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When Unfair Trade Is Also at Home: The Economic Sustainability of Coffee Farms

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Abstract: This paper addresses the issue of unfair trade practices, investigating the drivers of the differences between farm-gate and free-on-board (FOB) prices in the most important Arabica coffee producing countries worldwide: Brazil, Guatemala, Colombia, Honduras, Peru, and Ethiopia. Our study looks at those differences taking into account the literature on governance in agri-food chains, with a focus on each country's domestic market. We performed panel-corrected standard error (PCSE) estimates in ICO and World Bank data, covering the period from 2007 to 2016. In the paper we analyze (i) property rights as a proxy of transaction costs, once it brings more transparency and support to negotiations; (ii) access to electricity as a proxy of supporting infrastructure in communication and information activities, and (iii) quality of roads and quality of ports as proxies of transportation infrastructure. Our results show that heterogeneity in institutions and infrastructure are key in explaining the differences between farm-gate and FOB prices. The transaction costs derived from institutional failures and infrastructure gaps, lead to the use of intermediaries in the coffee supply chain, and this reduces the margin for coffee farmers. Actions that aim to reduce these inefficiencies bring more transparency and lower transaction costs, thereby directly contributing to the United Nations (UN) Sustainable Development Goals (SDGs).

Keywords: farm-gate prices; FOB prices; unfair trading; coffee



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1. Introduction

Coffee is one of the most cherished beverages in the world, with an estimated consumption of about 400 billion cups per year [1]. For edapho-climatic reasons, coffee growing is concentrated in the southern hemisphere. Approximately 25 million farmers, in more than 50 developing countries, are responsible for global coffee production [2]. Coffee is generally produced within a relatively small area of less than two hectares. Many of these producing countries are dependent on this economic activity, since they have few alternative sources of income [3–6]. As a frame of reference, 22 out of the major coffee producing countries are listed as Low Human Development Countries (LHDCs) [7].

Over the last few decades, there has been a significant increase in the world's coffee productivity, driven mainly by technological innovations adopted by Brazilian and Vietnamese farmers [7]. Since the extraordinary profits from innovation are almost immediately passed on to downstream prices, productivity gaining strategies have only accelerated the price drop in the international market [8].

The decline in coffee prices accentuates two dynamics of this market. On one hand, reflecting on the well-known social problems, there is an increase in poverty, as well as the exclusion of farmers who are unable to keep pace with the rate of innovation and productivity [9,10]. On the other hand, there is an increase in margins of downstream segments of the value chain (ICO, 2019a). In 2017, 70% of total coffee production was exported, resulting in US\$19 billion, while the coffee retail market had a value of US\$83 billion [11].

There are many studies on price transmission generally addressing the relation between prices paid to coffee bean producers, and those paid to processing and/or retail firms [12–16]. They show asymmetrical transmission of price changes along the chain, indicating that retail and processor margins grow when there is an excess supply and a decrease in green coffee prices. According to Daviron and Ponte [3,4], these results are a consequence of the sector's market structure: highly spread in the rural segment, in comparison to the increasingly oligopolistic processor and retailer segments. Falkowski et al. [17] point out that these dynamics characterize what is conventionally called Unfair Trading Practices (UTPs). In this sense, considering UTPs as a trading partner's unclear transfer of costs or risks to its counterpart [18], whatever drives income distribution in the value chain is directly related to the United Nations (UN) Sustainable Development Goals (SDGs), particularly in the coffee chain [1]. We highlight this connection and briefly discuss three SDGs: # 1—no poverty; # 9—industry, innovation, and infrastructure, and # 16—peace, justice, and strong institutions.

Nevertheless, as previously mentioned, studies dealing with the topic have always observed the relationship between green coffee producers and processors and/or retail firms. None have investigated the difference between farm-gate price and export price in the coffee supply chain worldwide. This paper seeks to verify such differences by analyzing each producing country, aspiring to indicate the reasons for farmers' income differences among them. Besides taxation issues by some countries' governments, these variations are also associated with transaction costs. For instance, bargain power, the number of intermediaries necessary to connect farmers to the international market, and issues related to infrastructure.

Our study, therefore, aims to investigate what drives the differences between prices paid to the farmer and those paid to free-on-board (FOB), based on ICO data [2]. We will analyze six countries that represent about 75.8% [19] of the total Arabica coffee production: Brazil, Guatemala, Colombia, Honduras, Peru, and Ethiopia. It is worth noting that there are two types of coffee most commercialized in the world: Arabica (*Coffea Arabica*) and Robusta (*Coffea Canephora*). Arabica coffee is characterized by a softer and sweeter flavor and higher quality, while Robusta has a higher concentration of caffeine and less sugar, providing a bitter and stronger flavor. The choice for Arabica coffee production traces to the consistency of data obtainable in ICO database. We adopt issues related to the institutional environment and infrastructure as proxies for transaction costs.

Figure 1 shows three groups of margins between prices obtained by local coffee growers and by exporters (FOB).

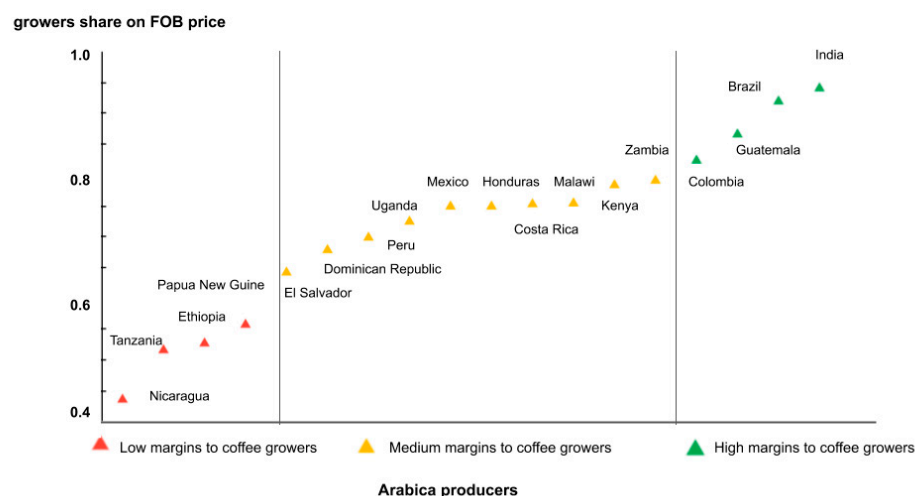


Figure 1. Ratio between farm-gate and free-on-board (FOB) prices worldwide. Note: The average share was used for most countries, in the period from 2007 to 2016. Exceptions are Malawi (2007–2010); Mexico (2007–2008); Tanzania (2007–2008); Zambia (2007–2011); Kenya (2000–2004). Source: ICO database [2].

This study contains six sections, including this introduction. Section 2 brings a short illustration of the price variations and our hypotheses. Section 3 describes the data. Section 4 explains the model used in the empirical analyses. Section 5 presents the main results and a brief discussion. Finally, Section 6 shows our conclusions.

2. Unfair Trade Practices: Differences in Margins Obtained by Coffee Farmers

According to Sexton [20], unfair trading practices (UTPs) result from three factors: (1) the weak party in a negotiation has no real alternatives to trade; (2) one of the parties depends on its counterparts for factors such as technology and knowledge; and (3) there is informational asymmetry (the contracts are incomplete), allowing opportunistic behavior in the course of negotiation, execution and finalization of the contractual relationship. The common focus in studies on UTPs is on the imbalance of power in the relationship between growers and buyers (distributors, processing firms, and retail), with the consolidation and concentration of the downstream segments of the value chain.

The imbalance of power between growers and negotiators is amplified in the case of a perennial culture such as coffee, in which there is great difficulty for production factors mobility. There are transaction costs associated with the change from one culture (or activity) to another, due to the specificity of both land and production. Perennial crops imply sunk costs, which affect the time needed for supply to respond to negative price signals. In other words, the characteristics of the production structure do not allow supply to respond to negative effects of prices especially in the short and medium terms, preventing the natural adaptation to low stimuli. As an escalating factor, there is the somewhat low price elasticity of demand for coffee in the short term. Excess production is barely absorbed by demand due to the stimulus of falling prices [21]. For these reasons, retail prices respond more quickly to price increases when there are supply problems, compared to price decreasing movements [22,23]. Several studies suggested the vulnerability of coffee farms compared to other segments across the production chain [3,23–25]. Other authors, analyzing the deregulation of the market concluded in the 90s, observed that coffee price volatility increased after trade liberalization in some producing countries, bringing them major losses [26–28].

However, the difference between the prices obtained by local coffee growers and by exporters (FOB), can also indicate domestic asymmetric price transmission, and other types of inefficiencies in the coffee chain. Price, information, and bargaining power asymmetries in economic activities remind us that these are social embedded phenomena that require institutional devices to be coordinated [17].

Global agri-food chains such as coffee deal with the institutional variation across countries. Coffee supply is mainly based on exports from countries with different institutional architectures. As the rules of the game and the configuration of the agri-food chains are different in each producing country, contract enforcement, definition of property rights, and external arbitration shall not be the same as well [29,30].

Institutions are then key aspects when analyzing UTPs. Menard and Valceschini [31] highlight the vital role of institutions in the governance of modern agri-food chains. Institutions can prevent opportunistic behavior, rebalance bargaining power inequalities, and provide an adequate arena for rights and rules allocation. They provide the rules that constrain the way agri-food chains organize and govern their economic activities [32], and they influence the main aspect that originates UTPs: the contract incompleteness.

A suggestive piece of empirical evidence comes from Hernandez et al. [33]. They studied the effects of the Ethiopian Commodity Exchange on coffee price dynamics between international and domestic markets. With cautious optimism, the authors conclude that the establishment of such an institution has indeed affected price transmission, however in a limited way. Their findings show that only a small fraction of the international prices is transmitted to Ethiopian coffee farmers.

As agri-food supply chains are deeply embedded in institutional environments, UTPs are clearly affected by the institutions involved. The institutional rules shall define the

way the supply chains must be governed, which regulatory conditions they should comply with, as well as the way they coordinate their relationships and organize their economic activities [32]. This paper assumes that institutions could then influence price transmission along the supply chain, bringing more transparency and inducing more fairness to the economic exchanges. As such, when operating efficiently, institutions could minimize UTPs. Therefore:

Hypothesis 1 (H1). *The more efficient an institutional environment, the smaller the difference between farm-gate and export prices in the coffee supply chain.*

As mentioned by the European Commission [18], UTPs are related to the transfer of risks and costs. Since coffee production is mainly concentrated in developing or under-developed countries [2], the transportation costs play a major role when looking at the international markets. Besides the institutional perspective, the difference between farm-gate and export prices in the coffee supply chain shall also be affected by the infrastructure available in producing countries.

Transport costs of coffee can be very high, depending on the quality of roads of a country, as well as the efficiency of its ports' operations. The costs to collect coffee at farms and transport it to ports could indeed affect farmers' remuneration. Moreover, coffee crops can also be found in mountainous territories and remote places [34], making this financial harm even bigger.

A recent study focused on the important Ethiopian coffee market suggests that one explanation of low farmers' income derives from transportation costs. Hütz-Adams [35] highlights that insufficient road infrastructure in many coffee producing regions make both inputs and coffee transportation expensive. The study also illustrated an unexpected point that makes transportation even more important: "Coffee that could be graded as specialty coffee is sometimes sold on the local market as there is no transport available" (p. 18).

Another issue that contributes to harder market access is the shortage of electricity in isolated areas. Electricity is increasingly important to access market information, financial system services, and net communication, which can provide data and opportunities to farmers. Therefore, both transportation and electricity may be considered as infrastructure support. We expect that coffee buyers would transfer the high transportation costs to farmers and penalize their remuneration when there are poor transport systems and infrastructure, i.e.:

Hypothesis 2 (H2). *The better the infrastructure, the smaller the difference between farm-gate and export prices in the coffee supply chain.*

3. Data

The data used in the statistical analysis was extracted from ICO and World Bank database [36]. It reflects the historical series of selected variables, from 2007 to 2016, in the following countries: Brazil, Colombia, Ethiopia, Guatemala, Honduras, and Peru. These countries are widely known for their Arabica coffee quality, and together they add up to around 75.8% of total Arabica coffee production and 47% [19] of all coffee exports, having been then chosen for their relevance in the market.

3.1. Dependent Variable: Price Ratio

In order to quantify the factors that reflect UTPs in the values traded in the Arabica coffee market, we used the ratio of prices obtained by rural producers over free-on-board (FOB) export prices as the dependent variable in the econometric model. This ratio represents the value that is lost in the coffee chain with intermediaries, and the share of producers in the final price of the exported merchandise. In this sense, the presence of UTPs would be strongly linked to a lower price ratio, close to 0, while fairer transactions would be related to figures closer to 1.

It is interesting to note that the average Price ratio for the countries chosen in the analysis in 2007 was 0.786; and in 2016 it was 0.727. The fall in the ratio was not progressive though, with oscillating years when this value was higher, as in 2010 (0.819) and 2011 (0.829), and years in which it was lower, as in 2015 (0.705).

The price ratio is the result of dividing the variable Farm-gate price by the variable FOB price. The variable Farm-gate price represents the amount paid to the farmer for the beans, and has been gathered from the historical ICO database, as well as the variable FOB price, which represents the amount paid for the beans on the countries' boards (see Table 1).

Table 1. Description of dependent variable.

Variables	Definition	Description
Component variables		
Farm-gate price	Unit value paid to coffee growers for the green bean in exporting countries	Currency/Weight: US cents/lb
FOB price	Unit value for the green bean exportation	Currency/Weight: US cents/lb
Dependent variable		
Price ratio	Growers share of value in the FOB price	0–1 (0 = Unfair trade; 1 = Fairer trade)

3.2. Explanatory Variables

The explanatory variables can be divided in two categories: the institutional environment and infrastructure, which was used as a proxy for the transaction costs in the Arabica coffee chain. The data was extracted from the World Bank database; the variable Access to electricity was collected by the organization itself, while the qualitative variables Property rights, Quality of port infrastructure and Quality of roads, have values between 1 and 7, and were gathered through The Global Competitiveness Report, prepared annually by the World Economic Forum (WEF), through interviews with approximately 15,000 business executives all over the world each year.

The variable Property rights was used in the model as a proxy to represent the country's institutional environment. The property rights component is a qualitative assessment of the extent to which a country's legal framework ensures the assets of individuals, either by enforcing contracts or by the rule of law. It reinforces the importance of institutions in ensuring the rule of law and justice for those who are extremely vulnerable to accomplish the SDG 16: Peace, Justice, and Strong Institutions.

Like other commodities, much of the coffee beans leave rural areas usually in the countryside, being transported to large ports before arriving into importing countries. According to ICO [2], a fruitful coffee sector requires a fruitful agricultural sector and rural environment, including investments in infrastructure for transportation, communication, energy, water, among other factors. These investments can reduce transaction costs in agricultural production and marketing.

The variables Quality of roads and Quality of port infrastructure assess the logistics infrastructure in exporting countries, and the variable Access to electricity gauges the access to infrastructure in terms of telecommunication services and market information. Over 90% of coffee is exported in green form, and value adding activities remain concentrated in importing countries. While technical challenges can be overcome, transportation and marketing costs, as well as tariff and non-tariff trade barriers, remain an obstacle to value increase at origin [2]. Additionally, Sachs et al. [1] place the SDG 9: Industry, Innovation, and Infrastructure, as one of the goals applicable to coffee chain. In some places, the lack of proper transportation infrastructure in rural coffee-producing regions has driven down the prices that smallholders can charge for their coffee at farm-gate.

The situation is even more sensible for Arabica coffee producers, whose premiums for coffee quality can be substantial, while production costs also tend to be higher. Accessing high-value segments requires a certain level of transport and market infrastructure, often a binding constraint for smallholders [2].

3.3. Control Variables

As a commodity, it is impossible to dissociate the production and export of green coffee beans from macroeconomic factors. These factors are represented by the variables Inflation, Consumer prices and Official exchange rate, extracted from the World Bank database, using as reference the institution's own base, in addition to the International Monetary Fund and International Financial Statistics database.

The farmer's payment is, in general, made in US dollars, which means that exchange rate fluctuations have a significant impact on the income received by coffee growers. The depreciation of local currencies in comparison to the US dollar encourages exports, while increases the risks related to exchange rate volatility. The effects of fluctuations are represented in the model by the variable Official exchange rate. In its turn, the variable Inflation, Consumer prices, reflects the annual variation in the average cost of a basic food basket in the selected countries.

The variable Rural population, measured as a percentage, was also extracted from the World Bank database, using data from the United Nations Population Division. In countries where economic development creates opportunities for high-paying jobs, many farmers and especially rural youths are looking for employment outside the coffee sector, migrating to urban areas or abroad [37,38]. This phenomenon has particularly affected coffee production as coffee cultivation still employs a lot of labor. The trend of workers quitting agriculture and the greater difficulty in finding workers for the activity has reduced the labor supply and increased labor costs [1].

The coffee-producing countries have predominantly low levels for economic and social development metrics. These control metrics are represented by the variables GDP per capita and HDI, both of which can be used as indicators for SDG 1: No Poverty.

Sachs et al. [1] posit that recent declines in the coffee global price have pushed a considerable number of producers below the extreme poverty line of US\$1.90 per day income. The low farm-gate prices contribute to accentuate this situation of low GDP per capita, a variable extracted from the World Bank, using its own database and the OECD National Accounts data.

Finally, the variable HDI, The Human Development Index, was extracted from the United Nations Development Program (UNDP) database [39]. This variable aims to access the development of countries using human criteria calculated from the indicators Life expectancy at birth, Expected years of schooling, Mean years of schooling, and GNI per capita (PPP \$) (see Table 2).

Table 2. Description of variables.

Variables	Definition	Description
Control variables		
Inflation, consumer prices	Change in the cost of a given basket of goods and services to the average consumer	Annual (%)
GDP per capita	Gross Domestic Product divided by midyear population	Current US\$
Official exchange rate	Exchange rate determined by national authorities or to the rate determined in the legally sanctioned exchange market	Local Currency Unit per US\$, period average
HDI	Human Development Index	Index
Rural population	People living in rural areas as defined by national statistical offices. It is calculated as the difference between total population and urban population.	% of total population

Table 2. Cont.

Variables	Definition	Description
Institutional variable		
Property rights	Response to the WEF survey question “In your country, to what extent are property rights, including financial assets, protected?”	1–7 (1 = not at all; 7 = to a great extent)
Infrastructure variables		
Access to electricity	Access to electricity	% of population
Quality of port infrastructure *	Business executives’ perception of their country’s port facilities according to the WEF survey.	1–7 (1 = extremely underdeveloped; 7 = efficient by international standards).
Quality of roads	Response to the WEF survey question “In your country, what is the quality (extensiveness and condition) of road infrastructure?”	1–7 (1 = extremely poor; 7 = extremely good—among the best in the world)

Note: * Respondents in landlocked countries were asked how accessible are port facilities (1 = extremely inaccessible; 7 = extremely accessible).

4. Model

Our empirical strategy involves panel-corrected standard error (PCSE) estimates. We used the `xtpcse` stata command for estimating pooled OLS models, with heteroscedastic and contemporaneously correlated errors across the panels.

More specifically, this is an alternative to the generalized least squares (FGLS) method, adjusting linear time series models when the disturbances are not independent and not distributed in an identical way. In the PCSE approach, the disturbances are seen as heteroscedastic between the panels and correlated contemporaneously between the panels. In our study, we used the method with standard errors corrected by the panel and assuming that there is no autocorrelation within the panel. In addition, we performed a Wooldridge test that did not allow us to reject the null hypothesis that there is no first-order serial correlation AR (1). Therefore, our estimates do not need to include corrections for AR (1).

We estimate the following equation:

$$Y_{it} = X_{it}\beta + Z_{it}\beta + \varepsilon_{it} \quad (1)$$

where Y_{it} is the outcome of interest, i.e., the relative price (ratio) between farm-gate and FOB prices, varying in percentage from 0% (less fair) to 100% (fairer). X_{it} refers to the four explanatory variables on institutional environment and infrastructure support: Property rights, Access to electricity, Quality of port infrastructure and Quality of roads. Z_{it} refers to our control variables: Inflation, GDP per capita, Exchange rate, HDI, Rural population. ε_{it} is a disturbance that may be autocorrelated along time t or contemporaneously correlated across panels i .

5. Results and Discussion

The results support our hypotheses. More specifically, (i) characteristics that indicate an efficient institutional environment are correlated to a decline in the difference between farm-gate and export prices in the coffee supply chain; (ii) aspects that illustrate proper infrastructure are correlated to a reduction in the difference between farm-gate and export prices in the coffee supply chain.

Table 3 reports descriptive statistics for all variables involved.

Table 3. Descriptive statistics.

Descriptive Statistics	Mean	Standard-Deviation (SD)	Min.	Max.
Arabica price ratio	0.76	0.14	0.41	0.10
Inflation	6.18	8.28	−27.78	44.35
GDP per capita	4705.29	3453.98	244.28	13,245.61
Exchange Rate	365.07	817.75	1.67	3054.12
Human development index (HDI)	0.64	0.11	0.37	0.75
Rural population	40.05	23.23	13.95	83.88
Property rights	3.97	0.35	3.31	4.68
Access to electricity	81.94	22.21	23.00	99.71
Quality of port	3.59	0.75	2.34	5.33
Quality of the roads	3.00	0.62	0.40	4.00

Table 3 shows that we have a heterogeneous sample in terms of proxies of institutional environment and infrastructure.

Table 4 presents our estimates considering first-order autoregressive effects. Model 1 presents all variables available. Our final model (Model 2) consists of a specific set of variables to avoid multicollinearity issues.

Table 4. Regression Model.

Variables	Model 1	Model 2
	Arabic Price Ratio	Arabic Price Ratio
Inflation	−0.000190 (0.00133)	
GDP per capita	1.16×10^5 * (6.95×10^6)	1.12×10^5 ** (5.46×10^6)
Exchange Rate	1.02×10^6 (1.36×10^5)	
Human development index (HDI)	−0.736 (0.530)	−0.603 *** (0.230)
Rural population	−0.000875 (0.00294)	
Property rights	0.0908 ** (0.0357)	0.0941 *** (0.0349)
Access to electricity	0.00634 *** (0.00133)	0.00658 *** (0.00111)
Quality of ports	0.00616 (0.0163)	
Quality of the roads	0.0402 * (0.0215)	0.0400 ** (0.0179)
Constant	0.190 (0.501)	0.0603 (0.179)
Observations	60	60
R-squared	0.703	0.703
Number of ID Country	6	6

Standard errors in parentheses . * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

Our findings support the general idea that institutions and infrastructure matter when analyzing unfair trading practices in agri-food chains. More specifically, Table 4 (Model 2) shows that property rights are correlated to a higher ratio between farm-gate prices and FOB prices, i.e., the better the institutional environment, the fairer the prices paid to coffee farmers. We also found a similar result regarding infrastructure, measured by access to electricity and quality of roads, i.e., the better the infrastructure, the fairer the prices paid to coffee farmers.

Institutions and Infrastructure

Figure 2 shows that from 2007 to 2016, Brazil was the leading country, on average displaying the highest ratio between farm-gate and FOB prices (92%), followed by Guatemala (87%), Colombia (82%), Honduras (75%), and Peru (71%). Ethiopia is the country in which producers obtained the lowest value (53%) in the period analyzed.

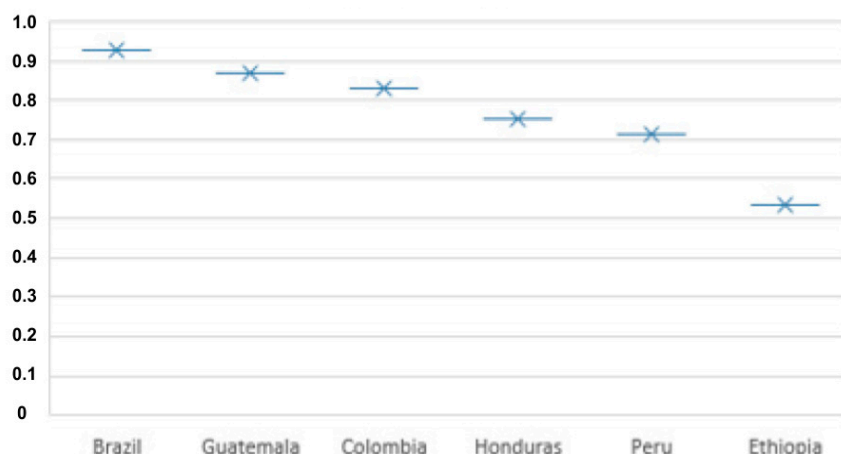


Figure 2. Ratio between farm-gate and FOB prices in the most important Arabica producing countries. Source: [2].

In Brazil, coffee production involves complex governance mechanisms to coordinate the whole chain towards both domestic and international markets [21,40]. Although present in remote locations, the supply chain involves a supportive activity from private agents who collectively handle issues that government fails to address [30,41]. There is no public organization responsible for the sector in the country, but there are several associations and cooperatives that provide support to producers. One example is the Cooxupé cooperative [42].

Many farmers negotiate their coffee in international markets, as well as provide adequate transportation services to ports at a low cost. Due to the relevance of such collective actions in the sector in Brazil, farmers often use them, and economy of scale is usual, making investments on transportation worthy. The so-called dry ports and the good roads and ports conditions stand out. Since the late 1990s, export tariffs have been reduced to zero, which has enabled greater gains for producers [21]. Finally, the country also offers efficient institutions to support producers, which results in fairer farm-gate prices, i.e., similar to those of exports (FOB).

In the case of Guatemala, the coffee sector has received support from a relevant institution since 1960, the Anacafé (Asociación Nacional del Café). The association is considered efficient and important in supporting coffee farmers in activities of trading, financial, and regulatory support. Assistance in exporting and rural development in geographically remote areas are also included [43]. The producers who do not participate in a cooperative or association are exposed to intermediaries, also known as coyotes, who usually offer lower prices at farm-gate level [44]. As a result, an interesting internationalization strategy from Anacafé can be observed: in 2010 the institution launched a platform that connects international buyers to local sellers at the farm-level [45]. According to this report, currently an issue is still traced to the poor transportation infrastructure of the country, which causes delays and increases production costs. A possible solution would be making investments in specific priority producing regions and most used port facilities.

Similarly, while being recognized as one of the highest quality producers in terms of beans, the Colombian market faces the same challenge in transportation infrastructure. Coffee beans are transported across remote areas without adequate roads from farms to buying centers, and then to cooperatives and ports. Gonzalez-Perez and Gutierrez-Viana [46] argue

that ‘Colombian freight rates are very high by international standards. FNC [Federación Nacional de Cafeteros de Colombia] has shown that it is far more expensive to take a container from coffee growing in Armenia to Cartagena (900 km) than from China to one of Colombia’s ports’ (p. 5). On the other hand, the coffee supply chain in the country also counts on a unique and active coffee institution—FNC—that supports the market domestically and internationally, providing logistic and institutional support for small producers. That said, some logistic constraints faced by Colombian small coffee producers—like the beans transport through the Andean region—could be handled by public goods through FNC support.

The coffee sector in Honduras presents another relevant institution to support its supply chain in terms of market access, technological assistance, training, etc., the Honduran Coffee Institute. However, the National Coffee Fund is the institution responsible for making supportive investments in building roads and bridges, creating infrastructure projects, and granting non-refundable resources to support farmers associations. On the other side, a step further to be developed in the country is the improvement of some policies regulating middleman activities. Improvement of market transparency is an important and needed step to be developed in order to foster growth in a sustainable way in the Honduran coffee chain [47].

The Peruvian coffee industry also faces issues on transportation. Sipa’s report [48] states that Peru can face problematic weather patterns, with heavy rains that stress pre-existing logistic issues within the supply chain, thus affecting its general performance. There is still a need to improve the quality of transportation activities in the Country, led by either cooperatives or intermediaries. The report also suggests that the Country has a fragmented coffee production, with a challenge to the orchestration of institutions. This report indicates the lack of a central agency that could represent “the public and private actors and that could coordinate the actions of all major national institutions, numerous regional/provincial organizations, and thousands of independent coffee producers” [48, p.31]. To these authors, despite the National Coffee Council (Consejo Nacional del Café, created in 2002), responsible for regulatory coordination and coffee industry development, the Country still needs a centralized entity that could provide a better leadership and a united vision of the industry. Lastly, the report Plan Nacional de Acción del Café Peruano [49] states that the Country has been going through an increase in violence and criminal rates in recent years, a situation that is even more intense in rural areas where the police presence is lessened, reflecting additional costs in cargo insurance to mitigate thefts during transportation.

The Ethiopian coffee chain presents an interesting scenario as well. The country counts on a relevant institution to coordinate prices in the market, the well-known Ethiopian Commodity Exchange (ECX) [33]. On the other hand, the supply chain is still inefficient in the relevant aspect of transportation. According to Hütz-Adams [35], ‘to improve the situation on the Ethiopian coffee market, the infrastructure must improve significantly, as this would automatically reduce costs and increase farm-gate price.’ (p. 3) The article “The Ethiopian commodity exchange and spatial price dispersion” points out that even though the ECX is associated with transparency in prices information, the lack of secure storage in the country limits the institution’s potential [50]. Additionally, transportation difficulty implies an increase in the number of required intermediaries to take the coffee to its final destination, increasing transaction costs.

According to Sachs et al. [1], the infrastructure indeed seems to be a global and recurrent grand challenge to coffee producing countries. Moreover, aspects regarding the coordination of the supply chain, such as institutions supporting the involved economic agents, also seems to be a key aspect. Based on institutionalist scholars (e.g., [29,51]), our empirical analyses suggest that better institutions can reduce transaction costs in the relationships along the supply chain, and then decrease the number of intermediaries, ultimately reducing the prices obtained by producers. In other words, it may affect unfair trading practices in agri-food chains.

6. Conclusions

This article focused on the underexplored drivers of the differences between farm-gate and FOB prices. Investigating the most important Arabica coffee producers worldwide—Brazil, Guatemala, Colombia, Honduras, Peru, and Ethiopia, we found that transaction costs play a key role in this matter. Our results show that institutional environment and infrastructure support affect the difference between the two prices. Specifically, our findings show that (i) the better protection of property rights, (ii) the better access to electricity, and (iii) the better the quality of roads, the lower the difference between farm-gate and FOB prices, i.e., the lower the inefficiencies, the fairer the prices paid to coffee farmers.

The restrictions related to transport and information infrastructure create opportunities for the intermediaries to retain part of the coffee farmers' income, diminishing their profits. Although intermediaries play an important role in the flow of production, they increase transaction costs, making supply chain governance more complex. Additionally, those intermediaries often use small producers' misinformation, and greater market power, to adopt unfair commercial practices.

Under these circumstances, confirming the expectations, UTPs are linked to transaction costs [20]. However, the UTP problem shall consider not only institutional failures, but also infrastructure gaps. The results show that the infrastructure raises a similar issue to the one raised by institutional gaps, by making the use of intermediaries mandatory to sell the product. Institutional settings and infrastructure seem to be key to the development of the governance of coffee supply chains in the near future. Pointing out potential sources of flaws can also help improving the business environment with more transparency and lower transaction costs, making it possible to contribute mainly to three SDGs (# 1, # 9 and # 16). In accordance with the conclusions of Sachs et al. [1], the coffee sector calls for multi-stakeholder solutions to keep the production sustainable, either economically and socially. Efforts to reduce producer poverty can also include strategies and public policy ensuring proper infrastructure and lowering the need for intermediation. The lack of proper transport infrastructure in rural coffee-producing regions has driven down the prices that smallholders can charge for their coffee at the farm-gate. Finally, strong institutions, which assure the rule of law and transparent information, are important to guarantee fairness in transactions and equal opportunities.

Our findings emphasize the importance of institutional theory to understand the differentiated income absorption capacity of an agricultural product across leading producing countries. The institutional theory admits a discussion regarding the imbalance of the income division within the value chain from a broader theoretical perspective, by pointing out how institutional environments may impact the competitiveness of economic agents. Institutions that minimize transaction costs indeed allow producers to retain greater value, enabling greater investments, generating a virtuous flow of productive gains throughout time.

Regarding policy implications, these findings show that institutional environments are crucial to increase the capacity of fair trading practices, by enabling a better value distribution along the agri-food chains and contributing to the SDGs. More specifically, they are relevant as they provide adequate public goods (infrastructure) and collectives (co-operatives and associations) to support economic exchanges. Such fairer trading practices are traced to the decrease in transaction costs (fewer intermediaries and greater bargaining power) and, therefore, larger investment capacity. In addition to investments in logistics and storage, the use of information technology is a public/private policy effect that reduces information asymmetries, leading to more efficient markets. Naturally, the process of moving towards the provision of public goods depends on particular historical conditions, and faces friction as it affects the interests of agents who obtain more profit from maintaining the status quo.

The present investigation also has some limitations that deserve attention in further studies. An analysis focused specifically on the number and concentration of intermediaries throughout the coffee supply chain may bring relevant insights related to unfair trading

practices and transaction costs. In addition, the problem of coffee beans theft has received little attention in the literature. This is a considerably recurrent obstacle in remote areas that affect small coffee farmers, and may influence other tiers of the coffee chain.

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