


**Research Article**

# Contracting decision and performance of Mexican coffee traders: The role of market institutions

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**We identified and explained the contractual choices of Mexican coffee traders in selling their product and analyzed the traders' performance. The data were obtained from personal interviews with 53 intermediaries in four coffee producing regions of the states of Oaxaca and Veracruz, Mexico. Marketing margins were used as an indicator of traders' performance. The results indicate that being a roaster, having a wet processing plant and selling cherry coffee negatively affects the use of contracts whereas being vertically integrated has a positive effect. The results also suggest that being registered in the National Coffee System (which only a minority of the interviewed traders were) increases the margin for the trader. Selling cherry coffee, participating in a competitive environment and having a contract decreases these margins (at 5% significance) and may thus enhance the performance of the supply chain and benefit the producers.**

**Keywords:** Contractual arrangements, intermediaries, trade, coffee, Mexico.

## INTRODUCTION

Middlemen play an important role in a commodity chain. They perform many of the activities required to bring goods from producer to consumer, and their productivity has a strong impact on the performance of the chain as a whole and the welfare of the agents involved (Sexton and Lavoie, 2001). Differences in the behavior of middlemen can be explained by economic and cultural factors. The way intermediaries interact can give information about the environment in which they make their transactions and vice versa (Fafchamps, 2004; Fafchamps and Minten, 1999).

Relationships and the environments in which intermediaries act are not static; they evolve over time. Agricultural commodity markets have undergone significant changes over the past twenty years, changes that at the same time affect the behavior of agents within a commodity chain. This is the case for the coffee chain, too. The major change occurred at the end of the nineteen eighties and

early nineties, when the coordinated marketing system under the International Coffee Agreement was abandoned. In many countries, including Mexico, this led to a withdrawal of the government from the sector, creating scope for private parties and their organizations. Since then, the degree of state interference has fluctuated; private sector organizations or public-private initiatives have come and gone.

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In this paper, we look at a particular aspect of the institutional arrangements, namely the use of sales contracts by the agents who buy coffee from the farmers or from other buyers.

There is a variety of channels in the Mexican coffee supply chain; within these there is a variety of steps through which coffee transits from producer to consumer (see Annexes 1 and 2). The simplest one is the product sold directly from the producer to the consumer. In this case, the product is sold at the regional, local or national market. Yet, the most common channel is the one starting from the producers who sell to the local collectors; then there are the regional collectors, and after that there are the state buyers; after this, the coffee is transported to the border to be sent to other countries by exporters. From then on, the product is taken over by processors (roasters) of consumer countries. This description implies that there are five steps in the supply chain, in this study we interviewed intermediaries placed on the first four steps.

Studies show that the relationships with middlemen can be crucial for the performance of the commodity chain (Gabre-Madhin, 1999; Fafchamps *et al.*, 2005). Knowledge of the Mexican coffee intermediaries' behavior, contributes to a better understanding of the coffee market, and gives information to improve Mexican coffee policies. Therefore, in this paper we investigate the coffee traders' behavior and the performance of the Mexican coffee agents. We focus on two coffee-producing states, Oaxaca and Veracruz.

More in particular, the objectives of this work are: to identify and explain the contractual sales arrangements of traders in the Mexican coffee chain and to assess the performance of coffee traders in the states of Oaxaca and Veracruz, Mexico. In order to reach these objectives, the following research questions need to be answered: what are the socio-economic characteristics of coffee traders in the states of Oaxaca and Veracruz, Mexico? What are the main factors that affect whether traders have a contract with their buyers? And how do contracts influence the performance of coffee traders in Oaxaca and Veracruz, Mexico?

The data used in our analysis were obtained by conducting face-to-face interviews with 53 intermediaries in four coffee-producing regions of the states of Oaxaca and Veracruz. Additionally, we held meetings with local authorities and people involved in the Mexican National Coffee System. Figure 1 shows that coffee prices have fluctuated enormously over the past decades, and that the margins between fob (free on board) prices and producer prices were also quite variable.

The margins range from 2.30% of the selling price when buying and selling cherry coffee to 63.48% when buying cherry and selling roasted coffee. We use this margin as a measure of the performance of the intermediary. Contractual arrangements with their buyers may help intermediaries invest in specialized equipment or otherwise reduce costs of trading and/or processing. But

many transactions are not based on contracts. The transaction costs of arranging a contract may exceed the benefits of having one in cases where reality is difficult to capture in regulations, or where contact is already intensive. We elaborate on these reasons in the next section.

The empirical work indicates that being a roaster, having wet processing facilities and selling cherry coffee negatively affect traders' use of contracts, whereas having dry processing facilities has a positive effect on their use of contracts. The findings also suggest that selling cherry coffee, participating in a competitive environment and having contracts positively influence intermediaries' performance, while being registered in the National Coffee System have a positive effect on the gross margin. The remainder of this paper is organized as follows: in Section 2, we present the theoretical approach; in Section 3, we present the data and methods used to analyze the information; in Section 4, we give the model specification and likely determinants of contract choices; in Section 5, we specify the model of traders' performance and show the empirical findings; and in Section 6, we present the conclusion.

## THEORETICAL APPROACH

Why are institutions so important for understanding contractual choices and the performance of traders in chains? According to North (1989), every process in which an exchange is performed has some costs involved. In the case of the Mexican coffee sector, one can think of the search for market information, finding farmers who sell coffee, inspecting the quality and transporting the product and arranging contracts between the agents who perform the mentioned activities (Jabbaret *et al.*, 2008). Contracts arise as facilitators of these interactions; they provide the possibility of doing business at low costs and thus influence the efficiency along the commodity chain. If transaction costs are low, economic actors will favor spot markets, but if transaction costs are high, they will favor contracting or vertical integration to lower these costs (Ruben *et al.*, 2007a). Additionally, Janvry *et al.* (1991) have argued that the existence of transaction costs might explain why households are not entering a certain agricultural market. Transaction Cost Economics (TCE) helps to understand how agents decide to run their business given the environment in which they execute their activities. Some traders may choose to buy and sell coffee without adding much value to the product they market, as costs and uncertainty are high. Others will choose to vertically integrate and sell more downstream in order to tackle these costs. Some agents turn to contractual agreements in order to reduce these costs (Williamson, 1979). Three principle attributes of transactions have been identified: the frequency with which transactions recur, the specificity of the assets necessary to come to a transaction, and the degree and type of uncertainty of

transactions. Normally local intermediaries make contractual arrangements and the roasters and exporters go for vertical integration. The TCE theory predicts that under high asset specificity and high uncertainty, the firms will embrace a highly integrated channel in all cases (Shervani *et al.*, 2007); thus more contracts should be found for agents with specific assets, uncertainty and frequency of transactions.

In terms of contracts, TCE portrays contracts as methods to constrain ex-post behavior, given the fact that there may be opportunistic behavior, information asymmetries, differences in bargaining power, and possible hold-up situations from asset-specific investments among agents (Williamson, 1979). TCE focuses as well on the determinants and the duration of contracts. It also distinguishes between a contractual and a non-contractual exchange, which has implications in terms of the formality of relationships (Masten and Saussier, 2000). Processing facilities, such as wet and dried plants, processing and roasting machines are specific assets for coffee, but not always for a specific buyer which implies that traders who have these facilities will prefer to have a contract with their buyer; in this way, they reduce uncertainty and opportunistic behavior. In fact a roasting facility provides an opportunity to serve many more customers and so leads away from being dependent on single buyers. Thus, having a multitude of customers compensates for a contract.

Traders face an uncertainty due to price volatility in the coffee market. Considering this possibility, intermediaries may want to have a contract with their buyer in which they can negotiate schemes to share the risks of a volatile market before the harvest season (and therefore the buying season) starts. This kind of agreements, in which uncertainty is reduced, may give them a higher utility. However, not all coffee traders face such uncertainty. There are traders who do not rely on coffee to make their living because they have another business parallel to marketing coffee. If traders can diversify their sources of income, they have a reason for not having a contract. Moreover, traders who have different lucrative activities usually do not have coffee asset-specific investments, hence another reason for not having a contract.

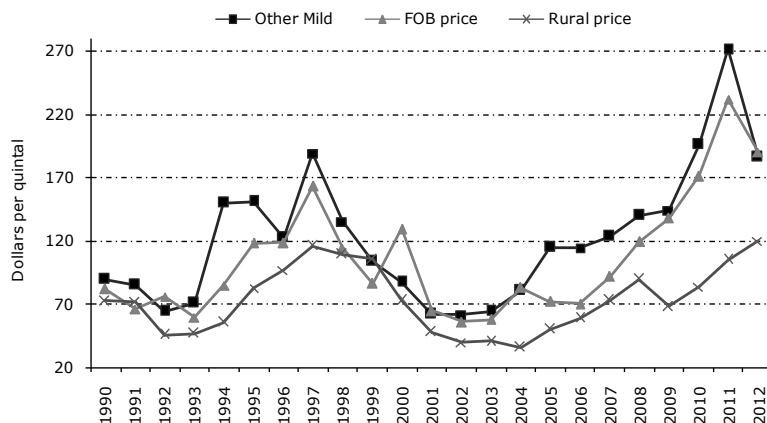
Two parts are involved in the transaction costs. One part is the ex-ante cost, which includes searching for potential exchange agents (consumers or wholesalers who offer the best price), the screening of potential agents, and bargaining (Keye *et al.*, 2000). The second part consists of the ex-post costs that take into account the transfer of property rights and the monitoring of compliance of any transaction (Rubenet *et al.*, 2007b). When markets are far from representing the ideal situation portrayed in economic textbooks, variables like trust, reputation and informal rules gain in importance (Fafchamps, 2002). As Gabre-Madhin (1999) asked, "in the absence of formalized market institutions that deter dishonest

behavior, such as credit bureaus, trade inspection services, and commercial tribunals, what institutions arise that promote trade among unknown parties?" The answer was that the brokers help in doing so. These social relationships then have an effect on contractual decisions and on trader performance. If there is trust between agents, formal agreements may not be needed (Fafchamps and Minten, 1999). Furthermore, these relationships may serve as substitutes to absent market institutions and may help traders to reduce costs and perform efficiently.

The exertion of market power by some firms in the coffee sector may also affect the behavior of other intermediaries. There is some concern about the level of competition within the Mexican supply chain, given that agricultural markets can show evidence of low levels of concentration of buyers or sellers (Sexton and Lavoie, 2001). Competition is thus an important element in the analysis. Being in a competitive environment is a factor that increases the probability of contractual agreements between agents as they have to secure the provision of the product and the market in which that product will be sold (Fischer *et al.*, 2009). Low competition may lead to higher marketing margins, which decreases the efficiency in the supply chain (Mose, 2007; Schroeter and Azzam, 1991).

An environment in which transaction costs are high may lead to higher margins, and thus, to a less efficient trader and supply chain. Poor physical infrastructure, high costs of processing, poor institutions and high costs of information gathering and monitoring contracts, are some of the costs associated with an inefficient set-up and higher margins (Jabbar *et al.*, 2008; Winter-Nelson and Temu, 2002). On the other hand, in a competitive environment, market power and hence marketing margins are reduced, creating a more efficient industry (Porter, 1998; Schroeter and Azzam, 1991). In this sense, a liberalization process like the one experienced by the Mexican coffee sector should end up in a competitive structure in which marketing margins of traders are low.

The Mexican coffee sector went from being ruled by a state-led marketing board to a free market set-up. This meant that part of the role played by the government in the regulated era had to be taken up by private agents. This role included not only buying, processing and marketing the coffee from growers but also providing them with financial and technical assistance. Those changes meant that new arrangements between these agents also had to be established. They may do so in order to reduce the transaction costs and the risk in the coffee market. One of these arrangements is that traders, especially exporters, may be vertically integrated in order to reduce transaction costs (Mehta and Chavas, 2008; Williamson, 2000; Winter-Nelson and Temu, 2002). Until the end of the nineteen eighties, the world market for coffee was controlled by a quota system resulting from the economic clauses of the International Coffee



**Figure 1.** Prices along the coffee supply chain (own elaboration with data from ICO and SIAP).

Agreements (ICAs), signed by the main producing and consuming countries. These ICAs were first put into action in the early nineteen sixties. The agreements stated that producing countries had the responsibility to control their coffee exports in order to affect world prices (Gilbert, 1987). The best way to do this was by means of direct government intervention in the producing, processing and marketing of coffee. This is why, under this controlled regime, most of the producing countries had marketing boards controlled by the state. These public institutions had the monopoly of the coffee trade and some of them were also in charge of technical assistance and financial support to coffee growers (Akiyama, 2001).

In the Mexican case, the government created the Mexican Coffee Institute (Instituto Mexicano del Café, INMECAFE) to control and promote coffee production and sales. The Institute sponsored this crop as a remunerative alternative for peasants via its different support programs (Santoyo *et al.*, 1994). Given that coffee-producing areas were growing and spreading, the Institute had to make sure these regions remained under the control of the government. Hence, officials were sent and infrastructure was built in several producing regions (Pérez *et al.*, 2001). While the INMECAFE and ICAs were working fully, there was no need for local or regional partner organizations, since every actor in the coffee supply chain relied on the effectiveness of the institutional environment until 1989.

Yet, at the end of the nineteen eighties, the ICAs' economic clauses broke down. This meant that the quota system was out, replaced by the free market. At the same time, liberalization policies were spreading throughout Central and Latin American countries, and Mexico was no exception. New coffee policies focused on reducing the size of the government and its expenditures, prioritizing regulation and macroeconomic stability, and abandoning interventions in commodity markets. For the Mexican coffee sector this meant INMECAFE had to

disappear (Snyder, 1999). The Institute was then dismantled between 1989 and 1992, creating a void in the coffee chain; a void that was to be filled by private agencies. In the absence of the state's marketing boards and direct involvement in the coffee market, new local, regional and national traders appeared.

The local small-scale traders still exist because large-scale firms lack the information the local and regional collectors have about the geographical area where they make their purchases. Small-scale traders know where the growers live and where the best coffee is sold. This means that new contractual arrangements were also created between large- and small-scale traders, depicting an agency relationship. In the first section of our analysis, we will investigate factors that may affect this contractual choice, elements relating to asset-specific investments, trade-credit relationships, and the type of coffee that is marketed by contracting partners.

A prime reason for wanting to secure a trade relationship is having made investments that are specific to these relationships. Traders who invest in machinery or in assets that can only be used in coffee-related activities may want to have contracts with their buyers in order to reduce the risk of being locked-in. In this sense, having a long-term contract may give them higher benefits, since they will not face ex-post opportunistic behavior from their buyers, who are aware of the traders' sunk costs due to asset-specific investments (Williamson, 1979).

However, traders who face recurrent transactions with their buyers, for example those who sell coffee every day, and who have not made any specific investments besides this, may not need a contractual agreement with their buyers. Repeated interactions between agents can lead to trust-like relationships that do not rely on formal agreements to secure transactions (Fafchamps and Minten, 1999).

Traders may also face asymmetries in information. Some large traders are unaware of the location of coffee growers or local collectors. With this in mind, small- or

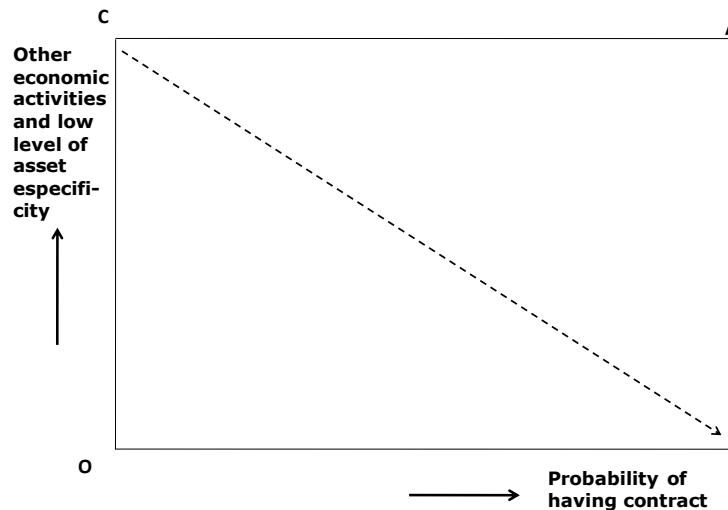


Figure 2. Relationship between other economic activities and contract.

medium-scale intermediaries who know where to buy coffee can signal large-scale buyers that they have this knowledge and may want to enter into a contract with them. In order to protect this information, intermediaries may want to negotiate better prices. If the intermediaries who know where to buy coffee, provide this information to a buyer without a contract, there is no guarantee that the buyer will buy the coffee from them. A contract may also reduce search costs involved in transactions and in this sense both parties could benefit utility from an agreement. Traders face an uncertainty that may be due to price volatility in the coffee market. Considering this possibility, intermediaries may want to have a contract with their buyer in which they can negotiate schemes to share the risks of a volatile market before the harvest season starts. This kind of agreements, in which uncertainty is reduced, may give them a higher utility. However, not all coffee traders face such uncertainty. There are traders who do not rely on coffee to make their living because they have another business parallel to marketing coffee. If traders can diversify their sources of income, they have a reason for not having a contract. Moreover, traders who have different lucrative activities usually do not have coffee asset-specific investments, hence another reason for not having a contract (see Figure 2).

Market institutions are a key factor when studying performance. The rules of the game can shape the way in which traders decide to run their business. In this analysis, we will use market institutions as a tool to understand traders' performance. These institutions can determine the way in which traders purchase and sell their coffee, how they pay and receive payment, and also the way in which they interact with other traders (Gabre-Madhin, 2001). The assets and the socio-economic characteristics of each trader, however, can also determine their trading practices. According to Jabbar et al. (2008), actors who face the same market institutions can have different trading practices, denoting that there

are trader-specific variables such as asset specificity, size and experience affecting trading behavior, and thus, their performance.

We have argued that new agents entered the sector as a consequence of liberalization. These changes, as we have explained, should furthermore impact traders' performance. From the fieldwork done for this study we observed that, after the liberalization, erstwhile exporters decided to become more involved in upstream steps of the supply chain; some of them acquired infrastructure that was left by the extinct INMECAFE. However, in the past twenty years, there has been little new investment in processing plants and infrastructure related to the coffee sector. This poses a constraint to the coffee chain, since processing plants are operating with old machinery. The lack of machinery to process coffee and roads in some regions also shapes the behavior of traders, since they have to take this condition into account in their trading practices.

We use marketing margins as an indicator of traders' performance as in Jabbar *et al.* (2008) and Mose (2007) since they can give an indication of how traders perform given the minimization of their variable costs. These margins are measured as the difference between the purchase and the selling price of a quintal of parchment coffee.<sup>1</sup> It is important to note that in our fieldwork we got information from traders who trade other types of coffee besides parchment coffee. In this logic, we had to make an adjustment in order to make the quantities and prices of coffee traded by each trader comparable. For this reason we transformed prices from other types of coffee into price of parchment coffee. This was done by applying a weight conversion; after this process, we obtained all prices in terms of quintals of parchment coffee purchased

<sup>1</sup> A quintal is 245 kg of cherry coffee, 57.5 kg of parchment coffee, 80 kg of natural dry or 46 kg of green coffee.

**Table 1.** Characteristics of coffee per producing state in Mexico.

State	Land with coffee (ha)	Land harvested (ha)	Production of cherry coffee (tons)	Yield of coffee per ha (tons of cherry coffee)	Farmers	Average land per farmer (ha)
Chiapas	253,462	251,951	529,250	2.10	174,571	1.45
Oaxaca	185,187	160,888	165,829	1.03	102,513	1.81
Veracruz	153,435	152,450	332,598	2.18	86,961	1.76
Puebla	88,577	70,066	259,246	3.70	47,124	1.88
Guerrero	54,328	53,917	51,152	0.95	21,326	2.55
Hidalgo	26,335	26,335	40,197	1.53	34,616	0.76
San Luis Potosi	22,539	22,539	18,688	0.83	17,552	1.28
Nayarit	19,473	19,473	29,394	1.51	5,401	3.61
Jalisco	4,497	3,984	4,357	1.09	1,106	4.07
Colima	3,018	2,633	2,566	0.97	820	3.68
Tabasco	1,040	1,040	619	0.60	1,211	0.86
Querétaro	300	300	150	0.50	296	1.01
Total	812,191	765,576	1,434,046	1.87	493,497	1.65

Source: Own elaboration with information from SIAP (2008) and (2010).

Note: Land with coffee, farmers, and average land per farmer referred to 2008, while the other data are from the 2008-09 harvesting season.

and sold by intermediaries. Then, we calculated the difference between buying and selling prices and we ended up with (standardized) gross marketing margins.

In the model specification section, we try to translate the theory into an empirical model that we can estimate. The fact that traders decide to have contracts with their buyers is important in understanding the setting in which they interact with each other. Knowing which factors can affect this decision can help us comprehend how the Mexican coffee chain is shaped and how the institutional environment (the rules of the game) relates to trader's decisions to have contracts – the play of the game.

## DATA AND METHODS

In Mexico, coffee is produced in twelve states (see Table 1). These states comprise 52 regions, which represent 541 municipalities (Escamilla *et al.*, 2005; SIAP, 2008). For the purpose of this work, two states (Oaxaca and Veracruz) were selected to investigate the relationships among coffee traders and the environment in which they interact. Oaxaca is located on the Pacific Ocean slope, whereas Veracruz is located on the Gulf of Mexico slope. The Oaxaca producing regions are characterized by long periods of dry and hot weather, which helps the picking and processing of coffee beans. As a consequence, most of the coffee that is marketed in this state is either parchment or green coffee. The Veracruz producing areas have humid weather and several periods of rain throughout the year. This means that farmers cannot dry their coffee as easily as in Oaxaca, which results in them selling cherry coffee to the intermediaries (FIRA, 2003). Cherry coffee is highly perishable and preferably must be processed within 24 hours after picking. These differences have an impact on the way in which coffee

traders interact with each other, on their performance, and on the type of mechanisms they choose to enforce their relationships.

After choosing the states of Oaxaca and Veracruz, the next step was to pick the regions (composed of some neighboring municipalities) in which the investigation was to be carried out. In this study, four regions were selected, two in each state. For this purpose we established five criteria: the average altitude of the coffee plantations, having electricity in the households (a proxy for remoteness or isolation), having paved road (a proxy for accessibility to urban areas), coffee cooperative participation, and the number of intermediaries registered in the municipality.

Regarding the intermediaries in the municipality, their number was calculated using the list of coffee traders who were registered with the Mexican Association of the Coffee Production Chain (AMECAFE, for its initials in Spanish) (AMECAFE, 2009). Municipalities with less than four registered intermediaries were considered as suffering from market restrictions. Therefore, municipalities with less than or equal to three intermediaries registered were considered as being faced with high market restrictions. Those municipalities where there were more than three intermediaries were considered as having few market restrictions to commercialize coffee.

With the above criteria, we then classified municipalities in Oaxaca and Veracruz into two categories, based on the number of restrictions they face. Those with four or more high market restrictions, including a low level of intermediary concentration, were grouped in the first category. Those with less than four restrictions but with a high level of intermediaries registered were included in the second category. A randomized selection was then



**Figure 3.** Location of coffee-producing states and selected regions in Oaxaca and Veracruz, Mexico.

performed to determine one region per category and state. The four selected regions, two in each state, are shown in Figure 3.

The selected region in Oaxaca with high market restrictions comprises the municipalities of San Felipe Usila and San Felipe Jalapa de Diaz. For the region with low market restrictions in this state, the municipalities included were Pluma Hidalgo, San Pedro Pochutla and Candelaria Loxicha. In the state of Veracruz, the municipalities included in the high market restrictions region were Chocaman and Tomatlan. For the low market restrictions region, the municipalities were Teocelo and Cosautlan de Carvajal.

The second step involved was to ask municipal and local authorities about coffee intermediaries working there. This procedure was undertaken in the field as we visited each of the selected municipalities. We then compared the names given with the ones in the registered list and the ones we found to be non-registered. After having gathered the whole list of intermediaries per municipality, we proceeded to select a random sample from them. Both the registered and the non-registered intermediaries selected added up to a total of 34.

The third step was to include relevant intermediaries that were referred to by the people we interviewed in the field. These relevant traders were described as being one step further in the coffee chain compared to those who referred them. Also, some of the relevant traders operate at a state or even a national level. In total, we surveyed 53 intermediaries. Apart from the surveys with intermediaries, we also held meetings with local

authorities and people involved in the National Coffee System Committees (NCSC).<sup>2</sup> For this purpose, we used semi-structured questionnaires.

It is important to clarify that the traders in our sample ranged from small collectors to exporters, which means that the stage in which each agent operated may vary. Some of them buy directly from coffee farmers (or are in fact coffee growers themselves) and perform their activities at a local level. Others buy coffee from these local intermediaries and sell it to traders who operate at a state or national level (see Annexes 1 and 2). We also interviewed roasters who sell their coffee directly to consumers. These characteristics will be taken into account when we analyze the contracting decisions these agents made. Of course, a contract is an agreement between two parties, so the characteristics of one side are just half of the story to explain contractual choices. However, having these different agents in our sample also allows us to depict how the other side of the contract might behave, since we cover different stages in the supply chain. Unfortunately, because of time and money constraints, we did not interview coffee producers who were the providers of the first stage of the coffee supply chain.

<sup>2</sup> The NCSC are non-governmental organisations constituted to serve as mechanisms for permanent planning, communication and consultation between different actors in the coffee chain.

**Table 3.** Classification of interviewed intermediaries.

Category	Number of respondents	Percentage
Local collectors	18	34.0
Regional collectors	7	13.2
Local cooperatives	4	7.5
Regional cooperatives	3	5.7
Traders/processors	8	15.1
Roasters	3	5.7
Exporters	8	15.1
Others	2	3.8
Total	53	100.0

Source: Own elaboration with data from the survey.

Table 2 shows the general characteristics of interviewed intermediaries. Traders are on average middle-aged, with considerable experience in the business of trading coffee. Most of them started their businesses after the market liberalization reforms took place in the early nineteen nineties.

Another aspect of traders' characteristics was that 43% (23) of the respondents were working in other activities besides coffee marketing. Among these, eleven respondents worked in local grocery stores. The rest of them diversified their income by producing and/or selling other agricultural products and by trading livestock. Even though these intermediaries do not rely solely on coffee as an economic activity, sixteen of them agreed that marketing coffee is the activity that promises them the highest economic benefits. It is important to keep in mind that coffee is a seasonal crop; in the case of Mexico, the harvest season runs from October to April. Respondents devote on average seven months to buy/sell coffee. Those who spend more months in the business and who engage in the processing or roasting of coffee are large exporting companies.

Using data from the survey, we classified the intermediaries by the size of the area where they operate, and also by determining whether they add value to the coffee they buy and sell by processing. As can be seen in Table 3, almost half of the interviewed people operated as collectors on a local or regional basis. This means that this group of intermediaries did not add any value to the coffee they marketed, apart from transport and selection. Only 13% of the respondents were affiliated with a local or regional cooperative. There were only three cases in the sample in which cooperatives directly exported their coffee. The rest of the cooperatives only collected coffee from its members and then sold it to other intermediaries. In terms of value added, we found that 20% of the respondents could be classified as processors/roasters. Also, if we look at regional differences, given the spatial set-up of our field work, we observed that processing activities often took place in areas where competition was high (see Annexes 1 and 2).

Regarding intermediaries who are involved in processing activities, we found that 20% of all respondents were involved in wet processing; all wet processing plants were located in the state of Veracruz, as expected. The average wet processing capacity was 120 quintals per day.<sup>3</sup> Survey data also show that intermediaries in Oaxaca only traded parchment coffee.<sup>4</sup> This proves that our assumptions about differences in the type of coffee that is traded in each state are reflected in the characteristics of our sample. We observed that 30% of the respondents were involved in dry processing activities, with an average capacity of 140 quintals per day.<sup>5</sup> More than half of the intermediaries involved in dry processing were exporting their coffee, and they accounted for all respondents who were classified as exporters. This is understandable, as most of the coffee is exported as green – and therefore processed – coffee.

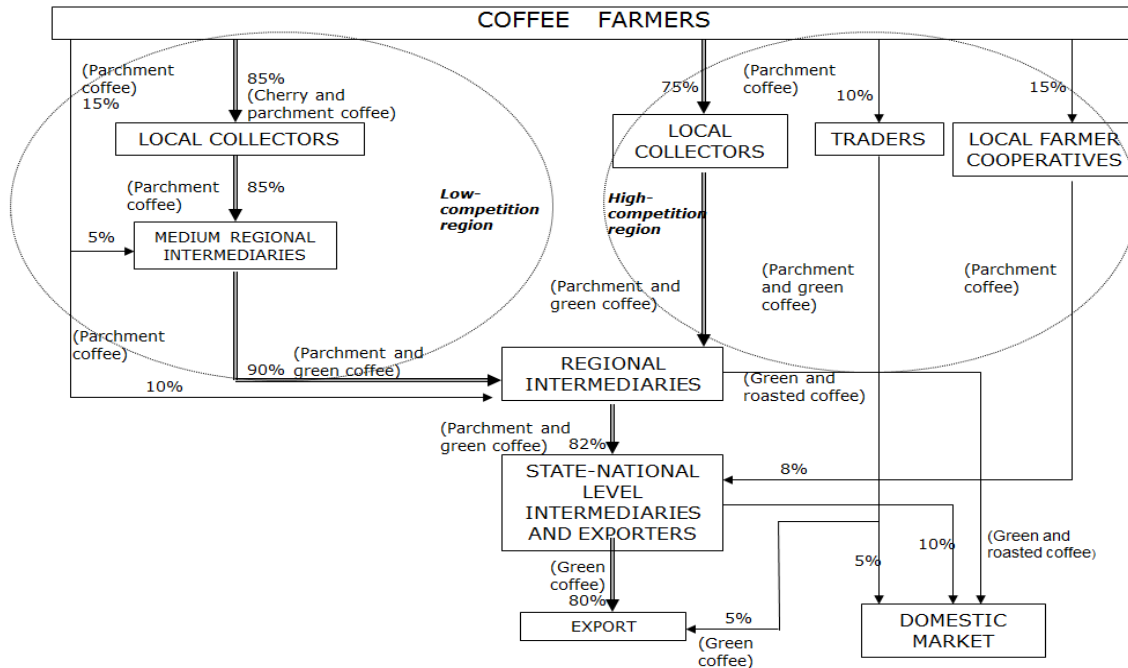
Three of the respondents were roasters. They operated mainly at a local level. They supplied to local cafeterias or stores, and some even had their own coffee bar. All roasters were located in regions with few market restrictions, which again showed that all value-adding activities were concentrated in areas where it was easier to buy and sell this product.

<sup>3</sup> Coffee processed by the wet method is called wet processed or washed coffee. The wet method requires the use of specific equipment and substantial quantities of water. Following the wet process, the fruit covering the seeds/beans is removed before they are dried.

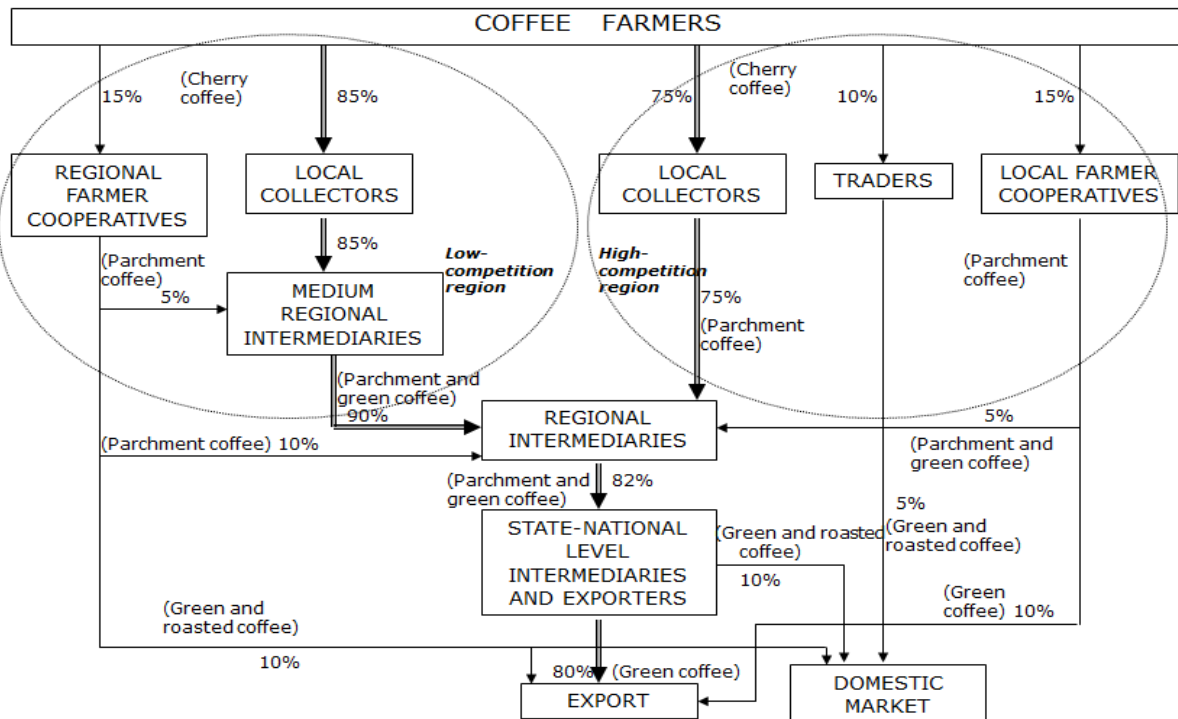
<sup>4</sup> Parchment coffee is obtained after cherry coffee beans go through wet processing. To obtain green coffee, parchment coffee goes through dry processing.

<sup>5</sup> The dry process is the oldest method of processing coffee. The entire cherry after harvest is first cleaned and then placed in the sun to dry on tables or on patios. The dry process is also known as unwashed or as the natural one.





Annex 1. Coffee commercialization scheme in Oaxaca.



Annex 2. Coffee commercialization scheme in Veracruz.

We also asked traders if they had five or more competitors in the buying area where they operated. A total of 50% of local collectors and 86% of regional collectors mentioned that they had five or more competitors. Also 50% of both local and regional

cooperatives stated that they had five or more competitors in the area where they operated. For processors, roasters and exporters, the percentage of traders who answered that they had five or more competitors was 75%, 67%, and 100%, respectively. We

**Table 4.** Assets owned by interviewed intermediaries.

Asset	Number of respondents	Percentage
Vehicle	30	56.6
Store	43	81.1
Coffee-cupping laboratory	6	11.3
Processing plant	18	34.0

Source: Own elaboration with data from the survey.

can see that in all stages of the supply chain, traders perceived their operational context as a quite competitive environment in terms of the number of traders they observed. However, it is clear that most of our sample consisted of traders present in the primary collection level of the coffee sector. As one of the interviewed coffee producers' leaders affirmed, high competition is established in areas where coffee farmers sell cherry coffee.

In the survey, 94% of the respondents had coffee growers as their suppliers. In addition, some of the interviewees made direct purchases from coffee producers, even when they worked at the regional or national level. Only 28% of the interviewed intermediaries had a contract with their suppliers. Half of those who had agreements stated that it was a verbal one.

An agreement between intermediaries and coffee growers can be beneficial for both participants. Intermediaries provide financial support to coffee producers to implement the picking, mainly to cover the transport of the coffee pickers and payments during the first days or week of the harvesting season. As was commented by some interviewees, they give money in advance to some coffee farmers in order to engage them for the coming harvesting season. Some respondents said that using this kind of financial agreement allowed them to pay a lower price and still receive a large quantity of coffee. The type of agreement set up with the buyers depends on the type of coffee that growers normally deliver.

To have as much coffee as possible, large firms instruct their commissioners to set up some kind of agreement with coffee producers. Normally these commissioners have good knowledge about the type of coffee that can be bought in the region. They are financed with money from the firms in order to fund some coffee producers who will later become their providers. It was found that some companies also had skilled commissioners to provide technical assistance to coffee growers in producing and processing coffee. They did so to improve the coffee quality.

For many small-scale producers, receiving economic support from the buyers establishes the relationship between the growers and the intermediaries. This kind of financing agreements became more common practice under the actual condition than they had been in the

ICAs' era; nowadays, no formal bank credit is available for small- and medium-scale farmers in the Mexican coffee sector. For some coffee farmers, an option to tackle this difficulty is to become a member of a cooperative that sometimes has access to economic support from governmental or non-governmental organizations.

Another aspect we investigated in the survey was the ownership of assets by intermediaries, which is shown in Table 4. Looking at regional differences, we observed that there are more intermediaries with vehicles in the zone with high market restrictions in Oaxaca. We argue that this happens because this area is isolated, since it is located in a mountainous area and has a precarious road infrastructure. Thus, intermediaries should own vehicles to overcome these difficulties. This can also imply that traders located in a region with high market restrictions face higher transaction costs due to the mentioned isolation that may reflect in their performance and contract choices. Only few intermediaries own a coffee-cupping laboratory, and they are exporters. Cupping is important since it is a way of inspecting and ensuring the intrinsic quality of the coffee before it is exported.

A third of the interviewed intermediaries own a processing plant, and most of them are located in the state of Veracruz. The fact that coffee growers mainly sell cherry coffee in the Veracruz regions creates a need for processing infrastructure, given that the coffee quality decreases if it is not processed within 24 hours after picking. Related to this, 80% of the respondents own a specific depot or place where they buy and sell coffee. The rest buys and stores coffee either in their house or in the processing plants. Despite this, traders stated that they do not store coffee seeking for better prices. They only use these depots to collect the required amount of coffee for transport later on. Local and regional intermediaries in Oaxaca usually take one week to gather the amount of parchment coffee necessary for a load. In Veracruz, those who buy and sell cherry coffee take one day to collect the coffee and they all sell it within the next 24 hours. Exporters are the ones who take more than a week to gather the amount of coffee needed, given the volume they trade.

When asked about the problems they face as coffee traders, 60% of the respondents mentioned that price volatility was the main obstacle to commercialize coffee. Others mentioned a lack of security when transporting

both coffee and money, and quality deficiency as problems. In terms of risk coping strategies adopted by intermediaries, we found that 30% of the sample tried to obtain good information about market conditions and prices. The most common way to gather information about prices was by phone, accounting for 95% of the respondents; internet was used by 37% of the sample. Most local and regional intermediaries made daily phone calls to their buyers to know the price for the coffee they were going to sell.

The most common type of the agreement between intermediaries was an oral contract. Only 15 respondents mentioned they used written contracts with their buyers to reduce any risk and uncertainty, and they were mainly exporters who needed a contract to export their coffee. In these cases, the contract was compulsory to deal with customs authorities. This group of respondents was also the only ones to state that they used the futures market as a price risk management activity. Even though the government is trying to attract small intermediaries and growers into price hedging programs, requirements are not easy to comply with.

Most local and regional intermediaries said they interact with only one downstream trader each year. This shows that repeated transactions take place between traders along the coffee chain. These repeated interactions may also be important when analyzing the (non-)existence of contracts. The fact that traders have known each other for years and that they trust each other may explain the absence of written contracts. Verbal agreements arise in these relationships, as we observed in the survey. However, if there are no written contracts, how can buyers be sure that sellers are going to give them their coffee year after year (or even day after day)? Forty per cent of the sample mentioned that they receive credit from their buyers at zero interest, and all of them stated they use this money to buy coffee.

These repeated transactions between traders are a sign of an environment in which intermediaries are not free to choose who to sell to, especially in the areas faced with high market restrictions. To assess this, we asked intermediaries whether they were now selling to a different person than they were five years ago. We observed that in the Oaxaca region with market restrictions, 60% of the intermediaries had changed buyer, because they were either looking for better prices or the last buyer did not respect their previous agreements. This result can be seen as an indication of intermediaries being free to choose the buyer that best fits their needs.

Not all interviewed traders followed regulations established in the coffee sector. Twenty five per cent of the sample was registered in the National Coffee System (NCS). After registration, agents have to fulfill some requirements and pay an annual fee to be part of this system. The requirements are that one has to be legally established as a firm or, in the case of a natural person,

one needs to have proper identification, a fiscal address, one has to be up to date with tax payments, and one needs to have a written recommendation from an active member of the coffee sector, among other things. Sixty per cent of the respondents were not registered in the NCS as intermediaries.

Most of the intermediaries who were not registered in the system belonged to the categories of local and regional collectors. When asked about the reasons for not being registered they mentioned that there were many requirements and a lot of paper work in order to be in the system. Since registered traders issue a bill to coffee growers in which the quantity and price of the transaction is stated, and this bill is then used by growers to get government subsidies, most unregistered intermediaries get these bills from buyers working downstream in the coffee chain to satisfy the producers' demand for the bills. The coffee chain starts with cherry coffee sold by growers; it is then transformed into parchment coffee, which is processed into green coffee, the type that is commonly exported. After that the green coffee can be transformed into roasted and ground coffee. In terms of the conversion from cherry to parchment coffee, we know that 245 kilograms of the former make one quintal of the latter. Also, the average cost for doing wet processing is 146 Mexican pesos per quintal. In this case, with the weight conversion, we multiply the price of one kilogram of cherry coffee to get a price per quintal of parchment coffee and add the processing cost to make it comparable.

When going from green to parchment coffee, the weight conversion applied is that a quintal of green coffee is equivalent to 0.80 multiplied by the weight of a quintal of parchment, and the costs to be subtracted are 110 Mexican pesos per quintal, indicating dry processing. We subtract the costs, since green coffee is one step further in the processing stage and to get prices in terms of parchment coffee can be seen as going backwards in this stage. To go from the prices of roasted coffee to those of parchment coffee, and knowing that the former is sold per kilogram, we multiply by 37.5 to get the weight equivalent of a quintal (in kilograms). We also have to subtract the associated processing costs, which in this case are 267 Mexican pesos; this is because we subtract both the costs of going from parchment to green coffee (110 Mexican pesos per quintal) plus the costs of going from green to roasted coffee (157 Mexican pesos per quintal).<sup>6</sup> After this process, we obtained all prices in terms of quintals of parchment coffee purchased and sold by intermediaries. Then, we calculated the difference between buying and selling prices and we ended up with standardized gross marketing margins. From the 53 traders in our sample, 44 observations were affected by this conversion. We could not perform the conversion on

<sup>6</sup> The processing costs per each of the steps in the supply chain were obtained from the interviewed processors.

**Table 5.** Descriptive statistics of variables included in the analysis (N = 53).

Variable	Units	Mean	SD
Having contract	1 if the intermediary has a contract	0.60	0.49
Margins <sup>1</sup>	Mexican pesos per quintal	410	687
Experience <sup>2</sup>	Years of experience in the coffee business	14.09	9.21
Other business	1 if the intermediary has another business	0.43	0.50
Owns vehicle	1 if the intermediary owns a vehicle	0.57	0.50
Restricted region	1 if the intermediary works in a restricted region for marketing coffee	0.40	0.49
Roaster	1 if the intermediary is a roaster	0.23	0.42
Wet processing plant	1 if the intermediary owns a processing plant	0.25	0.43
Dry mill	1 if the intermediary owns a dry mill	0.30	0.46
Long-term relationship	1 if the intermediary established a long-term relationship	0.34	0.48
Sells cherry coffee	1 if the intermediary sells cherry coffee	0.19	0.39
Competition	1 if there is competition in the region where the intermediary works	0.68	0.47
Registered in the NCS	1 if the intermediary is registered in the NCS	0.42	0.50
Buyer is registered	1 if the buyer is registered in the NCS	0.60	0.49
Volume of sales <sup>4</sup>	Quintals per season	4,250	7,708
Veracruz	1 if the intermediary resides in the state of Veracruz	0.49	0.54

Source: Own elaboration with data from the survey.

Notes: <sup>1</sup>The minimum is 25 and the maximum is 3,000.

<sup>2</sup>The minimum is 2 and the maximum is 46.

<sup>3</sup>The other business x owns a vehicle.

<sup>4</sup>The minimum is 50 and the maximum is 36,000.

the whole sample, since some traders refused to tell us their selling price. Furthermore, a limitation to this conversion is that the average costs we took into account in this process could change for each trader given their infrastructure and technology. However, we also could not get more precise costs because most interviewees did not share this information with us.

With the above characterization of coffee traders in the states of Oaxaca and Veracruz, Mexico, we constructed a set of variables to answer the research questions. A logit regression was performed to find variables affecting the intermediaries' decision to have a contract (or not) with their buyer. In this procedure, we used several explanatory variables related to individual, regional and market characteristics to predict the probability of a trader having a contract. To assess the performance of traders in the Mexican coffee sector, we calculated their gross margins. Then we investigated which variables affected the intermediaries' performance thus measured. To do so, we performed an ordinary least squares regression.

## CONTRACT CHOICES

### Model Specification

The decision to contract with another agent can be expressed a discrete choice model. In this case, an

intermediary will choose to enter into a contract with his buyer if the expected benefits of having one are greater than those of arranging the transaction in an alternative way (Masten and Saussier, 2000). In other words, a trader will choose to enter into a contract if the expected utility of having one is greater than the expected utility of not having a contract, otherwise the choice will be not to have a contract.

We constructed a set of variables that represent the socio-economic characteristics of intermediaries, as well as some indicators of their business practices and their relationship both with other traders and the environment in which they perform their activities (Milagrosa, 2007). Table 5 lists the variables that were included in the regressions.

The dependent variable was a dummy that took the value of one if a trader had a contract and zero if not. It also stood for those agents who were part of a vertically integrated organization.

As part of contracting decisions of traders in the Mexican coffee sector, factors like, among other things, asset specificity, bounded rationality, power relationships and opportunistic behavior have an effect on the traders' contracting decision. At the same time, these factors can also have an effect on the performance of the firm.

**Table 6.** Determinants of contract engagement (logit).

Variables	Coefficient	Marginal effect
Experience	-0.027 (0.582)	
Restricted region	.591 (0.450)	
Roaster	-3.285 (0.016)**	-0.673
Wet processing plant	-2.099 (0.050)**	-0.478
Dry mill	2.657 (0.037)**	0.449
Long-term relationship	1.054 (0.246)	
Sells cherry coffee	-2.701 (0.026)**	-0.587
Veracruz	-0.042 (0.967)	
Intercept	1.462 (0.161)	
Observation numbers	53	
Likelihood Ratio (LR) index	-25.32	
McFadden's R <sup>2</sup>	0.288	

Note: P-values in parenthesis. \* and \*\* refer to significance at 10% and 5%, respectively.

## Results of Contract Choices

Table 6 presents the results of the logit estimation of the model for the decision made by traders to have a contract with their buyer.

The first variable found to be significant (at a 5% level) in our model was the one that indicates whether a trader is a roaster. The magnitude of the marginal effect is also significant, since being a roaster decreases the probability of having a contract by 67%. We expected a positive sign (meaning an increase in the probability of having a contract) given the fact that roasters are traders who are vertically integrated and have made specific investments. Most roasters do not trade large amounts of coffee and usually sell their coffee to incidental customers. This means that they may choose other types of arrangements with these clients, especially spot market transactions, rather than formal contracts.

The wet processing plant variable negatively affects the decision to have a contract. Apparently, wet processing does not make the owner dependent on single buyers, and in this sense, the asset is not 'specific'. The opposite result was found for having a dry mill which is more used further downstream, notably by exporters. This magnitude of the associated marginal effect of the variable of owning a dry mill increases the likelihood of having a contract by 45%.

The last variable that was found to affect the contracting decision is the one depicting a trader who sells cherry coffee. The associated marginal effect shows that selling cherry coffee decreases the probability of having a contract by 59%. This finding is in line with our expectations. Traders who sell cherry coffee face repeated transactions with their buyer, and then trust-like relationships can be chosen over formal contractual agreements (Fafchamps and Minten, 1999).

In our approach of selecting the four regions, we included two regions as restricted in terms of having least quantity

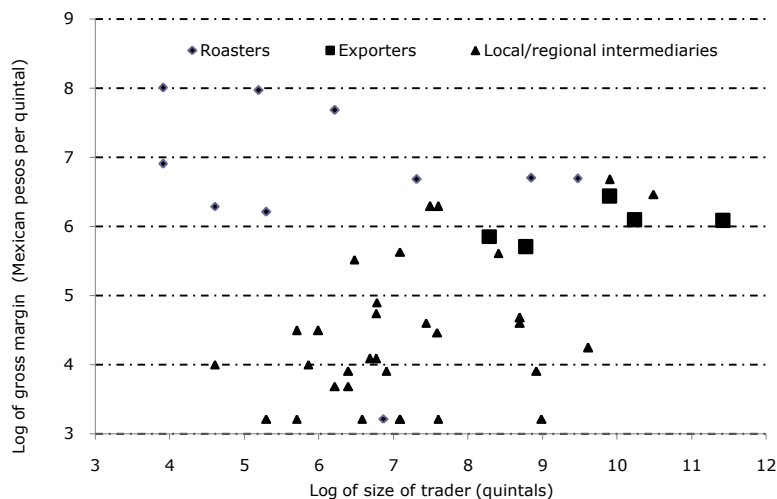
of traders operating, low level of producers' organization and being far from the coffee buying centers. We included this variable in the analysis but found that it was not significant in explaining the traders' contracting. Hence the overall marketing environment is no important factor for contracting.

## TRADERS' PERFORMANCE Model Specification

To find out which variables explain the variation of the margin, the (standardized) gross margins were included in a linear regression model as dependent variable. In this sense, we regressed the margins on a set of variables depicting trader's socio-economic, marketing and institutional characteristics. This linearization allows us to use the concepts drawn from the theory and apply them in an empirical way. In this study, by performance we mean the gross margins traders can get for the coffee they market, that is, the difference between purchase and selling prices.

Experience in marketing coffee was the first independent factor included in the model. As we have mentioned, specific experience in marketing coffee is not the same as experience in the coffee sector, which can be given by a trader's age. Most of the traders in our survey have had experience in the coffee sector even though they were not engaged in trading coffee. We expected a positive relation of this factor with the traders' performance. In terms of the characteristics of the firms, we utilized the variable of whether a trader had another activity to obtain income from. We expected that if traders diversified their livelihood they would have lower margins because they did not rely solely on the profits from trading coffee (Jabbar *et al.*, 2008).

The theory tells us that assets owned by a trader play a role in their performance. This is why we included vehicle ownership as an independent variable. The expectations



**Figure 4.** Size of intermediaries vs. marketing margin (own elaboration with data from the survey).

for this variable were twofold. On the one hand, traders who own a vehicle may have more working capital than those who do not. In this sense, margins for these traders may be low, because they have the ability of having a large volume of business (see Figure 4). This means that even though they have a small margin per quintal sold, they have the capital to buy more coffee and compensate (Jabbar *et al.*, 2008). On the other hand, since a vehicle forms a costly asset, this would require a higher return from their business, thus margins might be high.

The next set of variables show first the degree of integration that a given firm can have and secondly, the stage in the coffee chain in which a trader can be found. In our sample, some coffee agents had large margins but small businesses in terms of the quantity of the coffee they market.

We included a variable that indicates whether intermediaries traded cherry coffee. Traders who buy and sell cherry coffee should do the buying and selling transactions within 24 hours. This can be detrimental to their performance, since the urge to sell their coffee can deprive them of the opportunity to find better options in the market. This may also show that, given the environment in which they participate, they decide to sell cherry coffee because this means incurring lower costs. Hence, we expected a negative sign for this variable in the OLS regression.

Operating in a (non-)competitive environment affects the way traders perform. This is why we included a variable that indicates whether a trader operated in a region with more than five traders. We expected that the more competitive the environment was, the smaller the margins would get (Mose, 2007). This means that firms will look to compensate low margins with larger volumes of coffee being marketed.

Being registered in the NCS is another explanatory variable in the OLS model. Traders who had more

knowledge about how to develop their business performed better or had lower margins than those who had less knowledge (who were not registered in the NCS). Intermediaries might give lower prices to their providers in exchange for the bills; thus, traders would seek higher margins.

The next variable included in the model was the decision made by traders to have a contract with their buyer. This variable tries to link the concepts of contract with the traders' performance. Changes in the institutional framework should lead to contractual arrangements between parties in order to minimize costs (North, 1990). This means that having a contract should lead to lower margins as a consequence of such cost minimization. We should keep in mind that the margins we consider for our model consist of the difference between buying and selling, and that the contract we analyze is between traders and their buyers. In this sense, if there is in fact a contractual agreement, it could only secure the selling price. We used the estimated probability of having a contract obtained from the logit model to avoid a potential endogeneity problem.

### Results of Traders' Performance

Taking into account the possibility that having a higher gross margin would make it more likely that there would be more money to start another business or to buy a vehicle; and also that having a higher gross margin, traders would be more likely to be registered in the NCS, we suspected that there was an endogeneity problem. We did a Hausman test for those variables to check this and found that the problem was not present.

The results for the second estimation procedure are included in Table 7. The first variable listed as significant for our analysis of margins is the 'sell cherry coffee' dummy. The model shows that a trader who sells cherry

**Table 7.** Factors explaining gross log-transformed margins (OLS).

Variable	Coefficient
Experience	-0.023 (0.124)
Other business	-0.145 (0.595)
Owens a vehicle	0.086 (0.767)
Roaster	0.853 (0.122)
Dry mill	0.271 (0.568)
Sells cherry coffee	-1.936 (0.000)***
Competition	-0.689 (0.021)**
Registered in the NCS	1.070 (0.007)***
Buyer is registered in the NCS	-0.254 (0.434)
Having a contract (predicted)	-1.599 (0.062)*
Intercept	6.831 (0.000)***
Observation numbers	43
R squared	79.99

Note: P-values in parenthesis. \*, \*\* and \*\*\* refer to significance at 10%, 5%, and 1%, respectively.

coffee will have lower margins than one who sells other types of coffee. As we mentioned before, traders dealing with cherry coffee have to buy and sell their product within the next 24 hours to avoid loss of quality. Traders who sell cherry coffee also face lower transaction costs and this is reflected in lower margins. The latter may indicate that there are not enough incentives and market institutions encouraging them to invest in adding processing value to their product.

The results show that an intermediary who operates in a more competitive environment experiences a 69% decrease in the margins. This finding is consistent with the theory in the sense that higher competition lead to a lower marketing margin.

The output of our regression indicates that traders who are registered and arguably operate under the rules set by the current structure of the coffee sector get larger margins than those who are not. This finding may be related to the fact that registered buyers are obliged to declare taxes and pay the government a certain amount for the value of the coffee they buy. The latter is required by a government program named The Stabilization of Coffee Pricing Fund.

The fact that traders decide to engage in contractual agreements with their buyers reduces the gross margins. This shows that, as theory suggested, agents who make the decision to have contracts may face lower costs, since the reason to enter into such contracts was to tackle risks and uncertainty present in the market. In this sense, when dealing with lower costs, traders can settle for smaller per quintal margins. The rest of the variables included in the model made no significant contribution toward explaining coffee traders' performance.

## CONCLUSION

Liberalization of the market should bring about a change in the institutional environment of the market. This has to

result in a more competitive framework, in which agents have to find new ways to relate to each other to increase their earnings. In this paper, we investigated whether that proposition can be proven for the Mexican coffee supply chain. Twenty years have passed since the Mexicans experienced a transition from a state-controlled system to a free market. We provide some evidence on the successes and failures of the new institutional framework for this sector.

One of our results indicates that coffee agents have involved themselves in different activities as a response to the transition from a state-led commodity chain to a liberalized environment. We described how some of them decided to vertically integrate in order to reduce transaction costs and achieve higher efficiency in the market, relying on a larger volume of business to have enhanced profits. Others, on the other hand, invested in assets that allowed them to add value to their product and to attain a better performance in terms of margins per unit of product sold.

Most of the traders are unknown to the government, and thus are unable to participate in any governmental initiative. Data indicate that 60% of the traders are not registered in the National Coffee System. That situation creates unsettling circumstances for small-scale traders. Traders having processing facilities do not have more contracts. If agents are vertically integrated, such as roasters, they have less contracts, but if the traders have processing facilities in an earlier stage of the supply chain such as dry mills, they have more often contracts. In the first stage of the supply chain, having wet mills reduces the probability of having contract. These results are in line with the transaction costs economic theories in the sense that most contracting occurs where the market is thinnest: in the middle stage of the chain.

An interesting result is that high degree of competition will increase the chain's efficiency and lower the margins. Having a contract helps in reducing the uncertainty and

any opportunistic behavior, hence an increase in the performance (lower margin) is observed.

An important finding is that the stage of the Mexican coffee sector we analyzed appears to be reasonably competitive. A challenge for further research related to the issues we tackle in this research is to gather precise data to perform a similar analysis at all stages of the coffee supply chain.

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Accepted 30 October, 2014

**Citation:** Rodríguez-Padrón B, Cortés-Jarrín AR, Burger K (2014). Contracting decision and performance of Mexican coffee traders: The role of market institutions. *International Journal of Agricultural Marketing*, 1(2): 010-025.



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