channels</u>?

d) <u>Financial</u>: <u>capital and investments</u> required for all the previous determinants.
Which are your <u>investments and its costs</u>?
Which are your <u>financial sources</u>?

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b) For <u>whom</u> in the marketing chain <u>are these rules valid</u>?

c) <u>How are the rules defined</u>? Including the process of decision making, the analysis of alternative rules, the rule modification process (when and how are the rules modified?), and the antecedents that are considered to define a rule or its degree

(The issues related to contracts, prices establishment, incentives and sanctions were described in the transaction conditions, but are also part of the legislative function).

Judicial Function- function of <u>monitoring and ensuring the rules compliance</u>

a) <u>Who monitors and ensures the rules compliance</u>? And <u>with respect to whom</u> is this function developed (who is the target)?

b) <u>How is this function accomplished</u>? (procedures)

A relevant issue here is the <u>delivery compliance</u>, specifically with respect to <u>volume, consistency and quality</u>:
- Under what (market or not) conditions will you sell/buy your products out of the established agreement-contract? (specify incentives, to whom and frequency)
- Are there any sanctions because of that?
- Who monitor the quality of the product?
- Which is the method used?
- Frequency?
- Cost? And who pays for it?

Executive Function- function that <u>supports the rules compliance</u>. It considers the systems that exist throughout the marketing chain to help agents with rule compliance.

a) <u>Characteristics of the available services</u> in: production, post-harvest, training, coordination, managerial, financial services and development. Considering:
Contents, methods, costs of each service, who provides the services, and who pays for each service.

b) <u>Power of the services providers</u>
- Who chooses and decides about the services supply?
- How is this decided?
- How have the services supply changed through time?
- How have the costs and payment terms have changed through time?

- Does the service provider help in the problem resolution? Or have interest conflicts between buyers and suppliers? (for example, participate in the price establishment or negotiation, in the quality control, etc)

Additional Information

a) Market power
- What is the number of buyers at your level in the marketing chain? (competition)
- What is your share of the market (or how much, in percentage, do you buy in comparison to your competition)?
- How many suppliers do you have?
- To how many enterprises/individuals do you supply?
- How much do you supply to each buyer? (percentage)

b) Marketing margins
- What price do you pay for each of your suppliers?
- At what price do you sell your cocoa products?

Appendix B: Farmer Survey

1. PERSONAL DATA

1.01	Name of the enumerator	
1.02	Date	
1.03	Initial time	
1.04	Final time	

1.05	Name of interviewee	
1.06	Recinto	
1.07	Cantón	
1.08	Province	
1.09	Phone number	
1.10	Survey number	

2. LAND OWNERSHIP

2.01	How many hectares did you cultivate in total?						
Of all the hectares that you cultivated, how many were…							
	A (.0001)	**B (.0002)**	**C (.0003)**	**D (.0004)**	**E (.0005)**	**F (.0006)**	**G (.0007)**
	Owned	Rented	Sharecropped	Loaned	Partnership	Other	Total
2.02							

2.03	How many cacao hectares did you cultivate in total? (include non-productive and associated cacao)						
Of the cacao hectares that you cultivated how many were…							
	A (.0001)	**B (.0002)**	**C (.0003)**	**D (.0004)**	**E (.0005)**	**F (.0006)**	**G (.0007)**
	Owned	Rented	Sharecropped	Loaned	Partnership	Other	Total
2.04							

2.05	Who has the legal ownership of the cacao land? 1=Head, 2=Husband/wife, 3=Siblings, 4=Son/daughter in-law, 5=Grandfather/grandmother, 6=Grandchildren, 7=Parents, 8=Father/mother in-law, 9=Brother/sister, 10=Niece/nephew, 11=Other (Sp……………………………….)	
2.06	*Enumerator: Indicate (no need to ask) if it is men (1) or woman (2)*	

3. LAND CULTIVATION
What crops do you have in the farm?

	Crop	A (.0001) Specify crop (1/0)	B (.0002) Area Ha.	C (.0003) Number of trees	D (.0004) Associated with…?	E (.0005) 1=sale, 2=self-consumption, 3=if 1 > 2, 4=if 2 > 1, 5=property line, 6=nothing
	Eg: Apple	*1*	*2*	*50*	*Pear*	*3*
Fruit trees						
3.01	Cacao					
3.02	Coffee					
3.03	Palm					
3.04	Plantain					
3.05	Banana					
3.06	Citric					
3.07	*Zapote*					
3.08	*Mamei*					
3.09	*Achotillo*					
3.10	Mango					
3.11	Avocado					
3.12	*Guaba*					
3.13	Other Fruit-trees NOT for shade (Sp…......)					
3.14	Other Fruit-trees for shade (Sp………...)					
Wood producing trees						
3.15	*Laurel*					
3.16	*Fernán Sánchez*					
3.17	*Bantano*					
3.18	*Naranjo de monte*					
3.19	Other wood-trees for shade (Sp…............)					
3.20	*Teca*					
3.21	*Pachaco*					
3.22	Other wood-trees NOT for shade (Sp.)					
Annual crops						
3.23	Rice					
3.24	Maize					
3.25	Cassava					
3.26	Passion fruit					
3.27	Soy					
3.28	Self-consumption orchard					
3.29	Other (Sp………….)					
Forages						
3.30	Pastures					

4. CACAO PRODUCTION

	A (.0001)	B (.0002)	C (.0003)	D (.0004)	E (.0005)	F (.0006)	G (.0007)	H (.0008)
	Lot	Area (Ha)	Variety 1=*Nacional*, 2=CCN-51/*Ramilla*, 3=Other	Number of trees per Ha.	Age of plantation (years)	Production per Ha.	Unit	Measure of unit
4.01								
4.02								
4.03								
4.04								
4.05								

		A (.0001)	B (.0002)	C (.0003)	D (.0004)
		Organic (or about to be)	Fair Trade (or about to be)	Rain Forest Alliance (or about to be)	Other (Sp……… …………)
4.06	Do you produce cacao for ……… markets? (1/0)				
If yes, answer the following questions:					
4.07	For how many years?				
4.08	Motivation: 1= independent, 2= producer association, 3= 2nd level producer association, 4= NGO, 5= other				
4.09	Do you have certification? (1/0)				
4.10	If yes, who provided it (name)				

Agricultural training

4.11	Did the field administrator(s) studied in a technical school? (1/0)	
4.12	Did someone take a course in Agronomy or Rural Administration? (1/0)	
4.13	Did someone take a course or technical specialization program? (1/0)	
4.14	Have you received any kind of technical assistance, workshop, or recommendations for the cacao cultivation? (1/0)	
4.15	If yes, from whom? 1=INIAP, 2=ANECACAO, 3= ACDI-VOCA, 4= Producer organization, 5=2nd level producer organization, 6=3rd level producer organization (provincial), 7=4th level producer organization (regional), 8=5th level producer organization (national), 9=Other (Sp…………………………………….)	

If you received any kind of technical assistance, workshop, or recommendations for the cacao cultivation:			
Activity	**A (.0001)** For which activities were you taught or recommended? (1/0)	**B (.0002)** Did you apply what was taught or recommended? (1/0)	**C (.0003)** If not, why? 1= cost, 2= lack of time, 3= lack of credibility, 4= no market reward, 5= did not understand what was taught, 6= other (Sp…….....................…)
4.16 Pruning			
4.17 Fertilization			
4.18 Cut non-productive branches			
4.19 Eliminate infected pods			
4.20 Pests control			
4.21 Cut weeds manually			
4.22 Chemical weed control			
4.23 Irrigation			
4.24 Fermentation			
4.25 Drying			
4.26 Other (Sp…………………..)			

Which were your last year crop management practices? (i.e. from January to December 2005)

	Activity	A (.0001) Type of practice (1/0)	B (.0002) Frequency	C (.0003) Period 1=weekly, 2=bi-weekly, 3= 21days, 4=monthly, 5=yearly	D (.0004) Number of people required for this activity	E (.0005) Number of days required for this activity
	Eg: Pruning	*1*	*2*	*1*	*3*	*1*
4.27	Pruning (in general)					
4.28	Pruning to eliminate diseases (Sp………………………….)					
4.29	Treat wounds					
4.30	Fertilization					
4.31	Cut non-productive branches					
4.32	Eliminate infected pods					
4.33	Cut weeds manually					
4.34	Chemical weed control					
4.35	Irrigation					
4.36	Control tree height					

4.37	Have you had infected pods in the last season? (1/0)	
4.38	What caused the infection?...	
4.39	What did you do with the infected pods? 1= left them in the tree (did not harvest them), 2= cut them and leave them on the ground, 3=cut them and take them out of the farm, 4= harvested them and sold them separated from the healthy ones, 5= harvested them and sold them mixed with the healthy ones, 6= other (Sp……………………………………………………………………………)	
4.40	Did you clean or disinfect your tools for crop management? (1/0)	
4.41	If yes, what product did you use? 1=Chlorine, 2=Formol, 3=Other (Sp…………………………..)	

4.42	Have you found cacao plants dead on your farm? (1/0)	
4.43	If yes, what did you do with the plants? 1=cut them and burn the tree in the same place, 2= cut and take out of the farm, 3= left them there and re-plant, 4=left them there and do not do anything, 5= Other (Sp…………………………………………………………………………….)	

Have you found this problem in the cacao plantation? *SHOW PICTURES AND DO NOT TELL THE DISEASE NAME TO THE PRODUCER*		A (.0001) Name disease PICT. 1	B(.0002) 0=No*, 1=Minor, 2=Serious PICT. 1	C(.0003) Name disease PICT. 2	D (.0003) 0=No*, 1=Minor, 2=Serious PICT. 2	E (.0004) Name disease PICT. 3	F (.0006) 0=No*, 1=Minor, 2=Serious PICT. 3
4.44	*Witches broom*						
4.45	*Monilia*						
4.46	*Machete disease*						
4.47	*Diplodia*						
4.48	*Hierba del pajarito*						

*No: means that the producer has not found that disease in the field

4.49	Do you do biological control* of some disease? (1/0)	
4.50	If yes, 1= *Monilia*, 2=*Witches broom*, 3=Other (Sp…………………………………..), 4= Both	

*An organism represses/suppresses another organism, for example, fungus, insect, etc.

4.51		A (.0001)	B (.0002)
4.52	When is the high production season?	From (month)……….	To (month)……........
4.53	When is the second production peak?	From (month)……….	To (month)……........
		Frequency (how many times)	Period 1=weekly, 2=bi-weekly, 3=21days, 4=monthly, 5=yearly
4.54	Which was the high season harvest frequency?		
4.55	Which was the second peak season harvest frequency?		
4.56	Which was the low season harvest frequency?		

4.57	How do you decide when to harvest? 1=when the fruit is ripened 2=when you need money, 3=you program it like that, 4=when the buyer requires cacao, 5= other (Sp………………………………..…………………………………)			
		Quantity (.0001)	Unit (.0002)	Measure of the unit (.0003)
4.58	How much did you harvest in high season?			
4.59	How much did you harvest in mid-season?			
4.60	How much did you harvest in low season?			

4.61	**After the harvest, do you ferment your cacao (1/0)**	
	If yes answer the following questions, if not, skip to question 4.64	
4.62	For how many days?	
4.63	How do you ferment it? 1=in piles, 2=in sacks (Sp. material……………..…) 3=in wooden boxes, 4=in plastic bucket, 5=other (Sp……..…………….)	

4.64	**Do you dry your cacao? (1/0)**	
If yes answer the following questions, if not, skip to question 4.67		
4.65	For how many days?	
4.66	Where did you dry it? 1=over the cement, 2=over chopped cane, 3=over other material (Sp. material…………….), 4=on the road, 5=over plastic, 6=with drying machine, 7=other (Sp……………..………………........)	

4.67	During the past 5 years, have you re-planted cacao trees? (1/0)	
If yes answer the following questions, if not, skip to question 4.73		
4.68	Why? 1=renovation, 2=increase plantation area, 3=other (Sp…………………………………………………………………)	
4.69	Which variety? 1=*Nacional*, 2=CCN-51/*Ramilla*, 3=both, 4=other (Sp………………………………………..……………)	
4.70	How many hectares?	
4.71	How many plants per hectare?	
4.72	How did you finance the re-plantation 1=own resources, 2=bank, 3=buyer, 4=input provider, 5=loan from family/friends, 6=association, 7=exporter, 8= other (Sp…………………………………………..)	

During the last year, i.e. from January to December 2005, how much did you spent in…? (US$)

		A (.0001) Farm	B (.0002) Only cacao
4.73	Fertilizers		
4.74	Herbicides		
4.75	Insecticides		
4.76	Fungicides		
4.77	Labor for pesticides application (herbicides, insecticides, fungicides)		
4.78	Labor for cacao management		
4.79	Labor for cacao harvest		
4.80	Labor for cacao post-harvest		

How did you finance your cacao production costs (inputs, hand labor, etc.)?		**Yes=1, No=0**
4.81	Own resources	
4.82	Loan	
4.83	If yes, from whom? 1=buyer, 2=association, 3= other (Sp………..……………….)	

How do you finance the cacao low season?		
4.84	What is your **primary source** to finance the cacao low season? 1=wage labor (from agriculture or not) of someone in the family/farm, 2=from sale of other agricultural and livestock products, 3=from cacao sale in high season, 4=other own resource (Sp……………………………….……), 5=loan from the buyer, 6=loan from the association, 7=loan from other (Sp………………………………………….)	
4.85	If you received a loan, how much it was?	
4.86	If you received a loan, in which month?	
4.87	If you received a loan, when did you pay back? 1=in the next cacao harvest, 2=when I sold other agricultural products, 3=a fixed number of months after the loan (how many?.............), 4=I have not paid back yet, 5=Other (Sp…………….…………………)	
4.88	What other financial sources do you have for the cacao low season? (***arrange them***	

		according to their importance)
		1= wage labor (from agriculture or not) of someone in the family/farm, 2= from sale of other agricultural and livestock products, 3= from cacao sale in high season, 4= other own resources (Sp……………………………….…….…), 5=loan from the buyer, 6=loan from the association, 7=loan from other (Sp…………………………………………), 8= no other source	
4.89	Other source (1 to 8)	
4.90	Other source (1 to 8)	
4.91	Other source (1 to 8)	

According to the pesticides application for EVERY CROP during the last year:

		A (.0001) Did you use...? (1/0)	B (.0002) For which crop(s)?	C (.0003) For which diseases?	D (.0004) Area of application (Ha)	E (.0005) Number of times applied	F (.0006) Product quantity per application	G (.0007) Unit
HERBICIDES								
4.92	*Glifosato*							
4.93	*Diuron*							
4.94								
4.95								
4.96								
INSECTICIDES								
4.97	*Kevin*							
4.98	*Semevin*							
4.99	*Decis*							
4.100	*Furadan*							
4.101	*Malation*							
4.102								
4.103								
4.104								
FUNGICIDES								
4.105	*Cobrenordox*							
4.106	*Cobresandoz*							
4.107	*Óxido cuproso*							
4.108	*Koccide*							
4.109	*Clorotalonil*							
4.110	*Daconil*							
4.111								
4.112								
4.113								
OTHERS								
4.114	*Formol*							
4.115	*Alquitrán*							
4.116	*Caldo Bordeles*							
4.117	*Ecuafix*							
4.118								

5. ASSOCIATIONS

		Yes=1, No=0
5.01	Do you belong to an association related to agriculture?	

If the answer is no, continue to the following page

If yes, specify the type of association		Yes=1, No=0
5.02	Cacao association or cooperative (Name..…………………………………..………..)	
5.03	Association or cooperative not related to cacao	
5.04	Second level cacao association or cooperative (Name…………..……………...…..)	
5.05	Partnership	
5.06	Agricultural center	
5.07	Other group (Sp.…………………………………………………………………)	
If you currently participate,		
5.08	Is the organization juridical? (1/0)	
5.09	How many members does it have?	

If the organization is related to cacao, what activities does it carry out?		Yes=1, No=0
5.10	Input purchase	
5.11	Hire or provide technical assistance	
5.12	Fermentation	
5.13	Drying	
5.14	Cacao classification	
5.15	Packaging	
5.16	Marketing (negotiate sales)	
5.17	Financing	
5.18	Investment in infrastructure	
5.19	Drying machine	
5.20	Marquee	
5.21	*Tendales* (place to dry cacao)	
5.22	Place to ferment cacao	
5.23	Storage place	
5.24	Transport (eg: trucks, roads)	
5.25	Other investments (Sp.…...)	

6. MARKETING

During the last year, i.e. January to December 2005:

6.01	Who bought your cacao? 1=intermediary at the farm-gate 2=intermediary in the nearest assembly center, 3=intermediary in the nearest city/town, 4=producer association, 5= exporter, 6= other (Sp……………………………..)	
6.02	How did you transport the cacao to the buyer? 1=walking, 2=bicycle, 3=motorcycle, 4=pick-up truck, 5=car, 6=truck, 7=horse or mule, 8=bus, 9=other (Sp……………………………………………………….……)	
6.03	How many quintiles did you sell last year? (1 quintile = 100 pounds)	
6.04	How much money did you earn from cacao sale?	
6.05	Before you found the buyer, did you know the cacao price? (1/0)	
6.06	If yes, what price? 1=local price, 2=NY stock market price, 3=producer price*, 4=Guayaquil price, 5=other market price (Sp……..…………….)	
6.07	If yes, how did you know the price? 1=radio, 2=other producers, 3=ask at the nearest town/city, 4=2 and 3, 5=other (Sp……………...)	
6.08	Did somebody reject buying your cacao because of *Monilia*? (1/0)	
6.09	Do you have any records? 0=I do not have, 1=production reports, 2=sale reports, 3=all of them	
If the producer cultivates more than one cacao variety ask:		
6.10	How do you sell your cacao varieties? 1=separated 2=blended	

Producer price is ANECACAO (National Association of Cacao Exporters) price

With respect to your last cacao sale:

When was it?	6.11 Day		6.12 Month		6.13 Year	
6.14	Who was the buyer? 1=intermediary at the farm-gate 2=intermediary in the nearest assembly center, 3=intermediary in the nearest city/town, 4=producer association, 5= exporter, 6= other (Sp…………………………………………………..)					
6.15	Who transported the cacao? 1=producer/family member, 2=intermediary/buyer, 3=partner, 4=cacao association, 5=neighbor/community member, 6=other (Sp…………………..…………………………)					
6.16	How did you transport the cacao to the buyer? 1=walking, 2=bicycle, 3=motorcycle, 4=pick-up truck, 5=car, 6=truck, 7=horse or mule, 8=bus, 9=other (Sp……………………………………………………….)					
Transport cost	6.17 Cost $/quintile			6.18 Other expenses $		
Optional answer:	6.19 Total cost (all expenses included) $					
6.20	How many quintiles did you sell?					
6.21	Did you go for 1=only for sale or 2= other errands (Sp………………………..)?					
6.22	How was the price? 1=fixed, 2=bargained, 3=other (Sp………………………..)?					
6.23	Type of payment 0=cash, 1=installments/with some days of delay, -1=as part of a debt payment					
6.24	What was the initial sale price?					
6.25	What was the final sale price?					
6.26	Price per unit: 1=quintile, 2=pound, 3=sack (equal to……………pounds), 4= other (Sp…………..……………………)					
6.27	Who administrated the cacao earnings? 1= husband-head, 2= wife-head, 3=son(s), 4=daughter(s), 5=grandfather, 6= grandmother, 7=parents, 8=employees, 9=1 and 2, 10=other family member (Sp……………………………………………………….)					
6.28	What did you do with the money of the last cacao sale? 1=buy inputs for cacao,					

				Yes=1, No=0
	2=buy inputs for other crops, 3=home expenses, 4=save, 5=other (Sp...)			
6.29	*If you produce special cacao:* Do you have any certification? 0= none, 1=organic, 2=fair trade, 3=rain forest alliance, 4=other (Sp.......………….................................)			
Does the buyer discuss about……?				Yes=1, No=0
6.30	Moisture content			
6.31	*Monilia*			
6.32	Other diseases			
6.33	Impurities			
6.34	Fermentation			
6.35	Seed size			

		A (.0001)	B (.0002)	C (.0003)
Answer only the ones that are "yes" from the previous question (6.30 to 6.35)		Moisture content	*Monilia*	Other diseases
6.36	Did you or your buyer measure **……**? 0= no, 1=yes, 2=yes the buyer, 3=both of us, 4=third parties (Sp…………………………..)			
6.37	If yes, how did he/she measure it? 1=eye-bowl, 2=hydrometer or other device, 3=other (Sp………………)			
6.38	*If the producer measured,* you or the community has: 1=device to measure moisture, 2=device to measure weight, 3=1 and 2, 4=none			
6.39	What was the grade or percentage of …….?			
6.40	(If the producer also measured, describe the his/her point of view here)			
6.41	Did the buyer discount for……? (1/0)			

		Moisture content		*Monilia*		Other diseases	
		(.0001)	(.0002)	(.0003)	(.0004)	(.0005)	(.0006)
6.42	If yes, how much was the discount?	$	pounds	$	pounds	$	pounds

		A (.0001)	B (.0002)	C (.0003)
		Impurities	Fermentation	Seed size
6.43	Did you or your buyer measure **……**? 0= no, 1=yes, 2=yes the buyer, 3=both of us, 4=third parties (Sp…………………………..)			
6.44	If yes, how did he/she measure it? 1=eye-bowl, 2=device, 3=other (Sp………………)			
6.45	What was the grade or percentage of …..?			
6.46	(If the producer also measured, describe the his/her point of view here)			
6.47	Did the buyer discount for……? (1/0)			

		Impurities		Fermentation		Seed size	
		(.0001)	(.0002)	(.0003)	(.0004)	(.0005)	(.0006)
6.48	If yes, how much was the discount?	$	Lbs	$	Lbs	$	Lbs

How much was the total discount?	6.49	$	6.50	Lbs

6.71	Do you buy and re-sell cacao? (1/0)	
6.72	If yes, from how many producers?	
6.73	If yes, what percentage of your cacao earnings comes from other producers? (% bought)	
6.74	Did you give any credit or financial support to other producers? (1/0)	
6.75	If yes, what kind of support?.. and how much did you lend? ($)	

7. INFRASTRUCTURE AND MACHINERY

Available equipment (also for other crops):

Type		A (.0001) Yes=1, No=0	B (.0002) Is it in good condition? (1/0)
7.01	Pick-up truck		
7.02	Car		
7.03	Motorcycle		
7.04	Horse or mule		
7.05	Bicycle		
7.06	Tricycle		
7.07	Mechanical pump		
7.08	If yes, how many?		
7.09	If yes, 1=owned, 2=rented, 3=borrowed, 4=other		
7.10	Manual pump		
7.11	If yes, how many?		
7.12	If yes, 1= owned, 2= rented, 3= borrowed, 4=other		
7.13	Chainsaw		
7.14	Wheelbarrow		
7.15	Handsaw		
7.16	Other equipment or material……………...........		
7.17	Other equipment or material……………...........		
7.18	Other equipment or material……………...........		
7.19	Other equipment or material……………...........		

7.20	Do you have an irrigation system? (1/0):	
7.21	If yes, what type? 1=by flooding or furrows, 2=sub-foliage aspersion, 3=dripping, 4=other (Sp………………………………..)	

7.22	Do you store the cacao? (1/0)	
7.23	If yes, where? 1=storage for cacao, 2=storage for tools and chemical products, 3= other (Sp……………..……………….)	
7.24	Where do you get cacao sacks? 1=buyer, 2=association, 3=buy them in town, 4=other place (Sp……..…………………………..)	
7.25	Do you recycle the sacks (use them again)? (1/0)	
7.26	If you recycle, 1=do you use them only for cacao, 2=did you use them for chemical products, 3= other (Sp………………………..)	

8. HOUSEHOLD CHARACTERISTICS

	A (.0001)	B (.0002)	C (.0003)	D (.0004)	E (.0005)	F (.0006)	G (.0007)	H (.0008)	I (.0009)	J (.0010)	K (.0011)	L (.0012)
	Kinship*	Gender 1=male 2=female	Age (years)	Level of schooling Up to which schooling year did you complete? 0=none I=elementary II=high school III=college	Schooling What grade did you finish? Elementary= 1 to 6 High school= 1 to 6 College= 1 to 5	What is your primary activity (during the cacao harvest season)?**	What is your secondary activity (during the cacao harvest season)?**	Do you live at the farm? Yes=1, No=0	Do you work at your family's farm? Yes=1, No=0	Do you participate in the farm adminis_tration? Yes=1, No=0	Income from each family member ($)	By period 1=week, 2=monthly 3=bi-weekly, 4=21days, 5=yearly
	Eg: 1	*2*	*37*	*0 I II III*	*3*	*8*	*2*	*1*	*1*	*0*	*120*	*2*
8.01				0 I II III								
8.02				0 I II III								
8.03				0 I II III								
8.04				0 I II III								
8.05				0 I II III								
8.06				0 I II III								
8.07				0 I II III								
8.08				0 I II III								
8.09				0 I II III								
8.10				0 I II III								
8.11				0 I II III								
8.12				0 I II III								
8.13				0 I II III								

*Relatives: 1=head, 2=husband/wife, 3=son/daughter, 4=daughter/son in-law, 5=grandmother/father, 6=grandson/daughter, 7=parents, 8=mother/father in-law, 9=sister/brother, 10=niece/nephew, 11=Other (Sp.)

**Activities: 1=sell agricultural and/or livestock products from the farm, 2=earn wage in another farm, 3=marketing—not agricultural, 4=Services, 5=Industry, 6=handicrafts, 7=household activities, 8=student, 9=other (Sp.), 10=none

9. ROLE OF AGRICULTURE AND OTHER ACTIVITIES FOR HOUSEHOLD INCOME

Please think about all the household income sources from last year, i.e. January to December 2005:		%
9.01	What percentage of the household income came from the sale of agricultural and livestock products?	
9.02	What percentage of the income that came from the sale of agricultural and livestock products came from cacao sale?	

10. DWELLING CHARACTERISTICS

10.01	Do you live in the farm permanently? (1/0)	
10.02	The house where you live is: 1=owned, 2=rented, 3=loaned, 4=other (Sp………………………..….)	
10.03	What is the material of the house? (walls): 1=cement, 2=adobe, 3=brick, 4=wood, 5=other (Sp…………………………………………………....)	
10.04	What is the material of the floor: 1=ground, 2=cement, 3=wood, 4=stone, 5=brick, 6=other (Sp…………………………………)	
10.05	Does the house have….?: 1=complete hygienic service, 2=latrine, 3=none	
10.06	Do you have electricity? (1/0)	
10.07	Where does the water for the household consumption come from? 1=well, 2=natural string or river, 3=faucet, 4=rainfall, 5=other (Sp…………………………………..)	
10.08	Do you have telephone? 1=home line or cellular phone, 0=does not have	
10.09	Does the community center have a telephone? (1/0)	
10.10	What is the distance (Km.) to the nearest community center? (Name…………………………………)	
10.11	What is the distance (Km.) to the nearest assembly center where you could sell cacao?	
10.12	How far is your farm from a paved road? (Km.)	

Appendix C: Intermediary Survey

1. Contact information
1.01 Date _____
1.02 Name _____
1.03 Assembly Center's name _____
1.04 Address _____
1.05 Telephone _____

2. Marketing
2.01 What products do you sell?
Cacao, _____
2.02 What percentage of your sales comes from cacao sales? _____

2.03 For how long have you been an intermediary? (years)	
2.04 Is this your only assembly center? (1/0)	
2.05 If you have more than one, where are they? How many are they?.....................................	
What was the amount sold by this assembly center during the last year?			

High season	2.06 Quantity	2.07 Unit	2.08 Period
Mid-season	2.09 Quantity	2.10 Unit	2.11 Period
Low season	2.12 Quantity	2.13 Unit	2.14 Period
Period: 1= week, 2= bi-weekly, 3= every 21 days, 4= monthly, 5= yearly			
What is the sales percentage for each cacao variety? (%)			

2.12 *Nacional*	
2.13 CCN51	
2.14 Other varieties	
2.15 Who are your buyers? 1= small buyers, 2= large buyers, 3= producer associations, 4= exporter, 5= others…………………………………...	
2.16 Buyers' names:…………………………………………………….	
2.17 Where do you sell cacao? 1= here in your city/town, 2= other city/town (Sp…………………………..), 3= in Guayaquil, 4= other (Sp…………………………...)	
2.18 How many buyers do you have?	
2.19 Do you receive credit from your suppliers? (1/0)	
2.20 If yes, from whom? 1, 2, 3, 4, 5	

2.21 How many community assembly centers do you have in your city/town? Name them..	
2.22 How many of them buy from other assembly centers?	

¿Do you buy cacao from...?

	A (.00001)	B (.0002)	C (.0003)	D (.0004)	E (.0005)	F (.0006)	G (.0007)	H (.0008)	I (.0009)	J (.0010)	K (.0011)	L (.0012)	M (.0013)	N (.0014)	O (.0015)
	1/0	Number of suppliers	% of delivery	Average delivery high season/ producer	Freq. High season	Period 1, 2, 3, 4, 5	Unit	Average delivery 2° peak	Freq. 2° peak	Period 1, 2, 3, 4, 5	Unit	Average delivery low season/producer	Freq. Low season	Period 1, 2, 3, 4, 5	Unit
2.23 Intermediary															
2.24 Producers															
2.25 Association															

2.26 What is the average farm size? (hectares)	

3 Credit provision:

3.01 Do you give credit to producers? (1/0)	
3.02 Type of agreement: 1= cacao provision and to take a proportion each time, 2= producer can pay any time without cacao provision, 3= other..	
3.03 Interest rate (%)	
3.04 Discount for debt payment 3.05 Quantity 3.06 Unit	
3.07 The loan in general is in ... season: 1= high, 2=second peak, 3= low, 4= 1 and 2 equally, 5=all of them	
3.08 How many producers receive your financial support?	
3.09 How many producers do not comply with the agreement?	
3.10 Do you provide loans to intermediaries to buy cacao? (1/0)	
3.11 And for other reason? (1/0) (Sp...)	

4 Prices

4.01 How do you determine the price? 1= NY stock market, 2= buyer's price 3= I set the price in relation to the local market, 4= other......................................	
4.02 What is your margin per quintile?	

5 Quality

5.01 Quality requirements...

What activities do you perform?	Yes=1, No=0
5.02 Buy at the farm-gate	
5.03 Fermentation	
5.04 Drying	
5.05 Cleaning	
5.06 Classification	
5.07 Others (Sp..)	

5.08 Do you buy fresh cacao (in *baba*)? (1/0)	

	A (.0001) Do you discount for ...? (1/0)	B (.0002) How do you set it____? 1= eyeball, 2= measure with instrument, 3= do not determine, 4= Others (Sp...................)
5.09 Delivery volume		
5.10 Variety		
5.11 Moisture content		
5.12 *Monilia*		
5.13 Other diseases		
5.14 Impurities/cleaning		
5.15 Grade of fermentation		
5.16 Seed size		

Vita

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Pilar A. Jano was born in Santiago, Chile in 1979. In 2003, she graduated as an Agricultural Engineer from the School of Agriculture and Forestry, *Pontificia Universidad Católica de Chile*. She was a research assistant at the Latin American Center for Rural Development (RIMISP) from 2003 to 2005. After obtaining a graduate research assistantship at Virginia Tech in August 2005, she began her graduate studies in Agricultural and Applied Economics. She is interested in doing research in Latin American developing countries.