

THE ROLE OF THE ENTREPRENEUR IN STRATEGY DECISION IN THE CONTEXT OF AGRIBUSINESS

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ABSTRACT

This paper introduces the analysis of the entrepreneur to a more comprehensive understanding of strategies in Agribusiness. Current theories on Economic literature explain strategy adoption according to forces of the competitive environment (Porter 1985), organization arrangements and coordination among agents by the characteristics of the transactions (Williamson 1985) but provide limited explanations about what firms innovate and induce heterogeneity of strategies. Indeed, firms seek alternatives to the equilibrium to create and appropriate value. In this sense, the literature on Entrepreneur's human capital provides a broader understanding of strategy choice. For instance, the creative destruction from Schumpeter (1961), entrepreneur's alertness from Kirzner (1973), entrepreneur's judgment capacity from Knight (1964) and entrepreneur's education and experience from Schultz (1961). We investigate the entrepreneurial ability assessed by human capital framework to understand strategy choice due to an institutional change in the late 80s, based on a survey of 409 Brazilian coffee producers. Our findings suggest that entrepreneur's formal education and

experience explain strategy choice. For instance, higher formal education improves the probability to adopt a differentiation strategy which is a more entrepreneurial decision compared to the commodity strategy.

INTRODUCTION

The role of the entrepreneur has been neglected on the Economic literature to explain strategy adopted by firms. In this traditional literature, price is the main coordination mechanism that determines performance of the firms and, consequently, explains the strategic and organization decision given the consumer's preference, technological possibilities and resource endowment. This leaves no role for the classical entrepreneurial task of coordinating, arbitrating, innovating and dealing with uncertainty (Bhidé, 2000).

Moreover, assuming homogeneous entrepreneurial ability of the firms, the Economic literature provides answers that are incomplete at best. What explain different patterns of strategies adopted by firms in the same competitive environment? Why some firms innovate on alternative mechanisms of coordination? What firms induce variability of strategy in the industry?

All questions are relevant in the Agribusiness context that is commonly referred to as an example of perfect competition market. In this sense, routine management would suffice with no room for firm's strategies (Schultz, 1978). In order to have alternatives to the equilibrium, firms create and appropriate value by switching to a differentiation strategy or by organizing themselves in collective action to obtain a distinctive performance above the average of the industry. Thus, we observe firms that induce changes on the traditional Agribusiness System (Zylbersztjan, 1996) by means of innovation on goods, services and coordination arrangements.

“Entrepreneurship is about the new – new goods and services, but more generally new economic knowledge – and about how the new enters the economic system. To put it in

another way, entrepreneurship is about change” (Langlois, 2005:2). Entrepreneurship provides an alternative understanding of competitive environment by introducing the creative destruction (Schumpeter, 1961) and makes possible the investigation of the entrepreneur that has been neglected by the Economic literature. The entrepreneurs differ on their judgment capacity (Knight, 1964), alertness to identify opportunities (Kirzner, 1973) and entrepreneurial ability related to human capital (Schultz, 1961).

This study discusses the role of the entrepreneurs as the inductor of innovation (Foss and Klein 2004; Witt 1998; Casson 2005) and the source of variability on strategies adopted by firms. We analyzed the Brazilian rural entrepreneurs to provide empirical evidence for this discussion. More specifically, we focused the strategy choice of entrepreneurs in coffee business due to an institutional change in the late 80s.

To fulfill this objective, this paper is organized in three parts. The first part presents the classic literature on Entrepreneurship by discussing the creative destruction from Schumpeter (1961), entrepreneur’s alertness from Kirzner (1973), entrepreneur’s judgment capacity from Knight (1964) and entrepreneur’s education and experience from Schultz (1961). The second part provides a broad picture of the coffee market, the possible strategies and a deeper discussion about the institutional change in the late 80s. The third part presents the empirical model that develops connections between the Entrepreneurship literature and the Value creation in Agribusiness to provide empirical evidence from the Brazilian coffee producers and to illustrate how the human capital assessment amplifies the understanding of entrepreneurial ability.

1. Who is the entrepreneur?

Richard Cantillon was the first author to consider the entrepreneur as an important agent in the economic environment in his seminal work "An essay about the nature of the overall trade", dated by 1755. However, it is Schumpeter one of the most known pioneer to discuss the entrepreneurial role in the economic theory by his work "*The theory of economic development*" dated by 1912. The Schumpeterian entrepreneur is not a common businessman, but an innovator motivated by the opportunity of profit. This entrepreneur plays a key role in creating new businesses through a process of "destructive creation".

Essentially, the entrepreneur does things not done in the ordinary course of business routine. The entrepreneur is, therefore, the *first mover* that can be present both in a small activity and in large corporations, as a single physical person or a group. The effect of innovation is to unbalance and alter the structure of the market until the exhaustion of this process occurs and the beginning of a new innovation wave appears.

This process comprises five cases: (1) The introduction of a new good – i.e., one with which consumers are not yet familiar – or a new quality of a good. (2) The introduction of a new method of production, i.e., one not yet tested by experience in the branch of manufacture concerned, which need by no means be founded upon a discovery scientifically new, and can also exist in a new way of handling a commodity commercially. (3) The opening of a new market that is a market into which the particular branch of manufacture of the country in question has not previously entered, whether or not this market has existed before. (4) The conquest of a new source of supply of raw material or half-manufactured goods, again irrespective of whether this source already exists or whether it has first to be created. (5) The carrying out of the new organization of any industry, like the creation of a monopoly position (for example through trustification) or the breaking up of a monopoly position" (Schumpeter, 1961:66).

In Kirzner's framework, the entrepreneur is interpreted as the arbitrageur who discovers the profit opportunity rooted in the discrepancy among present prices. The knowledge of where to discover this market data and how to open up the possibilities for profit opportunities is what he calls entrepreneurship as "alertness". However, alertness *per se* cannot characterize the entrepreneur. In this sense, the Schumpeterian approach emphasize that the entrepreneur requires "intuition and the leap of logic", suggesting an action outside the familiar routine in the process of innovation (Langlois, 2002:18). However, the question turns to how to understand the cognitive heuristic of the entrepreneur? Although not directly identifiable, Knight (1964) and Schultz (1975) provide a productive framework towards the understanding of the entrepreneurs' decisions. The former highlight the entrepreneurs' behavior in conditions of uncertainty and the latter investigate the entrepreneurial ability by means of education and experience.

The uncertainty is an important factor, since business decisions made in a "world that is full of uninsurable risks ('uncertainty') will in general produce results that diverge more or less widely from the expected ones and thus lead sometimes to surplus gains and sometimes to losses, is one that common experience presses upon us very strongly. This idea may be true, but need not be added to the element of business ability and is of course, still more obviously, not quite the same as the element of risk: but we need not stress these relations" (Schumpeter, 1961:67-68). Knight (1964) in his 1921 work "Risk, uncertainty and profit" explains the importance of the evaluation or judgment of an entrepreneur in decision-making under uncertain conditions. Those who venture have expectations (and not scientific knowledge) of a result to be achieved, within limits that can be more or less narrow. The inclination to invest is thus guided by the opinion or belief in the real possibility of future gains (Knight, 1964:237). "Judgment primarily refers to the process of businessmen forming estimates of future events in situations in which there is no agreement or idea at all on probabilities of occurrence" (Foss and Klein, 2004:8).

At the bottom of the uncertainty problem in economics is the forward-looking character of the economic process itself. The entrepreneur faces two elements of uncertainty, which correspond to two types of foresight that must be exercised with regard to the production of goods aimed to meet consumers' desires. The first element regards the need to estimate the end of productive operations from the beginning. It is impossible to tell accurately what their results will be in physical terms (quantities and / or qualities of goods) before the resources are entered in the production process. The second element of uncertainty is the one related to forecast the future demand and this is important because the entrepreneur wants to drive the production towards the consumer's desires. Producers, then, must estimate (1) the future demand they are striving to satisfy and (2) the future results of their operations in attempting to satisfy that demand. The author also uses the terms 'objective' and 'subjective' probability to designate risk and uncertainty, respectively. For him, the best example of uncertainty is in connection with the exercise of judgment or the formation of those opinions as to the future course of events, in which opinions (and not scientific knowledge) actually guide most of our conduct (Knight, 1964:233).

Schultz (1975) affirms that entrepreneurship is the ability to adjust in response to changing circumstances. This is consistent with the uncertainty conditions assumed by Knight (1964), but Schultz emphasizes that adjustments to disequilibrium are costly and time consuming. Moreover, the ability to respond to disequilibrium increases through education, training and experience. "Schultz conceives entrepreneurial ability as a form of human capital (...) emphasizes the temporal aspect of entrepreneurial adjustment, particularly important for agricultural production in which temporal specificities loom large" (Klein and Cook 2005: p.6).

Finally, Knight and Schultz are complementary approaches to entrepreneurship. With uncertainty regarding the future, the firm is able to make positive profits although it belongs to a long-term competitive equilibrium framework (term that only exists in theory). Indeed, to capture the value created on disequilibrium, the entrepreneur relies on his judgment about the uncertainty condition (Knight, 1964) and on his previous

experience, education and training (Schultz, 1975). Those arguments have a relevant and revealing implication for the Economic Theory and the field of Entrepreneurship.

1.1 The Entrepreneur in Agribusiness and Value Creation

Previous studies of entrepreneurship in agribusiness are related to generation of economic activity in rural areas (Gladwin et al. 1989) and to regional development (Reid, 1987). “These studies were mainly descriptive of the firms located in rural areas, probably were useful to policy makers, but provided few insights into the impacts of entrepreneurs on the economy” (Gladwin et al., 1989). Thus, we take the analytical lenses of Knight and Schultz to provide a comprehensive understanding of the entrepreneur on firms’ strategy that will ultimately impact its performance and will impact the industry.

Agribusiness provides many sources of uncertainty, from the weather conditions to the way the resources are allocated. In addition, this industry is characterized by constant changes on the input and output price ratio and by great impact on government policies. All are sources of disequilibria where the entrepreneur emerges to create and appropriate value in the Knights’ sense.

The entrepreneur is “someone who specializes in taking judgmental decisions about the co-ordination of scarce resources” (Casson, 1982:23). In his view, the concept of entrepreneurial judgment is of paramount importance; judgment is not based on the simple application of marginal rules regarding resource allocation, but, rather, it is based on individuals, their perceptions and the information that they have available or choose to acquire. Central to this concept is the recognition that different individuals will make different decisions that will produce different outcomes because information is necessarily imperfect and costly to acquire.

Thus, the heterogeneity of judgment may be a source of value creation. This makes sense when we observe that entrepreneurs do not share their judgment with their peers (Witt, 2000). Hence, individuals differ in their ability to process information. Even though information may originate in the same source, they interpret their expected gains in different ways (Casson, 2005). That explains the heterogeneity in the configuration of firms even within the same industrial sector. No firm is like any other, because each has its own printed logo: the judgment of its entrepreneur.

On the perspective of Schultz, the adaptation to changing conditions is greatly improved by the knowledge that the farmer accumulates by previous decisions. Moreover, the farmer accumulates a type of experience that is relevant to strategic decisions because it is firm-specific and resource-specific (Kor, Mahoney and Michael, 2007). Indeed, the codified knowledge such as manuals or recommendations cannot replace the knowledge about how the resources will respond to a change or a treatment defined by the entrepreneur.

2. The International Coffee Market Regulation

The coffee market has a long history of regulation, started in the early 19th century. Holding at this time three fourths of the world production and relying exclusively upon this product in terms of foreign exchange receipts, Brazil adopted an unilateral policy to sustain prices. Until the early 1960s, Brazil made several attempts to make other coffee producer countries to also share the costs of this valorization policy. Since these attempts failed, Brazil had to use its own credit to stabilize the market (Saes, 2008).

In 1962, the first International Coffee Agreement (ICA) was signed within the scope of the International Coffee Organization (ICO), including 42 exporting countries and 25 consumers. Since then, the world market started to be systematically monitored and adjusted for a price maintenance policy but with interruptions due to hiked prices that caused its disruption in July 1989.

As the leading world producer, Brazil had a central role in the success of the price maintenance policy in the international market by reducing its participation, becoming a residual supplier and retaining stocks, while competitors expanded their production. Thus, Brazilian exports were defined by the difference between the world demand, at the price level established by IAC's members, and the production of all other exporters; this mechanism was known as "umbrella policy instrument".

As a result, Brazil was losing its share in the global market. Whereas in the beginning of the century it accounted for 80 percent of world exports, in 1950's that share had dropped to 40 percent and, in the 1980s, to 25 percent. Thus, the coffee producers' strategies were conditioned by the regulation during this period. For instance, to provide price stability, the government controlled the production offer through tax policy. Moreover, the driving force for this policy was strictly narrowed to price and production control, providing low incentive for investments in production differentiated by quality or any other attribute. The coffee production industry faced an adverse selection problem once the well skilled producers that used to develop a differentiated coffee migrated to other industries, concentrating the commodity-focused farmers into the coffee production. (Saes, 1997)

In the late 1980s, Brazil took a different position in the negotiations of the IAC's economic clauses: that of no longer accepting reductions in its share of the international market. In 1989, the decision made by Brazil and the US—which under president Bush' liberal philosophy was against a new export quota agreement—led to the collapse of the IAC with regard to the economic clauses. As a consequence, the government no longer was the central coordinator for coffee quantities and prices, thus, we observed the emergence of private strategies to guarantee coffee supply and quality.

Coffee has a host of possibilities for differentiation, starting with the attributes related to the variety of the bean (Brazilian Bourbon coffee bean, for instance), including production processes (organic, shade-grown, family-farmed, Fairtrade), place of production (origin, estate coffee), types of processing (natural coffee, pulped cherry and

demucilated), quality of the drink (which takes into account aroma, taste, body and acidity), the industrialization process (aromatization, decaffeination), type of preparation (espresso, cappuccino) and even the place where it is sold (coffee shop). This wide array of possibilities has been under the denomination of specialty coffees. One definition that encompasses all these possibilities is presented by Zylbersztajn and Farina (2001 : 68-69):

The concept of specialty coffees is closely associated with the pleasure derived from the drink. Such coffees stand out for some specific attribute linked with the product, the production process or a service related to it. They differentiate due to characteristics such as superior quality of the drink, aspect of the beans, type of harvest, type of preparation, history, origin of the crops, rare varieties and limited quantities, among other aspects. They can also include parameters of differentiation related to the economic, social and environmental sustainability of the production, so as to promote more equity among the links of the supply chain. Changes in the industrial process also lead to differentiation, with the addition of substances like in the case of aromatized coffees, or their subtraction, like the decaffeinated. Traceability and service incorporation are also factors of differentiation and, therefore, of value-aggregation.

This definition aggregates several concepts. Some concern easily observable or testable aspects, and others regard aspects that are hard to identify, such as the conditions under which the beans were produced, thus differentiation attributes can be associated with tangible characteristics, like the physical and sensorial features, and intangible ones, like those present in the goods of belief, whose features are not readily identifiable. Table 1 organizes the different categories of specialty / differentiated coffee and provides a brief description about the attributes demanded by consumers and required from coffee farmers to adhere in one of the specific strategy of differentiation.

Table 1- Categories of specialty / differentiated coffee

Type of Differentiation	Attributes that are required from the coffee farmers	Most important attribute required from consumers	Entry barrier drivers	How farmers can adhere to the differentiation strategy
Exceptional quality	To produce with quality	Company's Brand	Low entry barriers	To produce quality. Price premium is an incentive mechanism.
Origin (Estate Coffee)	To be located in a region that has a specificity	Origin Certification and the brand of the firm	High entry barriers (must be limited)	To be in the region and to produce according to the certification requirements
Organic	To use methods that preserves soil with no use of pesticides nor highly soluble fertilizers	Organic coffee certification	Low entry barriers	Producers must have certification. Price must compensate investment (in poor countries there is no need for investment)
Shade-grown (eco-friendly)	To produce in the forest shade	Eco-friendly coffee certification.	High entry barrier, need access to a specific micro-region condition.	Producers must be producing in areas of forest and must be certified
Fairtrade	To be a small producer and participate in a cooperative	Fairtrade coffee certification	High entry barriers (FLO defines the growth of associates' number according to demand).	Producers must adhere to Fairtrade rules

Source: Based on Giovannucci (2001)

3. Different Entrepreneurial Ability Among Coffee Producers in Brazil

The institutional change in the late 80s created incentives for private strategies based on quality differentiation once the policy that was focused only on volume and price mechanisms was over. As this market grew some Brazilian farmers switched some or all

of their production capacity to differentiated coffee while others remained focused on commodity production. What explains different entrepreneurial ability among coffee producers in Brazil? What contributes to the entrepreneurial ability of farmers to adopt a differentiation strategy?

In this context, we consider that a farmer that adopted a differentiation strategy has more entrepreneurial ability compared to another farmer that kept focused on commodity strategy. Indeed, to adopt a differentiation strategy, the farmer must invest in specific assets such as equipment, the genetic variety of the coffee trees and the agronomic practices according to the type of the specialty. Moreover, the farmer assumes additional uncertainty by choosing a differentiation strategy. First, the farmer assumes a trade-off when switching to a differentiation strategy that is the increase of the quality of the coffee beans but with reduction of the volume production per area. Thus, the aimed price premium for the specialty must payback all the incremental investments and must compensate the reduction in volume of production. Second, an adverse climate condition affects much more the specialty production compared to a commodity one. In addition, the profitability may be more affected because the agronomic treatment of a specialty field is more intense. In conclusion, an adverse climate reduces the volume of production and reduces the value of the agronomic treatments for specialties. Considering the literature on Entrepreneurship, by the perspective of Knight, the entrepreneur is the one with ability to make decision in the presence of uncertainty based on his own judgment. Thus, the entrepreneur will not necessarily chose the low uncertainty alternative, but will be confident on his ability to make adjustments due to changes in the environment. In this sense, Schultz affirms the positive relation of entrepreneurial ability with human capital, specifically, with the accumulated experience and formal education.

To explore who adopts a differentiation strategy, this research turns to human capital theory (Becker and Tomes, 1986) as a key element to the understanding of entrepreneurial ability (Schultz, 1961) and strategy choice. Considering that farmers possess equivalent physical assets and identical information about production and the

market, differences in decisions then must be attributed to the way in which they process information, their mental models and cognitive structures. While these models and structures cannot be observed directly, human capital theory can provide a window into these structures by exploring the relationship between formal education¹ and the experience of the decision maker influence the firms' positioning in the market. Indeed, Shultz argued long ago that it is the stock of skills and knowledge (Schultz, 1961) that determine the individuals' entrepreneurial ability (Schultz, 1982) to respond to changes in economic environment.

3.1 Hypothesis Under Consideration

When human capital concept was addressed, there was much concern about the view of the man as a "stock" because human is "free" and not comparable to other forms of capital. But people become even freer the more they invest on formal education and training (Schultz, 1961). Here, better human capital is associated to more opportunities both for work and for earnings. In this sense, we state the first hypothesis:

Hypothesis 1: Formal education improves the probability to adopt a differentiation strategy

One source of experience is the one acquired in other businesses. Farmers' experience growing a crop and its historical production expertise in alternative crops increases the overall yield performance (Goodwin, Featherstone and Zeuli, 2002). In this case, diversification is a source of experience that provides the owner a firm-specific knowledge, as a consequence of interactions with its resources in different contexts (Kor, Mahoney and Michael, 2007). Thus, we state the second hypothesis:

¹ Becker and Tomes (1986) considers the formal education as an investment that an individual can make to increase his human capital.

Hypothesis 2: Experience from diversification improves the probability to adopt a differentiation strategy

Another source of experience is the family. There are incentives to transfer knowledge within a family explained by reciprocal altruism and care for future generations (Murphy et al., 2008). In this sense, the owners' family can be considered a repository of knowledge acquired through years of past decisions, an experience that is valuable to be transferred through generations. Thus, we state the third hypothesis:

Hypothesis 3: Experience from owners' previous generations in the same business improves the probability to adopt a differentiation strategy

Hypothesis 3 captures the experience from owner's previous generation, in other words, founder's child or grandchild may have some advantage over entrants to adopt a differentiation strategy. But family may influence the business regardless being a founder or non-founder thus we state the fourth hypothesis. Indeed, the family can positively or negatively affects decisions on business.

Hypothesis 4: Family influence changes the probability to adopt a differentiation strategy

Hypothesis 4a: Family influence improves the probability to adopt a differentiation strategy

Hypothesis 4b: Family influence reduces the probability to adopt a differentiation strategy

3.2 Methodology

The dependent variable is the probability of strategic choice that takes value of 1 for differentiation strategy or 0 for commodity strategy. Considering a binary dependent

variable, the logit analysis is the appropriate method to estimate the coefficients in the model:

$$\Pi_i = e^{z_i} / (1 + e^{z_i}) \text{ or } z_i = \log (\Pi_i / (1 - \Pi_i))$$

Where:

Π_i is the probability of i^{th} case experiences the event of interest

z_i is the value of the unobserved continuous variable for the i^{th} case

The model assumes z is linearly related to predictor:

Model 1

$$Z_i = \beta_0 + \beta_1 \text{Region} + \beta_2 \text{Owner's Age} + \beta_3 \text{Size}$$

Model 1 considers the control variables. "Region" is a categorical variable to control for differences on 8 Federal States, "Owner's Age" is measured in years and "Size" is measured in hectares (unit of area).

Model 2

$$Z_i = \beta_0 + \beta_1 \text{Region} + \beta_2 \text{Owner's Age} + \beta_3 \text{Size} + \beta_4 \text{Contract}$$

Model 2 introduces the use of the variable "Contract". From the Transaction Cost Economics perspective, a contractual arrangement (Williamson, 1985) will be set to prevent from quasi rent appropriation (Klein, Crawford and Alchian, 1978) due to idiosyncratic investments made to accomplish a differentiation strategy.

Model 3

$$Z_i = \beta_0 + \beta_1 \text{Region} + \beta_2 \text{Owner's Age} + \beta_3 \text{Size} + \beta_4 \text{Contract} + \beta_5 \text{Education} + \beta_6 \text{Diversification} + \beta_7 \text{Generation} + \beta_8 \text{Family Influence}$$

Model 3 introduces variables to test for Human Capital hypotheses. “Education” is a categorical variable for 8 levels of education, from 1 “elementary incomplete” to 8 “under graduation”. “Diversification” is a measure for other activities that owners experience that, in extreme, will vary from 0 if owners are focused on coffee business to almost 100, if owners are much diversified. “Generation” takes value of 1 for owners that are founders’ child or grandchild or value of 0 if the owner is the business founder. “Family Influence” variable was created by factor analysis of the F-PEC based questions, on which high values indicate strong family influence. Eigenvalue indicates that 1 factor is appropriate to represent the 4 questions, standardized by z-scores. Correlation matrix on table 2 indicates low correlation and no significance among human capital predictors.

Table 2 - Correlation Matrix

	Pearson Correlation	1	2	3	4	5	6
1	Differentiation Strategy	1	0.154 **	0.145 **	0.074	0.075	-0.165 **
			(0.002)	(0.003)	(0.136)	(0.129)	(0.001)
2	Use of Contractual Arrangement	0.154 **	1	-0.030	-0.062	-0.003	-0.105 *
	Sig. (2-tailed)	(0.002)		(0.551)	(0.216)	(0.950)	(0.039)
3	Education level	0.145 **	-0.030	1	0.025	0.001	0.002
	Sig. (2-tailed)	(0.003)	(0.551)		(0.611)	(0.979)	(0.976)
4	Experience from diversification	0.074	-0.062	0.025	1	-0.064	-0.076
	Sig. (2-tailed)	(0.136)	(0.217)	(0.611)		(0.200)	(0.137)
5	Experience from generation	0.075	-0.003	0.0013	-0.064	1	0.048
	Sig. (2-tailed)	(0.129)	(0.950)	(0.978)	(0.200)		(0.346)
6	Family influence	-0.165 **	-0.105 *	0.002	-0.076	0.048	1
	Sig. (2-tailed)	(0.001)	(0.039)	(0.976)	(0.137)	(0.346)	
**	Correlation is significant at the 0.01 level (2-tailed)						
*	Correlation is significant at the 0.05 level (2-tailed)						

In this study, the dependent variable is the probability of Strategic Choice that take value of 1 for differentiation strategy or 0 for commodity strategy. It is assumed equal probability of 0.50 for each alternative. Logit analysis maximizes the “likelihood” that an event will occur.

β reflect the effect of a change in an independent variable on $\log [P_i / (1 - P_i)]$. β test the usefulness of predictors, by significance level of the Wald statistic, but it does “not indicate the increase in the probability of the event occurring, given a one-unit increase in the corresponding independent variable” (Judge et al., 1988: 791). The $\exp(\beta)$ is the

estimated odds ratio of event occurrence by change in one independent variable, all others being equal. We analyzed probabilities change based on $\exp(\beta)$.

3.3 Data

This empirical study is possible because we collected data by interviewing 409 farmers by phone, following a structured questionnaire from July to November of 2007. The sample of farmers was provided by coffee processing industries and cooperatives. The database covers all relevant production areas in Brazil with relatively the same proportion on volume of coffee harvested per Federal State.

For classification purposes, we considered that the farmer adopted a differentiation strategy if he declared the production of a specialty / differentiated coffee and we did not consider the share of this category in the total production. We assume that most farmers initiated their production on a commodity strategy and then switched (or not) to any level of differentiation strategy. In this sense, 35% of the farmers in our sample adopted a differentiation strategy and 65% remained in the commodity. Considering the use of contract that specifies the volume and price of coffee between the farmer and the buyer (for instance, roast industries, cooperatives, traders and exporters), 11% of the observations adopted this governance mode while 89% commercialized their production in the spot market. Regarding the experience from diversification, the sample average was 45.7%, which means that the income from coffee business was responsible for 54.3% of the farm total income.

The relevant variables to the models addressed in this study are presented in the table 3. We provide details about how each variable is measured or calculated. The variables are organized in dependent variables, explanatory and control variables.

Table 3 - Relevant variables

Dependent Variable: measure for strategy choice	
Strategy Choice	Variable equals (0) if farmer is focused on commodity production or (1) if the farmer produces a specialty / differentiated coffee
Explanatory Variables: measures for human capital	
Education level	The measure is consisted of 8 pre-determined levels of education: (1) Elementary incomplete; (2) Elementary; (3) Middle incomplete; (4) Middle; (5) High School incomplete; (6) High School; (7) College incomplete and (8) College Degree.
Diversification Experience	The measure for diversification is the inverse of income dependence on coffee business. The less the dependence on coffee production to farmer's income, the more the diversification experience. This variable takes value from zero, if the farmer is focused only on coffee production, to a maximum limit of 99, if the coffee represents 1% of total farmer income.
Generational Experience	The measure is a dichotomous variable that equal (0) if the farmer is the founder of the coffee business or (1) if the farmer is the second or third generation on coffee production.
Family Influence	The measure was created by factor analysis of 4 statements from the F-PEC (Family – Power, Experience and Culture) scale. The F-PEC is consisted of statements about family influence on which the respondent answers a 5 point-scale that range from “strongly disagree” to “strongly agree”. The original statements are (1) Family members perform at a level beyond normal to make the business succeed; (2) The family business is defended in the family's discussion with friends and employees; (3) Family members matter if the business fails; (4) Family members understand and support business decisions. High value indicates strong family influence. Eigenvalue indicates that 1 factor is appropriate to represent the 4 questions, standardized by z-scores.
Control variables	
Size	Size is measured by land dimension. All data were standardize to hectare (10,000 meters square).
Owner's Age	Measured in years.
Federal State	Discrete variable that corresponds to the Federal State in Brazil: (1) Bahia; (2) Ceara; (3) Espirito Santo; (4) Minas Gerais; (5) Paraná; (6) Rio de Janeiro; (7) Rondonia; (8) São Paulo.

Table 4 indicates that almost half of the interviewed farmers completed the undergraduate education. It is not identified any relevant difference on formal education between founders and non-founders groups.

Table 4 – Education Level

Education Level	ALL		FOUNDERS		NON FOUNDERS	
	N	Frequency	N	Frequency	N	Frequency
Elementary incomplete	1	0.24%	0	0%	1	0.44%
Elementary	7	2%	4	2.21%	3	1.32%
Middle incomplete	81	20%	34	19%	47	21%
Middle	32	8%	18	10%	14	6%
High School incomplete	12	3%	3	1.66%	9	4%
High School	69	17%	32	18%	37	16%
Under graduation incomplete	5	1.22%	0	0%	5	2%
Under graduation	200	49%	90	50%	110	48%
Missing	2				2	
Total	409		181		228	

Coffee farmers were asked about the influence of family to business based on the F-PEC (family – power, experience and culture) scale developed by Klein, Astrachan and Smyrniotis (2005). Answers were classified applying a 5-points Likert scale from 1 – “strongly disagree” to 5 – “strongly agree” for each of the four statements show in Table 5. We observe differences in response between founders and non-founders group, on average, non-founders group agree more than founders group in the following statements: “Family members perform at a level beyond normal to make the business succeed” and “The family business is defended in the family’s discussion with friends and employees”. For the other side, founders group perceive that “ Family members understand and support business decision” more than non-founders group.

Table 5 – Family Influence

	Family Influence	ALL			FOUNDERS			NONFOUNDERS		
		N	Mean	Std. Dev	N	Mean	Std. Dev	N	Mean	Std. Dev
1	Family members perform at a level beyond normal to make the business succeed	389	3.73	0.940	172	3.66	0.937	217	3,8	0,941
2	The family business is defended in the family's discussion with friends and employees	389	3.68	0.903	172	3.49	0.964	217	3,83	0,822
3	Family members matter if the business fails	388	4.37	0.622	171	4.36	0.665	217	4,37	0,588
4	Family members understand and support business decisions	389	4.30	0.676	172	4.38	0.632	217	4,24	0,706

3.4 Results

Results are organized on Table 6. Any of the control variables are statistically significant in all models. Thus, the probability of differentiation strategy choice is not affected by region, owners' age or size. Model 2 indicates that use of contract is relevant for strategic decision (sig < 0.01) and all human capital variables introduced in Model 3 are relevant for strategy choice (sig < 0.05).

Regarding to model fit, the introduction of variables positively contributes to percent of correctly predicted indicator and to Pseudo R-square. Indeed, the complete model 3 increases the Pseudo R-square from 0.056 in model 2 to 0.189. The Hosmer and Lemeshow test is the most critical to indicate good model fit; model 1 is > 0.05 and models 2 and 3 are equal 0.05, all indicating good model fit.

Table 6 – Results from Models 1, 2 and 3

	Model 1			Model 2			Model 3		
	B	S.E.	Sig.	B	S.E.	Sig.	B	S.E.	Sig.
Region (Federal State)			0.573			0.475			0.490
Bahia	0.242	0.593	0.683	0.537	0.617	0.384	0.692	0.652	0.288
Ceara	1.206	0.823	0.143	1.601	0.841	0.057	1.363	0.880	0.121
Espirito Santo	-0.211	0.502	0.674	0.221	0.533	0.678	0.549	0.576	0.339
Minas Gerais	-0.005	0.399	0.990	0.331	0.428	0.439	0.500	0.455	0.271
Parana	0.071	0.674	0.915	0.348	0.698	0.617	0.058	0.758	0.938
Rio de Janeiro	-0.032	1.281	0.980	0.414	1.293	0.748	1.375	1.518	0.365
Rondonia	1.772	1.215	0.144	2.204	1.229	0.072	2.753	1.402	0.049
Owners' Age	-0.001	0.008	0.865	0.002	0.008	0.858	-0.001	0.009	0.880
Size (coffee area)	0.001	0.001	0.537	-0.001	0.001	0.779	0.001	0.001	0.654
Use of Contract Arrangement				1.139	0.373	0.002	1.326	0.412	0.001
EducationLevel									0.026
EducationLevel(1)							-21.436	40,192	0.999
EducationLevel(2)							-1.125	1.166	0.334
EducationLevel(3)							-1.202	0.352	0.000
EducationLevel(4)							-0.590	0.456	0.196
EducationLevel(5)							0.403	0.646	0.532
EducationLevel(6)							0.144	0.311	0.642
EducationLevel(7)							-21.442	19,172	0.999
Experience from diversification							0.008	0.003	0.023
Experience from generation							0.579	0.255	0.023
Family influence							-0.321	0.129	0.012
Constant	-0.622	0.599	1.076	-1.172	0.637	0.065	-1.723	0.769	0.025
Percent correctly predicted	66.230			68.062			72.513		
Pseudo R-square (Nagelkerke)	0.023			0.056			0.189		
Hosmer and Lemeshow Test	0.221			0.050			0.050		

The logit analysis maximizes the “likelihood” that an event will occur. Considering that the farmer has equal chance to choose one of the two possible strategies, in column (A) is indicated 0.500 probability for differentiation strategy and 0.500 for commodity strategy. The introduction of explanatory variables changes the probabilities as discussed below.

Odds ratio and probabilities of Model 3 are organized in table 7. Contractual arrangements improve the probability to adopt a differentiation strategy (sig < 0.01). The

odds ratio to differentiation strategy choice is 3.766 times greater for an owner that set contractual arrangements with coffee buyers rather than the odds ratio to differentiation strategy choice of someone that keeps market relationship with coffee buyers, all other factors being equal. Considering equal odds ratio to differentiation and commodity strategy (column A), the probability to choose a differentiation strategy increases to 0.790 (column B) if owner has contractual arrangements to coffee buyers, an increase of 0.29 percent points (column C).

Table 7 – Probability interpretation of Model 3

	Sig.	Exp(B)	(A)	(B)	(C)
Use of Contract Arrangement	0.001	3.766	0.500	0.790	0.290
EducationLevel *	0.026	1.494	0.500	0.599	0.099
Experience from diversification	0.023	1.008	0.500	0.501	0.002
Experience from generation	0.023	1.786	0.500	0.641	0.141
Family influence	0.012	0.725	0.500	0.420	-0.079

We found support to Hypothesis 1 (sig < 0.05), that formal education improves the probability to adopt a differentiation strategy. Although a categorical variable, we run another logistic regression considering formal education as a continuous variable to capture the incremental effects; all other variables had no significant changes from original model 3. The increase on one level of formal education increases the probability to invest on differentiation strategy from 0.500 (column A) to 0.599 (column B), an increase of 0.099 percent points (column C).

Although we found support to Hypothesis 2 (sig < 0.05) that experience from diversification improves the probability to adopt a differentiation strategy, it keeps almost the same probability to adopt a commodity strategy as our assumption (column A).

We found support to Hypothesis 3 ($\text{sig} < 0.05$), that experience from owners' previous generations in the same business improves the probability to adopt a differentiation strategy. The odds ratio to differentiation strategy choice is 1.786 times greater for an owner with previous generations in the same business rather than the odds ratio to differentiation strategy choice of someone that started the business, all other factors being equal. Considering equal odds ratio to differentiation and commodity strategy (column A), the probability to choose a differentiation strategy increases to 0.641 (column B) if the owner has previous generations in the same business, an increase of 0.141 percent points (column C).

We found support to hypothesis 4 ($\text{sig} < 0.05$), that family influence changes the probability to adopt a differentiation strategy. Moreover, we found support to hypothesis 4b that family influence reduces the probability to adopt a differentiation strategy; as a consequence, we rejected the hypothesis 4a. Here the interpretation of effects on levels of family influence to strategic decision is not straightforward because of treatments on original scales (z-scores and data reduction by factor analysis). Still, the results are consistent with the contradictory findings of family influence in the literature, as indicated by Murphy et al (2008), family may also represent a source of costs to the business as result of nepotism, agency costs and conflict.

CONCLUSION

Considering the Knight's approach, the entrepreneur will not necessarily chose the low uncertainty alternative, but will be confident on his ability to make adjustments due to changes in the environment. This might explain differences in strategy adoption in the context of Brazilian Coffee Production. In this sense, we consider that a farmer that adopted a differentiation strategy has more entrepreneurial ability compared to another farmer that remained focused on commodity. Moreover, our findings support that the accumulated experience and formal education contribute to the entrepreneurial ability necessary to manage the uncertainty and trade-offs when switching strategies.

The literature on human capital provides a broader understanding of entrepreneurial ability and its effects on strategy choice. We discussed the literature on Entrepreneurship with emphasis on the creative destruction from Schumpeter (1961), entrepreneur's alertness from Kirzner (1973), entrepreneur's judgment capacity from Knight (1964) and entrepreneur's education and experience from Schultz (1961). This study provides empirical evidence based on Brazilian coffee producers that supports, specifically, the latter approach.

Schultz (1982) relates the improvement in human capital with more entrepreneurial ability. Our findings corroborates this theory in the sense that formal education, experience from diversification and experience from owners' previous generations explain strategy choice in the context of Brazilian coffee producers. For instance, higher formal education improved the probability to adopt a differentiation strategy which is a more entrepreneurial decision compared to the commodity strategy.

Finally, we recognize limitations on this effort to integrate the entrepreneurs' human capital, entrepreneurial ability and strategy choice. First, a financial capital constrain may impose a bias towards a commodity strategy and the influence of human capital may be under estimated. Second, estimators applied in the models may be affected by endogeneity problems regarding to strategy and governance choice. For instance, Nickerson, Wada and Hamilton (2001) identified and controlled for endogeneity

problems, an issue that deserve attention in future analysis. Third, we are sure that other competing or complementary explanations from, for instance, entrepreneurship and family business literature may provide new hypothesis to be tested or may condition some of our findings. Still, we expect that entrepreneur's human capital approach amplify the understanding of strategy choice.

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